



# GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project  
 TYPE OF TRUST FUND: GEF Trust Fund

For more

information about GEF, visit [TheGEF.org](http://TheGEF.org)

## PART I: PROJECT INFORMATION

Project Title:	Green Energy SMEs Development Project		
Country(ies):	Tajikistan	GEF Project ID: <sup>1</sup>	9191
GEF Agency(ies):	UNDP	GEF Agency Project ID:	5476
Other Executing Partner(s):	Ministry of Energy and Water Resources	Submission Date:	10 July 2015
		Re-submission Date	31 July 2015
GEF Focal Area(s):	Climate Change	Project Duration (Months)	60
Integrated Approach Pilot	IAP-Cities <input type="checkbox"/> IAP-Commodities <input type="checkbox"/> IAP-Food Security <input type="checkbox"/> Corporate Program: SGP <input type="checkbox"/>		
Name of parent program:	N/a	Agency Fee (\$)	239,396

### A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES<sup>2</sup>

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
CCM-1 Program 2	GEFTF	2,519,963	21,900,000
Total Project Cost		2,519,963	21,900,000

### B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: Identify, support and promote scalable, private sector-led business models for provision of affordable and sustainable energy products and services for Tajikistan's rural population						
Project Component	Financing Type <sup>3</sup>	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
Component 1: Enabling policy framework and capacity development for green energy SMEs	TA	Conducive policy and regulatory framework for green energy SMEs  Technical capacities, know-how and entrepreneurship opportunities for green energy products and services	1. Enabling policies and regulations for green energy SMEs adopted 2. Business incubators for green energy SMEs are set-up 3. SMEs engaged in manufacturing of solar thermal kits and EE stoves established, including at least 5 women-led SMEs 4. At least 500 rural women trained and provided with skills	GEFTF	500,000	1,100,000

<sup>1</sup> Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

<sup>2</sup> When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#).

<sup>3</sup> Financing type can be either investment or technical assistance.

			in entrepreneurship, marketing, sales and servicing of green energy products.			
Component 2: Access to finance for green energy SMEs and/or energy service users	TA	Improved access to equity investment and affordable loans for green energy SMEs and/or energy service users	1. Affordable credit facilities for green energy SMEs designed in partnership with MFIs 2. Crowdfunding platform and/or other business models to capture remittances flows for energy access set-up	GEFTF	100,000	650,000
	Inv		3. Equity and loan resources leveraged for investment in green energy SMEs (additionally, on-top of co-financing committed at the beginning of the project): - at least \$15,000,000 in the form of loans; - at least \$5,000,000 in the form of equity	GEFTF	500,000	11,500,000
Component 3: RESCO business models for green energy SMEs	TA	Improved access to sustainable energy services in remote rural areas: at least 400 households/2,000 people	1. At least 4 scalable business models for RESCO identified and implemented	GEFTF	350,000	500,000
	Inv		2. Financial incentive scheme for up to 2,000 kW of new decentralized RES-based power capacity provided through RESCO model	GEFTF	950,000	7,250,000
Subtotal					2,400,000	21,000,000
Project Management Cost (PMC) <sup>4</sup>				GEFTF	119,963	900,000
<b>Total Project Cost</b>					2,519,963	21,900,000

<sup>4</sup> For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

**C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE**

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
Recipient Government	Ministry of Energy and Water Resources	In-kind	500,000
Recipient Government	Ministry of Industry	In-kind	250,000
Recipient Government	Committee for Investment and State Property	In-kind	100,000
Beneficiaries	Tajik Technical University	In-kind	100,000
GEF Agency	UNDP	Grants	300,000
GEF Agency	UNDP-managed LITACA project	Grants	4,000,000
Private Sector	PAMIR Energy	Equity	5,000,000
Private Sector	Sistemavtomatika	Equity	100,000
Private Sector	Micro-Finance Institutions "Sarvati Vakhsh", "Rushdi Vose" and "Imdodi Hotal"	Loans	1,500,000
Donor Agency	Asian Development Bank	Grants	10,000,000
CSO	Association of Energy Professionals	In-kind	50,000
<b>Total Co-financing</b>			<b>21,900,000</b>

**D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS <sup>a)</sup>**

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) <sup>b)</sup>	Total (c)=a+b
UNDP	GEFTF	Tajikistan	Climate Change (under FLEX mechanism)	(select as applicable)	2,519,963	239,396	2,759,359
<b>Total GEF Resources</b>					<b>2,519,963</b>	<b>239,396</b>	<b>2,759,359</b>

a) Refer to the [Fee Policy for GEF Partner Agencies](#).

**E. PROJECT PREPARATION GRANT (PPG)<sup>5</sup>**

Is Project Preparation Grant requested? Yes  No  If no, skip item E.

**PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS**

Project Preparation Grant amount requested: \$70,000					PPG Agency Fee: 6,650		
GEF Agency	Trust Fund	Country/ Regional/Global	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee <sup>6</sup> (b)	Total c = a + b
UNDP	GEF TF	Tajikistan	Climate Change	(select as applicable)	70,000	6,650	76,650
<b>Total PPG Amount</b>					<b>70,000</b>	<b>6,650</b>	<b>76,650</b>

<sup>5</sup> PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$100k for PF up to \$3 mil; \$150k for PF up to \$6 mil; \$200k for PF up to \$10 mil; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

<sup>6</sup> PPG fee percentage follows the percentage of the Agency fee over the GEF Project Financing amount requested.

## F. PROJECT’S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS<sup>7</sup>

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO <sub>2e</sub> mitigated (include both direct and indirect)	594,615 metric tons

## **PART II: PROJECT JUSTIFICATION**

### 1. *Project Description.*

#### 1.1 *Global environmental and local development problems*

- Approximately 70% of the Tajik people suffer from extensive shortages of electricity during the winter. These shortages, estimated at about 2,700-4,000 GWh/year or up to one third of winter electricity demand, impose economic losses at 3% of GDP. In addition to the financial costs, inadequate power supply leads to major development and environmental problems, such as health impacts from indoor air pollution and extreme winters, large-scale deforestation, and GHG emissions from coal, wood and diesel oil combustion by rural residents in winter. WHO lists Tajikistan among the 20 worst- affected countries for diseases resulting from indoor air pollution. Rural children are forced to study in poorly heated class rooms with indoor temperature below 10°C and spend the rest of their day collecting fuel wood to heat their homes (See Pictures 1 - 2)<sup>8</sup>. According to 3rd National Communication to UNFCCC, rural energy use is also the key source of CO<sub>2</sub> emissions in Tajikistan. Its relative share in total CO<sub>2</sub> emissions has increased from 40% in 1990 up to 70% in 2010 and is projected to grow further due to rising residential use of coal, which is currently the only locally available alternative to centralized energy supply (Figure 2).
- Unmet demand for electricity along with households’ current spending on alternative fuels in winter (Figure 2) represent both a potentially large market for decentralized renewable energy services in rural areas, estimated at over US\$300 million in annual revenues, and simultaneously an opportunity to reduce GHG emissions from rural energy use, alleviate poverty and boost local economic development. Despite abundant potential for renewable energy, in particular solar (Figure 1), this business niche is not yet being actively pursued by entrepreneurs due to the presence of many market barriers, detailed below, which the proposed project will seek to address.

*Figure 1: Installed Capacity and Potential for Renewable Energy in Tajikistan*

	 Biomass	 Solar PV	 Wind	 Small Hydro
Installed Renewable Electricity Capacity 2012 in MW	0	< 1	0	132
Technical Potential for Installed Renewable Electricity Capacity in MW	300	195,000	2,000	23,000

Source: UNDP Renewable Energy Snapshots for Europe and Central Asia, 2014

<sup>7</sup> Provide those indicator values in this table to the extent applicable to your proposed project. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the [GEF-6 Programming Directions](#), will be aggregated and reported during mid-term and at the conclusion of the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and/or SCCF.

<sup>8</sup> For detailed account and social dimension of energy shortages in Tajikistan see recent World Bank’s study “[Assessment of household energy deprivation in Tajikistan : policy options for socially responsible reform in the energy sector](#)”.

Picture 1: Heating system in rural class room

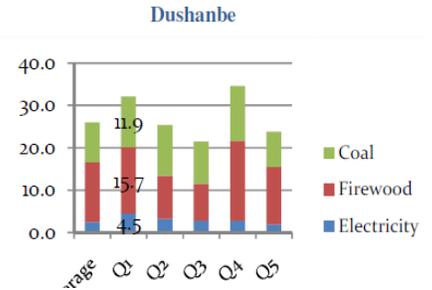


Picture 2: Fuel wood collection by rural kids in Tajikistan



Figure 2: Share of energy expenditures in rural household budget, %

Olds using simultaneously electricity, wood and co.



Source: UNDP calculations based on Living Standard Survey 2009

## 1.2 Baseline scenario

- Participation of private actors in energy service market in Tajikistan is currently minimal. Power sector is highly monopolized: 98% of existing generation capacity (5,148MW), transmission and distribution network are owned and operated by state-owned Barqi Tajik company. In order to cope with persistent energy shortages, the Government of Tajikistan, through Barqi Tajik, is prioritizing investment in large hydro and coal-based power generation: launch of new 150 MW coal-based thermal power plant near capital Dushanbe is envisaged in 2015, while the construction of 3,600 MW Rogun hydro power plant has been on-going for already over a decade without immediate prospects for its completion in the near future.
- Apart from Barqi Tajik, there is only one Independent Power Producer (IPP) operating in the country, Pamir Energy. Established in 2002 as a public-private partnership between the Government of Tajikistan, IFC and Aga Khan Fund for Economic Development (AKFED), Pamir Energy is responsible for operational management of all power generation, transmission and distribution facilities in Gorno-Badakhshan Autonomous Okrug (GBAO) of Tajikistan under 25-year concession agreement. Pamir Energy has invested US\$ 37 million in the electrical infrastructure of GBAO and increase of hydro-based generation capacity from 33 MW to 43.5 MW. As a result, over 86% of GBAO's inhabitants have access to electricity. Tariff subsidies, provided by the Swiss Agency for Development and Cooperation (SDC) and WB International Development Association (IDA), ensured that even the poorest households are able to access power while at the same time guaranteeing financial sustainability of the company. Since 2008 Pamir Energy is exporting electricity (surplus power in the summer months) to Afghanistan. The company is the only successful example of market-based business model for energy service provision in Tajikistan; however, its success wouldn't be possible without donor-funded support scheme which guaranteed minimum "lifeline" power supply to poorest consumers at subsidized rate of 0.02 \$/kWh (as opposed to 0.03 \$/kWh required for Pamir Energy to break even).
- In parallel, there is also a growing interest among rural residents and entrepreneurs in construction of micro and mini hydropower plants (below 1 MW) to overcome the deficiencies of centralized power supply. Based on government efforts to promote the sector over the last [20 years], there are now 230 private or semi-private small hydro power (SHP) operators throughout the country, operating off-grid to provide electricity to nearby communities and businesses. For example, SHP "Panchrud" (630kW) is one of the most recent additions: this 100% private SHP has ensured uninterrupted power supply to three nearby villages (over 5,000 people), two rural hospitals and two schools. However, such private initiatives are rare and limited in scale. The 230 private SHPs represent a total installed capacity of 55 MW, less than 1% of total power generation capacity in the country.

Private SHPs usually deploy inefficient “do-it-yourself” or second-hand technology and suffer from lack of professional operational and maintenance services. Their financial sustainability is undermined by the lack of guaranteed demand for electricity in summer time, when customers prefer the much cheaper electricity provided by Barqi Tajik through central grid<sup>9</sup>.

6. Private companies are also active in selling diesel oil, coal and wood, as well as electric heaters in rural areas. However, as far as green energy, such as solar PV or solar heating, is concerned, the market is at very nascent stage. Solar water heating, in particular, is a promising alternative for Tajikistan where it can cover up to 80% of households’ daily needs in hot water during 10 months a year and significantly reduce the use of fuel and electricity. The technology is mature and its costs are constantly decreasing. But there is only one company in the country, JSC Sistemavtomatika, with capacities for assembling and installing such solar solutions (PV and heaters).
7. All in all, in the baseline scenario provision of green energy services and products by the private sector will continue to be negligible due to the existence of several investment risks, described below. These investment risks result in high financing costs in Tajikistan - commercial lending rates for green private sector activities are in excess of 25%, along with loan short terms (tenors) and high collateral requirements. The current risk-return profile of green energy activities in Tajikistan is unattractive to existing or potential entrepreneurs and limited private capital is currently flowing to this sector.
8. Market Demand Risk: This risk arises from low awareness, willingness and ability to pay for green energy services by rural consumers, thus undermining prospects of sustainable and sufficient return on investment. Due to abundance of cheap electricity supply by Barqi Tajik in summer months, small, Independent Power Producers (IPPs) lack guaranteed market for their electricity for almost half of the year. Recent Law on Renewable Energy Sources (adopted in 2010, revised in 2014) mandates Barqi Tajik to off take surplus electricity from IPPs in summer, however tariffs are set at very low level and Barqi Tajik’s own poor financial standing does not make for a bankable Power Purchase Agreement (PPA). With regard to other green energy solutions, such as solar heating and PV, demand risk is predominantly due to nascent stage of this market segment. Low consumer awareness to date about the products and technologies, along with weak technological and marketing potential of suppliers to reach out and make a compelling offer to their potential client base, inhibit the demand.
9. Financial Sector Risk: This risk stems from a lack of access to finance for green energy SMEs. Although SMEs are considered an engine of Tajikistan’s economy and represent 60% of all employment, they struggle to gain access to banking services and affordable credit resources. In the latest “Enterprise Survey Of Tajikistan” businesses identify “access to finance” as the single greatest obstacle in the business environment. On the other hand, banking sector lacks information, experience and skills with financing green energy projects and, therefore, given overall capital scarcity in Tajikistan’s banking system, such projects are not being actively sought and/or prioritized by the banks. Access to equity is also restricted. Not surprisingly, most of the existing small hydro power plants in Tajikistan have been self-financed by their owners. On the other hand, there is a thriving micro-finance market in the country and substantial flow of remittances from Tajik residents living and working abroad (share of remittances in GDP is over 50%, one of the highest in the world). Both options can become a viable source of finance for green energy, especially at the household level.
10. Energy Market Risk: This risk arises from limitations and uncertainties in the energy market, and sub-optimal regulations to address these limitations and promote green energy markets. Despite a number of positive regulatory reforms to stimulate private investment, Tajikistan still ranks only 143<sup>rd</sup> of 189 economies in the World Bank’s 2014 Doing Business Report. Firms in Tajikistan cite poor implementation of legislation, weak protection for property rights, and the limited availability of key inputs, including electricity (!), among main obstacles. On top of this, there are additional barriers to green energy entrepreneurship. For

---

<sup>9</sup> Tajikistan’s power generation is predominantly (98%) based on hydro which has very strong seasonality: in winter when runoff is low power generation is also at its minimum level resulting in shortages, whereas in summer there is a huge surplus and therefore abundance of cheap electricity.

example, the Law on Renewable Energy Sources (RES Law) does call for the creation of conducive market environment for private investment in green energy; however, this intention remains declarative in nature. Implementation of mandatory off-take contracts between Barqi Tajik and IPPs is limited: there is only one signed PPA (albeit at very low tariff). Establishment of National RES-EE Fund, also envisaged by the RES Law, is on hold due to the lack of vision regarding specific modalities of its operation and the type of support and incentives the Fund should provide. There are also regulatory barriers related to extensive requirements for licencing, certification and permitting of green energy projects, products and services, which carry additional risks for private sector.

11. **Technology Risk:** This risk arises from the lack of experience with and know-how about green energy technologies in Tajikistan. Local entrepreneurs, while being highly enthusiastic about market opportunities for green energy, lack essential knowledge and skills to manufacture, install and operate these technologies. Most of the existing small hydro power plants are built on “do-it-yourself” basis, often using second hand equipment. Their operational performance is sub-optimal due to the absence of quality control and adequate O&M services. Solar technologies are even less advanced (hence even more riskier and costly): there is only one company with some minimal manufacturing capacities in this area and the absolute absence of qualified technicians and installers.

### ***1.3 Baseline initiatives***

12. Increasingly, there is a recognition among authorities, private sector and international institutions of the importance of green energy market development for Tajikistan. A number of initiatives are being implemented and planned. These initiatives, listed below, will constitute the baseline on which the proposed GEF-supported project will be built.
  - In the area of policy and regulatory support, EU/GIZ-funded Sustainable Energy Programme for Central Asia (CASEP)<sup>10</sup> is supporting the Government of Tajikistan in elaborating National Strategy for Renewable Energy and related policies and legislation. CASEP also supports capacity building and demonstration projects in the area of RES and energy efficiency.
  - ADB Access to Green Finance Project will leverage Tajikistan’s sound micro-finance system by providing affordable credit to help households and SMEs narrow the affordability gap for smart green energy solutions (SGES), such as solar heating and PV installations, biogas, energy efficient stoves and appliances. The Facility will provide grants to micro-finance institutions (MFIs) to help them capitalize revolving funding schemes and provide loans to households and microenterprises for the purchase of SGES. The support will also include capacity building and technical advice to MFIs on structuring SGES loans.
  - EBRD/Clean Investment Fund (CIF) “Tajikistan Small Business Climate Resilient Finance Facility” is currently being designed<sup>11</sup>. The Facility (capitalized with EBRD and CIF financing) will support the uptake of climate-resilient and clean energy technologies by small businesses, farmers and rural households, including, inter alia, small-scale renewable energy generation and energy efficiency. The Facility will provide targeted credit lines through local banks and will also offer specialized technical assistance services to participating banks.
  - UNDP through its Livelihood Improvement in Tajikistan-Afghanistan Cross-border Areas (LITACA) project (US\$ 10 mln) will provide capacity building and investment support for rehabilitating priority infrastructure and facilitate business development as a means of improving livelihoods of the population living along the Tajik-

---

<sup>10</sup> CASEP is in the final stage of implementation and won’t overlap in time with the GEF-funded project, nevertheless it is an important baseline initiative on which the new project will build upon. UNEP/GIZ team was consulted at the PIF design stage and provided useful feedback and recommendations regarding the GEF project design.

<sup>11</sup> EBRD/CIF project is not included in the list of co-financiers because the project has not yet received final approval from the funders. At PIF design stage consultations were held with EBRD and agreement in principle reached on collaboration subject to approval of both GEF PIF and EBRD/CIF project.

Afghan border. Improving sustainability of energy supply is one of the main focus areas of this project. Specifically, it envisages the construction of two small hydropower plants, as well as deployment of other types of small-scale green energy solutions in rural areas. Also, since early 2000s, UNDP under its Communities Program (CP) has been supporting development of MFIs in Tajikistan. At present, the total credit portfolio of seven microcredit funds (each covering several districts), supported by UNDP, is more than US\$7.5 million. Total number of active clients is above 18,000. Portfolio at risk (i.e. with up to 30 days delays in repayment) makes up only US\$93,000 (1.2%). While MFIs are not yet active in green energy financing, their strong position on the market, client base and credit history make for a sound baseline to incorporate green energy lending in their operations.

- Pamir Energy plans to expand its coverage and client base in GBAO by providing electricity to remaining off-grid communities (roughly 15% of GBAO's population) through community/household-level solar PV projects. The company has committed US\$5 mln from its own resource for this initiative and is looking for partners and technical assistance to help overcome complex financial, technology and market barriers associated with the project.
- Basel Agency for Sustainable Energy (BASE) has conducted market research<sup>12</sup> to explore potential of harnessing large flows of remittances from Tajik residents working abroad to finance sustainable energy solutions in rural areas (completed in 2015). Based on the findings, several commercially viable business models have been proposed, including selection of products, pricing and financing partners in Tajikistan and abroad, that can facilitate poor families' access to renewable energy and energy efficiency. BASE plans to continue implementation of this initiative with a pilot project based on the findings of market study and its experience with similar initiatives in the USA / Haiti remittance corridor.

#### **1.4 Proposed alternative scenario**

13. **Objective:** The objective of the proposed project is to identify, support and promote scalable, private sector-led business models for provision of affordable and sustainable energy products and services for Tajikistan's rural population, with a focus on solar-based applications (PV and solar water heating).
14. **Expected impact on market transformation:** The ultimate goal of the project is to ensure the transformation of Tajikistan's energy sector, which is highly monopolized and centralized, and facilitate the emergence of new class of independent energy companies, which can offer affordable and sustainable energy services to rural population. Estimated annual market potential for this new business niche is US\$300 million. The ambition and the expected scale of market transformation is to ensure that by the end of the project at least 10% of this market potential (representing US\$30 million in annual revenues) is realized and delivered by new and independent RES-based energy companies (as opposed to less than 1% in the BAU).
15. **Strategy:** The proposed alternative scenario offers a comprehensive strategy to scale-up private sector engagement in green energy market by **improving the risk-return profile of private investment in green energy products and service**. The theory of change underlying this approach is presented in UNDP's Derisking Renewable Energy Investment (DREI) methodology ([www.undp.org/drei](http://www.undp.org/drei)). DREI is based on the premise that one of the principal challenges for scaling-up investment in renewable energy is to lower high financing costs that negatively affect renewables' competitiveness against baseline technologies – i.e. primarily fossil fuels. As these higher financing costs reflect barriers and associated risks in the investment environment, a key entry point for policy-makers is to address these risks via a combination of three core types of measures: (i) policy de-risking instruments, (ii) financial de-risking instruments and, wherever needed, by increasing returns through (iii) targeted financial incentives:
  - **Policy de-risking instruments** address and attempt to remove the underlying barriers that are the root causes of risks. These instruments utilize policy and programmatic interventions to reduce risk;

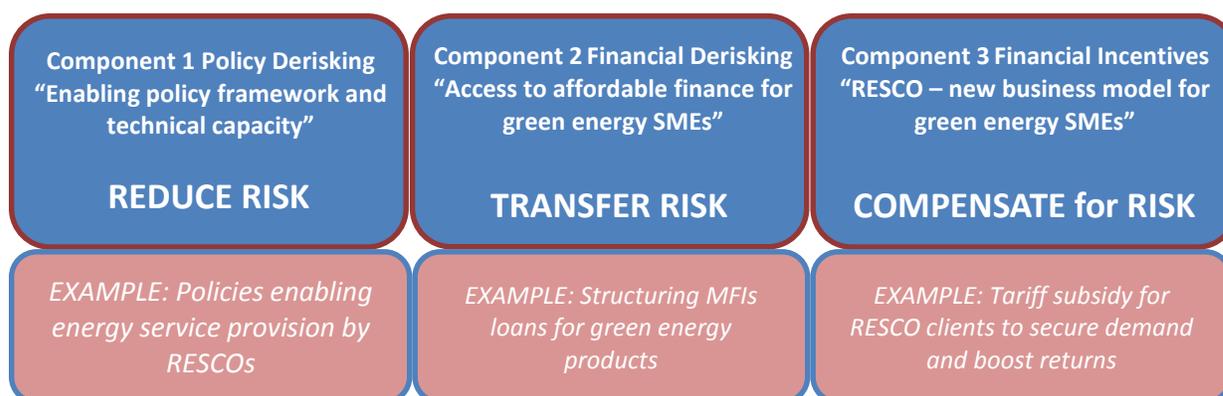
---

<sup>12</sup> Summary of the BASE market study is available at [http://energy-base.org/wp-content/uploads/2013/11/BASE\\_SECORemittancesPhaseII\\_Summary.pdf](http://energy-base.org/wp-content/uploads/2013/11/BASE_SECORemittancesPhaseII_Summary.pdf)

- **Financial de-risking instruments** do not seek to directly address the underlying barrier but, instead, function by transferring the risks that investors face to financial actors. These instruments can include concessional loans, guarantees, political risk insurance and public equity co-investments.
- Recognizing that not all risks can be eliminated through policy derisking or transferred through financial derisking, efforts to reduce risks can be supplemented by **direct financial incentives** (price premiums, tax breaks, etc.) to compensate for residual incremental costs and to thereby increase returns.

16. In line with DREI approach, the proposed project consists of three inter-linked components dealing with policy derisking, financial derisking and financial incentives schemes respectively (See Figure 3). First component will address policy and technology risks faced by green energy enterprises/SMEs by supporting the development and implementation of enabling policy framework, as well as the improvement of domestic technological base, skills and capacities for green energy products and services. Under the second component, in partnership with local and international partners, the project will facilitate access to affordable finance, loans and equity, for green energy SMEs. Finally, to address energy market risks the third component will establish innovative and scalable business models and then provide direct financial incentives for green energy products/service provision in rural areas.

Figure 3: Proposed project structure based on DREI framework



### 17. Component 1: Enabling policy framework and technical capacity development for green energy SMEs

18. This component will address policy and technology risks faced by green energy investors in Tajikistan and will build on on-going efforts of the EU/GIZ CASEP to set-up comprehensive policy framework and technological capacity for investment in green energy.
19. The work under this component will follow two streams. First, the project will work with the Ministry of Energy and Water Resources and other relevant governmental agencies (e.g. Ministry of Finance, Ministry of Industrial Development, etc) to put in place and implement enabling policies and regulations for green energy SMEs, such as a) revision and proposal of relevant by-laws based on Pamir Energy model to enable other companies/energy service providers (RESKO-type) to offer their services on the market basis in residential and public sector (hospitals, schools, etc); b) provision of fiscal and other incentives for green energy SMEs, with a particular focus on women-led companies; c) introducing streamlined procedures for green energy product certification and related quality and performance standards, etc.
20. Under the second stream, the project will support the establishment of Info-Educational Centers on Green Energy in two priority regions, the southern Khatlon region on the border with Afghanistan and GBAO. The Centers will operate on a public-private partnership basis (e.g. in GBAO in partnership with Pamir Energy) and will provide information and capacity building to local stakeholders about renewable energy and energy efficiency equipment,

products and services. Through the Centers, SMEs will be able to disseminate information about their products, and also learn about new market opportunities, receive information on financing schemes for green energy, as well as other type of business support, training and advice. Also, the Centers will implement a number of educational and market outreach activities targeting (i) general population, (ii) local governments and business sector about green technology possibilities that would enhance their business proposition or local development opportunities, (iii) women interested in establishing green energy SMEs/energy cooperatives and mobilizing communities in the use of clean energy (the topics may range from do-it-yourself solar thermal systems<sup>13</sup>, installation and maintenance of household PV systems or EE cook stoves, home insulation measures performed with locally available materials, biogas, drip-to-drip technology, etc), and (iv) MFIs - on green energy financing (in conjunction with activities under Component 2).

## 21. Component 2: Access to affordable finance for green energy SMEs

22. This component will facilitate access to finance, loan and equity, for green energy SMEs under terms and conditions, which match the risk/reward profile of their products and services. This component will also have two streams: under the first stream, the project will partner with national and international financial organizations, ADB, EBRD and local MFIs, to offer loans and microcredits to green energy SMEs and their customers. Under the second stream, it will explore new and innovative ways of leveraging green energy financing, such as through crowdfunding platforms.
23. First, in partnership with baseline ADB and EBRD-supported projects and building upon UNDP's network of MFIs, the project will introduce scalable consumer financing models for green energy products such as, household PV/solar water heating/heat pumps. Assistance will be provided to build MFIs' awareness and confidence in green energy micro-finance, support market research and link the design of financial products with qualified suppliers of green energy products and services, as well as other actors in the value chain. The project will also provide guarantee funds to partner MFIs to reduce interest rate for the pilot range of microcredits targeting solar water heating (SWH) systems. As the market matures and confidence of MFIs and end-users in the product improves, the need for this initial subsidy will phase out.
24. Second, development of a crowdfunding platform for green energy in Tajikistan will be supported, based on UNDP's prior experience with similar projects in Croatia ([Energy independent school](#)) and Lebanon ([Live Lebanon](#)) and in cooperation with existing crowdfunding platforms, where this possibility has already been checked and confirmed:
  - o [Indiegogo](#) – one of the best world crowdfunding platforms for investing outside USA for this type of projects (in terms of crowdfunding community, number of green energy project available, success rate, etc.), where a special subpage will be created for Tajik green energy projects;
  - o [Citizenergy](#) – EU based renewable energy crowdfunding platform in which UNDP Croatia is one of the developers and where Tajik green energy projects would have a special subpage for investments;
  - o [Solarschools](#) – UK based crowdfunding platform for solar energy in schools, for a focus on investing in PV systems on schools in pilot regions in Tajikistan. Platform can be translated to Tajik and managed for chosen schools to provide them with PV systems.
25. Several options will be explored, i.e. donations, equity and loan crowdfunding models. A mobile app version will be developed to enable user friendly investing in several languages, with a focus on large Tajik population working abroad, but also targeting international RES community and social impact investors worldwide. Also, partnership with BASE will be explored (at PPG stage) to collaborate on implementation of innovative model directing

---

<sup>13</sup> This activity is based on a recent UNDP pilot project in which 15 women were trained to produce their own solar thermal systems based on locally available, affordable and reliable materials. This experience revealed high demand and potential for such solutions among Tajik women. Here is the video about the project: <https://vimeo.com/121033654#at=34> , and detailed description: <http://www.rtc.org/2015/02/20/tajikistans-women-take-solar-power-into-their-own-hands/>

remittances of migrants working abroad towards sustainable energy products such as PV systems for their families living in rural areas in Tajikistan.

## 26. Component 3: RESCO - New business model for green energy SMEs

27. Third component will address market demand risk stemming from low affordability of green energy products/services for rural residents, in particular when it comes to high upfront cost of solar PV and other RES applications. This risk will be circumvented by designing and supporting Renewable Energy Service Company (RESCO) model for delivery of green energy services and products in rural areas. Business models may include several options, e.g. a *leasing model*, whereby the clients rent a RES system (PV) and operation/maintenance risks are borne by the RESCO; a *hire-purchase model* (whereby RESCO retains ownership of the RES system until user has completed payments over the lease period); or even a *concession model* (whereby one or more RESCOs are contracted on a fee-for-service basis by the Government to – for example – provide energy services to the public sector facilities, schools or hospitals). No single business model provides unambiguous benefits vis-à-vis the others, and further work will be undertaken during the PPG phase to elaborate the design options for RESCO support. The main advantage of the RESCO and its fee-based model is that it will remove the high upfront capital costs that users face, as well as will move the responsibility for maintenance of RES systems from residents, communities and public sector to the private sector, thus creating a scalable model for sustainable RES-based energy service provision in rural areas.

28. Pilot RESCOs will be selected via open process based on pre-agreed criteria from among existing

Figure 3: Financial model of Solar PV project

SOLAR PV LEASING MODEL	
<b>Investment under Scheme</b>	\$1,500,000
Total Installed Capacity (kW)	500
Investment Costs/kW (USD)	\$3,000
<b>LCOE &amp; RESCO Tariffs</b>	
Solar PV LCOE (USD/kWh)	\$0.280
Winter Season Retail Tariff for End Users	\$0.280
<b>Power Generation under Scheme</b>	
Full Load Hours (hrs/yr)	1,577
Total Annual Generation (kWh/yr)	788,400
<b>Financial Incentive</b>	
National Tariff Utility Pays (USD/kWh)	\$0.050
RESCO Cross Subsidy for Summer Month Premium Required (USD/kWh)	\$0.280
Months per Year Instrument is Required	6
Number of Years in PPA (years)	5
Monthly Cost of Instrument	\$5,111
Lifetime Cost of Instrument	\$53,330

Source: UNDP's own estimates

companies engaged in energy service provision, such as RES equipment manufacturers/installers, independent power producers, etc. Qualified RESCOs will receive advisory support for the development of their business plans, feasibility study and market assessment, the design of RESCO management system, structuring finance (in conjunction with work under Component 2), marketing and communication with customers, and other training and capacity building needs required to implement RESCO model in practice. Indicatively, the target for the project is to facilitate RESCO-based investment in new RES capacity of at least 2,000 kW (solar PV, wind, small hydro). Already at PIF design stage, expressions of interest were collected from several energy companies, interested in the RESCO model (e.g. Pamir Energy).

29. GEF funding will be reserved to offer direct financial incentives to RESCO clients, in the cases

where affordability of fee payments for RESCO services will be identified as a bottleneck. For example, preliminary analysis indicate that this would definitely be the case for RESCO projects with solar PV as main technology due to the very nascent stage of solar market development and particularities of Tajik power sector, where more expensive solar electricity will have to compete with abundant and cheaper hydro-based power in summer (see Figure 3).

## 1.5 Global environmental benefits

30. Global environmental benefits in the form of GHG emissions reductions have been tentatively and conservatively estimated at 69,125 tCO<sub>2</sub>e in direct GHG emissions reduction and in the range of 525,000 tCO<sub>2</sub>e (bottom-up) - 924,000 tCO<sub>2</sub> (top-down) indirectly (see Table 1 below), based on the following assumptions (to be refined at PPG stage):

31. Direct GHG emissions reduction:

- Emission factor of 0.3tCO<sub>2</sub>e/MWh for off-grid electricity generation is based on field survey of diesel consumption in rural communities conducted by UNDP at PIF preparation stage;
- Targeted installed capacity of decentralized RES-based solutions based on RESCO model under Component 3: 1500kW in small hydro and 500kW in solar PV
- Targeted number of solar water heating installations to be supported under Component 2: 500 units, average capacity – 18l, operating days: 10 months/300 days a year;
- Emission factor of 0.13 kgCO<sub>2</sub>e/l/day for solar water heating is based on field findings of UNDP-GEF project to promote solar water heating in Lebanon

32. Indirect GHG emissions reduction (bottom-up):

- Replication factor of 50 for solar PV RESCO is based on confirmed commitment from Pamir Energy to roll out the scheme to cover all remaining off-grid households in GBAO (cca 5,000 households up from initial 500 households in the GEF-supported pilot);
- Replication factor of 4 for small hydro RESCO is based on GEF Manual guidelines for similar projects involving demo, capacity building and financial mechanisms

33. Indirect GHG emissions reduction (top-down):

- Total market potential for small hydro, solar PV and solar water heating technologies is based on the findings presented in the World Bank study<sup>14</sup>;
- GEF causality factor of 0.5.

Table 1: Estimates of Direct and Indirect GHG Emissions Reduction

	Small hydro	Solar PV	Solar water heating	TOTAL
<b>Direct GHG emissions reductions</b>				
Installed capacity, kW	1,500	500	9,000	
Number of households	300	100	500	
Clean energy generation, kWh/year	7,884,000	788,400	300	
Emission factor, tCO <sub>2</sub> e/MWh	0.3	0.3	0.13	
Direct GHG emissions reductions, tCO <sub>2</sub> /year	2,365	237	351	
Investment lifecycle	25	20	15	
<b>Direct GHG emissions reductions, tCO<sub>2</sub>/lifecycle</b>	<b>59,130</b>	<b>4,730</b>	<b>5,265</b>	<b>69,125</b>
<b>Indirect bottom-up</b>				
Replication factor	4	50	10	
<b>Indirect GHG emissions (bottom-up), tCO<sub>2</sub></b>	<b>236,520</b>	<b>236,520</b>	<b>52,650</b>	<b>525,690</b>
<b>Indirect top-down</b>				
Full market potential, MWh/year	185,000	77,000	20,000	
Casualty factor	0.5	0.5	0.5	
<b>Indirect GHG emissions (top-down), tCO<sub>2</sub></b>	<b>693,750</b>	<b>231,000</b>	<b>19,500</b>	<b>944,250</b>

## 1.6 Innovation, sustainability and potential for scaling up

34. Innovation: project design involves several innovative elements, such as piloting RESCO business model for decentralized provision of green energy services for the first time in Tajikistan; use of crowdfunding platform to leverage external financing, in particular from large community of Tajik citizens living and working abroad; and engaging strong local MFI sector in green energy financing. Also, the focus on and engagement of women as target

<sup>14</sup> World Bank 2012 “[Tajikistan’s Winter Energy Crisis: Electricity Supply and Demand Alternatives](#)”

beneficiaries of green energy services and stakeholders in developing green energy market in Tajikistan is novel for Tajikistan. None of the above models alone can address all risks associated with green energy market, however, taken together and in combination with other more “traditional” policy derisking instruments under Component 1, they offer an integrated package of innovative and scalable solutions aimed at removing barriers and improving the risks/reward profile of green energy investment in Tajikistan.

35. **Sustainability:** by addressing key risks and the underlying barriers that impede the development of green energy market in Tajikistan, the creation of a sustainable business niche will be realized. The key element of project’s sustainability is its focus on private sector as a driving force and solution provider for green energy access in rural Tajikistan, as opposed to earlier public sector-led efforts.
36. **Potential for scaling-up:** there is a large potential for scaling-up market-based provision of green energy products and services in Tajikistan. With unmet annual demand in energy currently being in the range of 2,700 GW-4,000 GWh/year and its projected increase by 7,000 GWh/year by 2020, project-supported business models and solutions can grow and expand many-fold subject to effective removal of underlying barriers to private sector equity and debt investors in this sector. The project will do so by supporting identification and piloting of scalable private-sector business models. This is because efficient and effective deployment of proven energy access solutions is a key business capability. By leveraging this capability, the project will accelerate the rate at which access to energy is improved for thousands of un-served Tajik customers.

2. **Stakeholders.** Will project design include the participation of relevant stakeholders from [civil society](#) and [indigenous people](#)? (yes  /no  ) If yes, identify key stakeholders and briefly describe how they will be engaged in project design/preparation.

37. Following organizations will represent civil society and local communities and will be closely involved in project design:
- Local Micro-Finance Institutions “Sarvati Vakhsh”, “Rushdi Vose” and “Imdodi Hotal” will be involved in market assessment and design of green energy microcredit products (Component 2)
  - “Association of Energy Sector Professionals” - leading Tajik NGO dealing with energy issues will be consulted regarding the scope of enabling policies and regulations and technical capacity building of the domestic supply chain under Component 1
  - NGO “Youth Ecological Center” and NGO «Little Earth» are active in promoting the use of renewable energy and energy efficiency in the mountainous regions of Tajikistan, focusing on Pamir-Alay region, Khatlon and GBAO. They will provide inputs in the design of Component 1 related to the gaps and scope of project-supported technical capacity development for RES in the remote rural areas.
  - “Village Organizations”, set up by the Aga Khan Foundation in mountainous Badakhshan region, is a network of over 1,200 independent Village Organisations (VO) dealing with institutional development at the community level, such as local development planning, management capacity building and promotion of good governance. Village Organizations, active in the project target areas, will be involved in the design of Component 1 (technical capacity development ) and Component 3 (operationalization of RESCO model)
  - NGO “Women and Earth” (“Zan va Zamin”) works to improve access to natural resources and renewable energy, focusing in particular on the rights of women, in the southern-eastern part of Khatlon (Vose, Shurobod, Muminabad, Khovaling, Hamadoni, Farkhor districts). This NGO will also be consulted in the course of project design to help identify gender-specific capacity/knowledge needs for RES application.
38. The project will specifically target Pamiri Tajiks, a minority group living in the Gorno-Badakhshan Autonomous Province of Tajikistan (GBAO). It is envisaged that at least 50% of targeted beneficiaries would be Pamiri Tajiks, i.e. 200 households/1,000 people (or 0.05% of the entire Pamiri Tajik population) will directly benefit from the Project.

3. *Gender Considerations.* Are [gender considerations](#) taken into account? (yes  /no  ). If yes, briefly describe how gender considerations will be mainstreamed into project preparation, taken into account the differences, needs, roles and priorities of men and women.

39. Gender context in Tajikistan: the total population of Tajikistan is 8.16 million; more than 70% of the population live in rural areas and majority of them are women and children. Critical concerns related to gender equality in Tajikistan are that women experience unequal access and control over resources (e.g. property, land, water, credit, etc.). There is horizontal and vertical gender segregation in the labour market, as 85,5% of rural women are working in agriculture, public health and school education with low income, whereas only a mere 7-8% of women maintain management positions in these sectors. Poor quality of social infrastructure and basic services, patriarchal relations, lack of economic and leadership capacities make rural women very vulnerable to poverty, social deprivation and environmental issues. Male labour migration led to increase in the number of women-headed households by 1,5 times from 2008 to 2012, with exponential increase of rural women’s unpaid workload at the household and additional role of breadwinner.

40. Integration of gender perspectives in development of Tajikistan’s society is currently widely recognized at all level of country governance. However, despite many positive developments, women are still not represented well, do not have a fair share of the resources, and are not seen as the important contributors to improved wellbeing in society that they are. At the local community level, there is still widespread lack of recognition of women’s contribution, which is manifested in development policies, and household practices that perpetuate unequal access to financial services, property, rights, legal protection, education, information, health, and other economic and social services. It furthermore prevents women from participating effectively in making the decisions that shape economic, political, and social development. Women require access to services, resources and appropriate knowledge and skills to address their basic needs and adapt to a changing world.

41. Against this context, the proposed project has been designed with a very explicit focus and consideration of the role of women as potential beneficiaries of green energy services and stakeholders in developing green energy market. Project results framework includes a number of gender-related indicators; women were identified as one of the main target groups for provision of training and technical capacity building. Finally, the work with women will also build on the leading roles in the community to help mobilize interest and raise awareness about green energy solutions. Gender issues will be addressed directly in the M&E plans for the project, as follows: 1) Project preparation activities will include a baseline analysis of women’s participation in SMEs; 2) The project will apply a gender marker as per UNDP guidance; 3) The project will monitor the share of women and men as direct beneficiaries; and 4) An analysis of women’s inclusion in project activities will be included in both the mid-term evaluation and the terminal evaluation of the project and will be explicitly stated in the terms of reference for those evaluations.

4 *Risks.* Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable).

Risk Type	Risk Assessment	Risk Description	Risk Mitigation Strategy
Market	High	Widespread poverty and lack of sustainable source of income resulting in low ability to pay for energy supply services	Component 2 and Component 3 of the project are designed to address or at least partially mitigate this risk, via engagement with strong domestic micro-finance sector for provision of green energy loans, as well as by piloting RESCO model to avoid the need of high-upfront payment for RES solutions by the rural customers.
Technology	High	Insufficient quality of locally produced equipment leading to	Component 1 of the project will be addressing the technology/capacity risk, which is

		early break-down of SHP systems and dwindling consumer confidence in the technology	substantial in view of very nascent stage of green energy sector in Tajikistan
Political	Medium	Lack of political support may jeopardize the achievement of immediate results and over-all impact	Political will and commitment to improve investment climate and in particular investment framework for green energy is essential to removing market risks. Already at PPG stage, the project will work closely with key Governmental agencies dealing with investment promotion to design a comprehensive policy package, secure their buyin and support at highest political level.
Social	Medium	Lack of interest from communities to support the project, inadequate assessment that do not portray/represent communities necessities (misrepresentation), project actions/activities are not oriented towards different community cultural contexts.	The project will work closely with several grass root organizations and civil society partners, including women organizations, to address social/cultural risks and misperceptions about green energy technologies at the local level (see Section 2 for detailed list of local partners to be involved in awareness raising and advocacy)
Nature/climate-related	Low-medium	Climate change poses several risks to Tajik local communities, in particular related to increased occurrence of natural disasters (landslides, floods, etc) and availability of water resources.	Knowledge and expertise of UNDP's Disaster Risk Management Programme in Tajikistan will be sought to help assess nature/climate-related risks for GEF-supported investment (in particular small hydro) and develop risk mitigation measures, which would vary on a case by case basis.

5. *Coordination.* Outline the coordination with other relevant GEF-financed and other initiatives.

42. The project will build on and coordinate closely with the following GEF-financed initiatives:

- *UNDP-GEF “Technology Transfer and Market Development for Small Hydropower”* project (scheduled for completion in 2016) facilitates technology transfer and local capacity development for domestic manufacturing, construction and maintenance of small hydro power plants. As a result of the project two local manufacturers will be able to provide turn-key SHP solutions and ensure required operational and maintenance services. Both companies expressed interest to participate in piloting RESCO-based implementation of small-hydro power projects.
- The project will seek collaboration with *UNIDO-GEF Global CleanTech Innovation Programme for SMEs*, which supports green energy entrepreneurs around the world through training, mentoring, showcasing and access to capital.

6. *Consistency with National Priorities.* Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes  /no  ). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.

43. Tajikistan’s 3<sup>rd</sup> National Communication (3<sup>rd</sup> NC)<sup>15</sup> to UNFCCC emphasizes the importance of renewable energy (small hydro and solar) development, specifically in remote rural communities, as the priority mitigation, climate change adaptation and poverty alleviation measure for the country. In particular, 3<sup>rd</sup> NC clearly acknowledges the problem related to the energy deficit in rural areas and limitation electricity supply in rural areas for 2-8 hours per day among key development challenges faced by the country. It further states that since the majority of Tajikistan's population lives in rural areas, the key source of CO2 emissions are 'energy activities' in housing and communal areas. According to 3<sup>rd</sup> NC, “the contribution of these activities to CO2 emissions has increased from 40% in 1990 to 70% after 2000” and therefore should be the focus of the national mitigation and poverty reduction strategies. In this regard, 3<sup>rd</sup> NC identifies the development of community-level renewable energy systems (RES) among national mitigation and adaptation priorities and specifies that international support is needed in Tajikistan to assist with “dissemination of best practices at the local level to support and promote state measures on RES”.

7. *Knowledge Management.* Outline the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

- During project formulation stage (PPG), potential partnerships and networking opportunities with relevant projects and initiatives will be identified and modalities for collaboration and knowledge exchange worked out. The most prominent opportunities in this respect are related to:
  - UNDP-UNCDF CleanStart initiative, which supports MFIs in green energy financing in Asia and Africa;
  - UNIDO-GEF Global CleanTech Innovation Programme for SMEs and its on-line platform for knowledge sharing among green energy entrepreneurs
  - Partnership on Women’s Entrepreneurship in Clean Energy (wPOWER) programme, which works in Asia and Africa to popularize clean energy by empowering female entrepreneurs to educate their communities on the benefits of using clean energy products and make them customers.
  - BASE and its experience with harnessing remittances flow to finance sustainable energy solutions in Latin America

Detailed KM plan will be elaborated at PPG stage and will make an integral part of the project’s M&E plan.

**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**

**A. RECORD OF ENDORSEMENT<sup>16</sup> OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):**

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Khayrullo Ibodzoda	Chairman	COMMETTEE ON ENVIRONEMNTAL PROTECTION UNDER THE GOV. OF TAJIKISTAN	25/07/2014

<sup>15</sup> [http://unfccc.int/resource/docs/natc/tjknc3\\_eng.pdf](http://unfccc.int/resource/docs/natc/tjknc3_eng.pdf)

<sup>16</sup> For regional and/or global projects in which participating countries are identified, OFP endorsement letters from these countries are required even though there may not be a STAR allocation associated with the project.

**B. GEF AGENCY(IES) CERTIFICATION**

**This request has been prepared in accordance with GEF policies<sup>17</sup> and procedures and meets the GEF criteria for project identification and preparation under GEF-6.**

<b>Agency Coordinator, Agency name</b>	<b>Signature</b>	<b>Date (MM/dd/yyyy)</b>	<b>Project Contact Person</b>	<b>Telephone</b>	<b>Email</b>
Adriana Dinu UNDP – GEF Executive Coordinator		July 31, 2015	Marina Olshanskaya UNDP-GEF Regional Technical Adviser	+90-545- 908-66-04	marina.olshanskaya@undp.org

<sup>17</sup> GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, and SCCF