TERMINAL EVALUATION

of the UNDP/GEF Full-Size Project

Draft Report (yellow)

Technology Transfer and Market Development for Small-Hydro Power in Tajikistan

GEF Project ID: 4160, UNDP Project ID (PIMS): 4324

SHP plant in Pinyon

This Terminal Evaluation Report was prepared for the UNDP CO Tajikistan by:

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Profile of the evaluator

The Terminal Evaluation was conducted in November through December 2017 by Mr. Jiří Zeman.

Mr. Zeman has 25+ years of international professional experience in energy efficiency, renewables, climate change and energy utilities. Since 2009, he has been working as a freelance consultant. Between 1990 and 2006, he worked with SEVEn, The Energy Efficiency Center in Prague, the Czech Republic, a leading energy efficiency consulting organization, where he served as a Deputy Director. During 2006-2008, he worked for the Utility Competence Center of Hewlett Packard for Central and Eastern Europe, Middle East and Africa as a Solution Architect. Mr. Zeman evaluated more than dozen UNDP/GEF energy efficiency and renewable energy projects, prepared feasibility studies, developed energy efficiency and renewable energy projects for financing and implementation, and drafted renewable energy legislation and bylaws.

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Abbreviations and acronyms

APR	Annual Project Review
AWP	Annual Work Plan
CASA 1000	Central Asia South Asia Electricity Transmission and Trade Project
CDR	Combined Delivery Reports
CO	UNDP Country Office
CPAP	UNDP Country Programme Action Plan
EE	Energy efficiency
EM	Energoremont - manufacturing company
EOP	End of Project
FIT	Feed-in tariff
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	Greenhouse Gas
HPP	Hydropower plant
IR	Inception Report
IRD	Integrated Rural Development
JICA	Japan International Cooperation Agency
KM	Korgohi Mashinasozi/Tajiktekstilmash - manufacturing company
LITACA	Project for Livelihood Improvement in Tajik-Afghan Cross-Border Areas (under JICA)
MEWR	Ministry of Energy and Water Resources of the Republic of Tajikistan
MTE	Mid-Term Evaluation (equivalent to MTR)
MTR	Midterm Review (equivalent to MTE)
NGO	Non-Government Organization
PDF	Project Development Facility
PIMS	Project Information Management System (UNDP GEF)
PIR	Project Implementation Review
PIU	Project Implementation Unit
ProDoc	Project Document
PV	Photovoltaic – electricity generation from solar energy
RE	Renewable Energy
SGP	Small Grants Programme of GEF
SHP	Small hydropower
ToR	Terms of Reference
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

1. Executive summary

Table 1: Overview of the project identification

Project title	Technology Transfer and Market Development for Small-Hydro Power in Tajikistan
GEF Project ID	4160
UNDP Project ID	4324
Country	Tajikistan
Region	Europe and Central Asia
Focal Area	Climate Change
FA Objectives, (OP/SP):	CCM-3: Promote Investment in Renewable Energy Technologies (GEF-5)
Operational Program	
GEF agency	UNDP
Executing Entity	UNDP
Implementing Entity	
Other Partners Involved	Ministry of Energy and Water Resources

Table 2: Key project milestones

	Originally expected date	**Actual date**
CEO endorsement/approval		December 28, 2011
Agency approval date		April 1, 2012
Implementation start	March 2011	April 1, 2012
Midterm evaluation completion	October 2014	March 2015
Terminal evaluation completion		December 2017
Project completion	December 31, 2015	December 31, 2017

Table 3: Overview of budgeted and actual financial sources spent by end of October 2017

	Budgeted in Project Document	**Actual as of October 2017**
GEF financing:	**2,000,000 USD**	**2,000,000 USD**
Other:	**3,030,000 USD**	**11,333,282 USD**
Cash total:	*2,830,000 USD*	*11,550,000 USD*
- *UNDP*	*1,330,000 USD*	*1,457,282 USD*
- *Government*	*1,500,000 USD*	*8,300,000 USD*
- *Other*		*1,576,000 USD*
In-kind (Companies)	*200,000 USD*	*200,000 USD*
Total project costs (incl. GEF)	**5,030,000 USD**	**13,333,282 USD**

The Project Document included into the project budget also 4.25 mil USD of planned UNDP parallel financing, which gives a total of 9.280 mil USD, however only sum of 8,45 mil USD was indicated (ProDoc, page 51).

As of beginning of November 2017, in total 1,694,135 USD have been spent of the GEF budget, i.e. 85% of the total GEF budget of 2 mil USD with the remainder being committed, and a total of 3,209,178 USD, i.e. 96% of the total combined GEF + UNDP Trac project budget of 3.33 mil USD.

1.1 Brief description of project

The "Technology Transfer and Market Development for Small Hydro-Power in Tajikistan" project (referred to as the "Project") aims to improve the access to clean electricity in Tajikistan and to minimize utilization of traditional biomass and fossil fuel for power generation. Tajikistan is the eighth richest country in the world in terms of hydropower resources. Some 98% of power generation in the country is generated in hydro power plants, mostly built during the Soviet period. However, despite this large hydro power potential, the country still experiences electricity shortages. The water flow in rivers is highly seasonal, with minimum water flow in winter season with highest demand.

The Project addresses problems in the development of small hydropower plants in Tajikistan including:

- Low electricity tariffs cover only low operational costs and do not provide opportunity for investment cost recovery of new power plant re/constructions. This particularly affects the national utility, Barki Tojik (BT) that owns and operates the majority of hydropower plants in Tajikistan, as well as potential investors to new SHP facilities;
- Limited institutional capacity for development and implementation of a feasible program for effective replication of small hydropower plants;
- Lack of a developed supply chain for locally produced SHP equipment. All SHP electro-mechanical equipment has been imported, mainly from Russia or China;
- Lack of locally available skilled workers for construction, installation, operation & maintenance and service of small hydro power plants.

1.2 Project results and terminal evaluation rating

The project objective has not been fully met. No new SHP plants have been developed with a support of the designed financial support scheme, the EE and RE Trust Fund, although 6 new SHP plants are under development, financed by the Government and international donors. Development of SHP has not been significantly accelerated due to two main factors:

1. Due to budget constraints and ability of Tajikistan to attract financing for and renew/start construction of large-scale hydro-power generation (3.600 MW HPP Rogun) and transmission projects (CASA-1000), the funding for the designed SHP financial support scheme, the EE and RE Trust Fund, has not been mobilized.

2. The Project managed to work with the MEWR and to review and adopt updated National SHP Program with significantly improved quality of shortlisted potential SHPs suitable for construction. Only feasible SHP were shortlisted, which lead to significant downsize of the National SHP Program and reduction of number of suitable SHPs.

In Outcome 1, the Project was successful in developing enabling legislative and regulatory environment for SHP development, EE and RE legislation has been revised and adopted, including bylaws and regulations for SHP financial support scheme and Trust Fund operation. The government/MEWR has been trained in their capacity to assess feasibility of SHP plants and their sustainable operation and monitoring.

In Outcome 2, an innovative and demanding SHP technology transfer was implemented, two local production companies have been trained and supported in SHP technology production, and produced SHP mechanical parts including turbines for five newly constructed SHP plants with ca 60% share of locally provided goods/technology and services. Extensive vocational trainings and educational modules for students have been developed and implemented, guidebook on SHP development developed and disseminated, and workshops and trainings on SHP development, maintenance and repairs implemented.

In Outcome 3, five new green-field SHP projects have been implemented and new SHP plants constructed, sustainable operation of additional two SHP plants under development has been supported, six new SHPs are under development at the end of project that received indirect project support through trainings of local experts and governmental decision makers. Feasibility studies of 29 potential SHPs have been developed and shortlisted in the National SHP Program. Innovative sustainable operational schemes have been designed, including non-cash settlement of electricity bills, and SHP operators were trained.

In Outcome 4, the national scaling-up program has been designed and approved, the revised and improved National SHP Program has been developed and adopted, however the EE and RE Trust Fund was not funded. International RE conference was held in 2016.

The main success of the Project that was not reflected in the project LogFrame was a change of the MEWR approach and mindset: from extensive low-quality SHP development facing a risk of unsustainable operation towards feasible SHP development with sustainable operation and monitoring performed by the MEWR experts. This, combined with a lack of budgetary resources, leads to a decrease of SHP actually supported and constructed.

However, in the mid-/long-term, after completion of the CASA-1000 transmission line to Afghanistan and Pakistan, new power export capacity is expected to attract private investors to finance new hydro-power projects, including SHP, and thus reducing the need for subsidies for new SHP plants.

Table 4: Overview of project objective and outcome achievements rating

Indicator	Target	Achievements	Rating
Goal: Reduction of GHG emissions from energy use by rural and remote communities			
Avoided GHG emissions from rural communities' energy use by end of project (EOP), ktCO2	45 ktCO2	9.275 ktCO2 cumulative savings by EOP, lifetime GHG savings of 139.3 $ktCO_2$[1]	**HS**

[1] Project GHG emission reductions and electricity generation is based on estimates and the Project GHG emission reduction report (Estimation of greenhouse gas reduction for the UNDP/GEF projects "Technology transfer and market development for SHP in Tajikistan" and "Support to Sustainable Transport Management in Dushanbe", D. Halubouski, 2014), because net electricity generation supplied to customers is not metered yet.

(should be lifetime)			
Avoided GHG emissions from rural communities' energy use by end of project influence period, 10 years (EOPIP), ktCO2 – (**lifetime savings)**	244 ktCO2 (**Should have been revised to ca 122 ktCO2 in the IR**)	Cannot be evaluated how many SHPs will be implemented within 10 years after EOP	N/A
Objective: Significantly accelerate the development of small-scale hydropower (SHP) by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs.			
No. of new small hydropower projects under implementation by EOP	10	6 SHP plants under construction with indirect project support	**MS**
Minimum No. of fully operational SHPs by EOP	5	5 new SHP plants in operation Additional 2 SHP with sustainable operation	**HS**
Annual electricity generation from newly installed sHPPs by EOP, MWh/yr	2 430	4 993 MWh/year	**HS**
Cumulative (**should be annual**) electricity generation from newly installed SHPs by EOPIP, MWh (**should be MWh/yr**)	6 500	Cannot be evaluated how many SHPs will be implemented within 10 years after EOP	N/A
Outcome 1: Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country.			
Adopted regulation operationalizing RES Law	Rules and regulations adopted by end of Year 1	Adopted	**HS**
Outcome 2: Enhanced technical and planning know-how and developed market chain for SHP in Tajikistan			
% of the total SHP installed cost provided by locally made goods and services	50% by the end of Year 4	60%	**HS**
Outcome 3: Improved confidence on the technical and economic viability of integrated SHP-based rural development model			
No. of SHP demos/pilots incorporating aspects of productive uses and livelihood support for host communities	At least 5 community-owned SHP projects operate on a sustainable basis and at least 5 additional are under construction by the end of Year 4	5 new SHP plants constructed and in operation Additional 2 SHP supported in sustainable operation 6 SHP plants under construction with indirect project support	**HS**
Outcome 4: National Scaling-up Programme of Renewable Energy-based Integrated Rural Development			
Adopted and financed National Scaling-up Program	Adopted and financed National Scaling-up Program by the end of Year 4	National Scaling-up Program Adopted EE and RE Trust Fund not funded	**MS**

Rating: HS (Highly Satisfactory) – S (Satisfactory) – MS (Moderately Satisfactory) – MU (Moderately Unsatisfactory) – U (Unsatisfactory) – HU (Highly Unsatisfactory)

Table 5: Summary of terminal evaluation rating

Criteria	Rating						Comments
	HS	S	MS	MU	U	HU	
1. Monitoring and Evaluation							
M&E design at entry	**HS**						
M&E plan implementation	**HS**						
Overall quality of M&E	**HS**						
2. IA & EA Execution							
Quality of UNDP Implementation	**HS**						

Quality of Execution	**HS**						
Overall quality of Implementation/Execution	**HS**						
3. Assessment of Outcomes							
Relevance	**R**						
Effectiveness		**S**					
Efficiency		**S**					
Overall Project Outcome Rating		**S**					

HS – Highly Satisfactory, S – Satisfactory, MS – Moderately Satisfactory, MU – Moderately Unsatisfactory, U – Unsatisfactory, HU – Highly Unsatisfactory
Relevance: R – Relevant, NR – Not Relevant

	L	ML	MU	U	Comments
4. Sustainability					
Financial Resources		**ML**			
Socio-political		**ML**			
Institutional Framework and Governance		**ML**			
Environmental	**L**				
Overall likelihood of sustainability		**ML**			

Sustainability: L – Likely, ML - Moderately Likely, MU - Moderately Unlikely, U – Unlikely

5. Impact	S	M	N	Comments
Environmental Status Improvement	**S**			Long-term estimate
Environmental Stress Reduction	**S**			Long-term estimate
Progress towards stress/status	**S**			
Impact	**S**			

Impact: S – Significant, M – Minimal, N - Negligible

Except for mobilizing funding for the designed EE and RE Trust Fund, which was influenced by external factors, the Project has developed excellent results. Especially when taking into consideration its exceptionally complex and demanding scope, and an innovative approach, including technology transfer component.

The overall project results rating is Satisfactory, due to lack of funding provided for the EE and RE Trust Fund. Otherwise, the rating would be Highly Satisfactory.

1.3 Lessons learned and recommendations

Lessons learned:

I. On-grid decentralized SHP/RE is an integral part of "large-scale" power sector

On-grid SHP[2], as well as other on-grid distributed electricity generating technologies based on renewable energy, are an integral part of the whole electricity system, and are closely interlinked with electricity market development, policies, pricing, legislation and market transformation. This Project illustrates how significant impact on SHP development may have new utility level power generation and transmission projects. When designing and

[2] Decentralized (distributed) SHP/RE power plants refer to small-scale power plants located close to power end-users (an opposite to centralized large-scale power plants). On-grid decentralized SHP/RE power plants refer to small power plants connected typically to low- or medium-voltage distribution network.

implementing on-grid decentralized RE projects, this interlink with and dependence on the "large" power system policies and development should always be taken into account.

II. With low-electricity prices covering just operational costs, subsidies are essential for new investment in power infrastructure

The example of the Pamir Energy illustrates that power development projects in low-income countries/regions cannot depend only on private investment and market mechanisms to fully recover investment costs, but subsidies for low-income households are essential. Renewable energy financial support schemes operational in mid- and high-income countries and financed by a levy paid by power consumers cannot thus be mechanically implemented, but they need to be adjusted to local conditions of low-income countries and supported by targeted social support scheme to low-income households, or other forms of grant funding and/or (operational) subsidies. Thus, subsidies to be provided for construction of new SHP plants by the EE and RE Trust Fund would be fully justified.

Export opportunities after completion of the CASA-1000 project, thanks to different power peak seasons in Tajikistan and Pakistan, will create a unique opportunity to recover investment costs of new small and large power generation projects from export prices and thus to potentially sell electricity on a domestic market for a lower price, affordable to local customers. This would decrease the need for subsidies to new power generation sources/low-income customers.

III. Priority to off-grid sites

With an implementation of the new power dispatching policy prioritizing electricity supply to residential sector, households are not expected to witness such a massive interruption (of up to 12 hours) of power supply during the winter season. This will dramatically decrease the need of and demand for alternative solutions, including SHPs, in these on-grid sites, as well as SHP's impact on livelihood improvement at these on-grid locations.

The priority of new SHP development in the short-term, until the CASA-1000 project will be completed, should thus be primarily to off-grid locations, as properly reflected by the MEWR.

IV. Key success factor – right people at right positions

The major achievement of the Project is that it succeeded to change the mindset of the MEWR, including its focus on feasible SHP development primarily in off-grid sites and sustainable SHP operation. The key success factor was that there were the right people at right positions, both within the project team headed by the Project Manager, and at the MEWR.

The Project benefited from the unique opportunity, when the part-time Chief Technical Advisor served in the same time also as a Renewable Energy Expert with the Sustainable Energy Programme for Central Asia (CASEP). Thus, he had an opportunity to spend an extensive time in Tajikistan, working in both positions with MEWR and other stakeholders on developing RE/SHP enabling framework conditions, including RE legislation.

The project success also heavily depends on the personality of Mr. Jamshed Shoimzoda, MEWR Deputy Minister and National Project Director, and his professional background in economy and investment. He was the key person who drove the changes at all levels of the

MEWR, including the changes in policy, National SHP Program, SHP priorities, and RE legislation/regulation updates.

This illustrates that the implementing agency – UNDP can influence the Project success only to some extent. Critical is also the attitude and qualification of local policy and decision makers, as well as other stakeholders.

V. Extensive tendering impacts implementation period

The Project included extensive tendering needed for demonstration projects and for technology transfer component. Due to its complexity, the whole tendering process according to the UNDP procurement requirements, was extremely time-demanding. The scope of tendering and realistic time needed for implementation should be taken into account when developing other projects in the future. Also, the tendering for an international company for SHP technology transfer has been delayed, and it took in total 9 months. Delays were caused because of no/little interest of international companies. Several companies that were directly addressed by the Project refused to submit proposals, because they were not interested in small SHP technology transfer with capacity below 1 MW.

Recommendations:

Recommendation to UNDP

I. Install meters of electricity supplied from the SHP plants

Electricity generated at the SHP plants is metered at electricity meters integrated in control panels. However, part of the electricity generated is used for frequency control through heating of water in ballast water tanks. The Project should install electricity meters at SHP plants outlets to meter net electricity supplied to customers for both, future monitoring and verification of metered electricity consumption for billing.

II. Elimination of soil erosion at SHP in Pinyon

The soil at the water inlet and outlet from the SHP plant at Pinyon was flushed with water flow and threatened foundations of the SHP facility construction. The eroded parts should be covered with soil, and the SHP construction fixed to eliminate further erosion in the future.

III. Publish project information and documents on-line

The Project has developed, published and disseminated lots of valuable information, documents and publications to local stakeholders. However, these documents are not easily accessible on-line. The Project is encouraged to publish all available relevant project deliverables on-line, either at own UNDP web site, or at web sites of local stakeholders, so that this information would be easily accessible even after Project termination. The information may contain Lesson learned report, updated RE legislation and regulations, project presentations and presentations from the 2016 International Conference, SHP plant fact sheets, List of shortlisted feasible SHP sites from the National SHP Program, etc.

IV. Continuity in RE support and establishment of a financial support mechanism and provision of technical assistance

The project team and the Project Manager have developed significant experience in developing enabling framework for SHP and renewable energy in Tajikistan. UNDP is encouraged to integrate into its potential future renewable energy projects in Tajikistan activities that would support effective implementation of the developed SHP/RE framework also in the future, including in particular through technical assistance for the support of the development of a sustainable financial support mechanism. In addition, UNDP should continue to support RE policy dialogue with the MEWR, support to funding mobilization via the financial support mechanism, and putting the Trust Fund into operation.

The new UNDP GEF Green Energy SMEs Development project which will start in 2018 in Tajikistan should provide a good opportunity to put these recommendations into practice. The new project manager of this project should be given this final evaluation report in order to improve the implementation of the Green Energy SMEs Development Project.

V. Complex projects would benefit from long-term support

GEF funding is project based and it is typically provided for project duration of 4 years. Complex projects with an ambition to substantially transform local market that include policy, primary legislation and secondary regulations development and implementation, support to feasible project development, design and construction of pilot projects, and design, funding and operation of a financial facility to support large-scale rollout maximizing GHG reductions could hardly be delivered within the four year period only. In my experience, long-term effectiveness and sustainability of lots of such GEF-financed projects would significantly benefit if the implementation would be supported even after termination of the 4-year period or if projects that warrant such a measure be extended for 1 ½ to 2 years in accordance with UNDP and GEF rules. The long-term support must not be necessarily extensive, but should cover primarily at least costs of part-time consultancy support of local/international experts to secure full roll-out and replication of pilot projects on a large-scale, and thus to maximize GHG emission reductions. The solution to this measure is to extend projects and make it clear that the project extension is on the basis of focusing on scale-up and roll out and then having an action plan for how this would be achieved.

2. Introduction

2.1 Purpose of the evaluation

This terminal evaluation was performed at the request of UNDP (the GEF Agency) as a standard mandatory requirement for all UNDP-supported GEF-financed projects. The terminal evaluation mission took place in Tajikistan, on November 6-15, 2017, the Terminal Evaluation Report was submitted in December 2017.

The objective of this evaluation is to assess achievements of project’s objectives, affecting factors, broader project impact and a contribution to the general goal/strategy, and a project partnership strategy. It also provides a basis for learning and accountability for managers and stakeholders and for providing lessons learned which can be applied to the design of future relevant UNDP projects.

According to the GEF and UNDP/GEF Monitoring & Evaluation Policies, the terminal evaluation has four objectives:

i. Monitor and evaluate results and impacts;
   Analyze and evaluate effectiveness of the results and impacts that the project has been able to achieve against the objectives, targets and indicators stated in the project document;

ii. Provide a basis for decision making on necessary amendments and improvements;
   Assess effectiveness of the work and processes undertaken by the project as well as the performance of all the partners involved in the project implementation;

iii. Promote accountability for resource use;
   Provide feedback and recommendations for subsequent decision making and necessary steps that need to be taken by the national stakeholders in order to ensure sustainability of the project’s outcomes/results; and

iv. Document, provide feedback on, and disseminate lessons learned.
   Reflect on effectiveness of the available resource use; and document and provide feedback on lessons learned and best practices generated by the project during its implementation.

The 2012 UNDP “Project-Level Evaluation - Guidance for Conducting Terminal Evaluations of UNDP-Supported, GEF-Financed Projects” specifies five complementary evaluation purposes of UNDP-supported GEF-financed projects:

- To promote accountability and transparency, and to assess and disclose the extent of project accomplishments.
- To synthesize lessons that can help to improve the selection, design and implementation of future GEF financed UNDP activities.
- To provide feedback on issues that are recurrent across the UNDP portfolio and need attention, and on improvements regarding previously identified issues.
- To contribute to the overall assessment of results in achieving GEF strategic objectives aimed at global environmental benefit.

- To gauge the extent of project convergence with other UN and UNDP priorities, including harmonization with other UN Development Assistance Framework (UNDAF) and UNDP Country Programme Action Plan (CPAP) outcomes and outputs.

2.2 Scope and methodology of the evaluation

The methodology used for the project terminal evaluation is based on the UNDP/GEF Monitoring & Evaluation Policies and includes following key parts:

I. Project documents review prior to the evaluation mission and submission of the Terminal Evaluation Inception Report
II. Evaluation mission and on-site visits, interviews with project management, UNDP CO, project partners, representatives of the implementing partner, government, steering committee, SHP developers, technology suppliers and installers, SHP owners, and other relevant stakeholders and independent experts
III. Drafting of the terminal evaluation report, ad-hoc clarification of collected information and collection of additional information if needed
IV. Circulation of the draft terminal evaluation report for review and comments
V. Finalizing the terminal evaluation report, incorporation of comments received

The terminal evaluation methodology follows the standard evaluation methodology of UNDP/GEF projects and it combines review of project documents, interviews with relevant stakeholders, analysis of gathered information, presentation of preliminary findings and conclusions at the end of the TE mission, review of the draft TE report, and incorporation of comments received.

The challenge of an external evaluation is always a proper assessment and a good understanding of the local situation and the development context, and especially of its evolvement over the project implementation period. The most important source of information were interviews with local stakeholders.

Selection of interviewed persons is critical for an ability to get an appropriate and full picture of project implementation. Thus, it was important to have an opportunity to interview project stakeholders with different background and representing different stakes/interests in the Project, including governmental representatives, SHP suppliers, NGOs, and SHP users.

Information and data collection methodology used for the terminal Evaluation was based primarily on relevant document analysis, situation analysis based on information collected from open sources, own on-site findings and from interviews held with project stakeholders during the TE mission. This methodology combines both, primarily the hard-fact quantitative data, supplemented also with soft-fact qualitative data, and information provided by interviewed individuals. The major underlying assumption and challenge of data collection, is that the information collected is properly verified and interpreted by the TE evaluator, and that in result the information used is unbiased. To minimize the risk of misinterpretation, internal verification of data collected has been implemented (information cross-checked across different sources), and a three-step process of both data and findings external validation has been implemented that includes feedback from diverse interviewed parties/project stakeholders, the project team, and UNDP CO.

SWOT analysis of data collection method used:

Strengths: All relevant available sources of information are utilized, including quantitative and qualitative data, and hard-fact and soft-fact data (including information provided by individuals representing diverse interests and different levels of unbiasedness)

Weaknesses: Reliability of information provided differ by source (accuracy, unbiasedness based on diverse experience and interest of individual information provider, …)

Opportunities: Reliability of information collected and interpreted in the MTR can be verified internally and validated externally.

Threats: Risk of data and information misinterpretation.

2.3 Evaluation criteria

The following key evaluation criteria have been used in the terminal evaluation according to the 2012 UNDP "Project-Level Evaluation - Guidance for Conducting Terminal Evaluations of UNDP-Supported GEF-Financed Projects"[3]:

- *Relevance*

  The extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time, and the extent to which the project is in line with the GEF Operational Programs or the strategic priorities under which the project was funded.
- *Effectiveness*

  The extent to which an objective has been achieved or how likely it is to be achieved.
- *Efficiency*

  Cost-effectiveness of funds spent to reach project objectives and results and the extent to which results have been delivered with the least costly resources possible.
- *Results*

  The positive and negative, foreseen and unforeseen changes to and effects produced by a development intervention. In GEF terms, results include direct project outputs, short to medium-term outcomes, and longer term impact including global environmental benefits, replication effects and other local effects.
- *Sustainability*

  The likely ability of an intervention to continue to deliver benefits for an extended period of time after completion (includes environmental, financial and social sustainability).
- *Impact*

  The impact criteria includes environmental status improvement, environmental stress reduction and progress towards environmental status improvement and stress reduction.

2.4 Structure of the evaluation report

This terminal evaluation report follows the structure specified in the "Project-Level Evaluation, Guidance for Conducting Terminal Evaluations of UNDP-Supported GEF-Financed Projects", UNDP 2012.

[3] "Project-Level Evaluation - Guidance for Conducting Terminal Evaluations of UNDP-Supported GEF-Financed Projects", UNDP, 2012, Box 3: UNDP Evaluation Criteria, page 15,

The terminal evaluation report includes:

- Executive Summary
- Introduction
- Project description and development context
- Findings – project design, implementation and results
- Conclusions, lessons learned and recommendations
- Annexes

3. Project description and development context

3.1 Project development context[4]

Tajikistan is the poorest country in the Central Asia, the Civil War in 1992-1997 imposed additional severe impacts on human and economic development. Until 2015[5], Tajikistan had a status of a lower-income country.

After gaining independence and subsequent civil war in Tajikistan in 1990s, due to the absence of proper maintenance and repair works on the generation, transmission and distribution power facilities, existing electricity grid has in rural areas deteriorated to the point where electricity supply is either not possible at all, or only with low voltage quality and frequent outages. At the same time, due to high population growth (higher than 2% annually), rural dwellers have been moving to more remote locations and previously uninhabited valleys without grid supply in the search for additional farmland.

After the breakdown of the Soviet Union, the electricity grid of Tajikistan has been divided into a northern and southern network, with both networks connected to Central Asian Network. This divided system has led to inconsistent power supply especially in remote areas. As a result, while the vast majority of the villages are connected to the grid, electricity has been only supplied for 2 to 6 hours per day during winter months, and with large voltage fluctuations that prevent utilization of most electricity appliances. In the summer, power supply is generally more reliable.

Imported fossil fuels and locally available coal, are hardly affordable for most rural inhabitants due to high costs and high transportation costs. Thus, rural population has been forced to rely on unsustainable usage of scarce biomass, and in some cases on expensive fossil fuels (diesel oil or coal). According to recent studies, in selected locations 70% to 80% of the forest cover has been lost during the last 20 years mainly due to the high demand for energy[6]. The deforestation and forest degradation has also resulted in soil erosion leading to a deterioration of natural resources and an increase in vulnerability of the rural population to natural disasters such as landslides during heavy rainfall. The situation has been worsened by the use of inefficient open-fire cook stoves with an efficiency estimated at no more than 10-30%. Moreover, the burning of fuel wood, compressed dung and, when available, hard coal in low-efficiency stoves has contributed to the deterioration of indoor air quality leading to a higher incidence of health risks. The lack of heating in public facilities, such as schools and hospitals, has created additional health risks for children and other vulnerable groups, especially during winter. Finally, the opportunities for the development of new sources of income (e.g. processing of agricultural products) and the improvement of living conditions have remained practically non-existent in the absence of a reliable and secure energy supply.

The Government of Tajikistan responded to this challenge and adopted in 2009 a Long-Term Program for Construction of Small Hydro Power Plants for the period 2009-2020. The GoT estimated that there were more than 900 sites in Tajikistan suitable for construction of SHPPs with a capacity of 100 kW to 3,000 kW that are economically and technically feasible. With an initial target of 189

[4] Based on the Project Document analysis; Sector Assessment (Summary): Energy, Asian Development Bank, https://www.adb.org/sites/default/files/linked-documents/47017-003-ssa.pdf; and World Bank data https://data.worldbank.org/?locations=TJ-XN

[5] After the Project start, Tajikistan graduated in 2015 to the lower-middle income country status, according to the World Bank rating based on Gross National Income (GNI) expressed in USD per capita.

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

SHPPs with a capacity of 103.6 MW, a total of 47 MW was developed during 2010 and 2011. Since 1990s, in total over 300 SHPPs have been constructed in Tajikistan with grant financing primarily from international donors, and to some extent financed by grants from local investors and communities. However, of these 300 SHPPs constructed over the last 20 years, 50% to 70% are not operational due to poor design, improper sizing (lack of actual water flow), and/or insufficient maintenance.

Construction of new electricity generating facilities is the highest priority of the energy policy in Tajikistan, of which large-scale hydro projects have the top priority. However, the renewal of the 3,600 MW Rogun HPP construction has been delayed and pending for decades, even as of the mid-term of this Project.

Access to affordable and reliable energy continues to be one of the most critical development challenges Tajikistan has been facing till now.

Box 1: Pamir Energy

Following the collapse of the Soviet Union in 1991 and a five-year civil war, Tajikistan's electrical infrastructure required major investment. Among the most affected areas was the Gorno-Badakhshan Autonomous Oblast (GBAO), where people and economic development suffered during the cold winter months. The lack of electricity for heating resulted in the closure of schools, health centers and businesses. Many of the region's 220,000 residents resorted to wood fuel for their heating and cooking needs during the winter. Chopping down trees decimated 70 percent of the region's forests within a decade. There was a sharp increase in respiratory disorders due to smoke inhalation.

The Aga Khan Fund for Economic Development (AKFED), in partnership with the International Finance Corporation (IFC), formed the Pamir Energy company in 2002 to address the situation. The company has invested around $37 million to repair the electrical infrastructure of GBAO and expand hydroelectric capacity. In the wake of these efforts, over 86 percent of the region's inhabitants now have access to electricity. Tariff subsidies funded by the Government of Switzerland ensure that even the poorest households can access power.

In 2012 with funding from the U.S. Agency for International Development (USAID), Aga Khan Foundation U.S.A. started the Cross-Border Energy project to expand Pamir Energy's reach across the border to Afghanistan's remote Shugnan District. This rural development program has helped to multiply electricity use there by nearly eightfold and helps establish infrastructure for regional growth in Central Asia.

Source: Aga Khan Foundation USA, http://www.akfusa.org/our-work/pamir-energy

The experience of the Pamir Energy provides a valuable lesson. Although Pamir Energy is operated as a private business, its sustainable operation heavily depends on continuous grant funding to subsidize electricity tariffs of poor households.

3.2 Project start and its duration

Project note received by GEF:	November 2, 2009
Project Preparation Grant approved by GEF:	May 6, 2010
Project Concept approved:	June 30, 2010
Project Document approved for implementation:	December 28, 2011
Project Document signed:	April 1, 2012
Project duration:	Originally planned for 4 years
Original operational closing date:	March 31, 2016
No-cost extension till:	December 31, 2017
Actual project duration:	5 years, 9 months

3.3 Problems that the project sought to address

The ultimate problem, the Project was designed to address, was a poor quality of electricity supply in rural areas with regular interruptions especially during winter periods and no electricity supply at all in remote locations.

Since the complex/system solution, construction of additional power capacity and upgrade and extension of power transmission and distribution capacities of the national utility Barki Tojik, was still pending at the launch of the Project, it focused on development of small hydro power plants.

The Project was designed to improve access to affordable and reliable energy as one of the most critical development challenges in Tajikistan.

Specifically, the Project was designed to address:

- Institutional and regulatory barriers:

  The legislative, institutional and regulatory framework and mechanisms in the energy sector in place do not effectively promote the utilization of small scale decentralized renewable sources of energy and do not attract investments in this sector.

- Capacity and technological barriers:

  There are no well-established or functioning supply chains for SHP system in place which would ensure broad availability of such systems and better service support for end-users.

- Lack of practical experience in designing and implementing integrated renewable energy-based projects targeting rural communities

- Lack of analysis and strategies for nationwide replication and scaling up of integrated renewable energy-based rural development model

3.4 Immediate and development objectives of the project

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

The Project was designed to do this by introducing a regulatory framework to supply the grid with electricity generated SHP through sustainable delivery models and financing mechanisms and assist the Government in attracting funding for SHP investments.

The strategic goal of this Project was declared as reduction of GHG emissions from energy use by rural and remote communities.

3.5 Baseline indicators and expected results

The Project Document specified in total 47 baseline indicators and targets for project goal, objective, each of four project outcomes, and for project outputs - two indicators and targets for the project goal, five indicators and targets for project objective, one to three indicators and targets for each outcome, and up to six indicators per one project output.

The Inception Report introduced significant revisions to the LogFrame – see Chapter 4.1.3 Log-frame analysis for more details. No additional changes to the LogFrame were introduced after the Midterm Review.

The full LogFrame, including revisions, is shown in Annex 2.

Following is an overview of project goal, objective and outcome indicators and targets, both as per Project Document, and the final version as per Inception Report revision.

Expected results include:

Component 1: Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country

Component 2: Enhanced technical and planning know-how and developed market chain for SHP in Tajikistan, addressing technical barriers to the widespread implementation of SHP technology.

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

Component 4: This project component was designed to systematically capture, analyze, assess, and report on project achievements and thus prepare foundation for National Scaling-up Program of Renewable Energy-Based Integrated Rural Development. The expected outcome from this component is a adopted and funded National Scaling-up Program of Renewable Energy-Based Integrated Rural Development.

Summary of project goal, objective and outcome level indicators and targets includes indicators and targets as of the ProDoc, as well revisions from the Inception Report (IR):

Project goal: Reduction of GHG emissions from energy use by rural and remote communities

Project goal indicators and targets:

- Avoided GHG emissions from rural communities' energy use by end of project (EOP), $ktCO_2$

  Target: 90 $ktCO_2$ (IR revised the target to: 45 $ktCO_2$)

- Avoided GHG emissions from rural communities' energy use by end of project influence period, 10 years (EOPIP), $ktCO_2$

  Target: 244 $ktCO_2$

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

Project objective indicators and targets:

- No. of new small hydropower projects under implementation by EOP

  Target: 2 714 (IR: 10)

- Minimum No. of fully operational SHPs by EOP

  Target: 10 (IR: 5)

- Cumulative electricity generation from newly installed SHPs by EOP, MWh/yr

Target: 4 860 MWh/yr (IR: 2 430 MWh/yr)

- Cumulative electricity generation from newly installed SHPs by EOPIP, MWh/yr

  Target: 13 118 MWh/yr (IR: 6 500 MWh/yr)

- Adoption of policy frameworks, allowing SHP-based generators preferable access to the grid and tariff 12

  Target: 4 (IR: removed)

Outcome 1: Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country.

Indicator and target:

- Adopted and enforced regulation operationalizing RES Law

  Target: Rules and regulations adopted by end of Year 1

Outcome 2: Enhanced technical and planning know-how and developed market chain for SHP in Tajikistan

Indicator and target:

- % of the total SHP installed cost provided by locally made goods and services

  Target: 50% by the end of Year 3

Outcome 3: Improved confidence on the technical and economic viability of integrated SHP-based rural development model

Indicators and targets:

- No. of SHP demos/pilots incorporating aspects of productive uses and livelihood support for host communities

  Target: At least 10 community owned SHP projects operate on a sustainable basis and at least 17 additional are under Construction by the end of Year 4
  (IR: At least 5 SHP project in operation and 5 under construction)

- Cumulative electricity generation from newly installed SHPs by EOP, MWh/yr

  Target: 4 860 MWh/yr (IR: removed)

- Cumulative electricity generation from newly installed SHPs by EOPIP, MWh/yr

  Target: 13 118 MWh/yr (IR: removed)

Outcome 4: National Scaling-up Programme of Renewable Energy-based Integrated Rural Development

Indicator and target:

- Adopted and financed National Scaling-up Program

  Target: Adopted and financed National Scaling-up Program by the end of Year 4

3.6 Main Stakeholders

Main project stakeholders identified in the Project Document and their role are specified in Table 6.

Table 6: Overview of SHP project stakeholders

Organization/Programme	Scope of work and areas for collaboration with project
Ministry of Energy and Industry (MEI) – until November 2013	The Ministry is responsible for the formulation and implementation of policies and measures in the energy and industry sector and will be a leading partner agency for the project implementation.
Ministry of Energy and Water Resources (MEWR) – from 2014 onwards	The Ministry of Energy and Water Resources is the successor of the Ministry of Energy and Industry, and was established by the Presidential decree #12 from 19 November 2013. The MEWR is the central executive body for the development and implementation of state policy and regulation in the energy and water fields, including renewable energy and energy efficiency programs. The MEWR is a National Partner under the Project.
Agency for Hydrometeorology under the Committee for Environmental Protection	The Agency, under the Committee for Environmental Protection, is responsible for hydro-meteorological observations and forecasting, observations over water-related phenomena with regard to hydrological change and glacier studies, and in charge of the implementation of climate change policy and programs.
Open Holding Joint Stock Company "Barki Tojik"	Barki Tajik is the state-owned company controlling all power generation, transmission and distribution in the country, including electricity and thermal heat.
Ministry of Economic Development and Trade (MEDT)	The Ministry is responsible for investment regulation and promotion policy. The Ministry is also responsible for coordinating state agencies in their activities in this area as well as for determining the tariffs in energy sector
Tajik Technical University	The university is responsible for preparing and promoting technical specialists. It is a primary partner for promoting the education modules on SHPP planning and development.
Tajik Energy Institute in Kurgantyube	The institute is responsible for preparing and promoting technical specialists. It is a primary partner for promoting the education modules on SHPP planning and development.
Local levels of government (district, jamoat)	Responsible for district development plans and integrated area-based development (energy, water, roads, social services, etc.)

Local production facilities and service providers	Apart from the utility Barki Tajik, organizations that can be involved in the construction and implementation of SHP are, for example, TadAZ, Chkalovsk Engineering Plant and Energorement, Tajiktekstilmash (construction and production) and Central Electric Networks (operation and connection). Different contractors can do the civil works construction.
Local research and educational institutes	These carry out research and development activities and are responsible for education and technical training, such as the TajikGidroenergoProekt Research Institute; Institute of Physics, Technical University, Academy of Science. The institutes can be involved in setting up SHP curricula as well as in the design of SHP.
Communities Programme of UNDP Tajikistan	UNDP Communities Programme (CP) is a multi-year and multi-million US$ initiative, on-going since 1996. The programme has 5 area offices in Sughd, Khatlon, and the Rasht and Zeravshan Valleys. The major aim of the Communities Programme (CP) is to help local communities in different regions to formulate and address their needs and priorities through making decisions, building civic awareness, mobilizing local resources, establishing local capacities, and fostering sense of ownership. UNDP CP supports a wide network of community based organizations, such as the 116 Jamoat Resource and Advocacy Centers (JRCs), 19 District Development Councils (DDCs), 59 Business Advisory Centers (BACs), 21 Dehkan Farm Associations (DFAs), and 6 Micro Loan Funds (MLFs) that function in Khatlon, Districts of Republican Subordination (DRS), and Sughd that help the Communities Programme with over 4 million USD to achieve the aforementioned results.
Tajikistan Afghanistan Poverty Reduction Initiative (TAPRI)	TAPRI is implemented under the umbrella of the UNDP Communities Programme, with support from the Government of Japan. The main objective of this project is to alleviate poverty through improvement of cross-border cooperation and promotion of sustainable economic and social development and improved livelihoods in specifically targeted Tajik and Afghan borderlands communities. Part of the project will be targeted at the installation of SHP-based power plants as a tool for poverty alleviation and development of business and social infrastructure in the selected border areas.

4. Findings

4.1 Project design and formulation

The project document is clearly formulated and logically structured. It provides a thorough information and situation analysis, and it clearly defines in detail project implementation strategy; it defines project results framework, time-bound budget and work plan, management arrangements and monitoring and evaluation plan, and explains policy and regulatory context. The project design provides all necessary and relevant information.

The project goal and objective is twofold: reduction of GHG emissions from energy use in rural and remote communities, and improved access to affordable and reliable energy in rural and remote communities that is one of the most critical development challenges of Tajikistan.

Since the systematic nation-wide least-cost solution at the power utility level, construction of additional hydro power capacities, and rehabilitation and strengthening of power transmission and distribution networks, was put on hold for decades during the Project design phase, the Project focused on accelerated development of small hydro power.

This is not the first SHP project implemented in Tajikistan. Since 1990s, few hundreds of SHP plants have been constructed and commissioned in Tajikistan, and financed mostly by grants from international donors, and to some extent also from local companies and government.

Due to extremely low cash income of poor households in rural and remote areas, power utility tariffs are extremely low and far not sufficient to finance power infrastructure reconstruction, nor to recover investment costs of needed additional new power capacity.

The “culture of grants”, and provision of electricity from new “free” turn-key SHP projects sponsored by donors, lead to a situation when most of these 300 new SHP plants constructed over the last two decades have been closed and are no more in operation, due to improper design and sizing, and/or poor operation and maintenance.

In this context, this UNDP/GEF project was designed to be truly innovative in Tajikistan: although its goal has been defined in terms of (relatively short-term) GHG reductions, its main value added is a focus on sustainable long-term impact. Specifically, this means that the Project was not designed only to deliver additional power from new SHP plants, but primarily to remove barriers that hamper sustainable development and operation of SHP in Tajikistan, and namely to:

- Strengthen and improve legislative and regulatory framework for small-scale hydropower development in the country,
- Strengthen technical and planning know-how and develop a market chain for SHP in Tajikistan,
- Improve capacity of local communities in proper operation and maintenance of SHP, and to
- Develop an effective replication strategy - National Scaling-up Program of Renewable Energy-Based Integrated Rural Development.

The Project Document did not address any specific gender issues.

4.1.1 **Project relevance**

This Project is highly relevant for Tajikistan. Lack of reliable electricity supply is one of the key factors undermining economic development in the country.

The Project is consistent with the GEF-4 Strategic Priority "To promote on-grid renewable energy", as it was designed to directly contribute to the wider use of small hydro resources for power generation by relieving the pressure on the main grid during winter months when grid power supply is constrained.

The Project was designed in line with GEF requirements:

- "the emphasis will be upon developing policies and regulatory frameworks that provide limited incremental support to strategically important investments",
- "host country willingness to adopt favorable policies and to follow through on the initiatives" was demonstrated by the Government of Tajikistan when Regulation #73 on the Long-term Program for Small Electric Power Station Construction for 2009 – 2020 was approved in 2009. The Project was designed to assist the Government of Tajikistan to implement the provisions of the Regulation, as well as to support objectives of the new Law on the use of Renewable Energy Resources in the Republic of Tajikistan.

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

- Programme on the Small Renewable Energy Development (1997);
- State Ecological Program for 1998-2008 (1997);
- National Action Plan for Climate Change Mitigation (2003);
- The Report and Action Plan on Building National Capacity to Implement Commitments of the Republic of Tajikistan on Global Environmental Conventions (2005);
- Third Poverty Reduction Strategy (PRS-3) of the Government of the Republic of Tajikistan (2010);
- Report "Investing in Sustainable Development: Millennium Development Goals (MDG) Needs Assessment" (2005).
- National Development Strategy for the period 2010 – 2020, and an updated National Development Strategy till 2030

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

4.1.2 **Project implementation approach**

The Project was designed in a wider context of international support to Tajikistan aiming to improve living standards and quality of life. Since 2010, the UNDP Environment and Energy Programme, has been aligned with the United Nations Development Assistance Framework (UNDAF) and the Country Programme Action Plan (CPAP), and it has been implemented in the framework of the Joint Country Partnership Strategy (JCPS), elaborated by the main development agencies active in Tajikistan.

Since 2010, UNDP has been implementing the Country Programme Action Plan (CPAP), with a focus on:

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

In 2006, the Government of Tajikistan signed an agreement with the UNDP for promoting the use of renewable energy sources to support rural development.

UNDP launched in 2009 its Integrated Rural Development (IRD) pilot project, development of a 200 kW Nurofar SHP plant in the Burunov Jamoat near Vahdat. The Project then supported the design of a 375 kW unit in Sorvo to international standards to further demonstrate the feasibility of SHP projects in Tajikistan developed within an IRD framework. Within its Integrated Rural Development approach, UNDP promotes access to locally available sustainable energy sources and efficient use of energy, combined with rural poverty reduction, support of local income generating activities, enabling social and economic development in rural areas.

Since then, the UNDP has implemented a few mini-hydro projects in Tajikistan that have benefited rural communities. Based on this experience, the Ministry of Industry and Energy requested UNDP financial support for implementation of the UNDP/GEF project "Promotion of Renewable and Sustainable Energy Use for Development of Rural Communities in Tajikistan" that started in 2010.

As the ProDoc states, all these activities "have to be seen as a stream of funding for implementation of a UNDP-led program on promotion of SHP and renewable energy".

The project implementation approach is holistic and complex. For full details, please see the project outcome and output level indicators and targets as shown in a LogFrame in Annex 2.

Project implementation approach is based on four components that were designed to include:

Component 1: **Regulatory framework for SHP**
Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country

- Development and enforcement of bylaws to the new Renewable Energy Law, including simplified licensing of SHP and specification of technical conditions for connection of SHP to the grid
- Development of a cadastre of SHP projects for effective monitoring and verifying RE generation
- Establishment of a dedicated National Fund to support renewable energy and energy efficiency installations

- Development of a financial support scheme and feed-in tariff methodology
- Capacity strengthening of central and local institutions to coordinate SHP/RE projects

Component 2: **Technology transfer**
Enhanced technical and planning know-how and developed market chain for SHP

- Technical and policy guidebook on SHP development
- On-the-job training of qualified local companies to be capable to manufacture and operate & maintain SHP plants locally
- Vocational trainings in SHP design, construction and O&M
- Training of local manufacturers to produce combined electricity and biomass-fired heating and cooking devices

Component 3: **SHP demonstrations**
Improved confidence of communities in the technical and economic viability of SHP technology in supporting socio-economic development

- Improved SHP design based on feasibility studies and updated hydrological data, community level development plans
- Engineering design of demonstration SHP plants
- Construction and commissioning of demonstration SHPs
- Training of local entities to own, operate and maintain SHPs
- Raising awareness of local beneficiaries in energy efficiency and renewable energy
- Micro-loans for energy efficiency and income-generating activities on a community level
- Development of local water management plans

Component 4: **SHP replication program**
Adopted and funded National Scaling-up Program of Renewable Energy-Based Integrated Rural Development

- Project results, GHG emission reductions and lesson learned compiled and published
- International conference on experience gained in renewable energy-based Integrated Rural Development
- Development and funding of a full-size replication program

The project implementation approach is unique primarily in its focus on technology transfer and on strengthening sustainable SHP operation and maintenance by combining it with Integrated Rural Development.

4.1.3 **Log-frame analysis**

The logical framework as of the Project Document was revised by the October 2012 Inception Report. At the Midterm Review removal of the Objective 2.4 was proposed. The MTR did not propose any additional changes to the Logical Framework.

The main change introduced by the Inception Report was downsizing of the end-of-project emission reduction target by 50% to 45 $ktCO_2$, and reduction of number of targeted SHP plants under construction and operation, and related power generation. Nominally, the biggest change was a reduction in the project objective target from 2 714 new Small Hydro Power projects under implementation by EOP to 10. However, the target of “2714” was a typing error and it should have read “27”. The original target was overestimated and not feasible within the planned project implementation period, and thus it was reduced to a more realistic target.

The revised LogFrame also significantly reduced number of indicators and targets: instead of 47 original targets as of Project Document, the revised LogFrame includes 25 indicators and targets.

The LogFrame originally included indicators and targets that referred to very detail results relevant rather to individual project activities. Since project activities within annual work plans are supposed to be monitored by the Project Manager on a regular basis, and the LogFrame is supposed to be used mainly for evaluation and reporting of main project results, the reduction of project indicators and targets is fully legitimate. In the best case, the number of project indicators and targets could be even lower.

At the MTR the Output 2.4: “Local manufacturers capable of producing combined electric and biomass-fired heating and cooking devices for rural households”. These technologies are widely available on Tajik market for affordable price, and thus local production could hardly be competitive.

Project goal and objective indicators and targets, namely electricity production and GHG savings by end of project and end of project influential period of 10 years are not defined in a consistent way and are unclear. The Inception Report revision of these targets made the situation even more inconsistent, since it decreased electricity production from SHP constructed by the end of project influential period (EOP + 10 years), however, it did not decrease adequately also the related GHG emission target. In any way, indicators and targets that should be based on results and performance of SHP plants constructed within 10 years after end of project are not SMART and cannot be evaluated at the end of project.

Except for that, the project logical framework is well structured, clear, and very detailed. It includes often several targets for project goal, objective, and for individual project outcome and output. The LogFrame properly specifies means of verification as well as risk and underlying assumptions.

Except for the project goal and objective targets, other project indicators are SMART, and targets and time-bound. The time-bound specification is declared in the wording of the target. It would be easier to read, if MTR and EOP targets were shown in two separate columns.

4.1.4 **Assumptions and risks**

The Project LogFrame defined assumptions for each of project objective, outcome and output targets. The main assumption used can be summarized as:

- Continued commitment of the Government of Tajikistan and other project partners to deliver expected results of the Project

Specific assumption of Outcome 2 – Technology Transfer included:

- Demand for SHP is on the rise as a result of establishing favorable policy framework

Table 7 summarizes 7 project risks identified by the Project Document as well as proposed mitigation measures. Risk impact and probability was combined into a single indicator of risk rating.

Out of 7 identified project risks, the only one was rated as "Substantial", all others as "Moderate" or "Low".

Higher costs of national developed SHP systems (under Technology Transfer component) in case of slower than expected development of national SHP market (i.e. local demand for SHP) was rated as the highest risk ("Substantial").

The Inception Report added three more risks, all rated as substantial.

They all include risks related to the performance of the Government, namely the risk of political instability/rotation of key project partners, slow implementation of laws and regulations, and a risk of none-establishment of a National EE and RE Trust Fund.

Table 7: Project Risks as of ProDoc

Risk	Risk Rating	Mitigation
Widespread poverty and lack of sustainable source of income resulting in low ability to pay for energy supply services	Moderate	UNDP co-financed activities (see Output 3.4) will support establishment of income-generating businesses in the areas where pilot projects are to be located in order to ensure solid client base for pilot SHPs and maximize consumers' ability to pay Optimization and standardization of system design to lower down SHPs costs will be conducted under Activity 1.3.2 Provision of grant funding to co-finance the implementation of SHP pilot projects until life-cycle cost of the systems have decreased to a level affordable for rural communities or incomes have increased. After this project completion, National RES-EE Fund is envisaged to support investments in community-owned SHPs via provision of dedicated subsidies and incentive-based tariff (see Annex E for details)
Investors (community owned, public or private sector) do not get sufficient return on investments, while Government support is not forthcoming	Moderate	Work with four UNDP-supported micro-loan funds to include support for SHP investment in their scope of operation (see Activity 3.2.5) Proper incentives for investors as envisaged to be delivered under Output 1.1.)
Slower than expected implementation of the pilot SHP projects	Moderate	Involvement of suitable experts to ensure sound design for the pilot SHP projects Close supervision of the implementation of the SHP plants (see Activity 3.3.2)

		Incentives for timely (or penalties for late) provision of previously committed local (in-kind) contributions to project implementation
Slower than expected development of a national market for SHP systems and thus higher than expected costs of such systems	Substantial	Capacity building and technical assistance to facilitate development of supply chains (all activities under Component 2, the key component of this project, are designed to mitigate this risk)
Slower than expected improvement of the institutional framework for SHP development	Low	The Project Board will closely coordinate with relevant Government institutions to support timely implementation of commitments. RES Law has been signed and Regulations are being developed. Establishment of RES-EE Fund, in particular, has been supported by all line Ministers and the President
Insufficient quality of locally produced equipment leading to early break-down of the renewable energy systems and dwindling consumer confidence in the technology	Moderate	Capacity building measures for local equipment manufacturers and service providers under Component 2 Regulatory measures to set and enforce quality standards under Component 1
Lack of interest in renewable energy systems on the part of local stakeholders (communities, beneficiaries) due to perceived inferiority compared to grid supply	Low	Awareness campaigns on the potentials and limitations of SHP systems (Activity 4.1.2) Information campaigns on the Government's plan to improve grid energy supply in rural areas

Table 8: Additional Risks Identified by the Inception Report

Risk	Risk Rating	Mitigation
Slow or none implementation of the adopted laws and sub-laws	Substantial	UNDP through its projects and consultation with key international organizations operating in Tajikistan will lobby the adoption of the laws.
Political instability and rotation of key government partners after the presidential elections in 2013	Substantial	If changes or rotation of the key government partners occur, UNDP will intensively cooperate with the newly appointed partners. This will be done through regular meetings, joint participation in national and international forums, negotiations, etc.
Not establishing a National RES and EE Trust Fund. The project success depends on the establishment of the National RES and EE Trust Fund that will substantially contribute to the development of the national market for SHP.	Substantial	Lobbying the establishment of the Trust Fund by involving a large number of international actors and investors. Creating the incentives for the establishment of the Fund through Government bodies concerned.

In principle, the ProDoc properly defined all key relevant potential risks as well as risk mitigation strategies.

The "Widespread poverty" risk was rated as a moderated risk only, to be mitigated by grant funding - *"Provision of grant funding to co-finance the implementation of SHP pilot projects until life-cycle cost of the systems have decreased to a level affordable for rural communities or incomes have increased"*.

Although poverty reduction is a national priority, it is a long-term process that cannot be solved within a planned 5-year project period only.

This implies, that the project in its project design phase relied on a long-term and continuous grant-funding for SHP construction, and that planned feed-in tariffs were not expected to fully recover SHP investment costs.

The Project Document should have reflected the experience of the Pamir Energy and highlighted the need for continuous grant funding even after project termination in more explicit way and estimate its risk rating as well (risk impact and probability).

4.1.5 **Planned stakeholder participation**

The Project Document specified key project implementation partners and stakeholders and their scope of work and areas of collaboration with the Project.

Key Project stakeholders identified in the ProDoc, include:

- Ministry of Energy and Industry (MEI)
- Agency for Hydrometeorology under the Committee for Environmental Protection
- Open Holding Joint Stock Company "Barki Tojik" - national power utility
- Ministry of Economic Development and Trade (MEDT)
- Local levels of government (district, jamoat)
- Local manufacturers/production facilities and service providers
- Local research and educational institutes
- Communities Programme of UNDP Tajikistan
- Tajikistan Afghanistan Poverty Reduction Initiative (TAPRI)

Additional stakeholders with responsibility and /or interest in energy and renewable energy were identified, namely:

- Tajik Geological Survey
- Ministry for Natural Resources
- Committee for Environmental Protection
- Ministry of Finance
- State Committee for Investments
- Antimonopoly Commission

4.1.6 **Linkages between the project and other interventions within the sector**

Despite a large number of SHP projects being funded and implemented since Tajikistan gained its independence in 1991, the Project Document identified that there was "*no project in the country*

addressing the root causes for and barriers to the development of SHP and local development in an integral and comprehensive approach".

UNDP played a critical and unique role in addressing these barriers and thus in supporting SHP development in more sustainable way. In 2010, UNDP and the Government agreed to launch a new initiative to promote community-based SHPs, and a UNDP sponsored project "*Promotion of Renewable and Sustainable Energy Use for Development of Rural Communities in Tajikistan*" was launched. These both UNDP and UNDP/GEF projects form basically one SHP promotion initiative lead by UNDP Tajikistan.

Other ongoing projects/programs, the UNDP Communities Program, and the Tajikistan Afghanistan Poverty Reduction Initiative (TAPRI[7]) were identified to provide co-financing, in addition to the Government of Tajikistan, for implementation of SHP in local communities.

There is a large number of other national and regional projects sponsored by international donors and individual countries that support renewable energy development (small hydropower) and energy efficiency in Tajikistan. Most of interventions focus on support of individual SHP plants. An example of a broader regional project is an EU funded project "CASEP - Sustainable Energy Programme in Central Asia: energy efficiency and renewable energy sources" that aimed to increase security, reliability and efficiency of energy supplies in the Central Asian countries and thereby to improve the preconditions for regional integration of efficient and sustainable energy systems and increased cooperation with European Union countries. The project was implemented between 2013 and 2016 by a consortium of GIZ, GFA and CAREC.

4.1.7 **UNDP comparative advantage**

UNDP combines two unique comparative advantages related to this Project in Tajikistan:

- On a global level, UNDP is a trusted GEF agency with demonstrated ability to raise funding for its projects, and
- On a local level, UNDP has been recognized as a leader in creating enabling environment for sustainable SHP development in Tajikistan (see the discussion above).

UNDP has a demonstrated administrative and project management capacity to implement renewable energy projects, it is a neutral GEF implementing agency. UNDP has a substantial in-country and regional expertise and experience from implementing similar renewable and SHP projects in other countries of operation. Through its five area offices located in Khatlon, Sughd and Districts of Republican Subordination, UNDP is very well positioned to outreach the communities on the ground and deliver effective support in addressing local socio-economic challenges. Notwithstanding the fact of being able to closely interact vis-à-vis the local stakeholders and beneficiaries.

Under the local governance component, the principle strengths of UNDP include: self-organization of local communities, district participatory planning; ability to attract contributions from various actors and the ability to link local experiences with national level institutions and policy dialogue.

Ongoing UNDP Communities Programme (CP) at the launch of this Project coordinated efforts on the local level: UNDP has supported rural infrastructure rehabilitation, including access to safe

[7] TAPRI ended in 2012 and was superseded by the LITACA (Livelihoods Improvement in Tajik-Afghan Crossborder Areas project)

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

4.1.8 **Replication approach and sustainability**

The Project Document addressed both the Project sustainability and replication.

Long-term sustainability of SHP electricity generation in Tajikistan were planned to be ensured by addressing barriers that impede the development of SHP, i.e. strengthening of the policy, institutional, legal, regulatory and operational capabilities of key national institutions, supporting the development of SHP through a market-driven approach, developing national capabilities and disseminating information. A specific component on SHP technology transfer was designed to secure sustainable replication (and repairs) of financially affordable SHP technologies in Tajikistan.

The financial sustainability on a local level was designed to be addressed by supporting income generating activities with access to micro-loans in areas served by the new SHP.

On a national level, the feed-in tariff scheme and a National EE and RE Fund to support SHP development were planned for, as well as development of a National Scaling-Up Program as a justification for continued state- and donor-support.

Experience from pilot projects and similar projects in Kazakhstan, Uzbekistan and Kyrgyzstan, technical assistance provided, and information dissemination activities and lessons learned were planned to support replication across the country and abroad.

4.1.9 **Management arrangements**

The project was designed to be implemented through the Direct Implementation Modality under the umbrella of UNDP’s Energy and Environment Programme in close coordination with the Ministry of Energy and Industry (Ministry of Energy and Water Resources as of March 2014) and other government entities.

The Ministry was designed to appoint a National Project Director who will be the main Focal Point of the government contact with the project.

A Project Manager (PM) will be hired to manage the activities on a day-to-day basis. The Project Manager will be responsible for overall project coordination and implementation, consolidation of work plans and project papers, preparation of quarterly progress reports, reporting to the project supervisory bodies, and supervising the work of the project experts and other project staff. The PM will also closely coordinate project activities with relevant Government and other institutions and hold regular consultations with project stakeholders.

The Project Manager was designed to be supported by the Chief Technical Advisor, national and international consultants.

UNDP CO was expected to provide financial, administrative support and other services as needed.

A Project Board was planned to be established to provide strategic directions and management guidance to project implementation, and to consist of representatives of the relevant ministries and state committees/departments participating in the project, the UNDP Country Office (CO), as well as representatives of the NGO community/Civil Society Groups, and representatives of the private sector if deemed appropriate.

4.1.10 **Lessons learned from other relevant projects**

Lessons learned from other SHP projects implemented by UNDP and other donors internationally, as well as locally in Tajikistan, were integrated into the very project design by an experienced international consultant, Mr. Zoran Morvaj, who drafted the Project Document.

Specifically, experience gained from following projects implemented by UNDP in Tajikistan were taken into account when designing this Project Document: UNDP sponsored project "*Promotion of Renewable and Sustainable Energy Use for Development of Rural Communities in Tajikistan*", the UNDP Communities Program, and the Tajikistan Afghanistan Poverty Reduction Initiative (TAPRI) sponsored by the Government of Japan.

The lessons learned from the UNDP sponsored "Promotion of Renewable and Sustainable Energy Use for Development of Rural Communities in Tajikistan" was very critical to designing the given GEF project. The most relevant lessons learned included:

- Local capacity building for manufacturing, maintenance and operation of small hydropower plants needs to be mainstreamed to achieve costs reductions;
- Creating favorable legal basis for accelerated implementation of adopted strategic documents for promoting small hydropower plant development;
- Integrated rural development model to be applied in all projects where renewable energy and energy efficiency are enevisaged.

UNDP report on Lessons Learned from the TAPRI project lists specific lessons learned from each TAPRI project component that comprised economic development, good governance, and cross-border cooperation. The most relevant lessons that this Project benefitted from and confirmed its validity, included:

- Awareness raising activities aimed at different target groups led to better interactions between the participants and stages of value chain development
- Inclusion of governance elements into economic development component allowed strengthening of social capital through better organization
- Environmental mainstreaming and energy efficiency were at the core of interventions
- Due to participatory mechanisms put in place by the project, the private sector gained local recognition for being an equal development partner
- The joint planning tool applied within the project led to an increased capacity of local authorities and greater involvement of the civil society and private sector

- Women can play important role in local development and therefore the role of women should not be undermined

4.2 Project Implementation

4.2.1 **Project implementation and adaptive management**

The Project was implemented according to the detailed work plan as it was described in the Project Document and revised in an Inception Report and Annual Work Plans. However, the Project did not focus only on delivery of planned results, but it was implemented in a flexible way reflecting actual development changes and opportunities in Tajikistan, and with a strategic focus on project goal and objective. The implemented Project accommodated additional adjustments and delivered several additional results that are not reflected in the project LogFrame.

A revision of a former National SHP Program 2009-2020 and support in development of a new National SHP Program 2015-2020 was a very important additional activity delivered by the Project, and an interesting example of a very effective adaptive management.

Based on the review of SHPs constructed over the last two decades, the Project identified that one of the main reasons why more than 50% of these new SHPs failed and are no more in operation, was oversizing of SHP design due to improper estimate of available water flow. SHPs were designed for an average annual water flow in rivers. Seasonal water flow fluctuates significantly (ten-fold or even more), and the average water flow is thus not representative nor for the winter, nor for the summer period. Electricity supply from SHP is most critical in winter periods with low water flows in rivers.

The Project has thus revised a list of 189 potential mid-size SHP plants as per National SHP Program 2009-2020, and assessed their feasibility and sizing. The Project worked with the Ministry of Energy, agreed upon a need to revise the Program to be more realistic and to exclude SHP locations that are not suitable, and a need to adjust actual SHP sizing (capacity) to actual winter water flows. As a result, the list of suitable SHPPs in a new National SHP Program 2015-2020 was significantly downsized in terms of number of potential SHP plants to 36% (from original 180 potential SHP plants to 62 potential SHPPs, of which 41 SHPPs have prefeasibility study developed already). In terms of capacity, the National Program was downsized to 76% (from 102.2 MW to 77.8 MW total capacity of SHPPs listed in National Programs).

This revision of National SHP Program has significant impacts: The Government and the Ministry of Energy have learned an important lesson and gained an important experience, the quality of the National SHP Program was significantly improved, as well as credibility of information on potential SHPPs listed in the Program available for potential investors. However, on the other hand, the estimated power generation from potential SHPPs and associated GHG emission reductions have been significantly reduced.

Despite the decrease of GHG emission reductions from potential SHPPs listed in revised National SHP Program, this revision/adaptive management cannot rated otherwise than very highly.

Other examples of implemented adaptive management include:

- Support to the establishment of a Renewable and Energy Efficiency Center

The RE and EE Center was established in mid 2017, and it is operated by a private company SystemAvtomatika. The facility has a conference hall for trainings, and a facility for testing performance of photovoltaic panels, the conference hall includes a display of several real-world RE and EE technologies, several trainings of professionals, university teachers and students were held already. The Center organizes also "mobile trainings" in different locations of Tajikistan. The Center organized trainings within this UNDP/GEF Project as well as for other parties and projects, including USAID, CAREC, and ADB. Under the South-South cooperation, the Center organized for example trainings for women on efficient do-it-yourself solar collector, heaters, and cookers, and trainings of trainers.

- Non-cash settlement of electricity bills

TajNor NGO contracted by the Project, developed among others an innovative non-cash scheme for settlement of electricity bills in remote areas. Poor households lacking cash income will settle their electricity bills by provision of their grown agriculture products that will be collected and sold on a market in larger municipalities. Earned cash will then be used for their electricity payments. This scheme will reduce transaction and transport costs of individual households when selling agriculture products as a "wholesale" for the whole community.

- Ad hoc adjustment of the SHP technology and facility repairs

Construction of SHPs, and SHP technology transfer witnessed several unexpected challenges. The Project and its partners were flexible enough to implement necessary ad hoc solutions.

Technical drawings provided to the Tajiktekstilmash for manufacturing of the Kaplan turbine included a mistake in one detail. The company manufactured the turbine according to the drawings, but was not able to assemble the turbine. After a detailed analysis of the problem, they found together with their Croatian partners, the "small" mistake in technical drawings. The drawings were revised and corrected and Tajiktekstilmash manufactured these specific parts again.

After construction of a water inlet channel for the SHP plant, local population used the water from this channel for irrigation of until then dry, uncultivated land. However, the water leaking from an irrigation ditch caused soil erosion and undermined the concrete construction of water channel. The flushed soil around water channel foundations had to be restored.

- Mobilizing co-financing for SHP construction and other related activities

The Project was successful to attract co-financing from the JICA under their LITACA project for the investment costs of pilot SHP plants in Jilikul and Shurobod in a total amount of 1.1 mil USD.

The Project raised capital for energy efficient renovation of a school facility in Ghuskef village by implementing innovative crowd-funding. 8 000 USD were raised through crowd-funding and additional 10 000 USD were provided by the UNDP through the Catalytic Facility Fund managed by the Istanbul Regional Hub, and the school was retrofitted to a higher energy efficiency standard (wall and roof insulation, energy efficient lighting and windows, and 2 kW_p photovoltaics system were installed).

- Study tours

The Project organized two study tours on SHP to Croatia, in total 18 participants were trained, including senior representatives from the Ministry of Energy and Water Resources, Ministry of

Industry and New Technologies of Tajikistan, both manufacturers (Energoremont, Tajiktekstilmash), Renewable Energy Association.

- Target of local production of heating and cooking devices was removed

As per MTR recommendations, the target of local production of combined electric and biomass-fired heating and cooking devices for rural households has been removed, since these (mostly Chinese) products are widely available on the Tajik market for an affordable and highly competitive price. Non-electric energy efficient heating and cooking furnaces were successfully demonstrated under the GEF SGP projects in Tajikistan.

4.2.2 **Partnerships arrangements**

The Project worked with a broad range of stakeholders and project partners that included:

- National and local governments and agencies, national parliament
- Local beneficiaries, SHP manufacturing and service companies, local communities
- International donor community active in Tajikistan

The primary national partner was Ministry of Energy and Water Resources, responsible for energy policy, including SHP, and for development and implementation of SHP legislation and regulations. Other national partners include Barki Tojik utility, Ministry of Economic Development and Trade, Ministry of Finance, Antimonopoly Agency, Ministry of Justice, Ministry of Industry and New Technologies, State Committee on Investments, and the local jamoats (self-governments). The cooperation with the Ministry of Energy and Water Resources, with the Deputy Minister, who served as a Project Director and as a head of the Project Board, as well as with the other staff and experts of the Ministry of Energy was very effective. The Ministry of Energy and Water Resources highlighted effectiveness of the technical assistance provided in developing SHP regulations, National SHP Program and pre-feasibility assessment of 27 SHP plants.

Two local companies, a private Energoremont and a state-owned Tajiktekstilmash, both experienced in reconstruction of large scale turbines, were selected as local manufacturers and service providers of SHP turbines and machinery. Croatian company Komperg provided technical assistance and technology know-how of the machinery SHP components. Jamoats, local self-governments, of all five pilot site communities, identified staff for SHP operation and maintenance and the staff was trained.

UNDP has been widely recognized as a leader in promoting sustainable SHP development in Tajikistan. UNDP has been in contact with other donors active in Tajikistan in energy sector reforms, such as JICA, OSCE, World Bank, ADB, EBRD, EU, KfW, GIZ, and USAID, both via participation in meetings of a Donor Coordination Committee, and via bilateral meetings.

Other stakeholders who actively participated in the project implementation, include:

- Association of Energy Professionals of Tajikistan
- Renewable Energy Association
- SystemAvtomatika company/EE and RE Center
- Tajik Technical University, Dushanbe
- National Energy Institute of Kurgantube
- TajNor – Tajik-Norwegian Center on Sustainable Development

- Microloan institute “Imdodi Rushd”
- Barki Tojik (national utility company)
- Ministry of Industry and New Technologies

4.2.3 **Monitoring and evaluation**

The Project Document described in detail necessary monitoring and evaluation requirements standard to all UNDP-supported GEF-financed projects. Specifically, it drafted a Monitoring and Evaluation Work Plan that identified responsible parties for M&E activities, allocated indicative budget, and specified time frame for each M&E activity. According to the M&E plan, key parties responsible for performing project monitoring and evaluation included Project Manager, Chief Technical Advisor, UNDP Country Office, UNDP GEF Regional Technical Advisor, UNDP Regional Coordination Unit, consultants, and project evaluators.

The Inception Report revised the Monitoring and Evaluation Plan and specified it in more detail.

The project was subject to standard UNDP monitoring and evaluation procedures. Crucial tools used for monitoring and evaluation included the log-frame, Inception Workshop and Inception Report, Mid-Term and Final Evaluation, and standard UNDP and GEF planning and reporting tools with quarterly and annual frequency, including risk logs in Atlas, Quarterly Project Progress Reports (PPR), Quarterly and Annual Work Plans (AWP), Annual Project Review/Performance Report (APR), Project Implementation Review (PIR).

Project implementation has been regularly reviewed by ten Project Steering Committee meetings held usually twice a year. The first Steering Committee meeting was held on July 5, 2012, three months after the Project start. The latest Steering Committee meeting was held on February 27, 2017. The very last Steering Committee meeting is planned for February 2018 to wrap up the project results and share the terminal evaluation results

The inception phase begun in April 2012, Inception Workshop was held on September 28, 2012, and the Inception Report was finalized in October, 2012.

The Mid-Term Evaluation report was submitted in March 2015, three years after Project start.

Since 2016, the Ministry of Energy and Water Resources organizes its own inspections on SHP construction sites to monitor and evaluate the progress and quality of SHP construction and installation.

The budget for monitoring and evaluation was designed to include 75,000 USD as of ProDoc, and it was revised to 51,000 USD as per the Inception Report. The reduction of M&E budget had no negative impact on effectiveness of M&E activities delivered.

Appropriate adaptive management has been implemented in response to monitoring and evaluation performed.

Monitoring and evaluation was properly designed, the rating of the M&E design is highly satisfactory. The M&E implementation was implemented accordingly to the plan, and it is rated satisfactory. Overall quality of monitoring and evaluation is rated highly satisfactory.

4.2.4 **Feedback from M&E activities used for adaptive management**

Feedback from M&E activities, namely revised work plan and LogFrame of the Inception Report, and recommendations of the MTR were taken into account and implemented in the next phase of project implementation. Feedback from annual PIRs was implemented in following implementation period and annual work plans.

Specifically, the MTR included following six recommendations. The project management response fully endorsed implementation of the MTR recommendations, and the MTR recommendations have been implemented with an extension till December 2017.

1. The Project should have as a top priority the successful completion and operation of the 4 sHPP projects currently under implementation
2. Continue capacity building work with Energoremont and KM workshops
3. Project approaches to provide O&M training for sHPP proponents should include existing sHPPs that were constructed over the past 20 years
4. With $1.4 million and 16 months remaining on the Project, a 15-month extension until June 30, 2017 is recommended
5. In consideration of the resources remaining on the Project, provide assistance to the Government (if there are sufficient resources) in the setup of the RE Trust Fund (or NTF). This assists the MoEWR in the strategic business planning of RES development. This will also inform potential financers and donors to the Fund of the Government’s financial requirements for developing SHPs over the next 10 or 20 years, and increase the likelihood of NTF capitalization
6. The Project should revise its strategies to work towards its GHG reduction and energy generation targets

Adaptive management was not implemented only in response to standard UNDP/GEF project monitoring and evaluation activities. Most of the changes and additional activities implemented by the project team as described in Chapter 4.2.1 Project implementation and adaptive management were implemented by the project team thanks to active and results-oriented project management.

In response to the Inception Report recommendation, the Project in coordination with other UNDP implemented projects on a cost-sharing basis hired an international consultant on learning and knowledge sharing, who worked in 2012 and 2013. A local consultant on visibility and communication was hired who had performed until 2015.

LogFrame was revised as per Inception Report recommendations: output indicator and target for technology transfer for electricity and biomass cookers have been removed.

4.2.5 **Financial planning and management**

The GEF budget of 2 mil USD as of the project document is shown in Table 9.

Table 9: GEF Project Budget as of Project Document [USD]

Year	1	2	3	4	Total	
Outcome 1	27 750	12 500	7 750	2 000	**50 000**	3%
Outcome 2	80 000	450 000	140 000	80 000	**750 000**	38%
Outcome 3	111 000	81 500	456 500	366 000	**1 015 000**	51%
Outcome 4	0	0	0	35 000	**35 000**	2%
Management	40 900	35 700	37 700	35 700	**150 000**	8%
Total	**259 650**	**579 700**	**641 950**	**518 700**	**2 000 000**	100%
	13%	29%	32%	26%	100%	

Table 10: UNDP Trac Project Budget as of Inception Report [USD]

Year	1	2	3	4	Total	
Outcome 1	100 000	100 000	50 000		**250 000**	19%
Outcome 2					**0**	0%
Outcome 3	310 000	365 000	65 000		**740 000**	56%
Outcome 4	25 000	15 000	10 000		**50 000**	4%
Management	72 480	72 480	72 520	72 520	**290 000**	22%
Total	**507 480**	**552 480**	**197 520**	**72 520**	**1 330 000**	100%
	38%	42%	15%	5%	100%	

Table 11: Combined UNDP Trac + GEF Project Budget as of Inception Report [USD]

Year	1	2	3	4	Total	
Outcome 1	127 750	112 500	57 750	2 000	**300 000**	9%
Outcome 2	80 000	450 000	140 000	80 000	**750 000**	22%
Outcome 3	421 000	446 500	521 500	366 000	**1 755 000**	53%
Outcome 4	25 000	15 000	10 000	35 000	**85 000**	3%
Management	113 380	108 180	110 220	108 220	**440 000**	13%
Total	**767 130**	**1 132 180**	**839 470**	**591 220**	**3 330 000**	100%
	23%	34%	25%	18%	100%	

The Table 12 shows annual project expenditures charged to the GEF budget by project outcomes for each year of project implementation period as reported in Combined Delivery Reports.

Table 12: GEF expenditures by project outcomes and years (CDR) [USD] as of end of October 2017

	2012	2013	2014	2015	2016	10/2017	Total	% of total	% of budget line
Outcome 1	0	1 049	6 689	28 677	18 041	4 897	**59 352**	4%	119%
Outcome 2	0	1 764	368 236	107 106	328	0	**477 435**	28%	64%
Outcome 3	0	6 330	116 119	566 538	346 009	40 650	**1 075 645**	63%	106%
Outcome 4	0	0	0	3 106	1 748	5 733	**10 587**	1%	30%
Management	4 749	6 980	45 784	13 524	0	78	**71 116**	4%	47%
Total	**4 749**	**16 123**	**536 828**	**718 951**	**366 126**	**51 358**	**1 694 135**	100%	85%
% of GEF budget	0.2%	0.8%	27%	36%	18%	3%	85%		

The Table 13 shows annual project expenditures charged to the combined GEF + UNDP Trac budget by project outcomes for each year of project implementation period as reported in Combined Delivery Reports.

Table 13: Combined GEF + UNDP Trac expenditures by project outcomes and years (CDR) [USD] as of end of October 2017

	2012	2013	2014	2015	2016	10/2017	Total	% of total	% of budget line
Outcome 1	25 765	53 782	19 676	30 145	18 041	4 897	**152 306**	5%	51%
Outcome 2	15 714	17 633	502 371	116 224	328	0	**652 270**	20%	87%
Outcome 3	224 730	136 723	232 178	569 732	346 009	40 649	**1 550 021**	48%	88%
Outcome 4	26 997	19 198	4 019	3 106	1 748	5 733	**60 801**	2%	72%
Management	105 974	201 736	222 756	166 623	48 914	47 777	**793 780**	25%	180%
Total	**399 180**	**429 072**	**981 000**	**885 829**	**415 040**	**99 057**	**3 209 178**	100%	96%
% of UNDP/GEF budget	12%	13%	29%	27%	12%	3%	96%		

As of beginning of November 2017, in total 1,694,135 USD have been spent of the GEF budget, i.e. 85% of the total GEF budget of 2 mil USD, and a total of 3,209,178 USD, i.e. 96% of the total combined GEF + UNDP Trac project budget of 3.33 mil USD.

Project management costs charged to the GEF budget reached 71,116 USD as of end of October, 2017, or 4% of the GEF budget. This is significantly lower amount than what was budgeted in the Project Document (150 000 USD), and from this point of view, the project was implemented in a very effective way. In fact, total project management costs are significantly higher, they reached 793 780 USD, or 25% of the total combined UNDP Trac + GEF budget of 3.33 mil USD. More than 90% of total project management costs were funded as a contribution from the UNDP trac budget.

All remaining funds from the GEF budget will be spent by the end of project, mostly for remaining SHP technology delivery and installation costs.

The Project implemented standard financial controls and timely flow of payments.

The Project was subject to a financial audit, as part of a general audit of UNDP projects in Tajikistan in 2015. The audit expressed no comments to the implementation of this SHP Project.

4.2.6 **Co-financing and in-kind contributions**

Table 14: Summary of co-financing

Partner Agency	Co-Financing Amount		Activities to date
	EOP Target (USD)	to November 2017 (USD)	
UNDP (*committed in-cash contribution*)	1,330,000	1,457,282	• Project operation expenses • Capacity building of the government officials; • Procurement of equipment for ER and KM[8]; • Development of education and promotional materials (SHP construction guidebook, RE and EE booklets, etc.)
JICA Funded LITACA project (cash)	1,000,000	1,100,000	• For the construction of 2 sHPPs • Promotion of IRD in the Tajik Afghan Cross-border areas
UNDP Istanbul Regional Hub through the Catalytic Facility (cash)	0	50,000	• Green energy development in rural areas focusing on solar. Several pilot projects with focus on solar for women were implemented
Ministry of Energy and Water Resources (cash)	1,500,000	8,300,000	• Supported SHPPs construction
CJSC "Energoremont" (ER) (in-kind)	100,000	100,000	• Installation and use of equipment and machinery for the production of the turbines; • Using the factory space and resources for the Technology transfer processes • Creating space for the machinery through repairing a workshop on the factory floor • Training and retraining the company staff • Human resources
State unitary Enterprise "Tajiktekstilmash" (KM) (in-kind)	100,000	100,000	• Installation and use of equipment and machinery for the production of the turbines; • Using the factory space and resources for the Technology transfer processes • Creating space for the machinery through repairing a workshop on the factory ground • Training and retraining the company staff • Human resources
Eurasian Development Bank (cash)	0	180,000	• Feasibility studies of SHPs on the irrigation channels, out of which 20 SHP sites were assessed for feasibility.
Systemavtomatika (cash)	0	18,000	• EE and RE Center facility reconstruction
Microloan institute "Imdodi Rushd" (cash)	0	20,000	• 127 microloans of average 315 USD provided for EE improvements of households, small production workshop, and EE start-ups (combined with 20 kUSD UNDP contribution).
Crowdfunding (cash)	0	8,000	• Crowdfunding for EE retrofit of a school combined with UNDP contribution of 10,000 USD
Total:	**4,030,000**	**11,333,282**	

[8] Equipment procured was valued at USD 320,000 and included computers, plasma welding apparatus, rotary hammer, percussion drill, drilling and milling machine, grinding machine, and a comprehensive tool set.

Table 15: Financial Planning Co-financing

Co-financing (Type/Source)	UNDP own Financing (mill US$)		Government (mill US$)		Other Sources (mill US$)		Total Financing (mill US$)		Total Disbursement (mill US$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Grants	1.33	1.46	1.50	8.30	0	1.58	2.83	11.33	11.33	11.33
Credits										
In-kind support					0.20	0.20	0.20	0.20	0.20	0.20
Other										
Total	**1.33**	**1.46**	**1.50**	**8.30**	**0.20**	**1.78**	**3.03**	**11.53**	**11.53**	**11.53**

The actual co-financing disbursed of 11.53 mil USD significantly exceeded the planned co-financing as of ProDoc of 3.03 mil USD.

Main additional co-financing contributions were mobilized from the Government of Tajikistan and from Japan International Cooperation Agency (JICA), both contributions were used for investment support of SHP construction, and from UNDP and Euroasian Development Bank.

4.2.7 **Management by UNDP and implementing partner**

The Project was managed according to the planned management scheme specified in the Project Document.

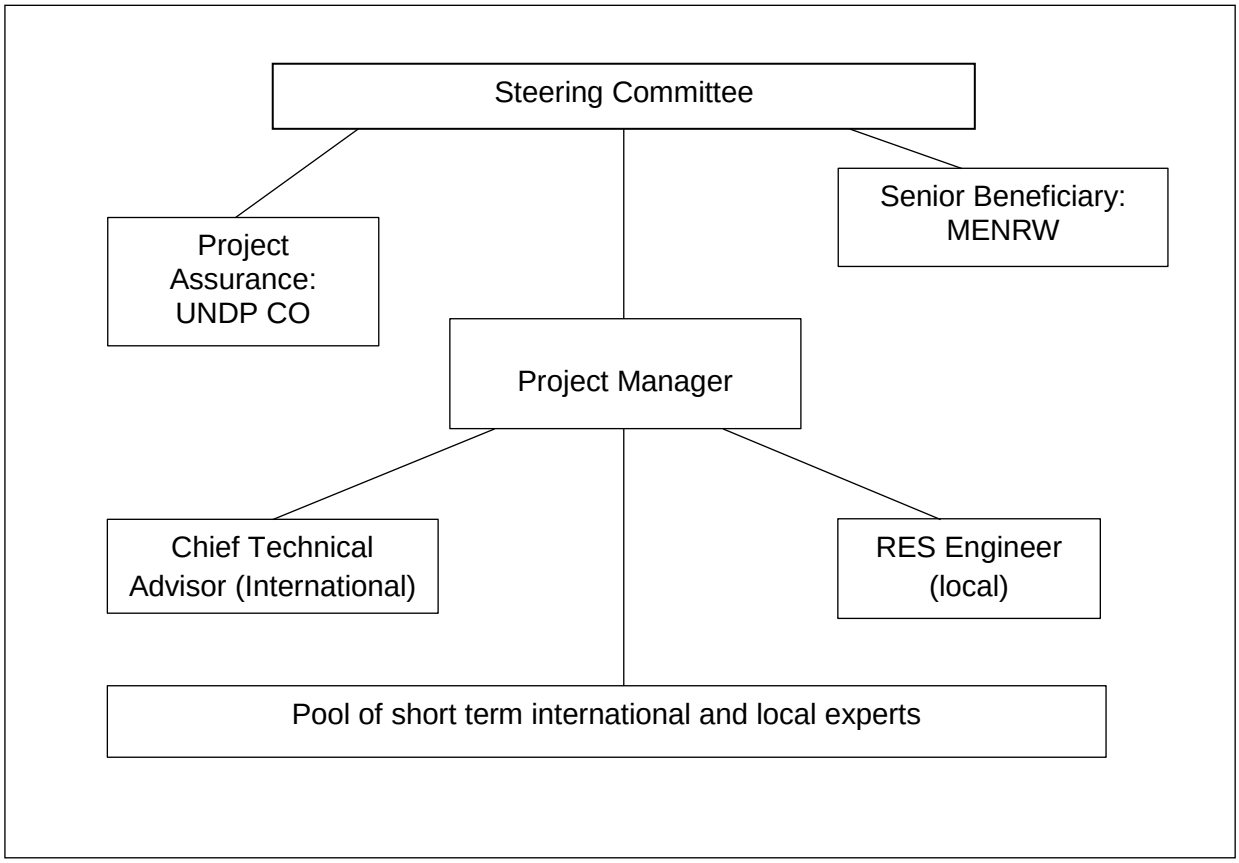
The Project was implemented through the Direct Implementation Modality under the umbrella of UNDP’s Energy and Environment Programme in close coordination with the Ministry of Energy and other government entities. The Ministry of Energy and Water Resources appointed the Deputy Minister, Mr. Jamshed Shoimzoda to serve as a National Project Director, Chair of the Steering Committee, and the main Focal Point of the government contact with the project.

The UNDP Country Office monitors the implementation of Project, reviews project implementation progress, and ensures proper use of GEF funds. UNDP Country Office (CO) provides also support services - including procurement, hiring, contracting of service providers, etc.

The project implementation was managed by the Project Manager, Mr. Jamshed Vazirov – Kodirkulov, and supported by a part-time long-term international Chief Technical Advisor, Mr. Paata Janelidze, and by a full-time local Renewable Energy Engineer, Ms. Violeta Strizhakova.

Chart 1 illustrates the organizational structure of the Project.

Chart 1: Organizational structure



The Project received full back-office support from the UNDP CO, including part-time Administrative Assistant and Financial Assistant. The project team included also a driver.

International consultants included Technology Transfer Consultant and a Consultant on Tendering.

UNDP CO provided effective support to the project implementation team, including appropriate focus on results and overall support of the project strategy and objective through its other activities and projects. UNDP CO support included also appropriate risk management and candor reporting such as PIR, and an effective support in implementation of an adaptive management in response to both project implementation challenges and opportunities. UNDP senior representatives provided active support also in negotiation with local and international stakeholders on a high-level meetings.

MEWR and the Deputy Minister, Mr. Jamshed Shoimzoda, the National Project Director and a Chair of the Steering Committee, played a crucial role in successful project implementation, namely in development and adoption of RE legislation, and enforcing quantity to quality change in SHP development.

The management of both, the implementing partner and the executing partner, and the overall quality of implementation and execution is rated highly satisfactory.

4.3 Results

The design of the 2 mil USD, four-year Project was very ambitious and innovative – aiming to improve quality of life and access to electricity on a large scale, and focusing on establishing local capacities in SHP technologies manufacturing, rather than just relying on technology imports.

The project was designed to focus on SHP, because the "large", utility-level comprehensive solution, extension of utility capacities in power generation, transmission and distribution, was not feasible and financially affordable neither for the Barki Tojik national power utility, nor for Tajikistan as a whole, due to poor financial situation and low income. Decisions on construction of needed large new power utility generation and transmission capacities have been thus postponed for decades since Tajikistan gained its independence.

During the project implementation period, the situation has changed significantly. In 2016, the construction of the major 3,600 MW hydro power plant Rogun was finally renewed after decades of delays, a new coal-fired 400 MW power and heat plant in Dushanbe was completed in 2016 and a new transmission lines in Tajikistan constructed by Chinese investors. In 2018, the construction of the 1,222 km long CASA-1000 power transmission line with a capacity of 1,000-1,300 MW is expected to be launched[9], connecting Kyrgyzstan with Tajikistan and with Afghanistan and Pakistan in next phases. In 2017, the Government has adopted also a new power supply dispatching policy, giving the priority of supply to residential sector. As of this coming winter, the residential sector thus should not face power supply restrictions during winter season, as it was the common practice by now.

These changes have significant impact on SHP development in the country. The investment priority in Tajikistan is now clearly with large-scale utility level projects, leaving future SHP projects with limited resources and lower investment priority, at least in the near future. After the power transmission line, the CASA-1000 project will be finished, and Tajikistan will have the transmission capacity to export power to Afghanistan and Pakistan, electricity generation will become a standard business commodity with a potential to be exported for a full market price. These market-based economic incentives are expected to increase the demand for new power generation, including power generation from SHP. Due to the fact that both, Pakistan and Afghanistan have electricity demand peak in the summer, and Tajikistan and Kyrgyzstan in winter, new power generation will provide opportunity to both, summer exports and electricity supply to domestic market in winter peak season.

The Project has delivered significant results in all of its components. However, due to the changes in investment priorities described above, not all targets have been fully achieved. Project targets have not been revised to accommodate these recent changes, since these changes materialized after the 2015 MTR.

The terminal evaluation reflects these recent changes in development and priorities of Tajik power industry and the fact that project targets could not have been adjusted to them. Evaluation of project targets achievement thus combines both, quantitative (nominal

[9] The bid submission deadline for supply and installation of transmission lines in Tajikistan and Kyrgyzstan was November 23, 2017.

comparison of achievements versus targets) and qualitative analysis of results (analysis of real benefits in current situation).

Summary of results

Despite the long-term and large funding of international donors to SHP projects in Tajikistan, this relatively small UNDP-supported and GEF-financed project has been clearly recognized by all stakeholders as a key promoter of enabling environment for SHP development in Tajikistan, which facilitated significant progress in policy and legal framework, design of the RE financial support scheme, strengthened awareness and capacities in feasible SHP development and operation, and established local SHP manufacturing capacity in Tajikistan. The Project demonstrated its approach in seven SHP plants with a total capacity of 745 kW.

Five new pilot SHP projects have been fully developed and constructed with the support of the Project as a green-field project by December 2017[10]. Additional two SHP projects have been in different stage of development and received direct support from the Project in sustainable operation capacity building of the operators, tariff establishment, power purchase agreement development and signing, and connection to the grid (Nurofar), and in SHP technology transfer (Dashti-Yazgulom). In total, all seven SHP plants generate 139 310 tons of direct project CO_2 emission reductions.

However, the main achievement of the Project is not additional capacity in SHP of 745 kW, and related GHG savings.

The main achievement of the Project, that is not reflected in the LogFrame, is the change of the mindset of the Ministry of Energy and Water Resources from quantity to quality, change in focus of the Ministry from grants and subsidies for SHP plants with low sustainability to development and support of feasible SHPs with sustainable operation.

Project results as per project outcomes are summarized below. Full description of project targets achievements as per the LogFrame is shown in Chapter 4.3.1.

<u>Outcome 1:</u>

The Project has supported drafting and adoption of the Energy Efficiency and Energy Saving Law and the Law on Renewable Energy Sources in 2013, including bylaws and provisions for establishment and operation of the Energy Efficiency and Renewable Energy Trust Fund in a short-term and long-term, feed-in tariff calculation methodology, national strategy for the development of renewable energy sources and energy efficiency, the revised National Program for Development of Renewable Energy Sources and Construction of SHPPs for the period of 2015-2020, SHP monitoring tool and cadaster, and simplified procedures for SHP licensing and construction, and terms of SHP connection to the grid.

SHP guidebook with all relevant RE legislation and feed-in tariff calculation methodology was developed, published and distributed, short term strategies for Renewable Energy and Energy

[10] Commissioning of the last SHP in Pinyon is scheduled for end of December 2017/beginning of January 2018.

Efficiency was prepared in cooperation with the European Union financed Sustainable Energy Programme for Central Asia (CASEP) project.

Due to lack of financing, the Government did not approve funding of the Energy Efficiency and Renewable Energy Trust Fund, and the funding was not mobilized from international donors neither. The Trust Fund will thus operate in a short-term as a consultative agency for RES investors within the MEWR.

30 governmental officials from the Ministry of Energy and Water Resources, Ministry of Economic Development and Trade, Ministry of Finance, Agency for the Antimonopoly control, Barki Tojik power utility, and Ministry of Justice, have been trained in application of RE/SHP policies, legislation and regulations.

Additional 45 staff of the Ministry of Energy and Water Resources and Barki Tojik utility were trained in SHPP cadastre, development of RES projects, and financial and economic analysis of RE/SHP projects (in cooperation of the CASEP project).

Notable qualitative achievement of the Project in this component was that it significantly improved quality of shortlisted potential SHP plants in the National SHP Program 2015 – 2020 based on feasibility assessment. This revision however meant that the number of listed potential SHP plants has been reduced, and SHP sites with insufficient water flow and/or demand were removed from the list. The Project also worked with MEWR and managed to review and adjust its SHP siting priorities. The MEWR SHP priority support is now primarily focused to off-grid sites which have no electricity supply at all. Potential on-grid SHP sites in remote areas which witnessed low-quality power supply receive lower priority. This is driven by the fact that the recent changes in power industry as described above - construction of new power utility generation, transmission and distribution capacities (CASA-1000 project, Rogun hydro power plant) are expected to improve the power supply quality in more cost-effective way than construction of new SHP plants in these on-grid locations.

Outcome 2:

Two local companies, privately owned Energoremont and state-owned Tajiktekstilmash, were selected as beneficiaries of SHP technology transfer and local manufacturers of SHP turbines. A Croatian company Komperg was selected as SHP technology transfer provider. The Project supported the manufacturing capacity of local companies by providing equipment, machinery and tools. The SHP technology transfer was organized in two phases. First, two small 15 kW water turbines were manufactured locally based on a license from Komperg. After its successful completion, additional four larger cross-flow and Kaplan turbines were manufactured under a license from Komperg staff. Both Energoremont and Tajiktekstilmash have had previous experience in larger water turbine reconstruction and repairs, and their staff was trained in SHP turbines manufacturing, installation and maintenance. Electrotechnical control panel and power generators (Serbian company Sever) have been imported, and the mechanical parts, including water turbines, have been manufactured locally. Construction of SHP facility was contracted to local construction companies. The share of locally produced goods and services is estimated to be 60% of total SHP costs.

Two SHP study tours to Croatia and Serbia were organized by the Project for representatives of both local manufacturers, Energoremont and Tajiktekstilmash, Ministry of Energy and Water Resources and the Ministry of Industry and New Technologies of Tajikistan.

General Director of Energoremont has been invited to an international conference in Istanbul to present their experience with manufacturing their first SHP turbines. Her presentation raised interest also from other neighboring countries in the region (Kyrgyzstan and Afghanistan). Both local companies have capacity to produce SHP turbines locally to run generators with a capacity 1-1000 kW.

Tajik Technical University developed SHP training modules for students of the Tajik Energy Institute in Kurgantyube, and they both deliver SHP trainings to 80-100 students annually, in total 270 students attended the courses. Tajiktekstilmash organized also on-the-job trainings on SHP for students in their factory. The Project supported Tajik Technical University in developing vocational training on SHP for practitioners and provided IT equipment (laptop, overhead projector and a screen). In total 45 technicians have been trained at the Tajik Technical University and Tajiktekstilmash within two years. Additional trainings have been developed and provided by the newly established EE and RE Center at facilities of Systemavtomatika and in regions.

Guidebook on SHP project development was developed for the Ministry of Energy and Water Resources and the MEWR disseminates the guidebook to interested parties as a hard copy and/or in an electronic format.

Outcome 3

Seven SHP plants have been constructed with the direct support from the Project, of which five SHPs were newly developed and development of additional two SHPs has been under development already. Sustainable operation has been ensured by identification of suitable SHP operators who were trained in SHP operation and basic maintenance/service and supported by the basic equipment, local turbine manufacturers are skilled to perform major repairs if needed, innovative electricity fee collection methods have been developed, including non-cash settlement of power bills (barter of agriculture products collectively sold on market for power). Ownership of the new SHP plants was handed over to the local municipalities - jamoats.

All SHP plants operate in an off-grid power island mode, although four SHP are located in the on-grid locations. The reason for this off-grid operation are both technical and financial. First, on-grid operation would require more sophisticated controls. And second, the Barki Tojik utility charges connection fees for integrating new SHPs into its power grid that is deemed to be excessive. During the summer season, Nurofar SHP sells excess power to the neighbouring business, and the Jilikul SHP plans to do so as well.

Feasibility studies of 29 potential SHP plants prioritized in the 2009-2020 National SHP Program were developed and 10 sites have been shortlisted as suitable for SHP construction. Five locations have been selected for SHP construction with the Project support. Integrated district development plans in five districts with SHP construction sites were reviewed and updated. Between 2012 and 2017, 37 SHP plants have been constructed with a total capacity of 4.3 MW and an investment costs of 10.5 mil USD in addition to SHP plants developed by

the Project. Five of these SHP plants received direct support from the Project in training in sustainable operation and management.

Table 16: SHP plants developed by the Project

SHP	Year	kW	Annual electricity generation, kWh/year	Status	Annual CO2 savings (tCO2)	Lifetime CO2 savings (tCO2)	Investment Costs, USD
1. Safedob	2017	175	1 073 100	off-grid	998	29 939	408 158
2. Pinyon	2017	100	613 200	off-grid	570	17 108	426 030
3. Jilikul	2017	100	788 400	off-grid	733	21 996	406 992
4. Khijborak	2017	100	613 200	off-grid	570	17 108	466 410
5. Sorvo	2016	30	236 520	off-grid	220	6 599	126 119
6. Dashti-Yazgulom	2014	15	91 980	off-grid	86	2 566	52 594
7. Nurofar	2012	200	1 576 800	off-grid	1 466	43 993	412 931
TOTAL		**720**	**4 993 200**		**4 644**	**139 310**	**2 299 234**

Note: Nurofar SHP plant has been extensively supported in sustainable operation and feed-in tariff calculation and on-grid connection procedures.

Additional 6 SHP plants under construction and funded by the Government, Barki Tojik utility and international donors benefitted from indirect Project support.

Outcome 4

National Strategy for Renewable Energy and corresponding action plans and national programs, revised National SHP Program 2016-2020 with downsized list of potential SHP sites with verified feasibility have been implemented.

The legislation establishing RE and EE Trust Fund is in place, however the funding for the Trust Fund to support investment in new SHP development was not mobilized yet. The Trust Fund is thus expected to serve under the Ministry of Energy and Industry as a consultative agency to assist potential investors in SHP.

Project results report was developed and shared with national partners in 2016. Publication on SHP case studies and experience from the Project is under development and it is scheduled to be published by UNDP Tajikistan in March 2018.

An international conference on "Promoting the Development of Renewable Energy Sources and Improvement of Energy Efficiency at the Community Level in Central Asia" was held in Dushanbe on October 20-21, 2016. The Conference was organized under the auspices of the Ministry of Energy and Water Resources of the Republic of Tajikistan jointly with the United Nations Development Programme in Tajikistan and in partnership with the Michigan State University, the Institute for Global Engagement and the Sistemavtomatika Company. Conference participants included policy makers, project developers, investors, experts from academic and research institutions of all five Central Asian states, Afghanistan, the United States and the European Union, as well as representatives of small and medium enterprises and NGOs in the fields of renewable energy and energy efficiency, and representatives of

international development and financial organizations, including international and bilateral donors, International Finance Institutions (IFI), and Microloan Institutions (MFI).

Table 17: List of Government and private sector supported SHPPs from 2012 - 2017

SHP	Commissioned, year	Capacity, kW	Investment cost, USD
1. Tusien	2013	250	925 000
2. Lukharvi	2012	50	187 000
2. Pitavkul-2	2017	1104	1 945 000
4. Tutak	2013	586	1 112 000
5. Toj	2017	125	452 000
6. Kuhiston	2012	500	1 035 000
7. Tashkif-2	2012	35	183 000
8. Paldorak-3	2012	125	378 015
9. Paldorak - 4	2012	100	301 000
10. Madrushkat-4	2012	15	25 000
11. Rog-5	2014	62	157 000
12. Ovchi-3	2013	15	18 000
13. Ovchi-4	2016	15	29 300
14. Ovchi-5	2014	15	21 000
15. Lolagi-2	2014	100	378 000
16. Kul	2012	31	56 000
17. Varmonik	2012	15	22 645
18. Gazhni	2012	5	12 000
19. Safedorak	2013	100	196 000
20. Dehpir-2	2012	12	19 000
21. Ghuskef	2012	10	15 600
22. Varva	2012	10	19 540
23. Pchef-2	2017	10	12 900
24. Khol-2	2014	10	13 450
25. Tangai	2014	20	63 000
26. Vistan-4	2014	90	276 000
27. Yos	2014	8	10 000
28. Mehnat	2012	15	15 000
29. Kanishbek	2013	10	12 000
30. Hazrati Emom	2012	7	5 500
31. Nova	2014	18	13 800
32. Yakhshor	2014	5	3 000
33. Kavluch	2012	10	12 000
34. Dikhi-Ho	2014	5	16 000
35. Safedob-2	2013	5	7 500
36. Shel-2	2015	15	23 200

37. Vanj-2	2013	800	2 500 000
TOTAL		**4308**	**10 470 450**

Table 18: SHP plant under development with indirect Project support

	SHPP	Installed capacity in kW	Location	Tentative budget in US$	Source of Funding
1	Padrud	700	Penjikent	1,249,000	Government
2	Pushti Bog	180	Baljuvan	520,000	Barki Tojik
3	Ok-su 1	800	Murgab	5,312,000	KfW, Government of Germany
4	Toj	125	Shahrinav	324,000	Barki Tojik
5	Motravn	300	Vanj	2,200,000	KOIKA, South Korea
6	Bustonkala	75	Bokhtar	122,000	Government
	Total	**2,180**		**9,727,000**	

In the following Chapter, the rating of project achievements as per project targets is evaluated and visualized with colors according to the indicator assessment key:

Indicator Assessment Key

Green= Targets Achieved	Yellow= Target almost achieved with minor shortcomings	Red= Target not achived, important shortcomings

Rating:

HS – Highly Satisfcatory, S – Satisfactory, MS – Moderately Satisfactory, MU – Moderately Unsatisfcatory, U – Unsatisfactory, HU – Highly Unsatisfactory

4.3.1 Overall results and attainment of objectives

Table 19: Project results and achievements as per LogFrame targets

Strategy	Indicator	Baseline	Targets	Achievement	Justification for Rating	Rating
Goal: Reduction of GHG emissions from energy use by rural and remote communities	Avoided GHG emissions from rural communities' energy use by end of project (EOP), ktCO2 – *refers to lifetime emission savings*	0	45 ktCO2	Lifetime GHG savings of 139.3 ktCO2 from SHP plants constructed by the EOP (9.3 ktCO2 cumulative savings by EOP)	Project GHG emission reduction report[11] and own calculation based on estimated power generation, because metered generation in 5 SHPs commissioned in December 2017 is not yet available. Target was exceeded.	HS
	Avoided GHG emissions from rural communities' energy use by end of project influence period, 10 years (EOPIP), ktCO2 – *refers to lifetime emission savings*	0	244 ktCO2 *(should have been downsized at IR according to downsized power generation target)*	6 additional SHP plants are under construction, 27 shortlisted in the National Program for potential development.	Cannot be evaluated how many additional SHP plants will be developed and implemented, and thus GHG emission saved, within 10 years after EOP	N/A

[11] Estimation of Greenhouse Gas Reduction (GHG) for the UNDP/GEF projects "Technology transfer and market development for SHP in Tajikistan" and "Support to Sustainable Transport Management in Dushanbe", D. Halubouski, 2014

Objective: Significantly accelerate the development of small-scale hydropower (SHP) by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs.	No. of new small hydropower projects under implementation by EOP	1	10[13]	6 SHP plants under construction with indirect project support	6 SHP plants shortlisted in the reviewed National Program are under construction, of which 2 financed by the Government, 2 by Barki Tojik utility, and 2 by international donors. For All SHPs pre-feasibility analysis has been developed by the Project. Construction of additional SHPs under discussion with potential donors. Target not fully achieved.	MS
	Minimum No. of fully operational SHPs by EOP	0[12]	5	5 new SHP plants in operation, additional 2 SHP with sustainable operation	5 SHP plants developed with direct Project support and commissioned in December 2017. Sustainable operation of additional 2 SHP developed by the Project. Target was exceeded.	HS
	Annual electricity generation from newly installed sHPPs by EOP, MWh/yr	0	2 430	4 993 MWh/year	See project goal justification for GHG emission reductions by EOP.	HS
	Cumulative electricity generation from	0	6 500	Cannot be evaluated how many SHPs will be implemented within 10 years	See project goal justification for GHG emission reductions by EOP influence period (EOP + 10 years)	N/A

[12] Many SHP constructed in the past are malfunctioning; none connected to the grid and few investments in SHP take place, except for by isolated donor-funded projects
[13] The projects are in various stages of development (assessment , feasibility, construction, operation)

	newly installed SHPs by EOPIP, MWh *(Refers to annual power generation, in MWh/year)*			after EOP		
Outcomes						
Outcome 1: Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country.	Adopted regulation operationalizing RES Law	No regulations in support of RES Law	Rules and regulations adopted by end of Year 1	Law on Renewable Energy and Energy Savings, including provisions on the National Trust Fund establishment reviewed, updated and approved in 2013, including bylaws of MEWR	Review of the RE and EE Law and regulations – see Output 1.1. Target was fully met.	HS
Output 1.1: Formulated, approved and enforced implementing rules and regulations (IRRs) of the new Law for RES that will facilitate actions geared towards the enhancement of the market environment for SHP	Simplified procedures and principles for the licensing and construction of SHP facilities	RES Law includes a number of provisions to facilitate investment in grid-connected RE projects, but they are not operationalized	Procedures adopted by end of Year 1 National RE/EE	Revised National SHP Program 2016-2020 adopted in 2015, SHP monitoring tool and cadaster adopted by the Government in 2016, implementation and licensing procedures simplified (MEWR the only licensing agency as of 2014), licenses for SHPs up to 10 kW waived	Review of regulations. Target was fully met. Due to budget constraints and large scale power projects prioritized for investment funding, funding of the Trust did not materialize. Grant support to	HS MU

	National RE/EE Fund		Fund set-up and is operational by end of Year 2	Provisions for the establishment of the National Trust Fund adopted, Trust Fund Charter developed and approved. Trust Fund not funded/operational.	SHP continues on direct subsidies to individual SHP plants. According to its Charter, the Trust Fund will serve as a consultancy agency until fully funded. Target not fully met.	
Output 1.2: Central and local government institutions with enhanced capacities to develop and coordinate SHP projects.	# staff members from relevant central and local government institutions trained in developing and coordinating SHP projects	0	30 staff members trained by the end of Year 2	75 staff trained in total 30 governmental officials from the Ministry of Energy and Water Resources, Ministry of Economic Development and Trade, Ministry of Finance, Agency for the Antimonopoly control, Barki Tojik, and Ministry of Justice trained in application of RE/SHP laws, policies and regulations	Additional 3-day training delivered by the CTA with support from the CASEP project to 45 MEWR and Barki Tojik utility experts on managing the SHP cadastre, SHP economic and feasibility evaluation and development. Target was exceeded.	HS
Outcome 2: Enhanced technical and planning know-how and developed market chain for SHP in Tajikistan	% of the total SHP installed cost provided by locally made goods and services	5-10%	50% by the end of Year 4	60%	Based on evaluation of project records, mechanical parts of SHP technology, including water turbines are newly locally produced and installed, construction works are locally provided, power generator and controls are imported. Target was fully met.	HS
Output 2.1:	Guidebook on SHP project development	0	Guidebook on SHP	Guidebook developed in 2013 and disseminated to stakeholders and MEWR as	Project reports and Guidebook review. Target was fully met.	HS

Guidebook on technical and policy aspects of SHP project development (to be used in all trainings to be delivered by the project)			project development prepared and disseminated by the end of Year 1	hard copies and electronically		
Output 2.2: Local workshops and manufacturers with enhanced capacities to install, construct, manufacture and repair SHP system equipment and components	Technology transfer and capacity development plan prepared for selected local manufacturers	0	2 technology transfer and capacity development plan prepared by the end of Year 1	Two local companies (Energoremont and Tajiktekstilmash) received technical assistance from Croatian company in production and maintenance SHP technology/mechanical parts including water turbines	Site visits to SHP locations and both companies, review of the technology and manufacturing process. Target was fully met.	HS
Output 2.3: Vocational training program for technicians involved in SHP design/construction and O&M	# of technicians annually undertaking vocational training on SHP	0	20 technicians annually undertaking vocational training	45 technicians have been trained at the Tajik Technical University and Tajiktekstilmash within two years. Additional trainings provided by the newly established EE and RE Information Center. Tajik Technical University	Review of project records, training modules and interviews with involved stakeholders. Target was exceeded.	HS

			on SHP starting from Year 2	developed SHP training modules for students of the Tajik Energy Institute in Kurgantyube, and they both deliver SHP trainings to 80-100 students annually, in total 270 students attended the courses.		
Outcome 3: Improved confidence on the technical and economic viability of integrated SHP-based rural development model	No. of SHP demos/pilots incorporating aspects of productive uses and livelihood support for host communities	0	At least 5 community-owned SHP projects operate on a sustainable basis and at least 5 additional are under construction by the end of Year 4	5 community-owned SHP plants developed and constructed and commissioned for sustainable operation in December 2017, additional 2 SHP plants directly supported by the Project (sustainable operation, 1x water turbine), additional 6 SHP plants under construction funded by the Government, Barki Tojik utility and international donors benefitted from indirect Project support	Target was exceeded.	HS
Output 3.1:	Feasibility studies	0	FS for 2 sites by	Feasibility studies for 30 SHP sites developed	Review of feasibility studies, National SHP Program, Project	HS

Technical studies, political commitments and institutional framework secured for pilot SHP projects			end of Year 1, 3 sites - by end of Year 2, 5 sites - by end of Year 3		records, and interviews with stakeholders. Target was substantially exceeded.	
	No. of integrated district development plans (IDDPs)	0	IDDP for 2 districts by end of Year 2, 3 districts - by end of Year 3	5 IDDP reviewed and updated in regions where new SHP plants have been constructed	Target was exceeded.	HS
	No. of SHP projects in the pipe-line	0	At least 5 further SHP projects identified and construction started (without direct project support)	In total feasible 27 SHP sites shortlisted for potential construction in the updated National AHP Program, of which additional 6 SHP plants are under construction funded by the Government, Barki Tojik and international donors.	Target was exceeded.	HS
Output 3.2:	No. of operational demo/pilot SHP	0	5	5 pilot SHP plants operational at EOP	On-site visits and review of SHP sites and technology	HS

Operational SHP demos/pilots in selected communities, demonstrating the viability of the technology and O&M&M models	plants by EOP				implemented. Target was fully met.	
Output 3.3: Pilot SHP operations sustained	No. of PPAs signed for purchase of power from pilot SHP plants by EOP No. of local business supported in pilot localities	0 0	At least 2 by the end of Year 3 5 by the end of Year 4	Nurofar SHP has a PPA agreement in place to sell excess electricity to Borik Tojik, Jilikul SHP is expected to sign a PPA contract with the utility after its completion and full operation. Nurofar SHP serves 2 local business, Jilikul SHP has an agreement to supply power to other 2 local business (restaurant, petrol station). 740 households, 8 schools, and 4 medical centres are supplied with power from new pilot SHP plants.	The target is expected to be fully achieved after the Jilikul is put in full operation. Number of business in remote areas is limited, business are available in larger on-grid sites. New business are expected to emerge with the reliable power supply from SHP sites. Target was almost reached.	S S
Outcome 4: National Scaling-up Programme of Renewable Energy-based Integrated Rural Development	Adopted and financed National Scaling-up Program	N/a	Adopted and financed National Scaling-up Program by the end of Year 4	National Scaling-up Program Adopted EE and RE Trust Fund not funded	Updated National SHP Program adopted with improved quality of shortlisted feasible SHPs. Due to budgetary constraints, and new priorities for financing large-scale utility power generation and transmission projects, and preferences of	MS

					international donors to fund selected concrete SHP plants, funds for the Trust Fund have not been mobilized. Additional 6 new SHP plants under construction are financed directly by the Government, power utility and international donors.	
Output 4.1: Project results assessed, analyzed and compiled into comprehensive national report	Project results and Lessons learned report	N/a	Project results and Lessons learned report prepared by end of Year 4	Report on lesson learned from the Project developed, published and disseminated in 2016.	The report published before EOP could not have included full project results.	S
Output 4.2: Conference on integrated renewable-energy based rural development organized	Conference on integrated renewable-energy based rural development	N/a	Conference on integrated renewable-energy based rural development organized by the end of Year 4	International Conference on “Promoting the Development of Renewable Energy Sources and Improvement of Energy Efficiency at the Community Level in Central Asia” was held in Dushanbe on October 20-21, 2016, organized by UNDP under auspices of MEWR	Conference press release. Target was fully met.	HS

Output 4.3 Approved and funded proposal for national scaling up of the SHP demos/pilots	Annual amount of governmental incentives allocated to support investment in new SHP plants under the scale-up plan by EOP, US$	N/a	3.5 mil USD	The EE and RE Trust Fund not Funded. 6 SHP plants from the updated National SHP Program under construction with investment cost of 9.7 mil USD, of which 1.371 mil USD provided by the Government, and 0.744 mil USD by Barki Tojik utility.	Target was not met.	U

4.3.2 **Relevance**

The Project was designed in line with Governmental policies and priorities, which highly prioritized SHP development in Tajikistan, namely with the Long-Term Program for Construction of Small Hydro Power Plants for the period 2009-2020, Third Poverty Reduction Strategy (PRS-3) of the Government of the Republic of Tajikistan (2010), and other governmental policies and documents as discussed in Chapter 4.1.1, as well with the revised National SHP Program for 2016-2020. As such, the Project is highly relevant.

Over the Project implementation period, the situation in Tajikistan has changed significantly, as discussed in Chapter 4.3, which resulted in review and changes in country priorities. The top investment priority in energy sector is now clearly focused on large-scale utility level power generation and transmission projects (Rogun hydro power plant, CASA-1000 transmission line). This has impact on limited funding available for future SHP projects, at least in a short term.

Actual investment priorities have changed, the National SHP Program for 2016-2020 has been downsized thanks to focus on quality and feasible potential SHP sites. Governmental financial support to new SHP development has been reduced dramatically, and the EE and RE Trust Fund was not funded yet. However, the policy priorities concerning SHP have not been changed in principal.

What has changed significantly is the potential scope of new SHP development in the short-term, until the transmission CASA-1000 project will be constructed. The relevance of SHP development in Tajikistan has not changed.

Despite the current downsizing of the financial support to new SHP development, the relevance of the SHP Project is still rated as Relevant.

4.3.3 **Effectiveness of project implementation**

Effectiveness of project implementation evaluates an extent to which an objective has been achieved.

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

The Project has been successful in supporting development and adoption of enabling legal and regulatory framework, it substantially improved the capacity in feasibility assessment and support of viable SHP plants of the line ministry, it developed capacity of local manufacturers to produce water turbines, capacity of SHP operators to operate SHPs in an effective and sustainable manner, feasible SHP development capacity of expert community. The Project developed and implemented sustainable delivery models, including capacity in development of SHP feasibility studies, review and update of suitable SHP sites in updated National SHP Program 2016-2020, development of feed-in tariff setting procedures, and innovative non-cash power bill settlement.

In total seven SHP plants have been constructed with a direct Project support, five of them as green-field projects, and two SHP plants have been already under development.

Annual electricity generation is estimated to be 4.993 MWh/year.

Funding for the EE and RE Trust Fund has not been mobilized.

Despite the limited funding/financial support scheme available for further SHP development, which is out-of-control of the Project, the overall effectiveness of project implementation is rated Satisfactory.

4.3.4 **Efficiency - cost-effectiveness of project implementation**

UNDP defines project efficiency (cost-effectiveness or efficacy) as an extent to which results have been delivered with the least costly resources possible.

The Project with 2 mil USD GEF funding was highly successful in mobilizing co-financing in addition to the planned co-financing as of ProDoc of 3.03 mil USD to support construction of SHP plants. Total co-financing mobilized reached 11.53 mil USD.

The GEF funding was used primarily for development of sustainable activities with long-term impact: enabling SHP framework, technology transfer and capacity strengthening, including capacity of local manufacturers to produce SHP technology. Only 4% of GEF budget was used for financing of project management costs.

Total direct lifetime emission reductions are estimated to be 139,310 tCO_2, which means 14.3 USD of GEF funds provided per ton of CO_2 saved. This is higher than current low GHG emission reduction prices, but well below the former 20 USD/tCO_2 benchmark.

The Project reached its main development and environmental objectives, except for funding of the EE and RE Trust Fund.

The cost-efficiency of project implementation is rated Satisfactory.

4.3.5 **Country ownership**

This Project can serve as a good example of a full and effective country ownership: it was designed fully in line with national development and environmental priorities of the country. The Government, and specifically the MEWR, as well as other national stakeholders, including local municipalities, demonstrated full support and commitment to successful project implementation. The full country ownership was demonstrated among others by higher than planned local co-financing, including co-financing provided by the Government.

The inability to provide funding for the Trust Fund does not indicate lack of ownership, but it is a result of changed governmental investment priorities after the country finally succeeded to mobilize financing for large power generation and transmission projects pending for decades.

Another example of full country ownership is an implementation of Ministry of Energy own monitoring system of newly developed SHP plants. Representatives of the Ministry visited the Project SHP construction sites, monitored and evaluated the progress of works. The Ministry liaised also with local municipalities regarding effective ownership and operation mode of constructed SHP plants.

One of the main indicators of country ownership is the changed approach of the Ministry of Energy towards development and support of feasible SHPs operated in a sustainable mode.

Country ownership is rated Highly Satisfactory.

4.3.6 **Mainstreaming and gender equality**

Project objectives and outcomes are fully in line with UNDP country program strategies and GEF conventions, namely with the UN Development Assistance Framework (UNDAF) outcomes “Water, sustainable environment and energy”, UNDP Country Programme Action Plan (CPAP) outcome Output 6.2: “Alternative renewable technologies including biogas, hydro, and solar power are demonstrated, understood, and widely used. Favorable policy and legal framework are established and contribute to private sector development”, UNDP country programme Outcome 6: “Improved environmental protection, sustainable natural resources management, and increased access to alternative renewable energy”.

In addition to environmental and resource/energy sustainability, the Project directly supported also other UNDP priorities, namely the economic development, poverty alleviation, and gender equality and women empowerment. Although gender equality was not specifically addressed in the Project Document, it was implicitly integrated in the Project design: unavailability of electricity results in unsustainable tree cutting and utilization of scarce local biomass for heating and open-fire cooking. Because of gender roles in traditional Tajik society, women are primarily those who cook dishes and spend their time in smoky outdoor kitchens with open fire, and are thus exposed to related health risks. The project eliminates wood and biomass collection, the time needed for fuel collection and preparation, as well as health risks associated with its utilization.

4.3.7 **Prospects of sustainability**

4.3.7.1 Financial risks

The ability of Tajikistan to finally mobilize funding for its major large-scale power generation and transmission projects will have a significant positive impact on socio-economic development, but it will have different financial impacts in short-term and mid-/long-term on prospects of SHP development in the country.

In the short-term, until the CASA-1000 project will be finalized, budgetary funding for SHP development will remain limited, and low electricity prices will not attract privately financed SHP projects. During this period, SHP development will primarily depend on continuous financial support/grants from international donor community and from limited national sources.

In the mid-/long-term, after CASA-1000 transmission line to Afghanistan and Pakistan will be finished, opportunities to export power for market price, primarily during the summer season, are expected to attract private investment to new hydro power projects in Tajikistan, including small hydro power. During the winter period, with limited export demand, these power generation capacities will be well positioned to serve domestic market in winter peaks. The critical factor especially for SHPs in remote areas will be the capacity of local distribution grid. However, the SHPs, as distributed sources, will in principle help to minimize the distribution constraints during the winter peak periods. Thus, in the mid-/long-term, it is expected that the share of private capital in SHP development will increase, and the dependence on international grants and local subsidies will be reduced. Successful completion of the CASA-1000 project of course depends on lots of factors, including political stability in Afghanistan and the region.

The financial risk includes also a capacity to mobilize funding in case of necessary SHP repairs. The risk of major repairs has been mitigated by developing local capacity in proper SHP operation and maintenance, by SHP technology transfer to and training of two local companies in SHP technology production and repairs, which will significantly reduce the repair costs, and by creating a full ownership of SHP plants with both local municipalities and central administration, the Ministry of Energy. However, this risk cannot be fully excluded.

Thus, despite the limited financial resources for large-scale SHP development in the short-term, the overall financial sustainability, combining short-term and mid-/long-term perspective, is rated to be Moderately Likely.

4.3.7.2 Socio-Economic Risks

Social and economic risks with potential impact on project results sustainability include:

- Continuous/strengthened economic and governance reforms in Tajikistan to improve the investment climate and mobilize private investment, including foreign investors.
- Political stability in the power export countries (Afghanistan) allowing to construct and operate power transmission lines to Pakistan which has impact on financial risk in the long-tem.
- Sufficient funding for SHP development even in the short-term, so that the experience and capacity gained in development of feasible SHP projects both at the governmental and local level, and of local companies, will not be lost.
- Ability of local companies to be competitive with their SHP technology on the market, both in terms of quality and price.

The socio-economic sustainability is rated Moderately Likely.

4.3.7.3 Institutional Framework and Governance Risks

The institutional framework has been strengthened, improved RE policies and legislation, including bylaws have been adopted, including the framework for establishment of the EE and RE Trust Fund and RE/SHP financial support scheme, the technical know-how has been transferred and local stakeholders trained. However, implementation and enforcement is not a one-time effort, but a continuous process that will for sure require also future revisions and

update of specific regulations to improve its effectiveness, for example streamlined conditions/affordable price for SHP connection to the grid.

Quality governance, and sufficient accountability and transparency are critical for any investment, and are not specific for SHP development, and are clearly out of scope of this Project.

Institutional framework and governance sustainability is rated Moderately Likely.

4.3.7.4 Environmental Risks

SHP plants have negligible, if any, negative environmental impacts, and significant positive environmental impacts, both globally (GHG reductions), and locally (reduction of unsustainable tree cutting, reduction of fossil fuel and oil/gas consumption etc.).

The only environmental risk that could affect sustainability of SHP operation could be glacier melting and extreme (high and low) water flows in rivers. SHP plants are not located in the river bed, but in a sufficient height. SHP operators have been trained to regularly maintain water inlets and drives to remove stones, and already did remove the stones from water inflows. Potential low water flow in case of melted and disappeared glaciers in a long-term is mitigated by utilization of only a fraction of minimal water flow for SHP production, providing sufficient reserve.

Environmental sustainability is rated Likely.

Overall prospects of sustainability of delivered project results are rated to be Moderately Likely.

4.3.8 **Catalytic Role**

Despite large number of SHP plants implemented and financed by international donors already, the Project served as a catalyst of development of an enabling SHP framework in Tajikistan. Project’s focus was not on construction of just additional SHP capacity, but it strengthened revised and newly adopted SHP policy, EE and RE legislation, it developed capacity in assessment and development of feasible SHP projects, and changed the mindset of the line ministry from quantitative, based on grants, to qualitative, based on more feasible SHP project development.

The Project has demonstrated “scaling up” of approaches in feasible SHP development on a national level.

The Project has demonstrated replication during its implementation period through knowledge transfer and capacity building primarily on a national level, and internationally/regionally as well (international conference). Expertise and trainings developed by the Project have been utilized also by other international donors financing SHP plants in Tajikistan, such as OSCE.

4.3.9 **Project Impact**

There have been some 300 SHP plants constructed in Tajikistan and funded by international donors, national government and in some cases by private investors over the last two decades. Most of these grant-funded projects are no more in the operation.

The major achievement of this 2 mil USD GEF-financed Project is not that it constructed additional 5 new SHP plants.

The Project managed to create enabling environment for SHP development, including policy and regulatory framework, capacity strengthening of SHP development and operation, successful SHP technology transfer, demonstration of SHP construction and sustainable operational arrangements. The financial support scheme has been designed and implemented in the EE and RE Law, however, the EE and RE Trust Fund has not been funded, due to budgetary restrictions and change in investment priorities to large scale power utility projects. Despite the fact that the Trust Fund has not been funded and available funding for SHP development is very limited, the Project has did manage to create significant impact.

UNDP through this Project has gained a unique position in Tajikistan recognized by all stakeholders – as a driver and promoter of feasible and sustainable SHP development in the country.

Since 5 new SHP projects have been finalized at the end of 2017, GHG emission reduction will fully start materialize after SHP commissioning in December 2017 and start of their full operation. Thus, environmental status improvement and environmental stress reduction cannot be assessed based on measured data, but its prospects can be estimated only. The Progress towards stress/status, environmental status improvement, and environmental stress reduction are estimated to be significant in the long-term, after completion of the CASA-1000 project that will provide opportunities for more investment to SHPs.

The project impact is rated to be Significant.

5. Conclusions, Lessons Learned and Recommendations

The project objective has been partially met. No new SHP plants have been developed with a support of the designed financial support scheme, the EE and RE Trust Fund, although 6 new SHP plants are under development, financed by the Government and international donors. Development of SHP has not been significantly accelerated due to two main factors:

1. Due to budget constraints and ability of Tajikistan to attract financing for and renew/start construction of large-scale hydro-power generation (3.600 MW HPP Rogun) and transmission projects (CASA-1000), the funding for the designed SHP financial support scheme, the EE and RE Trust Fund, has not been mobilized.
2. The Project managed to work with the MEWR and to review and adopt updated National SHP Program with significantly improved quality of shortlisted potential SHPs suitable for construction. Only feasible SHP were shortlisted, which lead to significant downsize of the National SHP Program and reduction of number of suitable SHPs.

In Outcome 1, the Project was successful in developing enabling legislative and regulatory environment for SHP development, EE and RE legislation has been revised and adopted, including bylaws and regulations for SHP financial support scheme and Trust Fund operation. The government/MEWR has been trained in their capacity to assess feasibility of SHP plants and their sustainable operation and monitoring.

In Outcome 2, an innovative and demanding SHP technology transfer was implemented, two local production companies have been trained and supported in SHP technology production, and produced SHP mechanical parts including turbines for five newly constructed SHP plants with ca 60% share of locally provided goods/technology and services. Extensive vocational trainings and educational modules for students have been developed and implemented, guidebook on SHP development developed and disseminated, and workshops and trainings o SHP development, maintenance and repairs implemented.

In Outcome 3, five new green-field SHP projects have been implemented and new SHP plants constructed, sustainable operation of additional two SHP plants under development has been supported, six new SHPs are under development at the end of project that received indirect project support through trainings of local experts and governmental decision makers. Feasibility studies of 27 potential SHPs have been developed and shortlisted in the National SHP Program. Innovative sustainable operational schemes have been designed, including non-cash settlement of electricity bills, and SHP operators were trained.

In Outcome 4, the national scaling-up program has been designed and approved, the revised and improved National SHP Program has been developed and adopted, however the EE and RE Trust Fund was not funded. International RE conference was held in 2016.

The main success of the Project that was not reflected in the project LogFrame was a change of the MEWR approach and mindset: from extensive low-quality SHP development facing a risk of unsustainable operation towards feasible SHP development with sustainable operation and monitoring performed by the MEWR experts. This, combined with a lack of budgetary resources, leads to a decrease of SHP actually supported and constructed.

However, in the mid-/long-term, after completion of the CASA-1000 transmission line to Afghanistan and Pakistan, new power export capacity is expected to attract private investors

to finance new hydro-power projects, including SHP, and thus reducing the need for subsidies for new SHP plants.

Project objective and outcome level results and rating are summarized in Table 20 below.

Table 20: Overview of project objective and outcome achievements rating

Indicator	Target	Achievements	Rating
Goal: Reduction of GHG emissions from energy use by rural and remote communities			
Avoided GHG emissions from rural communities' energy use by end of project (EOP), ktCO2 **(should be lifetime)**	45 ktCO2	9.275 ktCO2 cumulative savings by EOP, lifetime GHG savings of 139.3 $ktCO_2$	**HS**
Avoided GHG emissions from rural communities' energy use by end of project influence period, 10 years (EOPIP), ktCO2 – (**lifetime savings)**	244 ktCO2 (**Should have been revised to ca 122 ktCO2 in the IR**)	Cannot be evaluated how many SHPs will be implemented within 10 years after EOP	N/A
Objective: Significantly accelerate the development of small-scale hydropower (SHP) by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs.			
No. of new small hydropower projects under implementation by EOP	10	6 SHP plants under construction with indirect project support	**MS**
Minimum No. of fully operational SHPs by EOP	5	5 new SHP plants in operation Additional 2 SHP with sustainable operation	**HS**
Annual electricity generation from newly installed sHPPs by EOP, MWh/yr	2 430	4 993 MWh/year	**HS**
Cumulative (**should be annual**) electricity generation from newly installed SHPs by EOPIP, MWh (**should be MWh/yr**)	6 500	Cannot be evaluated how many SHPs will be implemented within 10 years after EOP	N/A
Outcome 1: Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country.			
Adopted regulation operationalizing RES Law	Rules and regulations adopted by end of Year 1	Adopted	**HS**
Outcome 2: Enhanced technical and planning know-how and developed market chain for SHP in Tajikistan			
% of the total SHP installed cost provided by locally made goods and services	50% by the end of Year 4	60%	**HS**
Outcome 3: Improved confidence on the technical and economic viability of integrated SHP-based rural development model			
No. of SHP demos/pilots incorporating aspects of productive uses and livelihood support for host communities	At least 5 community-owned SHP projects operate on a sustainable basis and at least 5 additional are under construction by the end of Year 4	5 new SHP plants constructed and in operation Additional 2 SHP supported in sustainable operation 6 SHP plants under construction with indirect project support	**HS**
Outcome 4: National Scaling-up Programme of Renewable Energy-based Integrated Rural Development			
Adopted and financed National Scaling-up Program	Adopted and financed National Scaling-up Program by the end of Year 4	National Scaling-up Program Adopted EE and RE Trust Fund not funded	**MS**

Rating: HS (Highly Satisfactory) – S (Satisfactory) – MS (Moderately Satisfactory) – MU (Moderately Unsatisfactory) – U (Unsatisfactory) – HU (Highly Unsatisfactory)

Terminal evaluation ratings are summarized in Table 21.

Table 21: Terminal evaluation rating

Criteria	Rating						Comments
	HS	S	MS	MU	U	HU	
1. Monitoring and Evaluation							
M&E design at entry	**HS**						
M&E plan implementation	**HS**						
Overall quality of M&E	**HS**						
2. IA & EA Execution							
Quality of UNDP Implementation	**HS**						
Quality of Execution	**HS**						
Overall quality of Implementation/Execution	**HS**						
3. Assessment of Outcomes							
Relevance	**R**						
Effectiveness		**S**					
Efficiency		**S**					
Overall Project Outcome Rating		**S**					

HS – Highly Satisfactory, S – Satisfactory, MS – Moderately Satisfactory, MU – Moderately Unsatisfactory, U – Unsatisfactory, HU – Highly Unsatisfactory
Relevance: R – Relevant, NR – Not Relevant

	L	ML	MU	U	Comments
6. Sustainability					
Financial Resources		**ML**			
Socio-political		**ML**			
Institutional Framework and Governance		**ML**			
Environmental	**L**				
Overall likelihood of sustainability		**ML**			

Sustainability: L – Likely, ML - Moderately Likely, MU - Moderately Unlikely, U – Unlikely

7. Impact	S	M	N	Comments
Environmental Status Improvement	**S**			Long-term estimate
Environmental Stress Reduction	**S**			Long-term estimate
Progress towards stress/status	**S**			
Impact	**S**			

Impact: S – Significant, M – Minimal, N - Negligible

5.1 Lessons Learned and Recommendations

Lessons learned:

I. On-grid decentralized SHP/RE is an integral part of "large-scale" power sector

On-grid SHP[14], as well as other on-grid distributed electricity generating technologies based on renewable energy, are an integral part of the whole electricity system, and are closely interlinked with electricity market development, policies, pricing, legislation and market transformation. This Project illustrates how significant impact on SHP development may have new utility level power generation and transmission projects. When designing and implementing on-grid decentralized RE projects, this interlink with and dependence on the "large" power system policies and development should always be taken into account.

II. With low-electricity prices covering just operational costs, subsidies are essential for new investment in power infrastructure

The example of the Pamir Energy illustrates that power development projects in low-income countries/regions cannot depend only on private investment and market mechanisms to fully recover investment costs, but subsidies for low-income households are essential. Renewable energy financial support schemes operational in mid- and high-income countries and financed by a levy paid by power consumers cannot thus be mechanically implemented, but they need to be adjusted to local conditions of low-income countries and supported by targeted social support scheme to low-income households, or other forms of grant funding and/or (operational) subsidies. Thus, subsidies to be provided for construction of new SHP plants by the EE and RE Trust Fund would be fully justified.

Export opportunities after completion of the CASA-1000 project, thanks to different power peak seasons in Tajikistan and Pakistan, will create a unique opportunity to recover investment costs of new small and large power generation projects from export prices and thus to potentially sell electricity on a domestic market for a lower price, affordable to local customers. This would decrease the need for subsidies to new power generation sources/low-income customers.

III. Priority to off-grid sites

With an implementation of the new power dispatching policy prioritizing electricity supply to residential sector, households are not expected to witness such a massive interruption (of up to 12 hours) of power supply during the winter season. This will dramatically decrease the need of and demand for alternative solutions, including SHPs, in these on-grid sites, as well as SHP's impact on livelihood improvement at these on-grid locations.

The priority of new SHP development in the short-term, until the CASA-1000 project will be completed, should thus be primarily to off-grid locations, as properly reflected by the MEWR.

IV. Key success factor – right people at right positions

[14] Decentralized (distributed) SHP/RE power plants refer to small-scale power plants located close to power end-users (an opposite to centralized large-scale power plants). On-grid decentralized SHP/RE power plants refer to small power plants connected typically to low- or medium-voltage distribution network.

The major achievement of the Project is that it succeeded to change the mindset of the MEWR, including its focus on feasible SHP development primarily in off-grid sites and sustainable SHP operation. The key success factor was that there were the right people at right positions, both within the project team headed by the Project Manager, and at the MEWR.

The Project benefited from the unique opportunity, when the part-time Chief Technical Advisor served in the same time also as a Renewable Energy Expert with the Sustainable Energy Programme for Central Asia (CASEP). Thus, he had an opportunity to spend an extensive time in Tajikistan, working in both positions with MEWR and other stakeholders on developing RE/SHP enabling framework conditions, including RE legislation.

The project success also heavily depends on the personality of Mr. Jamshed Shoimzoda, MEWR Deputy Minister and National Project Director, and his professional background in economy and investment. He was the key person who drove the changes at all levels of the MEWR, including the changes in policy, National SHP Program, SHP priorities, and RE legislation/regulation updates.

This illustrates that the implementing agency – UNDP can influence the Project success only to some extent. Critical is also attitude and qualification of local policy and decision makers, as well as other stakeholders.

V. Extensive tendering impacts implementation period

VI. The Project included extensive tendering needed for demonstration projects and for technology transfer component. Due to its complexity, the whole tendering process according to the UNDP procurement requirements, was extremely time-demanding. The scope of tendering and realistic time needed for implementation should be taken into account when developing other projects in the future. Also, the tendering for an international company for SHP technology transfer has been delayed, and it took in total 9 months. Delays were caused because of no/little interest of international companies. Several companies that were directly addressed by the Project refused to submit proposals, because they were not interested in small SHP technology transfer with capacity below 1 MW.

Recommendations:

Recommendation to UNDP

I. Install meters of electricity supplied from the SHP plants

Electricity generated at the SHP plants is metered at electricity meters integrated in control panels. However, part of the electricity generated is used for frequency control through heating of water in ballast water tanks. The Project should install electricity meters at SHP plants outlets to meter net electricity supplied to customers for both, future monitoring and verification of metered electricity consumption for billing.

II. Elimination of soil erosion at SHP in Pinyon

The soil at the water inlet and outlet from the SHP plant at Pinyon was flushed with water flow and threatened foundations of the SHP facility construction. The eroded parts should be covered with soil, and the SHP construction fixed to eliminate further erosion in the future.

III. Publish project information and documents on-line

The Project has developed, published and disseminated lots of valuable information, documents and publications to local stakeholders. However, these documents are not easily accessible on-line. The Project is encouraged to publish all available relevant project deliverables on-line, either at own UNDP web site, or at web sites of local stakeholders, so that this information would be easily accessible even after Project termination. The information may contain Lesson learned report, updated RE legislation and regulations, project presentations and presentations from the 2016 International Conference, SHP plant fact sheets, List of shortlisted feasible SHP sites from the National SHP Program, etc.

IV. Continuity in RE support

The project team and the Project Manager have developed significant experience in developing enabling framework for SHP and renewable energy in Tajikistan. UNDP is encouraged to integrate into its potential future renewable energy projects in Tajikistan activities that would support effective implementation of the developed SHP/RE framework also in the future, including RE policy dialogue with the MEWR, support to funding mobilization, and putting the Trust Fund into operation.

Recommendations to GEF

V. Complex projects would benefit from long-term support

GEF funding is project based and it is typically provided for project duration of 4 years. Complex projects with an ambition to substantially transform local market that include policy, primary legislation and secondary regulations development and implementation, support to feasible project development, design and construction of pilot projects, and design, funding and operation of a financial facility to support large-scale rollout maximizing GHG reductions could hardly be delivered within the four year period only. In my experience, long-term effectiveness and sustainability of lots of such GEF-financed projects would significantly benefit if the implementation would be supported even after termination of the 4-year period. The long-term support must not be necessarily extensive, but should cover primarily at least costs of part-time consultancy support of local/international experts to secure full roll-out and replication of pilot projects on a large-scale, and thus to maximize GHG emission reductions. It would be worth considering how the GEF could provide this additional long-term support, or how implementation agencies could convert part of the one-time funding into longer-term support.

6. Annexes

Annex 1: Evaluation mission itinerary

No	Description	Time
Monday, 6 November		
1	Arrival in TJK	4.00
2	Meeting and info on project achievements with the project team/UNDP	11.00 – 12.30
3	Meeting with Korgohi Mashinasozi (TT recipient)	13.30 – 15.00
4	Meeting with Energoremont (TT recipient)	15.30 – 17.00
Tuesday, 7 November		
1	Trip to Shamsiddin Shohin district to see the Safedob SHPP 175 kW Visiting the SHP Plant Meeting with local operators Meeting with local authorities	08.00 – 21:00
Wednesday, 8 November		
3	Meeting with Tajik Technical University	10.30 – 12.00
4	Meeting with Association of Energy professionals	13.30 – 15.00
5	Meeting with Tajik Norwegian Center for Sustainable Development	15.30 – 17.00
Thursday, 9 November		
1	Meeting with Ministry of Energy and Water Resources	9.00 – 11.00
2	Meeting with the consultant of the Ministry of Energy and Water Resources	
Friday, 10 November		
1	Trip to Rasht Valley to see Khijborak power plant 100 kW Visiting the SHP Plant Meeting with local operators Meeting with local authorities	8.00 – 18.00
Saturday, 11 November		
1	Desk work	

Monday, 13 November		
1	Meeting with Ministry of Industry and New Technologies	9.00 – 10.30
2	Trip to Ayni district to see SHPP Pinyon 100 kW Visiting the SHP Plant Meeting with local operators Meeting with local authorities	10.30 – 18.00
Tuesday, 14 November		
1	Trip to Dusti district to see Jilikul SHPP 100 kW Visiting the SHP Plant Meeting with local operators Meeting with local authorities	9.00 – 15.00
2	Desk review	15.00 – 17.00
Wednesday, 15 November		
1	Meeting with stakeholders and visiting the National Center for RE and EE in Dushanbe	9.00 – 13.00
2	Debriefing with UNDP	14.00 – 16.00
Thursday, 16 November		
1	Departure from Dushanbe	6.00

Annex 2: Logframe with revisions

Table 22 illustrates changes adopted based on the Inception Report recommendations. The changes are highlighted in yellow. ~~Crossed text~~ was deleted at the inception phase. The ~~Objective 2.4 has been removed~~ at the MTR. No other changes to the LogFrame have been introduced by the MTR.

The significant number of LogFrame changes introduced as per the Inception Report introduced two main revisions:

1. The LogFrame targets have been downsized to be more realistic – especially with the limited project implementation period
2. The number of indicators has been substantially reduced from 46 down to 26 indicators. However, this reduction of indicators did not mean reduction of the scope of the project, with the only one exception:

Table 22: LogFrame revisions

Strategy	Indicator	Baseline	Targets
Goal: Reduction of GHG emissions from energy use by rural and remote communities	Avoided GHG emissions from rural communities’ energy use by end of project (EOP), ktCO2	0	~~90~~ 45 ktCO2
	Avoided GHG emissions from rural communities’ energy use by end of project influence period, 10 years (EOPIP), ktCO2	0	244 ktCO2

Objective: Significantly accelerate the development of small-scale hydropower (SHP) by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs.	No. of new small hydropower projects under implementation by EOP Minimum No. of fully operational SHPs by EOP Cumulative electricity generation from newly installed SHPs by EOP, MWh/yr Cumulative electricity generation from newly installed SHPs by EOPIP, MWh/yr ~~Adoption of policy frameworks, allowing SHP-based generators preferable access to the grid and tariff~~	1 0 0 0 ~~1~~	~~27~~ 10 ~~10~~ 5 ~~4,860~~ 2,430 ~~13,118~~ 6,500 ~~4~~
Outcomes			
Outcome 1: Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country.	Adopted and enforced regulation operationalizing RES Law	No regulations in support of RES Law	Rules and regulations adopted by end of Year 1
Output 1.1: Formulated, approved and enforced implementing rules and regulations (IRRs) of the new Law for RES that will facilitate actions geared towards the enhancement of the market environment for SHP	Simplified procedures and principles for the licensing and construction of SHP facilities ~~Technical regulation to enable connection of SHP plants to the electric power grid~~ ~~Procedures on monitoring and verifying electricity production from SHP~~ National RE/EE Fund ~~Tariff methodology for RES electricity and~~	RES Law includes a number of provisions to facilitate investment in grid-connected RE projects, but they are not operationalized	Procedures adopted ~~and enforced~~ by end of Year 1 ~~Technical regulation adopted and enforced by end of Year 1~~ ~~Procedures adopted and applied by end of Year 1~~ National RE/EE Fund set-up and is operational by end of Year 1 ~~Methodology for RES electricity and standard PPA developed and adopted by~~

	~~standard PPA~~		~~end of Year 1~~
Output 1.2: Central and local government institutions with enhanced capacities to develop and coordinate SHP projects.	# staff members from relevant central and local government institutions trained in developing and coordinating SHP projects ~~Inter-ministerial Task Force to coordinate SHP policies development and implementation at central level~~	0 ~~0~~	30 staff members trained by the end of Year 2 ~~Inter-ministerial Task Force to coordinate SHP policies development and implementation at central level established and is operational~~ ~~by the end of Year 2~~
Outcome 2: Enhanced technical and planning know-how and developed market chain for SHP in Tajikistan	% of the total SHP installed cost provided by locally made goods and services	5-10%	50% by the end of Year ~~3~~ 4
Output 2.1: Guidebook on technical and policy aspects of SHP project development (to be used in all trainings to be delivered by the project)	Guidebook on SHP project development	0	Guidebook on SHP project development prepared and disseminated by the end of Year 1
Output 2.2: Local workshops and manufacturers with enhanced capacities to install, construct, manufacture and repair SHP system equipment and components	Technology transfer and capacity development plan prepared for selected local manufacturers ~~Number of local SHP manufacturers capable of providing turn-key integrated RES solutions and O&M services~~	0 ~~0~~	2 technology transfer and capacity development plan prepared by the end of Year 1 ~~At least 2 by the end of Year 2~~
Output 2.3: Vocational training program for technicians involved in SHP design/construction and O&M	# of technicians annually undertaking vocational training on SHP	0	20 technicians annually undertaking vocational training on SHP starting from Year 2
~~Output 2.4: Local manufacturers capable of~~	~~# of local craft workshops capable of manufacturing and assemblage of simple~~	~~0~~	~~At least 5~~ 1 ~~local craft workshop~~s ~~by the end of Year 3~~

~~producing combined electric and biomass-fired heating and cooking devices for rural households~~	~~electric heating and cooking devices~~		
Outcome 3: Improved confidence on the technical and economic viability of integrated SHP-based rural development model	No. of SHP demos/pilots incorporating aspects of productive uses and livelihood support for host communities ~~Cumulative electricity generation from newly installed SHPs by EOP, MWh/yr~~ ~~Cumulative electricity generation from newly installed SHPs by EOPIP, MWh/yr~~	0 0 0	At least ~~10~~ 5 community-owned SHP projects operate on a sustainable basis and at least ~~17~~ 5 additional are under construction by the end of Year 4 ~~4,860~~ ~~13,118~~
Output 3.1: Technical studies, political commitments and institutional framework secured for pilot SHP projects	~~Update hydrological data~~ Feasibility studies No. of integrated district development plans (IDDPs) ~~No. of local entities capable to manage SHP plants~~ ~~No. of engineering designs and all permissions~~ No. of SHP projects in the pipe-line	0 0 0 0 0 0	~~Updated data for 2 sites by end of Year 1, 3 sites - by end of Year 2, 5 sites - by end of Year 3~~ FS for 2 sites by end of Year 1, 3 sites - by end of Year 2, 5 sites - by end of Year 3 IDDP for 2 districts by end of Year 1, 3 districts - by end of Year 2, 5 districts - by end of Year 3 ~~2 local entities by end of Year 1, 3 local entities - by end of Year 2, 5 locaL entities - by end of Year 3~~ ~~Designs ready and permissions secured for 2 projects by end of Year 1, for extra 3 projects - by end of Year 2, and for 5 more projects - by end of Year 3~~ At least ~~17~~ 5 further SHP projects identified and construction started (without direct

			project support)
Output 3.2: Operational SHP demos/pilots in selected communities , demonstrating the viability of the technology and O&M&M models	~~No. of commissioned demo/pilot SHP plants by EOP~~ No. of operational demo/pilot SHP plants by EOP ~~Average annual operating performance of operational demo/pilot SHP plants by EOP~~ ~~Capacity, kW~~ ~~Load factor, %~~ ~~Net annual electricity production, MWh/yr~~ ~~On-grid price, US$~~	0 0 0	~~10~~ ~~10~~ 5 ~~92~~ ~~60%~~ ~~486~~ ~~0.03~~
Output 3.3: Pilot SHP operations sustained	No. of PPAs signed for purchase of power from pilot SHP plants by EOP ~~No. of energy efficient appliances supplied and EE upgrades conducted~~ No. of local business supported in pilot localities ~~No. of integrated river-basin management plans developed and adopted by authorities~~	0 0 0 0	At least ~~200~~ 2 by the end of Year 3 ~~At least 200 EE appliances and 10 EE upgrades by end of Year 4~~ ~~100~~ 5 by the end of Year 4 ~~10~~
Outcome 4: National Scaling-up Programme of Renewable Energy-based Integrated Rural Development	Adopted and financed National Scaling-up Program	N/a	Adopted and financed National Scaling-up Program by the end of Year 4
Output 4.1: Project results assessed, analyzed and compiled into comprehensive national report	Project results and Lessons learned report ~~No. of recipients of lessons learned report by EOP~~ ~~Total GHG emission reductions achieved by EOP, ktCO2~~ ~~Total GHG emission reductions achieved by~~	N/a	Project results and Lessons Learned report prepared by end of Year 4 ~~300~~ ~~90~~ ~~244~~

	~~EOPIP, ktCO2~~		
Output 4.2: Conference on integrated renewable-energy based rural development organized	Conference on integrated renewable-energy based rural development	N/a	Conference on integrated renewable-energy based rural development organized by the end of Year 4
Output 4.3 Approved and funded proposal for national scaling up of the SHP demos/pilots	Annual amount of governmental incentives allocated to support investment in new SHP plants under the scale-up plan by EOP, US$	N/a	3,500,000 US$

Annex 3: List of persons interviewed

UNDP:

Ms. Sanja Bojanic, Deputy Country Director UNDP

Mr.Jamshed Vazirov - Kodirkulov, Project Manager

Ms. Nargizakhon Usmanova, UNDP Programme Analyst

Mr. Khurshed Kholov, EEP Programme Manager

Ms. Violetta Strizhakova, RES Engineer

Mr. Paata Janelidze, CTA (skype call)

Tajiktekstilmash

Mr. Saburov Mazdak, General Director,

Mr. Parviz Madaminov, Project Manager on turbines manufacturing

Energoremont

Ms. Roza Khoshmukhamedova, General Director

Mr. Shodmon Khushov, Executive Director

Safedob SHP

Mr. Kholmurod Shomurodov, director of LLC „Expert Sanoat“, construction company

Mr. Sirojiddin Amonov, Chairperson of Safedob jamoat (municipality)

Local SHPP operators (5 persons)

Representatives of the local community

Tajik Technical University

Mr. Abdukarim Yakubovich, Head of the Electrical Department

Mr. Mamadamon Abdulloev, Vice-Rector for Science and International Relations

Ms. Gulnara Anvarova, Head of Center for Staff Professional Developmnet and Retraining

Association of Energy Professionals

Ms. Rafika Musaeva, Chairperson of the Association

Tajik Norwegian Center for Sustainable Development

Mr. Farukh Sultanov, Director

Ministry of Energy and Water Resources

Mr. Jamshed Shoimzoda, Deputy Minister

Mr. Vays Tilloev, Head of the RES Department

Mr. Furugzod Usmanov, Consultant

Khijborak SHP

Mr. Isuf, Director of LLC „Khurosonobsokhtmon“, construction company

Mr. Akram Rofiev, Deputy chairperson of Khijborak jamoat (municipality)

Local SHPP operators (5 persons)

Representatives of the local community

Pinyon SHP

Mr. Nasibullo Rajabov, field engineer of LLC „Sorbon-2005“, construction company

Representatives of the local distribution network system of Barki Tojik (3 people)

Representatives of the local SHPP operators (3 persons)

Representatives of the local community (4 people)

Jilikul SHPP

Mr. Nurov Fatkhiddin, director of LLC „Expert Sanoat“, construction company

Mr. Saidov Nurmahmad, First Deputy Chairperson of Jilikul (Dusti) district

Local operators (2 persons)

Representatives of the local community

National Center for RE and EE

Mr. Umarkhon Madvaliev, President of the Assocaition of RE and EE, Systemavtomatika

Annex 4: List of documents reviewed

General documentation

- UNDP Programme and Operations Policies and Procedures
- Project-Level Evaluation, Guidance for Conducting Terminal Evaluations of UNDP-Supported, GEF-Financed Projects, UNDP, 2012
- GEF Monitoring and Evaluation Policy
- GEF Guidelines for Conducting Terminal Evaluations
- GEF focal area strategic program objectives
- UNDP Development Assistance Framework
- UNDP Country Program Document
- UNDP Country Program Action Plan

Project documentation

- Project Identification Form
- Project Document
- Inception Report
- Annual and Quarterly Work Plans
- Annual and Quarterly Project Reviews/Progress Reports
- Project Implementation Review reports
- Project risk log
- Financial reports – Combined Delivery Reports
- GEF Operational Quarterly Reports
- Combined Delivery Reports
- Project Board/Steering Committee Meeting minutes
- Mid-Term Evaluation Report
- Management response to MTE

Other relevant documents

- Co-financing letters
- Minutes from Steering Committee meetings
- Feasibility studies of selected SHP plants

Annex 5: Evaluation Consultant Code of Conduct and Agreement Form

Evaluators:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System

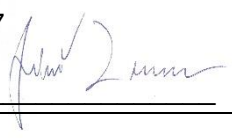
Name of Consultant: Jiří Zeman

Name of Consultancy Organization (where relevant)**:** _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at *Prague* on October 15, 2017

Signature: _____



Annex 6: Terminal Evaluation Questions/Matrix

Evaluative Criteria Questions	Indicators	Sources	Methodology
Relevance: How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, regional and national levels?			
• How well does the project align with evolving GEF focal area priorities through GEF 4 5 and 6?	• Extent to which UNFCCC and related GEF priorities and areas of work incorporated	• Project documents • National policies and strategies to implement the UNFCCC, or related to energy more generally. • Project partners • Project beneficiaries	•
• How well does the project support the National Climate Change Strategy? Are there linkages with other strategic documents, such as National Development Strategy, INDCs?	• Degree to which the project supports national environmental objectives		
• Is the project aligned with other donor and Government programmes and projects? Is the project country driven?	• Degree of coherence between the project and nationals priorities, policies and strategies		
• Does the project adequately take into account the national realities, both in terms of institutional and policy frameworks in its design and implementation?	• Adequacy of project design and implementation to national realities and existing capacities		
• Have implementation strategies been appropriate (is the logframe logical and complete)?	• Degree to which the project supports objectives of Government energy strategies		
• Was the project responsive to threats and opportunities that emerged during the course of the project?	• Level of adaptive management related to emerging trends		
• Did the project address the needs of target beneficiaries and other stakeholders? Was it inclusive? Were beneficiaries and other stakeholders effectively engaged in implementation?	• Degree to which the project supports local aspirations • Degree to which the project meets stakeholder expectations •		
• Has the experience of the project provided relevant lessons for other future projects targeted at similar objectives?	• Extent to which of lessons learned relating to all facets of the project are documented		

Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?			
• How well has the project performed against its indicators and targets?	• Extent to which milestones and targets are achieved as laid out in the logframe and monitoring plan	• Project reports • Minutes of Project and Steering Committee Meetings • Local partners and beneficiaries • Project risks log	•
• Which have been the key factors leading to project achievements?	• Achievement of milestones and targets as laid out in the logframe and monitoring plan		
• To what extent can observed results be attributed to the project or not (enabling environment for SHPV, level of uptake of SHP, etc.)? In this respect have there been notable changes in the enabling environment for the project?	• Extent of change to the enabling environment		
• Has the project failed in any respect? What changes could have been made (if any) to the design or implementation of the project in order to improve the achievement of the expected results?	• Evidence of adaptive management and/or early application of lessons learned		
• How has the project contributed to raising capacity of local stakeholders to address aims of the project or of Government?	• Extent of support from local stakeholders		
• What are the views of stakeholders on the implementation and activities of the project? Are there activities missing from the implementation?	• Extent to which stakeholders are actively participating in the project or • Extent to which beneficiaries were engaged in implementation and monitoring of the project		
• How well were risks, assumptions and impact drivers managed? What was the quality of risk mitigation strategies developed? Were these sufficient? Are there clear strategies for risk mitigation related to long-term sustainability of the project?	• Extent to which project has responded to identified and emerging risks (particularly risks of low participation due to perceived needs for immediate action rather than planning) • Level of attention paid to up-dating risks log		
Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards?			
• Financial efficiency: • Were the accounting and financial systems in place adequate for project management and producing accurate and timely financial information?	• Extent to which funds have been converted into outcomes as per the expectations of the ProDoc	• Project financial records • Project audit reports	•

• Have funds been available and transferred efficiently (from donor to project to contractors) to address the project purpose, outputs and planned activities? • Were funds used correctly – explain any over- or under-expenditures? • Were financial resources utilized efficiently (converted into outcomes)? Could financial resources have been used more efficiently? • Were issues raised in audit reports and how efficiently were they addressed? • Was project implementation as cost effective as originally proposed (planned vs. actual) • Did the leveraging of funds (co-financing) happen as planned?	• Level of transparency in the use of funds • Level of satisfaction of partners and beneficiaries in the use of funds • Timely delivery of funds, mitigation of bottlenecks. • Coordination and synergies of project funds and co-financing	• Project work plans and reports	
• Implementation efficiency (including monitoring): • Was the project implemented as planned, including the proportion of activities in work plans implemented? • Has monitoring data been collected as planned, analyzed and used to inform project planning? • Has project implementation been responsive to issues arising (e.g. from monitoring or from interactions with stakeholders)? • What learning processes have been put in place and who has benefitted (e.g. training, exchanges with related projects, overseas study visits) and how has this influenced project outcomes? • Were progress reports produced accurately and timely, and did they respond to reporting requirements including adaptive management changes? • Did the project experience any capacity gaps (e.g. staffing gaps)? • Has internal and external communication been effective and efficient? • How efficiently have resources and back-up been provided by donors, including quality assurance by UNDP?	• Extent to which project activities were conducted on time • Extent to which project delivery matched the expectation of the ProDoc and the expectations of partners • Level of satisfaction expressed by partners in the responsiveness (adaptive management) of the project • Level of satisfaction expressed by project team in regard to UNDP back-stopping	• Project work plans and reports • Local partners	•
• Efficiency of partnership arrangements for the project • To what extent were partnerships/linkages between institutions/ organizations/private sector encouraged and supported? • Which partnerships/linkages were facilitated? Which ones can be considered sustainable? • What was the level of efficiency of cooperation and collaboration arrangements? • Which methods were successful or not and why?	• Extent to which project partners committed time and resources to the project • Extent of commitment of partners to take over project activities	• Project work plans and reports • Local partners	•

Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?			
• Is the social, legal and political environment conducive to sustainability?	• Extent of supportive policies	• Steering Committee minutes • Local partners and beneficiaries	•
• Are there early signs of activities being taken up by project partners, and plans being developed to sustain them?	• Extent to which partners are considering post-project actions		
• Have partners and stakeholders successfully enhanced their capacities and do they have the required resources to make use of these capacities?	• Extent to which partners and stakeholders are applying new ideas outside of the immediate project context		
• Does the project have a clear exit strategy or transformational strategy?	• Intent to follow-up on the project (on the part of Government and stakeholders) • To what extent has the exit strategy been implemented		
Impact: Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and/or improved ecological status?			
• What impact has the project had on policy, legal and institutional frameworks relating to uptake of renewable energy?	• Evidence of uptake of new technologies • Extent to which national strategic planning supports project interventions	• Project reports • Minutes of Steering Committee meetings • Local partners and beneficiaries	•
• What impacts has the project had or is it likely to have on people in the project area in terms of cost-savings, income generating opportunities, etc.?	• Level of satisfaction of project interventions expressed by beneficiaries		
• Has the project had any impact on gender equality and economic empowerment for women and other marginalized groups? Was it intended to?	• Evidence of gender equity in project interventions such as trainings, installed SHP systems and rebates.		
• What lessons can be learned from the project regarding efficiency? Could the project have more efficiently carried out implementation (in terms of management structures and procedures, partnerships arrangements etc.)?	• Level of satisfaction in project implementation arrangements • Suggestions put forward by partners for possible improvement		

Annex 8: Terminal evaluation TOR

TERMS OF REFERENCE

TERMINAL EVALUATION TERMS OF REFERENCE

INTRODUCTION

In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a terminal evaluation upon completion of implementation. These terms of reference (TOR) sets out the expectations for a Terminal Evaluation (TE) of the *"Technology transfer and market development for SHP (small-scale hydropower) in Tajikistan" project* (PIMS #4324.)

The essentials of the project to be evaluated are as follows:

PROJECT SUMMARY TABLE

Project Title:	Technology transfer and market development for SHP in Tajikistan			
GEF Project ID:	4324		*at endorsement (Million US$)*	*at completion (Million US$)*
UNDP Project ID:	77414	GEF financing:	2.025	2.025
Country:	Tajikistan	IA/EA own:	1.33	1.33
Region:	RBEC	Government:	1.5	6
Focal Area:	Climate Change	Other:	3.67	3.7
FA Objectives, (OP/SP):	CC-SP3-RE (GEF-4)	Total co-financing:	6.5	11.030
Executing Agency:	UNDP	Total Project Cost:	8.525	13.055
Other Partners involved:	Ministry of Energy and Water Resources	ProDoc Signature (date project began):		1 Apr 2012
		(Operational) Closing Date:	Proposed: Apr 2016	Actual: Dec 2017

OBJECTIVE AND SCOPE

The project was designed to: significantly accelerate the development of SHP by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs. The project aims to do this by introducing a regulatory framework to supply the grid with electricity

generated SHP through sustainable delivery models and financing mechanisms and assist the Government in attracting funding for SHP investments.

The GEF financed, UNDP implemented "Technology transfer and market development for SHP in Tajikistan" is a four-year[15] project implemented directly by UNDP's Energy and Environment Programme. The responsible national partner for the execution of the project is the Ministry of Energy and Water Resources of the Republic of Tajikistan. The project has a GEF budget of USD 2,000,000 and UNDP's co-financing commitments of USD 1,330,000, and the potential co-financing commitments from the Government, private sector and other UNDP projects (including in-kind contribution) is USD 5,120,000. The Project Document was signed between the Ministry of Energy and Industry (currently the Ministry of Energy and Water Resources) of the Republic of Tajikistan and UNDP Country Office on 19 March 2012.

The aim of the project is to initiate UNDP Tajikistan's strategy – the scaling up of pilot activities for the acceleration of progress towards the achievement of MDGs with a particular focus on improving access to renewable energy in rural regions for the purpose of poverty reduction and triggering economic development. Its conceptualization falls within the frame of the Poverty Reduction Strategy III and National Development Strategy, which have been recognized to have no focus on promoting use of abundant renewable potential for poverty reduction, development and building environmental resilience.

The TE will be conducted according to the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects.

The objectives of the evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming.

EVALUATION APPROACH AND METHOD

An overall approach and method[16] for conducting project terminal evaluations of UNDP supported GEF financed projects has developed over time. The evaluator is expected to frame the evaluation effort using the criteria of **relevance, effectiveness, efficiency, sustainability, and impact,** as defined and explained in the UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects. A set of questions covering each of these criteria have been drafted and are included with this TOR (*Annex C)* The evaluator is expected to amend, complete and submit this matrix as part of an evaluation inception report, and shall include it as an annex to the final report.

The evaluation must provide evidence-based information that is credible, reliable and useful. The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the GEF Operational Focal Point, UNDP Country Office, project team, UNDP GEF Technical Adviser based in the region and key stakeholders. The evaluator(s) is expected to conduct a field mission to Dushanbe, Tajikistan, including the project sites in Ayni, Dusti, Garm and Shohin districts. Interviews will be held with the following organizations and individuals at a minimum: Ministry of Energy and Water Resources (former Ministry of Energy and Industry); Tajik Technical University; Association of

[15] The project was extended for additional 20 months. The new closing date is 31 December 2017.
[16] For additional information on methods, see the Handbook on Planning, Monitoring and Evaluating for Development Results, Chapter 7, pg. 163

Energy Professionals; CJSC "Energoremont"; SUE "Korgohi Mashinasozi"; Tajik-Norwegian Center for Sustainable Development; sHPP operators; local authorities and community leaders.

The evaluation team will review all relevant sources of information, such as the project document, project reports – including Annual APR/PIR, project budget revisions, midterm review, progress reports, GEF focal area tracking tools, project files, national strategic and legal documents, and any other materials that the evaluator considers useful for this evidence-based assessment. A list of documents that the project team will provide to the evaluation team for review is included in Annex B of this Terms of Reference.

EVALUATION CRITERIA & RATINGS

An assessment of project performance will be carried out, based against expectations set out in the Project Logical Framework/Results Framework (see Annex A), which provides performance and impact indicators for project implementation along with their corresponding means of verification. The evaluation will at a minimum cover the criteria of: **relevance, effectiveness, efficiency, sustainability and impact.** Ratings must be provided on the following performance criteria. The completed table must be included in the evaluation executive summary. The obligatory rating scales are included in Annex D.

Evaluation Ratings:			
1. Monitoring and Evaluation	***rating***	**2. IA and EA Execution**	***rating***
M&E design at entry		Quality of UNDP Implementation	
M&E Plan Implementation		Quality of Execution - Executing Agency	
Overall quality of M&E		Overall quality of Implementation / Execution	
3. Assessment of Outcomes	**rating**	**4. Sustainability**	**rating**
Relevance		Financial resources	
Effectiveness		Socio-political	
Efficiency		Institutional framework and governance	
Overall Project Outcome Rating		Environmental	
		Overall likelihood of sustainability	

PROJECT FINANCE / COFINANCE

The evaluation will assess the key financial aspects of the project, including the extent of co-financing planned and realized. Project cost and funding data will be required, including annual expenditures. Variances between planned and actual expenditures will need to be assessed and explained. Results from recent financial audits, as available, should be taken into consideration. The evaluator(s) will receive assistance from the Country Office (CO) and Project Team to obtain financial data in order to complete the co-financing table below, which will be included in the terminal evaluation report.

Co-financing (type/source)	UNDP own financing (mill. US$)	Government (mill. US$)	Partner Agency (mill. US$)	Total (mill. US$)

	Planned	Actual	Planned	Actual	Planned	Actual	Actual	Actual
Grants								
Loans/Concessions								
• In-kind support								
• Other								
Totals								

MAINSTREAMING

UNDP supported GEF financed projects are key components in UNDP country programming, as well as regional and global programmes. The evaluation will assess the extent to which the project was successfully mainstreamed with other UNDP priorities, including poverty alleviation, improved governance, the prevention and recovery from natural disasters, and gender.

IMPACT

The evaluator will assess the extent to which the project is achieving impacts or progressing towards the achievement of impacts. Key findings that should be brought out in the evaluations include whether the project has demonstrated: a) verifiable improvements in ecological status, b) verifiable reductions in stress on ecological systems, and/or c) demonstrated progress towards these impact achievements.[17]

CONCLUSIONS, RECOMMENDATIONS & LESSONS

The evaluation report must include a chapter providing a set of **conclusions**, **recommendations** and **lessons**.

IMPLEMENTATION ARRANGEMENTS

The principal responsibility for managing this evaluation resides with the UNDP CO in *Tajikistan.* The UNDP CO will contract the evaluator and ensure the timely provision of per diems and travel arrangements within the country for the evaluation team. The Project Team will be responsible for liaising with the evaluation team to set up stakeholder interviews, arrange field visits, coordinate with the Government etc.

EVALUATION TIMEFRAME

The total duration of the evaluation will be *20* days according to the following plan:

Activity	Timing	Completion Date
Preparation	*2* days	*5 July 2017*
Evaluation Mission	*7* days	*1 August 2017*
Draft Evaluation Report	9 days	*25 August 2017*
Final Report	*2* days	*14 September 2017*

[17] A useful tool for gauging progress to impact is the Review of Outcomes to Impacts (ROtI) method developed by the GEF Evaluation Office: ROTI Handbook 2009

EVALUATION DELIVERABLES

The evaluation team is expected to deliver the following:

Deliverable	Content	Timing	Responsibilities
Inception Report	Evaluator provides clarifications on timing and method	No later than 2 weeks before the evaluation mission.	Evaluator submits to UNDP CO
Presentation	Initial Findings	End of evaluation mission	To project management, UNDP CO
Draft Final Report	Full report, (per annexed template) with annexes	Within 3 weeks of the evaluation mission	Sent to CO, reviewed by RTA, PCU, GEF OFPs
Final Report*	Revised report	Within 1 week of receiving UNDP comments on draft	Sent to CO for uploading to UNDP ERC.

*When submitting the final evaluation report, the evaluator is required also to provide an 'audit trail', detailing how all received comments have (and have not) been addressed in the final evaluation report.

TEAM COMPOSITION

The evaluation team will be composed of *(1 international evaluator and 1 national evaluator).* The consultants shall have prior experience in evaluating similar projects. Experience with GEF financed projects is an advantage. *The international evaluator is designated team leader and is responsible for finalizing the report.* The evaluators selected should not have participated in the project preparation and/or implementation and should not have conflict of interest with project related activities.

The evaluation team member must present the following qualifications:

I. **Academic Qualifications:**

- Advanced post-graduate university degree (Masters and/or PhD) in Renewable Energy Sources Management, Natural Resource Management, Environmental Economics, Physics or other related areas

II. **Years of experience:**

- At least 10 years of professional experience for international evaluator and 7 years for national evaluator in providing management or consultancy services to the renewable energy and energy efficiency projects, preferably with components on small hydropower plants development;
- Professional experience in monitoring and / or evaluating of GEF-financed projects for UN or other international development agencies (at least in one project);

III. **Functional competencies**:

- Knowledge and experience with programming development, monitoring and evaluation;
- Consistently approaches work with energy and a positive, constructive attitude;
- Demonstrates openness to change, flexibility, and ability to manage complexities;

- Ability to work under pressure and with multi-disciplinary and multicultural teams and possess excellent inter-personal skills;
- Demonstrates strong written and oral communication skills;
- Remains calm, in control, and good humoured even under pressure;
- Proven networking, team-building, organizational and communication skills;
- Recognized expertise in the renewable energy and energy efficiency and excellent understanding of climate change issues;
- Familiarity with renewable energy and energy efficiency in CIS is an asset;

IV. **Corporate Competencies:**

- Demonstrates integrity by modeling the UN's values and ethical standard;
- Promotes the vision, mission, and strategic goals of the UN;
- Displays cultural, gender, religion, race, nationality, and age sensitivity and adaptability;
- Treats all people fairly without favoritism;

V. **Languages:**

- Fluency in English is required;
- Fluency in Russian will be considered an asset.

EVALUATOR ETHICS

Evaluation consultants will be held to the highest ethical standards and are required to sign a Code of Conduct (Annex E) upon acceptance of the assignment. UNDP evaluations are conducted in accordance with the principles outlined in the UNEG 'Ethical Guidelines for Evaluations'

PAYMENT MODALITIES AND SPECIFICATIONS

%	Milestone
10%	At contract signing
40%	Following submission and approval of the 1st draft terminal evaluation report
50%	Following submission and approval (by UNDP-CO and UNDP Regional Technical Advisor) of the final terminal evaluation report

ANNEX A: PROJECT LOGICAL FRAMEWORK[18]

This project will contribute to achieving the following Country Programme Outcome as defined in CPD: Outcome 6: Improved environmental protection, sustainable natural resources management, and increased access to alternative renewable energy.
Country Programme Outcome Indicators: **Key Indicator (1):** Number of alternative renewable technologies demonstrated.
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): Mainstreaming Environment and Energy
Applicable GEF Strategic Objective and Program: To promote on-grid renewable energy - CC-SP3-RE
Applicable GEF Expected Outcomes: Total avoided GHG emissions from hydropower generation.
Applicable GEF Outcome Indicators: Avoided GHG emissions from hydropower generation (tons CO_2/kWh); and \$/t CO_2.

Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
Goal: Reduction of GHG emissions from energy use by rural and remote communities	Avoided GHG emissions from rural communities' energy use by end of project (EOP), ktCO2 Avoided GHG emissions from rural communities' energy use by end of project influence period, 10 years (EOPIP), ktCO2	0 0	45 ktCO2 244 ktCO2	Project Annual reports; GHG emissions monitoring and verification reports, final evaluation	The target for sHPPs was scaled back during the Inception Phase from 27 to 10 sHPPs to the current number of 7 SHPPs based on anticipated delays in building local manufacturing capacity. This scale-back has had the impact of reducing the achievable direct GHG emission reduction targets: • Cumulative direct

[18] The logical framework has been updated in 2015 as a result of the Mid-term evaluation

Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
					GHG reductions to end-of-project (EOP) of less than 2,000 tonnes CO_2 (based on current plans for developing 7 sHPPs plus the completion of 5 sHPPs developed and financed by the GoT) in comparison to the cumulative EOP target of 45,000 tonnes CO_2; and Lifetime direct GHG reductions (assuming a 30-yr lifetime of the aforementioned sHPPs) of 59,910 tonnes CO_2 in comparison to the lifetime direct target of 244,000 tonnes CO_2
Objective: Significantly accelerate the development of small-scale hydropower (SHP) by removing barriers through enabling legal and	• No. of new small hydropower projects under implementation by EOP • Minimum No. of fully operational SHPs by EOP • Annual electricity generation	• 1 • 0[19]	• 10[20] • 5	Individual SHP project reports, Performance reports of operational SHPs; Project's annual reports, GHG	Continued commitment of project partners, including Government agencies and investors/developers

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

[20] The projects are in various stages of development (assessment , feasibility, construction, operation). The target was revised as a result of the mid-term evaluation in 2015. The overall numbers of the sHPPs have been scaled down from 10 sHPPs to current 7 sHPPs.

Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs.	from newly installed sHPPs by EOP, MWh/yr Cumulative electricity generation from newly installed SHPs by EOPIP, MWh	• 0 • 0	• 2,430 • 6,500	monitoring and verification reports. Project final evaluation report.	
Outcomes					
Outcome 1: Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country.	• Adopted regulation operationalizing RES Law	No regulations in support of RES Law	Rules and regulations adopted by end of Year 1	Published documents. Government decrees/laws. Project progress reports	Commitment of the various Government institutions to adopt and capacities to enforce required bylaws are in place; Low turn-over of trained government staff
Output 1.1: Formulated, approved and enforced implementing rules and regulations (IRRs) of the new Law for RES that will facilitate actions geared towards the enhancement of the market environment for SHP	• Simplified procedures and principles for the licensing and construction of SHP facilities • • National RE/EE Fund •	• RES Law includes a number of provisions to facilitate inve	• Procedures adopted by end of Year 1 • • • National RE/EE Fund set-up and is operational by end of Year 2	• Published IRRs • Project report documenting the status of IRRs enforcement • Project report on the status of operations of RE and EE Fund • Same as above	Commitment of the various Government institutions to adopt and capacities to enforce required bylaws are in place

Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
		stment in grid-connected RE projects, but they are not operationalized	•	• Same as above	
Output 1.2: Central and local government institutions with enhanced capacities to develop and coordinate SHP projects.	• # staff members from relevant central and local government institutions trained in developing and coordinating SHP projects	• 0	• 30 staff members trained by the end of Year 2	• Training reports •	Low turn-over of trained central and municipal staff is ensured
Outcome 2: Enhanced technical and planning know-how and developed market chain for SHP in Tajikistan	• % of the total SHP installed cost provided by locally made goods and services	• 5-10%	• 50% by the end of Year 4	• Project report on SHP market chain development	Potential market chain actors are interested in SHP projects Demand for SHP is on the rise as a result of establishing favorable

Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
					policy framework
Output 2.1: Guidebook on technical and policy aspects of SHP project development (to be used in all trainings to be delivered by the project)	• Guidebook on SHP project development	• 0	• Guidebook on SHP project development prepared and disseminated by the end of Year 1	• Published capacity needs assessment • Training reports • Same as above • Same as above • Same as above	• Commitment of partners to release staff for training program is in place • Commitment of universities and technical school to introduce new curricula is in place
Output 2.2: Local workshops and manufacturers with enhanced capacities to install, construct, manufacture and repair SHP system equipment and components	• Technology transfer and capacity development plan prepared for selected local manufacturers •	• 0 • 0	• 2 technology transfer and capacity development plan prepared by the end of Year 1	• Project report on SHP market chain development	• Interest of potential SHP market chain actors in provided capacity building and technology transfer is insured
Output 2.3: Vocational training program for technicians involved in	• # of technicians annually undertaking vocational training on SHP	• 0	• 20 technicians annually undertaking	• Training report	• Interest of local education institutions

Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
SHP design/construction and O&M			vocational training on SHP starting from Year 2		
Outcome 3: Improved confidence on the technical and economic viability of integrated SHP-based rural development model	• No. of SHP demos/pilots incorporating aspects of productive uses and livelihood support for host communities •	• 0 • •	• At least 5 community-owned SHP projects operate on a sustainable basis and at least 5 additional are under construction by the end of Year 4 •	Reports on pilot SHPs operations	Availability of local people with sufficient technical education and managerial experience Participation of local level government
Output 3.1: Technical studies, political commitments and institutional framework secured for pilot SHP projects	• Feasibility studies • No. of integrated district	• 0	• FS for 2 sites by end of Year 1, 3 sites - by end of Year 2, 5 sites - by	Report on implementation of pilot SHP projects Integrated District Development Plans	Same as above

Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
	development plans (IDDPs) • No. of SHP projects in the pipe-line	• 0 • 0	end of Year 3 • IDDP for 2 districts by end of Year 2, 3 districts - by end of Year 3 • • At least 5 further SHP projects identified and construction started (without direct project support)		
Output 3.2: Operational SHP demos/pilots in selected communities , demonstrating the viability of the technology and O&M&M models	• • No. of operational demo/pilot SHP plants by EOP ○	• 0	• 5	Report on implementation of pilot SHP projects	Same as above

Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
Output 3.3: Pilot SHP operations sustained	• No. of PPAs signed for purchase of power from pilot SHP plants by EOP • No. of local business supported in pilot localities	• 0 • 0	• At least 2 by the end of Year 3 • 5 by the end of Year 4	Report on implementation of pilot SHP projects	Same as above
Outcome 4: National Scaling-up Programme of Renewable Energy-based Integrated Rural Development	• Adopted and financed National Scaling-up Program	N/a	• Adopted and financed National Scaling-up Program by the end of Year 4	• Officially approved and published national scaling up plan	• Data on project impacts and results properly documented and made available to consultants
Output 4.1: Project results assessed, analyzed and compiled into comprehensive national report	• Project results and Lessons learned report •	• N/a	• Project results and Lessons learned report prepared	• Project results and Lessons learned report • Project report on	Data on project impacts and results properly documented and made available to consultants

Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
			by end of Year 4	GHG emission reduction monitoring	
Output 4.2: Conference on integrated renewable-energy based rural development organized	• Conference on integrated renewable-energy based rural development	• N/a	• Conference on integrated renewable-energy based rural development organized by the end of Year 4	• Conference report	Data on project impacts and results properly documented and made available to consultants
Output 4.3 Approved and funded proposal for national scaling up of the SHP demos/pilots	• Annual amount of governmental incentives allocated to support investment in new SHP plants under the scale-up plan by EOP, US$	• N/a	• 3,500,000 US$	• Officially approved and published national scaling up plan	Government commitment to promote SHP development and utilization is sustained

ANNEX B: LIST OF DOCUMENTS TO BE REVIEWED BY THE EVALUATORS

Document	***Description***
Project document	*Project Document*
Project reports	*Inception Report;* *Mid-Term Review;* *Project Implementation Reports (PIRs);* *Steering committee meeting minutes;* *Annual work plans;* *Annual financial reports;* *Audit result;* *Relevant tracking tools*
Annual Project Report to GEF	*PIR 2013, PIR 2014, PIR 2015, PIR 2016*
Other relevant materials:	*Maps, reports of the national and international consultants as relevant, project key document outputs, brochures and other materials*

ANNEX C: EVALUATION QUESTIONS

This is a generic list, to be further detailed with more specific questions by CO and UNDP GEF Technical Adviser based on the particulars of the project.

Evaluative Criteria Questions	Indicators	Sources	Methodology
Relevance: How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, regional and national levels?			
•	•	•	•
•	•	•	•
•	•	•	•
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?			
•	•	•	•
•	•	•	•
•		•	•
Efficiency: Was the project implemented efficiently, in-line with international and national norms and standards?			
•	•	•	•
•	•	•	•
•	•	•	•
Sustainability: To what extent are there financial, institutional, social-economic, and/or environmental risks to sustaining long-term project results?			
•	•	•	•
•	•	•	•
•	•	•	•
Impact: Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and/or improved ecological status?			

•	•	•	•
•	•	•	•

ANNEX D: RATING SCALES

Ratings for Outcomes, Effectiveness, Efficiency, M&E, I&E Execution	***Sustainability ratings:***	***Relevance ratings***
6: Highly Satisfactory (HS): no shortcomings 5: Satisfactory (S): minor shortcomings 4: Moderately Satisfactory (MS) 3. Moderately Unsatisfactory (MU): significant shortcomings 2. Unsatisfactory (U): major problems 1. Highly Unsatisfactory (HU): severe problems	4. Likely (L): negligible risks to sustainability 3. Moderately Likely (ML):moderate risks 2. Moderately Unlikely (MU): significant risks 1. Unlikely (U): severe risks	2. Relevant (R) 1.. Not relevant (NR) ***Impact Ratings:*** 3. Significant (S) 2. Minimal (M) 1. Negligible (N)
Additional ratings where relevant: Not Applicable (N/A) Unable to Assess (U/A		

ANNEX E: EVALUATION CONSULTANT CODE OF CONDUCT AND AGREEMENT FORM

Evaluators:

8. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
9. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
10. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence, and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals, and must balance an evaluation of management functions with this general principle.
11. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
12. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
13. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings and recommendations.
14. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.

Evaluation Consultant Agreement Form[21]

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Consultant: Jiří Zeman

Name of Consultancy Organization (where relevant)**:** _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at *Prague* on September 7, 2017

Signature: _____

[21] www.unevaluation.org/unegcodeofconduct

ANNEX F: EVALUATION REPORT OUTLINE[22]

i. Opening page:
- Title of UNDP supported GEF financed project
- UNDP and GEF project ID#s.
- Evaluation time frame and date of evaluation report
- Region and countries included in the project
- GEF Operational Program/Strategic Program
- Implementing Partner and other project partners
- Evaluation team members
- Acknowledgements

ii. Executive Summary
- Project Summary Table
- Project Description (brief)
- Evaluation Rating Table
- Summary of conclusions, recommendations and lessons

iii. Acronyms and Abbreviations
(See: UNDP Editorial Manual[23])

1. Introduction
- Purpose of the evaluation
- Scope & Methodology
- Structure of the evaluation report

2. Project description and development context
- Project start and duration
- Problems that the project sought to address
- Immediate and development objectives of the project
- Baseline Indicators established
- Main stakeholders
- Expected Results

3. Findings
(In addition to a descriptive assessment, all criteria marked with (*) must be rated[24])

3.1 Project Design / Formulation
- Analysis of LFA/Results Framework (Project logic /strategy; Indicators)
- Assumptions and Risks
- Lessons from other relevant projects (e.g., same focal area) incorporated into project design
- Planned stakeholder participation
- Replication approach
- UNDP comparative advantage
- Linkages between project and other interventions within the sector
- Management arrangements

3.2 Project Implementation
- Adaptive management (changes to the project design and project outputs during implementation)
- Partnership arrangements (with relevant stakeholders involved in the country/region)
- Feedback from M&E activities used for adaptive management

[22]The Report length should not exceed *40* pages in total (not including annexes).
[23] UNDP Style Manual, Office of Communications, Partnerships Bureau, updated November 2008
[24] Using a six-point rating scale: 6: Highly Satisfactory, 5: Satisfactory, 4: Marginally Satisfactory, 3: Marginally Unsatisfactory, 2: Unsatisfactory and 1: Highly Unsatisfactory, see section 3.5, page 37 for ratings explanations.

- Project Finance:
- Monitoring and evaluation: design at entry and implementation (*)
- UNDP and Implementing Partner implementation / execution (*) coordination, and operational issues

3.3 Project Results

- Overall results (attainment of objectives) (*)
- Relevance(*)
- Effectiveness & Efficiency (*)
- Country ownership
- Mainstreaming
- Sustainability (*)
- Impact

4. Conclusions, Recommendations & Lessons

- Corrective actions for the design, implementation, monitoring and evaluation of the project
- Actions to follow up or reinforce initial benefits from the project
- Proposals for future directions underlining main objectives
- Best and worst practices in addressing issues relating to relevance, performance and success

5. Annexes

- ToR
- Itinerary
- List of persons interviewed
- Summary of field visits
- List of documents reviewed
- Evaluation Question Matrix
- Questionnaire used and summary of results
- Evaluation Consultant Agreement Form

ANNEX G: EVALUATION REPORT CLEARANCE FORM

(to be completed by CO and UNDP GEF Technical Adviser based in the region and included in the final document)

Evaluation Report Reviewed and Cleared by
UNDP Country Office
Name: _____
Signature: _____ Date: _____
UNDP GEF RTA
Name: _____
Signature: _____ Date: _____