



## United Nations Development Programme

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<b>Project title:</b> Green Energy Small and Medium Enterprises (SMEs) Development Project		
<b>Country:</b> Tajikistan	<b>Implementing Partner:</b> UNDP	<b>Management Arrangements:</b> Direct Implementation (DIM)
<b>UNDAF/Country Programme (CP) Outcome:</b> <i>Resilience and Environmental Sustainability</i> <i>UNDAF/CP Outcome: People in Tajikistan are more resilient to natural and manmade disasters and benefit from improved policy and operational frameworks for environmental protection and sustainable management of natural resources.</i> <i>UNDAF/CP Outcome Indicator: Number of new green jobs created, environmentally sustainable livelihoods promoted through management of natural resources, ecosystems services, chemicals and waste, disaggregated by sex.</i>		
<b>UNDP Strategic Plan Output:</b> <i>Output 1.5: Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)</i>		
<b>UNDP Social and Environmental Screening Category:</b> <i>medium</i>		<b>UNDP Gender Marker:</b> 2
<b>Atlas Project ID/Award ID number:</b> 00097769		<b>Atlas Output ID/Project ID number:</b> 00101356
<b>UNDP-GEF PIMS ID number:</b> 5476		<b>GEF ID number:</b> 9191
<b>Planned start date:</b> January 2018		<b>Planned end date:</b> December 2022
<b>LPAC date:</b> TBD		
<b>Brief project description:</b> The project’s strategic objective is to facilitate the transformation of Tajikistan’s energy sector, in particular the emergence of independent energy entrepreneurs, which can offer affordable and sustainable energy products and services to the rural population. In line with UNDP’s Derisking Renewable Energy Investment approach, the project consists of three inter-linked components dealing with policy derisking, financial derisking and incentives, and a fourth cross-cutting component that addresses knowledge-related gaps. The first component addresses policy barriers faced by Green Energy (GE) enterprises/SMEs by supporting the development and implementation of the enabling policy framework. Under the second component, in partnership with local and international financial institutions, the project facilitates access to GE finance at affordable terms. The third component focuses on the supply chain to develop and improve GE products and services and bring them to the market, including through the provision of targeted investment support to innovative and scalable business models for GE products/service delivery in off-grid rural areas. Under the fourth component, knowledge gaps are addressed on both the supply and demand side of the market.		

FINANCING PLAN	
GEF Trust Fund	US\$ 2,519,963
UNDP TRAC resources	US\$ 300,000
<b>(1) Total Budget administered by UNDP</b>	<b>US\$ 2,819,963</b>
PARALLEL CO-FINANCING <i>(all other co-financing that is not cash co-financing administered by UNDP)</i>	
UNDP	US\$ 4,000,000
Ministry of Energy and Water Resources	US\$ 500,000
Ministry of Finance	US\$ 10,000,000
Pamir Energy Company	US\$ 5,000,000
Micro Finance Institution "Arvand"	US\$ 1,500,000
MFIs "Sarvati Vakhsh" and "Mehnatobod"	US\$ 350,000
55Group Company	US\$ 200,000
OJSC "Systemavtomatika"	US\$ 100,000
<b>(2) Total co-financing</b>	<b>US\$ 21,650,000</b>
<b>(3) Grand-Total Project Financing (1) + (2)</b>	<b>US\$ 24,469,963</b>
SIGNATURES	
<b>Signature:</b> print name below	<b>Agreed by Government</b>  
<b>Signature:</b> print name below	<b>Agreed by UNDP</b>  

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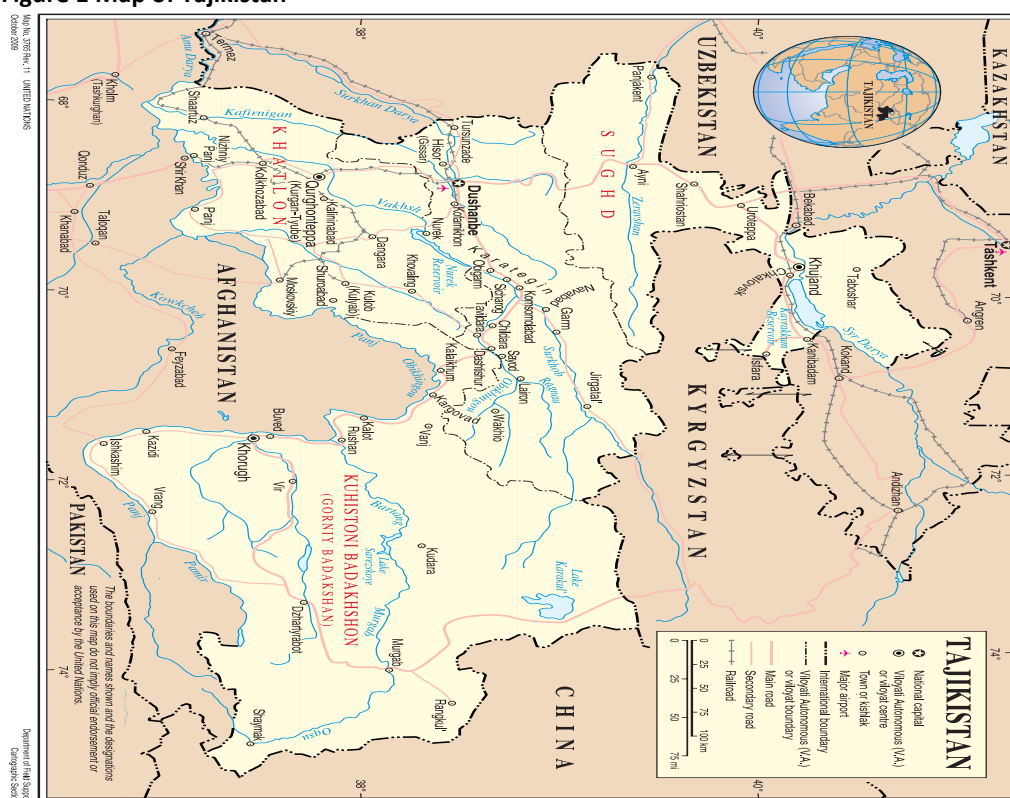
ADB	Asian Development Bank
AKFED	Aga Khan Fund for Economic Development
BfEE	Bundesstelle für Energieeffizienz
CCM	Climate Change Mitigation
CESVI	“Cooperazione e sviluppo” Italian Humanitarian Organization
CIF	Climate Investment Fund
CO	Country Office
CP	Communities Programme
CPAP	Country Programme Action Plan
DREI	Derisking Renewable Energy Investment
DRR	Deputy Resident Representative
EBRD	European Bank for Reconstruction and Development
EE	Energy Efficiency
ERC	UNDP Evaluation Resource Center
ESMP	Environmental and Social Management Plans
GBAO	Gorno-Badakhshan Autonomous Okrug
GDP	Gross Domestic Product
GE	Green Energy
GEF	Global Environment Facility
GEF Sec	Global Environment Facility Secretariat
GERES	Group for the Environment, Renewable Energy and Solidarity; French Humanitarian Organization
GHG	Greenhouse Gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IDA	International Development Association
IEO	Independent Evaluation Office
IFC	International Finance Corporation
IIWG	Inter-Institutional Working Group
INDC	Intended Nationally Determined Contributions
IPP	Independent Power Producer
KM	Knowledge Management
LPAC	Local Project Appraisal Committee
LITACA	Livelihood Improvement in Tajikistan-Afghanistan Cross-border Areas
M&E	Monitoring and Evaluation
MEWR	Ministry of Energy and Water Resources of Tajikistan
MFI	Micro-finance Institution
MRV	Measurement, Reporting and Verification
MTR	Mid-term Review
MVE	Monitoring, Verification and Enforcement
NC	National Communication

NDC	Nationally Determined Contribution
PIF	Project Identification Form
PIR	GEF Project Implementation Report
PMC	Project Management Cost
POPP	Programme and Operations Policies and Procedures
PPG	Project Preparation Grant
PV	Photovoltaic
RE	Renewable Energy
RESCO	Renewable Energy Service Company
RR	Resident Representative
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goal
SES	Social and Environmental Standards
SESP	UNDP Social and Environmental and Social Screening Template
SGP	Small Grants Programme
SHP	Small hydro power
SGES	Smart Green Energy solutions
SME	Small and medium enterprise
SSTrC	South-South and Triangular Cooperation
STAP	GEF Scientific and Technical Advisory Panel
SWH	Solar Water Heating
TE	Terminal Evaluation
TOR	Terms of Reference
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNDP-GEF	UNDP Global Environmental Finance
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

## II. DEVELOPMENT CHALLENGE

1. Tajikistan is Central Asia's smallest country (Figure 1); it is landlocked, with mountains covering 93% of its surface area. Tajikistan has a population of 8.4 million, the majority of which (74 percent) lives in rural areas, with a total population density of 48 persons per square km. More than 40 percent of the population lives below the national poverty line (US\$2 per person per day) and 21 percent are below the international poverty line (i.e. less than \$1.25 per person per day). Tajikistan's economy is based on cotton, aluminum and electricity, from which the country derives three quarters of its total export earnings. However, unemployment is high and a significant number of citizens (estimated at between 10 to 13 percent) seek work in other countries (over 90 percent in Russia) and send remittances to support families.





**Figure 1 Map of Tajikistan**



2. Tajikistan, in particular its rural areas, faces a number of closely interconnected *development and environmental challenges* related to the lack of security, access and low efficiency of energy use which has negative effects on poverty and the environment, including climate change, as summarized below (see also Technical Annex I for detailed discussion about security, access, affordability and environmental sustainability of rural energy use in Tajikistan, as well as the list of references and sources of information for this document).
3. **Energy security:** Tajikistan's power supply system is dominated by hydropower plants, most of which were built during the Soviet era. Hydropower plants account for 96 percent of the total installed capacity of 4,750 MW. However, hydropower generation capacity is highly seasonal and in winter time is insufficient to meet an estimated peak load of 3,500 MW because of low river flows during the period of peak demand. During winter, the system's firm capacity is reduced to 2,250 MW, which is 1,250 MW less than needed. Effective use of Tajikistan's large hydropower potential (cca 527 billion kWh per year, which is the eighth largest in the world

and 4 percent of worldwide hydro power potential) could create the prerequisites for increasing electricity exports and inflow of foreign currency. However, the use of hydropower resources depends on the natural climatic factors that cause changes in the water runoff in the seasonal and long-term perspective, and require significant upfront investments. Tajikistan's abundant potential for other types of renewable energy, in particular solar (Figure 2), offers a viable alternative to address the above challenge, but this potential remains largely unused.

**Figure 2 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

4. **Energy access:** Approximately 70 percent of the Tajik population suffers from extensive electricity shortages during the winter, estimated at about 2,700-4,000 GWh/year or up to one third of the total winter electricity demand. This power deficit imposes economic losses at 3 percent of GDP, but more importantly disrupts everyday life and Tajikistan's path to prosperity. An uninterrupted energy supply is needed in remote, isolated settlements, where the supply through the power grid is problematic or unavailable.
5. **Inefficient use of energy resources and energy poverty:** Approximately 20 percent of the average household budget (and up to 35 percent in rural areas) is allocated to covering families' energy needs. Despite these large expenditures on fuel, in winter, indoor temperatures dip below an adequate comfort level due to a lack of insulation and inefficient heating devices. In the past, heating demand in rural areas was met through centralized supply of highly subsidized fuel oil and coal and, in urban areas, through centralized district heating systems. After the end of the Soviet Union, fuel subsidies were terminated and most central heating systems collapsed thereby forcing households to switch to cheaper locally available alternatives such as coal, fuelwood and various agricultural residues. Efficiency of heating devices also remains extremely low and is a root cause of health problems: the World Health Organization (WHO) lists Tajikistan among the 20 worst-affected countries for diseases resulting from indoor air pollution.
6. **Environmental degradation and GHG emissions:** Rural energy use is the key source of CO<sub>2</sub> emissions in Tajikistan. Its relative share of 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 (3<sup>rd</sup> National Communication to UNFCCC). Inefficient use of resources (firewood) and lack of sustainable alternatives are also major drivers of environmental degradation, such as deforestation, soil erosion and loss of biodiversity.
7. **Market development for alternative Green Energy solutions** is urgently needed in Tajikistan to help improve security, access, affordability and environmental sustainability of rural energy use. The term "Green Energy (GE)", as used in this proposal, encompasses both the use of renewable energy (RE) sources for energy production (heat and electricity), as well as energy efficiency (EE) measures on the demand side, by households, businesses and other end-users (e.g. public sector). Potential Green Energy (GE) solutions for Tajik rural areas



include various RE technologies, such as solar PV, solar water heating, biogas, small and mini-hydropower, as well as EE measures (EE building materials, insulation, windows, as well as EE stoves and other appliances). Wider application of GE solutions would have multiple environmental and development impacts on Tajik rural residents and the whole economy, including contribution to several Sustainable Development Goals (SDGs), as illustrated in The strategic objective of the project is to facilitate transformation of Tajikistan's energy sector, in particular the emergence of independent energy entrepreneurs, which can offer affordable and sustainable energy products and services to the rural population. The estimated annual market potential for this new business are is \$300 million. The ambition and the expected scale of market transformation is to ensure that, by the end of the project, at least 10 percent of this market potential is realized and delivered by GE SMEs (as opposed to less than 1% in the business as usual scenario).

8. The theory of change underlying this project is based on 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 GE 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 those barriers via a combination of three core measures: (i) policy derisking instruments, (ii) financial derisking instruments and, where needed, by increasing returns through (iii) targeted financial incentives.
9. Similar to the DREI approach, the project consists of three inter-linked components dealing with policy derisking, financial derisking and incentives, and a fourth cross-cutting component that addresses knowledge-related gaps. Note that this project has not been designed using the full DREI methodology but rather borrows from DREI's conceptual approach to categorizing risks. The first component addresses policy barriers faced by GE enterprises/SMEs by supporting the development and implementation of enabling policy framework. Under the second component, in partnership with local and international financial institutions, the project will facilitate access to GE finance at affordable terms. The third component focuses on the supply chain to help develop/improve GE products and services and bring them to the market, including through the targeted investment support to innovative and scalable business models for GE products/service delivery in off-grid rural areas. The fourth component addresses knowledge and awareness gaps that are present on both the supply and demand sides of the market (see also **Error! Reference source not found.** for a graphical presentation of the Theory of Change).
10. Component 1 ***“Enabling policy and regulatory framework and capacity development for GE SMEs”*** will address policy and technology risks faced by GE SMEs in Tajikistan. The project will strengthen the policy and regulatory framework for the sustainable energy products and services market. Specifically, the project will provide technical assistance to the Ministry of Energy and Water Resources and the Inter-Institutional Working Group (IIWG) consisting of relevant governmental agencies (e.g. Ministry of Finance, State Committee on Architecture and Construction, Ministry of Economy) to support the operationalization of key provisions of the Law on Energy Saving and Energy Efficiency. The scope of work under this Component will include both legal and technical support with drafting relevant policy documents, as well as extensive capacity building, training and technical (material will include procurement of required equipment, e.g. laboratory equipment) support to relevant public agencies involved in policy implementation (e.g. State Committee on Architecture and Construction, Customs Service, Tax Authorities, Certification Laboratories, etc.).
11. Component 2 ***“Access to finance for GE SMEs and/or energy service users”*** aims at facilitating access to affordable finance for households, SMEs and other end-users wishing to invest in EE/RE products and/or services. The project will provide technical assistance to partner MFIs and other local finance organizations to develop and promote standard loan products targeting technologies, which have not yet been featuring prominently in the green loan portfolio with a particular focus on solar-based applications for households, farms

and SMEs. Assistance will cover product design and training to MFI staff on project appraisal, along with some limited financial resources (in the form of grants subject to the guidelines and limits established by UNDP Programme and Operations Policies and Procedures (POPP)) to complement MFIs' own financing. Product development will be undertaken in partnership with certified GE suppliers and technology information centers (Component 3). GEF investment support under this Component will be provided in the form of an interest rate subsidy (up to 10% on commercial loan interest rate – *maximum threshold for commercial interest rate should be determined at the inception stage based on analysis of prevailing market conditions*) for eligible GE technologies/projects, namely: solar (SWH, PV), other RE-based technologies and products – subject to the results of market assessment and availability of certified suppliers (See Technical Annex V – considerations of design options for financial de-risking instruments for further details).

12. Component 3 ***“Business models for GE SMEs”*** will address both market demand and supply risks by testing and demonstrating innovative business models and market facilitation approaches based on specific baseline energy demand and supply parameters, such as:
  - Geographic location: some areas are off-grid, some areas experience severe energy shortages during winter, whereas in other areas electricity supply is stable
  - Cost and type of baseline energy use: fuelwood, diesel, electricity
  - Category of energy end-user: electricity tariffs for end-users range from about \$0.02/kWh for residential consumers up to \$0.1 /kWh for electricity used for hot water and heat supply by private companies (e.g. tourist facilities)
  - GE technologies: equipment costs for small-scale RE and EE solutions vary considerably with EE building components, such as EE windows being the cheapest and therefore more affordable, while RE options, SWH or solar PV are significantly more expensive.
13. In addition, this Component will address knowledge and awareness barriers on both the supply and demand sides of the GE market targeting (i) general population, (ii) local governments and business sector about green technology possibilities that would enhance their business or local development opportunities, (iii) women interested in establishing GE SMEs/energy cooperatives and mobilizing communities in the use of clean energy (the topics may range from do-it-yourself solar thermal systems, installation and maintenance of household PV systems, home insulation measures performed with locally available materials, biogas, drip-to-drip technology, etc.), and (iv) MFIs - on GE financing (in conjunction with activities under Component 2). Information and capacity building will be provided to local stakeholders concerning RE and EE equipment, products and services in partnership with existing Info-educational Centers, NGOs and the private sector, such as those supported by GERES and Systemavtomatika. Through the Centers, SMEs will be able to disseminate information about their products, learn about new market opportunities, and receive information on financing schemes for GE, as well as other types of business support, training and advice. It will also support the establishment of technology showrooms, where applicants may receive technical advice on the selection of appropriate products, assistance with completing relevant technical details for loan applications (in conjunction with loan product development under Component 2), as well as information on post-service technology maintenance and contacts of relevant specialists and companies.
14. ***Sub-Component 3A: RESCO: solar energy for off-grid communities*** – Given that in the remote mountainous areas of Tajikistan the cost of grid expansion is prohibitively expensive, the project will support the Renewable Energy Service Company (RESCO) business model for delivery of GE services in off-grid rural areas. (Technical Annex II details international experience with RESCO.) RESCO will operate based on a concessional agreement with the Government of Tajikistan to provide energy services to a defined geographic area at agreed tariffs. However, due to widespread poverty and high costs of RE plant construction and operation in remote

mountainous regions of Tajikistan, public subsidy is required to make such a project viable and sustainable for the private company.

15. In consultation with the Government, the first RESCO model will be implemented in the Gorno-Badakhshan area of Tajikistan, the most remote regions with highest share of off-grid population in partnership with Pamir Energy Ltd. The pilot RESCO project will involve a solar PV-based mini-grid and will enable provision of basic energy services for Pamir's 250 residents (cca 3 kW per household). Technical Annex IV provides background information about the proposed pilot. The project will finance the costs of pilot project design, as well as partially subsidize capital costs, with the level of required subsidy estimated at 50 percent for solar PV and 20 percent for small hydro power (see cost-benefit analysis in Section X below); however, the exact estimate will only be made after the exact location is identified and full feasibility analysis of the investment is conducted.
16. The project will provide the first example of RESCO-based power supply provision for off-grid rural communities in Tajikistan and will establish an important blueprint for the Government and other interested private investors to follow. 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 RE systems from residents, communities and public sector to the private sector, thus creating a scalable model for sustainable RE-based energy service provision in rural areas.
17. After completion and evaluation of the Pamir pilot, technical assistance will be provided to replicate the RESCO model in other identified off-grid locations in partnership with other development partners and the Government, as per confirmed co-financing (see Section ii Partnerships for further details).
18. **Sub-Component 3B: Facilitating investment in SWH by tourism facilities and other SMEs** – Investment in solar water heating (SWH) systems represents the most cost-effective RE supply options for SMEs in Tajikistan. Despite their cost-effectiveness, however, uptake of SWH by SMEs is low due to many barriers described earlier, which this sub-component will address through a facilitation approach. The choice of "SWH for tourism" as a potential market segment to promote has been made based on the following considerations:
  - SWH is the most mature and the least costly GE technology available on the Tajik market;
  - Tariff for electricity supply for water heating is the highest in Tajikistan, i.e. about \$0.1 /kWh (as opposed to \$0.02/kWh for residential consumers) which makes investment in SWH very cost-effective (simple pay-back of 1 to 2 years);
  - The Government of Tajikistan prioritized the development of the tourism industry in rural areas. It has created favorable tax and policy regimes for tourism facilities and specifically requested GEF support to facilitate wider uptake of RE in the sector.
19. The facilitation approach adopted in this sub-component involves provision of pro-bono consultancy services and other facilitation services to tourism facilities to help them identify, secure financing, procure and implement SWH systems. It is based on successful international experience in Europe and developing countries, such as Korea for SME, the German "Bundesstelle für Energieeffizienz" (BfEE) or the GIZ programme to incentivize ESCO market in Thailand. The expected outcome is creation of new business-to-business relationships, which will lead to market demand growth for SWH products and related after-market services.
20. Component 4 "**Knowledge Management and M&E**" will include collection, analysis and sharing information about GE costs and benefits, as well as by monitoring and evaluating project results (including GHG emission reductions), documenting and disseminating best practices and lessons learnt.
21. The project will achieve the following impacts and directly contribute to a number of SDGs, as detailed below and illustrated in **Error! Reference source not found.**:

- a. **Improve the security of energy supply in the country, in particular to its most vulnerable rural residents** by reducing dependency on the over-dominant hydro power, which is further at risk of seasonal variations as well as climate change. Small sources, distributed over the country, along with reductions of demand achieved by implementing energy efficiency programs, diversify energy supply as well as lead to overall sustainability of the energy sector of Tajikistan.
- b. **Reduce GHG emissions in Tajikistan.** Renewable energy sources reduce carbon emissions of the power sector as they do not require fossil fuels. At the same time, energy efficiency measures create savings – avoiding excessive use of energy and contributing to the carbon emission reduction.
- c. **Serve as a leading example of energy sustainability using GE in the region.** Central Asia is still mostly reliant on fossil fuels. Energy generation using fossil fuels is perceived as being cheapest, as external costs and risks are rarely internalized in the overall cost of energy. Initiating a project in GE development provides an example for the region on best practices and puts Tajikistan, traditionally viewed as a poor neighbor, at the forefront of sustainable energy development.
- d. **Support development of new skills related to GE.** Provision of new products and services in Tajikistan will require capacity building activities to ensure a viable level of local support to EE and RE projects as well as to ensure the sustainability of the market after project end.
- e. **Create new jobs.** Implementation of the project requires development of the whole value chain, from supply through to planning and implementation to demand. People with specific competences, either already existing or acquired through training and education, are critical to success of the project. As the market starts growing, new human resources will be needed by market players.
- f. **Create a positive socio-economic momentum.** All of the above will transform the energy industry of Tajikistan from a centralized, historically unattractive utility market to a dynamic, multi-stakeholder environment specifically designed to attract SMEs, and create an environment for development and implementation of new GE goods and services.

22. .

23. The Government of Tajikistan recognizes both the importance and the numerous challenges related to energy insecurity, limited access and inefficiency of energy use, as well as the resulting environmental and social problems. The Government has introduced various measures to help address these challenges and promote the market for RE and EE, namely:

- On 1 December 2016, the lower chamber of the Tajik parliament adopted the **National Development Strategy until 2030**, which includes energy security among its main strategic objectives. Specifically, it establishes the following strategic goal for energy sector development: to achieve 10 percent share of alternative energy sources in the national power supply until 2030.
- The Strategy also emphasizes the need to promote the creation of sustainable jobs for Tajikistan's growing population and to address winter energy deficits, as well as the impacts of climate change.
- **The Law on the " Use of Renewable Energy Sources"** (adopted in 2010) and the **"Law on Energy Efficiency and Energy Saving"** (adopted in 2014), as well as a number of corresponding by-laws, provide an overarching legal framework for the development of GE sector in Tajikistan.

24. Tajikistan's 3<sup>rd</sup> National Communication (3<sup>rd</sup> NC)<sup>1</sup> to UNFCCC emphasizes the importance of renewable energy (small hydro and solar) development, specifically in remote rural communities, as the priority climate change

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<sup>1</sup> [http://unfccc.int/resource/docs/natc/tjknc3\\_eng.pdf](http://unfccc.int/resource/docs/natc/tjknc3_eng.pdf)

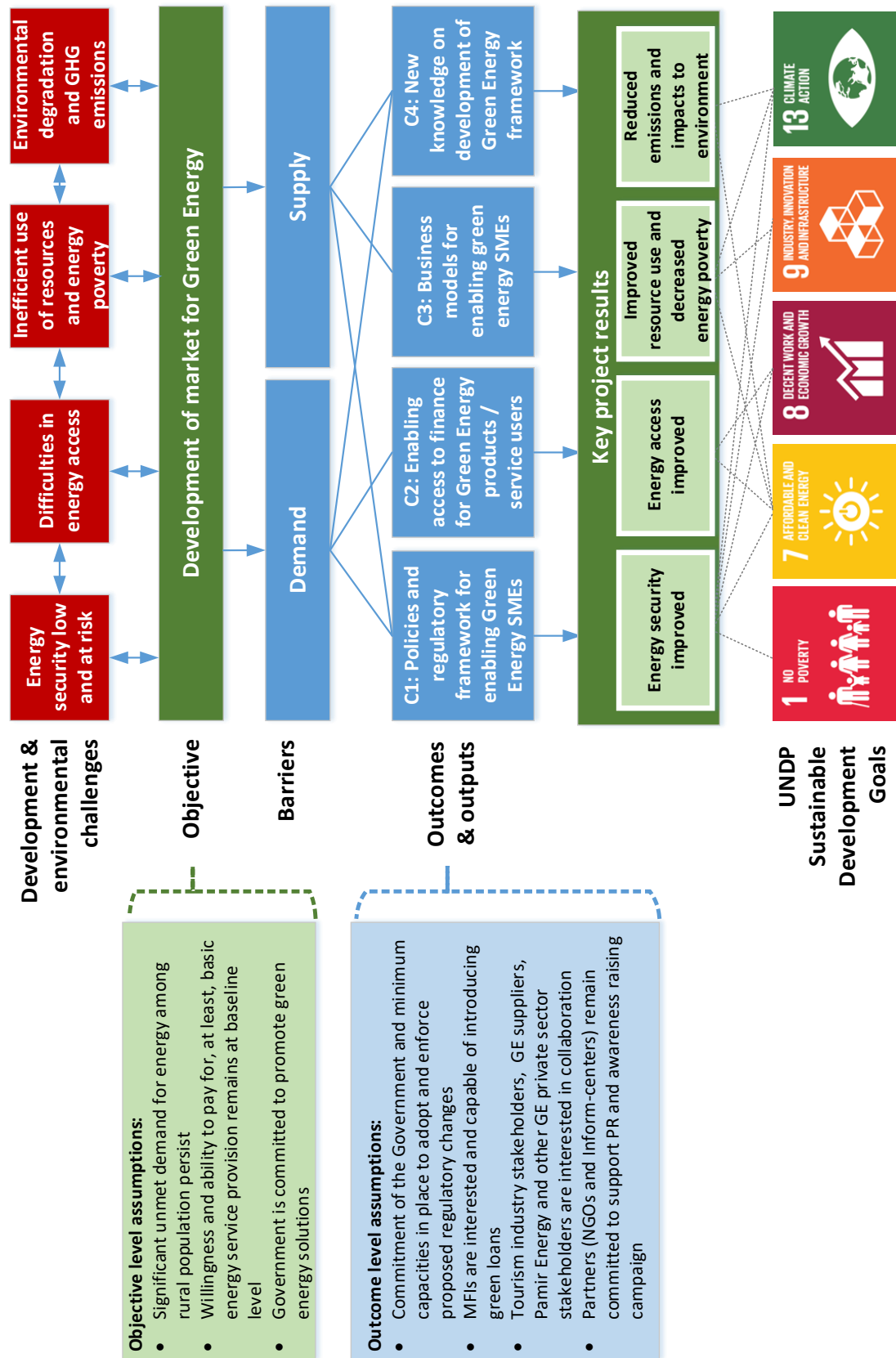
mitigation, adaptation and poverty alleviation measure for the country. It clearly acknowledges the problem related to winter energy deficit in rural areas and limitation of electricity supply for 2 to 8 hours per day as among the key development challenges faced by the country. The 3rd NC further states that, since the majority of Tajikistan's population lives in rural areas, the key source of CO<sub>2</sub> emissions is 'energy activities' in housing and communal areas. In this regard, 3rd NC identifies the development of decentralized RE systems as 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 RE”.

25. According to the Intended Nationally Determined Contribution (INDC)<sup>2</sup>, Tajikistan declared a flexible target for GHG emissions to not exceed 80 to 90 percent of the 1990 level by 2030. The INDC also notes the potential to achieve further reduction in GHG emissions and remain at 65 to 75 percent of the 1990 level by 2030, provided additional external resources are mobilized and scientific and technical assistance are provided to aid the Government in the implementation of its strategic priorities for energy sector development.

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<sup>2</sup> As of January 2017, Tajikistan has not submitted its NDC (New Climate Action Plan), only the INDC (Intended Nationally Determined Contribution). <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>

Figure 3 Theory of Change



## Baseline scenario

26. Despite high-level political support and international commitments, in the baseline scenario the market for GE in Tajikistan, in particular in remote rural areas, will most likely remain at a very nascent stage. Participation of private actors in the Tajikistan energy service market is and will remain minimal. The power sector is highly monopolized: 98 percent of the existing generation capacity (5,148 MW), transmission and distribution network are owned and operated by state-owned Barqi Tajik company. To cope with persistent energy shortages, the Government of Tajikistan, through Barqi Tajik, is prioritizing investment in large hydro and coal-based power generation: new 150 MW coal-based thermal power plant has been launched near capital Dushanbe in 2016, 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.
27. 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 a 25-year concession agreement. Pamir Energy has invested \$37 million in the electrical infrastructure of GBAO and increased hydro-based generation capacity from 33 MW to 43.5 MW. As a result, over 86 percent of GBAO's inhabitants have access to electricity. Tariff subsidies, provided by the Swiss Agency for Development and Cooperation (SDC) and World Bank 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 has exported electricity (surplus power in the summer months) to Afghanistan. The company is the only successful example of a market-based business model for energy service provision in Tajikistan; however, its success would not be possible without the donor-funded support scheme that guaranteed a minimum "lifeline" power supply to the poorest consumers at a subsidized rate of 0.02 \$/kWh (as opposed to 0.03 \$/kWh required for Pamir Energy to break even). Despite these successes, 16 percent of Pamir residents remain off-grid
28. There is also a growing interest among rural residents and entrepreneurs in the construction of micro- and mini-hydropower plants (below 1 MW) to overcome the deficiencies of the centralized power supply. Based on government efforts to promote the sector during 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. However, such private initiatives operate on a very small scale. The 230 private SHPs represent a total installed capacity of 55 MW, which is less than 1 percent of the 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 the summer months, when customers prefer the much cheaper electricity provided by Barqi Tajik through the central grid<sup>3</sup>.
29. Private companies are also active in selling diesel oil, coal and wood, as well as electric heaters in rural areas. However, as far as GE, renewable energy and energy efficiency are concerned, the market is at a nascent stage. Solar, in particular, is a promising alternative for Tajikistan where it can cover up to 80 percent of households' daily needs for hot water throughout 10 months a year and significantly reduce the use of fuel and electricity. Yet there are only a few companies in the country with sufficient capacities for assembling and installing such solar solutions (PV and heaters). Official statistics about the size of GE market (e.g. installed PV or sales) in

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<sup>3</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.

Tajikistan are not available. Such databases do not exist and most operations are conducted on the “grey market”, which bypasses authorized networks and channels.

30. Overall, as summarized in Table 1, the baseline of GE services and products remains negligible due to numerous barriers that prevent market growth on both the supply and demand side.

**Table 1 Barriers to GE market growth in Tajikistan**

Demand side	Supply side
<b>Barrier 1: Policy and regulatory framework</b> Framework laws on EE and RE exist and provide a good basis for EE and RE market development. However, their systematic implementation is lacking, in particular the development of a number of important by-laws and regulations. Component 1 will address this barrier.	
<b>Barrier 1.1:</b> Lack of specific policies and regulations mandating or promoting wider adoption of EE/RE technologies by end-users (e.g. building energy codes, green public procurement rules, etc.). Activity 1.1 will address this barrier.	<b>Barrier 1.3:</b> Absence of favorable tax and import regime for GE suppliers: although reduced import duties exist <i>de jure</i> , their application in practice is inadequate resulting in high transaction costs (up to 50 percent of the product) and consequently much higher end-user prices. Activity 1.2 will address this barrier.
<b>Barrier 1.2:</b> Lack of public financial incentives and mechanisms (grants, concessional loans, leasing), which are essential, given the nascent stage of the market, to boost the initial demand for GE among consumers: National EE/RE Fund, set up based on RE and EE Laws is being operationalized, but yet lacks operational capacities and credible financing plan and sources of revenues. Activity 1.2 will address this barrier.	<b>Barrier 1.4:</b> Absence of quality and performance standards for GE products leads to the dominance on the market of the products with sub-optimal and inferior qualities, which undermine consumers’ confidence in the technologies and discourage further demand. Activity 1.3 will address this barrier.
<b>Barrier 1.5:</b> Insufficient capacities among public agencies, the Ministry of Energy and Water Resources, State Committee on Architecture and Construction, Tax and Custom Office, etc. to design and implement the required policies and regulations. Capacity gaps will be addressed under Activities 1.1-1.3.	
<b>Barrier 2: Low ability to pay and unattractive financing terms for GE</b> Component 2 will address this barrier in partnership with IFIs, MFIs and local banks.	<b>Barrier 3: Under-developed supply chain for EE/RE products and services</b> Component 3 will address this barrier in partnership with Pamir Energy and other GE SMEs.
<b>Barrier 2.1:</b> High up-front costs of most EE/RE technologies, which are prohibitively expensive for consumers due to widespread poverty. Full costs of a 2 kW solar PV system are in the range of \$ 5,000 to 6000, while average household income is around \$120/month. Activities 2.1 and 3.1 will address this barrier.	<b>Barrier 3.1:</b> Dominance of low-quality products, mainly imported from neighboring China, being sold on grey market without reliable warranties and quality certificates. Activity 1.3 will address this barrier.
<b>Barrier 2.2:</b> High interest rates (28 to 30 percent) are a major financial hurdle for consumers willing to borrow funds for EE-RE. Activity 2.1 will address this barrier.	<b>Barrier 3.2:</b> Companies engaged in GE products supply are mainly SMEs with limited own capital and capacities. Activity 3.1 will address this barrier.
<b>Barrier 4: Limited knowledge and awareness</b>	
<b>Barrier 4.1</b> Lack of systematic monitoring (including country-specific methodology and tools) and reporting about environmental and social-economic benefits of GE. Activity 4.1 will address this barrier.	
<b>Barrier 4.2.</b> Potential GE end-users have very limited access to knowledge and information about existing solutions and their benefits for their business and/or households. Activity 4.2 will address this barrier.	<b>Barrier 4.3</b> There is no official, publicly available information about the rural energy supply situation, such as communities/areas with limited energy supply and off-grid communities (i.e. potential market for EE/RE). Activity 4.3 will address this barrier.



### Baseline initiatives

31. In the area of policy and regulatory support, the new GIZ project “*Value Chain Development in the Energy Efficiency Housing and Construction Sector, Tajikistan*” will provide technical assistance for the development and capacity building of the Government and relevant market actors to apply new building energy codes, which would incorporate stricter EE requirements.
32. ADB’s “*Access to Green Finance Project*” (\$10 million), in its final stage of implementation, works with Tajikistan’s micro-finance institutions (MFIs) to develop and provide new credit products for households and SMEs for smart GE solutions (SGES), such as solar heating and PV installations, biogas, energy efficient stoves and appliances. ADB also provided capacity building and technical advice to MFIs on structuring SGES loans. The Ministry of Finance will continue managing accumulated reflows and support MFIs through the established Project Implementation Unit (PIU).
33. The EBRD/Clean Investment Fund (CIF) “*Tajikistan Small Business Climate Resilient Finance Facility*”, launched in 2016 and capitalized with EBRD and CIF financing, supports the uptake of climate-resilient and clean energy technologies by small businesses, farmers and rural households, including, inter alia, small-scale RE and EE projects. The Facility provides targeted credit lines through local banks and MFIs, and also offers specialized technical assistance services to participating banks.
34. Credit terms under both the ADB and EBRD programmes (at 23 to 25 percent), however, are similar or only marginally better than standard commercial rates reflecting overall very low level of liquidity in Tajikistan’s financial system and high cost of capital. Under such conditions only a small number of EE/RE products can be financed. As a result, according to interviews with ADB and EBRD project teams, EE windows are the largest share of their portfolio (99%). For other GE solutions, in particular RE, the ADB Programme financed only about 10 biomass and solar projects out of 2,000 in total, and the numbers for EBRD are much smaller. Interviews with MFIs and technology suppliers also confirmed that the high credit cost coupled with high up-front costs of such technologies are a major deterrent for potential investors.
35. UNDP is supporting implementation of several baseline initiatives:
  - a. *Livelihood Improvement in Tajikistan-Afghanistan Cross-border Areas (LITACA)* project (funded by the Japan Government) provides capacity building and investment support for rehabilitating priority infrastructure and facilitating business development as a means of improving livelihoods of the population living along the Tajik-Afghan border. Improving sustainability of energy supply is one of this project’s main focus areas.
  - b. Since the early 2000s, UNDP under multiple-donor funded *Communities Program (CP)* and since 2015 under the regional *Aide for Trade* project (funded by the Finnish Government) has been supporting development of MFIs in Tajikistan and facilitated financing for green SMEs. Under the *Aide for Trade* project, UNDP through local MFIs established dedicated credit lines for innovative green business ideas (including EE and RE): the size of average credit ranges between \$1,000 and \$8,500 (provided in Tajik currency, Somoni) at 8 to 12 percent for up to 24 months. At present, the total credit portfolio of seven microcredit funds (each covering several districts), supported by UNDP, is more than \$7.5 million with a total number of active clients of more than 18,000. Portfolio at risk (i.e. with up to 30 days delays in repayment) makes up only \$93,000 or 1.2 percent.
36. *Pamir Energy LLC* plans to expand its coverage and client base in GBAO by providing electricity to remaining off-grid communities (roughly 15 percent of GBAO’s population) through off-grid mini-grid projects based on solar energy or other RE sources. The company has committed \$5 million of its own resources for this programme, but additional technical assistance and investment support are required to make the company’s investment viable.

37. Several *international and national NGOs*, as well as private companies, are supporting awareness and advocacy activities related to EE and technologies and products. The NGO *Geres*, in partnership with the State Committee on Architecture and Construction, established an educational center on EE while *JSC Systemavtomatika* with UNDP support set-up a RE information center. Both organizations provide advisory services and information to the general public regarding RE and EE technologies and products available on the Tajik market and other practical information, such as case studies and educational materials.

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### III. STRATEGY

38. The strategic objective of the project is to facilitate transformation of Tajikistan's energy sector, in particular the emergence of independent energy entrepreneurs, which can offer affordable and sustainable energy products and services to the rural population. The estimated annual market potential for this new business is \$300 million. The ambition and the expected scale of market transformation is to ensure that, by the end of the project, at least 10 percent of this market potential is realized and delivered by GE SMEs (as opposed to less than 1% in the business as usual scenario).
39. The theory of change underlying this project is based on 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 GE 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 those barriers via a combination of three core measures: (i) policy derisking instruments, (ii) financial derisking instruments and, where needed, by increasing returns through (iii) targeted financial incentives.
40. Similar to the DREI approach, the project consists of three inter-linked components dealing with policy derisking, financial derisking and incentives, and a fourth cross-cutting component that addresses knowledge-related gaps. Note that this project has not been designed using the full DREI methodology but rather borrows from DREI's conceptual approach to categorizing risks. The first component addresses policy barriers faced by GE enterprises/SMEs by supporting the development and implementation of enabling policy framework. Under the second component, in partnership with local and international financial institutions, the project will facilitate access to GE finance at affordable terms. The third component focuses on the supply chain to help develop/improve GE products and services and bring them to the market, including through the targeted investment support to innovative and scalable business models for GE products/service delivery in off-grid rural areas. The fourth component addresses knowledge and awareness gaps that are present on both the supply and demand sides of the market (see also **Error! Reference source not found.** for a graphical presentation of the Theory of Change).
41. Component 1 ***“Enabling policy and regulatory framework and capacity development for GE SMEs”*** will address policy and technology risks faced by GE SMEs in Tajikistan. The project will strengthen the policy and regulatory framework for the sustainable energy products and services market. Specifically, the project will provide technical assistance to the Ministry of Energy and Water Resources and the Inter-Institutional Working Group (IIWG) consisting of relevant governmental agencies (e.g. Ministry of Finance, State Committee on Architecture and Construction, Ministry of Economy) to support the operationalization of key provisions of the Law on Energy Saving and Energy Efficiency. The scope of work under this Component will include both legal and technical support with drafting relevant policy documents, as well as extensive capacity building, training and technical (material will include procurement of required equipment, e.g. laboratory equipment) support to relevant

public agencies involved in policy implementation (e.g. State Committee on Architecture and Construction, Customs Service, Tax Authorities, Certification Laboratories, etc.).

42. Component 2 “**Access to finance for GE SMEs and/or energy service users**” aims at facilitating access to affordable finance for households, SMEs and other end-users wishing to invest in EE/RE products and/or services. The project will provide technical assistance to partner MFIs and other local finance organizations to develop and promote standard loan products targeting technologies, which have not yet been featuring prominently in the green loan portfolio with a particular focus on solar-based applications for households, farms and SMEs. Assistance will cover product design and training to MFI staff on project appraisal, along with some limited financial resources (in the form of grants subject to the guidelines and limits established by UNDP Programme and Operations Policies and Procedures (POPP)) to complements MFIs’ own financing. Product development will be undertaken in partnership with certified GE suppliers and technology information centers (Component 3). GEF investment support under this Component will be provided in the form of an interest rate subsidy (up to 10% on commercial loan interest rate – *maximum threshold for commercial interest rate should be determined at the inception stage based on analysis of prevailing market conditions*) for eligible GE technologies/projects, namely: solar (SWH, PV), other RE-based technologies and products – subject to the results of market assessment and availability of certified suppliers (See Technical Annex V – considerations of design options for financial de-risking instruments for further details).
43. Component 3 “**Business models for GE SMEs**” will address both market demand and supply risks by testing and demonstrating innovative business models and market facilitation approaches based on specific baseline energy demand and supply parameters, such as:
- Geographic location: some areas are off-grid, some areas experience severe energy shortages during winter, whereas in other areas electricity supply is stable
  - Cost and type of baseline energy use: fuelwood, diesel, electricity
  - Category of energy end-user: electricity tariffs for end-users range from about \$0.02/kWh for residential consumers up to \$0.1 /kWh for electricity used for hot water and heat supply by private companies (e.g. tourist facilities)
  - GE technologies: equipment costs for small-scale RE and EE solutions vary considerably with EE building components, such as EE windows being the cheapest and therefore more affordable, while RE options, SWH or solar PV are significantly more expensive.
44. In addition, this Component will address knowledge and awareness barriers on both the supply and demand sides of the GE market targeting (i) general population, (ii) local governments and business sector about green technology possibilities that would enhance their business or local development opportunities, (iii) women interested in establishing GE SMEs/energy cooperatives and mobilizing communities in the use of clean energy (the topics may range from do-it-yourself solar thermal systems<sup>4</sup>, installation and maintenance of household PV systems, home insulation measures performed with locally available materials, biogas, drip-to-drip technology, etc.), and (iv) MFIs - on GE financing (in conjunction with activities under Component 2). Information and capacity building will be provided to local stakeholders concerning RE and EE equipment, products and services in partnership with existing Info-educational Centers, NGOs and the private sector, such as those supported by GERES and Systemavtomatika. Through the Centers, SMEs will be able to disseminate information about their

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<sup>4</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. A video about the project is available here: <https://vimeo.com/121033654#at=34> and a detailed description at: <http://www.rtcc.org/2015/02/20/tajikistans-women-take-solar-power-into-their-own-hands/>

products, learn about new market opportunities, and receive information on financing schemes for GE, as well as other types of business support, training and advice. It will also support the establishment of technology showrooms, where applicants may receive technical advice on the selection of appropriate products, assistance with completing relevant technical details for loan applications (in conjunction with loan product development under Component 2), as well as information on post-service technology maintenance and contacts of relevant specialists and companies.

45. **Sub-Component 3A: RESCO: solar energy for off-grid communities** – Given that in the remote mountainous areas of Tajikistan the cost of grid expansion is prohibitively expensive, the project will support the Renewable Energy Service Company (RESCO) business model for delivery of GE services in off-grid rural areas. (Technical Annex II details international experience with RESCO.) RESCO will operate based on a concessional agreement with the Government of Tajikistan to provide energy services to a defined geographic area at agreed tariffs. However, due to widespread poverty and high costs of RE plant construction and operation in remote mountainous regions of Tajikistan, public subsidy is required to make such a project viable and sustainable for the private company.
46. In consultation with the Government, the first RESCO model will be implemented in the Gorno-Badakhshan area of Tajikistan, the most remote regions with highest share of off-grid population in partnership with Pamir Energy Ltd. The pilot RESCO project will involve a solar PV-based mini-grid and will enable provision of basic energy services for Pamir's 250 residents (cca 3 kW per household). Technical Annex IV provides background information about the proposed pilot. The project will finance the costs of pilot project design, as well as partially subsidize capital costs, with the level of required subsidy estimated at 50 percent for solar PV and 20 percent for small hydro power (see cost-benefit analysis in Section X below); however, the exact estimate will only be made after the exact location is identified and full feasibility analysis of the investment is conducted.
47. The project will provide the first example of RESCO-based power supply provision for off-grid rural communities in Tajikistan and will establish an important blueprint for the Government and other interested private investors to follow. 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 RE systems from residents, communities and public sector to the private sector, thus creating a scalable model for sustainable RE-based energy service provision in rural areas.
48. After completion and evaluation of the Pamir pilot, technical assistance will be provided to replicate the RESCO model in other identified off-grid locations in partnership with other development partners and the Government, as per confirmed co-financing (see Section ii Partnerships for further details).
49. **Sub-Component 3B: Facilitating investment in SWH by tourism facilities and other SMEs** – Investment in solar water heating (SWH) systems represents the most cost-effective RE supply options for SMEs in Tajikistan. Despite their cost-effectiveness, however, uptake of SWH by SMEs is low due to many barriers described earlier, which this sub-component will address through a facilitation approach. The choice of "SWH for tourism" as a potential market segment to promote has been made based on the following considerations:
  - SWH is the most mature and the least costly GE technology available on the Tajik market;
  - Tariff for electricity supply for water heating is the highest in Tajikistan, i.e. about \$0.1 /kWh (as opposed to \$0.02/kWh for residential consumers) which makes investment in SWH very cost-effective (simple pay-back of 1 to 2 years);
  - The Government of Tajikistan prioritized the development of the tourism industry in rural areas. It has created favorable tax and policy regimes for tourism facilities and specifically requested GEF support to facilitate wider uptake of RE in the sector.

50. The facilitation approach adopted in this sub-component involves provision of pro-bono consultancy services and other facilitation services to tourism facilities to help them identify, secure financing, procure and implement SWH systems. It is based on successful international experience in Europe and developing countries, such as Korea for SME, the German “Bundesstelle für Energieeffizienz” (BfEE) or the GIZ programme to incentivize ESCO market in Thailand<sup>5</sup>. The expected outcome is creation of new business-to-business relationships, which will lead to market demand growth for SWH products and related after-market services.
51. Component 4 “**Knowledge Management and M&E**” will include collection, analysis and sharing information about GE costs and benefits, as well as by monitoring and evaluating project results (including GHG emission reductions), documenting and disseminating best practices and lessons learnt.
52. The project will achieve the following impacts and directly contribute to a number of SDGs, as detailed below and illustrated in **Error! Reference source not found.**:
- g. **Improve the security of energy supply in the country, in particular to its most vulnerable rural residents** by reducing dependency on the over-dominant hydro power, which is further at risk of seasonal variations as well as climate change. Small sources, distributed over the country, along with reductions of demand achieved by implementing energy efficiency programs, diversify energy supply as well as lead to overall sustainability of the energy sector of Tajikistan.
  - h. **Reduce GHG emissions in Tajikistan.** Renewable energy sources reduce carbon emissions of the power sector as they do not require fossil fuels. At the same time, energy efficiency measures create savings – avoiding excessive use of energy and contributing to the carbon emission reduction.
  - i. **Serve as a leading example of energy sustainability using GE in the region.** Central Asia is still mostly reliant on fossil fuels. Energy generation using fossil fuels is perceived as being cheapest, as external costs and risks are rarely internalized in the overall cost of energy. Initiating a project in GE development provides an example for the region on best practices and puts Tajikistan, traditionally viewed as a poor neighbor, at the forefront of sustainable energy development.
  - j. **Support development of new skills related to GE.** Provision of new products and services in Tajikistan will require capacity building activities to ensure a viable level of local support to EE and RE projects as well as to ensure the sustainability of the market after project end.
  - k. **Create new jobs.** Implementation of the project requires development of the whole value chain, from supply through to planning and implementation to demand. People with specific competences, either already existing or acquired through training and education, are critical to success of the project. As the market starts growing, new human resources will be needed by market players.
  - l. **Create a positive socio-economic momentum.** All of the above will transform the energy industry of Tajikistan from a centralized, historically unattractive utility market to a dynamic, multi-stakeholder environment specifically designed to attract SMEs, and create an environment for development and implementation of new GE goods and services.

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<sup>5</sup> [http://www.thai-german-cooperation.info/userfiles/3\\_Concept%20of%20ESCO%20Facilitation.pdf](http://www.thai-german-cooperation.info/userfiles/3_Concept%20of%20ESCO%20Facilitation.pdf)

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## IV. RESULTS AND PARTNERSHIPS

### i. Expected Results

53. **Project objective:** The objective of the 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 SWH).

#### **Component 1: Enabling policy and regulatory framework and capacity development for GE SMEs**

54. Component 1 will directly address Barrier 1 and will be delivered in partnership with main Governmental agencies: the Ministry of Energy and Water and the State Committee for Architectural Construction. The project will collaborate with the complementary GIZ-led capacity building project "*Value Chain Development in the Energy Efficiency Housing and Construction Sector, Tajikistan*", as well as in consultation with relevant business sector representatives and their associations.

#### ***Outcome 1.1 Conducive policy and regulatory framework for GE SMEs***

##### **Output 1.1: Policies and regulations promoting wider adoption of EE/RE technologies by end-users developed**

*Activity 1.1.1: Conduct detailed policy and regulatory gap analysis, benchmarking and identification of priority policy and regulatory measures, such as building energy codes, public procurement rules, etc.*

55. The project will undertake a detailed policy and regulatory gap analysis in the areas of RE and EE, specifically focused on the needs for and existence of by-laws required to operationalize key provisions of the EE Law. The analysis will identify key policy and regulatory documents that need to be developed to create a more conducive market environment for GE SMEs. For example, already during the PPG stage, it has been agreed that revision and amendment of the building code (SNIP) will be required to introduce more stringent requirements regarding building energy performance and the use of RE in buildings. The project will review existing building codes and identify most relevant where such revisions would be needed. Introduction of more stringent energy performance and RE requirements can significantly boost domestic demands for GE products and services, and thus are considered by most market players to be priority measures.

*Activity 1.1.2: Conduct stakeholder consultations, including both relevant public authorities and business representatives regarding the scope and modalities of proposed policy and regulatory changes.*

56. The project will organize one stakeholder consultation with participation of all relevant public agencies, and also businesses and NGOs, to discuss, verify and prioritize the need for and scope of suggested policy and regulatory documents.

*Activity 1.1.3: Revise and/or prepare new regulatory documents.*

57. Based on identified gaps and agreed priorities, the project will prepare draft regulation for adoption by relevant public authorities. These regulatory documents may include, for example requirements for minimum energy performance, mandatory installation of RE systems in new buildings in line with the Law on Energy Saving, Article 9, paragraph 1 and relevant international best practices.

*Activity 1.1.4: Present and facilitate adoption of the developed regulatory documents.*

58. Once the draft regulatory documents are developed, the project will provide additional support to facilitate their adoption by relevant authorities, as required. For example, the project may organize additional stakeholder consultations, provide training, facilitate additional expert inputs, organizing peer reviews and other supplementary measures, etc. as may be required by the Government.

**Output 1.2: Financial incentives and support mechanisms for green energy investment designed**

[target: \$30,000,000 in the form of private investment leveraged]

*Activity 1.2.1: Prepare a package of fiscal, custom and other incentives related to the production and import of GE technologies.*

59. Consultations with GE market participants in Tajikistan revealed that the existing custom policies for GE products (e.g. for solar water heating) are very unattractive. Custom duties increase the final product price by between 30 to 50 percent. At the same time, there are provisions in the EE Law that mandate the introduction of special custom and tax incentives for RE products. The project will review the existing tax and custom regulations applicable to GE products and will provide specific recommendations on how those regulations can be changed and/or better enforced.

*Activity 1.2.2: Provide training to relevant public authorities (custom and tax officers) to help them understand and implement proposed incentives.*

60. In line with recommendations provided under Activity 1.2.1, training will be delivered to custom and tax officers to raise their awareness and understanding of the applicable provisions for GE products.

*Activity 1.2.3: Provide advisory support to the Ministry of Energy and Water regarding operationalization of the EE/RE Fund and the design of its programming strategy.*

61. The Government is establishing the National EE-RE Fund, as foreseen by the EE Law. The Fund is expected to be the main financial vehicle driving and support market transformation towards EE and RE. Based on results and lessons learnt from pilot projects under Component 3, the project will provide advisory support to the Government related to various technical, legal and administrative aspects associated with establishment of the Fund and its secretariat. Also, project results from Component 2 and 3 will be monitored and evaluated, and recommendations regarding the Fund's programming strategy will be provided to incorporate proposed financial support mechanisms and business models in the Fund's programming strategy thus ensuring sustainability and scalability of project's results.

**Output 1.3: Performance standards for PV and SWH products developed and MVE designed**

62. Tajikistan market is flooded with low quality GE products, in particular solar PV and SWH, undermining consumers' confidence in the products and potentially seriously hampering prospects for market growth. To address this barrier, the project will support the adoption of relevant quality performance standards for PV and SWH.

*Activity 1.3.1: Review relevant international standards for PV and SWH.*

63. The project will conduct a review of the relevant international quality standards for PV and SWH equipment with the intent of identifying those most applicable and relevant (also from a monitoring and verification viewpoint) for Tajikistan.

*Activity 1.3.2: Select appropriate standards for Tajikistan and develop a roadmap for their introduction.*

64. The most appropriate standards for Tajikistan will be selected based on the review prepared under Activity 1.3.1. A roadmap will be prepared that details the specific steps required for the adoption of these identified standards, first on a voluntary and eventually on a mandatory basis. The roadmap will include legal arrangements, promotion campaign, work with customers and sellers, and the establishment of Monitoring, Verification and Enforcement (MVE) system.

*Activity 1.3.3: Elaborate institutional set-up for MVE.*

65. The responsibilities for various steps in the MVE of proposed quality standards will be clearly assigned to relevant counterparts. As part of the elaboration of the institutional responsibilities, capacities will be assessed, and gaps identified and strengthened through the provision of capacity building activities and technical support (e.g. laboratory equipment).

*Activity 1.3.4: Develop and parameterize the measurement and verification tool for compliance check.*

66. To facilitate the application of standards by relevant partners/laboratories, a measurement and verification tool will be developed, parameterized by reference laboratory and the quality of measurement checked for a certain period of time to statistically establish the accuracy of certification process.

*Activity 1.3.5: Provide training to entities in charge of MVE.*

67. Consistent with the defined institutional arrangements (Activity 1.3.3) and identified capacity gaps, training will be provided to all entities involved in MVE to ensure its smooth operation, in particular in the early years. On-the-job training may be considered as an appropriate capacity building approach.

## **Component 2: Access to finance for GE SMEs and/or energy service users**

68. Component 2 will directly address Barrier 2 and will be implemented in partnership with Tajik MFIs, the EBRD/CIF “Tajikistan Small Business Climate Resilient Finance Facility”, the ADB “Access to Green Finance Project” and the UNDP “Aide for Trade” projects.

### ***Outcome 2.1 Improved access to finance for GE products and service users***

[target: 16,000 beneficiaries using RE, including over 10,000 women]

### ***Output 2.1: Micro-financing products developed and introduced by MFIs***

[target: 2,000 loans / US\$ 2,600,000, including at least 100 women-led SMEs with approved green loans for SWH and other targeted EE/RE products]

*Activity 2.1.1: Prepare a comprehensive GE market assessment.*



69. The project will conduct a comprehensive market assessment to identify a) categories and parameters of GE products with the highest potential for market growth; and b) categories of consumers/clients with the best ability to pay and/or motivation to invest in GE products and/or services.

*Activity 2.1.2: Competitively select partner MFIs and banks.*

70. A call for proposal will be organized to select a range (up to 5) of financial partners. The selection of financial partners will be conducted based on open and transparent tender procedures and established criteria regarding financial, operational and administrative capacities of financial partners, as well as UNDP's requirements. Consistent with UNDP's "Guidance on Micro-capital Grants", the selected financial partner must demonstrate competency in the following areas:
- a) Institutional strength. Sound institutional culture with a mission and vision that is supportive of the expansion of micro-finance services to low-income clients; management and information systems that provide accurate and transparent financial reports according to internationally recognised standards; and efficient operating systems;
  - b) Quality service and outreach. Focus on serving low-income clients and on expanding client reach and market penetration; financial services that meet the needs of their clients;
  - c) Examples of needs-oriented services are small, short-term loans with collateral substitutes or alternative forms of collateral, and safe, convenient savings facilities. A reasonable time frame for sustainability is 5 to 7 years.
  - d) Sound financial performance. Interest rates on loans sufficient to cover the full costs of efficient lending on a sustainable basis; low portfolio in arrears and low default rates; a diversified funding base for its micro-finance operations to minimise dependency on donor subsidies.

*Activity 2.1.3: Develop and introduce "green loan" products by selected MFIs with a particular emphasis on ensuring and promoting equal access to such products for women and women-headed SMEs.*

71. Based on GE product selection and prioritization (Activity 2.1.1), assistance will be provided to partner MFIs to develop standard loan products for prioritized GE solutions. Product development will be undertaken in partnership with certified GE suppliers and technology information centers (Component 3).
72. GEF investment support will be provided in the form of an interest rate subsidy (up to 10% on commercial loan interest rate – maximum threshold for commercial interest rate should be determined at the inception stage based on analysis of prevailing market conditions) for eligible GE technologies/projects. Technical Annex V – considerations of design options for financial de-risking instruments – provides further details, which will be finalized during project implementation with the support of the Financial Mechanism Development Consultant (see Terms of Reference in Annex E).

*Activity 2.1.4: Develop and implement marketing campaign for new green loan products.*

73. Once the financial product has been determined (Activity 2.1.3), the project will support financial partners in marketing their product to consumers. Marketing support will be provided through a range of traditional and social media, TV, newspapers, etc.

**Output 2.2: MFIs trained to implement and monitor performance of new products**

74. In parallel with the design of the financial product, the project will build capacities of the selected MFIs to implement and monitor implementation of the new product.

*Activity 2.2.1: Conduct a capacity gap assessment and design of training programme for MFIs.*

75. A capacity gap assessment will be conducted for selected MFIs, with a focus on their technical knowledge and understanding of climate change and energy field. Based on the findings of this assessment, the training programme for MFIs will be designed.

*Activity 2.2.2: Deliver training and provide technical advisory (on-the-job) training to partner MFIs.*

76. Technical assistance will be provided to deliver the training package and to provide other required technical advisory services (on-the-job training) to partner MFI staff related to project appraisal.

*Activity 2.2.3: Develop monitoring tools for tracking performance of green loans.*

77. To support partner MFIs with project appraisal, dedicated project/loan assessment tools for GE products and services will be designed and provided to MFIs.

*Activity 2.2.4: Collect and analyze information on green loan performance.*

78. Once the loan agreements are signed with clients, the project team jointly with MFIs will monitor loan performance, including both repayment and achievement of anticipated environmental and social benefits (as per the Project Results Framework).

### **Component 3: Business models for GE SME**

79. Component 3 will directly address Barriers 3 and 4, and will be implemented in partnership with Pamir Energy Llc and other GE SMEs (see list of potential partner SMEs in the next section of the Project Document).

### ***Outcome 3: New business models and approaches enabling GE product/services delivery implemented***

[target: lifetime RE production per technology of 15,330 MWh solar PV and 43,800 MWh small hydro; target: 2,000 households/17,000 individuals including over 10,700 women]

### ***Output 3.1: RESCO Business Model for off-grid communities piloted and replicated***

[target: scalable model identified and implemented for up to 0.75 MW of new RES-based power]

80. The approach and activities involved in implementing the first RESCO-based project in the Gorno-Badakhshan area in partnership with Pamir Energy Ltd is summarized below.

*Activity 3.1.1: Undertake community energy needs assessment, including consult with beneficiaries and local stakeholders in GBAO.*

81. In the pilot community, the project will conduct a detailed energy needs assessment (residential, commercial and non-commercial demand) to estimate the minimum required capacity to be installed. In parallel, a RE resource assessment for the site will be conducted.

*Activity 3.1.2: Conduct technical design and cost-benefit analysis, including the determination and justification of the required subsidy level (if any).*

82. Based on the energy needs assessment, a feasibility study will be prepared, including technical, economic and financial analysis, as well as environmental and social impact assessment and Environmental and Social Management Plan (ESMP) of the proposed RE plant, in line with relevant provisions of the Republic of Tajikistan.

83. Based on the financial and economic analysis, the required level of subsidy (if any) to make the project financially viable for Pamir Energy will be estimated.
84. Both the technical and financial - economic analyses will be submitted to the Government for approval.

*Activity 3.1.3: Prepare RESCO model design: legal and contractual arrangement, and training on RESCO model implementation to relevant stakeholders.*

85. Based on the feasibility study prepared under the project, the package of documents required to operationalize the RESCO model will be prepared. This package will include all relevant legislation and policies, the Law on Concession and the Law on Public-Private Partnerships, including all required construction permits, studies, licenses. A Concession Agreement between the Government and Pamir Energy will be prepared for signature.
86. In addition, the RESCO's business plan will be prepared. Training will be provided to RESCO staff on its implementation (most likely through a technically supported learning-by-doing training approach).

*Activity 3.1.4: Project implementation, including preparation of technical specification, construction works, and technical and advisory support for implementation of the RESCO model.*

87. After the signature of the Concession Agreement, project implementation will begin:
- a) Detailed technical specifications will be prepared for procuring required products and services
  - b) Technical and advisory support with implementation of RESCO model in the community will be provided aiming, in particular, to achieve equal access to energy services for women (including women-headed households and SMEs).
  - c) Procurement of required products and services will be undertaken
  - d) Monitoring over the construction process provided.
88. Before construction works can begin, the project will work with the local community (mainly indigenous people) to raise their awareness and secure buy-in for the project.

*Activity 3.1.5: Support replication of RESCO pilot in other off-grid communities in GBAO (with Pamir Energy) and other off-grid locations across Tajikistan.*

89. After completion and commissioning of first RESCO project in partnership with Pamir Energy, an evaluation and analysis of the results will be conducted. The experience will be widely promoted to stimulate interest among other private sector companies.
90. A series of calls for proposal will be organized to solicit proposals, *involving both solar PV and small-hydro technologies (depending on the specific location and resource availability)*, from other interested private companies to implement projects based on RESCO model in partnership with Ministry of Energy and other development and private sector partners, as detailed in the Partnership section below. Note that no GEF funding will be used to cover the investment subsidy, if such proved needed, under this activity.

**Output 3.2: Facilitation approach to support investment in SWH by tourism facilities demonstrated ("Product facilitation")**

**[target: 5,000 m<sup>2</sup> of SWH installed]**

*Activity 3.2.1: Identify client base through SWH market demand assessment.*

91. A database of potential SWH clients, from among existing and registered tourism facilities, will be established. Essential market information regarding design parameters of the potential SWH system and information about the facility itself (type of tourism facility, energy needs, demand for hot water) will be gathered.

*Activity 3.2.2: Conduct a call for proposal to select partner GE SMEs and suppliers of SWH equipment, and establish a register of qualified SWH suppliers.*

92. A call for proposals will be organized among private sector GE market participants to solicit proposals for collaboration from potential SWH suppliers and installers. Effort will be made to identify and encourage application by including women-led SMEs. Received proposals will be reviewed, assessed and those passing qualification requirements will be included in the register of qualified SWH supplied. The register will be shared with a) perspective clients (e.g. tourism facilities); b) partner MFIs; and c) made available and promoted widely.

*Activity 3.2.3: Provide advisory services to potential clients/investors in SWH*

93. Once the database of potential clients (Activity 3.2.1) and the register of potential SWH suppliers (Activity 3.2.2) are established, the project will offer and provide (on a demand basis) advisory services to prospective clients. Support regarding selection of the optimal SWH system, financial analysis to estimate monetary savings, advice on technical specifications, selection of qualified suppliers and available financing opportunities (in conjunction with Component 2) will be provided.

*Activity 3.2.4: Deal facilitation*

94. The project will support a number of deal “facilitation” events (up to three (3) in each key region of the country), such as joint meetings and workshops involving potential suppliers and clients (and/or industry representatives), where SWH opportunities and clients’ needs are presented. Another aspect of these workshops is to enhance direct communication between tourism industry stakeholders and GE SMEs.

*Activity 3.2.5: Facilitate implementation and monitoring of SWH projects by interested clients.*

95. The project will closely monitor and document the conclusion of transactions between tourism facilities and SWH suppliers, as well as the performance of the supplied SWHs.

### **Output 3.3: Marketing and awareness raising campaign on GE conducted**

*Activity 3.3.1: Organize thematic and specialized exhibitions on GE in partnership with existing information and educational centers, MFIs and SMEs.*

96. Under this activity information will be provided to local stakeholders concerning GE products and services in partnership with existing Info-educational Centers, namely those supported by GERES and Systemavtomatika (See description of Stakeholders and Partnerships below). Through these Centers, “qualified” SMEs will disseminate information about their products and learn about new market opportunities, whereas consumers can receive information on financing schemes for GE. The establishment of technology showrooms (located in the same Centers) will be supported, where applicants may receive technical advice on the selection of appropriate products, assistance with completing relevant technical details for loan applications (in conjunction with loan product development under Component 2), as well as information on post-service technology maintenance and contacts of relevant specialists and companies.

*Activity 3.3.2: Design and publish relevant awareness and promotional materials.*

97. Based on the results of the comprehensive market study (Activity 2.1.1), specific information and knowledge gaps will be identified and addressed through this activity by developing and publishing relevant awareness raising and promotional materials.

*Activity 3.3.3: Implement nationwide marketing and awareness campaign about solar technologies and its benefits for households and businesses.*

98. A nationwide marketing and awareness raising campaign focused on solar technologies will be designed and delivered across the country. This campaign will cover: a) socio-economic, financial and environmental benefits of solar energy; b) information about existing MFI and dedicated loan products; and c) information about qualified domestic suppliers. This campaign will involve television, social media and other means aiming specifically to address the significant knowledge constraints regarding solar technologies among women-headed households.

#### **Component 4: Knowledge Management and M&E**

99. Component 4 will directly address Barrier 4 and will be implemented in partnership with local and international NGOs.

***Outcome 4: Project experience, results and lessons learned are systematically monitored, assessed, codified and disseminated***

**Output 4.1: Project results assessed, including achieved GHG emission reductions and socio-economic benefits, and made publicly available**

Activity 4.1.1: Develop appropriate methodology and assessment of achieved GHG emissions, as well as socio-economic benefits (including for women).

Activity 4.1.2: Conduct assessment of environmental and socio-economic benefits of pilot projects in line with developed methodology.

Activity 4.1.3: Conduct a final national conference to present and disseminate project results.

**Output 4.2: Independent mid-term review and final evaluation conducted**

Activity 4.2.1: Undertake independent mid-term review and terminal evaluation

Activity 4.2.2: Prepare and disseminate lessons learned report

100. Component 4 of the Project will support knowledge generation and sharing project-related best practices and lessons learned, with all Components of the Project anticipated to contribute knowledge products as specified in Table 2 below. These items together will comprise a knowledge platform for the project and will be used to build the capacity of relevant stakeholders. Each knowledge item will be tailored to its target audience and appropriate communication channels will be identified. Further, results from the project will be disseminated within and beyond the project's intervention zone through existing information sharing networks and forums. The project will identify and participate in, as relevant and appropriate, scientific, policy-based and/or any other networks, which may benefit from the project 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.

**Table 2 KM products and materials**

Component	Knowledge Product	Activity
Component 1	Policy and regulatory gap analysis for GE SMEs	Activity 1.1.1
	Package of fiscal, custom and other incentives related to production and import of GE technologies and related training materials	Activity 1.2.1
	Review of international performance standards for solar PV and SWH technologies	Activity 1.3.1
	Measurement & verification tool for compliance check with performance standards	Activity 1.3.4
Component 2	Comprehensive market assessment for GE project demand	Activity 2.1.1
	Training package for MFIs	Activity 2.2.2
	Monitoring tools for tracking performance of green loans	Activity 2.2.3
Component 3	RESCO model design, training and educational materials	Activity 3.1.1
	Awareness & outreach materials	Activity 3.3.2
Component 4	Project lessons learned report	Activity 4.3.2

## ii. **Partnerships**

101. UNDP Communities Programme (CP): The Project will cooperate closely with and build on UNDP's past and on-going work in the area of community area-based development, in particular in such sectors as improved energy access. The CP's portfolio is \$26.4 million (2014-2017), including, for example, the LITACA project funded by the Japan Government (\$10.7 million). The CP envisages substantial technical assistance and investment support to rural energy infrastructure. The Project will collaborate with CP to ensure that planned investments in off-grid energy supply are based on the RESCO model thus strengthening its sustainability and leveraging additional donor resources to support replication of the direct GEF investment (Activity 3.1.5). The CP also has lengthy experience in supporting MFI sectors in Tajikistan through the on-going *Wider Europe: Aid for Trade for Central Asia* project financed by the Government of Finland (\$2.9 million). The *Aide for Trade* project has successfully piloted a number of new MFIs' products for Tajik SMEs, such as loans for women entrepreneurs. This partnership with support implementation of Activity 2.1.3 related to the development and introduction of "green loans" for EE and RES.
102. ADB Green Finance Facility and EBRD ClimAdapt: Extensive consultation with ADB and EBRD project teams and their partner MFIs were held during the PPG stage. Agreements were reached regarding practical collaboration and synergies to be sought under Component 2 in the course of green loan product design and promotion. Also, the SWH facilitation approach under Component 3 will be implemented in collaboration and will benefit all three initiatives thereby maximizing leveraging potential for GEF investment.
103. GIZ Value Chain Development in the Energy Efficiency Housing and Construction Sector Project: The GIZ-led project will provide capacity building to GE SMEs regarding application of EE standards and practices in building sector. Under Component 1 of the GEF-funded Project, complementary support will be offered to the Government (Committee of Architecture and Construction) to adopt and implement such standards in the national regulatory framework (Activity 1.1.3).
104. GEF Small Grants Programme (SGP): The SGP has conducted micro RE and EE needs assessment surveys in four communities of the Khatlon region of Tajikistan to reveal key demand parameters, as far as availability and affordability of the GE products are concerned. The results of this study have been used to model a green loan product package to be supported by the GEF Project under Component 2. The SGP will continue working in the selected local communities to better understand key energy-related needs and barriers faced by end-users and

financiers, and this micro-analysis will be an important input to the comprehensive market demand assessment to be conducted under Activity 2.1.1.

### iii. Stakeholder engagement

105. During project design, a series of meetings and consultations with stakeholders have been conducted to better define the project strategy and activities, as well as the role of each stakeholder in project implementation, as detailed in Table 3 below.

**Table 3 Stakeholders by type and relevance to the project**

Type of Stakeholder	Name of Stakeholder	Relevance to Project, Role in Preparation, and Role in Implementation
Government	Ministry of Energy and Water Resources (MEWR)	National Project Implementing Agency. MEWR is the lead national counterpart for the Project. MEWR will oversee all project activities, will co-chair the Project Board, and will play a leading role in Component 1 and Component 3 (RESCO model design and implementation).
	Committee on Environmental Protection (CEP)	As the GEF Operational Focal Point and UNFCCC Focal point, CEP will ensure project alignment with national climate change goals and priorities. CEP will also be involved in project evaluation, at mid-term and final, and will provide inputs into the design and application of GHG emission reduction monitoring methodology (under Component 4).
	SUE "Scientific research institute on construction and architecture" at the Committee of Architecture and Construction of the Government of Tajikistan	The Institute will be a key project partner for implementation of Activity 1.1.3 (Revising and preparing new regulatory documents to introduce requirements for minimum energy performance, mandatory installation of RE systems in new buildings).
	Energy Department of the President's Apparatus	The Department is the key advisory body to the President on matters related to national energy strategy and security. Consultations with the Department have taken place to ensure that the project is aligned with national energy priorities, including greater energy security and improved energy access.
	Ministry of Finance	Ministry of Finance is the national agency overseeing the financial sector, including MFIs and ADB Green Finance Facility; it will be consulted and involved in implementation of Component 2.
Private sector	Pamir Energy	Pamir Energy has been selected as a partner for implementing the pilot RESCO under Component 3 in line with the concession agreement signed between Pamir Energy and the Government in 2002. Under the agreement, Pamir Energy was to take over and operate all electricity generation, transmission, and distribution facilities in GBAO for a 25-year period. Concession agreement puts responsibility on Pamir Energy to provide all population of GBAO with access to electricity. The Pamir Energy Company has been established through an innovative combination of private investors and

Type of Stakeholder	Name of Stakeholder	Relevance to Project, Role in Preparation, and Role in Implementation
		multilateral financial institutions (MFIs), backed by a donor-funded social protection program, to ensure that the electricity remains affordable. At the same time, the government has been centrally involved in facilitating and supporting the reforms necessary for the new framework to work. The financing was as follows: 45 percent through equity and 55 percent through debt provided by the IFC and IDA. Of the equity financing \$3.5 million was by IFC and \$8.2 million by The Aga Khan Fund for Economic Development (AKFED), the principal private sector partner in the venture.
	MLF Imon	One of the leading MFIs in Tajikistan, and partner to both the ADB and EBRD projects, has been consulted in the course of Project's design and provided important inputs regarding the current state and constraints of MFIs' operation with green products. They will also apply to be an MFI partner for the GEF Project and are interested in collaboration under Component 2.
	Korgohi Mashinasozi	These GE SMEs are active on the local market as suppliers, installers and operators of various small-scale, primarily solar but also various EE technologies. All have been extensively consulted in the course of Project's design and have provided essential inputs for the cost-benefit analysis and market assessment. All expressed interest to participate in the Project, as envisaged under Component 3.
	GE Technologies	
	Homsol	
	Sistemavtomatika	
NGO	GERES	National and international NGOs active in Tajikistan in the area of GE and sustainable development more broadly. The Youth Center is also active in promoting sustainable tourism. Component 3, in particular awareness raising activities, will rely on the NGOs' extensive experience, as well as GERES' educational EE center, as a platform for information dissemination and knowledge exchange.
	CESVI	
	Welthungerhilfe (German AgroAction)	
	Youth Center	
	Association of Energy Professionals	A professional energy NGO and think tank, the Association provides high-level policy advice to a range of Tajik decision-makers in the area of energy policy development. It will be involved in Component 1 and Component 3.

#### iv. Mainstreaming gender

106. Key gender issues were identified during the project preparation phase, including during the gender assessment (Annex G).

107. In Tajikistan, the ratio of female to male primary education enrolment is 98% and for secondary school enrolment it is 88%. Therefore, while the education gap between males and females is not significant, a gap does exist. However, rigid notions of men's and women's roles in society and in the home remain. It is believed that men should occupy the role of breadwinner and head of the household, whereas women should confine themselves to domestic and care work within the home.



108. The Tajik Civil Code gives women the right to have access to property other than land and to enter into contracts in their own names. In practice, property is routinely registered in the name of husbands or male relatives, as property ownership is seen as a male prerogative. In addition, most married couples live in property belonging to the husband's parents, meaning that the wife often has no legal claim on the property. Women lack education, access to productive resources and technical training that would enable them to increase productivity above subsistence levels and increase wealth.
109. Women and men have the same rights to access bank loans and credit. Few women apply for loans, however, primarily because they do not understand their rights and the procedures involved. The fact that most property is registered to men rather than women makes it difficult for women to secure credit, as they cannot provide collateral for loans. High bank charges and interest rates also hamper women's access to credit. As of 2012, women made up 32.91 percent of recipients of micro-credit in Tajikistan, according to the Microfinance Information Exchange.
110. The Project's activities have been designed to address some of these gender-related issues and are consistent with the gender action plan. The Project will:
- Ensure equal access to green loan products for women and women-headed SMEs under Component 2 (Activity 2.1.3)
  - Facilitate equal access to energy services and ensure that women-headed households and SMEs participate equitably in the RESCO project under Component 3 (Activity 3.1.5)
  - Commit dedicated financial and technical support to addressing the significant knowledge constraints regarding EE and RE technologies among women-headed households under Component 4 (Activity 3.3.3)
  - Ensure that the interests of women and women-headed households are adequately represented in the Project team and project management structures (Project Management).
  - Target at least 11,167 women (out of a total of 17,867) as direct beneficiaries of Project activities.

#### **v. South-South and Triangular Cooperation (SSTrC)**

111. This project has a great potential to contribute to and benefit from SSTrC with other Central Asian countries, as well as other developing countries with similar contexts. This cooperation will be ensured within the framework of the following initiatives.
112. UNDP Istanbul Regional Hub through its *Catalytic Facility and in line with the South-South Cooperation Strategy* supported the establishment of a "Center for Renewable Energy and Energy Efficiency in Dushanbe". The Center, established in October 2016 in partnership with JSC Systemavtomatika (one of the Project's private sector partners), serves as a regional information hub and service provider for RE and EE solutions, with a permanently operating exhibition hall, training and services center for RE systems. The Center will provide a platform to disseminate GEF project experience and lessons learnt across the Central Asian region; it has already established good working relationships and dialogue with counterparts from Kyrgyzstan and other former USSR countries.
113. Within the framework of the UNDP-China partnership, a project entitled "GE for Rural Development in Tajikistan" is being prepared to be funded by the *Chinese South-South Cooperation Assistance Fund*. It will build on and complement the GEF Project with a particular focus on supporting transfer of relevant Chinese knowledge, experience and technologies to address energy poverty in Tajikistan's rural areas.

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## V. FEASIBILITY

### i. Cost efficiency and effectiveness

114. The Project will directly support investment in RE under Component 2 “Green Loan product” and Component 3 “RESCO model,” and will therefore lead to direct GHG emission reductions. A GHG emission analysis has been conducted and is presented in Technical Annex III.

115. As a result of GEF support under Component 2 to design and implement green loan products, the direct GHG emissions reductions will be around 16,000 tCO<sub>2</sub> over the investment life-cycle (**Table 4**). This analysis is based on GEF support to about 2,000 loans that are issued at preferable terms enabling investment in 2,000 SWH household systems (although in reality the range of targeted RE products will be broader and determined based on market demand assessment) benefitting 16,000 people, including at least 11,000 women.

**Table 4 Cost-effectiveness, GHG emissions reductions and socio-economic benefits under Component 2**

Cost-effectiveness parameter		Value
Interest rate subsidy	%	10%
Cost per loan	TJS	2 274
Number of SWH	#	2 000
Total cost of instruments	TJS	4 548 269
	US\$	535 090
Leveraged financing	TJS	22 255 921
	US\$	2 618 344
Leveraging ratio	1 (GEF) to	5
<b>GHG emissions</b>		
tCO <sub>2</sub> per investment life-cycle	tCO <sub>2</sub>	16 288
Cost-effectiveness	US\$/tCO <sub>2</sub>	33
<b>Socio-economic benefits</b>		
Number of beneficiaries	#	16 000
Number of women beneficiaries	#	10 000

116. Component 3 will lead to direct GHG emission reductions from the investment in solar PV and small-hydro power plants based on the RESCO model (**Table 5**). Baseline GHG emissions in off-grid communities come from unsustainable use of biomass resources and use of diesel-based power generators. The methodology and assumptions for these estimates are based on recent research on the environmental benefits of decentralized solar-based electricity supply in the Pamir regions of Tajikistan by Zandler et al<sup>6</sup>. Specifically, the study concludes that around 220 kgC/capita (an equivalent of 807 kgCO<sub>2</sub>) is currently being extracted annually to

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<sup>6</sup> Zandler et al. 2016. Scenarios of Solar Energy Use on the “Roof of the World”: Potentials and Environmental Benefits. Mountain Research and Development, 36(3):256-266. Available at <http://www.bioone.org/doi/pdf/10.1659/MRD-JOURNAL-D-15-00077.1>

provide for basic energy needs of the local population, which will be stored (avoided) once an alternative RE-based source of energy is provided as a result of the Project. The study<sup>7</sup> further concludes that:

“realization of the PV power plant [to electrify off-grid communities in the Pamir region] would considerably change the region’s energy situation by increasing the sustainability of local energy resource use, alleviating energy poverty, and fostering carbon sequestration; it also showed that PV energy has great potential to improve the sustainable development and livelihoods of remote mountain communities, because similar conditions exist worldwide. Therefore, solar energy constitutes a suitable alternative to other renewable-energy resources in mountain environments”.

**Table 5 GHG emission reductions from Component 3**

		Solar PV	Small Hydro	Total
Installed capacity	kW	350	400	750
Asset lifetime	yrs	20	25	
Full load hours (hrs/yr)	hrs/yr	2 190	4 380	
Total annual generation (kWh/yr)	MWh/yr	767	1 752	2 519
Number of beneficiaries	#	933	1 067	2 000
Cumulative GHG emission reduction	tCO <sub>2</sub> e	15 071	21 531	36 602

117. In addition, the Project will undertake several activities that will stimulate market transformation, in particular support to the enabling policy and regulatory framework under Component 1. Since the GEF support for Component 1 will be in the form of technical assistance, there will be consequential GHG emission reductions of between 0.301 and 1.01 million tCO<sub>2</sub>. These are estimated using bottom-up and top-down approaches based on the GEF methodology, as summarized in **Table 6**.

118. For bottom-up emission estimates, the estimated direct reductions are multiplied by a replication factor – with the expectation that the volume of investments and GHG emissions reductions will increase at least by a factor of 10 for SWH, by a factor of 2 for solar PV and 5 – for small hydro over a 10-year period after project completion due to the project intervention. According to the GEF methodology this replication factor is modest.

119. To calculate the consequential GHG emission reductions using a top-down methodology, an estimate of the total 10-year market size was made based on the World Bank's<sup>8</sup> estimates of the winter energy shortages in Tajikistan, i.e. between 2,700 and 4,000 GWh/year (the lowest value in the range was used to be on a conservative side). For this calculation, the low level ‘1’ causality factor is used (weak, i.e. 10%) to be conservative.

**Table 6 Aggregated GHG Emission Reductions: Direct and Consequential**

GHG Emission Savings (tCO <sub>2</sub> )*	2017-2022	2023-2033
Direct	53,000	
Consequential (bottom-up)		301,000
Consequential (top-down)		1,012,000

\*Estimates are rounded to tCO<sub>2</sub>e

<sup>7</sup> Ibid

<sup>8</sup> World Bank. 2013. *Tajikistan’s Winter Energy Crisis: Electricity Demand and Supply Alternatives*. World Bank: Washington DC

120. Based upon a total GEF grant of \$2.5 million, the cost per tonne of direct CO<sub>2</sub> emissions reduction is \$47. McKinsey & Company<sup>9</sup> estimated the marginal abatement costs for various renewable energy technologies to be in the range of €60/tCO<sub>2eq</sub> and €70/tCO<sub>2eq</sub>. Based on these calculations, the project's direct GHG emission reduction potential is cost-effective. For consequential emissions, the total estimated cost (GEF funding) of CO<sub>2</sub> reduced is between \$2 and \$9/tCO<sub>2eq</sub>.

## ii. Risk Management

121. As per standard UNDP requirements, the Project Manager will monitor risks quarterly and report on the status of risks to the UNDP Country Office. The UNDP Country Office will record progress in the UNDP ATLAS risk log. Risks will be reported as critical when the impact and probability are high (Table 7). Management responses to critical risks will also be reported to the GEF in the annual Project Implementation Review (PIR).

**Table 7 Project risks**

Description	Type	Impact & Probability	Mitigation Measures	Owner	Status
Widespread poverty and lack of sustainable source of income resulting in perceived low consumers' creditworthiness/ ability to repay the loans	Market	I: High P: Medium	Component 2 will address this risk via Activities 2.2.2 (training to MFIs on project appraisal) and 2.2.3 (monitoring green loan performance). MFIs will be trained to understand and assess financial benefits of GE projects. This knowledge will be further improved based on real-life data on loan performance collected through loan monitoring program.		
Weak technical capacities to design and implement GE projects, under-developed supply chain for O&M	Technology	I: High P: High	International CTA will oversee project implementation and provide quality assurance in the course of GE pilot project design and implementation		
Lack of political support may jeopardize the achievement of immediate results and overall impact	Political	I: Medium P: Medium	Political will and commitment to improve the investment climate and, in particular, investment framework for GE is essential to remove market risks. During the PPG stage, the Project has worked closely with key Governmental agencies dealing with investment promotion to design a comprehensive policy package, secure their buyin and support at the highest political level.		
Climate change poses several risks to Tajik local communities, in particular related to increased occurrence of natural disasters (landslides, floods,	Nature/climate-related	Low-medium	Knowledge and expertise of UNDP's Disaster Risk Management Programme in Tajikistan will be used to assess all nature/climate-related risks for GEF-supported investment (in particular small hydro) and develop risk		

<sup>9</sup> Naucler T, Enkvist P-A. Pathways to a low-carbon economy: version 2 of the global greenhouse gas abatement cost curve. New York: McKinsey & Company; 2009.

Description	Type	Impact & Probability	Mitigation Measures	Owner	Status
etc.) and availability of water resources			mitigation measures, which would vary on a case-by-case basis.		

### iii. Social and Environmental Safeguards

122. The project will be implemented according to UNDP's environmental and social policies to ensure minimization of any environmental risks. The project has completed the standard UNDP social and environmental screening procedure (UNDP SESP attached as Annex F). The screening was undertaken to ensure that the project complies with UNDP Social and Environmental Standards (SES). The overall risk category is: Moderate. The ESMP will be completed once the location, technical design, environmental and social parameters are known, and will be part of Activity 3.1.2 – pilot RESCO project preparation,

### iv. Sustainability and Scaling Up

123. **Sustainability:** By addressing key risks and the underlying barriers that impede the development of the GE market in Tajikistan, a sustainable business area will be created. The key element of the Project's sustainability is its focus on the private sector as a driving force both on the supply and demand side of the GE market. The Project's design involves several innovative elements, such as piloting the RESCO business model for decentralized provision of GE services for the first time in Tajikistan, as well as the product facilitation approach to jump-start the SWH market in the tourism sector. While none of these models alone can address all barriers associated with GE market, 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 GE investment in Tajikistan thus ensuring sustainable demand for and supply of GE services and products on the market.

124. **Potential for scaling-up:** There is a large potential for scaling-up market-based provision of GE products and services in Tajikistan. Given the unmet annual demand in energy currently in the range of 2,700 to 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 support the identification and piloting of scalable private-sector business models. By supporting the efficient and effective deployment of proven energy access solutions the Project will accelerate the rate at which energy access is improved for thousands of unserved Tajik customers.

## VI. PROJECT RESULTS FRAMEWORK

<b>This project will contribute to the following Sustainable Development Goal (s):</b> <ul style="list-style-type: none"> <li>• SDG1 (No Poverty)</li> <li>• SDG7 (Affordable and Clean Energy)</li> <li>• SDG8 (Decent Work and Economic Growth)</li> <li>• SDG9 (Industry, Innovation and Infrastructure)</li> <li>• SDG13 (Climate Action).</li> </ul>					
<b>This project will contribute to the following country outcome included in the UNDAF/Country Programme Document:</b> UNDAF/CPD Outcome: People in Tajikistan are more resilient to natural and manmade disasters and benefit from improved policy and operational frameworks for environmental protection and sustainable management of natural resources. UNDAF/CPD Outcome Indicator: Number of new green jobs created, environmentally sustainable livelihoods promoted through management of natural resources, ecosystems services, chemicals and waste, disaggregated by sex.					
<b>This project will be linked to the following output of the UNDP Strategic Plan:</b> Output 1.5: Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)					
	Objective and Outcome Indicators	Baseline	Mid-term Target	End of Project Target	Assumptions <sup>10</sup>
<b>Project Objective:</b>  <b>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</b>	[GEF CCM Tracking Tool Indicator]: Volume of investment mobilized and leveraged for low GHG emission development s (mIn US\$)  [Indicator UNDP SP 2018-2021, Output 2.5.1]: Amount of resources brokered for investment in renewable energy and zero-carbon development	n/a	10 mIn US\$	30 mIn US\$	Significant unmet demand for energy among rural population persist
	Extent of change in modern energy coverage by users	No change	4,000 new users of RE products/services	Over 17,000 new users of RE products/services	Willingness and ability to pay for, at least, basic energy service provision remains at baseline level
	tCO <sub>2eq</sub> , direct emissions reductions (which are attributable to the project-facilitated investments made during the project's supervised implementation period, totaled over the respective lifetime of the investments)	n/a	15,000	53,000	Estimation over RE investment lifetime  Co-financing realized
	Increase in installed RE capacity per technology (MW for electricity and m <sup>2</sup> for SWH)	n/a	-	0.350 MW solar PV 0.400 MW small hydro 5,000 m <sup>2</sup>	Co-financing realized
	Lifetime RE production per technology (MWh)	n/a	-	15,330 MWh solar PV 43,800 MWh small hydro	Co-financing realized

<sup>10</sup> Risks are outlined in the Feasibility section of this project document.

	Indicators	Baseline	Mid-term Target	End of Project Target	Assumptions
<b>Component/Outcome 1</b>  <b>Enabling policy and regulatory framework and capacity development for green energy SMEs</b>	Status of by-laws enabling implementation of the Energy Efficiency Law	None existing	Draft sent to decision-makers	Final version adopted	Commitment of the Government to pursue proposed regulatory changes
	Number of officials trained (including number of women)	0	20 (5)	50 (15)	Staff turn-over in the Government is insignificant and trained people remain in their functions
	Additional decentralized RE-based capacity enabled by the designed financial incentives scheme, MW	None existing	0.35 MW	2.0 MW	Commitment of the Government to establish dedicated financial incentive scheme
	Status of system of compliance checks and enforcement of performance standard for selected EE/RE products	None existing	Draft developed and sent to decision-makers	Final version approved by decision-makers	At least basic capacities exist to enforce performance standards Commitment of relevant enforcement agencies to implement standards
<b>Component/ Outcome 2</b>  <b>Access to finance for green energy SMEs and/or energy service users</b>	Number and volume (US\$) of green loans approved for SWH and other targeted EE/RE products (including those for women-led SMEs)	0	500 loans / US\$ 650,000 (at least 25 loans to women-led SMEs)	2,000 loans/ US\$ 2,600,000 (at least 100 loans to women-led SMEs)	Willingness and ability to pay for, at least, basic energy service provision remains at baseline level
	Number of beneficiaries using RE (including number of women)	0	4,000 (2,500)	16,000 (10,000)	MFIs are interested and capable of introducing green loans
<b>Component/ Outcome 3</b>  <b>Business models for green energy SME</b>	Installed new RE-power generation capacity based on RESCO model, MW	0	0.35 MW	0.75 MW	Commitment of Pamir Energy to co-finance and replicate the project
	Number of SWH systems facilitated by the project (in tourism facilities)	0	20	100	Tourism industry stakeholders and GE suppliers are interested in collaboration
	Number of people with improved access to energy (including percentage of women)	0	4,000 (60% women)	17,867 (60% women)	Co-financing realized
	Number of people accessed by marketing and awareness raising campaign (including percentage of women)	N/a	1,000,000 (60% women)	3,000,000 (60% women)	Partners (NGOs and Inform-centers) remain committed to support PR and awareness raising campaign
<b>Component/ Outcome 4</b>  <b>Knowledge Management and M&amp;E</b>	Number of organizations receiving results of project, including GHG emissions and socio-economic benefits (targeted number to be established during project inception)	None	None	100% of identified participating stakeholder organizations	Responsibility for data collection are clearly assigned and responsible entities have adequate capacities and access to data Required data are available and/or can be collected with reasonable amount of effort

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## VII. MONITORING AND EVALUATION (M&E) PLAN

125. The project results as outlined in the project results framework will be monitored annually and evaluated periodically during project implementation to ensure the project effectively achieves these results.
126. Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the [UNDP POPP](#) and [UNDP Evaluation Policy](#). While these UNDP requirements are not outlined in this project document, the UNDP Country Office will work with the relevant project stakeholders to ensure UNDP M&E requirements are met in a timely fashion and to high quality standards. Additional mandatory GEF-specific M&E requirements (as outlined below) will be undertaken in accordance with the [GEF M&E policy](#) and other relevant GEF policies.
127. In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be agreed during the Project Inception Workshop and will be detailed in the Inception Report. This will include the exact role of project target groups and other stakeholders in project M&E activities including the GEF Operational Focal Point and national/regional institutes assigned to undertake project monitoring. The GEF Operational Focal Point will strive to ensure consistency in the approach taken to the GEF-specific M&E requirements (notably the GEF CCM Tracking Tool) across all GEF-financed projects in the country. This could be achieved for example by using one national institute to complete the GEF Tracking Tools for all GEF-financed projects in the country, including projects supported by other GEF Agencies.

### M&E oversight and monitoring responsibilities

128. Project Manager: The Project Manager is responsible for day-to-day project management and regular monitoring of project results and risks, including social and environmental risks. The Project Manager will ensure that all project staff maintain a high level of transparency, responsibility and accountability in M&E and reporting of project results. The Project Manager will inform the Project Board, the UNDP Country Office and the UNDP-GEF RTA of any delays or difficulties as they arise during implementation so that appropriate support and corrective measures can be adopted.
129. The Project Manager will develop annual work plans based on the multi-year work plan included in Annex A, including annual output targets to support the efficient implementation of the project. The Project Manager will ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality. This includes, but is not limited to, ensuring the results framework indicators are monitored annually in time for evidence-based reporting in the GEF PIR, and that the monitoring of risks and the various plans/strategies developed to support project implementation (e.g. gender strategy, KM strategy etc.) occur on a regular basis.
130. Project Board: The Project Board will take corrective action as needed to ensure the project achieves the desired results. The Project Board will hold project reviews to assess the performance of the project and appraise the Annual Work Plan for the following year. In the project's final year, the Project Board will hold an end-of-project review to capture lessons learned and discuss opportunities for scaling up and to highlight project results and lessons learned with relevant audiences. This final review meeting will also discuss the findings outlined in the project terminal evaluation report and the management response.
131. Project Implementing Partner: The Implementing Partner is responsible for providing any and all required information and data necessary for timely, comprehensive and evidence-based project reporting, including results and financial data, as necessary and appropriate. The Implementing Partner will strive to ensure project-level M&E is undertaken by national institutes, and is aligned with national systems so that the data used by and generated by the project supports national systems.



132. **UNDP Country Office:** The UNDP Country Office will support the Project Manager as needed, including through annual supervision missions. The annual supervision missions will take place according to the schedule outlined in the annual work plan. Supervision mission reports will be circulated to the project team and Project Board within one month of the mission. The UNDP Country Office will initiate and organize key GEF M&E activities including the annual GEF PIR, the independent mid-term review and the independent terminal evaluation. The UNDP Country Office will also ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality.
133. The UNDP Country Office is responsible for complying with all UNDP project-level M&E requirements as outlined in the UNDP POPP. This includes ensuring the UNDP Quality Assurance Assessment during implementation is undertaken annually; that annual targets at the output level are developed, and monitored and reported using UNDP corporate systems; the regular updating of the ATLAS risk log; and, the updating of the UNDP gender marker on an annual basis based on gender mainstreaming progress reported in the GEF PIR and the UNDP ROAR. Any quality concerns flagged during these M&E activities (e.g. annual GEF PIR quality assessment ratings) must be addressed by the UNDP Country Office and the Project Manager.
134. The UNDP Country Office will retain all M&E records for this project for up to seven years after project financial closure in order to support ex-post evaluations undertaken by the UNDP Independent Evaluation Office (IEO) and/or the GEF Independent Evaluation Office (IEO).
135. **UNDP-GEF Unit:** Additional M&E and implementation quality assurance and troubleshooting support will be provided by the UNDP-GEF Regional Technical Advisor and the UNDP-GEF Directorate as needed.
136. **Audit:** The project will be audited according to UNDP Financial Regulations and Rules and applicable audit policies.<sup>11</sup>

### **Additional GEF monitoring and reporting requirements**

137. **Inception Workshop and Report:** A project inception workshop will be held within two months after the project document has been signed by all relevant parties to, amongst others:
- a) Re-orient project stakeholders to the project strategy and discuss any changes in the overall context that influence project implementation including the formulation of detail criteria for selection of municipalities and participation in the final decision on their selection
  - b) Discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms;
  - c) Review the results framework and finalize the indicators, means of verification and monitoring plan;
  - d) Discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E budget; identify national/regional institutes to be involved in project-level M&E; discuss the role of the GEF OFP in M&E;
  - e) Update and review responsibilities for monitoring the various project plans and strategies, including the risk log; Environmental and Social Management Plan and other safeguard requirements (for moderate and high risk projects only); the gender strategy; the knowledge management strategy, and other relevant strategies;
  - f) Review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; and
  - g) Plan and schedule Project Board meetings and finalize the first year annual work plan.

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<sup>11</sup> See guidance here: <https://info.undp.org/global/popp/frm/pages/financial-management-and-execution-modalities.aspx>

138. The Project Manager will prepare the inception report no later than one month after the inception workshop. The inception report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and will be approved by the Project Board.
139. GEF Project Implementation Report (PIR): The Project Manager, the UNDP Country Office, and the UNDP-GEF Regional Technical Advisor will provide objective input to the annual GEF PIR covering the reporting period July (previous year) to June (current year) for each year of project implementation. The Project Manager will ensure that the indicators included in the project results framework are monitored annually in advance of the PIR submission deadline so that progress can be reported in the PIR. Any environmental and social risks and related management plans will be monitored regularly, and progress will be reported in the PIR.
140. The PIR submitted to the GEF will be shared with the Project Board. The UNDP Country Office will coordinate the input of the GEF Operational Focal Point and other stakeholders to the PIR as appropriate. The quality rating of the previous year's PIR will be used to inform the preparation of the subsequent PIR.
141. Lessons learned and knowledge generation: Results from the project will be disseminated within and beyond the project intervention area 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 the project. The project will identify, analyse and share lessons learned that might be beneficial to the design and implementation of similar projects and disseminate these lessons widely. There will be continuous information exchange between this project and other projects of similar focus in the same country, region and globally.
142. GEF Focal Area Tracking Tools: The following GEF Tracking Tool will be used to monitor global environmental benefit results: Climate Change Mitigation.
143. The baseline/CEO Endorsement GEF Focal Area Tracking Tool – submitted in Annex D to this project document – will be updated by the Project Manager/Team and shared with the mid-term review consultants and terminal evaluation consultants (not the evaluation consultants hired to undertake the MTR or the TE) before the required review/evaluation missions take place. The updated GEF Tracking Tool will be submitted to the GEF along with the completed Mid-term Review report and Terminal Evaluation report.
144. Independent Mid-term Review (MTR): An independent MTR process will begin after the second PIR has been submitted to the GEF, and the MTR report will be submitted to the GEF in the same year as the 3<sup>rd</sup> PIR. The MTR findings and responses outlined in the management response will be incorporated as recommendations for enhanced implementation during the final half of the project's duration. The terms of reference, the review process and the MTR report will follow the standard templates and guidance prepared by the UNDP IEO for GEF-financed projects available on the [UNDP Evaluation Resource Center \(ERC\)](#). As noted in this guidance, the evaluation will be 'independent, impartial and rigorous'. The consultants that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. The GEF Operational Focal Point and other stakeholders will be involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the UNDP-GEF Directorate. The final MTR report will be available in English and will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and approved by the Project Board.
145. Terminal Evaluation (TE): An independent TE will take place upon completion of all major project outputs and activities. The terminal evaluation process will begin three months before operational closure of the project allowing the evaluation mission to proceed while the project team is still in place, yet ensuring the project is close enough to completion for the evaluation team to reach conclusions on key aspects such as project sustainability. The Project Manager will remain on contract until the TE report and management response have been finalized. The terms of reference, the evaluation process and the final TE report will follow the standard

templates and guidance prepared by the UNDP IEO for GEF-financed projects available on the UNDP Evaluation Resource Center. As noted in this guidance, the evaluation will be ‘independent, impartial and rigorous’. The consultants that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. The GEF Operational Focal Point and other stakeholders will be involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the UNDP-GEF Directorate. The final TE report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and will be approved by the Project Board. The TE report will be publically available in English on the UNDP ERC.

146. The UNDP Country Office will include the planned project terminal evaluation in the UNDP Country Office evaluation plan, and will upload the final terminal evaluation report in English and the corresponding management response to the UNDP Evaluation Resource Centre (ERC). Once uploaded to the ERC, the UNDP IEO will undertake a quality assessment and validate the findings and ratings in the TE report, and rate the quality of the TE report. The UNDP IEO assessment report will be sent to the GEF IEO along with the project terminal evaluation report.

147. **Final Report:** The project’s terminal PIR along with the TE report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.

**Table 8 Mandatory GEF M&E Requirements and M&E Budget**

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget <sup>12</sup> (US\$)		Time frame
		GEF grant	Co-financing	
Inception Workshop	UNDP Country Office	5,000	5,000	Within two months of project document signature
Inception Report	Project Manager and Chief Technical Advisor	5,000	None	Within two weeks of inception workshop
Standard UNDP monitoring and reporting requirements as outlined in the UNDP POPP	UNDP Country Office	None	None	Quarterly, annually
Monitoring of indicators in project results framework	Project Manager	Per year: 8,000 Total: 40,000	Per year: 4,500 Total: 22,500	Annually
GEF Project Implementation Report (PIR)	Project Manager and UNDP Country Office and UNDP-GEF team	None	None	Annually
Supervision missions	UNDP Country Office	None <sup>13</sup>	None	Annually
Oversight missions	UNDP-GEF team	None <sup>13</sup>	None	Troubleshooting as needed
Knowledge management as outlined in Outcome 4	Project Manager	25,000 (1% of GEF grant)	25,000	On-going
GEF Secretariat learning missions/site visits	Project Manager and UNDP-GEF team	None	None	To be determined.

<sup>12</sup> Excluding project team staff time and UNDP staff time and travel expenses.

<sup>13</sup> The costs of UNDP Country Office and UNDP-GEF’s participation and time are charged to the GEF Agency Fee.

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget <sup>12</sup> (US\$)		Time frame
		GEF grant	Co-financing	
Mid-term GEF Tracking	<i>Project Manager</i>	<i>5,000</i>	<i>None</i>	<i>Before mid-term review mission takes place.</i>
Independent Mid-term Review (MTR)	<i>UNDP Country Office and Project team and UNDP-GEF team</i>	<i>20,000</i>	<i>5,000</i>	<i>Between 2<sup>nd</sup> and 3<sup>rd</sup> PIR.</i>
Annual audit costs	<i>UNDP Country Office and Project team</i>	<i>38,038</i>	<i>Per year: 5,000 Total: 25,000</i>	<i>Annually</i>
Final GEF Tracking Tool	<i>Project Manager</i>	<i>5,000</i>	<i>None</i>	<i>Before terminal evaluation mission takes place</i>
Independent Terminal Evaluation (TE) included in UNDP evaluation plan	<i>UNDP Country Office and Project team and UNDP-GEF team</i>	<i>30,000</i>	<i>None</i>	<i>At least three months before operational closure</i>
Translation of MTR and TE reports into English	<i>UNDP Country Office</i>	<i>5,000</i>	<i>500</i>	<i>As required. GEF will only accept reports in English.</i>
<b>TOTAL indicative COST</b> Excluding project team staff time, and UNDP staff and travel expenses		<b>\$178,038</b>	<b>\$83,000</b>	

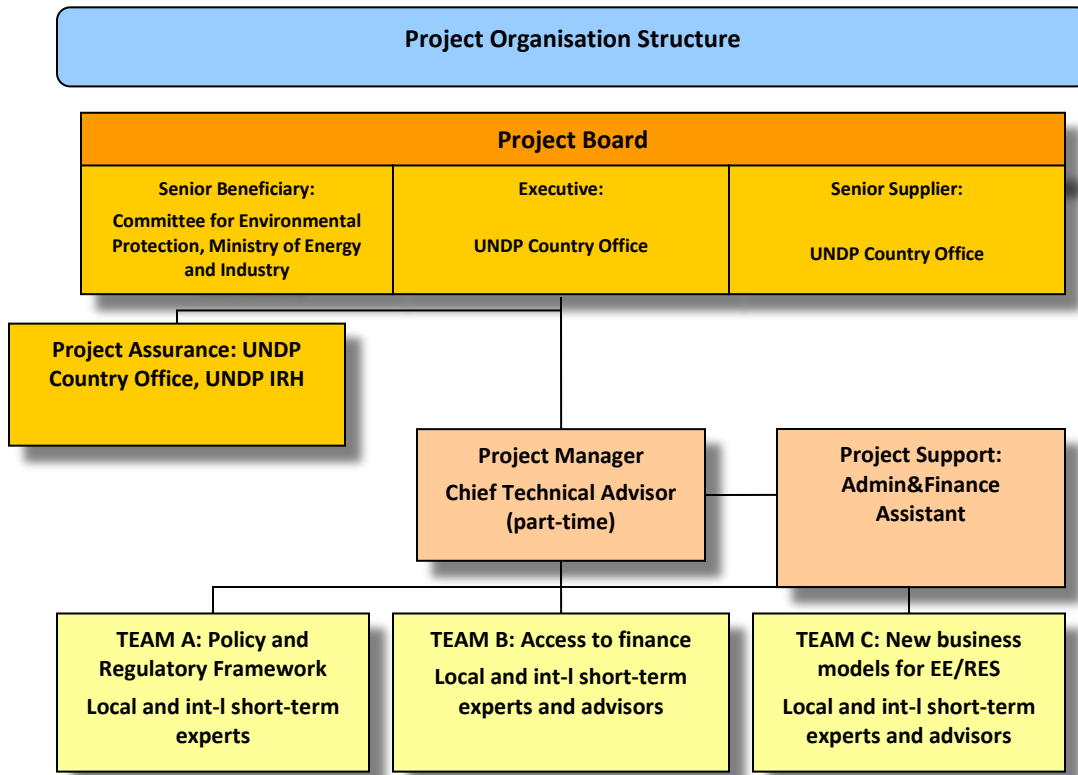
## VIII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

148. Roles and responsibilities of the project's governance mechanism: The project will be implemented following UNDP's Direct Implementation Modality (DIM), in line with *Standard Basic Assistance Agreement* between the Government of Tajikistan and the United Nations Development Programme (UNDP) signed by the parties on 1 October 1993.

149. The **Implementing Partner** for this project is UNDP. The Implementing Partner is responsible and accountable for managing this project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of UNDP resources. The Implementing Partner is responsible for:

- Approving and signing the multiyear workplan;
- Approving and signing the combined delivery report at the end of the year; and,
- Signing the financial report or the funding authorization and certificate of expenditures.

150. The project organisation structure is as follows:



151. **Project Board:** The Project Board (also called Project Steering Committee) is responsible for making by consensus, management decisions when guidance is required by the Project Manager, including recommendations for UNDP/Implementing Partner approval of project plans and revisions, and addressing any project level grievances. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case a consensus cannot be reached within the Board, final decision shall rest with the UNDP Programme Manager.

Specific responsibilities of the Project Board include:

- Provide overall guidance and direction to the project, ensuring it remains within any specified constraints;
- Address project issues as raised by the project manager;
- Provide guidance on new project risks, and agree on possible countermeasures and management actions to address specific risks;
- Agree on project manager's tolerances as required;
- Review the project progress, and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to plans;
- Appraise the annual project implementation report, including the quality assessment rating report; make recommendations for the workplan;
- Provide ad hoc direction and advice for exceptional situations when the project manager's tolerances are exceeded; and
- Assess and decide to proceed on project changes through appropriate revisions.

The composition of the Project Board must include the following roles:

Executive: The Executive is an individual who represents ownership of the project who will chair the Project Board. This role can be held by a representative from the Government Cooperating Agency or UNDP. The Executive is:

The Executive is ultimately responsible for the project, supported by the Senior Beneficiary and Senior Supplier. The Executive's role is to ensure that the project is focused throughout its life cycle on achieving its objectives and delivering outputs that will contribute to higher level outcomes. The executive has to ensure that the project gives value for money, ensuring cost-conscious approach to the project, balancing the demands of beneficiary and supplier.

Specific Responsibilities: (as part of the above responsibilities for the Project Board)

- Ensure that there is a coherent project organisation structure and logical set of plans;
- Set tolerances in the AWP and other plans as required for the Project Manager;
- Monitor and control the progress of the project at a strategic level;
- Ensure that risks are being tracked and mitigated as effectively as possible;
- Brief relevant stakeholders about project progress;
- Organise and chair Project Board meetings.

Senior Supplier: The Senior Supplier is an individual or group representing the interests of the parties concerned which provide funding and/or technical expertise to the project (designing, developing, facilitating, procuring, implementing). The Senior Supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project. The Senior Supplier role must have the authority to commit or acquire supplier resources required. If necessary, more than one person may be required for this role. Typically, the implementing partner, UNDP and/or donor(s) would be represented under this role. The Senior Supplier is:

Specific Responsibilities (as part of the above responsibilities for the Project Board)

- Make sure that progress towards the outputs remains consistent from the supplier perspective;
- Promote and maintain focus on the expected project output(s) from the point of view of supplier management;
- Ensure that the supplier resources required for the project are made available;
- Contribute supplier opinions on Project Board decisions on whether to implement recommendations on proposed changes;
- Arbitrate on, and ensure resolution of, any supplier priority or resource conflicts.

Senior Beneficiary: The Senior Beneficiary is an individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries. The Senior Beneficiary role is held by a representative of the government or civil society. The Senior Beneficiary is:

The Senior Beneficiary is responsible for validating the needs and for monitoring that the solution will meet those needs within the constraints of the project. The Senior Beneficiary role monitors progress against targets and quality criteria. This role may require more than one person to cover all the beneficiary interests. For the sake of effectiveness, the role should not be split between too many people.

Specific Responsibilities (as part of the above responsibilities for the Project Board)

- Prioritize and contribute beneficiaries' opinions on Project Board decisions on whether to implement recommendations on proposed changes;
- Specification of the Beneficiary's needs is accurate, complete and unambiguous;

- Implementation of activities at all stages is monitored to ensure that they will meet the beneficiary's needs and are progressing towards that target;
- Impact of potential changes is evaluated from the beneficiary point of view;
- Risks to the beneficiaries are frequently monitored.

**152. Project Manager:** The Project Manager has the authority to run the project on a day-to-day basis on behalf of the Project Board within the constraints laid down by the Board. The Project Manager is responsible for day-to-day management and decision-making for the project. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

The Implementing Partner appoints the Project Manager, who should be different from the Implementing Partner's representative in the Project Board.

Specific responsibilities include:

Provide direction and guidance to project team(s)/ responsible party (ies);

- Liaise with the Project Board to assure the overall direction and integrity of the project;
- Identify and obtain any support and advice required for the management, planning and control of the project;
- Responsible for project administration;
- Plan the activities of the project and monitor progress against the project results framework and the approved annual workplan;
- Mobilize personnel, goods and services, training and micro-capital grants to initiative activities, including drafting terms of reference and work specifications, and overseeing all contractors' work;
- Monitor events as determined in the project monitoring schedule plan/timetable, and update the plan as required;
- Manage requests for the provision of financial resources by UNDP, through advance of funds, direct payments or reimbursement using the fund authorization and certificate of expenditures;
- Monitor financial resources and accounting to ensure the accuracy and reliability of financial reports;
- Be responsible for preparing and submitting financial reports to UNDP on a quarterly basis;
- Manage and monitor the project risks initially identified and submit new risks to the project board for consideration and decision on possible actions if required; update the status of these risks by maintaining the project risks log;
- Capture lessons learned during project implementation;
- Prepare the annual workplan for the following year; and update the Atlas Project Management module if external access is made available.
- Prepare the GEF PIR and submit the final report to the Project Board;
- Based on the GEF PIR and the Project Board review, prepare the AWP for the following year.
- Ensure the mid-term review process is undertaken as per the UNDP guidance, and submit the final MTR report to the Project Board.
- Identify follow-on actions and submit them for consideration to the Project Board;
- Ensure the terminal evaluation process is undertaken as per the UNDP guidance, and submit the final TE report to the Project Board;

**153. Project Assurance:** UNDP provides a three – tier supervision, oversight and quality assurance role – funded by the GEF agency fee – involving UNDP staff in Country Offices and at regional and headquarters levels. Project Assurance must be totally independent of the Project Management function. The quality assurance role supports the Project Board and Project Management Unit by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. The Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. This project oversight and quality assurance role is covered by the GEF Agency.

**154. UNDP Direct Project Services:** UNDP will provide Direct Project Services (DPS), according to UNDP policies on GEF funded projects. DPS costs are those incurred by UNDP for the provision of services that are execution

driven and can be traced in full to the delivery of project inputs. Direct Project Services are over and above the project cycle management services. They relate to operational and administrative support activities carried out by UNDP. DPS include the provision of the following estimated services: i) Payments, disbursements and other financial transactions; ii) Recruitment of staff, project personnel, and consultants; iii) Procurement of services and equipment, including disposal; iv) Organization of training activities, conferences, and workshops, including fellowships; v) Travel authorization, visa requests, ticketing, and travel arrangements; vi) Shipment, custom clearance, vehicle registration, and accreditation. As is determined by the GEF Council requirements, these service costs are assigned as Project Management Cost, identified in the project budget as Direct Project Costs. Eligible Direct Project Costs should not be charged as a flat percentage. They should be calculated on the basis of estimated actual or transaction based costs and should be charged to the direct project costs account codes: “64397- Direct Project Costs – Staff” and “74596-Direct Project Costs – General Operating Expenses (GOE)”.

Governance role for project target groups:

155.SMEs, as delivery agents in the GE market, will contribute to the project’s success through their technical knowledge and specific local experience. Partner SMEs will be selected through open and transparent process.

156.Similarly, partner MFIs are the key delivery agents for Component 2. The selection of financial partners shall be conducted based on open and transparent tender procedures and established criteria regarding financial, operational and administrative capacities of financial partners, as well as UNDP’s requirements.

157.In line with UNDP’s Guidance on Micro-capital Grants, the selected financial partner must demonstrate competency in the following areas:

- a. Institutional strength. Sound institutional culture with a mission and vision that is supportive of the expansion of micro-finance services to low-income clients; management and information systems that provide accurate and transparent financial reports according to internationally recognised standards; and efficient operating systems;
- b. Quality service and outreach. Focus on serving low-income clients and on expanding client reach and market penetration; financial services that meet the needs of their clients;
- c. Examples of needs-oriented services are small, short-term loans with collateral substitutes or alternative forms of collateral, and safe, convenient savings facilities. A reasonable time frame for sustainability is 5 to 7 years.
- d. Sound financial performance. Interest rates on loans sufficient to cover the full costs of efficient lending on a sustainable basis; low portfolio in arrears and low default rates; a diversified funding base for its micro-finance operations to minimise dependency on donor subsidies.

158.Further requirements and eligibility criteria for financial partner selection are specified in the relevant UNDP policies, i.e. UNDP Guidance on Micro-capital Grants and UNDP Microfinance Policy.

159.Agreement on intellectual property rights and use of logo on the project’s deliverables and disclosure of information: In order to accord proper acknowledgement to the GEF for providing grant funding, the GEF logo will appear together with the UNDP logo on all promotional materials, other written materials like publications developed by the project, and project hardware. Any citation on publications regarding projects funded by the GEF will also accord proper acknowledgement to the GEF. Information will be disclosed in accordance with relevant policies notably the UNDP Disclosure Policy<sup>14</sup> and the GEF policy on public involvement<sup>15</sup>.

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<sup>14</sup> See [http://www.undp.org/content/undp/en/home/operations/transparency/information\\_disclosurepolicy/](http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/)

<sup>15</sup> See [https://www.thegef.org/gef/policies\\_guidelines](https://www.thegef.org/gef/policies_guidelines)



## Project management

160. The Project unit will be based at the UNDP Programme Office (Tajikistan). Implementation of project activities will be fully supported by the Energy & Environment Programme Officer and the Head of UNDP Energy and Environment Programme, as well as other programme staff. The Project manager will ensure synergy with all ongoing relevant projects within the Programme for more effective impact.
161. The Project is fully embedded within the governance systems of Tajikistan and, as such, directly supports its structures, functions and strategic commitments. In this context, the Project will implement its activities using the existing structures in Tajikistan and ensure participation of relevant government stakeholders through the Project Board. Project activities related to cooperation, training and information sharing will aim to use already established, legitimate participatory bodies, as well as existing training and cooperation platforms.
162. The project oversight and assurance role will be provided by the UNDP Country Office. In line with UNDP's Accountability Framework and Oversight Policy, UNDP Tajikistan has put in place an Internal Control Framework for DIM projects to ensure their effective and independent oversight and quality assurance. In particular, Energy & Environment Programme Officer will take primary responsibility for overseeing project implementation and regularly communicating the results of oversight work to relevant and concerned parties, the Government and other project partners. Where applicable, the UN Resident Representative, The Country Director, and the Deputy Country Director will ensure standard oversight and guidance. Additional quality assurance will be provided by the Istanbul-based UNDP Regional Technical Advisor as needed.

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## IX. FINANCIAL PLANNING AND MANAGEMENT

163. The total cost of the project is US\$24,469,963. This is financed through a GEF grant of \$2,519,963, \$300,000 in cash co-financing to be administered by UNDP and \$21,650,000 in parallel co-financing. UNDP, as the GEF Implementing Agency, is responsible for the execution of the GEF resources and the cash co-financing transferred to UNDP bank account only.
164. Parallel co-financing: The actual realization of project co-financing will be monitored during the mid-term review and terminal evaluation process and will be reported to the GEF. The planned parallel co-financing will be used as follows:

Co-financing source	Co-financing type	Co-financing amount, (US\$)	Planned Activities/Outputs	Risks	Risk Mitigation Measures
Ministry of Energy and Water Resources	In-kind	500,000	Project Management and Implementation of Component 1 : EE-RES policy design and enforcement	Coordination issues and delay in activities may arise	Coordination ensured through participation of Ministry's representative at PB meetings
UNDP	Grant	300,000	Project Management Cost		
UNDP-managed Aide for Trade project	Grant	600,000	Capacity building of MFIs to	Coordination among different projects' activities,	Different projects' activities will be identified at the

Co-financing source	Co-financing type	Co-financing amount, (US\$)	Planned Activities/Outputs	Risks	Risk Mitigation Measures
			implement green loan programme	including timing of implementation	project inception phase, ensuring coordination and alignment of different outputs and synergies
Other UNDP-managed projects: OPEC, LITACA, BOMNAF	Grant	3,400,000	Implementation of EE-RES projects based on RESCO model	Coordination among different projects' activities, including timing of implementation	Different projects' activities will be identified at the project inception phase, ensuring coordination and alignment of different outputs and synergies
Ministry of Finance	Loan	10,000,000	Financing for green loans through MFIs	Terms and conditions of loans do not match profile of GE projects/applicants leading to low uptake of loans	Component 2 is aimed at addressing this risk through initial market study/ understanding parameters of projects and applicants and then through design of appropriate products which address existing gaps in MFIs' portfolio of products
Micro-Finance Institutions "Sarvati Vakhsh", "Mehnatobod"	Loan	350,000	Green loan financing	Terms and conditions of loans doesn't match profile of GE projects/applicants leading to low uptake of loans	Component 2 is aimed at addressing this risk through initial market study/understanding parameters of projects and applicants and then through design of appropriate products which address existing gaps in MFIs' portfolio of products
Micro-Finance Institution "Arvand"	Loan	1,500,000	Establishing green loan product	Terms and conditions of loans doesn't match profile of GE projects/applicants leading to low uptake of loans	Component 2 is aimed at addressing this risk through initial market study/understanding parameters of projects and applicants and then through design of

Co-financing source	Co-financing type	Co-financing amount, (US\$)	Planned Activities/Outputs	Risks	Risk Mitigation Measures
					appropriate products which address existing gaps in MFIs' portfolio of products
Pamir Energy	Equity	5,000,000	Investment in GE (solar, small hydro, storage)	Pamir Energy's financial standing may deteriorate	To be address by appropriate structuring of the concession agreement between the Government and Pamir energy
SMEs (Sistemavtomatika, 55Group)	In-kind	300,000	Piloting RESCO model	SMEs' financial and organizational capacity constraints	Component 3 of the project will address this risk by supporting SMEs

165. **Budget Revision and Tolerance:** As per UNDP requirements outlined in the UNDP POPP, the project board will agree on a budget tolerance level for each plan under the overall annual work plan allowing the project manager to expend up to the tolerance level beyond the approved project budget amount for the year without requiring a revision from the Project Board. Should the following deviations occur, the Project Manager and UNDP Country Office will seek the approval of the UNDP-GEF team as these are considered major amendments by the GEF:

- a) Budget re-allocations among components in the project with amounts involving 10% of the total project grant or more;
- b) Introduction of new budget items/or components that exceed 5% of original GEF allocation.

166. Any over expenditure incurred beyond the available GEF grant amount will be absorbed by non-GEF resources (e.g. UNDP TRAC or cash co-financing).

167. **Refund to Donor:** Should a refund of unspent funds to the GEF be necessary, this will be managed directly by the UNDP-GEF Unit in New York.

168. **Project Closure:** Project closure will be conducted as per UNDP requirements outlined in the UNDP POPP. On an exceptional basis only, a no-cost extension beyond the initial duration of the project will be sought from in-country UNDP colleagues and then the UNDP-GEF Executive Coordinator.

169. **Operational completion:** The project will be operationally completed when the last UNDP-financed inputs have been provided and the related activities have been completed. This includes the final clearance of the Terminal Evaluation Report (that will be available in English) and the corresponding management response, and the end-of-project review Project Board meeting. The Implementing Partner through a Project Board decision will notify the UNDP Country Office when operational closure has been completed. At this time, the relevant parties will have already agreed and confirmed in writing on the arrangements for the disposal of any equipment that is still the property of UNDP.

170. **Financial completion:** The project will be financially closed when the following conditions have been met:

- a) The project is operationally completed or has been cancelled;
- b) The Implementing Partner has reported all financial transactions to UNDP;
- c) UNDP has closed the accounts for the project;

d) UNDP and the Implementing Partner have certified a final Combined Delivery Report (which serves as final budget revision).

171. The project will be financially completed within 12 months of operational closure or after the date of cancellation. Between operational and financial closure, the implementing partner will identify and settle all financial obligations and prepare a final expenditure report. The UNDP Country Office will send the final signed closure documents including confirmation of final cumulative expenditure and unspent balance to the UNDP-GEF Unit for confirmation before the project will be financially closed in Atlas by the UNDP Country Office.

## X. TOTAL BUDGET AND WORK PLAN

Atlas Proposal or Award ID:	00097769	Atlas Primary Output Project ID:	00101356
Atlas Proposal or Award Title:	Green Energy Small and Medium Enterprises (SMEs) Development Project		
Atlas Business Unit	TJK10		
Atlas Primary Output Project Title	Green Energy Small and Medium Enterprises (SMEs) Development Project		
UNDP-GEF PIMS No.	5476		
Implementing Partner	UNDP		

GEF Outcome/ Atlas Activity	Responsible Party (Implementing Agent)	Fund ID	Donor Name	Atlas Account Code	ATLAS Budget Description	Amount (USD) Year 1	Amount (USD) Year 2	Amount (USD) Year 3	Amount (USD) Year 4	Amount (USD) Year 5	Total (USD)	Budget Notes:
Activity 1: Enabling policy and regulatory framework and capacity development for green energy SMEs	UNDP	62000	GEF	71200	International Consultants	\$3,500	\$3,500	\$3,500	\$3,500	\$3,500	\$17,500	1
				71300	Local Consultants	\$20,000	\$20,000	\$10,000			\$50,000	2
				71400	Contractual Services Individual	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$90,000	3
				71600	Travel	\$3,000	\$3,000	\$3,000	\$3,000	\$3,000	\$15,000	4
				72100	Contractual Services- Companies	\$30,000	\$42,750	\$42,750	\$42,750	\$34,000	\$192,250	5
				74200	Audio Visual & Print Prod Costs		\$3,000	\$3,000	\$3,000	\$3,000	\$12,000	6
				75700	Training Workshop and Conference	\$2,000	\$2,000	\$2,000	\$2,000	\$2,000	\$10,000	7
	TOTAL ACTIVITY 1						\$76,500	\$92,250	\$82,250	\$72,250	\$63,500	\$386,750
Activity 2: Improved access to finance for green energy SMEs and/or energy service users	UNDP	62000	GEF	71200	International consultants	\$3,500	\$3,500	\$3,500	\$3,500	\$3,500	\$17,500	1
				71400	Contractual Services Individual	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$90,000	8
				71600	Travel	\$1,500	\$1,500	\$1,500	\$1,500		\$6,000	4
				72100	Contractual Services- Companies	\$8,000	\$6,000				\$14,000	9
				72600	Micro capital grants		\$130,000	\$130,000	\$140,000	\$135,090	\$535,090	10
	74200	Audio Visual & Print Prod Costs	\$1,500	\$1,410				\$2,910	11			
	TOTAL ACTIVITY 2						\$32,500	\$160,410	\$153,000	\$163,000	\$156,590	\$665,500
Activity 3: New business models for enabling green energy SME	UNDP	62000	GEF	71200	International Consultants	\$3,500	\$3,500	\$3,500	\$3,500	\$3,500	\$17,500	1
				71300	Local Consultants	\$8,000	\$8,000	\$8,000	\$8,000	\$8,000	\$40,000	12
				71400	Contractual Services Individual	\$32,400	\$32,400	\$32,400	\$32,400	\$32,400	\$162,000	13
				71600	Travel	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$50,000	14
				72100	Contractual Services- Companies	\$59,250	\$59,000	\$20,000	\$20,000	\$14,000	\$172,250	15

				72200	Equipment and Furniture		\$280,000	\$280,000	\$180,000		\$740,000	16
				74200	Audio Visual & Print Prod Costs				\$6,000		\$6,000	17
				75700	Training Workshop and Conference		\$5,000	\$5,000	\$5,000	\$5,000	\$20,000	18
	TOTAL ACTIVITY 3					\$113,150	\$397,900	\$358,900	\$264,900	\$72,900	\$1,207,750	
Activity 4: Project experience, results and lessons learned are systematically monitored, assessed, codified and disseminated	UNDP	62000	GEF	71200	International Consultants		\$30,000	\$20,000	\$30,000	\$30,000	\$110,000	19
				74200	Audio Visual & Print Prod Costs					\$10,000	\$10,000	20
				75700	Training Workshop and Conference					\$20,000	\$20,000	21
	TOTAL ACTIVITY 4					\$0	\$30,000	\$20,000	\$30,000	\$60,000	\$140,000	
Activity 5: Project Management	UNDP	62000	GEF	74596	Direct Project Costs	\$16,385	\$16,385	\$16,385	\$16,385	\$16,385	\$81,925	22
	UNDP	62000	GEF	72100	Contractual Services - Companies	\$9,665	\$9,665	\$6,165	\$6,265	\$6,278	\$38,038	23
	TOTAL ACTIVITY 5					\$26,050	\$26,050	\$22,550	\$22,650	\$22,663	\$119,963	
GEF TOTAL						\$248,200	\$706,610	\$636,700	\$552,800	\$375,653	\$2,519,963	
Activity 5: Project Management	UNDP	4000	TRAC	71400	Contractual Services Individual	\$43,400	\$43,400	\$43,400	\$43,400	\$43,400	\$217,000	24
				72100	Contractual Services- Companies	\$16,590	\$16,590	\$16,590	\$16,590	\$16,640	\$83,000	25
	TOTAL ACTIVITY 5					\$59,990	\$59,990	\$59,990	\$59,990	\$60,040	\$300,000	
TRAC TOTAL						\$59,990	\$59,990	\$59,990	\$59,990	\$60,040	\$300,000	
PROJECT TOTAL						\$308,190	\$766,600	\$696,690	\$612,790	\$435,693	\$2,819,963	

Summary of  
Funds:

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Amount Year 5	Total
<b>GEF</b>	\$248,200	\$706,610	\$636,700	\$552,800	\$375,653	\$2,519,963
<b>UNDP</b>	\$59,990	\$59,990	\$59,990	\$59,990	\$60,040	\$300,000
<b>UNDP in kind</b>	\$800,000	\$800,000	\$800,000	\$800,000	\$800,000	\$4,000,000
<b>Ministry of Energy and Water Resources</b>	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	500,000
<b>Ministry of Finance</b>	\$3,000,000	\$2,000,000	\$2,500,000	\$1,500,000	\$1,000,000	10,000,000

<b>Pamir Energy Company</b>	\$250,000	\$2,000,000	\$2,000,000	\$500,000	\$250,000	5,000,000
<b>Micro Finance Institution “Arvand”</b>	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	1,500,000
<b>MFIs “Sarvati Vakhsh” and “Mehnatobod”</b>	\$70,000	\$70,000	\$70,000	\$70,000	\$70,000	350,000
<b>55Group Company</b>	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	200,000
<b>OJSC “Systemavtomatika”</b>	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000	100,000
<b>TOTAL</b>	<b>\$4,888,190</b>	<b>\$6,096,600</b>	<b>\$6,526,690</b>	<b>\$3,942,790</b>	<b>\$3,015,693</b>	<b>\$24,469,963</b>

<b>Budget Note number</b>	<b>Justification</b>
1	33.33% cost of CTA (@700\$/day for 75 days)
2	Cost of local consultants to develop policy and regulatory framework (@500\$/wk for 100 weeks)
3	25% cost of Project Manager (@ \$27,614 annual proforma cost) + Legal Advisor (@600\$/wk for 80 weeks)
4	Local and international travel
5	Company services: review of international standards, development of new standards and MVE system, training and capacity building for national authorities, design of financial support mechanisms
6	Training materials
7	Premises and workshop expenses for training programme
8	Financial Advisor (@600\$/wk for 150wks)
9	Company services: green loan product design and training for MFIs
10	Green loan programme implementation through MFI. The MFIs with experience in RE and EE loans' management to be selected through competitive process. Maximum of \$150,000 can be granted per MFI in accordance with UNDP POPP and UNDP Guidance on Micro-capital grants. By Tajik Law, there are a number of entities that can be engaged into microfinance activities, including “microfinance funds”, which are “not for profit entities” (as defined in the Law on Microfinance of the Republic of Tajikistan). The list of all microcredit funds can be found here: <a href="http://nbt.tj/en/banking_system/fondhoi_karzii_khurd.php">http://nbt.tj/en/banking_system/fondhoi_karzii_khurd.php</a> . Partner MFIs for implementation of the proposed financial instrument will be selected from among “microfinance funds”, i.e. only MFIs with non-for-profit status will be eligible to apply. UNDP Tajikistan has established a mechanism for the Grant Committee to review applications and approve microfinance funds to be eligible for UNDP grant support. The Grant Committee reviews applicants following the announcement of the Expression of Interest. The same mechanism and institutional arrangements will be used to select partner MFIs for the GEF project.
11	Green loan promotion materials
12	Cost of local consultants to support RESCO model design and implementation + SWH Facilitators (@500\$/wk for 40 weeks)
13	25% cost of Project Manager (@ \$27,614 annual proforma cost) + RESCO Coordinator/Facilitator (@500\$/wk for 240 weeks)
14	In-country monitoring travel to project sites

Budget Note number	Justification
15	Company services: a) RESCO model design, technical design and specs, trainings for RESCOs; b) Company services: design and implementation PR, awareness raising and KM dissemination campaign
16	Pilot RESCO project implementation: procurement of equipment (solar PV)
17	Project PR and KM video materials and translation costs
18	Premises and workshop expenses for RESCO training programme + SWH facilitation programme
19	MTR (USD 20000); Final evaluation (USD 30,000); Develop appropriate methodology and assessment of achieved GHG emissions, as well as socio-economic benefits (including for women) (USD 30,000); Conduct assessment of environmental and socio-economic benefits of pilot projects in line with developed methodology (USD 30,000).
20	Inception report, KM materials and translation costs
21	Final conference for KM
22	Estimated direct project costs <u>per annum</u> are: a) for payments processing @ USD 30 UPL costs x 200 = USD 6,000; b) for travel claim (F10) processing @ USD 22.66 UPL costs x 100 = USD 2,266 c) for procurement process involving CAP @ USD 342 UPL costs x 7 = USD 2,394 d) for procurement process not involving CAP @ USD 141 UPL costs x 5 = USD 705 e) recruitment and service contract management @ USD 88 UPL costs x 40 = USD 3,520 e) issuance of contracts for consultancies @ USD 150 UPL costs x 10 = USD 1,500
23	Audit
24	50% cost of Project Manager (@ USD 27,614 annual proforma cost) + 100% cost of Project Administrative and Finance Assistant (@100% of USD 18,994 annual proforma cost), 100% cost of Driver (@ USD 8,677 of annual proforma cost) for the full project duration. ToRs for Project Manager, Project Administrative and Finance Assistant and Driver are in Annex E.
25	KM costs, M&E



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## **XI. LEGAL CONTEXT**

172. This document together with the CPAP signed by the Government and UNDP which is incorporated herein by reference, constitute together a Project Document as referred to in the Standard Basic Assistance Agreement (SBAA); as such all provisions of the CPAP apply to this document. All references in the SBAA to “Executing Agency” shall be deemed to refer to “Implementing Partner”, as such term is defined and used in the CPAP and this document.
173. MEWR as the Implementing Partner shall comply with the policies, procedures and practices of the United Nations safety and security management system.
174. UNDP will undertake all reasonable efforts to ensure that none of the project 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/sc/committees/1267/aq\\_sanctions\\_list.shtml](http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml). This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.
175. Any designations on maps or other references employed in this project document do not imply the expression of any opinion whatsoever on the part of UNDP concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

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## **XII. MANDATORY ANNEXES**

- A. Multi year Workplan
- B. Monitoring Plan
- C. Evaluation Plan
- D. GEF CCM Tracking Tool at baseline
- E. Terms of Reference
- F. UNDP Social and Environmental and Social Screening Template (SESP)
- G. UNDP ESMP
- H. Gender Assessment and Action Plan
- I. UNDP Project Quality Assurance Report
- J. UNDP Risk Log
- K. Co-financing letters

## Annex A: Multi Year Work Plan

Task/ Output	Responsible Party	Year 1	Year 2	Year 3	Year 4	Year 5
<b>1: Enabling policy and regulatory framework and capacity development for GE SMEs</b>						
Output 1.1: Specific policies and regulations promoting wider adoption of EE/RE technologies by end-users developed	MEWR					
Output 1.2: Financial incentives and support mechanisms for GE designed	MEWR					
Output 1.3: Performance standards for PV and SWH products developed and MVE designed	MEWR					
<b>2: Access to finance for GE SMEs and/or energy service users</b>						
Output 2.1: Standard micro-financing products developed and introduced by MFIs	MEWR					
Output 2.2: Capacity built at MFIs to implement and monitor performance of new products	MEWR					
<b>3: Business models for green energy SMEs</b>						
Output 3.1: RESCO Business Model for off-grid communities piloted and replicated	MEWR					
Output 3.2: Solar energy for tourism facilities and other SMEs	MEWR					
Output 3.3: Marketing and awareness raising campaign on GE conducted	MEWR					
<b>4: Knowledge management and M&amp;E</b>						
Output 4.1: Project results assessed, including achieved GHG emission reductions and socio-economic benefits, and made publicly available	MEWR					
Output 4.2: Independent mid-term review and final evaluation conducted	MEWR					
<b>Project management</b>	UNDP					

## Annex B: Monitoring Plan

The Project Manager will collect results data according to the following monitoring plan.

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
<b>Objective from the Project Results Framework</b>	<b>Indicator 1</b>	Number of new development partnerships with funding for improved energy efficiency and/or sustainable energy solutions targeting underserved communities/groups and women	Project team based on project progress reports and official documents confirming partner selection and signed partnership agreements	Annually Reported in DO tab of the GEF PIR	Project team	Official documents confirming partner selection and signed partnership agreements	Commitments and capacities in place at IP to monitor implementation  Risk: Private sector partner maybe unwilling to make publicly available information about funding
	<b>Indicator 2</b>	Extent of change in modern energy coverage by users	Contracts with end-users for provision of energy services/products	Annually Reported in DO tab of the GEF PIR	Project team and partners (SMEs, MFIs, RESCOs)	Partners' substantial report and project progress report	Responsibility for data collection should be incorporated in the partnership agreements with SMEs, MFIs and RESCOs  Risk: Signature of the contract with end-user may not necessarily lead to improved energy coverage (i.e. in terms of technology failure and/or insufficient capacities to operate it properly).

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
	<b>Indicator 3</b>	GHG emission reductions, tCO2	GHG emission reductions will be estimated based on project-specific methodology to be developed under Component 4, including specification of data sources and collection methods	Annually	Project Manager	Project progress report	Data collection will be imbedded in the TOR of all relevant sub-contractors as per methodology requirements  Risk: Baseline data may not be available at all and require additional investment in their collection
	<b>Indicator 4</b>	Increase in installed RE capacity per technology (MW for electricity, m <sup>2</sup> for SWH)	Implementing partner based on official information on installed RE plants	Annually	Project Manager	Project progress report	Willingness of the Implementing partner to provide data  Risk: Insufficient capacities of the implementing partner to collect data
	<b>Indicator 5</b>	Lifetime RE production per technology (MWh)	Estimated based on data on installed RE capacity from the Implementing partner	Annually	Project Manager	Project progress report	Willingness of the Implementing partner to provide data  Risk: Insufficient capacities of the implementing partner to collect data

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project Outcome 1	<b>Indicator 1</b>	Status of by-laws enabling implementation of the Energy Efficiency Law	Implementing partner, subsequent to adoption of Law	Annually Reported in DO tab of the GEF PIR	Project Manager	Project progress report	Implementing partner will take necessary action to have the Law adopted  Risk: status of by-laws is not official until they are formally adopted
	<b>Indicator 2</b>	Number of official trained (including women)	Project team based on records of the conducted training	Annually	Project Manager	Reports from training workshops	Inclusion in the TOR of the project team members responsible for training organization responsibilities regarding collection of required data (number of participants with breakdown by gender)  Risk: high staff turnover in public agencies may jeopardize results because of trained officials leaving their positions
	<b>Indicator 3</b>	Additional decentralized RE-based capacity enabled by the designed financial incentive scheme, MW	Implementing partner based on official information on installed RE plants	Annually	Project Manager	Project progress report	Willingness of the implementing partner to provide data  Risk: Insufficient capacities of the implementing partner to collect data

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
	<b>Indicator 4</b>	Status of system of compliance checks and enforcement of performance standard for EE/RE	Project team will provide report on status of implementation and enforcement of performance standards for EE/RE	Reported in DO tab of the GEF PIR	Project Manager	Project progress report	<p>Commitments and capacities in place at Implementing Partner to monitor implementation of the performance standard</p> <p>Risk: full data and information about real status of compliance and enforcement maybe impossible or too costly to collect</p>
<b>Project Outcome 2</b>	<b>Indicator 1</b>	Number and volume of green loans approved for SWH and other targeted EE/RE products	Partner MFIs	Annually	Project Responsible Partners (MFIs)	Project progress report	<p>Responsibilities for data collection are clearly specified in the partnership agreements with MFIs</p> <p>Risk: MFIs maybe unwilling/not in a position (due to confidentiality clause) to share full information about signed loans</p>

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
	<b>Indicator 2</b>	Number of beneficiaries using RE, including women	Partner MFIs	Reported in DO tab of the GEF PIR	Project Responsible Partners (MFIs)	Partner Banks annual report	Commitments and capacities in place at MFIs to monitor implementation  Risk: MFIs may not have enough capacities to monitor project implementation by beneficiaries, in particular technical aspects.
<b>Project Outcome 3</b>	<b>Indicator 1</b>	Installed new RE-power generation capacity based on RESCO model, MW	Pamir Energy LLC and other partner RESCOs	Reported in DO tab of the GEF PIR	RESCOs	Project progress report	Responsibilities for data collection are clearly specified in the partnership agreements with RESCOs  Risks: RESCOs may not be willing to disclose information about investments due to “commercial” interests
	<b>Indicator 2</b>	Number of SWH systems facilitated by the project	GE SMEs – “certified” by the project	Annually	Project team	Project progress report	Commitments and capacities in place at SMEs to monitor implementation  Risks: SME may not be willing to disclose all information regarding their clients



Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
	<b>Indicator 3</b>	Number of people with improved access to energy (including share of women)	Project team	Reported in DO tab of the GEF PIR	Project Manager	Project progress report	Responsibilities for data collection are clearly assigned within project team  Risk: not enough data about baseline energy access level in targeted community may jeopardize monitoring of project results
	<b>Indicator 4</b>	Number of people reached out by marketing and awareness raising campaign	Project team based on records of the conducted market research and conducted campaigns	Annually Reported in DO tab of the GEF PIR	Project Manager	Reports from M&A campaigns	Inclusion in the TOR of the project team members responsible for PR responsibilities regarding collection of required data  Risk: double-counting people reached out by the campaign (monitoring methodology has to account for this risk)
<b>Project Outcome 4</b>	<b>Indicator 1</b>	Number of organizations receiving results of project, including GHG emissions and socio-economic benefits	Project team based on records of the conducted market research and conducted campaigns	Reported in DO tab of the GEF PIR	Project Manager	Project progress report	Responsibilities for data collection are clearly assigned within project team  Risk: it will not be possible to estimate/count all organizations only those directly reached out, but further result dissemination impact ("word of mouth", etc) can't be monitored

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Mid-term GEF Tracking Tool	N/A	N/A	Standard GEF Tracking Tool available at <a href="http://www.thegef.org">www.thegef.org</a> Baseline GEF Tracking Tool included in Annex.	After 2 <sup>nd</sup> PIR submitted to GEF		Completed GEF Tracking Tool	All mandatory indicators from the GEF CCM Tracking tool have been incorporated in the project result framework. Assuming that M&E system in place to collect data and report on project result framework, it should be sufficient to report on GEF TT data  Risk: Project team doesn't understand the requirements/indicators of the CCM tracking tool (risk has to be addressed at the inception workshop)
Terminal GEF Tracking Tool	N/A	N/A	Standard GEF Tracking Tool available at <a href="http://www.thegef.org">www.thegef.org</a> Baseline GEF Tracking Tool included in Annex.	After final PIR submitted to GEF		Completed GEF Tracking Tool	All mandatory indicators from the GEF CCM Tracking tool have been incorporated in the project result framework. Assuming that M&E system in place to collect data and report on project result framework, it should be sufficient to report on GEF TT data
Mid-term Review	N/A	N/A	To be outlined in the MTR inception report	Submitted to GEF same year as 3 <sup>rd</sup> PIR	Independent evaluator	Completed MTR	Translation costs and travel costs included in budget.

Monitoring	Indicators	Description	Data source/Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Environmental and Social risks and management plans, as relevant.	N/A	N/A	Updated SESP and management plans  Environmental and Social Management Plans (ESMP) for moderate risk projects to be developed during the project inception period.	Annually  During inception period	Project Manager UNDP CO	Updated SESP  ESMP	N/A  Risk: ESMP implementation may require specific technical skills and qualification from the project team (provisions have to be made in terms of bringing qualified experts on board and/or training to responsible staff)

## Annex C: Evaluation Plan

Evaluation Title	Planned start date Month/year	Planned end date Month/year	Included in the Country Office Evaluation Plan	Budget for consultants (US\$)	Other budget (travel, site visits etc.)	Budget for translation (US\$)
Terminal Evaluation	September 2022	November 2022	Yes	30,000	-	5,000
Total evaluation budget				\$35,000		

#### **Annex D: GEF CCM Tracking Tool at baseline**

Provided as a separate Excel file

## **Annex E: Terms of References**

Terms of reference are provided below for Project Manager, Chief Technical Advisor, Project Board, Financial Mechanism Development Consultant, Project Driver and Project Administrative and Financial Assistant.

### **Project Manager**

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#### **Summary of key functions:**

In consultation with the Project Board, the Project Manager (PM) is responsible for day-to-day management, co-ordination and supervision of the implementation of the Project. Specifically, his\her responsibilities are but not limited to the following:

1. Supervises and ensures the timely implementation of the project relevant activities;
2. Prepares a detailed work plan for the project, manages the procurement and the project budget to assure timely involvement of local and international experts, organization of training and public outreach, purchase of required equipment etc. in accordance with UNDP rules and procedures;
3. Assures coordination among project activities;
4. Liaises with the relevant ministries, national and international research institutes, NGOs, and other relevant institutions in order to gather and disseminate information relevant to the project and organize realization of project activities;
5. Supervises and coordinates the contracts of the experts working for the project;
6. Submission of annual Project Implementation Reviews and other required progress reports to the PSC and the UNDP in accordance with the section “Monitoring and Evaluation” of the Project Document;
7. As applicable, communicating with the project’s international partners and attracting additional financing in order to fulfil the project objectives; and
8. Ensuring otherwise successful completion of the project in accordance with the stated outcomes and performance indicators summarized in the project’s results framework and within the planned schedule and budget.

#### **Required Skills and Experience:**

- Advanced degree in environment/development/management related studies or other related disciplines;
- Ten years’ experience in managing projects, including demonstrated capacity to actively explore new, innovative implementation and financing mechanisms to achieve the project objective;
- Good understanding of environment/development issues in Tajikistan;
- Demonstrated experience in working with government, donors and the United Nations system;
- Good analytical and problem-solving skills and the related ability for adaptive management with prompt action on the conclusion and recommendations coming out from the project’s regular monitoring and self-assessment activities as well as from periodic external evaluations;
- Ability and demonstrated success to work in a team, to effectively organize it, and to motivate its members and other project counterparts to effectively work towards the project’s objective and expected outcomes;
- Good communication skills and competence in handling project’s external relations at all levels;
- Familiarity and prior experience with UNDP and GEF requirements and procedures are considered as an asset;
- Fluency in English and local languages.

## **Chief Technical Advisor**

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### **Summary of key functions:**

In consultation with the Project Manager (PM) specifically, his\her responsibilities consist of the following:

1. Provides technical input in development of policies, regulations and bylaws;
2. Takes part in development of technical and non-technical guidance documents for all studies and assessment undertaken as part of the project;
3. Support and oversees the design of an innovative financing mechanism
4. Undertake an assessment of the monitoring network requirements and provides technical assistance;
5. Takes part in design and implementation of the RESCO scheme
6. Monitor field activities implementation
7. Provides support in organization of external evaluation of the project;
8. Ensures efficiency in the provision of support to local stakeholders at municipal level;
9. Ensures that all project-related issues and risks are identified and reported in a timely manner and suggests corrective measures;
10. Co-ordinates the work of the Project Team, individual consultants and contracted companies;
11. Organizes and implements trainings (through tailored-made seminars and on-the-job) to employees of Implementing Partner and relevant ministries to implement RESCO mechanism, along with organization of information workshops for municipalities and SMEs about the mechanisms of innovative financing and on the roles and responsibilities of all parties involved.
12. Assist PM in development of annual work plans based on the multi-year work plan included in Annex A, including annual output targets to support the efficient implementation of the project.
13. Identify capacity needs of municipal departments/companies and provide necessary trainings;
14. Provides support to mainstreaming gender equality in the project implementation;

### **Required Skills and Experience:**

- Degree in environmental science or engineering;
- Minimum ten years of professional experience in energy and environment field;
- Experience of the technical work in energy risk management and/or waste management;
- Experience of the development of low carbon interventions;
- Good analytical and problem-solving skills;
- Ability and demonstrated success to work in a team;
- Good communication skills and competence in handling project's external relations at all levels;

## Project Board

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- A Project Board will be established at the inception of the project to monitor project progress, to guide project implementation and to support the project in achieving its listed outputs and outcomes.
- It will be co-chaired by UNDP and Ministry of Energy and Water Resources of the Republic of Tajikistan focal point.
- Other participants can be invited into the Board meetings at the decision of the Board.
- The Board will meet regularly (at least twice a year) to review project progress, discuss and agree on project work plans. One of the key tasks of the Board will be to ensure coordination and synchronization of central and local-level activities supported by the project. In this respect, the Board will serve as a platform for key project stakeholders and beneficiaries to regularly get together and design a joint strategy of work on the project.
- The final list of the Project Board members will be completed at the outset of project operations and presented in the Inception Report by taking into account the envisaged role of different parties in the Board. The Project Manager will participate as a non-voting member in the Board meetings and will also be responsible for compiling a summary report of the discussions and conclusions of each meeting.
- The day-to-day management of the project will be carried out by a Project Manager under the overall guidance of the Project Board.

## Financial Mechanism Development Consultant for the Development of the RESCO Mechanism

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### Background:

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 SWH), focusing on off-grid communities and tourism facilities and other SMEs.

### Objective and functions:

The objective of the consultancy will be to develop a detailed financial scheme for the low-carbon urban development projects which represent a Renewable Energy Service Company (RESCO) in Republic of Tajikistan.

The output should address all of the aspects related to development of RESCO business model processes (performance-based), eligibility criteria for grants, monitoring and verification procedures for proving savings achieved, and procurement methods with criteria for awarding grants and revolving loans. The end result of the consultancy should include a clear formula and algorithm for awarding projects with grant/loans from the implementing partner (including appropriate legal and institutional arrangements).

The tasks encompassed will include the development of the RESCO business model processes (performance-based), eligibility criteria for grants, monitoring and verification procedures for proving savings achieved, and procurement methods with criteria for awarding grants and revolving loans.

The preparation of the outputs of the consultancy will be organized in cooperation and provision of support and guidance by the Project team.

The task will be based on: (i) a desk-review of available literature, (ii) consultations with relevant stakeholders (i.e. representatives of Ministry of Energy and Water Resources of the Republic of Tajikistan), and (iii) the considerations and insights of the service provider's team. The service provider will document consultations with stakeholders and support interaction with those stakeholders as partners to the financial instrument.



The report on financial instruments should have the following sections: (1) executive summary, (2) justification and elaboration of financial instrument selection, (3) detail description of procedures related to criteria for selection of eligible projects as well as monitoring and verification procedures and procurement methods with criteria for awarding grants and revolving loans; preferably presented in form of roadmap, (4) recommendations for next steps.

## Competencies

- |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Corporate Competencies:            | <ul style="list-style-type: none"> <li>• Demonstrates commitment to UNDP's mission, vision and values;</li> <li>• Displays cultural, gender, religion, race, nationality and age sensitivity and adaptability</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Core Competencies:                 | <ul style="list-style-type: none"> <li>• Demonstrating/safeguarding ethics and integrity;</li> <li>• Demonstrate corporate knowledge and sound judgment;</li> <li>• Self-development, initiative-taking;</li> <li>• Acting as a team player and facilitating team work;</li> <li>• Facilitating and encouraging open communication in the team, communicating effectively;</li> <li>• Creating synergies through self-control;</li> <li>• Managing conflict;</li> <li>• Learning and sharing knowledge and encourage the learning of others. Promoting learning and knowledge management/sharing is the responsibility of each staff member;</li> <li>• Informed and transparent decision-making.</li> </ul> |
| <b>Qualifications Requirements</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Education:                         | <ul style="list-style-type: none"> <li>• Bachelor's or equivalent degree in finance, economics or other related field. Master's or equivalent degrees will be at an advantage.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Experience:                        | <ul style="list-style-type: none"> <li>• At least 5 years of professional experience focused on finance.</li> <li>• Experience with preparation and implementation of public financial instruments to promote private sector investment in low-carbon energy. Specific experience with UNDP and GEF projects will be an advantage</li> <li>• Proven experience with financial modelling</li> <li>• Experience working in developing country contexts preferred, particularly those related to the Central Asian region</li> <li>• Experience working with multilateral organizations and the UN system preferred</li> <li>• Knowledge of MS Word, Excel and email communication software</li> </ul>          |
| Language Requirements:             | <ul style="list-style-type: none"> <li>• Fluency in English required. Excellent drafting skills required</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Others:                            | <ul style="list-style-type: none"> <li>• Familiarity with small PV and wind technologies and engineering economics</li> <li>• Excellent written and verbal communication skills</li> <li>• Strong organizational skills, ability to track and juggle multiple tasks</li> <li>• Good consultation and collaboration skills</li> </ul>                                                                                                                                                                                                                                                                                                                                                                         |

## Project Driver

### Background

The Project Driver will be locally recruited based on an open competitive process. He/she will be responsible to provide safe transportation services to the project. The Project Driver will report to the Project Manager.

### Duties and Responsibilities

- Ensures provision of reliable and secure driving services by:

- a) Driving project vehicles for the transport of authorized personnel and delivery and collection of mail, documents and other items;
- b) Meeting official personnel and visitors at the airport, visa and customs formalities arrangement when required;
- c) Drive office vehicles on official missions to locations inside and outside Tajikistan as required;
- Ensures cost-savings through proper use of vehicle through accurate maintenance of daily vehicle logs, provision of inputs to preparation of the vehicle maintenance plans and reports.
- Ensures proper day-to-day maintenance of assigned vehicles, through timely minor repairs, arrangements for major repairs, timely changes of oil, check of tires, brakes, car washing, etc.
- Ensures availability of all the required documents/supplies including vehicle insurance, vehicle logs, office directory, map of the city/country, first aid kit, and necessary spare parts.
- Ensures that all immediate actions required by rules and regulations are taken in case of involvement in accidents.

#### **Qualifications and experience**

- Secondary Education is mandatory;
- Valid Driver's license is mandatory;
- Five years' work experience as a driver;
- Safe driving record; knowledge of driving rules and regulations and skills in minor vehicle repair.
- Previous experience with international organizations is an advantage;
- Excellent knowledge of Tajik and Russian;
- Basic knowledge of English is an asset;
- Very good navigational skills. Excellent knowledge of roads and locations in Khatlon, GBAO and Tajik-Afghan border regions.
- Ability to communicate easily and effectively; diplomatic while pro-active, efficient, and organized.
- Ability to work under pressure and overtime hours, if required;
- High sense of responsibility, reliability, maturity and team spirit are important assets.
- Excellent knowledge of Tajik and Russian. Basic knowledge of English is an asset;
- Affinity with the mandate and role of the United Nations;
- Provides logistical support for the project, if required.

#### **Project Administrative and Financial Assistant**

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##### **Background**

The Project Administrative and Financial Assistant will be locally recruited based on an open competitive process. He/she will be responsible for the overall administrative support to, and financial management of the project. The Project Financial Assistant will report to the Project Manager.

##### **Duties and Responsibilities**

- Collect, register and maintain all information on project activities;
- Contribute to the preparation and implementation of progress reports;
- Advise all project counterparts on applicable administrative procedures and ensures their proper implementation;
- Assist in procurement and recruitment processes;
- Receive, screen and distribute correspondence and attach necessary background information;
- Prepare routine correspondence and memoranda for Project Managers signature;
- Assist in logistical organization of meetings, training and workshops;
- Prepare agendas and arrange field visits, appointments and meetings both internal and external related to the project activities and write minutes from the meetings;
- Maintain a project filing system;

- Maintain records over project equipment inventory;
- Monitor project budgets and financial expenditures;
- Assist in all procurement and recruitment processes;
- Advise all project counterparts on applicable financial procedures and ensures their proper implementation;
- Contribute to the preparation and implementation of progress and financial reports;
- Support the preparations of project work-plans, budgets and operational and financial planning processes;
- Assist in the preparation of payments requests for operational expenses, salaries, insurance, etc. against project budgets and work plans;
- Work closely with financial counterparts in the UNDP CO on payment requests;
- Follow-up on timely disbursements by the UNDP CO;
- Maintain data on co-financing commitments to the project;
- Coordinate the annual financial audit of the project; and
- Perform other duties as required.

#### **Qualifications and experience**

- A post-school qualification (diploma, or equivalent), preferably in financial management, accountancy or bookkeeping (or equivalent);
- At least 5 years of relevant financial management experience;
- Work experience in UNDP-GEF projects is highly desirable;
- Demonstrable ability to administer project budgets, and track financial expenditure;
- Excellent computer skills, in particular mastery of all applications of the MS Office package;
- Excellent written communication skills; and
- Knowledge of English and Russian is a requirement, while knowledge of Tajik will be an advantage.

## **Annex F: UNDP Social and Environmental and Social Screening Template (SESP)**

Provided as a separate annex

## **Annex G: Environmental and Social Management Plans (ESMP) for moderate and high risk projects only**

This project has identified as “moderate” risk, therefore an ESMP will be developed during the project inception period in parallel with preparing technical design for the pilot RESCO project (Activity 3.1.2) ESMP will form an integral part of the project design and will be submitted to the Government and UNDP-GEF for approval.

The objective of the ESMP is to ensure compliance of relevant policies and to direct the Project personnel and stakeholders during the implementation of the project in tackling the social and environmental concerns identified. Among those, the ESMP aims to manage the environmental and social impacts through appropriate mitigation measures that may arise with the implementation of the project. The ESMP will provide specific guidance to be followed consistent with any existing environmental and social impact studies of working sites (to be identified) but also the policies at the local, national and international level, and the UNDP.

The 'moderate' risk rating is due mainly to potential investments that may require construction works, such as construction of small hydro power plants and/or additional construction works to enable adequate installation of SWH systems (e.g. roof strengthening, etc). The preliminary consideration of potential environmental and social risks mainly relate to installation, operation and management of renewable energy systems (small hydro and/or solar systems), although sitting of the works may also involve moderate impacts.

It is expected that the Project will lead to sound positive environmental impacts due to the reduction of GHG emissions as a result of investment in solar PV and small-hydro power plants in off-grid communities, which currently depend on unsustainable use of biomass resources and diesel-based power generators.

It is also expected that the Project will lead to positive social impacts stemming from improved access to energy services by rural populations of Tajikistan, in particular in remote Pamir mountains, which are currently suffering from unreliable energy supply or do not have any access to centralized energy supply. In total over 17,000 people, including 11,000 women, will directly benefit from the Project's support.

Potential negative impacts will be identified and mitigation measures will be applied. These may relate to typical challenges faced by small-scale renewables investments, including safety to personnel during construction works and/or potential conflict between water-users (in case of small hydro).

The ESMP will include the following sections:

- Section 1 – Project scope and coverage, and objectives of the ESMP
- Section 2 – Potential social and environmental impacts due to the project activities and the methodology used
- Section 3 – Analysis of the legal and institutional framework relevant to the safeguards
- Section 4 – Procedures used for screening, assessment and management of environmental and social risks identified.
- Section 5 – Overview of institutional capacity assessment and building, including the assignment of responsibilities along the project cycle.
- Section 6 – Stakeholder engagement and disclosure process.
- Section 7 – UNDP's grievance redress mechanism to be utilised during the project.
- Section 8 – Monitoring and evaluation arrangements
- Section 9 – Budget for ESMP implementation.

The ESMP will be submitted to UNDP-GEF for review and approval.

## Annex H: Gender Assessment and Action Plan

### Purpose of this Annex

The Gender Assessment and Action plan represents an overview of the gender equality in Tajikistan, with special focus on energy and economy. After a brief analysis, performed by relying on recent country gender assessments performed by the Asian Development Bank in 2016 and World Bank in 2017. The shown content covers the brief contextual background of Tajikistan, leading to the overview of present state gender equality. Focus is further put on the energy sector and entrepreneurship. The Gender Action Plan is presented at the end of the Annex.

### Background

Tajikistan ranked 102nd out of 142 countries in the World Economic Forum's 2014 Global Gender Gap Index, with a score of 0.665, indicating limited progress from its 2007 score of 0.658. While its scores for educational attainment and for health and survival are relatively high, scores for both economic participation and opportunity (labor force participation, wage equality, and the numbers of senior, professional, and technical workers) and political empowerment (women in parliament and ministerial positions) are low, and offset the other positive indicators of equality.

Since 2009, Tajikistan has experienced a reduction in poverty, but rates still remain high. There are no differences in the relative rates for men and women, but female-headed households are more at risk for poverty and extreme poverty than households headed by males. National surveys indicate that households headed by females are less likely to have valuable goods such as cars, trucks, computers, land, and livestock. Given that the number of households headed by females appears to be increasing, women's limited access to and control over assets has serious repercussions for a considerable portion of the population.

### Overview of present state of gender equality

The national framework for gender equality, specifically the Law on State Guarantees of Equal Rights and Opportunities for Men and Women, lacks clear implementation processes. Other laws aim at protecting women's rights and security, such as those combating human trafficking, preventing domestic violence, and raising the legal age of marriage to 18 years. A national gender policy was passed in 2010, the National Strategy for Enhancing the Role of Women in the Republic of Tajikistan, which lists concrete actions to improve women's participation in education, the labor market, entrepreneurship, and in politics, albeit without identifying responsible agencies, timeframes with milestones, funding sources, and monitoring plans.

*Ethnographic interviews in Tajikistan reveal that the presence of remittance income can be a key determinant of whether the family can afford to pay electricity bills and buy heating fuels for the winter.* It is common for migrants to send money home in the summer/fall that is dedicated to purchasing wood or coal for the winter. A household's ability to procure energy sources can change drastically in the event a migrant loses a job, returns home, or stops sending remittances.

"Abandoned wives" and their households in Tajikistan constitute an increasingly vulnerable group, and one that is also hard to identify and reach with assistance programs. A 2009 IOM study estimated that up to one-third of labor migrants may settle permanently in the host country. The same study also found that families abandoned by migrants often live in primitive conditions without much support from family or extended family.

The female labor force participation rate is 45% and varies by region. In 2013, women's average monthly wages were only 63.3% of men's, which is already an improvement over the last decade. It is not clear whether the narrowing wage gap is due to salary increases for women or to decreasing men's wages. Only part of the gender wage gap can

be accounted for in variables such as differing employment patterns. Gender discrimination and stereotypes also figure in women's lower pay as they are assumed to have other sources of support.

Male and female employment patterns differ: according to the most recent Labor Force Survey, men's level of economic activity is almost double that of women. The majority of the economically inactive female population is between the ages of 25 and 49; the sharp decline in women's economic activity at this age corresponds directly to when they leave the labor market, marry, start families and have increased household obligations. In addition to domestic task distribution inequalities, women's generally lower level of education (especially vocational education), lack of professional qualifications, and high fertility rate combine with the absence of childcare facilities and gender stereotypes to place women in a weak employment position. Even among the working population, women are more commonly members of producers' cooperatives, as compared to men who generally work as employers or are self-employed (as own-account workers). A considerable segment of the population works in informal employment, and the majority of such workers are men. Still, many women work informally doing hard physical agricultural labor for long hours, in poor working conditions, and with a lack of such social protections as maternity leave and pension payments.

## Gender equality and energy

While energy poverty impacts the whole population, differences in access to resources ensures the impact on women and men is not the same. Household expenditures on gas (for cooking) and coal (for heating) are high, especially for rural households. As a result, the population relies heavily on supplementary fuels, which men are responsible for purchasing and women and children are responsible for collecting. Women spend considerable time collecting firewood, pressing dry dung, and preparing briquettes from coal dust, contributing considerably to the household budget through their labor. When energy resources are insufficient, daily domestic tasks are difficult. Insufficient heating and the use of unclean solid fuels for cooking contribute to health problems in women, children, and the elderly, who spend more time in the home.

Energy shortages also have a negative impact on businesses, especially small-sized and home-based enterprises. The types of businesses that women typically engage in, such as tailoring and sewing, and baking and food production, are associated with high electricity consumption. Women operating micro- and small-sized businesses may not have the capital to invest in generators, or even to pay high electricity tariffs. Women's entrepreneurship schemes should be linked to energy projects that could assist them to pay tariffs or to transition to more affordable or sustainable energy sources. It was reported that women are generally interested in efficiency and alternative sources of energy, but they are not always included in training programs, nor do they necessarily have the agency in the family to make decisions about adopting energy-saving technologies. As the population becomes exposed to new technologies, such as solar power, the need for local specialists will also increase, and there are potential opportunities for women if attention is given to attracting them to technical and vocational education and training in renewable energy.

## Entrepreneurship and Enterprise Development

Developing the private sector and attracting investment are cornerstones of national strategies for poverty reduction and improving living standards. The Government of Tajikistan and the international community have taken several positive steps to support women's entrepreneurship. After the "one window" system was introduced in 2009, the total number of individual entrepreneurs registering with tax authorities increased and in 2011, women represented 14.7% of sole proprietors overall. In the formal sector, women represented 21.3% of individual entrepreneurs operating on the basis of a patent (license) and 38.0% operating on the basis of a certificate from the tax authorities.

Support for women's entrepreneurship is a goal of the National Strategy for Enhancing the Role of Women in the Republic of Tajikistan for 2011–2020. Under this strategy, family-and home-based businesses receive particular attention with the goal of a more equitable distribution of labor, increased female agricultural employment, and

retraining for unemployed women. Gender analysis in the area of small and medium-sized enterprise development is complicated by incomplete data about women and men working in business, either as owners or employees. There is also no consensus on what constitutes a “women’s business” or “female entrepreneurship.” Still, women’s representation among registered owners of individual enterprises has increased. Female management of small, medium-and large-sized firms, however, is significantly less than in Eastern Europe and Central Asia combined. Women also represent roughly 20% of employees in the private sector.

Women’s businesses tend not only to be smaller in size, but they are also concentrated in service-oriented, nonproduction sectors where large number of workers are not required, or individual women work in high-risk sectors, such as shuttle and market-based trade. Although female-led firms have fewer employees, they do tend to hire more women, but they also have lower annual turnover and profits than male-led firms. Expanding opportunities for women to enter nontraditional, and more lucrative, sectors should have a follow-on effect of also increasing female employment.

Male and female entrepreneurs face many common problems in terms of starting and running businesses, such as access to finance, unfavorable tax rates, poor infrastructure, political instability, and corruption. However, prevailing gender norms are also responsible for women’s lower representation in business, and there are no special measures to offset the barriers that women face. Women experience greater bureaucratic obstacles in registering a business than men, are more likely to cite taxation as particularly onerous and, in some cases, report discrimination and harassment by tax authorities. Female entrepreneurs are also disadvantaged by their unequal access to human and social assets, such as business networks, specialized knowledge and skills, and even business-related information.

Despite loan requirements being gender neutral, in reality, women have more limited access to credit due to their lack of collateral, lack of business experience, high interest rates, and personal aversion to taking on risk. According to data from the Association of Microfinance Organizations of Tajikistan, on average around a quarter of microfinance loans and just under a third of bank loans were issued to women in 2014; additionally, the amount of credit that women received was less than what men received. Because women are less likely to have ownership rights to the kind of property that can serve as collateral, and they are deterred by interest rates that are too high for them to repay, women tend to borrow money from relatives or friends or to rely on remittances. Microfinance has also been an attractive option for women because of the less stringent collateral requirements and the possibility of group loans. However, there appears to be a decreasing number of female microcredit borrowers in recent years.

Gender stereotypes and how society perceives female entrepreneurs, and indeed how they perceive their own capacities, have a considerable impact on women’s success in business. Despite the growing number of female entrepreneurs, business is still widely perceived as a male occupation, especially running medium- and large-sized enterprises. Female entrepreneurs attach much greater value than males to family support because it is essential to whether a woman will start a business, for the general operation of the business, and for making decisions on new investments. Established female entrepreneurs who participated in this assessment also noted the value of receiving public recognition from a national organization, such as the National Association of Business Women of Tajikistan.

## Conclusion

There are many initiatives in Tajikistan to empower women economically; most focus on increasing women’s entrepreneurial activities through business training and, in some cases, small grants. The most effective initiatives combine basic business training with comprehensive assistance in developing business plans, followed by grants or credit lines that enable them to launch a business. Sustained support in the form of specialized training and information on marketing, legislation, taxation, regulations, and social fund payments, as well as mentoring, business incubators, small business support centers, and concessional loans, were also mentioned as aids for women growing their businesses.



## PROPOSED GENDER ACTION PLAN

Objective	Action	Indicator	Responsible Institution
<b>Component 1: Enabling policy and regulatory framework for GE SMEs</b>			
Strengthened public sector institutions, human resources, awareness and knowledge for gender sensitive climate smart policy making	Active involvement of women in capacity building and awareness seminars	Number of public sector technical staff and policy makers (% of women) trained	Governmental representatives
<b>Component 2: Access to finance for GE products/service users</b>			
Strengthened capacity of women entrepreneurs and women led SMEs to participate in the development of green markets	Awareness/training sessions targeting women entrepreneurs	Number of women entrepreneurs and/or women-led SMEs to participate in the development of green markets	Project team
Improved access of women led SME's to financing schemes	Inclusion of gender considerations in the guidelines/criteria for green loan products	Share of women/women-led SMEs among recipients/applicants of green loans	Partner MFIs
<b>Component 3: Business models for GE SMEs</b>			
Improved access to affordable and clean energy, in particular in rural areas	Inclusion of gender considerations in the scope of RESCO support mechanism	Share of women/women-headed households among project beneficiaries, i.e. households with improved energy access	RESCOs
Increased employment opportunities in GE sector	Targeted involvement of women in the jobs created under the RESCO projects	% of men and women representation in the number of jobs created	Project team
<b>Component 4: Knowledge Management and M&amp;E</b>			
Gender sensitive project best practices and evaluative knowledge	Ensure the set-up of the proper mechanism to monitor and report on gender impacts  Gender technical expert to support gender sensitive M&E and train project staff and partners (e.g. EFs staff) on gender based monitoring and evaluation	N/A	UNDP project and partners
	Dissemination of gender assessments, best practices and evaluative knowledge captured during the project implementation		UNDP office and UNDP Istanbul Regional Hub

## **Annex I: UNDP Project Quality Assurance Report**

To be prepared by the UNDP Country Office prior to issuance of the Delegation of Authority.

## Annex J: OFFLINE UNDP Risk Log

*To be entered into Atlas by UNDP Country Office*

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mngt response	Owner	Submitted	Last Update	Status
1	Widespread poverty and lack of sustainable source of income resulting in perceived low consumers' creditworthiness/ability to repay the loans	Project formulation	Other	Low uptake of project-facilitated green loans  I: 4 P: 3	MFIs will be trained to understand and assess financial benefits of GE projects. This knowledge will be further improved based on real-life data on loan performance collected through loan monitoring program.				
2	Weak technical capacities to design and implement GE projects, under-developed supply chain for O&M		Technical	Failure of demonstration project and as a result dwindling consumer confidence in RE technology and  I: 5 P: 5	International CTA will oversee project implementation and provide quality assurance in the course of GE pilot project design and implementation				
3	Lack of political support		Political	Achievement of immediate results may be jeopardized, in particular as far as creation of conducive investment framework is concerned  P = 3 I = 5	Work closely with MEWR and through them with other relevant public authorities (Ministry of Finance, Custom office, State Architecture Committee, etc).				
4	Climate change poses several risks to Tajik local communities, in particular related to increased occurrence of natural	Project formulation	Environmental	Failure or malfunction of RE systems  I: 2 P: 2	Knowledge and expertise of UNDP's Disaster Risk Management Programme in Tajikistan will be used to assess all nature/climate-related risks for GEF-supported investment				

	disasters (landslides, floods, etc.) and availability of water resources				(in particular small hydro) and develop risk mitigation measures, which would vary on a case-by-case basis.				
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## **Annex K: Co-financing letters**

Provided as a separate annex.

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### **XIII. TECHNICAL ANNEXES**

Annex I:	Overview of energy-development-environmental challenges in Tajikistan
Annex II:	Review of International experience with RESCO model
Annex III:	Financial, economic and environmental analysis of the GEF-supported investment
Annex IV:	Background information about Bulunkul village of Murgab District in Pamir, Tajikistan – pilot site for RESCO model implementation
Annex V:	Considerations of design options for financing de-risking instruments

## ANNEX I: OVERVIEW OF ENERGY-DEVELOPMENT-ENVIRONMENTAL CHALLENGES IN TAJIKISTAN

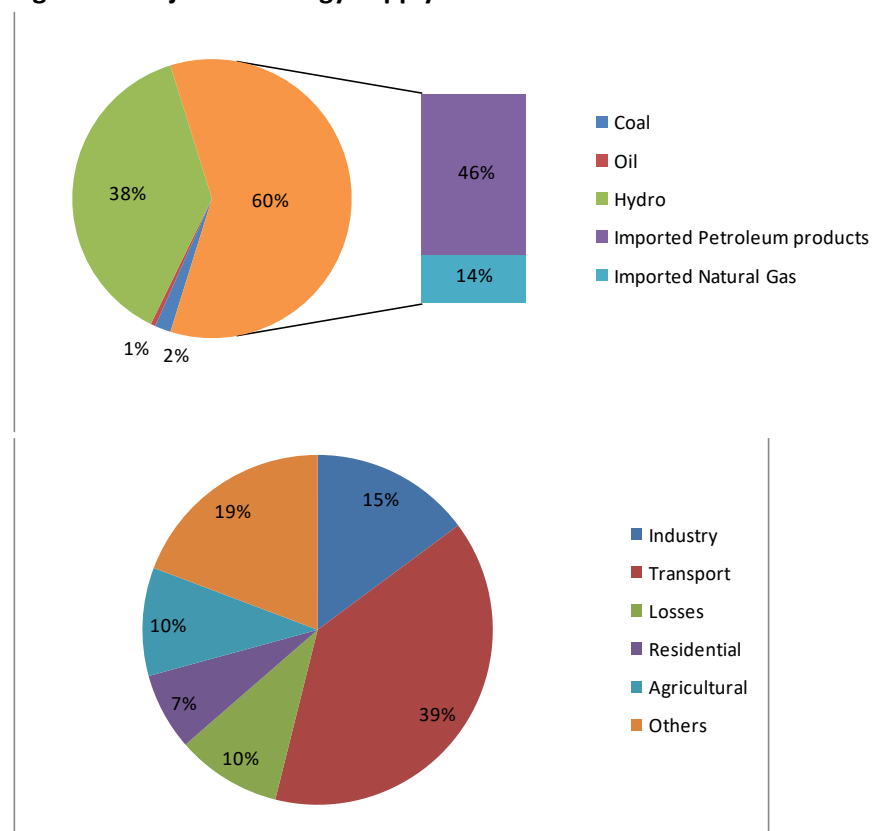
### 1. ENERGY BALANCE: OVERVIEW

Tajikistan's power system has an installed capacity of 5,389 megawatts (MW) comprising several large and a few small hydropower plants (4,971 MW), and three fossil-fuel fired combined heat and power plants (418 MW). In terms of percentages, Tajikistan's energy sector depends primarily on large hydropower, which accounts for 90% of all power production and 40% of the total primary energy supply (TPES). The remaining 60% of TPES come from imported oil, gas and coal.

On the demand side, the primary consumers are transport, industrial and agricultural sectors. Electricity is the most critical input for the two most exported commodities - cotton and aluminum. Aluminum production alone accounts for 40% of all domestic electricity consumption and agriculture is the second largest user – 20%.

Losses are also significant (10% of TPES or up to 20% of power supply), while the share of residential energy use (7%) is almost negligible (see Figure I-1).

**Figure I-1: Tajikistan Energy Supply and Demand**



Source: OECD/IEA, 2009 (OECD/IEA, 2009)

## 2. ENERGY SECURITY AND AVAILABILITY

Tajikistan has the second greatest hydropower potential among former Soviet Union countries (after Russia) of a theoretical 527 TWh/yr and technically and economically exploitable potential of over 264 TWh/year. Currently 5-6 % is exploited (World Energy Council, 2004). It occupies the 8th place in the world on absolute indicators of hydro resources and is on the 1st place globally in terms of per capita hydropower potential, per person and per area (Electricity Governance Initiative, 2009). Hydropower plants (HPPs) generate about 98% of all electricity in the country. The current installed capacity in the country is about 5,055 megawatts (MW), though many of the HPPs and the two thermal power plants are in dire need of rehabilitation and the capacity of many power stations has been derated. It is estimated that the effective available capacity of power generation facilities in Tajikistan as of 2012 was about 2,306 MW (Bank A. D., 2012).

Confirmed reserves of hydrocarbon resources in Tajikistan are limited: less than 1% of total exploitable energy potential (Energy Charter Secretariat, 2010). However, with recent discovery of reportedly major oil and gas deposits (EurasiaNet.Org, 2012), the situation might change in the future.

Regardless of the apparent abundance of hydropower resources, due to seasonal variability, its availability is limited in winter when demand is the highest and the country needs to rely on electricity imports. Tajikistan generates about 1,500 GWh of excess electric power in summer months which it can export, however in winter times power imports account for roughly 30% of domestic power production (OECD/IEA, 2008). Even with these imports, supply is insufficient to meet domestic demand. Estimates of winter shortfall vary with official statistics reporting 3,000–3,500 GWh/yr (Government of Tajikistan, 2010), while media reports state that only in January-February 2011 around 3,600 GWh of imports were required to help the country cope with the severe power deficit (Asia-Plus, 2011).

Approximately half of the estimated winter shortfall of 1,400 GWh/yr represents the unmet demand of rural households (UNDP, 2005). Rural population, accounting for 73% of the total population, uses only 10% of the total electricity consumed in Tajikistan (as shown in Table I-1) and is mostly impacted by the power rationing introduced by the Government. As illustrated in Table I-2, rural population was supplied with electricity, on average, only 2-4 hours/day during the winter period.

**Table I-1 Power Use in Tajikistan**

#	Consumer	kWh/year	%
1	Industry	6,582,865,551	50%
2	Agriculture (irrigation systems)	2,669,688,911	20%
3	Population, including:	3,937,870,275	30%
3.1	Urban	2,502,824,098	19%
3.2	Rural	1,378,030,875	10%
Total		13,190,424,737	100%



Source: UNDP, 2012 (UNDP, 2012)

**Table I-2 Balance of electric power consumption among rural residents in autumn-winter period in 2011-2012**

	<b>October 2011</b>	<b>November 2011</b>	<b>December 2011</b>	<b>January 2012</b>	<b>February 2012</b>	<b>March 2012</b>
<b>Factual demand (mln kWh)</b>	448,8	518,2	595,8	592,5	555,2	<b>463,1</b>
<b>Factual consumption (mln kWh)</b>	121,8	135,2	137,8	126,5	115,2	<b>87,1</b>
<b>Shortfall (mln kWh)</b>	327,0	383,0	458,0	446,0	440,0	<b>376,0</b>
<b>Time of outages (hours/day)</b>	<b>17 hours</b>	<b>18 hours</b>	<b>19 hours</b>	<b>20 hours</b>	<b>19 hours</b>	<b>22 hours</b>

Source: UNDP, 2012 (UNDP, 2012)

Preliminary conclusion with regard to power availability in Tajikistan can be summarized as follows:

- Tajikistan has abundant resources for hydro-based power generation which are unexploited at present.
- Due to high seasonal variability of existing power sources, domestic power supply is increasingly unavailable during fall-winter months.
- Rural population (comprising the majority of country's residents) is most hardly impacted by power shortages, with average household power use being just marginally sufficient to meet the minimum requirements.
- Because of frequent power cuts and regular rationing, even the minimum power supply is not often available when it is most required. Furthermore, winter energy shortages mean that educational and medical institutions cannot operate full-time and the pumping stations that supply drinking water are shut down.

The population is mitigating the problems outlined above by using fuel wood (43%) and other locally available fuels (agricultural waste, animal dung). In remote rural areas, around 98 % of the energy is derived from traditional/non-commercial energy sources. More than half of households surveyed during 2007 and 2009 reported heating with wood and dung (Tobias Hoeck, 2007). While traditional sources can substitute power to provide for cooking and heating, lighting and other energy uses can only be made available using electricity. Consequentially, most energy uses are unavailable for the majority of Tajik population for at least 6 months of a year.

As the previous section has shown, the most critical issue regarding "energy security" in the context of Tajikistan energy system is the provision of power to rural areas in winter period. Specifically, the key issues to be taken into account are:

- High seasonality and variability of power supply, mandating the need to monitor energy availability in the most critical part of the year, when persistent shortages occur;

- Highly unequal distribution of power supply (73% of population consumes only 10% of all energy) which mandates the need to monitor availability of energy supply to the most vulnerable consumers.

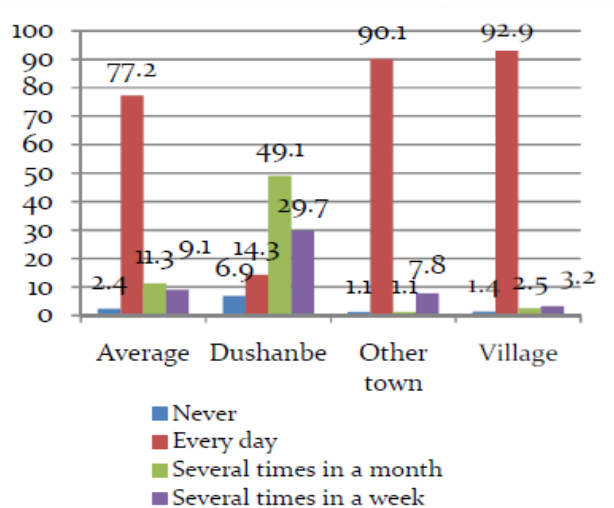
### 3. ENERGY ACCESS

In Tajikistan, access to power grid is nearly universal with 98.4% users connected to the grid. However, due to limited availability, especially in the winter period, consumers can hardly reap the benefits of universal grid access.

Barqi Tajik, the national power company, is implementing an extensive load shedding programme to limit power consumption by residents and businesses. Supply of electricity to households, including in the capital city is increasingly unreliable. Blackouts are common and electricity rationing has become the norm. Restrictions are imposed every year on the general public and social institutions from November to April, with rural and remote communities being most affected.

Analysis of the household statistic survey shows that 90% of Tajik households living outside of the capital experience power cuts on a daily basis in winter (see Figure I-2). According to information collected by the Tajik Consumers Union, as well from Barki Tajik (Table I-2), average daily supply of electricity in winter 2011-2012 was 4-5 hours a day (i.e. power outages lasted for 19-20 hours/day) and even this limited supply was “unstable, unpredictable and non-transparent” (BarkNest.TJ, 2012).

**Figure I-2 Frequency of power outages**



Source: Melikyan, 2011 (Melikyan, 2011)

The situation is far more complex regarding access to modern sources of heat and fuels. In Soviet times, heat supply in major Tajik cities was delivered through centralized district heating systems (based on natural gas or oil) and rural customers were centrally provided by heavy fuel oil (mazut) and coal imported

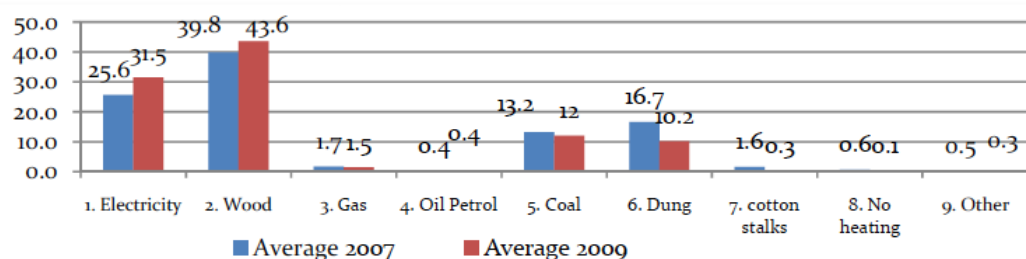
from other former Soviet Republics. Both rural and urban heat supply systems were heavily subsidized (Caron Cooper, 1992).

After Tajikistan became independent, due to high cost of imported hydrocarbon resources, all district heating facilities have gradually been taken out of operation and the centralized heat supply systems have been dismantled. As of today, only one centralized heating system remains in operation in the capital city of Dushanbe: with installed capacity of 190MW it can cover only 60% of the overall heat demand in the city. However, because of unreliable and expensive natural gas imports from Uzbekistan, as well as lack of investment in maintenance required upgrades, the plant operates at only 20-25% of its designed capacity, which means it is capable of meeting only 10% of existing demand (UNDP, 2012).

Due to lack of access to modern heat supply alternatives, both urban and rural residents can only rely on expensive fossil fuels, such diesel oil, LNG, or coal, or relatively inexpensive fuel wood. In rural areas, people also use manure, cotton stems and other agricultural by-products. Consequently, rural households rely predominantly on wood fuel (35-85%) and in urban areas both wood (30-35%) and electric energy (35-40%) are the two most common energy sources for heat supply and cooking (Figure I-3 and Figure I-4).

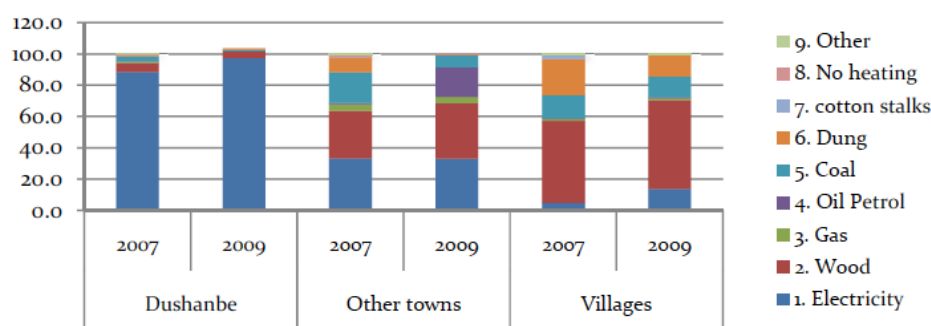
With the exception of access to pipelined natural gas, which is rather unstable due to political disagreements with the principal supplier Uzbekistan (Cleek, 2012), other fuels are openly available on the local market and consumer preferences are mainly dictated by the price and affordability concerns.

**Figure I-3 Household heating sources, %**



Source: Melikyan, 2011 (Melikyan, 2011)

**Figure I-4 Sources of heating, by location, %**



Source: Melikyan, 2011 (Melikyan, 2011)

As outlined above, the key issue on energy access in Tajikistan is not access to the electricity grid but access to uninterrupted supply and modern fuels. In this sense, “access” can just be the flip side of the “security” challenge described earlier. However, other factors also have to be taken into account:

- Power distribution infrastructure in the country is in a bad shape and suffers from chronic under-investment and lack of maintenance (e.g. transformers cannot bear the overload occurring due to increased electricity consumption for heating in winter).
- Corruption and the lack of transparency in power sector management contribute to unpredictability and unreliability of power supply (Electricity Governance Initiative, 2009). For example, media reported cases when Tajikistan continued to export electricity to neighboring Afghanistan even after rationing was introduced on its own territory (Asia Plus, 2011). Therefore, even if sufficient amounts of electricity are generated, Tajikistan residents can face electricity cuts during cold periods.

For the purpose of measuring the adequacy of energy access the following characteristics are important and should be taken under consideration in planning actions in Tajikistan:

- Access to electricity via central power grid is unreliable and limited to 4-5 hours a day in winter period;
- Access to centralized district heating services in urban areas no longer exists and hence urban population rely mainly on electricity and wood fuel for heat supply, hence access to alternative sources of heat is also important;
- In rural areas, wood and other agricultural waste products are primarily sources of energy for heating and cooking.

Official data and statistics for electricity rationing are available and being regularly provided by Barqi Tajik in advance of winter season. The rationing plan, specifying limits on power supply are being developed and approved by the Government for each of Tajikistan’s four regions and for each consumer category (public, residential and industrial) and are closely enforced by Barqi Tajik.

In addition, an independent NGO, Union of Consumers, regularly collects customer's data on actual situation with power supply for each city and region of the country (live data are available on-line). Whereas Barqi Tajik data refers primarily to official rationing plan and its implementation, consumers' data present real situation on the ground and tend to provide a more realistic and comprehensive picture on both scheduled and unscheduled outages. Further, the Enterprise Survey conducted by the World Bank represents a useful source of data on unscheduled electricity outages as reported by local enterprises. According to the available data, on average, there were 3.6 electricity outages a month with a duration of 5.5 hours or about 20 hours/monthly (World Bank, 2008).

For heating, it is an accepted practice to consider the scale of firewood use as a proxy indicator to assess the status of access to modern and sustainable heating and cooking alternatives in developing world (Bazilian, 2010). Unfortunately, there are no reliable statistics in Tajikistan to provide reliable data and the only existing credible source are the Household Survey, which were used to derive the baseline estimates and targets (Melikyan, 2011).

#### **4. ENERGY AFFORDABILITY**

Affordability of energy in Tajikistan will be examined at two levels:

1. Share of individual household costs for energy in absolute and relative terms
2. Absolute and relative cost of energy for the national economy.

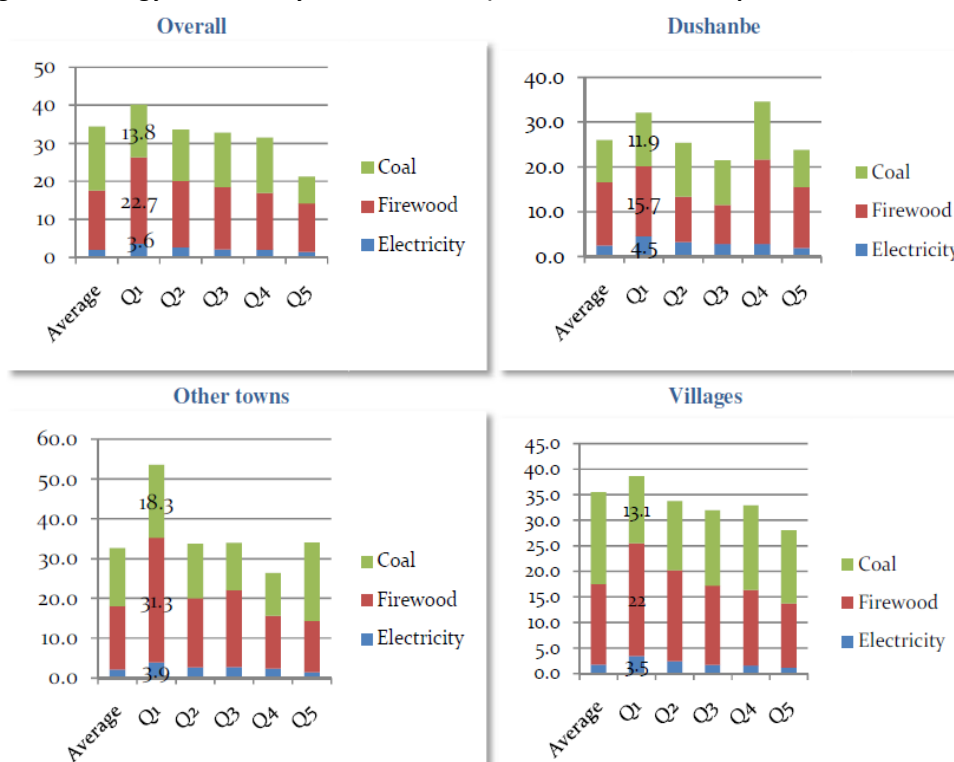
The cost of energy for national economy is particularly important since electricity prices remain to be heavily subsidized by the Government (UNDP, 2012). As of 1 April 2012, the Government adopted a 2.32 US Cents tariff per kWh for residential consumers and 5.61 and 13.87 US Cents per kWh for industrial and other commercial consumers respectively.

Barqi Tojik reportedly generates large quasi-fiscal deficits (USD 150 million or 2 percent of the state budget in 2013) because of chronic loss-making tariffs, poor payment collection, and high electricity losses (Bank W. , 2014). Hence, Barqi Tojik is neither able to properly rehabilitate and maintain current sector assets nor invest in new energy infrastructure. Barqi Tojik is accumulating large arrears (accounts payable equivalent to 17 percent of GDP), including tax arrears, delayed repayment of loans from the Ministry of Finance, and delayed payments to independent power producers and other creditors. As a result it is currently not likely to be credible as a power purchaser from any new large hydro project.

Current average electricity tariffs are a fraction of long-run marginal costs and among the lowest in the world. Tariff increases combined with an effective mechanism to protect poor consumers, improved collection rates, and a credible long-term tariff adjustment mechanism would be essential to attract any large power sector investments. Barqi Tojik's 2013 cash collection was about 60 percent of billings (76 percent including non-cash collection), compared to 95 percent for utilities performing at international standards (Bank W. , 2014).

Even though the tariff for households remains low at approximately 25% of cost-recovery levels (Slay, 2009), due to the fact that 42% of the population lives below the poverty line, in absence of sufficient power supply in winter, total energy costs (electricity and fuels) represent high portion of household budgets. Energy expenditures absorb an average 35% of household budgets and up to 55% in the poorest households (see Figure I-5), which is far beyond UK's 10% threshold for fuel poverty.

**Figure I-5 Energy affordability for households (share of household expenditures, 2009, %)**



Source: Melikyan, 2011 (Melikyan, 2011)

Power tariffs set lower than the cost-recovery levels have a substantial direct implication for the economy. In winter 2011-2012, for example, the average production costs at the Dushanbe thermal power plant were 21.05 US Cents/kWh, whereas the average selling price of electricity was 1.89 US Cents/kWh. During this period, the plant generated 46.9 GWh of electricity, out of which 37.0 GWh was eventually delivered to final consumers; the direct losses from winter operations to state-owned Barqi Tajik Company therefore amounted to nearly 9 mln US\$ (UNDP, 2012).

In addition to cross-subsidized residential tariff, the government also provides direct targeted subsidies to lower-income families by partially paying their electricity bill. For example, in 2011, these subsidies reached 133,360 lower-income families, totalling 4.2 million Somoni (cca 890,000 US\$). It is estimated that direct and indirect energy subsidies could account for as much as 19% of Tajikistan GDP (World Bank, 2004).

Second factor contributing to unaffordability of energy supply are high losses and costs of power transmission. Official statistics report losses at 10% (Figure I-). However, other reports show that the losses could be as high as 18% (Bukarica, 2011).

Nearly universal access to cheap electricity, inherited from the Soviet era is clearly no longer affordable in Tajikistan. Remote villages with small aggregate consumption are linked to distant power supply points. Investments in maintaining the transmission and distribution infrastructure, without even considering expansions of the system, can never be recovered by small consumption billed at low prices (for detailed assessment - see (ADB, 2005)<sup>16</sup>). To maintain the inherited power infrastructure, enormous investments are required. To enable these investments, the power tariff has to be significantly increased. Such a change would however decrease affordability for end-users and further limit end-use consumption, which is already at minimal levels.

Until recently, electricity used to be one of the main exports of Tajikistan, generating up to 20% of all its export revenues (Center for Social and Economic Research, 2008). Due to seasonal variability, the country has large excess capacity for power generation in summer and can export around 4 GWh. Due to Uzbekistan's unilateral withdrawal in 2009 from the Central Asia grid, Tajikistan was cut off from both the sources of power imports in winter and exports in summer, dropping exports in 2011 to an insignificant 0.3% (UNDP, 2012).

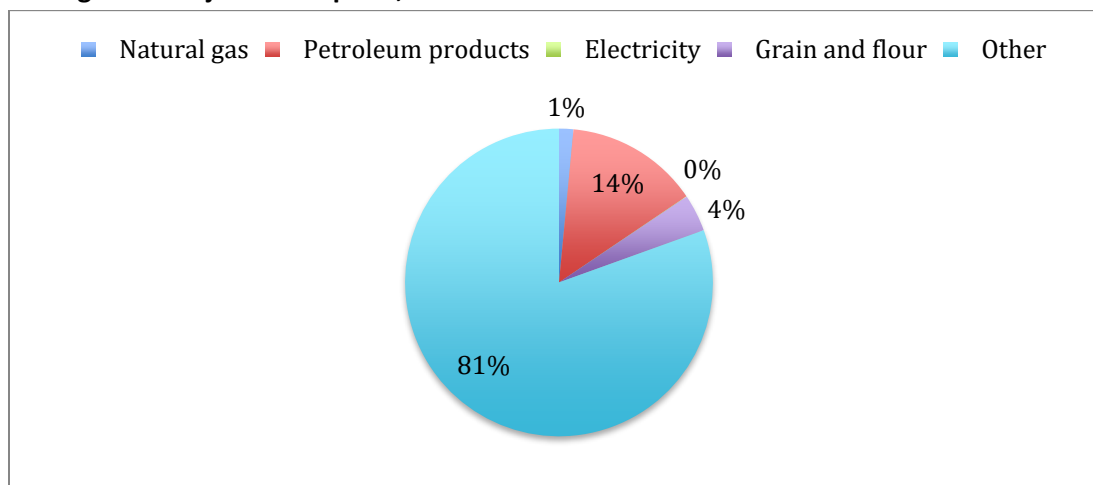
Since then, Tajikistan reportedly has a surplus of some 4,200 GWh in summer. A portion of this is being exported to neighboring countries but given the lack of adequate markets, water is routinely spilled at the reservoirs. Tajikistan reported summer electricity sales to the Kyrgyz Republic (167 GWh), Kazakhstan (14 GWh), and Afghanistan (594 GWh) in 2012. The transmission links to Kazakhstan and the Kyrgyz Republic are older links established when Tajikistan was a part of the Central Asia Power System. The country has a power purchase agreement with Afghanistan for the supply of firm power during summer via a new 600 MW double circuit 220-kilovolt (kV) transmission line built during 2009–2010 (ADB, 2014). The export of surplus power does not place a burden on the peak load and can be readily met in the summer months when water flows are high and the HPPs were originally designed with higher capacity than required to meet the summer electricity demand of Tajikistan.

Finally, to complete the overview of energy affordability in Tajikistan, the country presently imports up to 40% of the total volume of its energy needs, primarily in the form of oil and natural gas due to of chronic shortage of energy resources and lack of own hydrocarbon reserves. Situation is increasingly volatile due to political tensions with Uzbekistan. As illustrated at Figure I-6, energy imports currently constitute around 15% of all product imports in Tajikistan which is about 500 mln US\$/year.

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<sup>16</sup> The cost of transmission and transformation were estimated at 2.7cUS\$/kWh. This is the annualized current replacement cost per kWh of energy delivered in the peak period; the value decreases to about 1.7 c/kWh when all energy transfers are considered. It is still relatively high, but this appears to be due to the transmission network having been extended to provide almost universal coverage, rather than having been justified on purely economic basis.

**Figure I-6 Tajikistan Imports, %**



Source: Statistical agency under the President of the Republic of Tajikistan, 2012 (Statistical agency under the President of the Republic of Tajikistan, 2012)

In summary, the following patterns of energy affordability in Tajikistan are important:

- Households spend considerable portion of their income on energy services: an average Tajik household can be regarded as living in energy poverty according to international standards.
- The Government devotes a large share of public resources to subsidize ongoing inefficiencies in power supply
- Increasingly expensive fuel imports add significantly to overall cost of energy.

There are no established benchmarks for the share of energy expenditures in GDP yet, neither there is a definitive number or source of energy expenditures as a percent of the global economy. However, estimates shows that over 730 mln US\$ annually is being spent to cover the cost of energy use in Tajikistan (Table I-4). These are highly conservative estimates and somewhat lower than 1 bln US\$ according to assessment commissioned by UNDP earlier (Bukarica, 2011). Still, even at 730 mln US\$, energy cost would represent about 13% of Tajik GDP in 2010 or 1.5 times higher than 8% in USA (US Energy Information Administration, 2012) and nearly 3 times more that Tajikistan's own health expenditures, i.e. 5% of GDP in 2010 (Khodjamurodov, 2010). These estimates, however, do not capture the cost of firewood since there are no reliable statistics on its commercial use and consumer prices.

**Table I-4 Energy expenditures in Tajikistan, 2010**

	Coal, t	Oil Products, t	Natural Gas, m3	Electricity, kWh
<b>Consumption</b>	190	510,000	180,000,000	16,500,000,000
<b>Price, US\$ per unit</b>	75	1,020	0.26	0.01
	14,250	520,200,000	46,800,000	165,000,000

Source: Own estimates

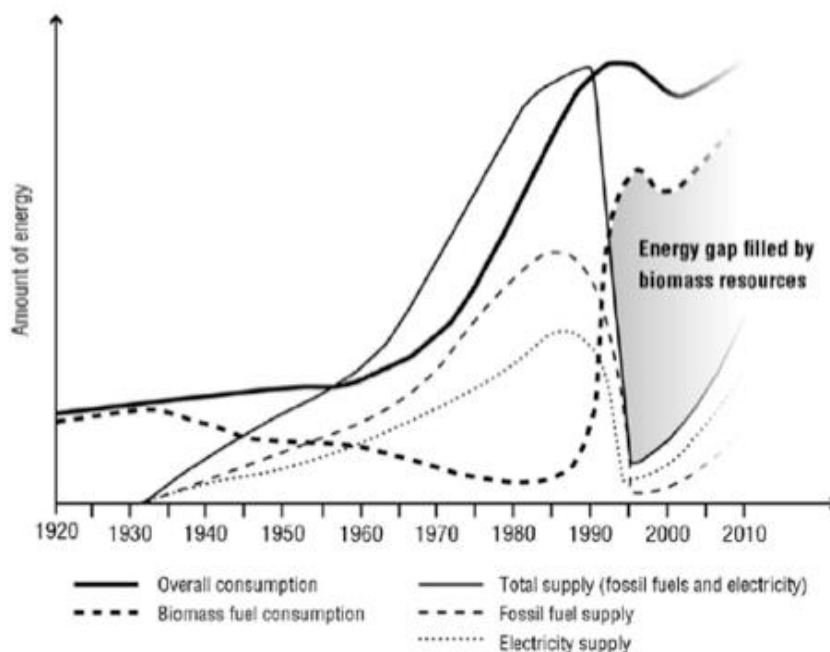


## 5. ENVIRONMENTAL AND SOCIAL SUSTAINABILITY

At the local level, due to absence of other affordable alternatives over the last two decades, fuel wood has become the main source of energy. The scale of transformation of energy use pattern in rural Tajikistan is best illustrated at Figure I-7. Results of this transformation have been highly detrimental for the local social, economic and environmental situation.

Use of wood for fuel results in many environmental problems and health risks: deforestation, soil erosion, and indoor pollution. Tajikistan has predominantly semi-arid mountainous landscape with forests occupying only 410 thousand ha, i.e. less than 3% of the country's territory. Due to the extensive fuel wood use, some of Tajikistan's mountainous regions have lost up to 70 percent of their wood covering since the late 1990s<sup>17</sup>.

**Figure I-7 Model of energy consumption and supply in Tajik Pamir since 1920**



Source: Hoeck, 2007 (Hoeck, 2007)

Although there are no official statistics on rural energy use, there are many indications that suggest that Tajikistan forestry sector is indeed on a highly unsustainable path. According to (FAO, 2010), the total available volume of biomass stock in Tajikistan is 6.6 mln m<sup>3</sup> and official data on annual wood fuel use is about 7,500 m<sup>3</sup>. The same report, however, disagrees with official statistics and puts the volume of fuel wood use at 90,000 m<sup>3</sup> according to expert estimates.

<sup>17</sup> 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”.

Household living standard survey shows that fuel wood consumption is on average 1m<sup>3</sup>/capita/year and 78% of rural households use wood as a primary source for heating and cooking (Melikyan, 2011), which translate in about 5 mln m<sup>3</sup> of annual demand for fuel wood. These estimates are consistent with findings of field survey of rural energy use patterns conducted by UNDP in 9 villages across Tajikistan: it shows that average household uses annually about 14 m<sup>3</sup> of wood fuel or 1.4 m<sup>3</sup> per capita (if an average household size in rural Tajikistan is 10 people). Other experts (Kirchhoff, 2012) provide even higher estimate for annual wood fuel demand – 15-20 mln m<sup>3</sup>. Clearly, with continuation of such trends unchecked (i.e. without alternative and affordable energy provision), it is a matter of years, not decades, when forest cover will be totally lost in Tajikistan.

**Table I-5 Results of field survey of rural energy use in Tajikistan**

Locality	Number of Households	Wood (m <sup>3</sup> )	Wood (m <sup>3</sup> )/Household	Dung bricks (unit)
Nilu village	420	2,318.4	5.5	478 800
Ardjinak village	58	543.5	9.4	241 048
Navobod village	172	2,356.4	13.7	1 233 670
Pushtimiyona village	50	407.5	8.2	227 900
Shirkent village	198	4,124.34	20.8	1 124 244
Kyrgyz-kishlok village	7	99.82	14.3	68 152
Yavroz village	60	1,320	22.0	393 240
Tavishi Poyon village	45	1,010.7	22.5	459 000
Langar locality	6	71.16	11.9	33 480
<b>Average</b>			<b>14.2</b>	

Source: Saidmuradov, 2010 (Saidmuradov, 2010)

The detrimental impact of wood fuel use and other agricultural residues in Tajikistan on people's livelihood and environment has been carefully examined (Hoeck, 2007) and can be summarized as follows:

- Uncontrolled use of forest for firewood leads to deforestation, the land is being converted for grazing and becomes prone to erosion and salinization, which hinders the natural rehabilitation of the former forests;
- The harvest of teresken shrubs results in the complete removal of the vegetation cover on affected mountain slopes. Vast areas thus become liable to wind and water erosion, leading to the risk of desertification;
- The use of firewood from fruit trees deprives residents of an important vitamin-rich supplement as well as of a potential source of income;
- The use of dung as fuel leads to the need to purchase additional artificial fertiliser as a substitute or decrease in harvest.

Finally, use of firewood for domestic cooking and heating has proven to have significant negative impact on occupant's health. While no local estimates exist for Tajikistan, it is well documented in the global literature on energy access, see for instance (WHO and UNDP, 2009). All in all, while fuel wood is for the time being the only available, accessible and affordable source of energy for rural population, clearly the situation is not acceptable from societal and environmental perspective.

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## **Annex II: Review of international experience with the RESCO business model**

### **1 Definition and need for RESCOs**

A Renewable Energy Service Company (RESCO) is an energy service company which provides energy to the consumers from renewable energy sources, usually solar photovoltaics, wind power or micro hydro. Their revenue comes from service fees from clients or other sources. Their services include: selling renewable facilities, installing of systems, managing the operation of renewable systems, maintaining and repairing renewable facilities, serving as financial intermediaries, etc. RESCOs include investor owned, publicly owned, cooperatives, and community organizations. The main characteristics of a RESCO are:

- The household serviced does not own the generation equipment, which is owned by an external organization such as a Government agency or the RESCO;
- The user does not carry out maintenance, all maintenance and repair service is provided by the RESCO;
- The user pays a service charge that covers the capital repayment requirement and the cost of providing for maintenance and repairs.

The concept is similar to a conventional electric utility in that the generation equipment is not owned by the user and the electricity that is generated is made available to the customer for a fee. The fee charged to the user includes any required capital replacement cost and all operating, maintenance and repair costs plus a profit for the operating organization.

There are two significant differences between the conventional utility approach and that of the RESCO. For a RESCO:

- Generation may be distributed among many households instead of being centralized at a power station;
- Many organizations regulated by the government may provide services independently of each other.

The RESCO concept is most suitable for small-scale renewable energy systems like the photovoltaic solar home system (PV SHS). Rather than sell SHS to homeowners, the RESCO sell the service that is produced by the SHS and, in turn, collects a monthly fee. The RESCO can aggregate a large number of consumers into a single project rather than for each SHS. The consumer overcomes the high cost barrier by having only to make small monthly payments. Dozens of RESCOs have been set up to provide the services of sale and installation and maintenance of household solar PV systems in China and India, and solar water heating in India.

### **2 Examples of RESCO Business Models (B2B and B2P)**

Some of the feasible RESCO business models are as follows:

1. User Financing model
2. Shared-Saving model
3. RESCO-User Bank Facilitation

These three business models have been elaborated hereafter.

### 1. User Financing RESCO model:

Under this model, the users themselves arrange for the project financing. The end user is to submit the proof of installation along with necessary documents for availing the capital subsidy. Operation and maintenance of systems are carried out by the RESCO in exchange for a monthly operation and maintenance payment made by the end user. The RESCO enters into a guaranteed performance contract with the end user.

### 2. Shared-Saving RESCO model:

Under this model too, the RESCOs are supposed to carry out the installation work of solar applications at the consumers' premises. However, here the returns to the companies are secured as a negotiated percentage of savings achieved by the solar interventions. The RESCO is funded through lending institutions like commercial banks and IREDA. The company is also supposed to carry out a baseline survey of energy utilised at the intended consumer's premises. Following the submission of the baseline data to the lending institutions and verification of the same by an energy auditor, the RESCO is permitted to install the solar equipment. The lending institutions require submission of proof of successful installation, as well as of energy savings achieved in order to release the capital subsidy to the RESCO. For the verification of the claims of energy saved, they rely on the services of an energy auditor.

### 3. RESCO-User-Bank Facilitation model:

Here, the RESCOs install the solar applications on the consumers' premise while the returns to the companies are secured through monthly bills rose against the service. The RESCO is funded through lending institutions like commercial banks and the Indian Renewable Energy Development Agency (IREDA). The company needs to enter into a performance contract with the project owner and the end user is to pay a onetime refundable security deposit to the RESCO. Lending institutions require submission of proof of successful installation of solar equipment, as well as energy savings achieved in order to release the capital subsidy to the RESCO. The lending institution relies on the services of an energy auditor to verify the claims of energy saved. The bank where the project owner has his/her account facilitates the payment of the monthly bill to the RESCO for services provided.

Each model has its rationale and expected payback periods which justify the level of risk and/or required capital investment as shown in the table below.

Model	Rationale	Expected payback period
Self-financing	RESCOs would be providing operation and maintenance (O&M) services to the projects at the end user sites. Returns are only envisaged on the O&M service. Such an arrangement qualifies for a longer payback period.	Long (more than 5 years)
User financing RESCO model		
Shared-saving RESCO model	Percentage negotiated on the savings facilitated by solar interventions acts as a return to the ESCOs. This model can be expected to have a moderate payback period.	Moderate (3-5 years)
RESCO-User-Bank facilitation model	RESCOs are provided with capital subsidies on solar application as well as monthly bills for services provided at the project site. Returns would be high, thus this business model would be expected to have a shorter payback period.	Short (up to 3 years)

### **3 Overview of financing models for rescos**

To ensure a long term sustainable financing market for RESCOs, it is important that the local and regional institutions which have or manage finance have the capacity to be involved and are involved in the energy market. In many cases, getting the financing organizations involved requires encouragement to overcome barriers such as lack of experience with renewable energy, prior project failures and incorrect perception of risk.

The tools available to strengthen financing organizations ability to make loans for renewable energy development include:

- Risk reduction schemes that are used to lower the perceived risk by commercial lenders for loans for renewable energy systems. This can include training in risk management for renewable energy finance, interest subsidy plans to allow lenders to see a high interest rate but borrowers a lower rate, extended component warranties to ensure systems work for the whole period of the finance and capacity building programmes to improve the quality of businesses providing renewable energy equipment;
- Loan guarantees that are used to guarantee loans for renewable energy equipment purchase; concessionary loans to micro-finance institutions to finance renewable energy systems at the local level; and
- Subsidized interest for finance of renewable energy systems where the interest rate can be made lower for the purchase of renewable energy systems.

Financing of renewable energy projects has been done in several well-established ways. Relevant to RESCOs each of the following will be presented along with brief assessment of suitability for financing:

- Debt and equity finance
- Grants
- Venture capital
- Consumer financing
- Fee-for service
- Subsidies
- Community based credit / rural credit co-operatives
- Build-operate-transfer (BOT)
- Third party financing

The most appropriate arrangement for finance in a particular country will depend on the type of financing barriers that currently exist and the state of the renewable energy market in a country.

#### **3.1.1 Debt and Equity Finance**

Loans, or debt finance requires repayment of both the principal sum borrowed and interest charged on that principal. Finance institutions will generally only provide debt finance to projects and project developers once the market is mature and therefore may need encouragement to enter the market. Debt finance can be provided to local finance institutions to allow them to on-lend to consumers, to project developers, or debt can be provided directly to a project developer. The debt must be repaid whatever the outcome of the project.

Equity financing consists of selling an ownership interest in the project to investors. Investors will expect high returns on their investment and some control of the organization since they share the risks with the



primary owner. An investor's stake is represented by shares which give the shareholder residual ownership in the assets and earnings of the project after all other debt and creditor obligations have been paid. Since it is high risk the expected rate of return is high, usually greater than 15 percent. Debt finance is generally only available when the market is mature or equity is already in place. Therefore equity financing of an organization or project will help them to attract debt from local finance organizations.

As RESCOs have usually been implemented only in developing countries which were considered a high risk environment for both debt and equity finance, these models will not be examined further.

### **3.1.2 Grants**

Grants can be provided for demonstrations, pilot projects, to develop the market or to buy down the cost of the technology. Grants for finance have often been used to develop "revolving funds" for renewable energy finance. Unfortunately their long term success rate has been low as simply giving funds without requiring a return on investment produces little incentive for grant users to proactively participate in the project.

Grants often originate from private foundations, but can also be provided by international development organizations like the World Bank (WB), the ADB, the GEF, UN agencies, bilateral funding organizations and governments.

### **3.1.3 Venture capital**

Venture capital is typically invested or 'ventured' in the start-up stage of a company's development, before products and markets are proven, and the capital provided is therefore at high risk. In return, venture capital funds require a high rate of return, which they obtain by taking equity in a number of companies, some of which they hope will be highly successful (UNEP, Eco Securities, 2007). Venture capital provides investment funding at relatively high risk but often-innovative research that may eventually lead to the development of new companies that produce and market innovative cost-effective sustainable energy technologies.

A typical energy venture capital fund management company is staffed with people who have operational experience in the energy industry, with both technology and management backgrounds. Technology specialists and financiers may complement the competencies of the energy experts. Over the past 10 years, a number of new venture capital funds have emerged in Europe and North America that are specifically targeting sustainable energy technologies as an investment theme. A significant number of such venture capital firms now exist. For example, the Financing Sustainable Energy Directory lists, as of July 15, 2003, over 50 firms willing to consider private equity investments in a full range of sustainable energy projects including all forms of renewable energy generation and energy efficiency (UNEP and BASE, 2002). This financial mechanism has rarely been used in developing countries.

### **3.1.4 Consumer Financing**

#### **3.1.4.1 Lease purchase (hire-purchase) model**

In a lease-purchase arrangement, renewable energy equipment is provided under rental terms for a lease period during which full ownership and maintenance responsibility remains with the supplier. After completion of the lease period when the required capital repayment has been made, ownership is transferred to the recipient.

This financing approach has been used in renewable energy projects outside the Pacific with some success but so far not in PICs though the Namara, Fiji, EU funded PV electrification project of 1994 had a similar concept. For that project, for 10 years villagers were to pay a small monthly fee for the use of the PV

equipment that belonged to and was maintained by the Department of Energy then after 10 years, ownership was to be transferred to the individual households.

#### **3.1.4.2 Consumer loans made through commercial banks**

Loans are typically secured by collateral or a mortgage on the items being financed. This approach is common for purchases of houses, vehicles and expensive durable goods such as major appliances. Due to the difficulty of collecting repayments in distant rural areas, this type of finance is focused on urban households where salaried workers are the norm and where finance institutions have offices and agents. This finance method is rarely available for renewable energy equipment except for solar water heaters. For other types of renewable energy equipment or for rural borrowers, risk reduction incentives such as loan guarantees are needed, at least in the beginning.

#### **3.1.4.3 Consumer loans through rural “micro-finance” organizations**

Small scale finance for rural consumers and “cottage” businesses is being offered in several Pacific Islands through non-government organizations (NGOs) and, in the case of Fiji, by “roaming” agents of commercial banks. By maintaining a presence in rural areas, transaction costs can be kept low and by using payment terms that fit the needs of rural households, the repayment rates can be kept high.

Although to date the Pacific island countries (PIC) micro-finance organizations have not been financing renewable energy technology for rural areas, for household and “cottage” business use it is a finance option.

For Melanesian countries, where there are large rural populations without electricity, there appears to be a developable market for micro-finance of renewable energy systems, notably small PV based home lighting systems, for the more affluent rural households.

#### **3.1.4.4 Community based credit / rural credit co-operatives**

Rural Credit co-operatives are essentially mini-banks. They are focused on the local community concerning loan requirements, their client base and repayment schemes. They require customers to first establish a savings account and build a good reputation for good management of personal finances. They have to have low operating costs and good management to be self-sustaining.

They can either provide loans to customers to purchase RE technologies or they can be directly involved in implementing projects where the technology is owned by the co-operative.

#### **3.1.5 Fee-for-service**

In a fee for service finance arrangement, ownership and maintenance of the equipment remains with the supplier and the recipient pays a periodic fee for the services received. Fees include components for capital recovery, maintenance, administration and profit. The result is similar to a lease purchase arrangement with a non-terminating lease. This allows the capital cost to be financed over a very long period, 15 years and more, making the periodic payment much lower than would be required for short term finance. This approach is well geared to a programme where a capital rich organization (for example government) provides the capital investment and becomes equipment owner and another field oriented technology organization (for example a technical company) manages the installation, operation and maintenance of the project.

This is the general structural form for most of the longer term solar based rural electrification projects of the Pacific island countries in which the capital cost is typically provided to the operating company as a

grant. The longest running fee for service operator is the Solar Energy Company of Kiribati (SEC) that reorganised as a fee for service company (Solar Utility) in 1989 and currently has approximately 2000 household installations under its administration. The SEC has been provided the solar equipment for their rural household installations as a grant (initial trial systems were provided by JICA but the bulk of the installations were funded by the EU). The fees collected therefore do not include capital recovery costs, only O&M, administration and a component for payment into a battery replacement fund.

A GEF project for Fiji (implemented by the Fiji office of UNDP) developed a complete structure for what they termed RESCO (Renewable Energy Service Company) development. The core concept is creation of a public/private partnership. The Department of Energy (DOE) would purchase the solar equipment and make the systems available for subsidised lease by qualified RESCOs. The RESCOs would market the leased systems, install them and collect the fees necessary to cover their costs and profit as well as to pay the DOE lease fee and an amount to go into a component replacement fund that would ensure that sufficient funds will be available for battery and major component replacement when needed. The concept is under trial with several hundred systems (financed by grants from Japan) installed in rural Vanua Levu. A Labasa based RESCO has been contracted to provide the necessary project operational support. Funding is being sought to finance a “proof of concept” project that will include several thousand installations on both Viti Levu and Vanua Levu.

Under the present rural electrification policy structure, 90% of the capital cost is covered by government with the capital repayment amount limited to 10 percent. This approach is well suited for international finance agency participation and finance for fee for service type rural electrification.

### **3.1.6 Subsidies**

#### **3.1.6.1 Subsidy to consumers**

Subsidies are provided by a public agency directly to consumers to encourage expansion of renewable energy use. The subsidies may be in the form of interest rate reduction for loans, loan guarantees, tax credits, direct rebates, extended warranties or other risk abatement concepts.

Consumer financial incentives by the Cook Islands Government are to some extent responsible for the wide spread use of solar water heaters in Rarotonga households. Having this in mind, reasonable targets for this model would be urban areas, and solar water heater programme would include subsidies intended to encourage consumer use of the technology as well as capacity building support for the businesses providing the equipment.

#### **3.1.6.2 Subsidy to dealers**

These are subsidies provided by a public agency to encourage the participation of businesses in the development of renewable energy. They may be in the form of reduced import duties, loan guarantees, low interest capital loans, preference for government purchasing, marketing assistance, subsidised employee training programmes, tax relief, direct subsidy for the purchase of renewable energy equipment and other incentives for business participation. Dealer subsidies have tended to improve profitability of renewable energy businesses and to encourage private company participation.

While this may result in more efficient delivery of renewable energy services than can be provided directly by government agencies, rarely have they resulted in significant market expansion since the incentives are usually not passed on to consumers in the form of lower cost systems.

### **3.1.7 Build-Operate-Transfer (BOT)**

The BOT approach was used as early as 1834 in Egypt with the development of the Suez Canal. The revenue-producing canal, financed by European capital with Egyptian financial support, had a concession to design, construct, operate, and then transfer to Egypt. BOT (Build-Operate-Transfer) is a relatively new approach to infrastructure development, which enables direct private sector investment in large-scale projects such as roads, bridges and power plants. The theory of BOT is quite simple:

- **Build:** A private company (or consortium) agrees with a government to invest in a public infrastructure project (such as a road or power station). The company then secures their own financing to construct the project.
- **Operate:** The private developer then owns, maintains and manages the facility for an agreed concessionary period (e.g. 20 years) and recoups their investment through charges or tolls (e.g. road tolls or electricity sales).
- **Transfer:** After the concessionary period, the company transfers ownership and operation of the facility to the government or relevant state authority.

Although the benefits of BOT are directly depended to the specific project and its economic environment, there are a number of general characteristics that make them attractive:

- Countries are provided with an opportunity to finance projects without involving public funds;
- Countries are benefited by the expertise and experience of the concession company;
- Investment, construction, operation and technological risks are shifted to the concession company;
- Investments are stimulated and private sector participation is promoted.

The main barriers that often arise in BOT agreements are related to financial uncertainties, technical problems and legal and political disputes. One of the main barriers in establishing BOT projects is the lack of legal certainty in some countries regarding the realization of particular aspects of a project. It might not be clear as to what extent private entities may draw revenue from the operations of power projects. In other instances, there might be lack of clarity as to the basis and effect of certain construction and long-term contractual assurances that the government would need to make to the private consortium. Enabling legislation to make the underlying legal framework attractive for BOT projects is therefore imperative

### **3.1.8 Third Party Financing**

Third Party Financing (TPF) is one of the most promising financing schemes for the promotion of renewable technologies. The general concept of TPF is the funding of an RE project by an external Renewable Energy Service Company (RESCO), using the achieved energy savings to pay for that investment. RESCOs are typically used to provide rural electrification services in developing countries, using renewable energy. The RESCO makes the investment and continues to own and operate the equipment such as a wind/solar photovoltaic hybrid system for a small village (although operation and maintenance is often contracted to local villagers). The users usually pay a fixed fee to the RESCO (because the cost of individual metering would be prohibitive), which covers the cost of the equipment and ongoing operation. There are many different approaches to Third Party Financing but they all share the following common elements:

- An outside energy service company (RESCO) makes the investment with no upfront capital required by the energy user;

- The energy savings produced, viewed as a stream of income, are used for the repayment of the investment and provided services of the RESCO, for a specific period.

Third Party financing was developed to help companies finance investment without affecting their balance sheets. The user of renewable energy technologies does not have to finance the initial outlay that is required for the realization of the project. In contrast, RESCO fully undertakes the financing, design, development and operation of the project. Instead, the investment is reimbursed by payments related to the performance of the technology installed for a specific time, as specified in the contract. Problems of third party include high initial capital outlay requirements, lack of understanding of energy issues by financial intermediaries, lack of familiarity of investors with energy technologies, need of a reliable energy service company to trust in. The concept of the energy service company (ESCO) has been implemented in some countries of the region such as in Egypt and Tunisia. However, the RESCO concept has not been applied yet in the region.

### **3.2 Financial risk mitigation measures**

The lending institution understands the market being financed, the higher the perceived risk for servicing that market. Finance of renewable energy systems is not common and information about actual loan risk is limited. Therefore finance institutions protect themselves by assigning renewable energy lending a high risk status since the actual risks are essentially unknown. Risk mitigation measures can provide cost effective incentives for companies to extend credit for financing non-conventional technologies where the risk is assumed to be high but in fact is simply unknown and may actually be low.

#### **Loan Guarantees**

Guarantees are a contractual promise from a financing or otherwise well-capitalised organization to provide back-up to a loan. In the case of renewable energy projects there is often little or no acceptable collateral to pledge as security against the risk of making the loan. Instead, a developer or finance institution might seek a guarantee from a large, well-capitalised organization, such as a national government, that should the project or national programme fall into arrears, the guarantor will cover the loss.

This makes lending to and investing in renewable energy programmes more attractive to commercial lenders.

Guarantees are offered by multilateral development banks and national development banks. For example, the Multilateral Investment Guarantee Agency (MIGA) was organised by the World Bank in 1988 to mitigate the risks commercial lenders face in engaging a development project. MIGA fulfils this mandate and contributes to development by offering political risk insurance (guarantees) to investors and lenders, and by helping developing countries attract and retain private investment. In addition, the International Finance Corporation (IFC) has the Guaranteed Recovery of Investment Principal (GRIP) programme through which private investors are guaranteed a minimum return on investment.

Some countries have instituted loan guarantee funds capitalised by donor agencies or international finance organizations. The advantages of guarantees are that they can encourage lending in a previously un-served market, can assist in leveraging other capital and can be used at many different project scales. The disadvantage is that there are often substantial costs associated with them particularly if the actual risk does turn out to be high and there are many defaults.

#### **Partial loan guarantees**

Partial loan guarantees are generally from private investment funds. They can be used to guarantee principal (capital) repayments on a loan for an initial period, typically one or two years. They can either limit risk to the lender or extend the period of the loan. They can be for different types of debt vehicles including loans. Partial loan guarantees are obtained where the acceptability of risks of the project is marginal to the lender and the partial loan guarantee can make the difference between the project going forward or not.

### **Export Credit Financing**

Export credit financing can be used to help develop companies in a new market. The exporter of the product to be imported for a RET system is insured so that the costs due to the time-lapse between the purchase and the installation of the equipment is covered.

### **3.3 Recommended enablers for RESCOs**

There is geographical factor relevant to seeding finances for RESCOs. However, in terms of present needs, the RESCO approach is more useful in remote or rural areas and semi-urban areas.

- **Socio-economic conditions:** As a financing mechanism for the commercial application of renewable energy services, the RESCO approach should be envisioned after research and development and technological viability have been proven and a business model developed. The RESCO approach can be applied in both developed and developing countries.
- **RESCO Funding stakeholders:** Seed finance can be provided by international organizations (United Nations Environment Programme (UNEP) under the Rural Energy Enterprise Development (REED) programme , Global Environment Facility (GEF) small grants program), governments, energy investment companies (e.g., Energy through Enterprise E+Co) and non-profit organizations.
- **Target users:** Local entrepreneurs possessing ideas that can be turned in viable commercial activities.
- **Time span:** Seed finance should be a removable form of support that intervenes only in the start-up stage of the finance continuum. RESCO entrepreneurs should be able to move on with their own investment after receiving initial capital to start or expand their businesses.
- **Expected impacts:** The provision of seed finance is expected to enable capable entrepreneurs in rural areas of developing countries to initiate or expand RESCOs, providing clean energy products and services in rural areas of developing countries, thus contributing to environmental improvement, employment creation, and poverty alleviation. Through services they provide, RESCOs serve as bridges between renewable system suppliers and end-users and contribute to the application of renewable energy and improving living standards.

As technical progress and experience with many renewable energy technologies has developed, the challenge of boosting renewable energies has shifted from one of financing demonstration projects and development assistance funded projects and programmes to one of supporting the creation of markets and investments in the renewable energy sector. Through the creation of RESCOs, a chain of clean energy service provision, marketing, system instalment, repair, and maintenance can be established. The local enterprise approach to the provision of renewable energy services not only provides environmental benefits, but also contributes to employment generation, poverty reduction, and economic revival of rural areas. More importantly, developing indigenous know-how, technical, marketing, and managerial capacity in developing countries is the only way to ensure that the deployment of renewable energy

technologies would not simply mean a shift from the current heavy dependence on oil to a new form of external technological and financial dependence with regard to renewable energy.

Ideas and proposals for setting up new businesses or expanding existing businesses in the provision of clean energy technologies and services abound in developing countries.

The principal obstacle to turning business proposals into reality has been inadequate access to financing. Many financiers and investors consider doing business in clean energy technologies and services in rural areas a high-risk business with uncertainty over returns. As a result, financing mechanisms such as venture capital, which is the most common form of financing new businesses (e.g., information and communication technologies), has not been attracted to financing the creation and development of small renewable energy enterprises. The unavailability of catalytic capital in market is a major barrier to the ability of small, start-up enterprises to get started. Seed finance aims to fill this gap by pulling resources into sound business proposals capable of delivering energy services on a commercial basis and generating employment in a sustainable manner.

Support structures are presently suitable for delivery by a regional renewable energy finance mechanism:

- **Micro-finance for rural electrification.** The programme would provide terms improvement supplements for finance to micro-finance agencies of government, cooperatives, NGOs, commercial banks and other rural focused small loan organizations. The programme would include loan guarantees, and interest subsidies plus grant based training for those organizations to improve skills in renewable energy loan structuring and risk management. The program would focus on those countries with a large un-electrified rural population and emphasize loans that would result in productive use of renewable energy in rural areas. Primary financiers are expected to be national development banks, commercial banks, rural businesses having large local employment (e.g. plantation owners), and rural development NGOs;
- **Support for finance for renewable energy based Independent Power Producer (IPP) development in those countries where there is either an existing legal and regulatory structure in place for IPPs or where the utility has shown a clear interest in developing such structures in a manner that could be financially attractive to private developers.** The programme would provide terms improvement supplements to loans and grants for technical assistance for entrepreneurs wanting to develop renewable energy projects for feeding power to the national grids Primary financiers are expected to be international finance institutions, ADB, national development banks, local investment funds (insurance and pension funds) and venture capital funds;
- **Loan supplements for the capitalisation of RESCOs for rural electrification.** Supplements to improve the terms of loans for system capitalisation, the provision of grants for capacity building and terms improvement supplements for three to five year loans for working capital would be made available for the finance of RESCOs in those countries where the concept has already been developed to the point where the primary barrier to expansion is finance. Primary financiers are expected to be ADB, international finance institutions, national governments and national development banks;
- **Loan guarantees for commercial banks on finance for solar water heaters.** For those countries where the potential market for solar water heating in urban areas is large, the programme would provide loan guarantees to commercial lending institutions for loans to consumers for the purpose of installation of solar water heaters. This is intended to reduce the perceived risk of such loans and allow longer terms of finance at reasonable rates of interest for households to install solar water heaters;

- **Renewable energy business development loan supplements.** This programme emphasises improving the terms of capitalisation loans and providing capacity development grants to assist entrepreneurs develop businesses that support renewable energy development (excluding RESCOs which are treated separately). Included would be terms improvement for loans for the development of manufacturing of renewable energy components (e.g. solar water heaters, PV charge controllers), biofuel production (e.g. coconut oil processed as a diesel substitute for marine transport or power production), and expansion of existing renewable energy businesses.

## 4 Examples of international implementations of RESCOs

### 4.1 UNEP activities in China, Brazil and Africa

#### **Start-up capital, equity investment, and other support instruments**

The most urgent need of a prospective entrepreneur with a sound business proposal is access to start-up capital for establishing a new business and growth capital for a business expansion.

Typically, seed finance programmes will provide such capital in the form of loans to be paid back by the entrepreneur, direct equity investment in the enterprise, or grants. Under the UNEP supported African Rural Energy Enterprise Development (AREED) programme, the first support to an energy entrepreneur might be a modest loan (e.g., \$5,000) to support the preparation of a business plan. If promising, a second financing could be arranged to assist in the company's start-up—this time possibly the purchase of an equity share in the company.

Once the business is operating, a working capital loan might be provided on a cost-sharing basis with the owner(s). Once the company has reached a point where it is capable of turning to other partners such as financial institutions and investors, AREED's role diminishes and can be limited to providing a guarantee to establish a line of credit with a local bank. Total AREED support to a company typically ranges from \$50,000 to \$120,000, although it can reach \$250,000 (UNEP AREED).

#### **Partnership among programmes' managers, financiers, NGOs, etc.**

Enterprise development programmes under seed financing need to be built on effective partnerships with all relevant actors in the financing and development of rural renewable energy enterprises. Typically, these will involve international organisations, governments, financial institutions, and local development organisations, in addition to entrepreneurs. In Africa, the UNEP-supported AREED programme builds on a network of local and international partners including the UN Foundation; energy investment companies such as E+Co; locally active organisations such as Enda Tiers Monde, and financial institutions such as the Development Bank of Southern Africa. In China, the CREED programme works with the prominent environmental conservation organisation, Nature Conservancy. In Brazil, the local partners of the B-REED programme are BRASUS and INSTITUTO ECO-Engenho.

The substitution of firewood with cleaner fuel such as LPG (liquefied petroleum gas) is expected to alleviate environmental problems such as deforestation and biodiversity loss caused by the unsustainable collection of fuelwood, which is common in many rural areas. The CREED programme in China is expected to do so in the northwest part of Yunnan province and in neighboring areas of western China.

RESCOs are responding to the large market demand for various services for renewable energy application in remote areas. The end-users need to buy the facilities at a location near their home, and need technicians to install the facilities. They also need after-sale service to keep these facilities operating normally. In China between 1990 and 2004, over 200,000 units of household wind turbines have been installed, to provide electrical power for about 1 million people. Dozens of RESCOs have been set up in



order to sell, install, and maintain household solar photovoltaic (PV) systems in China and India, as well as solar water heating systems in India.

Under the AREED programme, UNEP has supported the creation of enterprises in the following areas: charcoal briquetting (Mali), PV rural electrification (Mali), manufacturing and distribution of efficient cook stoves (Zambia), solar crop drying (Ghana), cook stove manufacturing (Zambia), and a solar thermal company (Senegal). These companies provide clean energy technologies and services, which contribute to alleviating environmental problems such as deforestation and biodiversity loss caused by the unsustainable collection of fuelwood, and shifting away from traditional pollution-intensive sources of energy: for example, upgrading and chain distribution of efficient cook stoves; solar drying and windpowered water pumping; shifting from charcoal and traditional stoves that reach a 10 percent efficiency and only last approximately 12 to 18 months, to improved stoves with a thermal efficiency measured to be between 20 and 25 percent and a life span estimated at eight years, leading to significant savings in charcoal consumption of more than 50 percent.

Following success in the implementation of AREED, the initiative is being replicated in Brazil under Brazil Rural Energy Enterprise Development (B-REED) and in China under the China Rural Energy Enterprise Development (CREED).

Related good practices:

- Encouraging various finance sources for the utilisation of landfill gas through economic incentive policies, China
- Promoting household photovoltaic systems in remote areas of China through international funding and establishment of effective mechanisms, China
- Financing solar photovoltaic systems through rural finance institutions, India.
- Setting up renewable energy service companies (RESCOs) for maintenance and operation of village renewable energy systems, China.
- Economic incentive policy to stimulate market growth for small wind turbines, China.
- Commercialisation of solar hot water systems through financial intermediary scheme implemented by MNES/IREDA, India.

## **4.2 India**

The Ministry of New and Renewable Energy (MNRE) has come up with a framework to capture the business model of a RESCO. A RESCO will set up the solar power project and then monetize the energy produced as compared to a system integrator, who would install the project and be involved in the execution and implementation of the project for another RESCO. The framework proposed for assessing RESCOs is given below:

RESCOS are expected to operate on a model wherein they will purchase the asset (solar panels/collectors) using long term funds, generate power, distribute it and collect revenues from their customers. As a result, the ability of the RESCO to implement more projects is directly linked to its net worth as the RESCO will have to put in its own funds (typically around 20 per cent of project cost) for every project; i.e. for every project implemented by the RESCO (through the subsidy route or otherwise), it would typically own fixed assets up to 5 times its contribution.

CRISIL has used the above rationale to recommend the quantum of project-size (cumulative limit) that can be taken up by RESCOs at a particular-level of entity grading. The multiple will be applied to the entity through a composite matrix of grading & key parameters. These multiples have been finalised post deliberations with MNRE and shall be used for finalising the quantum of work that the RESCO can undertake under the subsidy route. If any entity, undertakes a project exceeding the defined threshold

corresponding to its grading, the grading shall be deemed to be invalid and the entity would require to undertake the entire grading exercise again.

### **4.3 China**

The UNDP/GEF project of Capacity Building of rapid Development of Renewable Energy Commercialisation in China, supported the set-up of several renewable power systems in villages for demonstration from 1999 to 2001. The Bulunkou project, in Xinjiang province, was one of them. Apart from providing financial support, the UNDP project also supported the set-up of a RESCo for the maintenance and operation of the village power system. This RESCo is the first one that was set up specifically to provide services for the village power system's maintenance and operation.

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In Bulunkou Xiang, five wind turbine/PV/diesel hybrid village power systems were installed in 2002, with a capacity of 60 kilowatts, 8 kilowatts, and 120 kVA, respectively. The UNDP/GEF project provided U.S.\$585,570 for the initial investment, used mainly for the procurement of facilities. The local government provided 1.6 million yuan (U.S.\$194,000) for the construction of basic infrastructure.

In China, there will be a large market potential for RESCO. Simply through the national project on Electricity Facility Construction in Non-Electrification Townships in Western Provinces of China, about 800 renewable systems need such services after 2005. Furthermore, the Chinese government is considering the promotion of a similar program, to supply power to villages that are without access to a power grid, numbering in the range of 122,000 in 1999.

The application of RESCOs comes without any special requirements. So, it is easy to emulate the RESCO mode in other developing countries, when providing support for the application of integrated renewable systems in remote villages.

### **4.4 The Beijing Sunshine Schools program**

Under the umbrella China's national Golden Sun Program, Beijing will install 100 megawatts of roof-top photovoltaic (PV) systems in schools and other educational institutions in Beijing Municipality. It is the largest such initiative in China to date. Most projects under the Golden Sun Program involve large PV installations in a single location. By contrast, the Sunshine Schools program will involve distributed PV capacity in about 800 facilities. The capacities of most systems are expected to range from 50 to 200 kilowatts.

The program will test the renewable energy service company (RESCO) business model for distributed rooftop solar PV systems, whereby investments are financed by the service provider, which also provides maintenance and other after-sale service.

The project is also expected to pilot two-way metering and net metering for rooftop PV systems. If proven successful, the project would provide valuable experience and demonstration effects for China's growing solar PV market.

In addition to policy replication, the program launched a parallel effort to educate students in the schools about environmental sustainability. It includes a competition with awards given out by both Beijing and

central government officials as well as school administrators. Online monitors showing the amount of renewable energy generated and carbon dioxide avoided are displayed in the schools. Link-ing faculty, students, and parents with sustainability initiatives in schools should reinforce green lifestyle concepts both at school and at home.

The World Bank is providing a \$100 million loan for the installation of the solar PV systems, as well as a grant from the Global Environment Facility to establish online monitoring by the city of the renewable energy generation of the schools and to conduct technical studies on grid connection issues. The hope is that the Beijing project can be replicated in other Chinese cities developing similar schemes.

#### **4.5 Philippines, Palawan Region**

The Palawan New and Renewable Energy and Livelihood Support Project (PNRELSP) of the Philippines (UNDP-GEF No. PHI/99/G35-PHI/99/013), or the Project, is aimed at reducing the long-term growth of greenhouse gas (GHG) emissions through removing the barriers to commercial utilization of renewable energy (RE) power systems to substitute for use of diesel generators in Palawan. As part of the project interventions, the project originally intends to demonstrate the viability of the RESCO (Rural Energy Service Company) delivery mechanism of renewable energy systems, and economic activities of productive use of renewable energy services for rural communities. The RESCO approach was however changed to Direct Sales approach because of the unsuccessful RESCO project in Aklan Province, which this project intends to replicate. That failed RESCO project was implemented by Shell Solar Philippines Corporation (SSPC, formerly Shell Renewables Philippines, Inc.), which is also the private company partner of this Project.

The overall outcomes of the revised Project are:

- Increased level of awareness of the people about renewable energy systems;
- increased information and services on renewable energy for potential investors; and,
- a commercial and sustainable delivery mechanism set up such as Direct Sales approach to provide renewable energy services in the province of Palawan.

The Global Environmental Facility (GEF) grant for this medium size project was US\$ 750,000. This was matched with co-financing from the United Nation Development Programme under its Target for Resource Assignments from the Core (UNDP TRAC) in the amount of US\$ 100,000, the Provincial Government of Palawan (PGP), US\$ 300,000, and SSPC as the private sector stakeholder, for US\$ 1,400,000 bringing the total project cost to US \$ 2,550,000.

#### **4.6 Solomon Islands**

In 2012, Japan provided SBD 29.4 million (USD 4 million) through its PEC Fund for about 2 000 solar home systems to be installed under a “solar utility” or renewable energy service company (RESCO) concept, whereby users pay a periodic fee for the services provided, and the utility provides all maintenance and repairs. The Department of Energy will oversee the project, which is being implemented by a Japanese company, the Inter Action Corporation. The approach here is to use established credit schemes and associations as financial institutions from which members can obtain loans to buy solar home systems from the project. Due to public interest, the project has been opened up to members of the public who are not members of any credit schemes/associations on condition that they pay 100% of costs up-front before installation and servicing takes place. The managing company (RESCO or utility) will be selected by tender with installations starting around March 2013.

The government plans to scale up this approach using the network of active NGOs in the country that presently works within remote communities in the country.

Although a number of companies sell solar PV equipment, only one (Willies Electric Power and Solar) specialises in the technology. Willies has pioneered the concept of accepting local products in payment for solar installations, thereby avoiding the common problem in rural areas of poor access to cash. It also provides training in solar installation and maintenance. In 2008, Willies, with funding from the Renewable Energy and Energy Efficiency Partnership (REEEP), implemented the Pacific Micro Energy Services Company (PMESCO) initiative which, as a pilot project, provided funding for 70 solar PV units powering small LED lights for purchase by villagers through a micro-credit arrangement. The cost of the systems was typically SBD 1 860 (USD 253) with 25% down payment and the rest to be paid over 24 months. However payments were accepted as crops or product provided they had a cash value. The systems were provided by the non-profit Light Up The World Foundation (LUTW) and included 5 W of PV panels and two LED lights with associated batteries and a control unit. However, the Energy Division received a number of complaints from some participants who said that the price of solar was too high, despite the 100% exemption on import duty taxes provided by the government.

Since 2008, the government of the Solomon Islands through the Ministry of Mines, Energy & Rural Electrification has been implementing solar electrification projects at rural schools and clinics as well as providing infrastructure for rural communities such as solar battery-charging stations and solar water-pumping from bore-holes. This is a major challenge as the total number of schools in the Solomon Islands in 2009 included 520 early childhood education (ECE) schools, 507 primary schools, 167 community high schools, 16 provincial secondary schools, nine national secondary schools, and 26 rural training centres. Most of these are rural-based and are ideal targets for electrification by solar PV.

#### **4.7 Fiji**

A GEF project for Fiji (implemented by the Fiji office of UNDP) developed a complete structure for what they termed RESCO (Renewable Energy Service Company) development. The core concept is creation of a public/private partnership.

The Project Document was signed by the Government of Fiji and UNDP in June 2000, and implementation of activities began in 2001. A midterm review was carried out in March 2003 with the final midterm review report dated June 2003 highlighting progress made in the implementation of activities but also stated a number of concerns with respect to: project coordination; steering committee membership; proposed country office's role; among others. In addition and as raised by other specific activity reports a number of recommendations for supplementary activities were formulated to strengthen the achievement of; and, realise, the relevant objectives and indicators of the project.

Generally, the project has suffered from practical weaknesses (i.e. the operation of a commercialised RESCO) and inadequate control due to a weak monitoring and evaluation framework. Structurally, the project was designed with four principal pillars: (i) training; (ii) public information and awareness; (iii) technical, legal, economic, and financial analysis; and (iv) practical demonstration of private sector mobilisation to support renewable energy for rural electrification.

The Department of Energy (DOE) purchases the solar equipment and make the systems available for subsidised lease by qualified RESCOs. The RESCOs would market the leased systems, install them and collect the fees necessary to cover their costs and profit as well as to pay the DOE lease fee and an amount to go into a component replacement fund that would ensure that sufficient funds will be available for battery and major component replacement when needed. The concept is under trial with several hundred

systems (financed by grants from Japan) installed in rural Vanua Levu. A Labasa based RESCO has been contracted to provide the necessary project operational support. Funding is being sought to finance a “proof of concept” project that will include several thousand installations on both Viti Levu and Vanua Levu.

Under the present rural electrification policy structure, 90% of the capital cost is covered by government with the capital repayment amount limited to 10 percent. This approach is well suited for international finance agency participation and finance for fee for service type rural electrification is proposed as an important component of a renewable energy finance package for the PICs.

In 1983, rural electrification through PV with a RESCO management structure was first tried in Fiji at Namara (Kadavu) and Vatulele (Koro) with between 30 and 40 solar PV systems each. Under this arrangement households paid FJD 25 initially, but falling to FJD 3–4 per month. Installations were funded by United States Agency for International Development (USAID) through the Peace Corps. A third installation was scheduled on Totoya but the island’s Peace Corps volunteers left early and the installation never took place. The Koro project failed after the Peace Corps volunteer manager left and the village cooperative spent the accumulated funds on other projects, leaving no money for battery replacements. The Namara cooperative also failed as an organisation after the departure of the local Peace Corps volunteer, although its management was taken over by village leaders who successfully maintained the systems through a community structure they established using the technician trained under the original project. Several projects in the late 1980s and mid-1990s increased panel capacity at Namara and provided high-quality battery replacements allowing the project to continue operating to the present day. The Namara solar installation may be the longest continuously running solar electrification project in the Pacific islands region. Although these early pilot projects provided much useful information for later PV projects, they were themselves not considered successful general models for rural electrification projects in the region.

the initial pilot project in the year 2000 has resulted in around 2 000 households being electrified through solar PV systems supplied by the FDOE RESCO. Another 1 000 rural homes are expected to be electrified by solar home systems in 2013. In this approach, a variant of the Kiribati “Solar Utility” structure, the FDOE owns the installations, collects a monthly fee and provides all maintenance and repairs through a private contractor. This is not the true RESCO approach, given that the maintenance company is paid by the FDOE and not by the customers themselves. This means that there is less incentive to provide the high-quality support services and rapid repairs that inspire customers to quickly resume fee payments after a system failure. The approach is highly subsidised by the FDOE, but has been operating with reasonable levels of service reliability for over a decade.

In 2010 RESCO customers were interviewed by an Australian National University team, which found that installations were poorly maintained with some households having to wait more than a year for repairs. A majority of the households surveyed considered that the service they received was poor but remained with it because they did not want to go back to using kerosene for lighting.

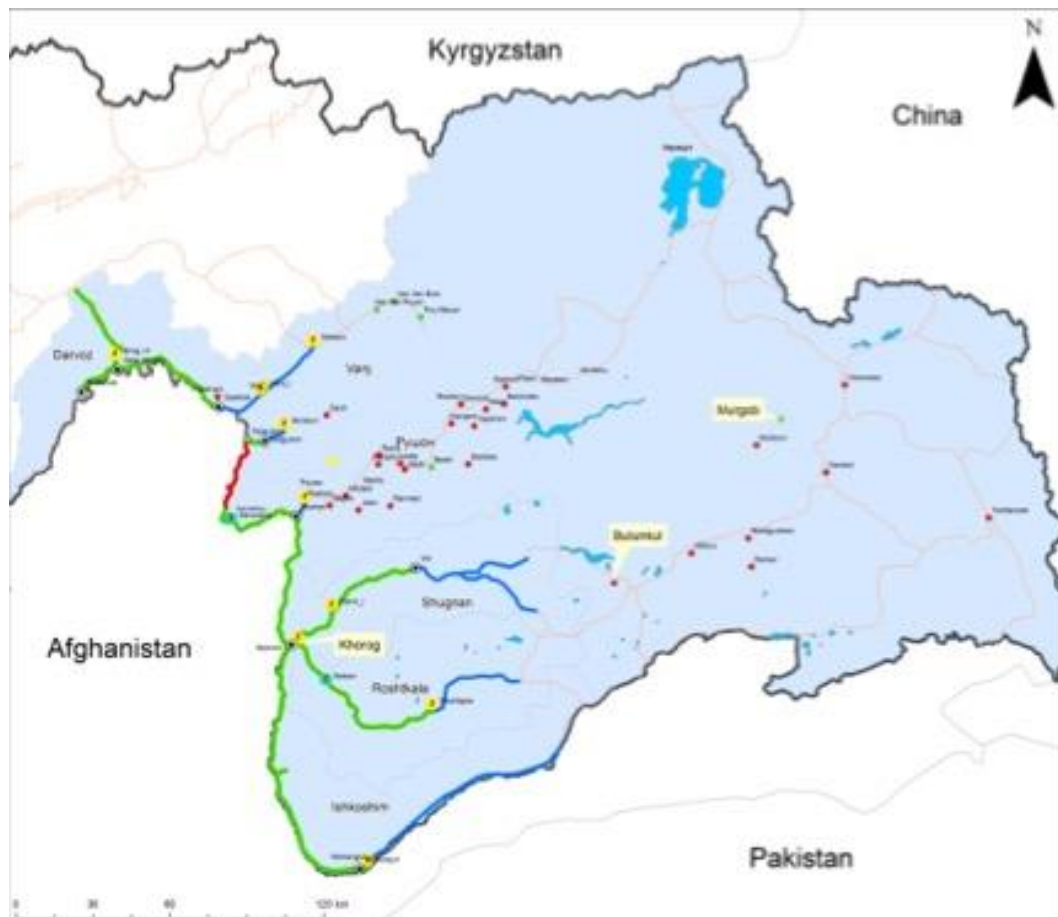
### **Annex III: Financial, economic and environmental analysis of the GEF-supported investment**

See excel file – provided separately

#### **Annex IV: Background information about Bulunkul village of Murgab District in Pamir, Tajikistan – pilot site for RESCO model implementation**

The Murgab district lies in the Viloyati Mukhtori Kuhistoni Badakhshon (VMKB/GBAO) in the Pamir Mountains, in the remote Eastern part of Tajikistan. The district is one of the least developed areas of Tajikistan. The VMKB estimates the population of about 220,000 residents, mainly settled in the valley along the Panj River with the centre at Khorog. This town can be reached from Dushanbe in about 14 hours on the road or in one hour by plane. The regional center of Murgab lies about 305 km east from Khorog in a side valley, formed by the Ak-Su River, a tributary to the Panj River.

Bulunkul is the village located close to lake Bulunkul, in the vicinity of Lake Yashilkul. The total population of the village is 250. There are 36 households, consisting of 52 families. Bulunkul village was founded in 1943. The population stems from three different locations (Shugnan district, Bartang valley of Rushan and Alishur), and they speak three dialects of a common language, Shugnani. There is also one Kirghiz family. In addition to their own language, most people also speak Tajik and Russian. Further up the valley, the population is mostly Kirghiz, whose way of life is more nomadic. The nearest settlement to Bulunkul is Alichur, the centre of the Jamoat of which Bulunkul is part, and the majority of the population in Alichur is Kirghiz. Some inhabitants of Bulunkul also speak Kirghiz.



The main source of livelihood is livestock. All families have a few privately owned animals (mainly cows and sheep), and they also look after animals from various groups (cows, yaks and sheep), whose products they use. The majority of the animals is owned by groups (public cooperative farms).

The products (animals, meat, milk products, mainly yoghurt and butter) are either sold on the market in Khorog or traded against products not available in the village (flour, clothes etc.). Presently, there is no market for animal skins, which before were exported to Afghanistan and Pakistan for processing.

The second most important source of livelihood is fishing. Fishing is being done exclusively in lake Bulunkul (the small lake near the village); no fishing in lake Yashilkul, since there is no equipment (boats, nets) to do so. Fish is sold partially within the village, sometimes to merchants coming from Khorog or Murgab. As part of the Pamir Energy project development the regulating structure at Yashikul Lake was established in order to provide sufficient volume of water during the wintertime for Pamir I and Khorog HPP's of Pamir Energy. Regulating structure at the Lake Yashilkul managed by PE as well as 5 of Bulunkul residents are employed at this structure

There is no agriculture being done, although there apparently was some during the Soviet Union period, when cow dung was used for fertilising the fields. Now, all dung is used as fuel, since there is no alternative source of energy. But in any case, at this altitude and with the extremely limited vegetation period, the potential for such production is very small. Under the Social Corporate Responsibilities in Bulunkul village, Pamir Energy has been providing support for the local community through expanding the areas of pastures, fauna monitoring and etc. An Expert has been brought to Bulunkul to introduce the agriculture and the process is in progress now. As number of cultivated lands will increase, it will enable to increase livestock's; more livestock's will enable Bulunkul to target Khorog market, and electricity will enable to insert a small production of dairy and meet the processing.

### **Education**

The village has a school with grade 1 to 4 (for children of 7 to 10), which has presently 34 pupils. Older Children go to school in Murgab or Khorog, if they have relatives there with whom they can stay. Otherwise, they do not go to school any longer.

### **Health**

The village has one health post. A health worker, who is responsible for health services to herding families in the wider area, comes here on an irregular basis. Otherwise, they have to go to Alichur (about 40 km away) for health services, or to Murgab or Khorog. During the Soviet Union period, the health post had permanent staff.

Health problems, especially for children, are diarrhoea and respiratory infections. The nutritional situation in the villages relying mainly on livestock is generally better than in villages at lower altitudes which do not have livestock (Health and Nutrition Survey; Food and Nutrition Surveillance System, oral communication).

### **Drinking water**

There is one well in the village, from where all the households get their drinking water. It provides water also in winter.

### **Sanitation**

There are two toilets (pit latrines) in the village. Otherwise "we use nature".

### **Energy**

The village has its own diesel-fuelled generator for producing electricity, but there is no more diesels available. The generator is said to be still in working conditions. Presently, the only energy source, except for kerosene, which is being used for lamps, is "torf", the dung of their animals. This is used for cooking and heating in winter. Winters are long and very cold, therefore large amounts of fuel are required, and animal dung is no longer available for fertilizing fields. This has brought to a halt agricultural production, which was maintained here at a low level before.



**Most Urgent Needs of the Village**

- Access to energy
- Livestock development
- Development of fisheries as an alternative source of income.
- Land tenure / land use regulation, allocating more land to the village and creating clarity about use rights.

## **Annex V: Considerations of design options for financing de-risking instruments**

### **1. Summary**

This report presents proposed design options for the green energy investment de-risking package to be implemented under the GEF-supported UNDP-implemented Green Energy SME Development Project in Tajikistan. 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 (SWH)).

Based on research, data analysis, and stakeholder consultations conducted during Project Preparation Phase (PPG), the following package of de-risking instruments is being proposed:

- A. Policy de-risking: Technical assistance to micro-finance institutions (MFIs) to design and implement "green loan products" targeting solar and other RE and EE technologies, including marketing and appraisal of such projects by MFI,
- B. Financial de-risking: Financial support to green energy projects in the form of interest rate subsidy. The financial mechanism will be administered by MFIs to be selected based on transparent and competitive process in the Year 1 of UNDP-GEF project implementation, in line with UNDP's policy for micro-financing organizations

### **2. Background**

1. UNDP-GEF "Green Energy SME Development" Project is aimed at identifying, supporting and promoting 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 SWH). To achieve its objective, this five-year Project is being designed in four components, which include a combination of policy and financial de-risking and financial incentives to RE projects, as follows:
  - Component 1: Policy de-risking
  - Component 2: Financial de-risking
  - Component 3: Financial Incentive for RESCO
  - Component 4: Knowledge Management and M&E
2. PIF also envisages the following financial allocations for implementation of the financial de-risking:
  - Component 2: Financial de-risking: 0,5 mln US\$
3. Against this background and established objectives and targets, at PPG phase the following tasks and preparatory activities have been undertaking leading to the formulation of the proposed design options, as presented in the following sections of the report and in the Technical Annexes to UNDP-GEF Project Document:

- Preliminary market survey: availability of RE and EE products, availability of O&M services, technology specifications, prices;
- RE and EE needs assessment survey in local communities: energy needs assessment, level of awareness regarding RE and EE technologies and their affordability/readiness to pay;
- Barrier analysis: key factors and risks faced by green energy SMEs and end-users;
- Consultations with local SMEs, MFIs, and NGOs regarding proposed design options for de-risking package;
- Identification of pilot RESCO project in consultation with the Ministry of Energy and Water Resources;
- Cost-benefit analysis, including economic analysis, GHG emission reduction estimation and quantification of other social benefits.

### **3. Financial de-risking: instrument selection (Component 2)**

#### **3.1. *Baseline financial approach for investing in the SWH systems by households/SMEs:***

4. Market for RE solutions in Tajikistan is at very nascent stage: official statistics regarding annual sales and/or installed SWH systems is not available. According to RE suppliers prevailing financial approach among end-users – upfront payments from savings/equity (debt finance is rarely used to finance SWH systems due to high cost of credit)

#### **3.2. *Baseline domestic commercial financial sector involvement:***

5. Local financial sector in Tajikistan has very low liquidity; this leads to high rates being charged on commercial loans (28-30%) and short tenors (up to 3 years, 1 year – on average). MFIs are interested in providing financing for SWH products, but their technical knowledge to assess such projects is limited

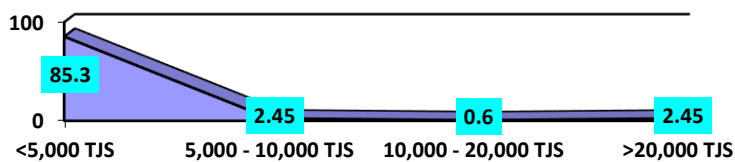
#### **3.3. *Baseline public financial instruments:***

6. There are two parallel IFI-supported initiatives which support local financial organizations in developing and providing credit products for households and SMEs for smart green energy solutions (SGES), such as solar heating and PV installations, biogas, energy efficient stoves and appliances: ADB “Access to Green Finance Project” and EBRD/Clean Investment Fund (CIF) “Tajikistan Small Business Climate Resilient Finance Facility”. These projects provide targeted credit lines through local banks and MFIs, and also offer specialized technical assistance services to participating banks. Credit terms (i.e. 23-25%) under both ADB and EBRD programmes, however, are only marginally better than standard commercial rates (28-30%). As a result, according to ADB and EBRD project teams, most of the loans (99%) in their portfolio have been provided to finance the cost of energy efficient (EE) windows; other most expensive EE or RE products, such as SWH systems have seen very low uptake. For example, ADB project financed only 10 biomass and solar projects out of 2,000 in total, the numbers for EBRD are much smaller. Interviews with MFIs and technology suppliers also confirmed that high credit cost coupled with high up-front costs of such technologies is a major barrier to investment.

### 3.4. Financial viability gap analysis

7. RE and EE needs assessment survey conducted by UNDP in 4 districts in Khatlon region of Tajikistan helped reveal key demand parameters as far as green energy products are concerned. Specifically, majority of the respondents (85,3%) are willing and able to spend only up to 5,000 TJS/year for such product either from own resources and/or as loan repayment (See Figure VII-1).

**Figure VII-1 Willingness and ability to pay for green energy by households, TJS/year**



8. Market price of a SWH system (150 l) which is required to meet energy needs of an average Tajik households (8 people) is 10,200 TJS. In view of survey's findings, without debt finance, the costs are not affordable for most end-users (87,75%). However, under the market interest rates (28%, 3 years tenor) and even under ADB/EBRD green loan finance projects (25%, 3 years tenor), annual costs to end-user are still higher than the affordability threshold of 5,000 TJS (see Table VII-1).

**Table VII-1 RE cost to end-user under baseline**

#### End-user model - Baseline

Total cost to consumer	TJS	16 377
Principle	TJS	10 200
Debt service	TJS	6 177
Annual payment	TJS	5 459
Pay-back	Yrs	5

#### End-user model – ADB/EBRD

Total cost to consumer	TJS	15 676
Principle	TJS	10 200
Debt service	TJS	5 476
Annual payment	TJS	5 225
Pay-back	Yrs	5

### 3.5. Risk review and sensitivity analysis

9. Key barrier to investment in SWH identified through conducted financial analysis, as well as consultations with local stakeholders, MFIs, green energy suppliers, and end-users is related to high cost of loans for such products which makes the terms of financing unaffordable to consumers.
10. Interest rate subsidy mechanism is proposed to help address this barrier. The size of subsidy has been tentatively determined based on sensitivity analysis, i.e. the impact of different loan interest rate on the annual payment by end-users, as presented in Table VII-9. For example, for the proposed investment in household SWH system, annual payments by end-users are below affordability threshold of 5,000 TJS when the loan interest rate is at or below 20%.

**Table VII-9 Sensitivity analysis: interest rate and annual payments**

Interest rate (%)	Annual payment (TJS)
10%	4 102
15%	4 467
<b>20%</b>	<b>4 842</b>
25%	5 225
30%	5 616

### 3.6. Design options and comparison

11. Cost-effectiveness, as well as environmental and socio-economic benefits of the proposed financial mechanism has been assessed, as presented in Table VII-9.

**Table VII-10 Cost-effectiveness**

<b>Cost-effectiveness</b>		
Interest rate subsidy	%	10%
Cost per loan	TJS	2 274
Number of SWH	#	2 000
Total cost of instruments	TJS	4 548 269
	US\$	535 090
Leveraged financing	TJS	22 255 921
	US\$	2 618 344
Leveraging ratio	1 (GEF) to	5
<b>GHG emissions</b>		
tCO <sub>2</sub> per investment life-cycle	tCO <sub>2</sub>	16 288
Cost-effectiveness	US\$/tCO <sub>2</sub>	33
<b>Socio-economic benefits</b>		

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Number of beneficiaries	#	16 000
Number of women beneficiaries	#	10 000

12. Alternatively, financial viability gap can be addressed through the provision of direct subsidy to end-users. However, this option is less sustainable from market development point of view. Also, UNDP's POPP doesn't allow direct subsidy (grant) provision. Another important aspect contributing to sustainability of the proposed mechanism is the involvement of the broad range of domestic financial sector actors, as partners, but also as beneficiaries. The project will provide technical assistance to MFIs to help them understand and be able to appraise low-carbon investment.

### **3.7. Recommendation on a preferred financial instrument**

13. Based on conducted analysis the following choice of public and financial de-risking instruments seem most appropriate from the perspective of a) ability to address the prevailing market barriers; b) cost-effectiveness; and c) potential to ensure sustainability:

Policy de-risking:

- *Technical assistance to financial sector partners (MFIs) to develop and market dedicated green loan products*

Financial de-risking:

- *Interest rate subsidy – 10% from market rate*

14. It is also recommended that detailed design of the mechanism be completed at the inception phase of the project and be based on
- full-fledged market demand survey, identification of “affordability” thresholds for consumers, as well as their priority energy needs which can be met with EE-RE technologies.
  - in-depth market review in terms of availability of EE-RE products on the local market, prices, O&M services in the capital and in the regions.
  - Lessons learnt and recommendations of baseline initiatives by ADB and EBRD

## **4. Financial partner selection (Component 2)**

15. The selection of financial partners shall be conducted based on open and transparent tender procedures and established criteria regarding financial, operational and administrative capacities of financial partners, as well as UNDP's requirements.
16. In line with UNDP Guidance on Micro-capital grants, selected financial partner must demonstrate competency in the following areas:
- Institutional strength. Sound institutional culture with a mission and vision that is supportive of the expansion of micro-finance services to low-income clients; management and information systems that provide accurate and transparent financial reports according to internationally recognised standards; and efficient operating systems;
  - Quality service and outreach. Focus on serving low-income clients and on expanding client reach and market penetration; financial services that meet the needs of their clients;
  - Examples of needs-oriented services are small, short-term loans with collateral

- substitutes or alternative forms of collateral, and safe, convenient savings facilities. A reasonable time frame for sustainability is 5 to 7 years.
- d. Sound financial performance. Interest rates on loans sufficient to cover the full costs of efficient lending on a sustainable basis; low portfolio in arrears and low default rates; a diversified funding base for its micro-finance operations to minimise dependency on donor subsidies.
17. Further requirements and eligibility criteria for financial partner selection are specified in the relevant UNDP policies, i.e. UNDP Guidance on Micro-capital grants, UNDP Microfinance policy and POPP. Specifically, according to POPP: Micro-capital grants for credit and non-credit activities may be included among the inputs financed by UNDP. An individual micro-capital grant may not exceed \$150,000. A recipient organization may receive multiple grants provided the grants do not exceed on a cumulative basis \$300,000 within the same programme or project. On all requests related to credit or microfinance, technical clearance from UNCDF is also required.
  18. By Tajik Law, there are a number of entities that can be engaged into microfinance activities, including “microfinance funds”, which are “not for profit entities” (as defined in the Law on Microfinance of the Republic of Tajikistan). The list of all microcredit funds can be found here: [http://nbt.tj/en/banking\\_system/fondhoi\\_karzii\\_khurd.php](http://nbt.tj/en/banking_system/fondhoi_karzii_khurd.php). Partner MFIs for implementation of the proposed financial instrument will be selected from among “microfinance funds”, i.e. only MFIs with non-for-profit status will be eligible to apply.
  19. UNDP Tajikistan has established mechanism of the Grant Committee to review applications and approve microfinance funds to be eligible for UNDP grant support. Grant Committee reviews applicants following announcement of the Expression of Interest. Same mechanism and institutional arrangements will be used to select partner MFIs for the GEF project.

## 5. Financial instrument design

20. Support to eligible projects will be provided in the form of interest rate subsidy (up to 10% on commercial loan interest rate – *maximum threshold for commercial interest rate should be determined at the inception stage based on analysis of prevailing market conditions*)
21. Eligible technologies/projects:
  - a) Solar (SWH, PV) and other RE-based technologies
  - b) Other green energy products (e.g. EE stoves) – subject to the results of household needs assessment and product availability
22. The investment cost of an eligible sub-loan is limited to USD 2,000. Multiple sub-projects to the same applicant for different sub-projects are not allowed.
23. Eligibility of sub-projects from technical perspective will be determined by the Technical Advisor, who will support partner MFIs in technical appraisal of the applicants. Financial appraisal of sub-projects will be conducted by the partner MFIs. Technical consultant will also provide capacity building and advisory support to MFIs.
24. Eligible beneficiaries: households and SMEs (subject to them meeting standard requirements of MFIs to be assessed at financial partners’ selection stage).