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## **United Nations Development Programme**

### **Government of Turkey**

# **Mid-Term Review of UNDP/GEF Project: Sustainable Energy Financing Mechanism for Solar PV in Forest Villages in Turkey (ORKÖY-PV Project)**

(GEF Project ID: 5098; UNDP PIMS ID: 5323)

## **Final Report**

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**July 2019**

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## SYNOPSIS

**Title of UNDP supported GEF financed project:** Sustainable Energy Financing Mechanism for Solar PV in Forest Villages in Turkey (ORKÖY-PV Project)

**UNDP Project ID:** PIMS 5323

**GEF Project ID:** 5098

**Evaluation time frame:** March 2016 to May 2019

**CEO endorsement date:** 17 December 2015

**Project implementation start date:** 23 August 2016

**Project operational closure:** 1 September 2020

**Date of evaluation report:** 18 July 2019

**Region and Countries included in the project:** Turkey

**GEF Focal Area Objective:** Climate Change Focal Area Objective #3 (for GEF-5): Promoting Investments in Renewable Energy Technology

**Implementing partner and other strategic partners:** Implementing entity: Ministry of Agriculture and Forestry (MoAF), General Directorate of Forestry (OGM), Forest Village Relations Department (ORKÖY)

**Mid-Term Review team members:** Mr. Roland Wong, International Consultant  
Mr. Egbert Liese, International Strategy Revision Consultant

### Acknowledgements:

The Mid-Term Reviewers wish to acknowledge with gratitude the time and effort expended by all Project participants and stakeholders during the course of the ORKÖY-PV Mid-Term Review. In particular, we wish to thank UNDP Turkey, the Forest Village Relations Department (under the General Directorate of Forestry or OGM and the Ministry of Forestry and Agriculture), GUNDER and other key Project personnel for making the efforts to recall details of their time while on the project. In particular, we wish to thank Mr. Nuri Ozbagdatli, Mr Bahtiyar Kurt, Mr. Murat Morel, Ms. Naz Ozguc and Mr. Necmettin Tokur of UNDP Turkey for being generous with their time to provide their passionate opinions on the potential impact of this Project, as well as your hospitality and insights. We sincerely hope that this report contributes towards a greener and lower carbon future for Turkey.

## EXECUTIVE SUMMARY

This report summarizes the findings of the Midterm Review Mission conducted during the 9-20 May 2019 period for the UNDP-GEF Project entitled: “Sustainable Energy Financing Mechanism for Solar PV in Forest Villages in Turkey” (hereby referred to as the ORKÖY-PV Project or the Project), that received a US\$ 3.78 million grant from the Global Environment Facility (GEF) in March 2016.

## Project Information Table

Project Title:	<i>Sustainable Energy Financing Mechanism for Solar PV in Forest Villages in Turkey (ORKÖY-PV Project)</i>			
GEF Project ID:	5098		<i>at endorsement (Million US\$)</i>	<i>at mid-term (Million US\$)</i>
UNDP Project ID:	5323	GEF financing:	3.780	0.466
Country:	Turkey	IA/EA own:	0.200	0.000
Region:	Europe and CIS	Government:	47.675	0.000
Focal Area:	Climate Change	Other:	4.625	0.000
FA Objectives, (OP/SP):	FA Objective #3 for GEF 5: Promoting investment in renewable energy technologies	Total co-financing:	52.500	0.000
Implementing Partner:	Ministry of Agriculture and Forestry (MoAF)	Total Project Cost:	56.280	0.466
Other Partners involved:	N/A	ProDoc Signature (date project began):		23 August 2016
		(Operational) Closing Date:	Proposed: 1 September 2022	Actual: 1 September 2020

## Project Description

The main objective of the ORKÖY-PV Project is to “support the successful launching of a sustainable energy financing mechanism within the ORKÖY credit mechanism to ensure that there is at least 30 MW of installed capacity of grid-connected, cooperative solar PV in forest villages) by the end of the project”. It was designed to do so by:

- developing and expanding policy and institutional framework to promote on-grid residential solar PV;
- demonstrating the technical and economic viability as well as the business model of the ORKÖY sustainable energy financing mechanism for solar PV systems through 4 pilot installations, mainly land-based solar PV plants; and
- scaling up and replication at the national level.

## Project Progress Summary

The Project has only secured permits and bids for 2 demonstration land-based solar PV projects for a total of 200 kW of installed capacity. A new EIGM policy of May 2019 now supports net metering for rooftop solar PV installations with feed-in tariffs that are sufficiently low to discourage electricity sales from individual householder to the grid (Para 32). The ORKÖY-PV Project is now in position to utilize the remaining GEF funds to demonstrate rooftop solar PV installations.

## MTR Ratings and Achievement Summary

Measure	MTR Rating <sup>1</sup>	Achievement Description
<b>Project Formulation</b>	Conceptualization/ Design Rating: 4	Project strategy that included US\$ 50 million co-financing for ORKÖY's SFM for land-based plants was sound for Turkey's economic conditions in 2015. However, with Turkey's economic slowdown in 2017, the devaluation of its currency, and subsequent change in energy policy favouring rooftop solar PV, the original project strategy was no longer relevant. Forecasting these changes was not possible for the Project (Para 25).
	Stakeholder Participation Rating: 5	Project formulation was conducted in close consultation government, international organizations, finance institutions, NGOs, PV manufacturers and installers (Para 22).
<b>Progress Towards Results</b>	Objective Achievement Rating: 2	Only progress is ITB process for 2 land-based 100 kW solar PV plants to be awarded in July 2019 (Para 31). Remaining funds for pilot projects to be used to pilot rooftop solar PV installations totaling 200 kW of installed capacity. With 14 months remaining in Project, there is insufficient time for additional pilot projects to demonstrate an ORKÖY SFM unless there is a Project extension for more than 18 months (Para 35).
	Outcome 1 Achievement Rating: 3	ORKÖY's SEFM Unit established (Para 37). However, Government of Turkey under their own initiatives issued a new net metering policy in May 2019 in favor of <u>rooftop solar PV installations</u> and promoting household self-consumption to mitigate the risk of oversupply of electricity into the grid (Para 36). Project plans to develop its own selection criteria and legal documents in support of these new policies (Para 38).
	Outcome 2 Achievement Rating: 2	ITB process underway for 2-100 kW land-based solar PV plant demonstrations. New net metering policy favoring rooftop solar PV now allows Project to prepare documents and ITB process for another 200 kW of rooftop solar PV pilots (Para 40).
	Outcome 3 Achievement Rating: 2	No progress until completion of demonstration projects under Component 2 (Para 44).
<b>Project Implementation &amp; Adaptive Management</b>	Implementation Approach Rating: 4	Despite not having a full-time Project Manager (see Para 58), the Project has been appropriately managed adaptively, using the PRF and maintaining a good relationship with the ORKÖY SEFM Unit. The lack of progress to date cannot be attributed to a poor implementation approach.
	Monitoring and Evaluation Rating: 4	Project personnel have demonstrated their ability to keep current on issues and obstacles towards implementing Component 2 demonstration projects. However, there is a need to improve PIR reports by reporting the progress of each of the outputs of ORKÖY-PV that are listed in the PRF (Para 65).
	Stakeholder Participation Rating: 5	Project has invested considerable time on outreach to all stakeholders and developing a strong relationship with ORKÖY and OGM personnel. This includes all government agencies involved with the sale of electricity and communities hosting demonstration projects under Component 2 (Paras 66 and 67).
<b>Sustainability</b>	Sustainability Rating: 3	The “moderately likely” risk is related to the lack of confirmed ORKÖY financing for scale up of rooftop solar PV programs for forest villages. This is related to the fact that ORKÖY financing cannot be confirmed until the September prior to the year of implementation (Paras 73 and 74).
<b>Overall Project Achievement and impact</b>	Rating: 3	Project achievement to date has been delayed by unforeseen regulatory obstacles, clarified as of April 2019 in favor of rooftop solar PV (Paras 80-81). While the impact of ORKÖY-PV to date has been minimal, ORKÖY remains keen to utilize the remaining GEF resources to demonstrate rooftop solar PV followed by replication and scaling up of the ORKÖY's SFM, possible only if a Project extension is granted (Paras 82-83).

<sup>1</sup> Evaluation rating indices (except sustainability – see Para 70): 6=Highly Satisfactory (HS): The project has no shortcomings in the achievement of its objectives; 5=Satisfactory (S): The project has minor shortcomings in the achievement of its objectives;

## Conclusions

ORKÖY-PV Project has experienced numerous and difficult unforeseen regulatory hurdles in its target to develop 4 land-based demonstration solar PV projects under Component 2. The resulting outcome has been only 2 land-based solar PV projects approved for implementation as of July 2019 and leaving the Project short of its target of 4 land-based solar PV projects (Para 80). Coinciding with the Government’s legislative clarity as of May 2019 on its encouragement of rooftop solar PV installations (Para 81), the ORKÖY-PV Project is now in a position to move forward on piloting rooftop solar PV installations in forest villages (for the purpose of catalysing and launching ORKÖY’s sustainable financial mechanism, envisaged as a 20% grant and 80% soft loan for each rooftop solar PV installation) notwithstanding their higher unit costs in comparison to land-based solar PV plants.

However, the current end-of-project (EOP) date of 1 September 2020 is insufficient time for the ORKÖY-PV Project to fully expend the remaining GEF funds. The lack of an extension of this EOP date from the current EOP date will be a lost opportunity to catalyse solar PV installations towards the 30 MW installed capacity target for forest villages lost (Para 83).

## Recommendations

To improve implementation (and meet GHG emission reduction targets), the ORKÖY-PV Project as a **first priority** should seek a 24-month extension from UNDP and GEF to be able to utilize its remaining resources of US\$3.314 million to maximize the number of solar PV installations using GEF grant funding in an effort to reach the objective level target of 30 MW of installed solar PV capacity (see Para 86).

To correct Project design, make amendments to the ORKÖY-PV Project’s PRF (see Para 87 and Appendix F) that reflect a revised ORKÖY-PV strategy and proposed solar PV rollout plan mentioned in Para 86 that is based on a new Theory of Change (see Figure 6). This revised PRF should be finalized in close consultation with the SEFM Unit in ORKÖY (Para 89).

To improve the monitoring and evaluation of the Project, ORKÖY-PV Project staff should bolster its efforts as a **high priority** to monitor the quality of rooftop solar PV installations, highlighting the sustainability issues related to poor quality installations and deteriorating solar PV system performance and using an international consultant to bring to ORKÖY global experience of solar PV MRV systems (see Para 88).

Recommendations and proposals for future directions underlining main objectives includes commencing outreach to international and domestic development banks after 2020 to initiate a process of familiarizing banks with possible opportunities to “co-finance” a market transformation of solar PV generation in forest villages in Turkey, appointing a MRV manager as part of the ORKÖY team, and developing an ITMO trade model for carbon markets after 2021 (see Para 90).

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4=*Moderately Satisfactory (MS)*: The project has moderate shortcomings in the achievement of its objectives; 3=*Moderately Unsatisfactory (MU)*: The project has significant shortcomings in the achievement of its objectives; 2=*Unsatisfactory (U)*: The project has major shortcomings in the achievement of its objectives; 1=*Highly Unsatisfactory (HU)*: The project has severe shortcomings in the achievement of its objectives.

## ABBREVIATIONS

Acronym	Meaning
APR-PIR	Annual Project Report - Project Implementation Review
CO	UNDP Country Office
CO <sub>2</sub>	Carbon Dioxide
CPAP	Country Programme Action Plan
EBRD	European Bank for Reconstruction and Development
EPDK	Energy Market Regulation Authority
EOP	End of project
EU	European Union
FiT	Feed in Tariff
FY	Fiscal Year
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Green House gas
GoT	Government of Turkey
IPA	Instrument for Pre-Accession Assistance
kWh	kilowatt hour
MoAF	Ministry of Agriculture and Forestry
MoENR	Ministry of Energy and Natural Resources
MoEU	Ministry of Environment and Urbanization
MoF	Ministry of Finance
MRV	Monitoring, reporting, and verification
MTR	Midterm review
NARP	The National Awareness Raising programme
NGO	Non-governmental organization
OGM	General Directorate of Forestry
ORKÖY	Forest Village Relations department
OR-KOOP	Central Union of Turkish Forest Cooperatives
PA	The Paris Agreement
PIMS	UNDP/GEF Project Information Management System
PIR	Project implementation report
PIU	Project implementation unit
PM	Project manager
PPG	Project Preparatory Grant (GEF)
PRF	Project Results Framework
PSC	Project Steering Committee
PV	Photovoltaic
SMART	Specific, Measurable, Attainable, Relevant, Time-bound
ORKÖY-PV	“Sustainable Energy Financing Mechanism for Solar Photovoltaic Systems in Forest Villages in Turkey” Project
tCO <sub>2</sub>	Tonne of Carbon Dioxide
TE	Terminal Evaluation
TL	Turkish Lira
TOR	Terms of Reference
UN	United Nations
UNDAF	UN Development Assistance Framework
UNDP	United Nations Development Programme
UNFCCC	UN Framework Convention on Climate Change



# 1. INTRODUCTION

1. This report summarizes the findings of the Midterm Review (MTR) Mission conducted during the June 12-16, 2017 period for the UNDP-supported GEF-financed Project entitled: “**Sustainable Energy Financing Mechanism for Solar PV in Forest Villages in Turkey**” (hereby referred to as the ORKÖY-PV Project or the Project). In December 2015, this Project received a USD 3.78 million grant from the Global Environmental Facility (GEF). The Project objective is to “support the successful launching of a sustainable energy financing mechanism within the ORKÖY credit mechanism to ensure that there is at least 30 MW of installed capacity of grid-connected, residential solar PV in forest villages in Turkey (approximately 2.5% or 175,000 people living in forest villages will have their electricity needs met by solar PV) by the end of the project”. ORKÖY is the Forest Village Relations Department within the General Directorate of Forestry (OGM) under the Ministry of Agriculture and Forestry (MoAF).

## 1.1 Purpose of the Mid-Term Review

2. In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP-supported GEF-financed projects are required to undergo an MTR at the mid-point of implementation of a project to provide a comprehensive and systematic account of the performance of an ongoing project by reviewing its design, process of implementation and achievements vis-à-vis GEF project objectives and any agreed changes during project implementation. As such, the MTR for this Project serves to:
  - assess early signs of project success or failure with the goal of identifying the necessary changes to be made to set the Project on-track to achieve its intended results;
  - strengthen the adaptive management and monitoring functions of the Project;
  - enhance the likelihood of achievement of Project and GEF objectives through analyzing Project strengths and weaknesses and suggesting measures for improvement;
  - enable informed decision-making;
  - create the basis for replication of successful Project outcomes achieved to date;
  - identify and validate proposed changes to the ProDoc to ensure achievement of all Project objectives; and
  - assess whether it is possible to achieve the objectives in the given timeframe, taking into consideration the pace at which the Project is proceeding.
3. This MTR was prepared to:
  - be undertaken independent of Project management to ensure independent quality assurance;
  - apply UNDP-GEF norms and standards for midterm reviews;
  - assess achievements of outputs and outcomes, likelihood of the sustainability of outcomes, and if the Project met the minimum M&E requirements; and
  - provide recommendations to increase the likelihood of the Project delivering all of its intended outputs and achieving intended outcomes.

## 1.2 Scope and Methodology

4. The scope of the MTR covers the entire UNDP-supported, GEF-financed, MoAF-executed ORKÖY-PV Project and its components as well as the co-financed components of the Project. This MTR assesses

38 months of Project progress, achievements and implementation taking into account the status of Project activities, outputs and the resource disbursements made up to 16 May 2019. The MTR also reports on the progress against objective, outcome, output, and impact indicators listed in the latest Project Results Framework (PRF) as provided on Appendix F as to how these outcomes and outputs will be achieved within the Project duration (up to 31 March 2020) or with a Project extension. The MTR report concludes with recommendations, as appropriate, for the key stakeholders of the Project. The MTR will be approached through the criteria of *relevance*, *effectiveness*, *efficiency*, *sustainability*, and *impact*, as defined and explained in the UNDP “Guidance for Conducting Midterm Reviews of UNDP-supported, GEF-financed Projects”, and the GEF M&E policy.

5. The methodology adopted for this MTR includes:

- Review of Project documentation (e.g. APR/PIRs, meeting minutes of Project Steering Committee) and pertinent background information;
- Interviews with key Project personnel including the current Project Manager, Project Coordinators, technical advisors, and Project developers;
- Interviews with relevant stakeholders including other government agencies and institutes and private sector entities; and
- Field visits to selected Project sites and interviews with beneficiaries.

A detailed itinerary of the Mission is shown in Appendix B. A full list of people interviewed and documents reviewed are given in Appendix C and Appendix D respectively. The MTR Team for the UNDP-GEF project was comprised of one international MTR consultant and one international strategy revision expert.

6. The Project was reviewed in the context of:

- *Project strategy*: This includes an analysis of the ORKÖY-PV Project design (and Project Results Framework) as outlined in the ProDoc to identify if the strategy is effective in achieving the desired outcomes;
- *Progress towards results*: This is to include information provided from, amongst others, Project work plans, Project implementation reports (PIRs), relevant Project reports and information provided from various Project stakeholders;
- *Project implementation and adaptive management*: This would be an assessment of the quality of support to the Project from UNDP as well as the Executing Agency of the Project, the Ministry of Agriculture and Forestry (MoAF). Assessment parameters would include management arrangements, work planning, finance and co-finance, Project level monitoring and evaluation systems, stakeholder engagement, reporting and communications; and
- *Sustainability*: The likely ability of an intervention to continue to deliver benefits for an extended period of time after the end-of-Project (EOP). The MTR sustainability assessment essentially sets the stage for the Terminal Evaluation during which sustainability will be rated under the four GEF categories of sustainability, namely financial, socioeconomic, institutional framework and governance, and environmental.

7. All possible efforts have been made to minimize the limitations of this independent MTR. Notwithstanding that a total of 12 days were spent in Ankara and Istanbul by the MTR team to collect

and triangulate as much information as possible, follow-up interviews and Skype conversations by the MTR team were also made after the May 2019 mission.

### 1.3 Structure of the MTR Report

8. This MTR report is presented as follows:

- An overview of ORKÖY-PV Project activities from a development context from its commencement of operations in March 2016 to the present;
- An assessment of Project strategy and design;
- An assessment of Project progress towards results;
- An assessment of Project implementation and adaptive management;
- Assessment of sustainability of Project outcomes; and
- Conclusions and recommendations.

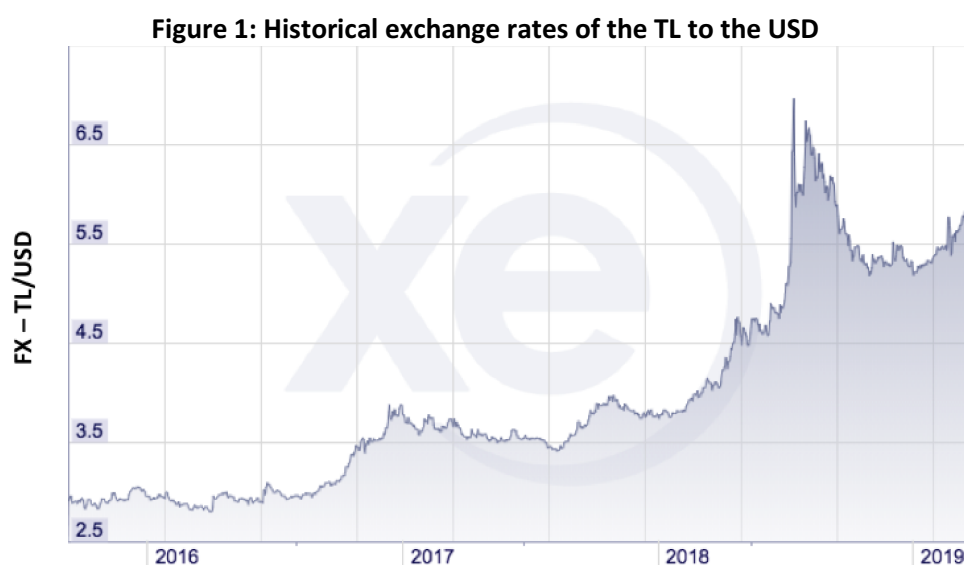
9. This MTR report is designed to meet UNDP-GEF’s “Project-level Monitoring: Guidelines for Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects” of 2014:

[http://web.undp.org/evaluation/documents/guidance/GEF/midterm/Guidance\\_Midterm%20Review%20 EN 2014.pdf](http://web.undp.org/evaluation/documents/guidance/GEF/midterm/Guidance_Midterm%20Review%20EN_2014.pdf)

## 2. PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT

### 2.1 Development Context

10. Although Turkey has one of the most developed economies globally with its position as a leading producer of agricultural products and manufacturer of motor vehicles and home appliances (amongst other manufactured products), it has been experiencing an economic slowdown since 2017 exacerbated in August 2018 with significant devaluation of the Turkish Lira (TL). The GDP of Turkey since 2009 has ranged between 3 and 11%, leading the country to experience significant development in its infrastructure. However, the Turkish economy has been in recession since August 2018 resulting in the value of the TL to the US Dollar (USD) depreciating from TL 2.8 per USD to the current rate of TL 6.0 in 2019 (Figure 1). This has resulted in a significant increase of the interest rate that the Central Bank of Turkey charges domestic banks for borrowing. As a result, a typical interest rate on a consumer loan in Turkey would be in the order of 30%.

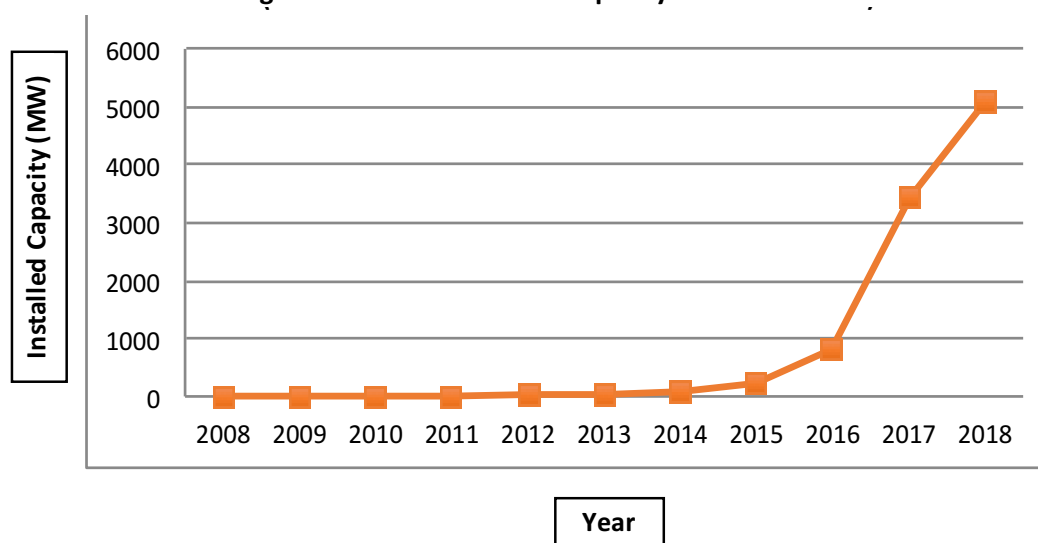


11. Financial institutions active in Turkey do see the high interest rate limiting lending to residential solar PV. Some of them are working to design new financial products to reduce cost and risk and increase scale. Two products currently being designed are:
- vendor finance where funding is provided to a producer of solar PV panels, who is then able to sell their panels on credit; and
  - with building companies to fund installation of solar PV on the rooftops of newly constructed apartment buildings. PV panels are hereby installed on a larger scale, and increase the value of the apartments to generate their own electricity. The advantage of this product is the marginal additional investment required in comparison to the purchase of the apartment.
12. With the robust growth of its economy between 2009 in 2017, Turkey had been dependent on the import of energy, mainly oil and natural gas from Central Asia and Russia. With this high dependency on energy imports, there has been concern within the GoT on this unsustainable approach, which is

subject to concerns over the security of supply and the predictability of energy pricing. Until 2015, Turkey’s development of its own domestic renewable energy sources has been limited, mainly due to an unappealing financial, legislative and institutional environment for energy investments.

13. More recently, in combination with the slowdown in Turkey’s economy and concerns over its energy security, there have been more significant announcements to encourage renewable energy investments in Turkey to support its implementation of the Electricity Sector Strategy in 2009. This strategy outlines the country’s commitment to renewable energy and energy efficiency programs that aim to provide 30% of the country’s power supply by the centenary of the Turkish Republic in 2023. These goals are reiterated in Turkey’s National Climate Change Action Plan of 2011 to help reduce carbon emissions of Turkey, which have been rising at a rate of 8 to 10% annually since 1990.
14. The investments in solar PV have also seen a rapid rise in Turkey. Since 2015, the installed capacity of solar PV coming online has increased 20-fold from 249 MW in 2015 to more than 5GW in 2018 as illustrated on Figure 2. However, with the current economic situation, there is uncertainty that this rapid growth in solar PV coming online can be sustained.

**Figure 2: Installed solar PV capacity since 2008**



15. This uncertainty can be partially offset by the Paris Agreement (PA) that supports mitigation efforts of other Parties as voluntary partnerships, a possible vehicle for sustaining growth of solar PV and other forms of renewable energy. This PA includes provisions for:
  - the transfer of mitigation outcomes “that can also be used by another party to fulfil its nationally determined contribution” (Article 6.2). Such transfers can take place as part of a formal emission trading arrangement (with the issuance and transfer of a carbon unit) or in the context of results-based payments without a transfer of a carbon unit;
  - a sustainable development mechanism that allows private and public entities to support mitigation projects that generate transferrable GHG emissions (Article 6.4). Programmes and projects developed under this new mechanism can issue tradable carbon units, which feature recalls of the operations of the Clean Development Mechanism. Programmes and projects will

need to have a net positive mitigation effect, which means that not all emission reductions generated can be used to offset emissions generated elsewhere; and

- the transferable unit both under Article 6.2 and 6.4 being called Internationally Transferred Mitigation Outcomes or ITMOs. Several of pilots are currently being developed for both Article 6.2 and 6.4. Transactions under Article 6.2 are already possible, while the Rule Book for transactions under Article 6.4 will likely be finalised later this year at the CoP 25 in Chile.

## 2.2 Problems that ORKÖY-PV Project Seeks to Address

16. Turkey’s forest villages, the target of this Project, are generally impoverished with government support required to mitigate population losses due to the paucity of economic opportunities for their residents. As a measure to assist these communities in breaking out of a vicious poverty cycle, ORKÖY through its resources has had plans to continue promoting renewable energy technologies within these communities, replicating the successful and still ongoing solar water heating program. However, legislation prior to the commencement of this Project was not supportive of providing renewable energy concessions, which would improve the access of households in these communities to affordable renewable energy technologies such as solar PV. Moreover, the past renewable energy incentives such as the feed in tariff (FiT) favour those households deemed to be wealthy enough with money to invest in these technologies.
17. At its operational commencement on 23 August 2016, the ORKÖY-PV Project sought to address the following problems deemed as obstacles to solar PV technologies in forest villages:
  - The approval process for installations for renewable energy technologies which is long, arduous and protracted;
  - Poor FiT and tenure pricing levels that serve as disincentives for development of local renewable energy generation, especially considering the FiT relative to import electricity prices;
  - Prohibitive costs to community generation schemes that include costs for the connections to transmission lines and distribution companies, and re-importing electricity at higher costs for the benefit of utility companies, thus substantially reducing the net-benefit to the community;
  - Complex and highly bureaucratic administrative processes;
  - Lack of functional solar PV installations in forest villages that could convince residents to invest in renewable energy technologies.

## 2.3 ORKÖY-PV Project Description and Strategy

18. The main objective of the ORKÖY-PV Project is to “support the successful launching of a sustainable energy financing mechanism within the ORKÖY credit mechanism to ensure that there is at least 30 MW of installed capacity of grid-connected, cooperative solar PV in forest villages by the end of the project”. It was designed to do so by:
  - developing and expanding the policy and institutional framework to promote on-grid, residential solar PV;
  - demonstrating the technical and economic viability as well as the business model of the ORKÖY sustainable energy financing mechanism for solar PV systems through 4 pilot installations; and
  - scaling up and replication at the national level.

## 2.4 ORKÖY-PV Project Implementation Arrangements

19. The ORKÖY -PV Project is implemented under a national implementation modality (NIM) with UNDP Turkey. The implementing partner of the ORKÖY-PV Project is the Ministry of Agriculture and Forestry (MoAF). Key Project decisions are made by the Project Board, chaired by MoAF with Board members consisting of representatives from OGM (forestry planning), Ministry of Development (MoD), Ministry of Foreign Affairs (MFA), UNDP Turkey and GÜNDER<sup>2</sup> (the Turkish chapter of the International Solar Energy Society comprising of members from the entire solar PV value chain).

## 2.5 ORKÖY-PV Project Timing and Milestones

20. The ORKÖY-PV Project that commenced on 23 August 2016 was designed as a 4-year project, ending 1 September 2020. Progress to date has been unsatisfactory with details available in Section 3.2 of this report. A summary of significant events for the first 38 months of the Project include:

- the Government of Turkey signing the ORKÖY-PV ProDoc on 23<sup>rd</sup> of August 2016;
- the Inception Workshop for the Project conducted in November 2016;
- the Project entering into a Responsible Party Agreement (RPA) on 29 June 2017 with GUNDER to provide extensive expertise and access their international professional network within the PV industry. They immediately commenced drafting reports on grid capacity and requirements for 4 villages where demo projects were to be installed. These reports were completed in late 2017;
- changes in renewable energy legislation in Turkey in early 2018 that affected strategies of ORKÖY-PV, in particular, the use of Renewable Energy Cooperatives (RECs) as a means of streamlining land acquisition for land-based solar plants;
- delays experienced in ORKÖY inputs into the Project by mid-2018 due to changes in the government when the implementing partner of the Project changed its name from the Ministry of Forestry and Water Affairs to the current name of the Ministry of Agriculture and Forestry;
- the commencement of a dramatic rising commercial interest rates for loans in Turkey as of early 2018, which had numerous impacts most notably the slowdown of manufacturing activity. This in turn was seen to cause delays from GoT in the determination of feed in tariffs for solar PV, and net metering policies;
- numerous issues emerging in late 2018 concerning the use of forest cooperatives for owning land-based solar PV plants, further delaying progress of these projects and forcing ORKÖY to assess other legal entities such as “Village Legal Entities” as other alternatives;
- establishment of a “sustainable energy financing mechanism” unit (or SEFM unit) within ORKÖY setup in early 2019, consisting of 4 full-time personnel from OGM;
- a 3-day training course on renewable energy systems conducted in late January 2018 for 30 OGM staff under the leadership of GUNDER accompanied by their network of experts from private sector companies and universities;
- a 3-day study tour conducted to Freiburg, Germany between 27 February and 2 March 2018 with the participation of OGM personnel from pilot regions and Ankara;
- an Invitation to Bid (ITB) process initiated in August 2018 for the 4 land-based solar PV plants. Unfortunately, several obstacles were encountered between mid-2018 and early 2019 to acquire lands for these plants. As of May 2019, only 2 of these plants have received all permits while the

<sup>2</sup> <http://www.mesia.com/member/gunder-international-solar-energy-society-turkey-section/>

other 2 land-based projects were cancelled. One of these cancelled projects in Gecek (near Corum) has agreed to a program for rooftop solar PV installations;

- EIGM issuing a policy on net metering for rooftop solar PV installations on May 9 and 12 2019 with specific measures to ensure the focus of electricity generation from these rooftop solar PV installations is for self-consumption, and not sale of electricity into the grid; and
- a 2<sup>nd</sup> ITB process initiated in May 2019 to implement the 2 land-based solar PV plants that have received all permits for implementation. Selection of the successful contractor was expected in July 2019.

These events have left the Project with numerous challenges to fully deliver all outcomes and outputs that includes the delivery of solar PV demonstration projects (Outcome 2.1), and scale up and replication of the ORKÖY-PV of ORKÖY that will contribute to the deployment of 30 MW of installed solar PV capacity with forest villagers (Outcome 3.1). Details of these challenges and other progress-related issues are provided in Section 3.2 of this report.

## 2.6 Main Stakeholders

21. The main stakeholder of the ORKÖY-PV Project is ORKÖY (the Forest Village Relations Department within OGM under MoAF). To achieve the specific ORKÖY-PV Project objective of “supporting the successful launching of a sustainable energy financing mechanism within the ORKÖY credit mechanism to ensure that there is at least 30 MW of installed capacity of grid-connected, residential solar PV in forest villages in Turkey by the end of the project”, the ORKÖY-PV Project needed to engage a wide range of stakeholders across the solar PV value chain in Turkey (as specified in the ProDoc) including:

- *Ministry of Environment and Urbanization (MoEU)*, who serve as the focal point of UNFCCC, and house the Climate Change Department under the General Directorate of Environmental Management. MoEU is relevant to ORKÖY-PV as it pertains to its legislation for monitoring, reporting and verification (MRV) of climate change mitigation activities;
- *The Ministry of Energy and Natural Resources (MoENR)* responsible for developing energy policy for Turkey and policies related to natural resource use. In particular, their General Directorate of Renewable Energy or EIGM is the key organization in the setting of renewable energy policies in Turkey;
- *The Ministry of Development (MoD)* responsible for defining, assessing, and monitoring programme outputs towards country-level outcomes that will ensure ORKÖY-PV results are linked to national development plans;
- *Turkish Electricity Distribution Company (TEDAS)*, the state economic enterprise responsible for approval procedures for energy projects including solar PV, according to related legislation (i.e. Law #5346 “Law on Utilization of Renewable Energy Sources For the Purpose of Generating Electrical Energy”). TEDAS as a key stakeholder of the Project, identifies the renewable energy project’s structure, properties and conditions prior to their approval and commencement of implementation;
- *Turkish Electricity Transmission Company (TEIAS)*, the state economic enterprise responsible for transmission of electricity within the country. TEIAS is also a key stakeholder to the Project in terms of defining the quotas for intake of electricity into the transmission system. This involves approaches by regional distribution utilities to TEIAS on the suitability of energy projects in terms of quotas;



- *Energy Market Regulation Authority (EPDK)* who perform the regulatory and supervisory functions in the energy market. Their involvement on the Project is key to overcoming specific barriers in terms of defining the methodology, permissions and ensuring the replicability of Project results;
- *Turkish Utilities (private sector)* who can purchase the electricity provided by the solar PV systems through power purchase agreements, either on the spot market or through longer-term agreements. Electricity can only be purchased in accordance with the Turkish legislation on feed-in-tariffs for renewable energy. These utilities includes Osmangazi EDAŞ (the local company for Afyon Project site), Fırat EDAŞ (the distribution company in Elazığ Region), Yeşilirmak EDAŞ (distribution company for Çorum), and Meram EDAŞ (the company for Konya region);
- *Forest Cooperatives and the OR-KOOP (Central Union of Turkish Forest Cooperatives)*. Forest cooperatives are legal non-governmental bodies consisting of forest villagers with a mandate of development of forest villages. OR-KOOP is the organization that is representing the forest cooperatives in Turkey with its headquarter in Ankara. OR-KOOP is an organization that was founded by 27 regional forest cooperative unions with more than 2,000 cooperative members. The forest cooperatives are eligible to be supported by ORKÖY;
- *Forest Village Legal Entity*, the smallest governance body in Turkey, and managed by the “Mukhtar”, Head of Village, who is elected for a 5-year term during national elections. Forest village legal entities are eligible for supported from ORKÖY;
- *GUNDER (the Turkish Section of the International Solar Energy Society)*, the umbrella organization of solar PV companies in Turkey. The aim of GUNDER is to promote and direct all activities for better utilization of solar energy. Since GUNDER is an umbrella organization serving governmental bodies as well as the private sector, GUNDER also serves as a partner of the Project. Some of technical support activities will be implemented by GUNDER along with capacity development activities for sustainable energy finance program;
- *Solar PV installers/manufacturers (private sector)* to install and maintain solar PV equipment for forest villagers who will have successfully obtained financing either from the ORKÖY soft loans or later from domestic and international banks. They are mostly the members of the GUNDER; and
- *Domestic and International Banks (private sector)*. While domestic and international banks were envisaged to have a key project role, the steep rise of commercial lending rates (as mentioned in Paras 10 and 49) and the 0% interest soft loans from ORKÖY have precluded their involvement. Furthermore, the ORKÖY soft loan programme (initially US\$ 45 million) was assessed as not being large enough to cover the financing costs to bring in domestic and international banks in the context of how they might provide financing for further investment in solar PV systems for forest villagers. If interest rates were to steeply decline and demand for the rooftop solar PV programme was extended to other residential stakeholders who may be able to afford commercial loans, bank stakeholders could include DenizBank, Sekerbank, Halkbank, Ziraat Bankası and EBRD.

### 3. FINDINGS

#### 3.1 Project Strategy

22. The ORKÖY-PV Project design was formulated in close consultation government, international organizations, finance institutions, NGOs, PV manufacturers and installers, and intended to catalyse energy-related GHG emission reductions through increasing the deployment of renewable energy in forest villages and other villages in Turkey. Forest villages are defined under the Turkish Forest Law #6832 as any village that contains a forest area within their administrative borders. While these communities have limited land resources and a lack of income generating opportunities, they have traditionally extracted resources from these forested areas for their income. Moreover, they have been traditionally dependent on fossil fuels, and do not have the capacity or fiscal resources to invest in renewable energy technologies such as solar PV, which have the potential to decrease their living expenses and reduce energy-sector related GHG emissions.
23. Forest villages were identified in the 5<sup>th</sup> National Communications to the UNFCCC of Turkey as being particularly vulnerable to the impacts of climate change. Since they are eligible for financial and technical support from ORKÖY, the ORKÖY-PV Project was designed to overcome these capacity and fiscal constraints, and employ existing financial packages within ORKÖY to bring affordable solar PV technologies to forest villagers. While the Turkish Law on “Utilization of RES for the Purpose of Generating Electrical Energy” was adopted in 2005 with subsequent amendments as recently as 2012, the ORKÖY-PV Project strategy was to strengthen existing policies and institutional support to enable growth of solar PV in forest villages. The Project was also setup to support demonstration solar PV projects in forest village jurisdictions, and facilitate scale up of solar PV installations in forest villages on the basis of successful demonstrations.

##### 3.1.1 Original Project Design

24. The approach of the ORKÖY-PV Project seeks to catalyse the deployment of solar PV to forest villages through the ORKÖY Social or Economic Credit Programme. With the PPG phase of ORKÖY-PV being implemented in 2015, some of the *prominent baseline conditions* and activities prior to the commencement of ORKÖY-PV include:
  - ORKÖY initiated a SWH programme in 2004 for forest villages<sup>3</sup>. In late 2018, a cumulative total of more than 144,000 households have received an interest-free credit to buy a solar water heater. The credit, covering 100 % of the investment costs for a solar water heater, has to be repaid in three equal instalments, starting one year after installation. With less than a 1% default rate on these loans, the successes of this program have been cited as an example for use in a similar solar PV program financed by ORKÖY;
  - capacity of ORKÖY staff to manage a solar PV program is low. A grid connected solar PV program would involve extensive consultations with MoENR, TEDAS and TEIAS, all of whom ORKÖY staff have not had any exposure;
  - cost of a grid connected solar PV system is not affordable to forest villagers. Without any access to commercial financing and the high cost of borrowing in Turkey today, forest villagers need a

<sup>3</sup> <https://www.solarthermalworld.org/content/40000-forest-villagers-turkey-heat-water-sun>

form of concessional financing from external entities such as ORKÖY to be able to access such systems;

- while rooftop solar PV systems are more costly<sup>4</sup>, the Project design initially envisaged the implementation of land-based solar PV plants as one measure to reduce the costs of solar PV electricity to forest villagers to an extent that the payback period of any solar PV investment was to be less than 7 years. To effectively implement this modality, the Project and ORKÖY sought to implement land-based solar PV projects through forest cooperatives, notwithstanding that ORKÖY’s experience with these legal entities was very poor<sup>5</sup>;
- there is an extensive network of ORKÖY field offices throughout Turkey that has the capacity for rapid transfer of positive messaging to other field offices and Forest villages. This capacity can be used to spread positive messaging over an affordable grid connected solar PV scheme to be demonstrated by the Project to reduce monthly energy costs of forest villagers.

25. These baseline activities were incorporated into the Project strategy that was developed in close consultation with the implementing partner, MoAF (formerly the Ministry of Forestry and Water Affairs at the commencement of the Project). The information collected from MoAF and its personnel from OGM and ORKÖY provided an appropriate representation of baseline initiatives for ORKÖY-PV Project support. Historically, ORKÖY has several other financial packages to support forest communities in agriculture, livestock grazing, and sustainable forest resource extraction activities. The Project strategy that included US\$ 50 million co-financing for ORKÖY’s SFM for land-based plants was sound for Turkey’s economic conditions in 2015. As such, activities of the ORKÖY-PV Project appear to be aligned with and represent the best path towards promoting the use of renewable energy technologies by the most remote communities in Turkey<sup>6</sup>. However, with Turkey’s economic slowdown in 2017, the devaluation of its currency, and subsequent change in energy policy favouring rooftop solar PV, the original Project strategy was no longer relevant. There were also changes in ministries and office turnover during the 2016-18 period also delayed the Project’s progress. Forecasting these changes was not possible for the Project. Notwithstanding, the current ORKÖY administration is highly supportive of the Project which is viewed by the MTR team as a positive outcome.

26. Underlying assumptions of each baseline activity towards their contribution to achieving the overall Project results was covered in the PRF including assumptions such as the sustained commitment of ORKÖY and relevant stakeholders such as the government, utilities, installation companies, banks, and forest villagers, and the successful implementation of demonstration projects. However, the PRF does not cover risks (which are covered separately in the ProDoc on page 54). There are 2 risks which deserve to be placed on the PRF, and added to the risk log on page 54 of the ProDoc:

- an additional risk to the achievement of the GHG emission reductions of ORKÖY-PV is the possible increase in household fossil fuel energy consumption due to reduced monthly household energy costs resulting from the availability of renewable electricity from solar PV systems. Possible mitigation responses for this may be allowances for additional solar PV panels

<sup>4</sup> Applications for each solar PV installation was the same. By this logic, rooftop installation application costs would be very high in comparison to a 100 kW land-based solar PV plant.

<sup>5</sup> This included transactions where ORKÖY gives the cooperatives funds for a project, with the cooperative paying back the interest free loan within 3 years (such as for heating). A default rate of 95% of payback for these loans from forest cooperatives has occurred.

<sup>6</sup> The financial packages to support forest communities, are restricted to the following conditions: finance of ORKÖY can have a maximum of 20% and the remaining 80% soft loan, with a minimum of 0% interest and a maximum tenor of 7 years.

for a particular household, or guidance and advice to the household on reinvesting the additional income to enhance their income generating activities;

- an additional risk to the achievement of the GHG emission reductions of Component 3 would be the possibility of deteriorating oversight by ORKÖY or other agencies concerned with the quality of solar PV systems installed. The obvious mitigation measure to this would be to ensure that the roster of solar PV installers guarantee technical support in the event a solar PV system functions. The number of inspectors employed by ORKÖY or other concerned agencies would need to increase to be able to routinely audit companies and respond to complaints of poorly functioning solar PV systems installed.
27. A review of the ORKÖY-PV ProDoc reveals that gender issues were considered wherever practical on this Project. This included a focus on gender balance in the creation of solar PV related employment, primarily for maintenance and security of solar PV installations under Output 1.1 which was on the evaluation and selection of public-private business models for provision of affordable grid connected residential solar PV to forest villagers. There was also mention of gender balance on the Project Board. Otherwise, none of the remaining outcomes or outputs were linked to gender issues. As such, while gender issues appear to have been lightly addressed on this Project, the Project has made practical efforts to include gender dimensions in its design.

### 3.1.2 Analysis of Project Results Framework

28. The Project Results Framework (PRF) of the ORKÖY-PV Project generally meets most of the “SMART” criteria<sup>7</sup> that is sufficient to effectively monitor project progress. Specific comments regarding some of the indicators in the PRF are as follows:
- Descriptions of the Project objective, outcomes and outputs do not need to include description of the targets or other quantifiable descriptors. These can be or already have been set as targets PRF. For example, the ORKÖY-PV Project objective provides a description that “at least 30 MW of installed capacity of grid connected residential solar PV in forest villages in Turkey (or 175,000 people living in forest villages) will have their electricity needs met.....”, that can be reduced since of 30 MW and 175,000 people are already mentioned in targets;
  - Similarly, the descriptor for Outcome 2.1 can drop the detail of “4 solar PV demonstration projects each up to 100 kW” as these are already covered under the indicators and targets;
  - Some of the targets should be described as targets, and not as dates only. For example, the target for Output 1.2 should be “published ToR by late 2019”, or the target for Output 1.5 should be “framework published by mid-2019”; and
  - In the opinion of the MTR team, there is no need to have indicators for both outcomes and outputs. There are indicators of the outcome indicators are also output indicators. To streamline the PRF, there should be an economy of words where each indicator and target is monitored either at the output or outcome level. Para 87 makes detailed suggestions on this.
29. Appendix F provides suggested edits to the PRF. However, given the need for a revised ORKÖY-PV Project strategy, Appendix F also provides other suggested edits in light of the recommended strategy revisions as detailed in Para 87. Project design and formulation is rated as **moderately satisfactory**.

<sup>7</sup> Specific, Measurable, Attainable, Relevant, Time-bound

## 3.2 Progress towards Results

### 3.2.1 Progress towards Outcome Analysis

30. Progress towards results is provided on Table 1 against the EOP targets in the ORKÖY-PV PRF. Comments on some of the ratings are provided in the following paragraphs. For Table 1, the “achievement rating” is color-coded according to the following colour coding scheme:

Green: Completed, indicator shows successful achievements	Yellow: Indicator shows expected completion by the EOP	Red: Indicator shows poor achievement – unlikely to be completed by project closure
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#### Project objective level targets:

31. With regards to the target of “28,750 tons CO<sub>2eq</sub> emissions reduction from the power sector (compared to the project baseline) by end of project”, the Project only made progress in the setup and completion of permitting for 2 land-based solar PV plants under a cooperative model for forest villages, each at 100 kW installed capacity. At the time of writing of this MTR, an Invitation to Bid (ITB) process was underway with the contract award and commencement of the construction of these 2 land-based plants expected in July 2019. Once these plants are commissioned by late 2019, GHG emission reductions will be generated by this Project.
32. The original number of land-based solar PV plants on this Project was 4. Moreover, early in the Project, all solar PV electricity generation for forest villages was planned around the land-based models. During the early phases of the Project between 2016 and 2018, the Project experienced numerous obstacles to develop all these land-based plants with the primary obstacles being land acquisition and organization of functional forest village cooperatives<sup>8</sup>. As recently as January 2019, the Project had developed 3 land-based solar PV plants; however, one of these villages had the rights of a land-based solar PV plant is stripped from them due to legal issues. Around this time, there were also indications from EIGM on migrating away from unlicensed land-based solar PV plants for forest villages towards rooftop solar PV installations since land-based solar projects were more difficult to

<sup>8</sup> Other obstacles included changes in key management personnel within OGM and ORKOY in 2016 (commencement of the Project), indecision of the Project Board over a period of 8 months in deciding which villages to select for pilot solar PV plants, changes in the names and mandates of key Ministries (such as the Ministry of Forestry and Water Affairs to MoAF) in 2017, discussions on alternatives to the forest cooperatives as the legal entity (alternatives through the heads of the villages, the Mukhtars), identification of lands suitable for a solar-PV plant, and undertaking a 4 to 6 month land acquisition process of state-owned lands from the local Treasury office that can cede the lands free of charge on the basis of its use for social projects. The Project also looked at options to purchase lands or have donations from individuals to the forest cooperative for the solar PV plant. This involved establishment of the *forest cooperative*, acquiring and preparing the application for call letters from the utility (essentially an application by the forest cooperative for access to the grid), consolidation of bills and contracts of all landowners into one contract, determination of the location of the various components of the solar PV plant, obtaining of all permits for these 4 land-based projects, the process for which all was concluded in late 2018 resulting in 3 call letters and permits for only 3 villages. In Corum, the Project was to be located on state-owned lands to be rented; however, after the obtaining of all required permits and preparing of call letters, the Treasury withdrew the call letter after uncovering the illegal use by one of the cooperants on the designated lands, forcing the Project to look into rooftop solar PV installations instead. The final step of the process was to obtain approvals from TEDAS, which on the basis of new legislation in January 2019, required applicants to bring a construction permit to TEDAS before approval. This required going to the municipality to obtain another permit which took 3 to 4 months from each municipality prompting calls from the Project to the MoENR to streamline this process (since MoENR suggested the forest cooperatives approach at the commencement of ORKÖY-PV). By February 2019, MoENR informed ORKÖY-PV of the coming new legislation, which was to allow licensed solar PV projects (> 5MW) to be bid for, and for unlicensed solar installations (<5 MW) to be constructed for own consumption.

**Table 1: Progress Towards Results Matrix (Achievement of outcomes against End-of-Project Targets)**

Project Strategy	Indicator	Baseline Level	Level in 2018 PIR	End-of-Project Target	Midterm Level and Assessment	Achievement Rating	Justification for Rating
<b>Project Objective:</b> To support the successful launching of a sustainable energy financing mechanism within the ORKÖY credit mechanism to ensure that there is at least 30 MW of installed capacity of grid-connected, residential solar PV in forest villages in Turkey (approximately 2.5% or 175,000 people living in forest villages will have their electricity needs met by solar PV) by the end of the project	Amount of reduced CO <sub>2</sub> emissions from the power sector (compared to the project baseline) by end of project, tons CO <sub>2eq</sub>	0	0.	28,750	0 for all indicators.  Based on current progress to setup solar PV systems in forest villages and only 14 months remaining, these targets are unlikely to be achieved.		See Paras 31-35
	Cumulative installed capacity of grid-connected PV systems (kWp)	0	However, considerable efforts placed into the development of 4 land-based solar PV plants (each 100 kW) that was delayed due a lengthy permitting process, and issues with forest cooperatives.	30,000			
	Cumulative total electricity generation from installed grid-connected PV systems (kWh/year)	0		47,520,000			
	Cumulative number of created job positions for forest villagers related to solar pv	0		450			
	Number of people living in forest villages who will have their electricity needs met by solar PV	0	0	175,000			
<b>Outcome 1.1:</b> Enhanced enabling policy and environment within which ORKÖY's sustainable energy financing mechanism continues to operate beyond the lifetime of the project	ORKÖY-PV unit appointed, introduced and confirmed by ORKÖY	None	Draft proposal for establishment of ORKÖY-PV Unit within ORKÖY Department has been completed	5 months after project start	ORKÖY-PV unit appointed, introduced and confirmed by ORKÖY.		See Para 37
	National Framework published and approved	None	Project team has prepared a proposal for revised ORKÖY regulation and ToR for ORKÖY loan and grant facilities	6 months after project start	Government (EIGM) has promulgated new renewable energy legislation for solar PV in May 2019, clarifying government's position on encouraging rooftop installations and not land-based solar installations		See Paras 36, 38 and 39

Project Strategy	Indicator	Baseline Level	Level in 2018 PIR	End-of-Project Target	Midterm Level and Assessment	Achievement Rating	Justification for Rating
	Technical report developed and published	None	The technical report on grid capacity and requirements has been completed for the 4 pilot villages by GUNDER	7 months after project start	GUNDER has completed the technical report on grid capacity and requirements for 4 pilot villages.		See Para 38
<b>Output 1.1:</b> Evaluation and selection of public- private business models (ORKÖY, solar PV installers, utilities, domestic banks) for provision of affordable, grid-connected residential solar PV to forest villagers, using an individual household and/or cooperative model.	Completed and published Evaluation report by Year 1	0		ER by end of Year 1	Business models not yet fully evaluated due to lack of legislative clarity until May 2019 when legislation favouring rooftop solar PV was promulgated. These models are likely to be fully developed before the end of 2019.		See Paras 36,38and 39
<b>Output 1.2:</b> Terms of Reference for ORKÖY's Credit Programme are revised, agreed, published and disseminated	Completed and published TOR by Year 1	0		3 months from project start	Terms of reference for ORKÖY's credit program will be revised in 2019 on the basis of new legislation favouring solar PV rooftop installations.		See Paras 36 and 38
	No. of dissemination events for stakeholders	0		At least 5	No dissemination events for stakeholders have been conducted		--
<b>Output 1.3:</b> Sustainable energy financing unit established within ORKÖY with dedicated full time staff	No. of full time staff appointed	0		At least 2	4 full-time OGM staff assigned to the ORKÖY-PV unit		See Para 37
	ORKÖY-PV unit appointed, introduced and confirmed by ORKÖY	No ORKÖY-PV unit		5 months after project start	ORKÖY-PV unit appointed, introduced and confirmed by ORKÖY		See Para 37
<b>Output 1.4:</b> Model contract for ORKÖY soft loan developed and utilized	Model contract published and approved by ORKÖY	None		6 months after start of project	Conditions of model contract are currently being developed on the basis of rooftop solar PV installations		See Pars 36 and 38

Project Strategy	Indicator	Baseline Level	Level in 2018 PIR	End-of-Project Target	Midterm Level and Assessment	Achievement Rating	Justification for Rating
<b>Output 1.5:</b> National Framework designed and operationalized to use Turkey's Feed-In-Tariff scheme for the purpose of solar PV for forest villagers	National Framework published and approved	0		6 months after start of project	New renewable energy legislation for solar PV has been promulgated by EIGM in May 2019, clarifying government's position on encouraging rooftop installations and not land-based solar installations. EIGM currently streamlining application procedures.		See Para 36
<b>Output 1.6:</b> Technical report on grid capacity and requirements for grid-connected PV installations	Technical report developed and published	None		7 months after start of project	The technical report on grid capacity and requirements has been completed for the 4 pilot villages by GUNDER.		See Para 38
<b>Output 1.7:</b> Methodology for innovative approach (e.g. net metering) is developed, published and disseminated	Methodology developed by end Year 2	None		End of year 2	Government is in the process of rolling out new net metering legislation for solar PV, clarifying government's position on encouraging rooftop installations and not land-based solar installations. Currently, this legislation and supporting rules and regulations are under development for publication and dissemination by Government.		Para 36
	Number of dissemination events	0		At least 10	No dissemination events have been held. Several are planned in 2019 and 2020 to promote ORKÖY's solar PV program for forest villagers.		--
<b>Outcome 2.1:</b> Sustainable Energy Financing Mechanism of ORKÖY successfully finances four solar PV demonstration projects (each up to 100 kW in total) in forest villages, using either individual household and/or cooperative models	No. of projects implemented.	0	Initiating small-scale PV plants via forest cooperatives was problematic since all for PV sites did not have a cooperative or the cooperative was inactive (ranging from conflicts between villagers to financial bottlenecks related to	4	0.  However, 2 land-based projects are being implemented, each 100 kW in Afyon and Konya. A 3 <sup>rd</sup> land-based project in the Corum District was converted to a rooftop solar project after the legal rights to the land-based solar PV project were removed. Considering the government's position on supporting rooftop solar PV		See Para 40



Project Strategy	Indicator	Baseline Level	Level in 2018 PIR	End-of-Project Target	Midterm Level and Assessment	Achievement Rating	Justification for Rating
			cooperative management). Project was seeking other legal arrangements such as Renewable Energy Cooperatives to proceed with implementation.		installations, OGM has requested the MTR mission, if possible, to recommend an increase in the size of the pilot program for rooftop solar PV.		
	No. of regions involved	0	4 pilot projects were to be involved in 4 regions	At least 3	0 regions involved in successfully financed solar PV installations.  However, 2 regions will be involved with the 2 land-based 100 kW land-based plants. In addition to the 100 rooftop installations in Gecek (near Corum), OGM has also requested 2 additional villages with 100 installations, plus another hundred installations to be distributed over 20 villages throughout the country. In total, these pilot projects will involve more than 20 regions in the country.		See Para 40
	Total installed capacity of the projects (kWp)	0	None	400	0 MW installed capacity.  However, with the clarity in the government’s position on rooftop solar PV installations, OGM has requested up to 600 kW of installed capacity that are wholly funded through GEF funds as grants.		See Para 40
<b>Output 2.1:</b> Business plans & feasibility studies prepared for a total of 4 demonstration projects in forest villages up to 400 kW	No. of project reports prepared and approved	0		4	2 project reports prepared by GUNDER and approved for 2 land-based 100 kW solar PV plants.  Reports will be prepared for the rooftop solar phase of the pilot projects.		See Para 41

Project Strategy	Indicator	Baseline Level	Level in 2018 PIR	End-of-Project Target	Midterm Level and Assessment	Achievement Rating	Justification for Rating
<b>Output 2.2:</b> Four demonstration projects successfully implemented in forest villages in 4 different regions.	No. of projects implemented	0		4	0 projects successfully implemented.  However, 2 projects are now being implemented plus rooftop solar PV installations in 4 more villages are scheduled to be completed by early 2020. As such, the target can be reached within current time frame of Project.		See Para 40
	No. of regions involved	0		4	0 regions where projects successfully implemented.  However, the target can be reached within current time frame of Project where pilot solar PV installations in 6 villages are scheduled to be completed by early 2020.		See Para 40
	Total installed capacity of the projects (kWp)	0		400	0 kWp of installed capacity.  However, new solar PV rollout plan backed by OGM will have 600 kW installed before EOP.		See Para 40
<b>Output 2.3:</b> Case studies prepared on each of the demonstration projects	No. of case studies prepared	0		4	0 case studies prepared.  There is sufficient time to achieve target by EOP and prepare documentation on changes in the electricity consumption of forest villagers with pilot solar PV installations.		See Paras 42-43
<b>Output 2.4:</b> Short video documentary prepared on the demonstration projects	No. of video spots published	0		1	0.  However, target can be reached within the current time frame of Project.		See Paras 42 and 43
<b>Outcome 3.1:</b> Sustainable Energy Financing Mechanism of ORKOY	Amount of reduced CO <sub>2</sub> emissions from the power sector	0	No progress on CO <sub>2</sub> emissions reduced from the power	28,750	No progress on this indicator until the completion of pilot PV rooftop installations under Component 2.		See Paras 44-47

Project Strategy	Indicator	Baseline Level	Level in 2018 PIR	End-of-Project Target	Midterm Level and Assessment	Achievement Rating	Justification for Rating
successfully provides soft loans to contribute to the deployment of at least 30MW of solar PV during project lifetime	(compared to the project baseline) by EOP, tons CO <sub>2eq</sub>		sector due to the development of the 4 pilot PV plants		Target cannot be reached prior to EOP.		
	Cumulative installed capacity of grid-connected PV systems (kWp)	0	Ongoing development of the 4 pilot PV plants that will be grid-connected for demonstration and possible replication by forest villagers	30,000	No progress on this indicator until the completion of pilot PV rooftop installations under Component 2.  Target cannot be reached prior to EOP.		See Paras 44-47
	Cumulative total electricity generation from installed grid-connected PV systems (kWh/year)	0		47,520,000	No progress on this indicator until the completion of pilot PV rooftop installations under Component 2.  Target cannot be reached prior to EOP.		See Paras 44-47
<b>Output 3.1:</b> National Awareness Raising Programme (NARP) for ORKÖY Sustainable Energy Financing Mechanism addressing forest village end-users and cooperatives	NARP is developed	None		12 months after project start	The NARP has not yet been completed due to the lack of approvals over the land-based solar PV plants.  With new EIGM legislation supporting rooftop solar PV installations for residential houses, a NARP will be developed by early 2020.		See Para 47
<b>Output 3.2:</b> Solar PV Training Manual for actors in solar PV value chain (ORKÖY officials, installers, utilities) on how to develop, finance, and implement solar PV projects is prepared, published and disseminated widely	Training manual developed	None		15 months after project start	Manual will be developed on the basis of rooftop solar PV that has recently been legislated by EIGM.		See Para 47
<b>Outcome 3.2:</b> Sustainable Energy Financing Mechanism of ORKÖY has in place systems for M&E,	MRV system developed	None		Projects annual reports	Not yet developed.  However, an MRV system from other similar projects can be adopted with		See Para 48

Project Strategy	Indicator	Baseline Level	Level in 2018 PIR	End-of-Project Target	Midterm Level and Assessment	Achievement Rating	Justification for Rating
quality standards, and certification systems and training programmes					adjustments made for Turkey’s energy environment		
	Quality standards developed	None			EU standards already exist within Turkey’s solar PV industry. With the legislative certainty in April 2019 for rooftop solar PV, quality standards for the associated equipment for residential households will be provided in ORKÖY-PV’s next ITB for rooftop solar PV in June 2019.		See Para 49
	Certification scheme implemented	None			Similar to quality standards developed, EU certification schemes will be adopted by June 2019 and utilized for rooftop solar installations.		See Para 49
<b>Output 3.3:</b> Twenty National workshops held to promote the solar PV training manual targeting solar PV value chain (ORKÖY officials, installers, utilities)	No. of dissemination events	0		20	These dissemination events will be planned once a solar PV training manual for rooftop solar installations is completed. However, conducting 20 of these workshops prior to the EOP will be a challenge.		See Para 48
	No. of involved persons/entities	0		400	Unable to report		--
<b>Output 3.4:</b> MRV system and indicators designed and implemented to reliably track energy consumption	MRV system developed	None		End Year 1	Unable to report		See Para 48
<b>Output 3.5:</b> Quality standards and certification scheme designed and implemented for solar PV hardware and for skilled technicians	Quality standards developed	None		End Year 1	EU standards already exist within Turkey’s solar PV industry. With the legislative certainty in April 2019 for rooftop solar PV, quality standards for the associated equipment for residential households will be provided in ORKÖY-PV’s next ITB for rooftop solar PV in June 2019.		See Para 49
	Certification scheme implemented	None		End Year 1	Similar to quality standards developed, EU certification schemes will be		See Para 49

Project Strategy	Indicator	Baseline Level	Level in 2018 PIR	End-of-Project Target	Midterm Level and Assessment	Achievement Rating	Justification for Rating
					adopted by June 2019 and utilized for rooftop solar installations		
<b>Output 3.6:</b> Workshops with domestic and international banks to consult, build familiarity and integrate their lending to solar PV with ORKÖY	No. of events organized	0		At least 10	Unable to report.  However, these are planned before the EOP.		See Paras 48-50
	No. of involved institutions	0		At least 50	Unable to report.  However, there are a number of financial institutions interested in working with ORKOY though the target is not achievable prior to the EOP.		See Paras 48-50
<b>Output 3.7:</b> Project Website - Practical Guide to Investing in Solar PV in Turkey	Web site developed and updated	None		Within 6 months	Website not yet developed		See Para 71
<b>Output 3.8:</b> Programme of Activities (PoA) carbon market for forest villages solar PV project	The programme developed	0		End of year 2	No program has yet been developed.  However, it is unlikely that this program will be developed prior to the EOP.		See Para 51
<b>Output 3.9:</b> 30 MW of solar projects successfully implemented	Amount of reduced CO <sub>2</sub> emissions from the power sector (compared to the project baseline) by EOP, tons CO <sub>2eq</sub>	0		28,750	0.  Target unlikely to be achieved within the remaining period of the Project.		See Para 53
	Cumulative installed capacity of grid-connected PV systems (kWp)	0		30,000	0.  Target unlikely to be achieved within the remaining period of the Project.		
	Cumulative total electricity generation from installed grid-connected PV systems (kWh/year)	0		47,520,000	0.  Target unlikely to be achieved within the remaining period of the Project.		

regulate for purposes of “own consumption”. This coincided with the Government’s closure of the “Director-General’s Office for Cooperatives” under the Ministry of Trade in March 2019 and public disclosure of their new energy policy that unlicensed land-based solar PV projects would no longer be approved after 2020. By May 2019 during the MTR mission, EIGM issued their policy supporting net metering for rooftop solar PV installations to augment this direction (with FiTs that were sufficiently low to discourage electricity sales of unlicensed projects to the grid)<sup>9</sup>.

33. The timing of EIGM’s rooftop solar PV policy has been fortuitous for the MTR mission where it was now possible for OGM to scope its program with ORKÖY to provide solar PV to forest villages. With regards to ORKÖY-PV Project targets, the MTR mission has provided recommendations (see Para 86) for how the Project will utilize remaining GEF funds to finance pilot solar PV installations in an attempt to meet critical objective level targets such as the installed capacity of 30 MW, and GHG emission reductions of 28,750 tonnes of CO<sub>2eq</sub>. For its part in encouraging unlicensed solar PV systems, the Government is supporting reduced application costs for these systems by streamlining applications for installations between 3 to 10 kW (with a small check to ensure the availability of the main local transformer that has a capacity of 50 MW)<sup>10</sup>.
34. However, as of 1 April 2019, the feed-in tariff for these unlicensed solar PV installations is TL 0.26 per kWh, a rate pegged to the USD, and reviewed every 3 months likely to ensure the spirit of “own consumption” for these installations. In addition, the transmission fee was set at TL 0.14 per kWh, leaving TL 0.12 tariff to support payback to the solar PV electricity generation. With the purchase of grid electricity being set at TL 0.65 per kWh (a rate also pegged to the USD and reviewed every 3 months), the electricity bills were to be calculated on the basis of monthly net metering. For example, if the average monthly consumption is 80 kWh, while solar PV installation generates 100 kWh, the household would save the 80 kWh at TL 0.65 it otherwise would have purchased and would in addition be able to sell the remaining 20 kWh to the grid at TL 0.12.
35. The implementation of demonstration solar PV installations using GEF funds followed by a second phase consisting of ORKÖY support through a combination of grants and soft loans, will to a large extent determine how many forest village households will be serviced by solar PV electricity. Currently, there are 2 land-based projects under development (Afyon and Konya), and two rooftop solar PV programmes planned (Corum and Elazig). Further details on the potential achievement of this target with the remaining Project time can be found in Para 86. With regards to the target of the number of jobs created for forest villagers related to solar PV, the installations will be provided by companies that are successful in the ITB process who then outsource these jobs to qualified technicians. The link between these technicians and persons in the forest village is not clear, with the possibility that this target may not be achieved by the EOP.

#### Outcome 1.1 targets:

36. New legislation has come into effect on 10 and 12 May 2019 that supports government policies to ensure that solar PV installations for residences is used only for consumption by the households, and not for the sale of electricity into the grid. As a result, this new legislation provided clarity that

<sup>9</sup> This direction was also caused by the economic crisis in Turkey that resulted in excess power generation in Turkey, and the Government not wanting to regulate the electricity from unlicensed projects into the grid.

<sup>10</sup> For 0 to 3 kW, there is no such search for the 50 MW transformer, and the process is streamlined for these applications.

unlicensed solar PV plants would only be solar PV rooftop installations with capacities that are commensurate to their actual electricity consumption. New legislation also includes:

- allowances for each household in a forest village to install up to 10 kW of installed capacity;
  - allowances for each industrial establishments to install up to 5 MW of installed capacity;
  - an obligation by government to net metering to purchase any excess electricity generated by the solar PV rooftop installation at a rate determined by the Energy Regulatory Commission that is reviewed every 3 months. The FiT (rate for selling electricity to the grid) at the start of the ORKÖY-PV Project was USD 0.13, which would now be equal TL 0.65 per kWh. The fluidity of the new tariff rates and installed capacity commensurate to the households electricity consumption ensures that *any scheme with forest villages solar PV would not be focused on the sale of excess electricity by solar PV installations in forest villages*;
  - measures to streamline the application process for rooftop solar PV. This includes the applicant receiving a permit from TEDAS for the rights to an installed capacity commensurate to their actual monthly electricity consumption, involving municipalities to ensure the rooftops have the static strength for solar PV installations, and decreasing application costs for rooftop solar PV.
37. The appointment and setup in mid-2018 of 4-person ORKÖY-PV unit (also referred to as the SEFM Unit) within ORKÖY provides the appropriate Government of Turkey institutional structure for managing the diffusion of solar PV to forest villages. Since its formation, the SEFM Unit has been active in outreach to beneficiary communities, detailed discussions with mukhtars regarding forest cooperative models, studying household energy consumption, information dissemination and providing guidance to the ORKÖY-PV Project on regulatory requirements for implementing land-based and rooftop solar PV installations in forest villages.
38. Notwithstanding the completion of a study on grid capacity and requirements for upgrading in 4 pilot villages, a technical report to summarize the ORKÖY business model for grid-connected residential solar PV to forest villagers with net metering has not yet been completed due to legislation for rooftop solar PV only being made public in April 2019. With this legislative clarity favouring roof are solar PV as of April 2019, the business model for ORKÖY will be documented by late 2019 based on the ongoing efforts of EIGM to streamline the application process for rooftop solar PV installations, and the assistance of the Project to structure the rollout of the solar PV program for forest villages using GEF funds as grants in concert with ORKÖY funds (20% grant and 80% soft loan). The document will also provide selection criteria for pilot PV installations in forest villages such as a minimum of 10 months occupancy in the house, a minimum level of monthly electricity consumption, and the rooftop being in compliance with municipal standards for static strength.
39. In addition, there is also regulatory certainty as of April 2019 over the future of (unlicensed) land-based solar PV plants. These are only allowed in the case of public installations used for agricultural irrigation, water treatment plants or waste treatment facilities. The land-based pilot projects originally pursued by the ORKÖY-PV Project are therefore no longer allowed. However, since 2 land-based pilot projects were already permitted prior to April 2019, they are currently being implemented with an ongoing ITB process now underway.

#### Outcome 2.1 targets:

40. With regards to the target of “number of projects implemented”, the Project has experienced difficulties in developing these solar PV projects as originally planned in the ProDoc, the main reason

being the shifting legislation of the Government and EIGM on unlicensed land-based solar PV projects as mentioned in Para 36. The end result, however, of what is referred to as “Phase I” of the Project is that 2 of the 4 land-based solar PV projects are currently under an ITB process for Afyon and Konya. Another pilot site, Corum (in the village of Gecek) has agreed to a rooftop solar pilot programme for approximately 25 installations, more in line with the latest legislation. In addition, ORKÖY had expressed to the MTR team and the ORKÖY-PV PMU to maximize remaining ORKÖY-PV resources allocated towards pilot rooftop solar PV in another 3 villages, each with 25 pilot installations. ORKÖY also requested another 100 pilot rooftop installations to be setup in another 15 to 20 villages scattered throughout Turkey (covering more than 4 regions) to maximize its geographical coverage and to optimize dissemination of ORKÖY’s solar PV scheme that will help in deploying ORKÖY’s Sustainable Finance Mechanism. This is summarized in Table 2.

41. In preparation of this new phase of rooftop solar PV for ORKÖY-PV, the Project will be required to prepare business plans for a larger rooftop programme. In addition to the 2 land-based studies already completed by GUNDER, the Project will need feasibility studies and business plans for the rooftop solar PV in 4 villages, and for the installations in the 20 other villages where there will be around 5 installations per village, for a total of 600 kW installed capacity.

**Table 2: Anticipated Phase I Solar PV installations in 2019 under Component 2**

Details	Locations	Budget Year	Number of installations	kW per installation	kW Total
<b>Phase I</b>					
- Land Installation	Afyon and Konya	2019	2	100	200
- Roof Installation	Corum and 3 other villages	2019	100	2	200
- Roof Installations	15 to 20 locations	2019	100	2	200
<b>Total Installed</b>					<b>600</b>

42. Upon completion of these installations, the Project will undertake case studies of each of the villages where rooftop solar PV installations and the 2 land-based solar PV plants and video documentaries are prepared and published. Of interest to ORKÖY will be the changes in electricity consumptive habits after the installation of the solar PV system. While there is a risk of increased electricity generation from these households, there is also a strong likelihood of no increased consumption due to the obligation of the household to pay back the loan in less than 7 years, and a lack of increased disposable income from electricity savings. These studies may also provide clues to future policies regarding the rules of forest villager engagement on these programmes for which ORKÖY and the Government would seek a trend towards financial independence of the forest villager from the solar PV investment. This may especially be valuable considering there will be case studies undertaken for the various installed capacities of 1.2, 2.0, 3.2 and 4 kW, and where the daily household electricity consumption is in the range of 3 to 10 kWh. This may also mean that the forest villager invests disposable income towards the strengthening or their start-up of income generating activities.
43. Case studies will also be undertaken for the land-based solar PV projects. The Government will be able to learn from these installations notwithstanding their halting of approvals for unlicensed land-based solar PV projects. The outcomes from these 2 land-based solar PV plants should be able to inform policymakers and financial institutions active in Turkey of the pros and cons of these projects, and whether or not land-based projects are in the future for Turkey’s unregulated projects for



residential use. Data on generation and use will provide information through documentation or short videos documentaries that policymakers and financial institutions can use to better understand risks associated with the finance and implementation of residential solar PV installations. Information will be shared with a “Residential Solar PV Finance Working Group”.

*Outcome 3.1 targets:*

44. Without the completion of the pilot schemes in Component 2, there has indeed been limited progress on this rollout that involves the ORKÖY sustainable finance mechanism. The mechanism proposed by ORKÖY is to be a combination of a grant and a soft loan, similar to the mechanism used for the SWH programme. The final mix of grant and soft loan is intended to be a grant of 20% of the investment cost and a 7-year 0% interest loan for the 80% remainder of the investment cost. However, to cushion the transition to this soft loan scheme, another phase is proposed by ORKÖY to pilot the management of the roll out and uptake by forest villages of the sustainable finance mechanism. Under this “replication” phase, the transitional soft loan will consist of a combination of 47% grant (13.3% ORKÖY and 33.3% GEF funding) and 53.3% ORKÖY funding (at 0% interest and 7-year tenor). This will lead to a Phase II of anticipated additional installations of solar PV capacity of 2 MW as illustrated in Table 3.

**Table 3: Anticipated Solar PV installations in Phase II**

Details	Locations	Budget Year	Number of installations	kW per installation	kW Total
<b>Phase II</b>					
- Roof Installations	To be determined based on information from Phase I	2020	1,000	2	2,000
<b>Total Installed</b>					<b>2,000</b>

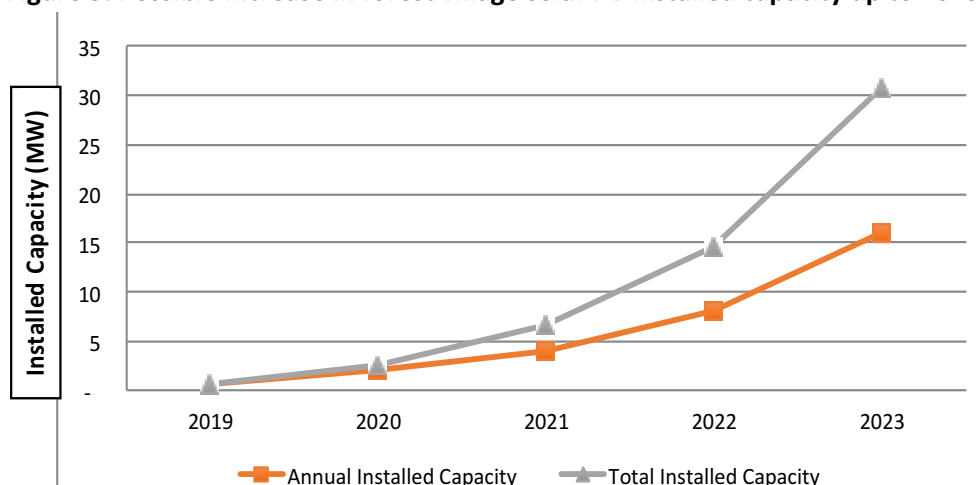
45. The GEF funds available is the determinant of the number of rooftops for solar PV installations for Phase II. With the current EOP scheduled for August 2020, a Phase III cannot be implemented under the ORKÖY-PV Project where solar PV purchases by forest villagers would be completely financed under the ORKÖY sustainable finance model (i.e. 20% grant and 80% ORKÖY soft loan with a 7-year tenor with no interest). ORKÖY’s SFM is to be funded with repayments of loans from earlier years (revolving) and additional budget from ORKÖY. It is envisioned that ORKÖY will continue until the uptake of these loans for forest village residences for solar PV shows saturation, as has happened with ORKÖY’s SWH financing mechanism. It is anticipated for the first 3 years of the SFM (budget years 2021, 2022 and 2023), that potential additional installed capacity under a Phase III would be 28 MW, increasing the total installed capacity resulting from the ORKÖY-PV Project (through completion of Phases I, II and III) to an installed capacity above the 30 MW project target. The installed capacity of a Phase III is summarized on Table 4.
46. Based on the anticipated rollout of ORKÖY’s SFM mentioned in Paras 44 and 45, it would be realistic to assume that over the next 5 years, the target of 30 MW could be achieved under a Phase III with the increases illustrated in Figure 3. A successful ORKÖY SFM to reach this target will require the installation of an estimated 14,000 solar PV systems between 2021 through 2023. While there are risks that this target may not be achieved within a Phase III (risks mainly related to possible disruption in available financing from ORKÖY and the lack of sustained technical support to ensure the market

sustains good quality solar PV installations), these risks could be mitigated with a no-cost extension of the ORKÖY-PV Project to provide an appropriate level of technical support.

**Table 4: Anticipated Solar PV installations in Phase III**

Details	Locations	Budget Year	Number of installations	kW per installation	kW Total
<b>Phase III</b>					
- Roof Installation	To be determined based on information from Phases I and II	2021	2,000	2	4,000
- Roof Installation	To be determined	2022	4,000	2	8,000
- Roof Installation	To be determined	2023	8,000	2	16,000
<b>Total Installed</b>					<b>28,000</b>

**Figure 3: Possible increase in forest village solar PV installed capacity up to 2023**



47. Outputs 3.1 and 3.2 still have not yet been delivered due to the legislative uncertainty during 2017 to 2018 of the Project. However, with the April 2019 legislation supporting the rollout of rooftop solar PV, the National Awareness Raising Programme (NARP) and solar PV training manual can now be prepared with a focus on rooftop solar PV installations.

Outcome 3.2 targets:

48. With regards to the target of “project annual reports for an MRV system, quality standards and implemented certification scheme”, the Project has not yet made substantial progress considering the pilot solar PV installations have not yet been completed from Component 2. ORKÖY-PV Project personnel have mentioned that work in this area would commence in late 2019 once the 2 pilot land-based solar PV plants and rooftop solar installations in 2 forest villages are completed. Existing MRV plans from other rooftop solar programs will be used and adopted for this particular project. The quality of these plans, most importantly, should be sufficiently robust to bring confidence to

potential climate financiers of the quantities of GHG emission reductions being generated by the MRV system. With this incremental strengthening of the MRV system, workshops led by an international consultant (see Para 88) need to be conducted to disseminate a strengthened MRV system along with quality and certification schemes to inform ORKÖY officials, utilities, and solar PV installers throughout Turkey, and to solicit their feedback on these schemes, and to improve them to ensure full utility of the schemes by all stakeholders and enhance the likelihood of climate financing.

49. With regards to quality standards and certification schemes of Output 3.5, the Project will follow EU quality standards and certification schemes. These standards will be contained in the manual from Output 3.2 that will contain the PV standards that have been adopted from international standards into national ones by TSE (i.e. TS EN, TS EN IEC, etc.). However, the Project needs to develop a certification scheme specific to OGM driven projects (using EU schemes as a guide) as a means of launching and sustaining the ORKÖY SFM. To accelerate their adoption in Turkey, the Project should utilize the services of an international consultant who is familiar with the schemes (see Para 88), and who could quickly advise ORKÖY and other relevant stakeholders on the most efficient means of disseminating these schemes.
50. Workshops under Output 3.6 are still necessary in consideration of the possibility that the US\$45 million ORKÖY funds would be exhausted and possibly scaling installation of rooftop solar PV in other non-forest villages throughout Turkey. The MTR mission did have discussions with several financial institutions in Istanbul on their interest in providing finance for rooftop solar PV installations in partnership with ORKÖY. Although there is interest especially from Turkish development banks and EBRD, the provision of commercial finance under current conditions (at 30% interest) does not appear to be a possibility. Furthermore, finance from these institutions is difficult to determine considering the need for finance with ORKÖY may not be determined for another 2 to 3 years, and the difficulties of determining market and living conditions at that time.
51. Further to Output 3.6 and workshops with financial institutions, the current economic situation leading to interest rates of 30% for consumer loans on one hand and the introduction of concessional support under Article 6.2 and 6.4 of the PA creates an opportunity for the Project. Additional resources from financial institutions leveraged with new carbon schemes under the PA, which newly defines carbon credits as “internationally transferred mitigation outcomes” or ITMOs, could scale investment in residential solar PV. Engagement with financial sector stakeholders to consult on ITMO generation from projects like the ORKÖY-PV Project, should therefore be considered and could lead to scaling-up beyond the 30 MW installed solar PV target. While such a scheme is likely not to be fully developed before the EOP as a part of Output 3.8, the Project could aim to have the program designed including informing all stakeholders involved prior to the EOP. The development of the MRV system for this project to be developed under Output 3.5, should consider the possibility of ITMO transfer.
52. The workshops will have the form of consultations with financial stakeholders (i.e. domestic banks and bilateral and international financial institutions and relevant governmental agencies and departments). The consultation should focus on new financial products for finance of residential rooftop solar PV and new developments. These consultations should specifically include policy and regulatory interventions, exploring concessional finance under either Article 6.2 or 6.4 of the Paris Agreement, which can catalyze further investment in rooftop solar PV. The data obtained from the performance of the pilot projects should be an integral part of the engagement, and shared with the sector. The data provides critical information on performance and use patterns.

53. With regards to the delivery of Output 3.9, there is simply insufficient time to the EOP of September 2020 to achieve 30 MW of installed solar PV in forest villages. The achievement of such a large target of installed capacity is now somewhat challenging considering the original target was based on land-based projects with a larger generation capacity per installation. With the shift by government with this legislation for rooftop solar PV, this target is even more challenging since installers were now be dealing with different households at different sites. The possibility of achieving the 30 MW installed capacity target and associated GHG reduction and electricity generated targets by September 2020, will almost certainly justify a request for extension as a recommendation of this MTR. With an extension of 18 to 24 months, this Project can create momentum for the ORKÖY sustainable financing mechanism, and as a deliverable at the EOP, provide letters of commitment and funding from ORKÖY to meet the 30 MW target, albeit after the EOP. This concept is further elaborated in Para 86.

### 3.2.2 Remaining Barriers to Achieving Project Objective

54. A primary barrier remaining in the achievement of ORKÖY-PV Project objectives is the time remaining to the EOP which is up to 1 September 2020, 14 months from the time of writing of this MTR report. Many of the barriers that afflicted the ORKÖY-PV Project since 2016 involved legislative and regulatory barriers, which caused ORKÖY-PV personnel to expend considerable time to overcome. Fortunately, at the time of writing of this MTR, many of these legislative and regulatory barriers appear to have been removed with the Government’s announcement of its preference for rooftop solar PV installations that is net metered with a feed in tariff regime that encourages residential electricity generation for home consumption only. In addition, there is also regulatory certainty over the future of land-based solar PV plants where new legislation provides few if any incentives for developing (as detailed in Para 39). Remaining barriers that remain in obstructing the Project from meeting this objective include:
- the need for increased visibility of the ORKÖY financial mechanism for rooftop solar PV installations amongst forest villages throughout Turkey that will be required to meet or exceed the installed capacity target of 30 MW in forest villages;
  - the need to test the sustainable finance mechanism with ORKÖY on handling of applications and interest by inhabitants in the forest villages;
  - lack of confirmed and identified sources to sustain capitalization of ORKÖY fiscal resources to support continuation of its financial mechanism to reach the 30 MW installed capacity target;
  - the absence of a developed and robust MRV system to track quality of rooftop solar PV installations, electricity generated from these systems, and overall changes in electricity consumption by a beneficiary households, and that is able to attract potential climate financing entities; and
  - the absence of other financial resources (such as commercial funding and climate finance) to support achieving Project objective or scale residential rooftop solar PV in other villages.
55. Without an extension of time of 18 to 24 months to implement the ORKÖY-PV Project, many of the aforementioned barriers would still remain. With the granting of a Project extension, implementing a revised ORKÖY-PV Project strategy using the remaining resources of ORKÖY-PV, there is a strong likelihood that the barriers listed in Para 54 can be removed with the completion of sufficient demonstrations of solar PV installations using ORKÖY’s sustainable finance mechanism. The SFM should provide the required catalyst for initiating interest in forest villages in the investment into

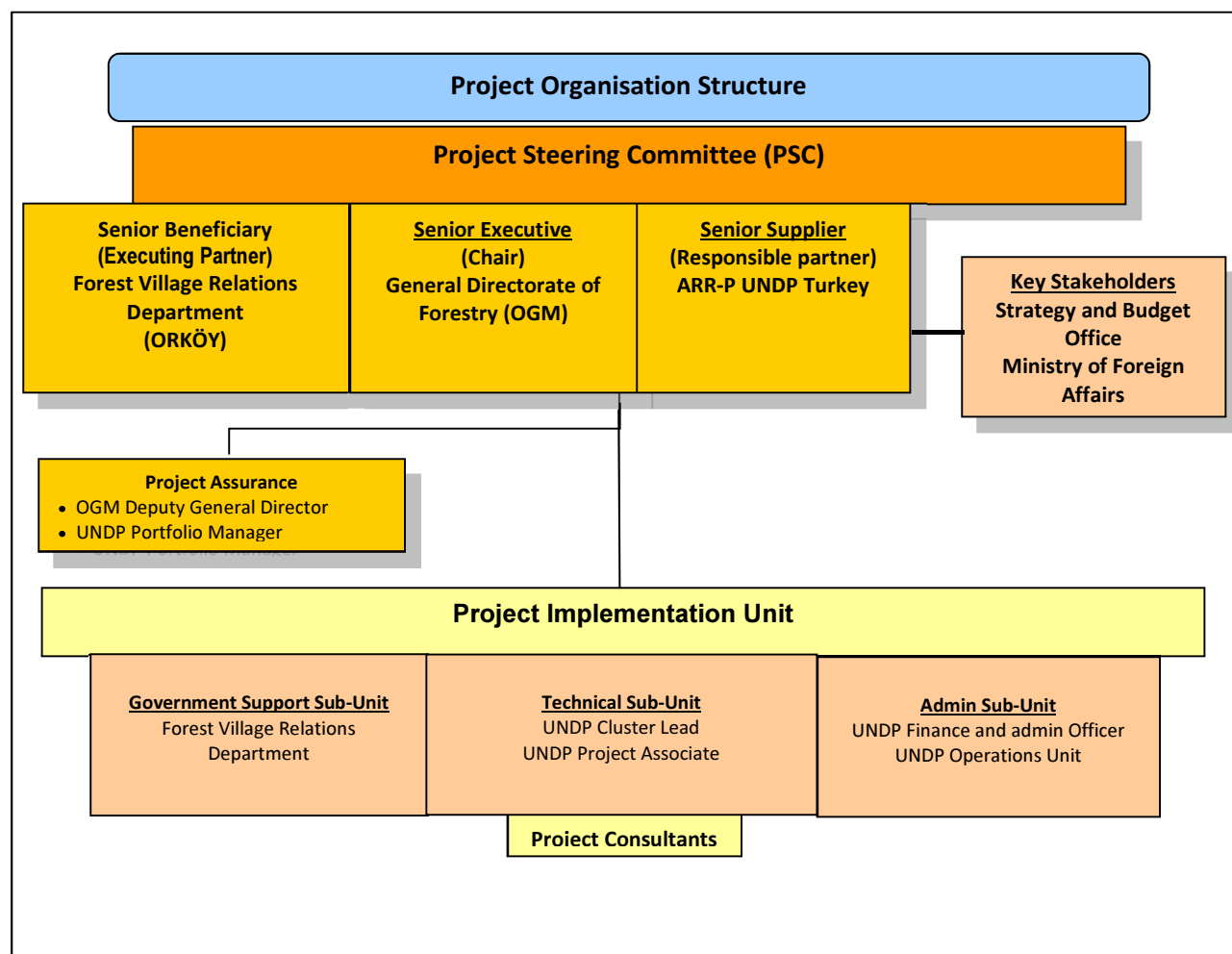
rooftop solar PV installations. Details of the newly planned program with new demonstration phases of the rooftop solar PV installations under Components 2 and 3 are provided in Para 86.

### 3.3 Project Implementation and Adaptive Management

#### 3.3.1 Management Arrangements

56. The ORKÖY-PV Project is under national implementation (NIM) with recent changes made to the Project’s management arrangements. While the ORKÖY-PV Project has been previously headed by the MoAF, (formerly the Ministry of Forestry and Water Affairs) with the Project Steering Committee (PSC) chaired by a Deputy Undersecretary of MoAF, it is now under a different management arrangement as per Decision 3 from the 22 March 2019 PSC meeting minutes as illustrated on Figure 4.

**Figure 4: Current management arrangements for the UNDP-GEF Project “Sustainable Energy Financing Mechanism for Solar Photovoltaic Systems in Forest Villages in Turkey” (ORKÖY-PV) Project**



57. Under the new management arrangements, the PSC is now chaired by the General Director of OGM who has oversight over ORKÖY-PV’s Project Implementation Unit (PIU) that is headed by a Project Coordinator. The PIU consists of 3 subunits for government support, technical and administrative functions. The Project Steering Committee (PSC) reviews and approves annual work plans and budgets prepared by the PIU. The PSC includes representatives from OGM, ORKÖY, and UNDP Country Office. To date, the ORKÖY-PV project has held 2 PSC meetings: one in 2017 and one in March 2019. No meeting was conducted in 2018 due to difficulties encountered in implementing the 4 land-based pilot solar PV plants.
58. ORKÖY-PV has been operating without a full-time Project Manager to date due to the re-structuring of project management teams under UNDP Turkey in 2016-17. The Project Manager role has been filled in part-time by a UNDP’s Natural Resources and Biodiversity Cluster Lead with only a part-time Project Coordinator and full time Project Associate. Other than personnel from GUNDER, all other staff positions within the subunits are not occupied. At the time of writing of this MTR report, the UNDP CO is actively recruiting for a full-time Project Manager. Once this position is filled in, and the recommendations from this MTR report are adopted by management, UNDP and the ORKÖY-PV Project will recruit the necessary staff towards meeting ORKÖY-PV’s objective. Descriptions of some of these personnel are provided in Paras 86, 88 and 90.

### **3.3.2 Work Planning**

59. The MTR team was provided one annual work plan (AWP) prepared by the ORKÖY-PV Project, from 2017, and a multiyear work plan for the entire Project from 2017 to 2020. No AWP’s were provided for 2018 or 2019, presumably due to the poor progress experienced in 2017 and 2018, and the constant adaptive management required by PIU to overcome the numerous obstacles that were encountered in land acquisition and permitting in 2018 and 2019 for the land-based pilot solar PV plants. The 2017 AWP was based on activities as envisaged by the ProDoc as well as the Inception Workshop of November 2016. The 2017 PSC meeting minutes do not provide much evidence of results being discussed and proposals tabled on results-based action plans, likely due to the poor progress of the Project since its commencement in August 2016.
60. The ORKÖY-PV Project’s progress reports were provided as PIRs from 2017 and 2018 that provided fairly well detailed information on how the Project was being adaptively managed. This includes reporting progress against the outcome indicators of the ORKÖY-PV PRF. Since this MTR report was prepared just prior to the issuance of the 2019 PIR, much of the information from these previous PIRs provide a backdrop to the main implementation issues of this Project which occurred between July 2018 and the present (the details of which were provided in Paras 32 to 34). As such, details of the adaptive management of the ORKÖY-PV Project has been provided by interviews with the UNDP’s Natural Resources and Biodiversity Cluster Lead, part-time Project Coordinator, full time Project Associate, and UNDP’s part-time Senior Technical Advisor Energy Efficiency & Renewable Energy.
61. In conclusion, work planning for the ORKÖY-PV Project has been difficult due to the ongoing delays and regulatory issues for the land-based solar PV projects in 2018 and 2019. With many of the expected outcomes and outputs for 2017 not being achieved, the Project has been forced to adaptively manage its activities in response to the numerous regulatory obstacles in an effort to provide timely delivery of the pilot solar PV plants of Component 2.

### 3.3.3 Finance and Co-Finance

62. After 33 months of Project disbursements, only 12% of the ORKÖY-PV grant of US\$3.78 million has been expended or committed as of 16 May 2019. The expenditure of ORKÖY-PV’s GEF budget up to 16 May 2019 can be characterized as follows:
- Most of the expenditures, approximately 75%, are personnel expenses, either contractual or individual consultants;
  - Approximately 48% of the US\$465,987 expended to date for GUNDER expenditures for various consulting reports<sup>11</sup> and the study tour to Germany in 2018;
  - Of the GUNDER expenditures, US\$95,913 was expended on personnel to set up the land-based pilot solar PV projects on Component 2;
  - The remaining 52% of the US\$465,987 was spent on travel-related costs to the demonstration communities and project management;
  - Remaining funds available to undertake and implement demonstration solar PV installations and piloting the ORKÖY financing scheme is in the order of US\$3.3 million;
  - Due to the devaluation of the Turkish lira since late 2017, the budget of the Project has experienced some increases, availing additional Turkish liras for local salaries, consulting fees and the demonstration budgets of Component 2.
63. Despite the low rates of disbursement, the Project has demonstrated that appropriate financial controls are in place, notably through the detailed Project budget reports made available to the MTR team. Moreover, these reports provide evidence that expenditures of activities were made through informed decisions that closely follow the plans in the ProDoc. One of the indications of Project cost control is the involvement of UNDP’s Procurement Department at the CO, which is involved in the selection of a solar PV contractor for 2 land-based solar PV plants of Component 2, and ensuring all UNDP and related rules procurement complied with. In conclusion, however, the cost effectiveness of the use of the ORKÖY-PV Project budget to date has been **moderately satisfactory**, primarily from the lack of delivery of demonstration solar PV plants (Component 2) within the first 3 years of the Project. Disbursement of the ORKÖY-PV’s GEF resources are provided in Table 4.
64. Co-financing commitments for the ORKÖY-PV Project was to have been US\$52.5 million of which US\$45 million was to be a part of ORKÖY’s financing mechanism. To date, only in-kind co-financing from ORKÖY has been realized in attempts to overcome the difficulties in implementing the land-based demonstration solar PV plants, and to align the Project with the recent legislative changes in April 2019 that favour rooftop solar PV installations. The in-kind co-financing of ORKÖY is based on their commitments to form the SFM Unit, identifying demonstration models for Components 2 and 3, collecting information from forest villages on household energy use, and household ability to pay for a rooftop solar PV installations. The “grant” co-financing from ORKÖY for the sustainable financing mechanism will only be realized contingent on the success of the demonstration rooftop solar PV installations. ORKÖY’s financial mechanism will be funded likely from OGM’s forest extraction activities. As income from these activities is likely to remain available and being outside the budget of the central government, it is realistic to assume that the funding will remain available when the solar PV demonstrations are proven to be attractive for forest village inhabitants. However, based on the lack of co-financing leveraged to date, co-financing of the ORKÖY-PV project to date has been **moderately unsatisfactory**. Co-financing details to date are summarized on Table 5.

<sup>11</sup> These reports would have included delivery or partial preparation of reports for Outputs 1.1, 1.6 and 2.1.

**Table 4: GEF Project Budget and Expenditures for the ORKÖY-PV Project (in USD as of 16 May 2019)**

ORKÖY-PV Components	Budget (from Inception Report)	2016 <sup>24</sup>	2017 <sup>25</sup>	2018	2019 <sup>26</sup>	Total Disbursed	Total to be expended in 2019 <sup>27</sup>	Total Remaining
COMPONENT 1: Policy & Institutional Framework for supporting sustainable energy financing mechanism for solar power in forest villages	755,100	-	-	127,513	7,360	134,873	-	620,227
COMPONENT 2: Solar PV demonstration Projects	1,241,009	-	-	180,154	25,910	206,064	-	1,034,945
COMPONENT 3: Replication and scaling up – Enhancement of the sustainable energy financing mechanism	1,633,891	-	-	38,731	8,040	46,771	-	1,587,120
Project Management	150,000	-	-	70,941	7,100	78,041	-	71,959
<b>Total (Actual)</b>	<b>3,780,000</b>	-	-	<b>417,339</b>	<b>48,410</b>	<b>465,749</b>	-	<b>3,314,251</b>
Total (Cumulative Actual)		0	0	417,339	465,749			
Annual Planned Disbursement (from ProDoc) <sup>28</sup>		1,216,610	1,168,952	957,200	390,102			
<b>% Expended of Planned Disbursement</b>			<b>0%</b>	<b>44%</b>	<b>12%</b>			

<sup>24</sup> Commencing March 2016 - the Project Document signed by the Government of Turkey on 1 March 2016. Expenditures included in 2018

<sup>25</sup> Expenditures included in 2018

<sup>26</sup> Up to 16 May 2019

<sup>27</sup> Expenditures for the remainder of 2019 not yet allocated pending completion of this MTR

<sup>28</sup> Year 1 is only March-December 2016 when the Project was being implemented



Table 5: Actual Co-Financing for ORKÖY-PV Project (as of 16 May 2019)

Co-financing (type/source)	UNDP own financing (million USD)		Government (million USD)		Partner Agency (million USD)		Private Sector (million USD)		Total (million USD)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Grants <sup>29</sup>	0.100	0.000 <sup>30</sup>	45.000						45.100	0.000
Loans/Concessions									0.000	0.000
• In-kind support	0.100		2.675	2.032 <sup>31</sup>			4.625		7.400	2.032
• Other									0.000	0.000
<b>Totals</b>	0.200	0.000	47.675	2.032	0.000	0.000	4.625	0.000	52.500	2.032

<sup>29</sup> Includes all cash contributions

<sup>30</sup> TRAC expenditure is only USD 237.20.

<sup>31</sup> Estimate assumes Central Staff: 1 Departments, 4 staff Regional Directorates: 4 directorates and 5 staff Grand Total: 24 staff with a monthly average cost: 10,000 TL X 24 staff = 240,000 TL, annual Cost: 240,000 X 12 = 2,880,000 TL, spread over a 3-year period, the cost was 2,880,000 X 3 = 8,640,000 TL, and assuming 1 USD = 4.25 TL, 8,640,000 TL is equivalent to USD 2,032,940.

### 3.3.4 Project Level Monitoring and Evaluation Systems

65. The MTR team has had access to the 2017 and 2018 PIRs that provide details of ORKÖY-PV progress reporting for monitoring and evaluation of all Project outcomes and indicators. These reports inform the ORKÖY-PV Project team and counterpart government personnel mainly on the progress of implementing the demonstration solar PV plants of Component 2. Considering the lack of progress in 2017 and 2018, and the recent April 2019 legislative clarity favoring rooftop solar PV installations, the style of PIRs will provide appropriate information for the purposes of managing M&E, and managing “critical risks” (which should be divided into the categories of political, financial, organization, environmental and organizational). The rating of M&E systems of the ORKÖY-PV Project is **moderately satisfactory** with the need to improve PIR reports by reporting the progress of each of the outputs of ORKÖY-PV that are listed in the PRF. This report is making a recommendation for using a new PRF as detailed in Para 87 and Appendix F.

### 3.3.5 Stakeholder Engagement

66. The Project has made **satisfactory** efforts to facilitate partnerships that can be categorized as follows:
- Government agencies such as EPDK, TEDAS and TEIAS, all of whom are important in the regulatory process for the approval of the grid-connected solar PV projects;
  - Mukhtars or forest village councils where many the decisions at the forest village level are made;
  - Private sector companies involved in the supply chain for solar PV installations;
  - GUNDER, the Turkish Chapter of the Solar Alliance with whom the Project has an RPA to provide expert technical assistance from the solar PV industry in Turkey; and
  - Financial Institutions for potential co-financing. However, due to the high interest rate (Paras 10 and 48) and limited progress with bankable projects, outreach to financial institutions at the past junctures of the Project would have been irrelevant. Nevertheless, it is proposed that the PIU over the remainder of the Project should engage with financial institutions to provide information of the performance of the demonstration projects to jointly seek with these financial institutions for possible funding mechanisms for scaling up of solar PV beyond forest villages (more details in Para 90).
67. The PIU of the ORKÖY-PV Project have invested considerable time on outreach to all stakeholders and developing a strong relationship with ORKÖY and OGM personnel. Most importantly, this has resulted in outreach and involvement of forest village stakeholders to increase their awareness of the importance and benefits of renewable energy to their communities as well as the country and a raised profile of the Project. In addition, PIU personnel have also built good relationships with all the key government agencies involved in regulatory approvals of the demonstration solar PV projects of Component 2. For the remaining period of the ORKÖY-PV Project, the Project is in position to implement a number of the demonstration and replication solar PV projects in an attempt to reach the target of 30 MW of solar PV installed capacity in forest villages.
68. Another key stakeholder engaged on ORKÖY-PV is GUNDER, a sectoral NGO with support from both public and private sectors entities related to the PV industry in Turkey, and established through the Decision of Council of Ministers no. 92/2752 of 10 February 1992, pursuant to Law #3335 on Establishment of Organizations with International Qualifications. The Project has an RPA with GUNDER to support the Project with local and international experience and expertise of solar PV systems, its installation, and associated regulatory, legal, financial and administrative aspects of

these installations. This is viewed as an excellent and essential partnership for ORKÖY-PV since GUNDER can utilize its strong links with several international platforms and extensive professional network with individual PV professionals and international organizations, to improve ORKÖY-PV delivery. As such, the GUNDER partnership fills a large void of relevant local and global solar PV expertise to support ORKÖY-PV activities and increase its global visibility.

### 3.3.6 Reporting

69. ORKÖY-PV progress reporting has been **satisfactory** in the context of providing ORKÖY-PV Project personnel with sufficient information to adaptively manage the Project, and to provide adequate budget allocations. Paras 59 to 61 provide evidence for this statement. Moreover, there is evidence the Project has used its 2017 and 2018 PIRs as well as knowledge collected from one-on-one meetings with ORKÖY and OGM to contribute to appropriate actions for adaptive management of the ORKÖY-PV Project.

### 3.3.7 Communications

70. With regards to Project communications with stakeholders, ORKÖY-PV project personnel have spent considerable efforts to maintain communications with ORKÖY-PV stakeholders:
- The Project has close collaboration with ORKÖY and OGM in facilitating this outreach, notably with respect to initial and ongoing consultations with the 4 communities that are targeted for pilot solar PV installations, land-based or rooftop installations;
  - ORKÖY-PV project personnel also have facilitated several discussions with the various agencies responsible for regulatory approval of pilot solar PV projects (under Component 2). This includes discussions with EPDK, TEDAS, TEIAS and host municipalities, all agencies required for consultations with regards to energy pricing, quotas for renewable energy into the grid, pricing for the use of distribution and transmission lines, and regulations regarding municipal requirements for approval of solar PV installations that are either land-based or located on rooftops;
  - In general, despite the poor progress of ORKÖY-PV, its communication with stakeholders has been satisfactory as evidenced by the stakeholders that were interviewed during the MTR mission of May 2019.
71. The ORKÖY-PV Project does not yet have a specific website for its Project activities to promote its solar PV program and financial mechanisms. This is largely due to the lack of progress during the first 33 months of the Project. With the legislative certainty for rooftop solar installations, the Project is now able to set up its website initially to describe the pilot solar PV installations (using the 100% GEF grant) under Component 2, and the impacts that these installations have on the energy consumption of the particular household. It is expected in 2020 when the initial ORKÖY financial mechanism is implemented that further updates on the impacts of these rooftop solar PV installations will be provided on this website.

## 3.4 Sustainability

72. In assessing sustainability of the ORKÖY-PV Project, the mid-term reviewers asked “how likely will the Project outcomes be sustained beyond Project termination?” Sustainability of these objectives

was evaluated in the dimensions of financial resources, socio-political risks, institutional framework and governance, and environmental factors, using a simple ranking scheme:

- 4 = *Likely (L)*: negligible risks to sustainability;
- 3 = *Moderately Likely (ML)*: moderate risks to sustainability;
- 2 = *Moderately Unlikely (MU)*: significant risks to sustainability; and
- 1 = *Unlikely (U)*: severe risks to sustainability; and
- U/A = *unable to assess*.

Overall rating is equivalent to the lowest sustainability ranking score of the 4 dimensions.

73. Financial risks to sustainability: Current financial risks to the sustainability of the ORKÖY-PV Project are related to the lack of confirmed sources of financing that would allow this Project to reach its target of 30 MW of installed solar PV capacity. The current level of funding from ORKÖY appears to be equivalent to US\$20 million. These funds are sourced from revenues generated from OGM’s forestry activities which are transferred to ORKÖY’s financial mechanism (outside the budgets of the central government) for assisting forestry communities that includes assistance for agriculturally based income generating activities and the planned solar PV installations. According to discussions with ORKÖY personnel, access to these ORKÖY assistance funds including the solar PV financial mechanism is initiated in the September of each year for entry into the following year’s budget (a process that is coordinated by the Special Budgeting Office of the Presidency). While discussions with ORKÖY personnel during the MTR mission were highly positive with regards to securing funds for ORKÖY’s solar PV financial mechanism, there are some risks that the required budget may not be provided for a particular year.
74. Moreover, the current capital cost estimate for the installation of 30 MW of installed solar PV capacity is in the order of US\$45 million that assumes the unit installed cost of US\$1,500 per kilowatt. On the basis of the planned rollout of the ORKÖY financial mechanism is depicted on Figure 5, it is possible that as much as 6.6 MW of solar PV capacity could be installed by the EOP, if the Project receives an extension of 18 months with an EOP of 1 March 2022. However, beyond this EOP date, funds towards the ORKÖY financial mechanism for solar PV installations will need to be confirmed on an annual basis to meet the target of 30 MW of installed capacity. Based on Figure 5, and assuming funds are available for substantial growth in the number of solar PV installations in 2022 and 2023, the 30 MW target for forest village installed solar PV capacity could be reached by 2023. For these reasons, the rating for the financial risks to sustainability is moderately likely (ML).
75. Socioeconomic risks to sustainability: The ORKÖY-PV Project appears to have excellent relationships with all stakeholders that are mentioned in Section 3.3.5. In addition, there is also a strong likelihood that the demonstration solar PV installations will result in substantial changes to participating forest village households, likely in 2 different ways. Firstly, those households that have received the 100% grant under Component 2 are likely to increase their energy consumption considering that they do not have to service any debt. Secondly, for those forest village households that assume service debt from the ORKÖY financial mechanism under Component 3, there is a strong likelihood that these households may not increase their energy consumption within the 5 to 7 years of service debt. Notwithstanding these changes in energy consumptive patterns, there is an anticipation that investment in these solar PV systems will be popular amongst forest villagers considering the benefits of reduced household costs and increase reliability of electricity supplies.

76. On the supply side for solar PV systems in Turkey, while the current interest rates are high, the increasing price of electricity (that is also pegged to the USD) and the recent solar PV legislation change is probably going to lead to an increase in residential rooftop solar PV installations. This increase will challenge the sector to increase its number of skilled solar PV technicians that may result in a number of weaker private sector solar PV entities where the risk of inferior installations exists. This risk may dampen some of the enthusiasm for solar PV installations amongst forest villages unless there are substantial efforts to ensure high quality of installations. However, according to GUNDER, more than 3,000 PV and SWH installation companies exist in Turkey. As such, the socioeconomic risks to sustainability is rated as moderately likely (ML).
77. Institutional framework and governance risks: Although there are no national standards for solar PV equipment and their installations, the solar PV industry in Turkey generally complies with EU standards in this regard. For example, the recent ITB for the 2 land-based solar PV plants follow these EU standards. Moreover, it is likely ITB's for future rooftop solar programs in each village will adopt standards and regulations for all ORKÖY supported solar PV projects.
78. A higher risk of the Project from a governance perspective will be the shortage of management personnel with the required capacity and skills within ORKÖY and OGM to manage a larger solar PV program. Although the existence and functionality of the SFM Unit enhances the possibilities of recruitment, ORKÖY and OGM may also experience shortages of inspectors required to ensure compliance with all suppliers and installers of solar PV equipment with the standards as specified in the ITB. In addition, the Project will assist ORKÖY in setting up an MRV unit that will be responsible for these inspections and the close monitoring of the electricity savings and GHG emission reductions from these solar PV installations. This suggests that continued support *is required* to sustain the capacity of ORKÖY and OGM personnel who will ensure solar PV installations under the ORKÖY sustainable financial mechanism are of a high quality and maximize generation of GHG emission reductions from the power sector. As such, institutional framework and governance risks to sustainability is rated as moderately likely (ML).
79. Environmental risks to sustainability: One of the main drivers of the ORKÖY financial mechanism for solar PV installations is to reduce the vulnerability of forest villages who are exposed to higher climate risks. In addition, the solar PV installations will also reduce the dependency of forest villages on fossil fuels. With all other Project inputs are geared towards reducing GHG emissions with collateral benefits in improving local air quality and living conditions, environmental risks to sustainability of this Project are viewed to be insignificant, and resulting in a rating of environmental risks to sustainability as likely (L).

## 4. CONCLUSIONS AND RECOMMENDATIONS

### 4.1 Conclusions

80. The commencement of its operations, the ORKÖY-PV Project has experienced numerous and difficult unforeseen regulatory hurdles in developing land-based demonstration solar PV projects in 4 villages under Component 2. This included difficulties in land acquisition and permitting approvals, many of which were not anticipated prior to the initiation of the development of these projects. In addition to the difficulties of having forest village cooperatives implement and manage land-based energy projects, these regulatory hurdles have increased development costs and caused substantial delays. The resulting outcome has been only 2 land-based solar PV projects approved for implementation as of July 2019 and leaving the Project short of its goal of 4 land-based solar PV projects.
81. More importantly, as of May 2019, there has been legislative clarity regarding the government’s position on solar PV power generation and its encouragement of rooftop solar PV installations. The new policy now defines lower feed-in tariffs and no relief from transmission costs for rooftop solar PV installations, effectively encouraging households to consume the electricity it generates from rooftop solar PV installations, and removing the focus on each household on profiting from net-metered electricity generation. The new policy also serves to discourage land-based solar PV plants, which are more difficult for the government to enforce in the context of minimizing electricity sales to the grid from these plants. This has in part been driven by the Government’s desire to avoid an oversupply of electricity in Turkey’s market affected by the slowdown in its manufacturing sector.
82. The new policy also reduces the risks for the ORKÖY-PV Project to move forward on piloting rooftop solar PV installations in forest villages notwithstanding their higher unit costs to land-based solar PV plants. ORKÖY’s position of the ORKÖY-PV Project is for its continuance but to re-focus on the promotion and piloting of rooftop solar PV installations for forest village households. However, in consideration of the substantive efforts over the past 2 years undertaken to obtain regulatory approvals, the 2 land-based solar PV plants in villages near Afyon and Konya will continue to receive ORKÖY-PV support. Once completed, these plants will provide valuable lessons to the Government of Turkey on the benefits of these types of projects to forest villages, and the experiences in monitoring community consumption of electricity from land-based projects.
83. The current balance in the ORKÖY-PV budget is US\$3.3 million. With over 13 months remaining until the current EOP, the Project cannot fully utilize these funds unless a no-cost Project extension is granted. Furthermore, there will be insufficient time to catalyse and launch ORKÖY’s sustainable financial mechanism, envisaged as a 20% grant and 80% soft loan for each rooftop solar PV installation. Without an extension of ORKÖY-PV, the Project will not be able to fully expend the remaining funds and the opportunity to catalyze solar PV installations for forest villages will be lost.
84. There is also another opportunity for the Project in consideration of the current economic situation that has to interest rates of 30% for consumer loans on one hand and the introduction of concessional support under Article 6.2 and 6.4 of the Paris Agreement. This opportunity consists of Project-supported engagement with financial sector stakeholders to consult on ITMO generation from solar PV installations that are being supported by the ORKÖY-PV Project and ORKÖY, creating the possibilities of scaling the rooftop solar PV installations beyond the 30 MW target.
85. Table 6 provides a summary of the achievements and the MTR ratings for the ORKÖY-PV Project.

**Table 6: MTR Ratings & Achievement Summary Table for “ORKÖY-PV” in Turkey**

Measure	MTR Rating <sup>32</sup>	Achievement Description
<b>Project Formulation</b>	Conceptualization/ Design Rating: 4	Project strategy that included US\$ 50 million co-financing for ORKÖY’s SFM for land-based plants was sound for Turkey’s economic conditions in 2015. However, with Turkey’s economic slowdown in 2017, the devaluation of its currency, and subsequent change in energy policy favouring rooftop solar PV, the original project strategy was no longer relevant. Forecasting these changes was not possible for the Project (Para 25).
	Stakeholder Participation Rating: 5	Project formulation was conducted in close consultation government, international organizations, finance institutions, NGOs, PV manufacturers and installers (Para 22).
<b>Progress Towards Results</b>	Objective Achievement Rating: 2	Only progress is ITB process for 2 land-based 100 kW solar PV plants to be awarded in July 2019 (Para 31). Remaining funds for pilot projects to be used to pilot rooftop solar PV installations totaling 200 kW of installed capacity. With 14 months remaining in Project, there is insufficient time for additional pilot projects to demonstrate an ORKÖY SFM unless there is a Project extension for more than 18 months (Para 35).
	Outcome 1 Achievement Rating: 3	ORKÖY’s SEFM Unit established (Para 37). However, Government of Turkey under their own initiatives issued a new net metering policy in May 2019 in favor of <u>rooftop solar PV installations</u> and promoting household self-consumption to mitigate the risk of oversupply of electricity into the grid (Para 36). Project plans to develop its own selection criteria and legal documents in support of these new policies (Para 38).
	Outcome 2 Achievement Rating: 2	ITB process underway for 2-100 kW land-based solar PV plant demonstrations. New net metering policy favoring rooftop solar PV now allows Project to prepare documents and ITB process for another 200 kW of rooftop solar PV pilots (Para 40).
	Outcome 3 Achievement Rating: 2	No progress until completion of demonstration projects under Component 2 (Para 44).
<b>Project Implementation &amp; Adaptive Management</b>	Implementation Approach Rating: 4	Despite not having a full-time Project Manager (see Para 58), the Project has been appropriately managed adaptively, using the PRF and maintaining a good relationship with the ORKÖY SEFM Unit. The lack of progress to date cannot be attributed to a poor implementation approach.
	Monitoring and Evaluation Rating: 4	Project personnel have demonstrated their ability to keep current on issues and obstacles towards implementing Component 2 demonstration projects. However, there is a need to improve PIR reports by reporting the progress of each of the outputs of ORKÖY-PV that are listed in the PRF (Para 65).
	Stakeholder Participation Rating: 5	Project has invested considerable time on outreach to all stakeholders and developing a strong relationship with ORKÖY and OGM personnel. This includes all government agencies involved with the sale of electricity and communities hosting demonstration projects under Component 2 (Paras 66 and 67).
<b>Sustainability</b>	Sustainability Rating: 3	The “moderately likely” risk is related to the lack of confirmed ORKÖY financing for scale up of rooftop solar PV programs for forest villages. This is related to the fact that ORKÖY financing cannot be confirmed until the September prior to the year of implementation (Paras 73 and 74).
<b>Overall Project Achievement and impact</b>	Rating: 3	Project achievement to date has been delayed by unforeseen regulatory obstacles, clarified as of April 2019 in favor of rooftop solar PV (Paras 80-81). While the impact of ORKÖY-PV to date has been minimal, ORKÖY remains keen to utilize the remaining GEF resources to demonstrate rooftop solar PV followed by replication and scaling up of the ORKÖY’s SFM, possible only if a Project extension is granted (Paras 82-83).

<sup>32</sup> Evaluation rating indices (except sustainability – see Para 70): 6=Highly Satisfactory (HS): The project has no shortcomings in the achievement of its objectives; 5=Satisfactory (S): The project has minor shortcomings in the achievement of its objectives;

## 4.2 Recommendations

86. To improve implementation (and meet GHG emission reduction targets), the ORKÖY-PV Project as a **first priority** should seek a 24-month extension from UNDP and GEF to be able to utilize its remaining resources of US\$3.314 million to maximize the number of solar PV installations using GEF grant funding in an effort to reach the objective level target of 30 MW of installed solar PV capacity. On the basis of the remaining budget and local capacity to replicate and scale up solar PV installations, a rollout schedule for rooftop solar PV installations for the remainder of this Project with a 24-month extension is proposed and illustrated on Figure 5. The primary purpose of increasing the number of solar PV installations is to more effectively raise awareness of ORKÖY’s solar PV SFM across a wider geographic area covering several regions within Turkey. Details of the rollout plan on Figure 5 includes:

- Under Component 2, implementation of the 2 land-based solar PV plants (in Afyon and Konya each at 100 kW that are also referred to as a part of Phase I) that are both undergoing an ITB process with UNDP, with an expected award of these 2 projects by July 2019. While there may be limited potential for replication of land-based solar PV plants based on current legislation and ongoing discussions with EIGM, these 2 projects need to proceed considering the substantial efforts of the village and the Project personnel to obtain all permits and regulatory approvals for these solar plants. Upon their commissioning, lessons will be generated from the operations of these land-based solar PV plants for ORKÖY and EIGM in the event that there are future legislative efforts to encourage more land-based solar PV plant developments;
- Under Component 2, an increase in GEF resources from the ORKÖY-PV Project are proposed to support 200 rooftop solar PV installations in 2019 on residential houses considering the favorable legislation encouraging these installations including the streamlining of rooftop solar PV applications. This would include 4 villages each with 25 installations plus an additional 20 villages each with 5 rooftop installations. These installations (also referred as Phase I) will be financially supported 100% by GEF grant, and would be subjected to MRV activities for case study information that will generate lessons for scaling up of rooftop solar PV installations;
- Under Component 3, two additional phases are proposed:
  - *replication of the rooftop solar PV installations from Component 2 (referred to as Phase II)*. This will commence in September 2019, a date when ORKÖY secures commitments for funding support for forest village solar PV installations in 2020, supported by marketing efforts throughout Turkey for promoting rooftop solar PV with ORKÖY. For these installations, the proposed financing for an estimated 1,000 solar PV installations would be financed with 33% GEF funding (grant) and 67% ORKÖY funding (of which ORKÖY funds are divided into 20% grant and 80% soft loan<sup>33</sup>). Similar to installations under Component 2 (or Phase I), these installations would also be subject to MRV activities and the generation of lessons to be learned for further scale up of this program;
  - *scale up of rooftop solar installations in 2021 and 2022 (referred to as Phase III)*:
    - similar to the aforementioned replication phase, Phase III will commence in September 2020 to secure ORKÖY funding and a marketing campaign similar to Phase II;

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4=Moderately Satisfactory (MS): The project has moderate shortcomings in the achievement of its objectives; 3=Moderately Unsatisfactory (MU): The project has significant shortcomings in the achievement of its objectives; 2=Unsatisfactory (U) The project has major shortcomings in the achievement of its objectives; 1=Highly Unsatisfactory (HU): The project has severe shortcomings in the achievement of its objectives.

<sup>33</sup> 0% interest and tenor of 7 years



Figure 5: Rollout of ORKÖY-PV Demonstration Projects and Replication and Scale-up Phases

Activity	Number of rooftops	Installed capacity (kW)	ORKOY Grant (US\$)	ORKOY Soft Loan (US\$)	GEF Cost (US\$)	Total Cost	2019					2020					2021					2022					2023											
							J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Component 2: Solar PV Demonstration Projects (Phase I)																																						
2 - 100 kW land-based pilot plants	0	200	0	0	300,000	300,000																																
Rooftops in 4 villages (avg install @ 2 kW each)	100	200	0	0	300,000	300,000																																
Rooftops in 20 villages (10 kW each)	100	200	0	0	300,000	300,000																																
MRV																																						
Sub-total:	200	600	0	0	900,000	900,000																																
Component 3: Replication (Phase II)																																						
Marketing for 2020 replication phase																																						
Rooftops for 2020 (avg install @ 2 kW each)	1,000	2,000	400,000	1,600,000	1,000,000	3,000,000																																
MRV																																						
Sub-total:	1,000	2,000	400,000	1,600,000	1,000,000	3,000,000																																
Component 3: Scaling-up (Phase III)																																						
Marketing for 2021-22 scale-up phase																																						
Rooftops for 2021 (avg install @ 2 kW each)	2,000	4,000	1,200,000	4,800,000	0	6,000,000																																
Rooftops for 2022 (avg install @ 2 kW each)	4,000	8,000	2,400,000	9,600,000		12,000,000																																
MRV																																						
Sub-total:	6,000	12,000	3,600,000	14,400,000	0	18,000,000																																
Totals up to EOP:	7,200	14,600	4,000,000	16,000,000	1,900,000	21,900,000																																
Beyond the EOP																																						
Marketing for 2023 scale-up phase																																						
Rooftops for 2023 (avg install @ 2 kW each)	8,000	16,000	4,800,000	19,200,000		24,000,000																																
Totals beyond EOP:	15,200	30,600	8,800,000	35,200,000	1,900,000	45,900,000																																
							Current EOP of Project										EOP of Project with 18-month										EOP of Project with 24-month extension											

- proposed financing for an estimated 2,000 solar PV installations in 2021 will be 80% ORKÖY soft loan (0% interest, 7 years tenor) combined with a 20% grant from ORKÖY. No GEF funds will be involved in financing these solar installations;
- *scale up of rooftop solar installations in 2022*. This will commence in September 2021 to secure funding and commence a marketing campaign for ORKÖY-supported solar PV installations in 2022. The Project will also continue supporting ORKÖY capacity building for MRV (notably for quantifying electricity generated by renewable energy sources and related GHG emission reductions and possibly generating ITMOs); and
- *rooftop solar installations in 2023*. The Project will provide assistance in delivering “Output 3.3: Commitments and contracts to achieve installation of 30 MW of solar projects” (see Appendix F), which could be in the form of a confirmation of funds by September 2022 that are available to ORKÖY in 2023 for an additional 8,000 rooftop solar PV installations. This can bring the cumulative total of installed capacities under ORKÖY-PV to its target of 30 MW;
- the Project should employ the services of an international consultant with management experience in solar PV programmes, to guide the implementation of ORKÖY’s SFM under the Project and support the PMU in improving the ORKÖY legislation for financing small-scale PV programmes for forest villages and accordingly support the design and implementation of awareness raising activities for all stakeholders including forest villagers, PV manufacturers and installers and private finance institutions and banks. Specific tasks of this consultant are provided in Appendix I.

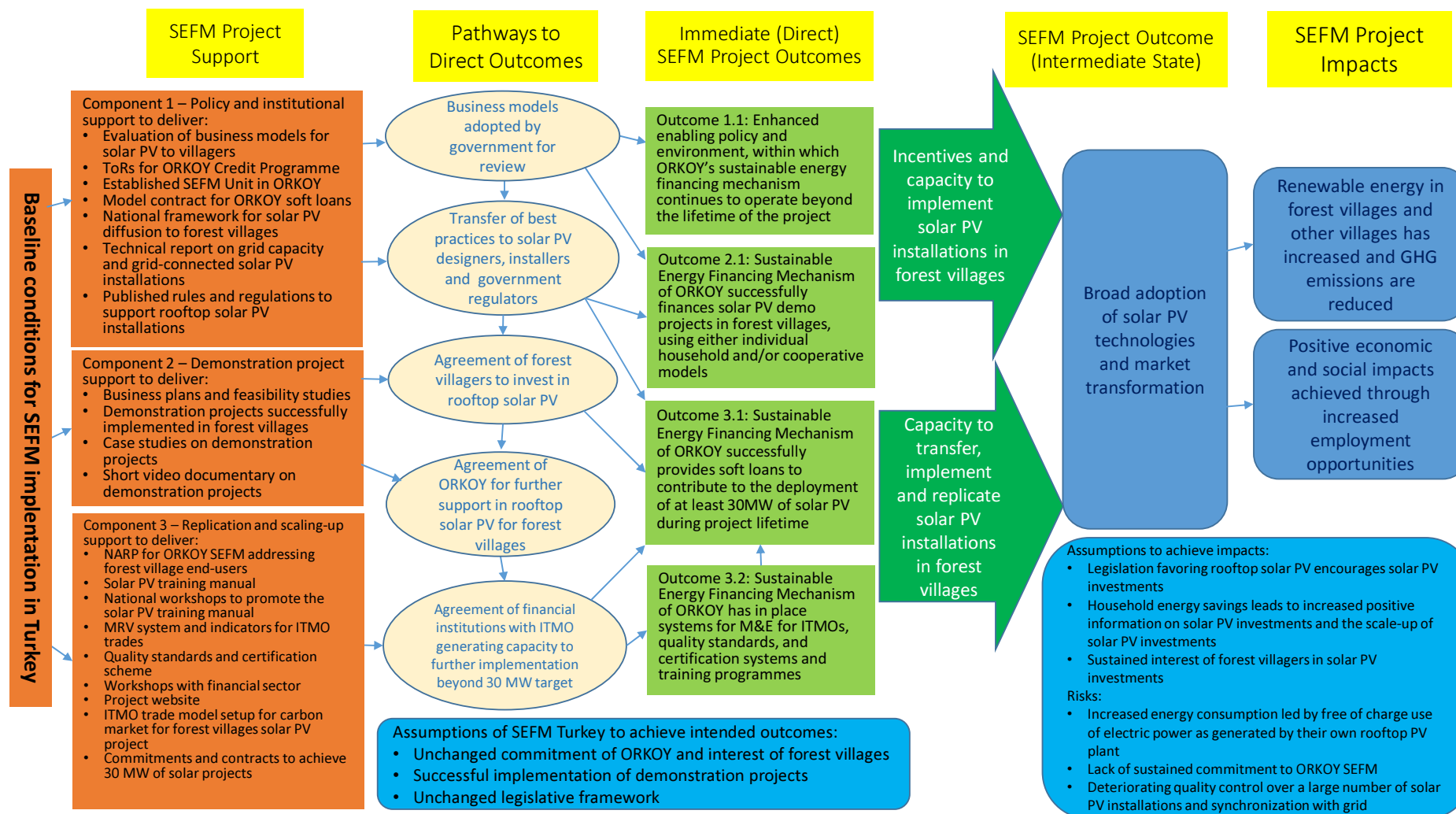
87. To correct Project design, a number of suggestions are provided here to adjust the design of the ORKÖY-PV Project including:

- *Suggested amendments to the ORKÖY-PV Project’s PRF (in Appendix F) that reflect a revised ORKÖY-PV strategy and newly proposed solar PV rollout plan mentioned in Para 86 that is based on a new Theory of Change on Figure 6.* The revised PRF with changes made in red font, was prepared with an economy of words to simplify the intent of the Project and its new strategy (that is contained in Appendix F) and to clarify the indicators that are important for monitoring the progress of the Project. A key change in the PRF style is the elimination of duplicated indicators since they are repeated as both *outcome and output indicators*. Moreover, delivery of proposed outputs within each outcome should deliver intended outcomes, thus precluding the need for indicators that are repeated as output or outcome indicators;
- *For Component 2, indicators and targets for the demonstration solar PV projects were adjusted under Output 2.2.* Adjustments include the 2 land-based solar PV plants, and the 200 rooftop solar PV installations spread over 24 villages. The outputs delivering the feasibility studies, case studies and short video documentary on these demonstration projects remain the same;
- *For Component 3, indicators and targets were adjusted to reflect both the replication and scaling up phases (Phases II and III respectively) that involve the ORKÖY sustainable energy financing mechanism up to the proposed EOP (with the 24-month extension to 1 September 2022).* The proposed edits involve moving the old Output 3.9 to Output 3.2 and under “Outcome 3.1: Sustainable Energy Financing Mechanism of ORKÖY successfully provides soft loans to contribute to deployment of at least 30MW of solar PV during project lifetime”. Outputs to be delivered under “Outcome 3.2: Sustainable Energy Financing Mechanism of ORKÖY has in place systems for M&E, quality standards, and certification systems and training programmes” would then be more relevant to delivering the outcome but also include outreach to financial institutions (Output 3.7) and Project linkages to carbon markets (Output 3.9);

- A revised “indicative” ORKÖY-PV Project budgets for the remaining implementation period of ORKÖY-PV and a proposed 24-month extension is provided on Table 7. This table only provides rough estimates of the GEF funds required to demonstrate, replicate and scale up the ORKÖY financial mechanism with the exception of the grant funds for Components 2 and 3 (under ATLAS code 72100) for a total of USD 1.95 million<sup>34</sup>. More precise budgeting for remaining activities should be undertaken by the PIU in collaboration with ORKÖY. However, the conclusion of this costing analysis is that there should be sufficient GEF funds to increase original grant components for the Phase I demonstration installations to the levels illustrated in Figure 5.
88. To improve the monitoring and evaluation of the Project, ORKÖY-PV Project staff should bolster its efforts as a **high priority** to monitor the quality of rooftop solar PV installations as a means to address sustainability concerns in Paras 75-78. Strengthening these efforts would likely involve:
- highlighting the sustainability issues related to poor quality installations and deteriorating solar PV system performance during the national workshops to be delivered under Output 3.3. This may involve sharing international information regarding these issues, and measures to mitigate or minimize system deterioration performance. While the MTR team has heard that ITB bidders are obligated to provide technical support services for a period of 5 to 10 years after installation as a condition for award, one of the measures that could be set up to enforce this condition would be a hotline supported by ORKÖY to report delinquent solar PV suppliers;
  - ensuring that the MRV system designed under Output 3.4 contains SMART indicators that can be reliably monitored in a cost-effective way and to generate useful and reliable energy consumption information from rooftop solar PV installations in forest villages. Data on reliability and use can be shared on the Project website and in qualitative form with financial stakeholders;
  - ensuring the MRV system (of Output 3.4) will allow ITMO trading under Article 6.4. Actual verification will not be required within the scope of this Project;
  - highlighting the importance of quality standards and certification schemes under Output 3.5 as they pertain to mitigating the aforementioned system performance issues. This output may also involve assisting ORKÖY in identifying and sizing solar PV inspections to ensure compliance to these quality standards and certification schemes, and improving the ability of these technicians and inspectors to routinely spot poor quality installations;
  - posting the aforementioned information on a website as part of the delivery of Output 3.7;
  - using an international consultant to bring to ORKÖY global experience of solar PV MRV systems that can support an ITMO generation programme.
89. To improve the monitoring and evaluation of the Project, ORKÖY-PV PIU should, as a **high priority**, finalize the revised PRF as suggested in Para 87 and provided in Appendix F, to be done in close consultation with the SEFM Unit in ORKÖY. Key issues to be addressed in these consultations would be the rate of scale up proposed by the MTR team, bearing in mind that the scale up plan was intended to illustrate measures to reach the objective level target of 30 MW of installed solar PV systems. The SEFM Unit may or may not change some of the targets proposed by the MTR team. The PIU should seek approval of the SEFM Unit for the proposed streamlined language in the PRF, which should result in clarity in monitoring progress for the remainder of ORKÖY-PV. With this approval, the PIU would be enabled to report progress on their future PIRs using the output targets in the revised PRF.

<sup>34</sup> The additional USD 50,000 is required for the tendering process for the demonstrations for rooftop solar PV programs for 24 villages.

Figure 6: ORKÖY-PV Theory of Change



**Table 7: Estimated Revised Costs with proposed 24-month ORKÖY-PV extension (yellow cells indicates suggested changes to budget line)**

GEF Outcome/Atlas Activity	Responsible Party (Implementing Agent)	Atlas Budgetary Account Code	ATLAS Budget Description	Total from ProDoc (US\$)	Actual disbursements to Dec 2018 (US\$)	Estimated actual 2019 disbursements (Jan-May)	Total disbursed to May 2019	Available budget as of May 2019 to EOP (US\$)	Revised budget as of May 2019 to EOP	Budget Note (see Table 8)
OUTCOME 1: Policy and Institutional Framework for supporting Sustainable energy financing mechanism for solar power in forest villages	1981	71200	Int. Cons.	59,000	0					1
	9932				3,013		3,013	53,987	53,987	
	1981	71300	Loc. Cons.	106,900	32,624					2
	9932				0		32,624	67,700	25,000	
	1981	71400	ContServ-Ind	109,200	25,218	6,700	31,918	88,800	88,800	3
	1981	71600	Travel	91,000	5,650	500				4
	9932				0		6,150	41,378	37,911	
	1981	72100	ContServ-Comp.	44,000	7,946					
	9932				13,415		21,361	10,585	10,585	
	1981	72200	Equipment Furniture	25,000	0		0	20,000	20,000	5
	9932	74100	Professional Services	0	742		742	510	510	
	1981	74200	Audio Visual and Print Prod	20,000	1,225	160	1,385	18,840	18,840	6
	1981	74500	Miscellaneous	0	21		21	100	100	
	1981	75700	Training Workshop and Conference	300,000	35,391		35,391	291,910	200,000	7
	1981	76100	Foreign Exchange Currency Loss	0	2,267		2,267	0	0	
TOTAL OUTCOME 1				755,100	127,513	7,360	134,873	593,809	455,733	
OUTCOME 2: Solar PV demonstration Projects	1981	71200	Int. Cons.	93,000	0					8
	9932				0		0	75,000	25,000	
	1981	71300	Loc. Cons.	147,700	19,345	5,660				9
	9932				8,125		33,131	69,340	60,000	
	1981	71400	ContServ-Ind	54,109	26,961	6,600	33,561	53,400	53,400	
	1981	71600	Travel	66,200	7,382	1,600				4
	9932				2,896		11,878	18,900	18,900	
	1981	72100	ContServ-Comp.	77,000	0					10
	9932				0		0	59,430	59,430	
	1981	72100	ContServ-Comp.	650,000	84,413	11,500				11
	9932				0		95,913	610,624	950,000	
	1981	72200	Equipment Furniture	0	1,948		1,948	0	0	
	1981	72400	Audio Visual and Print Prod	0	0		0	10	10	
	9932	74100	Professional Services	0.00	5,658	550	6,208	2,896	2,896	
	1981	74200	Audio Visual and Print Prod	55,000	2,282		2,282	30,000	30,000	12
	1981	74500	Miscellaneous	0	142		142	0	0	
	1981	75700	Training Workshop and Conference	98,000	15,536		15,536	82,427	25,000	13
	1981	76100	Foreign Exchange Currency Loss	0	5,467		5,467	0	0	
TOTAL OUTCOME 2				1,241,009	180,154	25,910	206,064	1,002,027	1,224,636	

**Table 7 (con'd): Estimated Revised Costs with proposed 24-month ORKÖY-PV extension (yellow cells indicates suggested changes to budget line)**

OUTCOME 3: Replication and scaling up - Enhancement of the sustainable energy financing mechanism	1981	71200	Int. Cons.	206,750	0						14
	9932				0		0	104,000	75,000		
	1981	71300	Loc. Cons.	127,400	10,883	400				15	
	9932				0		11,283	155,385	125,000		
	1981	71400	ContServ-Ind	96,000	19,732	7,600	27,332	99,868	99,868	3	
	1981	71600	Travel	139,500	524	40	564	128,907	120,000	4	
	1981	72100	ContServ-Comp.	143,000	0		0	100,500	90,000	16	
	1981	72100	ContServ-Comp.	746,241	7,000		7,000	856,241	1,000,000	17	
	1981	74100	Professional Services	0	210		210	2,055	2,055		
	1981	74200	Audio Visual and Print Prod	35,000	0		0	36,500	25,000	18	
	1981	75700	Training Workshop and Conference	140,000	16		16	163,000	25,000	19	
	1981	76100	Foreign Exchange Currency Loss	0	366		366	0	0		
TOTAL OUTCOME 3				1,633,891	38,731	8,040	46,771	1,646,456	1,561,923		
Project Management	1981	71300	Loc. Cons.	0	1,300	2,000	3,300	1,500	1,500	20	
		71400	ContServ-Ind	94,000	49,131	3,700	52,831	43,994	43,994		
		71600	Travel	12,540	1,481		1,481	4,720	4,720		
		72200	Equipment Furniture	2,500	0		0	1,250	1,250		
		72400	Communic & Audio Visual Equip.	0	5,304		5,304	400	400		
		72500	Supplies	0	360		360	0	0		
		72800	Information technology Equip.	0	1,020		1,020	1,500	1,500		
		73400	Rental & Maintenance of Other Eq.	0	0		0	100	100	21	
		74100	Professional Services	5,000	1,700	1,400	3,100	1,100	1,100		
		74500	Miscallenous	3,000	4,852		4,852	6,129	6,129		
		74598	Direct Project Costs	19,918	5,298		5,298	5,894	5,894		
		75700	Training Workshop and Conference	13,042	520		520	5,372	5,372		
		76100	Foreign Exchange Currency Loss	0	-25		-25	0	0		
		GEF TOTAL		150,000	70,941	7,100	78,041	71,959	71,959		
		71400	ContServ-Ind	100,000	0		0	99,763	99,763		
		74500	Miscallenous	0	237		237	0	0		
		UNDP TOTAL		100,000	237	0	237	99,763	99,763		
TOTAL Project Management			250,000	71,178	7,100	78,278	171,722	171,722			
GEF TOTAL			3,780,000	417,339	48,410	465,749	3,314,251	3,314,251			
TOTAL			3,880,000	417,577	48,410	465,987	3,414,013	3,414,013			

**Table 8: Budget notes in support of budget lines (yellow cells correspond to yellow cells in Table 7)**

1. During Pre-PSC meeting, it is decided that there would be a strategy revision in the project in accordance with the new renewable energy strategy of Turkey. For this purpose an international consultant would be hired for necessary strategy revision preparations. After the acceptance of strategy revision, new ToR will be prepared for ISTA (International Solar Technical Advisor) and IME (International Marketing Expert). The new ToRs for international consultants are expected to be approved by the GDF in the second half of 2019. Therefore, allocated budget is distributed between 2019 and 2020.
2. With reference to devaluation of Turkish Lira against US Dollars, the Local Consultant rates were lower than what was assumed. Moreover, less consulting time may be required due to new government legislation for rooftop solar PV installations
3. Mobilization of the Project Field Coordinator position created a necessity for additional budget for 71400 line of 2020. Accordingly, the same amount from 71600 were transferred to 71400 line of 2020.
4. Further reductions in travel costs due to a focus on rooftop solar PV installations.
5. The formation of SEFM Unit in GDF was decided in pre-PSC meeting of 2019. Accordingly, most of the related IT and furniture expenditures transferred to 2020.
6. Since there is a delay (as explained in budget note of 71200 of Outcome 1) in the mobilization of International Consultant and establishment of SEFM unit under General Directorate of Forestry (GDF), all related communications materials described under 74200 were transferred to 2020.
7. Budget for training workshops can be reduced due to additional focus on rooftop solar PV installations, and the more than 3,000 companies in Turkey that have experience in rooftop solar PV installations.
8. Budget for international consultants can be reduced due to additional focus on rooftop solar PV installations where there are more than 3,000 companies in Turkey that have experience in rooftop solar PV installations.
9. Budget for local consultants can be reduced due to additional focus on rooftop solar PV installations where there are more than 3,000 companies in Turkey that have experience in rooftop solar PV installations..
10. This activity will be carried out as planned. However, with reference to devaluation of Turkish Lira against US Dollars, the Subcontracting rates for publishing and dissemination under Activity 2.2 and 2.3 and video service and broadcasting services were lower than what was assumed. Accordingly, the balance amount were transferred to 2020.
11. These are funds for US\$900,000 for grant funding for Phase I (see Figure 5). The additional US\$50,000 is required for assistance in setup of the ITB process.
12. Since the installation of demo PV plants and rooftop solar PV installations will start in the second half of 2019 under Phase I, with its completion by early 2020, the most of the costs of audio visual and printed production (74200) were transferred to 2020. The main payment will be done in beginning of 2020.
13. Budget reduced since only 2 land-based demo PV plants in 2 forest villages will start in second half of 2019, with remaining solar PV installations being rooftop solar PV installations commencing late 2019. This will reduce the need for workshops from 20 to 5 and trainings from 4 to 2 to take place between 2019 and 2020.

14. Because of the delay in hiring ISTA as explained in budget note of 71200 of outcome 1, the cost of international consultant was reduced, as it is estimated that the number of days for the consultant would be lower than what was estimated at the beginning of the project. This ISTA would have oversight of MRV efforts, workshops with the financial sector and setup for ITMOs (Outputs 3.5, 3.7 and 3.9 respectively).
15. Because of the delay in hiring LST and LME as explained in budget note of 71200 of outcome 1, the cost of local consultant was reduced in 2019. Another slight reduction in this budget line can be made due to rooftop solar PV focus.
16. Since there is a delay in Outcome 2 Activities, Outcome 3 related communication activities will start in the first half of 2019. A slight reduction of this budget can be made due to additional focus on rooftop solar PV installations.
17. These are funds allocated to the 1,000 rooftop solar PV Installations of Phase II.
18. Slight reductions can be made with this budget line given the focus on rooftop solar PV installations.
19. Budget reduced for workshops to support Output 3.5 on MRV systems to generate ITMOs and Output 3.6 on quality standards and certification schemes, and outreach to selected financial sector stakeholders (Output 3.7).
20. In Project Management, the budget line 71300 is opened for the independent outcome evaluator expenses.
21. In Project Management, the budget line 73400 is opened for the rental of IT equipment expenses.

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90. Recommendations and proposals for future directions underlining main objectives are provided here are **medium priority** and are designed as a means of addressing the financial sustainability issue that is mentioned in Paras 73-74. This recommendation pertains to the proposed outreach of the Project to the financial sector in attempts to allow scaling to other villages outside the scope of this Project. This should include exploring the possibility of ITMO trading under Article 6.4 (or even Article 6.2) by:

- commencing delivery of Output 3.6 consisting of outreach to international and domestic development banks after 2020. By 2020, lessons learned from the demonstration projects of Component 2 can be shared. By 2021, further lessons can be learned from replication projects of Component 3 that will involve the performance of the initial stages of the ORKÖY financing mechanism for solar PV installations in forest villages. Disseminating this information to the financial sector can commence the process of familiarizing banks with possible opportunities to “co-finance” a market transformation of solar PV generation in forest villages in Turkey;
- appointing a MRV manager as part of the ORKÖY team. This person should be in charge of the development of the MRV system, the roll out, the yearly collection of data and reporting; and
- developing an ITMO trade model for carbon markets for this Project as part of the delivery of Output 3.9. Likely to commence in 2021, this should involve the SEFM Unit and consultants both international and domestic to prepare documents on specific MRV actions to quantify ITMOs and stakeholders involved.

## **APPENDIX A – MISSION TERMS OF REFERENCE FOR ORKÖY-PV PROJECT MTR**

### **1- BACKGROUND**

The project being implemented in collaboration with the General Directorate of Forestry, Department of Forest and Village Relations (aka ORKOY) is a 4 year long (2016-2020) GEF Full Size Project, namely Sustainable Energy Financing Mechanism for Solar Photovoltaic Systems in Forest Villages in Turkey, aka ORKOY GEF Project. The project assists Turkey with the promotion and financing of on-grid solar PV systems via village cooperatives in forest villages. The public support and involvement in the initiative will be led by the GDF, working together with other key actors in the solar PV value chain, including private sector solar PV installers, Turkish utilities, and domestic and international banks as well as other institutions that provide financing. The project objective is to support the successful launching of a sustainable energy financing mechanism within the ORKOY credit mechanism to ensure that there is at least 30 MW of installed capacity of grid-connected, cooperative solar PV in forest villages) by the end of the project; 28,750 tons CO<sub>2</sub>eq avoided emissions from the power sector (compared to the project baseline) by the end of the project; 30MWp cumulative installed capacity of grid-connected PV systems; 47,520,000 kWh/year cumulative total electricity generation from installed grid-connected PV systems and 450 created job positions for forest villagers. The project is divided in 3 components focused on:

- Developing and expanding the policy and institutional framework to promote on-grid, residential solar PV (Component 1),
- Demonstrating the technical and economic viability as well as the business model of the ORKOY sustainable energy financing mechanism for solar PV systems through 4 pilot installations (Component 2), and
- Scaling up and replication at the national level (Component 3).

The financing scheme will be divided on 4 phases. The first one will use grants only for financing of the pilot sites installation; second phase will use combination of GEF and ORKOY grants and ORKOY soft loan; third phase will introduce commercial loan together with GEF/ORKOY grants and ORKOY soft loan and the last phase will use deferred supplier payment tool in combination with ORKOY grant/soft loan and commercial line of credit.

The Consultant will serve for overall Mid-Term Evaluation of all components, outputs and activities of subject project.

### **2- SCOPE OF WORK, RESPONSIBILITIES AND DESCRIPTION OF THE PROPOSED ANALYTICAL WORK**

The MTR will assess progress towards the achievement of the project objectives and outcomes as specified in the Project Document and assess early signs of project success or failure with the goal of identifying the necessary changes to be made in order to set the project on-track to achieve its intended results. The MTR will also review the project's strategy, its risks to sustainability.

The mid-term review will be carried out by MTR Expert. The consultant will receive the support of UNDP Country Office and Project Management Unit, and will be assisted by a facilitator assigned by UNDP (when needed).

## Mid Term Review Consultant

The international consultant will be responsible to deliver the expected output of the mission.

### Duties and Responsibilities of the MTR Expert:

- Desk review of documents, development of draft methodology, detailed work plan and MTR outline;
- Debriefing with UNDP and GDF, agreement on the methodology, scope and outline of the MTR report;
- Interviews with PMU, UNDP Turkey, GDF and project partners;
- Debriefing UNDP and project partners and will provide an aide memoire;
- Development and submission of the first MTR report draft. The draft will be shared with the key project stakeholders for review and comment;
- Finalization and submission of the final MTR report through incorporating suggestions received on the draft report;

### The Facilitator Assigned by UNDP Turkey CO will assist the MTR Expert with below services:

- Provide support in collection of background materials;
- Participation in debriefings with UNDP CO and GDF representatives;
- Organize the mission program together with the Project Management Unit, arrange and facilitate meetings with key stakeholders;
- Assistance to the MTR Expert in conducting interviews with relevant stakeholders and provide translation during the interviews when necessary;
- Participation in debriefing with UNDP and project partners;
- Necessary support will be provided to MTR Expert in circulation of the draft MTR report among the key project stakeholders for review and commenting.

## 3- INSTITUTIONAL ARRANGEMENTS

UNDP will provide the IC all relevant background documents. UNDP is not required to provide any physical facility for the work of the IC. However, depending to the availability of physical facilities (e.g. working space, computer, printer, telephone lines, internet connection etc.) and at the discretion of the UNDP and relevant stakeholders such facilities may be provided at the disposal of the IC.

The Consultant will report to Natural Resources and Biodiversity Cluster Lead. The Consultant will conduct the MTR in collaboration with Energy Efficiency and Renewable Energy Senior Technical Advisor and Monitoring & Evaluation Advisor at UNDP CO. The consultant cannot have participated in the project preparation, formulation, and/or implementation (including the writing of the Project Document) and should not have a conflict of interest with project’s related activities.

The principal responsibility for managing this evaluation lies with UNDP Country Office in Turkey. UNDP will assign a facilitator to set up the stakeholder interviews, arrange the field visits, coordinate with the GDF and provide translation (when necessary).

In preparation for the evaluation mission, Natural Resources and Biodiversity Cluster Lead, with assistance of UNDP CO, will arrange completion of the Management Effectiveness Tracking Tool (METT). Results of METT should be used by an international project evaluation consultant, who will provide his/her

comments and track the progress in management effectiveness of project sites. Upon incorporation of the evaluator’s comments the METT will be finalized and the results should be attached as a mandatory Annex to the MTR report.

These Terms of Reference follow the UNDP-GEF policies and procedures.

#### 4. DELIVERABLES

The products expected from the evaluation are as follows:

- Detailed methodology, work plan and outline;
- Mid-term review report with findings;
- Lessons learned and recommendations for improvement, including recommendations for the revision of project strategy, approach, outputs and activities, if necessary;
- Recommendations for a strategy for future replication of the project approach for other types of the climate change and sustainable energy financing projects, for other countries in the region;
- Description of best practices, and an “action list” in a certain area of particular importance for the project.

The core product of the Mid-Term Review will be the Mid-Term Review Report given in Section 4 and Rating Tables given in Annex 2 of Procurement Notice.

MTR Expert will be responsible to submit the following deliverables.

Milestone/Deliverables	Estimated Date	Estimated Number of Days to be invested*
Inception Report: Desk review, development of methodology, updating time table, drafting mission programme. Incorporating comments received from UNDP Country Office (if necessary).	30 January 2019	4
In-country field visits, interviews, preliminary mission findings briefing(s), debriefings with project partners and providing aide memoire. Delivering a presentation on aide memoire (finding(s) and recommendation(s)) to Project Partners.	01 - 25 February 2019	12
Submission of Draft MTR report	15 March 2019	7
Finalization of the MTR Report in line with the comments received from the relevant stakeholders regarding the Draft MTR Report.	15 April 2019	2
Milestone/Deliverables	Total Number of days	25

Each and every activity to be conducted by the Consultant is subject to UNDP approval. Each step shall be conducted upon approval of the previous step by UNDP.

Number of days to be invested for each deliverable may change but the total number of days worked by the individual contractor cannot exceed 25 days for this assignment (i.e for submission of the deliverables) as defined in the ToR.

### Reporting Line

The consultant will be responsible to the UNDP Natural Resources and Biodiversity Cluster Lead for the completion of the tasks and duties assigned in Section 6 of this ToR. All of the reports are subject to approval from UNDP Forestry Cluster Lead in order to realize the payments to the consultant. He/she will work in close collaboration with Project Management Unit, GDF, and other project partners.

### Reporting Language

The reporting language should be in English.

### Title Rights

The title rights, copyrights and all other rights whatsoever nature in any material produced under the provisions of this TORs will be vested exclusively in UNDP.

### 5- minimum qualification requirements

The expected qualifications of the expert are as follows:

	Minimum Requirements	Assets
<b>General Qualifications</b>	<ul style="list-style-type: none"> <li>Bachelor’s Degree in Energy, Natural Resources, Environmental Economics, Engineering, Business Administration, Economics or other related areas.</li> <li>Fluency in English both written and spoken.</li> <li>Full computer literacy.</li> </ul>	<ul style="list-style-type: none"> <li>Proven knowledge and experience on renewable energy and/or climate change</li> <li>Masters or Higher Degree in Energy, Natural Resources, Renewable Energy, Solar Energy, Environmental Economics, Engineering, Business Administration, Economics, Forestry</li> </ul>
<b>Professional Experience</b>	<ul style="list-style-type: none"> <li>Minimum ten (10) years of relevant professional experience.</li> </ul>	<ul style="list-style-type: none"> <li>More than fifteen (15) years of relevant professional experience.</li> <li>Experience working in one or more environmental or renewable energy project(s) in the Europe &amp; CIS region</li> </ul> <p>Experience working in one or more environmental or renewable energy project(s) in Turkey in the past 7 years</p>
<b>Specific Experience</b>	<ul style="list-style-type: none"> <li>5 years of professional experience in providing management or consultancy services to environment and/or renewable energy projects.</li> </ul>	<ul style="list-style-type: none"> <li>Solid knowledge in results-based management (especially results-oriented monitoring and evaluation).</li> <li>Knowledge of GEF M&amp;E guidelines and procedures.</li> </ul>

	Minimum Requirements	Assets
	<ul style="list-style-type: none"> <li>Experience in monitoring and evaluation of environment and/or renewable energy projects for UN or other international development agencies (at least in one project).</li> </ul>	<ul style="list-style-type: none"> <li>More than 8 years of relevant professional experience in providing management or consultancy services to environment and/or forestry projects.</li> <li>Experience in having worked on solar energy projects anywhere in the world as an advisor, consultant, developer, evaluator and/or investor in the past 7 years</li> <li>Experience in having worked on solar energy projects in Turkey as an advisor, consultant, developer, evaluator, and/or investor in the past 7 years</li> </ul>
<b>Notes:</b> <ul style="list-style-type: none"> <li>Internships (paid/unpaid) are not considered professional experience.</li> <li>Obligatory military service is not considered professional experience.</li> <li>Professional experience gained in an international setting is considered international experience.</li> </ul>		

The consultant should avoid any kind of discriminatory behavior including gender discrimination and ensure that

- human rights and gender equality is prioritized as an ethical principle within all actions;
- activities are designed and implemented in accordance with “Social and Environmental Standards of UNDP”;
- any kind of diversities based on ethnicity, age, sexual orientation, disability, religion, class, gender are respected within all implementations including data production;
- differentiated needs of women and men are considered;
- inclusive approach is reflected within all actions and implementations, in that sense an enabling and accessible setup in various senses such as disability gender language barrier is created;
- necessary arrangements to provide gender parity within all committees, meetings, trainings etc. introduced.

Female candidates are encouraged to apply.

## 6. TIMING AND DURATION

The duration of the assignment will be approximately 4 months upon signature of the Contract. The work will be undertaken during a period of 25 man/day throughout the time-frame below;

- Estimated Contract Start Date: 07 January 2019
- Estimated Date for Submission of Last Deliverable: 15 April 2019
- Estimated Contract Completion Date: 14 May 2019

## 7. PLACE of WORK

Place of work (duty station) for the assignment is home-based. There will be missions to Ankara and selected project sites. The mission shall be a minimum of 10 working days in Turkey, although this may be broken into two shorter missions with the mutual agreement of the consultant and UNDP Turkey, provided that the total number of days spent in Turkey is not less than 10 working days. The mission to Turkey will cover days spent in Ankara, as well as days spent to visit project sites and also possibly a day or days in Istanbul for relevant meetings. All travel related costs (cost items indicated below) of these missions out of the duty station (economy class flight ticket and accommodation in 3 or 4-star hotel) will be borne by UNDP. Approval of UNDP is needed prior to the missions is needed. The costs of these missions may either be;

- Arranged and covered by UNDP CO from the respective project budget without making any reimbursements to the consultant or
- Reimbursed to the consultant upon the submission of the receipts/invoices of the expenses by the consultant and approval of the UNDP. The reimbursement of each cost item subject to following constraints/conditions provided in below table;
- covered by the combination of both options

Cost item	Constraints	Conditions of Reimbursement
Travel (intercity transportation)	full-fare economy class tickets	1- Approval by UNDP of the cost items before the initiation of travel 2- Submission of the invoices/receipts, etc. by the consultant with the UNDP's F-10 Form 3- Acceptance and Approval by UNDP of the invoices and F-10 Form.
Accommodation	Up to 50% of the effective DSA rate of UNDP for the respective location	
Breakfast	Up to 6% of the effective DSA rate of UNDP for the respective location	
Lunch	Up to 12% of the effective DSA rate of UNDP for the respective location	
Dinner	Up to 12% of the effective DSA rate of UNDP for the respective location	
Other Expenses (intra city transportations, transfer cost from /to terminals, etc.)	Up to 20% of effective DSA rate of UNDP for the respective location	

## 8. Payments

Payments will be made within 30 days upon acceptance and approval of the corresponding deliverable by UNDP on the basis of actual number of days invested in that respective deliverable and the pertaining Certification of Payment document signed by the consultant and approved by the responsible Portfolio Manager.

The total amount of payment to be affected to the Consultant within the scope of this contract cannot exceed 25 days. The consultant shall be paid in US\$ if he/she resides in a country different than Turkey. If

he/she resides in Turkey, the payment shall be realized in TL through conversion of the US\$ amount by the official UN exchange rate valid on the date of money transfer.

If the deliverables are not produced and delivered by the consultant to the satisfaction of UNDP as approved by the responsible Cluster Lead, no payment will be made even if the consultant has invested man/days to produce and deliver such deliverables.

Expected delivery dates of the reports will be finalized by UNDP during the Briefing Meeting that will be conducted upon contract signature.

The amount paid to the consultant shall be gross and inclusive of all associated costs such as social security, pension and income tax etc.

**Tax Obligations:** The IC is solely responsible for all taxation or other assessments on any income derived from UNDP. UNDP will not make any withholding from payments for the purposes of income tax. UNDP is exempt from any liabilities regarding taxation and will not reimburse any such taxation to the IC.



## APPENDIX B – MISSION ITINERARY (FOR MAY 2019)

#	Activity	Stakeholder involved	Place
<b>9 May 2019 (Thursday)</b>			
	Arrival of Roland Wong in Ankara		
1	Evaluation debriefing meeting with ORKÖY-PV Project Team	UNDP	Ankara
<b>10 May 2019 (Friday)</b>			
2	Meeting with ORKÖY-PV Unit at ORKOY	ORKÖY, OGM, MoAF	Ankara
3	Meeting with Director of EIGM	General Directorate of Renewable Energy or EIGM	Ankara
4	Meeting with an Expert on Electricity Market Development	Energy Market Regulatory Authority or EPDK	Ankara
5	Meeting with Technical Advisory group to Project	GUNDAR	Ankara
<b>11 May 2019 (Saturday)</b>			
	Work on MTR report		
<b>12 May 2019 (Sunday)</b>			
	Travel to Corum and Gecek		
6	Meeting with mukhtars of Gecek and tour of village households	Forest village targeted for rooftop solar PV installations	Gecek
	Travel to Ankara		
<b>13 May 2019 (Monday)</b>			
7	Meeting with solar PV expert in Turkey, formerly head of GUNDAR	Solar PV expert	Ankara
8	Meeting with ORKÖY-PV Unit at ORKOY	ORKÖY, OGM, MoAF	Ankara
<b>14 May 2019 (Tuesday)</b>			
	Travel to Istanbul		
<b>15 May 2019 (Wednesday)</b>			
9	Meeting with EBRD	EBRD	Istanbul
10	Meeting with Garanti Bank	Garanti Bank	Istanbul
11	Meeting with UNDP Istanbul Regional Hub	UNDP	Istanbul
<b>16 May 2019 (Thursday)</b>			
	Travel to Ankara		

#	Activity	Stakeholder involved	Place
12	De-briefing meeting with ORKÖY-PV Unit at ORKOY	ORKÖY, OGM, MoAF	Ankara
<b>17 May 2019 (Friday)</b>			
13	Meeting with Solar OV company at ITB meeting at UNDP Office	Neoenerji	Ankara
<b>18-19 May 2019 (Saturday-Sunday)</b>			
	Working on MTR report		
<b>20 May 2019 (Monday)</b>			
14	MTR De-briefing meeting with UNDP Turkey	UNDP	Ankara
<b>21 May 2019 (Tuesday)</b>			
	Departure of Roland Wong from Ankara		

Total number of meetings conducted: 14

## APPENDIX C – LIST OF PERSONS INTERVIEWED


This is a listing of persons contacted in Ankara, Istanbul and Gecek (unless otherwise noted) during the Mid-Term Review Period only. The Evaluation Team regrets any omissions to this list.

1. Mr. Nuri Ozbagdatli, CCE Portfolio Manager, UNDP Turkey;
2. Mr. Bahtiyur Kurt, Natural Resources and Biodiversity Cluster Lead, UNDP Turkey;
3. Mr. Murat Morel, ORKÖY-PV” Project Coordinator;
4. Ms. Naz Özgüç Yurtvermez, Monitoring and Evaluation Advisor. UNDP Turkey;
5. Mr. Necmettin Tokur, Senior Energy Efficiency Advisor, UNDP Turkey;
6. Mr. John O’Brien, Regional Technical Advisor, Istanbul Regional Hub, UNDP;
7. Mr. Sahin Aybal, Deputy General Director, OGM, Government of Turkey;
8. Mr. Mesut Güler, Deputy Head of Department, ORKOY Department, OGM;
9. Mr. Yusuf Kurt, Branch Manager, ORKOY Department, OGM;
10. Mr. Kaan Toptan, Branch Manager, ORKOY Department, OGM;
11. Mr. İsmail Tugay, Engineer, ORKOY Department, OGM;
12. Mr. Sebahattin Öz, EIGM Director, Government of Turkey;
13. Ms. Özlem Önenç, EIGM, Government of Turkey;
14. Mr. H. Hasan Atug, Expert, EPDK, Government of Turkey;
15. Mr. Mehmet Izzet, Ozaydin, General Manager, Plurawatt and member of GUNDAR;
16. Mr. Farul Telemcioglu, Temiz Enerji Vakfi (Clean Energy Foundation Turkey – [www.temev.org.tr](http://www.temev.org.tr));
17. Özgür Özcan, NEOENERJI Clean Energy, Istanbul;
18. Mr. Emre Oguzoncul, Principal, Energy Efficiency and Climate Change, EBRD, Istanbul;
19. Ms. Derya Ozet Yalgi, Sustainability Manager, Project Finance Department, Garanti Bank, Istanbul.

## **APPENDIX D – LIST OF DOCUMENTS REVIEWED**

1. UNDP Project Document and GEF CEO Endorsement Request for ORKÖY-PV Project;
2. ORKÖY-PV Project Inception Report, 2017
3. Project Annual Report for 2015 and 2016;
4. Annual Work Plans for ORKÖY-PV Project for 2016 and 2017.

## APPENDIX E – TRACKING TOOL

 <b>Tracking Tool for Climate Change Mitigation Projects (For Mid-term Evaluation)</b>		
<b>Special Notes: reporting on lifetime emissions avoided</b>		
<p><b>Lifetime direct GHG emissions avoided:</b> Lifetime direct GHG emissions avoided are the emissions reductions attributable to the investments made until the mid-term evaluation, totaled over the respective lifetime of the investments. Please refer to the Manual for Calculating GHG Benefits of GEF Projects.</p> <p><a href="#">Manual for Energy Efficiency and Renewable Energy Projects</a>  <a href="#">Manual for Transportation Projects</a></p> <p>For LULUCF projects, the definition of "lifetime direct" applies. Lifetime length is defined to be 20 years, unless a different number of years is deemed appropriate. For emission or removal factors (tonnes of CO<sub>2</sub>eq per hectare per year), use IPCC defaults or country specific factors.</p>		
General Data	Results at Mid-term Evaluation	Notes
<b>Project Title</b>	Sustainable Energy Financing Mechanism for Solar PV in Forest Villages in Turkey	
GEF ID	5323	
Agency Project ID	5732	
Country	Turkey	
Region	ECA	
GEF Agency	UNDP	
Date of Council/CEO Approval	December 17, 2015	Month DD, YYYY (e.g., May 12, 2010)
GEF Grant (US\$)	3,780,000	
Date of submission of the tracking tool	July 26, 2019	Month DD, YYYY (e.g., May 12, 2010)
Is the project consistent with the priorities identified in National Communications, Technology Needs Assessment, or other Enabling Activities under the UNFCCC?	1	Yes = 1, No = 0
Is the project linked to carbon finance?	1	Yes = 1, No = 0
Cumulative cofinancing realized (US\$)	0	
Cumulative additional resources mobilized (US\$)	-	additional resources means beyond the cofinancing committed at CEO endorsement

Objective 3: Renewable Energy		
Please specify if the project includes any of the following areas		
Heat/thermal energy production	0	Yes = 1, No = 0
On-grid electricity production	1	Yes = 1, No = 0
Off-grid electricity production	1	Yes = 1, No = 0
Policy and regulatory framework	5	0: not an objective/component 1: no policy/regulation/strategy in place 2: policy/regulation/strategy discussed and proposed 3: policy/regulation/strategy proposed but not adopted 4: policy/regulation/strategy adopted but not enforced 5: policy/regulation/strategy enforced
Establishment of financial facilities (e.g., credit lines, risk guarantees, revolving funds)	5	0: not an objective/component 1: no facility in place 2: facilities discussed and proposed 3: facilities proposed but not operationalized/funded 4: facilities operationalized/funded but have no demand 5: facilities operationalized/funded and have sufficient demand
Capacity building	5	0: not an objective/component 1: no capacity built 2: information disseminated/awareness raised 3: training delivered 4: institutional/human capacity strengthened 5: institutional/human capacity utilized and sustained
Installed capacity per technology directly resulting from the project		
Wind		MW
Biomass		MW el (for electricity production)
Biomass		MW th (for thermal energy production)
Geothermal		MW el (for electricity production)
Geothermal		MW th (for thermal energy production)
Hydro		MW
Photovoltaic (solar lighting included)	-	MW
Solar thermal heat (heating, water, cooling, process)		MW th (for thermal energy production, 1m <sup>2</sup> = 0.7kW)
Solar thermal power		MW el (for electricity production)
Marine power (wave, tidal, marine current, osmotic, ocean thermal)		MW
Lifetime energy production per technology directly resulting from the project (IEA unit converter: <a href="http://www.iea.org/stats/unit.asp">http://www.iea.org/stats/unit.asp</a> )		
Wind		MWh
Biomass		MWh el (for electricity production)
Biomass		MWh th (for thermal energy production)
Geothermal		MWh el (for electricity production)
Geothermal		MWh th (for thermal energy production)
Hydro		MWh
Photovoltaic (solar lighting included)	-	MWh
Solar thermal heat (heating, water, cooling, process)		MWh th (for thermal energy production)
Solar thermal power		MWh el (for electricity production)
Marine energy (wave, tidal, marine current, osmotic, ocean thermal)		MWh
Lifetime direct GHG emissions avoided	-	tonnes CO <sub>2</sub> eq (see Special Notes above)

## APPENDIX F – PROJECT RESULTS FRAMEWORK FOR ORKÖY-PV PROJECT FROM DECEMBER 2016 INCEPTION REPORT (WITH SUGGESTED CHANGES IN RED FONT)

The changes suggested in this PRF in red font are made with the assumption of a Project extension of 24 months to enable to the PMU to work towards closer achievement of the objective level targets.

<b>This project will contribute to achieving the following Country Programme Outcome as defined in the 2011 – 2015 CPD for Turkey</b> Outcome 3: Strengthening policy formulation and implementation capacity for the protection of the environment, and cultural heritage in line with sustainable development principles and taking into consideration climate change and disaster management
<b>Country Programme Outcome Indicators:</b> Reductions in the level greenhouse gas emissions.
<b>Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one):</b> 1. Mainstreaming environment and energy, and 4. Expanding access to environmental and energy services for the poor.
<b>Applicable GEF Strategic Objective and Program:</b> Climate change objective3: To promote investment in renewable energy technologies
<b>Applicable GEF Expected Outcomes:</b> 3a Appropriate policy, legal and regulatory frameworks adopted and enforced; 3b Sustainable financing mechanisms established and operational; 3c GHG emissions avoided.
<b>Applicable GEF Outcome Indicators:</b> 3a Extent to which EE policies and regulations are adopted and enforced; 3b Volume of investment mobilized; 3c Avoided GHG emissions from on-grid PV electricity generation (tons CO <sub>2</sub> /MWh); and \$/t CO <sub>2</sub> .

Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
<b>Project Objective: To support the successful launching of a sustainable energy financing mechanism within the ORKÖY credit mechanism to ensure that there is at least 30 MW of installed capacity of grid-connected, residential solar PV in forest villages in Turkey (approximately 2.5% or 175,000 people living in forest villages will have their electricity needs met by solar PV ) by the end of the project</b>	• Amount of reduced CO <sub>2</sub> emissions from the power sector (compared to the project baseline) by end of project (EOP), tons CO <sub>2eq</sub>	• 0	• 28,750	Project's annual reports, GHG monitoring and verification reports	Continued commitment of project partners, including Government agencies and investors/developers
	• Cumulative installed capacity of grid-connected PV systems by EOP (kWp)	• 0	• 30,000	Project final evaluation report	<b>Unexpected rise in cost of solar PV during remaining period of implementation, increasing reluctance of forest villagers to invest with ORKÖY's SFM</b>
	• Cumulative total electricity generation from installed grid-connected PV systems by EOP (kWh/year)	• 0	• 47,520,000	Post project market monitoring and evaluations	
	• Cumulative number of created job positions by EOP for forest villagers related to solar pv	• 0	• 450	Annual reports from forest cooperatives	
					1.5 work positions per project (maintenance, security)

Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
	<ul style="list-style-type: none"> <li>Number of people living in forest villages <b>by EOP</b> who will have their electricity needs met by solar PV</li> </ul>	<ul style="list-style-type: none"> <li>0</li> </ul>	<ul style="list-style-type: none"> <li>175,000</li> </ul>		There may be no link between jobs created and persons in the forest village, with the possibility that these jobs may only be with solar PV installation companies.
<b>Component 1:</b> <b>Policy &amp; Institutional Framework for supporting Sustainable energy financing mechanism for solar power in forest villages</b>					
<b>Outcome 1.1:</b> <b>Enhanced enabling policy and environment, within which ORKÖY's sustainable energy financing mechanism continues to operate beyond the lifetime of the project</b>	<ul style="list-style-type: none"> <li>ORKÖY-PV unit appointed, introduced and confirmed by ORKOY</li> <li>National Framework published and approved</li> <li>Technical report developed and published</li> </ul> <p><b>These indicators are repeated as output indicators. Suggest that either outcome or output indicators be removed in revised PRF.</b></p>	<ul style="list-style-type: none"> <li>None</li> <li>None</li> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>ORKÖY-PV Unit confirmed 5 months after project start</li> <li><del>6 months after start of project</del> Published before end of 2019</li> <li>Published report 7 months after project start</li> </ul>	Published documents.  Projects annual reports.	Unchanged commitment of ORKOY and relevant stakeholders (utilities, government).  Unchanged legislative framework.
<b>Output 1.1:</b> Evaluation and selection of public- private business models (ORKÖY, solar PV installers, utilities, domestic banks) for provision of affordable, grid-connected residential solar PV to forest villagers, using an	Completed and published Evaluation report by Year 1	None	ER by <del>end of Year</del> <b>late 2019</b>	Published ER	Unchanged commitment of relevant stakeholders (ORKÖY, utilities, installers, banks)



Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
individual household and/or cooperative model					
<b>Output 1.2:</b> Terms of Reference for ORKÖY's Credit Programme are revised, agreed, published and disseminated	<ul style="list-style-type: none"> <li>Completed and published TOR by Year 1</li> <li>No. of dissemination events for stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>0</li> <li>0</li> </ul>	<ul style="list-style-type: none"> <li><del>3 months from project start</del> Published ToR before end of 2019</li> <li>At least 5</li> </ul>	Published TOR before end of 2019  Lists of participants, official publications, media reports	Unchanged commitment of relevant stakeholders (ORKÖY, utilities, installers, banks)
<b>Output 1.3:</b> Sustainable energy Financing unit established within ORKÖY with dedicated full time staff	<ul style="list-style-type: none"> <li>No. of full time staff appointed</li> <li>ORKÖY-PV unit appointed, introduced and confirmed by ORKÖY</li> </ul>	<ul style="list-style-type: none"> <li>0</li> <li>No ORKÖY-PV unit</li> </ul>	<ul style="list-style-type: none"> <li>At least 2</li> <li>Unit appointed 5 months after project start</li> </ul>	Project's annual reports  ORKÖY's official announcement	Unchanged commitment of ORKÖY
<b>Output 1.4:</b> Model contract for ORKÖY soft loan developed and utilized	Model contract published and approved by ORKÖY	None	<del>6 months after start of project</del> Published before end of 2019	Model contract published	Unchanged commitment of ORKÖY
<b>Output 1.5:</b> National Framework designed and operationalized to use Turkey's Feed-In-Tariff scheme for the purpose of solar PV for forest villagers	National Framework published and approved	None	<del>Framework approved 6 months after start of project</del> by end of 2019	Published framework	Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government)
<b>Output 1.6:</b> Technical report on grid capacity and requirements for grid-connected PV installations	Technical report developed and published	None	Technical report published 7 months after start of project	Published report	Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).  Unchanged legislative framework.
<b>Output 1.7:</b> <del>Methodology for innovative</del>	<del>Methodology developed by end Year 2</del> Net metering pilot results	0	Results published by	Published methodology	Unchanged commitment of ORKÖY

Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
<del>approach (e.g. net metering) is developed;</del> Reports on results of recently introduced and piloted net metering published and disseminated	<del>published</del>  • Number of dissemination events	  • 0	<del>end of year 2</del> <del>end of 2019</del>  • <del>At least 1</del> 2 <sup>35</sup>	Lists of participants, official publications, media reports, press releases	and relevant stakeholders (utilities, government).  Unchanged legislative framework
<b>Component 2:</b> <b>Solar PV demonstration Projects</b>					
<b>Outcome 2.1:</b> <b>Sustainable Energy Financing Mechanism of ORKOY successfully finances four Solar PV demonstration projects (each up to 100 kW in total) are setup in forest villages, using either individual household and/or cooperative models</b>	<ul style="list-style-type: none"> <li>• No. of land-based solar PV plant projects (each 100 kW) implemented</li> <li>• No. of regions involved household rooftops where solar PV installed</li> <li>• No. of villages where pilot solar PV are being installed</li> <li>• Total installed capacity of the projects (kWp)</li> </ul> <p><b>These indicators are repeated as output indicators. Suggest that either outcome or output indicators be removed in revised PRF.</b></p>	<ul style="list-style-type: none"> <li>• 0</li> <li>• 0</li> <li>• 0</li> <li>• 0</li> </ul>	<ul style="list-style-type: none"> <li>• 2</li> <li>• <del>At least 3</del> 200<sup>36</sup></li> <li>• Minimum 19<sup>37</sup></li> <li>• <del>400</del> 600</li> </ul>	Project documents  Approvals from competent bodies  Press releases	Unchanged commitment of ORKOY and interest of forest villages
<b>Output 2.1:</b> Business plans & feasibility studies prepared for <del>a total of four</del> land-based solar PV installation and for rooftop-based solar PV installation demonstration projects in forest villages <del>up to 400kW</del>	No. of project reports prepared and approved	0	<ul style="list-style-type: none"> <li>• Minimum of 2 for the land-based solar PV installations</li> <li>• Minimum of 19 for the rooftop-based solar PV</li> </ul>	Published documents	Unchanged commitment of ORKOY and interest of forest villages

<sup>35</sup> One with governmental stakeholders and one with financial sector stakeholders.

<sup>36</sup> As illustrated in Figure 6, 100 rooftop installations in 4 villages and 100 rooftop installations in an estimated 20 villages.

<sup>37</sup> Ibid 36.

Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
			installations		
<b>Output 2.2:</b> <del>Four</del> Demonstration projects successfully implemented in forest villages <del>in 4 different regions</del> in several different regions of Turkey.	<ul style="list-style-type: none"> <li>No. of <del>land-based</del> solar PV plant projects (each 100 kW) implemented</li> <li>No. of <del>regions involved</del> household rooftops where solar PV installed</li> <li>No. of villages where pilot residential rooftop solar PV are being installed</li> <li>Total installed capacity of the projects (kWp)</li> </ul>	<ul style="list-style-type: none"> <li>0</li> <li>0</li> <li>0</li> <li>0</li> </ul>	<ul style="list-style-type: none"> <li>2</li> <li><del>At least 3</del> 200<sup>38</sup></li> <li>Minimum 19<sup>39</sup></li> <li><del>400</del> 600</li> </ul>	Project documents  Approvals from competent bodies  Press releases	Unchanged commitment of ORKÖY and interest of forest villages
<b>Output 2.3:</b> Case studies <del>prepared</del> on each of the Demonstration Projects	No. of case studies prepared	0	Minimum 2 <sup>40</sup>	Published case studies	Unchanged commitment of ORKÖY and interest of forest villages.  Successful implementation of demonstration projects
<b>Output 2.4:</b> Short video documentary <del>prepared</del> on the demonstration projects	No. of video spots published by EOP	0	1	Published video spots	Unchanged commitment of ORKÖY and interest of forest villages.  Successful implementation of demonstration projects

<sup>38</sup> As illustrated in Figure 6, 100 rooftop installations in 4 villages and 100 rooftop installations in an estimated 20 villages.

<sup>39</sup> Ibid 36.

<sup>40</sup> This will include two studies: one for the 2 villages with land-based solar PV projects and second study for the rooftop solar PV projects in 19 villages.

Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
<b>Component 3:</b> <b>Replication and scaling up – Enhancement of the sustainable energy financing mechanism</b>					
<b>Outcome 3.1:</b> <b>Sustainable Energy Financing Mechanism of ORKÖY successfully provides soft loans to contribute to the deployment of at least 30MW of solar PV during project lifetime</b>	<ul style="list-style-type: none"> <li>Amount of reduced CO<sub>2</sub> emissions from the power sector (compared to the project baseline) by EOP, tons CO<sub>2</sub>eq</li> <li>Cumulative installed capacity of grid-connected PV systems (kWp)</li> <li>Cumulative total electricity generation from installed grid-connected PV systems (kWh/year)</li> </ul> <p><b>These indicators are repeated as output indicators. Suggest that either outcome or output indicators be removed in revised PRF.</b></p>	<ul style="list-style-type: none"> <li>0</li> <li>0</li> <li>0</li> </ul>	<ul style="list-style-type: none"> <li>28,750</li> <li>30,000</li> <li>47,520,000</li> </ul>	Project's annual reports, GHG monitoring and verification reports	<p>Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).</p> <p>Successful implementation of demonstration projects</p> <p>Interest of other financial subjects in the program</p>
<b>Output 3.1:</b> National Awareness Raising Programme (NARP) for ORKÖY Sustainable Energy Financing Mechanism addressing forest village end-users and cooperatives	NARP is developed	None	<del>12 months after project start</del> NARP developed by end of 2019	Published NARP document	Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).
<del><b>Output 3.2:</b> Solar PV Training Manual for actors in solar PV value chain (ORKÖY officials, installers, utilities) on how to develop, finance, and implement solar PV projects is prepared, published and disseminated widely</del> Moved to Output	<del>Training manual developed</del>	<del>None</del>	<del>15 months after project start</del>	<del>Manual published</del>	<p><del>Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).</del></p> <p><del>Successful implementation of demonstration projects</del></p>

Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
<b>3.3.</b>					
<b>Output 3.2.3.2:</b> Commitments and contracts to achieve installation of 30 MW of solar projects <b>successfully implemented</b>	<ul style="list-style-type: none"> <li>Amount of reduced CO<sub>2</sub> emissions from the power sector <del>(compared to the project baseline)</del> completed solar PV installations and those to be financed by committed ORKÖY budgets by EOP, tons CO<sub>2</sub>eq</li> <li>Number of rooftops where solar PV is installed using ORKÖY financing scheme by EOP</li> <li>Cumulative installed capacity of grid-connected PV systems <b>or</b> these systems that are committed under ORKÖY budgets by EOP (kWp)</li> <li>Cumulative total electricity generation from installed grid-connected PV systems <b>or</b> these systems committed under ORKÖY budgets by EOP (kWh/year)</li> </ul>	<ul style="list-style-type: none"> <li>0</li> <li>0</li> <li>0</li> <li>0</li> </ul>	<ul style="list-style-type: none"> <li>28,750</li> <li>3,000 by end of 2021 and 7,000 by end of 2022</li> <li>30,000</li> <li>47,520,000</li> </ul>	<p>GHG monitoring and verification reports</p> <p>Implemented MRV system</p> <p>OGM annual report, featuring ORKÖY soft loans and grants for 2020, 2021 and 2022</p> <p>Budget of ORKÖY has been allocated for 2023 soft loan and grant applications</p> <p>ORKÖY</p>	<p>Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).</p> <p>Successful implementation of demonstration projects</p> <p>Interest of other financial subjects in the program.</p> <p>Unexpected rise in the cost of installation of rooftop solar PV</p>
<b>Outcome 3.2:</b> Sustainable Energy Financing Mechanism of ORKÖY has in place systems for M&E, quality standards, and certification systems and training programmes	<ul style="list-style-type: none"> <li>MRV system developed</li> <li>Quality standards developed</li> <li>Certification scheme implemented</li> </ul> <p><b>These indicators are repeated as output indicators. Suggest that either outcome or output indicators be removed in revised PRF.</b></p>	None	End Year 1 MRV system, quality standards and certification scheme developed in early 2020	Projects annual reports.	<p>Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).</p> <p>Successful implementation of demonstration projects</p>

Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
<b>Output 3.3:</b> <del>Twenty</del> National workshops <del>held</del> to promote the solar PV training manual targeting solar PV value chain (ORKÖY officials, installers, <del>distribution companies</del> )	<ul style="list-style-type: none"> <li>No. of dissemination events</li> <li>No. of involved persons/entities</li> <li><del>Residential rooftop solar PV manual for ORKÖY staff</del></li> <li><del>Workshop material for the 4 different workshops (ORKÖY staff, OGM local staff, installers and distribution companies)</del></li> </ul>	<ul style="list-style-type: none"> <li>None</li> <li>None</li> </ul>	<ul style="list-style-type: none"> <li><del>20-12</del><sup>41</sup></li> <li>400</li> <li><del>1 manual</del></li> <li><del>4 workshop materials (presentations)</del></li> </ul>	Lists of attendance Press releases	<p>Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).</p> <p>Successful implementation of demonstration projects</p>
<b>Output 3.4:</b> MRV system and indicators designed and implemented to reliably track energy consumption	MRV system developed	None	<del>End Year 1</del> MRV system developed by early 2020	Projects annual reports.	<p>Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).</p> <p>Successful implementation of demonstration projects</p>
<b>Output 3.5:</b> Quality standards and certification scheme designed and implemented for solar PV hardware and for skilled technicians	<ul style="list-style-type: none"> <li>Quality standards developed</li> <li>Certification scheme implemented</li> </ul>	<ul style="list-style-type: none"> <li>None</li> <li>None</li> </ul>	<ul style="list-style-type: none"> <li><del>End Year 1</del> Standards developed by early 2020</li> <li><del>End Year 1</del> Scheme implemented by early 2020</li> </ul>	Projects annual reports.	<p>Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).</p> <p>Successful implementation of demonstration projects</p>
<b>Output 3.6:</b> Workshops with domestic <del>financial sector stakeholders and international banks</del> to	<ul style="list-style-type: none"> <li>No. of events organized</li> <li>No. of involved institutions</li> </ul>	<ul style="list-style-type: none"> <li>0</li> <li>0</li> </ul>	<ul style="list-style-type: none"> <li>At least <del>10</del> 3</li> <li>At least <del>50</del> 5</li> </ul>	<p>Projects annual reports.</p> <p>Lists of attendance</p>	Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).

<sup>41</sup> This will include 4 regions and 4 target groups.

Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
consult, build familiarity and <del>integrate their lending support finance to residential rooftop solar PV with ORKÖY</del>				Press releases	Successful implementation of demonstration projects
<b>Output 3.7:</b> Project Website - Practical Guide to Investing in Residential Rooftop Solar PV in Turkey	Web site developed and updated	0	<del>Within 6 months of the start of the project</del> Website developed by end of 2019	Web site	Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).  Successful implementation of demonstration projects
<b>Output 3.8:</b> <del>Programme of Activities (PoA)</del> ITMO trade model setup for carbon market for <del>forest villages residential rooftop solar PV project</del>	The <del>programme</del> trade model developed	None	<del>End year 2</del> Trade model delivered by late 2021	Projects annual reports.	Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).  Successful implementation of demonstration projects
<b>Output 3.9:</b> <del>Commitments and contracts to achieve 30 MW of solar projects successfully implemented</del>	<ul style="list-style-type: none"> <li><del>Amount of reduced CO<sub>2</sub> emissions from the power sector (compared to the project baseline) completed solar PV installations and those to be financed by committed ORKÖY budgets by EOP, tons CO<sub>2eq</sub></del></li> <li><del>Number of rooftops where solar PV is installed using ORKÖY financing scheme by EOP</del></li> <li><del>Cumulative installed capacity of</del></li> </ul>	<ul style="list-style-type: none"> <li><del>0</del></li> <li><del>0</del></li> <li><del>0</del></li> </ul>	<ul style="list-style-type: none"> <li><del>28,750</del></li> <li><del>1,000</del></li> <li><del>30,000</del></li> </ul>	GHG monitoring and verification reports  Implemented MRV system  <del>ORKÖY budget letter for ORKÖY soft loans and grants for 2022 and 2023</del>	Unchanged commitment of ORKÖY and relevant stakeholders (utilities, government).  Successful implementation of demonstration projects  Interest of other financial subjects in the program.

Strategy	Indicator	Baseline	Targets	Source of Verification	Assumptions and Risks
	<p><del>grid-connected PV systems or these systems committed under ORKOY budgets by EOP (kWp)</del></p> <p>• Cumulative total electricity generation from installed grid-connected PV systems <del>or these systems committed under ORKOY budgets by EOP (kWh/year)</del></p>	• 0	• 47,520,000		



## APPENDIX G - RESPONSES TO COMMENTS RECEIVED ON DRAFT MTR REPORT

To the comments received on 6 July 2019 from the Mid-Term Review of “Sustainable Energy Financing Mechanism for Solar PV in Forest Villages in Turkey (ORKÖY-PV Project)” (UNDP PIMS 5323), responses are provided in the following table by institution (“Author” column) and track change comment number (“#” column):

Author	#	Para #/ Comment location	Comment/Feedback on draft TE report	TE response and actions taken
Nazife Ece	1	Cover Page	Could you please kindly confirm whether you went through the checklist for Gender Sensitive midterm review analysis in the MTR Guidance document? It is here for your ease of reference: <a href="http://web.undp.org/evaluation/documents/guidance/GEF/mid-term/Guidance_Midterm%20Review%20_EN_2014.pdf">http://web.undp.org/evaluation/documents/guidance/GEF/mid-term/Guidance_Midterm%20Review%20_EN_2014.pdf</a>	The MTR confirms the use of the checklist for Gender Sensitive midterm review. Wherever appropriate, gender analyses were provided in the text of the MTR report.
John O’Brien	2	Para 21, last bullet on international and domestic banks	You read the ProDoc phase 1 was GEF only, phase 2 was GEF grant mostly soft loan, phase 3 was less GEF grant more soft loan, phase 4 was entirely ORKÖY soft loan and then beyond that the project document talked about bringing in commercial banks. Funding of \$45 million USD was to have come from ORKÖY. This appears to have failed to materialize. This has nothing to do with ‘regulatory’ issues that favor rooftop versus land based so you need to discuss more.	The MTR team confirms that the regulatory obstacles have been a primary cause of the lack of ORKÖY co-financing to date. Edits have been made to this bullet to provide the details of the latest information provided to the MTR team on this issue.
Nazife Ece	3	Section 3.1.1	I think it would help if you sub-categorize this section as follows: <ul style="list-style-type: none"> <li>• Problem addressed and underlying assumptions</li> <li>• Relevance of the project strategy</li> <li>• How the project addresses country priorities</li> <li>• Country ownership</li> <li>• Decision-making processes</li> <li>• Were gender considerations incorporated into project design?</li> </ul>	Some edits were made in this section to sub-categorize. However, many of these issues are also addressed in Section 2 which provides a development context to the Project followed by how the Project is addressing the problems.
John O’Brien	4	Para 24, 3 <sup>rd</sup> bullet	How is it not-affordable with a zero percent interest rate loan guaranteed by ORKÖY? The project was never designed to work with commercial financing. It was designed to be GEF grants and a ZERO percent interest rate soft loan.	Edits have been made in this bullet of Para 24 to clarify that a grid-connected solar PV system is not affordable to forest villagers who would require some form of concessional finance from ORKÖY.

<b>Author</b>	<b>#</b>	<b>Para #/ Comment location</b>	<b>Comment/Feedback on draft TE report</b>	<b>TE response and actions taken</b>
Necmettin Tokur	5	Para 25	With regards to the “the ownership of the ORKÖY-PV project by OGM, ORKÖY and its parent agency and MoAF appears to be strong”, this has been the case only during the last couple of months, before which ownership was a concrete problem which is one of the reasons that led to significant delays.	Comment is appreciated. Edits have been made in Para 25 to reflect the comment.
John O’Brien	6	Para 26	With regards to the first bullet, is this rooftop or land-based, and why is it free? Village cooperatives will be selling to the grid.	Comment is appreciated. Edits have been made to clarify the risk that is mainly in reference to rooftop solar PV installations
Nazife Ece	7	Para 28	I think there needs to be more critical and substantial analysis of the logframe especially because you suggest a revised strategy. Please also talk about whether progress has led to beneficial development effects? Why and Why not?	Agreed. Project progress is covered under Section 3.2 against the PRF.
Nuri Ozbagdatli	8	Table 1 comment on “Outcome 1.1 on National Framework published and approved”	ORKOY regulation is revised for supporting PV projects. Energy regulation is just clarified in May 2019 for PV. Since the 2018 PIR is about the ORKOY regulation, it would be good to mention about this progress.	Comment appreciated and is reflected in the column on “Midterm Level and Assessment”.
Naz Ozguc	9	Table 1 comment on “Output 1.1 on Completed and published Evaluation report by Year 1”	Public-private business model has been prepared for land based solar PV, however, these needs to be extended to roof top as well. This may change to yellow if appropriate.	Comment appreciated with change made to “achievement rating”.
Naz Ozguc	10	Table 1 comment on “Output 2.3”	Case studies for land based solar PV plants can be ready before the EOP, for your assessment	Comment appreciated with change made to “achievement rating”.
John O’Brien	11	Para 30	Why will there be no attempt to replicate these 2 x 100 kW (land-based) systems?	These reasons are given in Para 43 of Final MTR report.
Necmettin Tokur	12	Para 32	Is this misunderstood?? They have closed the DG for Cooperatives under the Ministry of Trade. And the reason of closure was not RE issues... it was rather due to negative approach of gov’t to cooperative model in general.	Comment appreciated with edits made in Para 32.
John O’Brien	13	Para 34	Please explain the calculation. If the average rooftop system is 3KW then it needs 10,000 systems to be installed. Or is the average system say 2.2KW. Please explain the math.	The calculation is provided in the Final MTR Report in Paras 40-42 and 45 as well as Tables 2 to 4.

<i>Author</i>	<i>#</i>	<i>Para #/ Comment location</i>	<i>Comment/Feedback on draft TE report</i>	<i>TE response and actions taken</i>
John O’Brien	14	Para 36	Okay, but throughout the document you make claim after claim that rooftop is better than land based with not even the most basic of analysis to support this claim. Rooftop has the battery storage issue which adds cost. And there is low capacity factor issue also. And there is maintenance issue.	Para 38 in the Final MTR report clarifies that there is legislative clarity for rooftop solar PV installations through net metering. The report <u>does not</u> make any claims that rooftop is better than land-based, and no battery storage is being proposed. It is the Government that has reasons to encourage rooftop solar PV instead of land-based.
John O’Brien	15	Table 2	Why are we sticking with just 200KW and then go 100% to rooftop? Why can’t we have a target of say 2MW or land based and 28MW rooftop	See response to Comments 11 and 13.
Necmettin Tokur	16	Tables 2 and 3	Possible risks (low, medium or high) should also be mentioned where appropriate so that the reader become familiar with and appreciate them for achievement of anticipated figures.	Risks to these models are covered under “Assumptions and Risks” in new PRF in Appendix F.
Necmettin Tokur	17	Para 52	PV standards are in place in the form of TS EN, TS EN IEC, etc. as adoption of international standards as national ones by TSE. The issue is to develop a certification scheme specific to OGM driven projects	Comment appreciated with edits made in Para 49 of final MTR report
John O’Brien	18	Para 61	You need to discuss what co-financing commitment is going to be the new commitment now for the rooftop systems: 1) What if any ORKOY co-financing is left for land based systems?; and 2) What ORKOY co-financing is available for the rooftop systems?	The narrative on co-financing has been re-written in Para 64 in the Final MTR report based on the latest information received in early July 2019.
Nuri Ozbagdatli	19	Section 3.4 on “Sustainability”	In the executive summary chapter sustainability is ranked as “2 as Unsatisfactory” even though the rating from the reviewers are in overall “Moderately likely” as indicated in this section. Should we re-consider this ranking based on the reviewers ratings?	The rating of moderately unlikely will remain as the current remaining time for the ORKÖY-PV Project is 14 months, insufficient time to accomplish any substantial progress towards the objectives. This rating serves as one of the strong justifications for a no-cost extension.

<b>Author</b>	<b>#</b>	<b>Para #/ Comment location</b>	<b>Comment/Feedback on draft TE report</b>	<b>TE response and actions taken</b>
John O’Brien	20	Table 6 comment on “Project Formulation”	The main reason strategy is not relevant now is NOT the downturn. It is that almost \$50 million USD of cash co-financing from ORKOY did not materialize. You absolutely need to mention this. Without this money there is ZERO chance to reach the 30MW.	The ORKÖY-PV strategy became irrelevant due to changing economic conditions amongst other factors, resulting in poor progress in the setup of pilot PV solar projects (Component 2). Edits have been made in the report as well as Table 6 to provide the necessary details.
Nuri Ozbagdatli	21	Table 6 comment on “Project Formulation”	One of the reasons is the economic slowdown. However, the main reason is change on energy policy. Another reason is the lack of ownership from the ORKOY due to rapid office turnover	Comment is appreciated with correction made as suggested with lack of ownership due to rapid office turnover being mentioned as a factor in the table on “Overall Project Achievement”.
Nuri Ozbagdatli	22	Table 6 comment on “Project Implementation Approach”	Need to write the reason for that, i.e. the project management structure set according to UNDP restructuring process at that time.	Comment appreciated but will be placed in Para 58, as the MTR author wishes to keep Table 6 as brief as possible.
Nuri Ozbagdatli	23	Table 6 comment on “Sustainability”	Also need to mention the reason which is annual investment budget planning process. This process is out of UNDP and Ministry control. This is to be coordinated by the SBO of the Presidency.	Comment appreciated but will be placed in Para 73, as the MTR author wishes to keep Table 6 as brief as possible.
John O’Brien	24	Table 6 comment on “Overall Project Achievement and impact”	I don’t agree. It has been delayed also by co-financing failing to materialize. With 0% interest soft loans, land based is attractive also. Due to regulatory barriers and co-financing failing to materialize, and with the agreement of the project board, the project has decided to focus on rooftop (rather than land based) solar PV over the second half of the project.	Again, similar to Comment 20, the lack of progress is primarily due to unforeseen regulatory obstacles. Edits have been made in Table 6 with recent information to provide additional clarity to the reasoning for the lack of overall project achievement

## APPENDIX H – PROPOSED CHANGES TO THE PROJECT STRATEGY<sup>42</sup>

### H1. Addressed Barriers to Achieving Project Objective

H-1. Due to the recent change in rules for unlicensed solar PV, the project has clarity. The road for implementing residential rooftop solar PV for own use has been cleared by simplified procedures, monthly net metering and updated FiT. However, the updated rules also restrict Land-based application to public use in case of some agricultural situations (irrigation, water treatment and waste treatment).

H-2. ORKÖY team and ORKÖY sustainable finance mechanism both have been established. The SFM includes 20% grant and 80% interest free loan, to be repaid in 7 instalments after each harvest (i.e. a tenor of 7 year). The budget for application 2020 will be allocated later this year.

### H2. Remaining Barriers to Achieving Project Objective

H-3. A primary barrier remaining in the achievement of ORKÖY-PV Project objectives is the time remaining to the end of Project, which is up to 1 September 2020. Many of the barriers that afflicted the ORKÖY-PV Project since 2016 involved legislative and regulatory barriers. These barriers caused ORKÖY-PV personnel to expend considerable time in overcoming. Fortunately, as recently as May this year, many of these legislative and regulatory barriers appear to have been removed with the Government’s announcement of its preference for rooftop solar PV installations that is net metered with a FiT regime and simplified procedures. All these will need to encourage residential electricity generation for home consumption only.

H-4. There is also regulatory certainty over the future of (unlicensed) land-based solar PV plants. These are only allowed in the case of public installations used for agricultural irrigation, water treatment plants or waste treatment facilities. The model pursued under ORKÖY-PV Project over the past couple of years is therefore no longer possible. As the two land based pilot projects have already been permitted and currently being procured, these two can continue and provide data on use and generation of electricity.

H-5. Other barriers or risks that currently remain in obstructing the Project from meeting this objective include:

- the need for **increased visibility** of the ORKÖY financial mechanism for rooftop solar PV installations amongst forest villages throughout Turkey that will be required to meet or exceed the installed capacity target of 30 MW in forest villages;
- the need to **test the sustainable finance mechanism** with ORKÖY on handling of applications and interest by inhabitants in the forest villages;
- lack of **confirmed and identified sources** for capitalization of ORKÖY fiscal resources to support continuation of its financial mechanism to reach the 30 MW installed capacity target;

<sup>42</sup> Excerpted from Project Strategy Revision of UNDP/GEF Project: Sustainable Energy Financing Mechanism for Solar PV in Forest Villages in Turkey (ORKÖY-PV Project) by Dr. Egbert Liese, Project Revision Consultant.

- the absence of a developed **MRV system** (that is linked to climate finance) to track quality of rooftop solar PV installations, electricity generated from these systems, and overall changes in electricity consumption by a beneficiary households; and
- the absence of **other financial resources** (such as commercial funding and climate finance) to support achieving Project objective or scale residential rooftop solar PV in other villages.

### H3. Feasibility of Rooftop Solar PV under ORKOY SFM

H-6. With the Government’s legislative preference of rooftop solar PV installations, there is a need to demonstrate the benefits of residential rooftop solar PV that includes own generation of electricity and to certain extent independence from changing electricity prices amongst several other benefits to consumers. However, and although installation cost has reduced significantly over the past could of years, it still is a sizable investment. The ORKÖY SFM is intent on making such investments in residential rooftop solar PV feasible for the households in the forest villages. As the households in these villages vary in electricity consumption and needs, the ORKÖY team has collected consumption data from forest villages, obtained from the electricity distribution companies and identified 4 electricity consumption categories<sup>43</sup>. These categories are presented in Table H-1.

**Table H-1: Electricity consumption categories**

Electricity consumption category	Description	Average daily electricity consumption (kWh)	Average monthly electricity bill (TL) w/ 0.63TL/kWh	Solar PV generation capacity (kWe)
Category I	Small household of 2, with limited electricity use	3.5	66.15	1.2
Category II	Small household of 2, with larger electricity use	5.0	94.50	2
Category III	Larger household of 4 to 6, or small household with limited processing activities	8.0	151.20	2.8
Category IV	Household with some processing activities	10.0	189.00	4

H-7. The total amount of hours of sun per day per year for Ankara is 82.1. This varies over the year with the lowest average of sun hours in the month of December (2.5 hours per day). See Table H-2 below for the average hours of sun per month in Ankara.

**Table H-2: Average amount of hours per month in Ankara**

Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Average Hours	2.7	3.9	5.2	6.5	8.5	10.1	11.4	10.8	9.2	6.7	4.6	2.5	82.1

<sup>43</sup> These electricity consumption categories have been formed for assessing the feasibility purposes and only give an indication of the actual to be installed installations. Actual selection of installed capacity will be determined when pilots are selected.

H-8. Based on these averages the generation capacity can be calculated. As the applicable generation capacity should be focused on own use, the installation should be able to generate the required electricity in the month of December, i.e. with an average of 2.5 hours of sun per day. As this is the lowest average hours of sun per day per month, the installation would be generating more electricity than needed in the other months in the year, which will be sold to the grid. For each category, financial proposals have been obtained from 2 local installation companies for the equipment and installation on a rooftop in each category. See the generation capacity, electricity generation, electricity use, feed-in and investment cost in table 3.

**Table H-3: Generation capacity, generation, use and investment cost per category**

Electricity consumption category	Solar PV generation capacity (kWe)	Yearly electricity generation (kWh/y)	Electricity use (kWh/y) <sup>44</sup>	Electricity sold to the grid (kWh/y)	Investment cost (USD)
Category I	1.2	2,956	1,260	1,696	2,000
Category II	2	4,926	1,800	3,126	2,500
Category III	2.8	6,896	2,880	4,016	3,100
Category IV	4	9,852	3,600	6,252	4,400

H-9. As the maximum tenor of the ORKÖY SFM loan is 7 years, 80% of the investment (20% grant) will have to be repaid in this period. Furthermore, the feasibility assessment assumes that the households would be able and willing to pay for the solar PV installation, as long as the monthly cost would not exceed (i) the current electricity payments plus (ii) the income realised from the sale of the abundant electricity to the grid (deemed minimum ability to pay) by much. Based on the above and use of the ORKÖY SFM, the yearly annuity payments under the loan for each of the categories mirror the deemed minimum ability to pay. See table 4 below. Although households in categories I and II pay slightly more than the deemed minimum ability to pay – respectively 35% and 11%, it can be concluded that the investments with the support from ORKÖY are feasible. Note that the households in Category III and IV pay less than their deemed minimum ability to pay, respectively 9% and 2%.

**Table H-4: Summary feasibility assessment of rooftop solar PV categories**

Electricity consumption category	Loan amount (USD)	Grant amount (USD)	Yearly annuity payment (USD)	Yearly deemed minimum ability to pay (USD)
Category I	1,600	400	229	170
Category II	2,000	500	286	257
Category III	2,480	620	354	391
Category IV	3,520	800	503	514

<sup>44</sup> With the configuration of the installed capacity, some small amount of electricity still needs to be purchased from the grid. These are 23, 12, 43 and 24 kWh per year, respectively for the capacities I, II, III and IV.

## H4. Demonstration and Residential Rooftop Solar PV

### *Pilot Demonstrations*

- H-10. With regards to the target of “number of projects implemented”, the Project has experienced difficulties in developing these solar PV projects as originally planned in the ProDoc. The main reason being the shifting legislation of the Government and EIGM on unlicensed land-based solar PV projects. The end result, however, is that 2 of the land-based solar PV projects are currently under an ITB process for Afyon and Konya. Due to the recent change in rules for unlicensed solar PV, further land-based residential solar PV projects will be very restricted and therefore has reduced value to function as demonstration for the scale up phase. However, the installations will still be able to produce valuable information on generation and use. Furthermore, these projects will demonstrate an alternative (or additional) model to generate electricity for communities in Turkey, especially those that are still allowed (for irrigation, waste water and waste treatment).
- H-11. In addition to Afyon and Konya, two other regions, Corum and Elazig, had been chosen at the beginning of the project. For these two regions, it has been agreed to a rooftop solar pilot programme for approximately 25 installations per village, in line with the latest legislation. As, especially in the countryside, it is deemed crucial to demonstrate how these residential solar PV installations can benefit, ORKÖY expressed to the MTR team and the ORKÖY-PV PMU to maximize remaining ORKÖY-PV resources allocated towards pilot rooftop solar PV. It would strengthen the scale up if, in addition to Corum and Elazig, 2 further villages could partake in the pilot with each also 25 pilot installations. Furthermore, ORKÖY also requested another 100 pilot rooftop installations to be setup in another 15 to 20 villages scattered throughout Turkey to maximize its geographical coverage to disseminate the ORKÖY Solar PV Project and to pilot these installations in different climatic conditions. The summary of the total pilot installation activities is presented in table 5 below.

**Table H-5: Pilot of Solar PV installations**

Installation Type	Locations	Budget Year	Number of installations	kW per installation	Total (kW)
- Land Installation	Afyon and Konya	2019	2	100	200
- Roof Installations	Corum, Elazig and 2 other regions	2019	100	2	200
- Roof Installations	15 to 20 locations	2019	100	2	200
Total Installed					600

- H-12. In preparation of this new phase of rooftop solar PV for ORKÖY-PV, the Project will be required to prepare business plans for a larger rooftop programme. In addition to the 2 land-based studies already completed by GUNDER, the Project will need feasibility studies and business plans for the rooftop solar PV in 4 villages, and for the installations in the 20 other villages where there will be around 5 installations per village, for a total of 600 kW installed capacity.
- H-13. Upon completion of these installations, the Project will be setup to undertake case studies of each of the villages where rooftop solar PV installations and the 2 land-based solar PV plants and video documentaries will be prepared and published. Of interest to ORKÖY will be the changes in electricity consumptive habits post-purchase of the solar PV system. While there is a risk of increased electricity generation from these households, there is also a strong likelihood of no increased consumption due



to the obligation of the household to payback the loan in less than 7 years, and a lack of increased disposable income from electricity savings. These studies may also provide clues to future policies regarding the rules of forest villager engagement on these programmes for which ORKÖY and the Government would seek a trend towards financial independence of the forest villager from the solar PV investment. This may especially be valuable considering there will be case studies undertaken for the various installed capacities of 1.2, 2.0, 3.2 and 4 kW<sup>45</sup>, and where the daily electricity consumption is in the order of 3 to 10 kWh. This may also mean that the forest villager invests disposable income towards strengthening of their income generating activities.

H-14. Case studies will also be undertaken for the land-based solar PV projects. The Government will be able to learn from these installations notwithstanding their halting of approvals for unlicensed land-based solar PV projects. The outcomes from these 2 land-based solar PV plants should be able to inform policymakers of the pros and cons of these projects, and whether or not land-based projects are in the future for Turkey’s unregulated projects for residential use.

H-15. The outcome of the pilot projects will also have valuable information for the financial institutions active in Turkey. Data on generation and use will provide information that these institutions can use to better understand risks associated with the finance of residential solar PV installations. Information will be shared via the Consultation on Residential Solar PV Finance with the financial sector stakeholders.

### *Pilot Replication (Financial Mechanism Pilot) and Scale up*

H-16. Without the completion of the pilot schemes in Component 2, there has indeed been limited progress on this rollout that involves the ORKÖY sustainable finance mechanism (SFM). The mechanism foreseen and proposed by ORKÖY is to be a combination of a grant and a soft loan, similar to the mechanism used for the SWH programme. The final mix of grant and soft loan is to be a grant of 20% of the investment cost and a 7-year 0% interest loan for the remaining 80% of the investment cost. However, prior rolling out this final mix, a second pilot phase is proposed by ORKÖY to test the roll out handling by ORKÖY and uptake in the forest villages of the sustainable finance mechanism. Under this second pilot, the conditions of the mechanisms will be softer and consist of a combination of 60% grant funding (25% GEF + 35% ORKÖY) and 40% ORKÖY soft loan (at 0% interest and 7 year tenor). This will lead to an anticipated additional solar PV capacity of 2 MW.

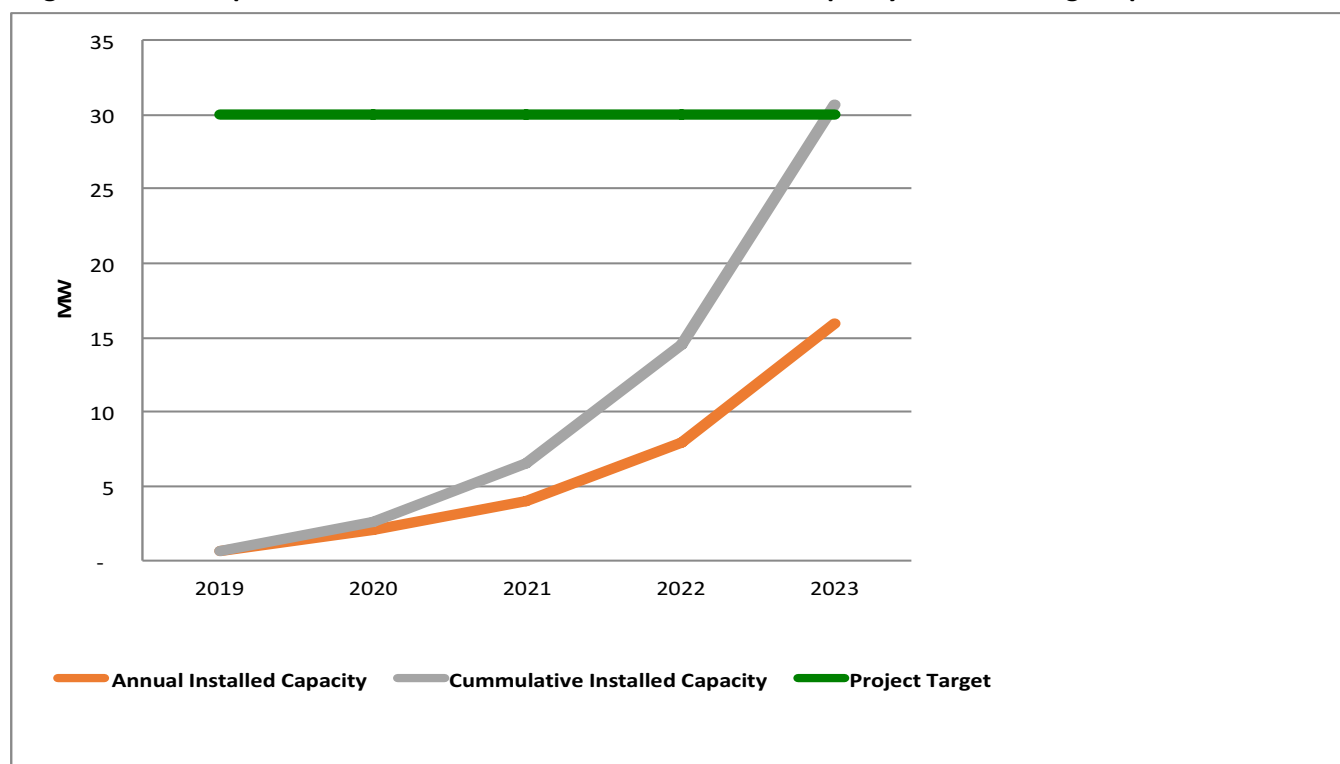
H-17. The GEF funds available is the determinant of the number of rooftops for solar PV installations for Phase II. By the third year of the solar PV rollout for Phase III, forest villager solar PV purchases would be completely from ORKÖY: 20% grant and 80% ORKÖY soft loan (7-year tenor with no interest). This is the ORKÖY SFM and will be funded from the ORKÖY budget. It is envisioned that ORKÖY will continue until the uptake of these loans for residential solar PV shows saturation, similar to ORKÖY’s SWH financing mechanism. For the first 3 years of the SFM (budget years 2021, 2022 and 2023), it is anticipated that the additional installed capacity would be 28 MW, bringing the total installed capacity resulting from this Project above the 30MW target. On the basis of these pilots and planned roll-out of the SFM, the target of 30 MW could be achieved in 5 years as presented on Table 6 and Figure 3.

H-18. Detailed planning and budget allocation for all three phases is presented in Figure 5 in the main report.

<sup>45</sup> Project team to fine tune capacity categories based on the actual situations and needs in the villages.

**Table H-6: Anticipated pilot solar PV installations in Replication and Scaling-Up phase**

Installation Type	Budget Year	Number of installations	kW per installation	Total (kW)
<b>Replication</b>				
- Roof Installation	2020	1,000	2	2,000
<b>Scaling-Up</b>				
- Roof Installation	2021	2,000	2	4,000
- Roof Installation	2022	4,000	2	8,000
- Roof Installation	2023	8,000	2	16,000
<b>Total Installed</b>				<b>30,000</b>

**Figure H-1: Anticipated increase in residential solar PV installed capacity in forest villages up to 2023**

## H5. Monitoring, Reporting and Verification System

H-19. The ORKÖY PV Project also includes the preparation and implementation of a Monitoring, Reporting and Verification system (MRV). For the MRV system a monitoring plan should be developed, to generate data allowing aggregated reporting on (i) electricity produced by the solar PV installations, (ii) electricity consumed by the participating households; and (iii) electricity delivered to the grid. Furthermore, it should also be able to report on the CO<sub>2</sub> reduction by the installations, due to replacement of electricity from the grid. The frequency should be agreed, but is likely to be on a monthly basis. The project should appoint a MRV manager as part of the ORKÖY team. This person

should be in charge of the development of the MRV system, the roll out, the yearly collection of data and reporting.

H-20. Existing MRV plans from other rooftop solar programs that have been developed for carbon credits generation will be used and adopted for this particular project. The quality of these plans, most importantly, should be sufficiently robust to bring confidence to potential climate financiers of the quantities of GHG emission reductions being generated by the MRV system. With this incremental strengthening of the MRV system, workshops will be conducted to disseminate a strengthened MRV system along with quality and certification schemes to inform ORKÖY officials, utilities, and solar PV installers throughout Turkey, and to solicit their feedback on these schemes, and to improve them to ensure full utility of the schemes by all stakeholders and enhance the likelihood of climate financing.

## **H6. Engagement with Financial Sector Stakeholders and ITMO Generation**

H-21. One of the Project Outputs (3.6) is “Workshops with domestic and international banks to consult, build familiarity and integrate their lending to solar PV with ORKOY” is still necessary. Although ORKÖY seem to be able to allocate sufficient budget, it might be possible that ORKÖY funds would be exhausted. Furthermore, finance for scaling installation of rooftop solar PV in other non-forest villages throughout Turkey would further benefit use of domestic energy resources. The MTR mission did have discussions with several financial institutions in Istanbul on their interest in providing finance for rooftop solar PV installations in partnership with ORKÖY. Although there is interest especially from Turkish banks and EBRD via domestic banks, the provision of commercial finance under current conditions (at approximately 30% interest) does not appear to be a possibility.

H-22. The current economic situation leading to interest rates of approximately 30% for consumer loans on one hand and the introduction of concessional support under Article 6.2 and 6.4 of the PA<sup>46</sup>, creates an opportunity for the Project. Additional resources from financial institutions leveraged with new carbon schemes under the PA, which newly defines carbon credits as “internationally transferred mitigation outcomes” or ITMOs, could scale investment in residential solar PV. Engagement with financial sector stakeholders to consult on ITMO generation from projects like the ORKÖY-PV Project, should therefore be considered and could lead to scaling-up beyond the 30 MW installed solar PV target, especially in other non-forest villages. While such a scheme is likely not to be fully developed before the end of Project as a part of Output 3.8, the Project could aim to have the program designed, including informing all stakeholders involved prior to the end of Project. Components that will need to be developed are a solid MRV system (see Paras H-19 and H-20) and ITMO project design document, describing the ORKÖY SFM.

H-23. The workshops should have the form of consultations with the financial stakeholders, such as domestic banks and bilateral and international financial institutions and relevant governmental agencies and departments. The consultation should focus on sharing information (especially on the performance of the installed installations under the pilot phase) and on preparation of two building blocks that could support a future ITMO generating Project under either article 6.2 or 6.4. These building blocks are a robust MRV system that can legitimise an ITMO trade under the PA and an ITMO Project Design Document based on the ORKÖY SFM.

<sup>46</sup> While, the Paris Agreement entered in to force on 5 October 2016 as, to date, 185 countries have ratified the PA, Turkey – together with 9 other countries – has signed, but not (yet) ratified the PA (note that an additional 2 Parties have not signed and not ratified the PA). Turkey can therefore currently not benefit from any support under the PA.

H-24. The Project could reach out to the financial sector stakeholders on the above mentioned topics every year until the end of the project. The stakeholders could include Development Banks, such as EBRD and the World Bank, domestic commercial banks, such as Sekerbank and Garanti and relevant governmental institutions.

## H7. Financial Plan

H-25. The total budget needed to implement the 30MW installed residential solar PV is estimated to be USD 49.9 million. The ORKÖY team has requested additional budget to be allocated to the pilot installations. This budget is available in the overall budget and would, in the view of the reviewers, be a better allocation to secure the project target to ensure 30MW installed solar PV in forest villages, as it would increase the dissemination, which is crucial for scaling. The total contribution from GEF to the pilot and replication investments would be USD 1.9 million. The remainder of the total budget of USD 49.9 million will be provided by ORKÖY. This would make ORKÖY’s contribution USD 44 million, of which USD 8.8 million in grants and USD 35.2 million in soft loans. See detailed financial plan in table 8 below.

**Table H-8: Financial plan ORKÖY PV pilot, replication and scaling-up**

Activity	ORKOY Grant (US\$)	ORKOY Soft Loan (US\$)	GEF Cost (US\$)	Total Cost
<b>Component 2: Solar PV Demonstration Projects</b>				
* 2 - 100 kW land-based pilot plants	-	-	300,000	300,000
* Rooftops in 4 regions (avg install @ 2 kW each)	-	-	300,000	300,000
* Rooftops in 20 locations (10 of 2kW each)	-	-	300,000	300,000
<b>Component 3: Replication</b>				
* Rooftops for 2020 (avg install @ 2 kW each)	400,000	1,600,000	1,000,000	3,000,000
<b>Component 3: Scaling-up</b>				
* Rooftops for 2021 (avg install @ 2 kW each)	1,200,000	4,800,000	-	6,000,000
* Rooftops for 2022 (avg install @ 2 kW each)	2,400,000	9,600,000		12,000,000
* Rooftops for 2023 (avg install @ 2 kW each)	4,800,000	19,200,000		24,000,000
<b>Totals:</b>	<b>8,800,000</b>	<b>35,200,000</b>	<b>1,900,000</b>	<b>45,900,000</b>

## H8. Project Extension

H-26. Some of the barriers mentioned in Para H-5, can be resolved with the activities outlined above within the remaining period of the ORKÖY-PV Project. However, most of them simply need more time to complete and ensure 30 MW of installed solar PV in forest villages. On the basis of a newly planned program for ORKÖY to demonstrate rooftop solar PV installations with a no-cost extension, there is a strong likelihood that with the remaining resources of ORKÖY-PV, there will be sufficient demonstration of solar PV installations and ORKÖY’s sustainable finance mechanism that will provide the required catalyst for initiating interest in forest villages in the investment into rooftop solar PV installations.

H-27. The achievement of such a large target of installed capacity is now somewhat challenging considering the original target was based on land-based projects with a larger generation capacity per

installation. The shift by government with this legislation to rooftop solar PV, this target is even more challenging since installers will now be dealing with different households at different sites. The impossibility of achieving the 30 MW installed capacity target and associated GHG reduction and electricity generated targets by September 2020, will almost certainly justify a request for extension as a recommendation. With an extension of 18 to 24 months, this Project can create momentum for the ORKÖY SFM, and as a deliverable at the end of Project, provide letters of commitment and funding from ORKÖY to meet the 30 MW target, albeit after the end of Project.

## H9. Summary of Project Strategy Revisions

H-28. The key proposed revisions to the Project Strategy are summarised in the Table H-9.

**Table H-9: Summary of barriers and project strategy revisions**

Barrier	Strategy Revision	Description
– Visible Rooftop Solar PV	– Increase installations and locations under Pilot	✓ 4 regions, each 25 installations; ✓ 15-20 other locations with a total of 100 installations
– Tested Sustainable Finance Mechanism	– Test SFM under replication activity	✓ 1,000 applications for financing tested
– Operational MRV system	– Develop MRV plan and implement	✓ Develop MRV system (Monitoring Plan) to monitor performance and results
– Available funding from ORKOY	– Obtain commitment to allocate budget	✓ Secure commitment from ORKOY on Project Strategy Revision and co-financing
– Available other financial resources	– Engage with financial sector stakeholders on future climate finance or ITMO trade	✓ share performance information of Pilot ✓ Prepare 2 building blocks for climate finance/carbon market support (MRV, SFM model) ✓ Consult on above with financial sector stakeholders.

## APPENDIX I – DRAFT TERMS OF REFERENCE FOR AN INTERNATIONAL CONSULTANT

This table provides a framework for an International Consultant’s ToRs against relevant (old) outputs of the ORKÖY-PV Project PRF. With approval of a new PRF for the ORKÖY-PV Project (as recommended in Para 87), these ToRs need to be adjusted to align with the new output numbers of the new PRF. Note that the proposed tasks listed in the following table should still be valid with the new PRF.

Outputs (from old PRF)	Activities	Proposed tasks for International Consultant
<b>COMPONENT 1: Policy &amp; Institutional Framework for supporting Sustainable energy financing mechanism for solar power in forest villages</b>		
Output 1.4: Model contract for ORKOY soft loan developed and utilized	1.4.1. Development of model contracts	The Consultant is expected to review the draft model contract produced for financing of small-scale PV plants by ORKOY soft-loans.
Output 1.5: National Framework designed and operationalized to use Turkey’s feed-In-Tariff scheme for the purpose of residential solar PV for forest villagers	1.5.1. Design of the National Framework under ORKOY	This output also includes review by the Consultant of existing regulatory framework for PV installations in Turkey and produce recommendations for improvement of the framework considering international best practices.
Output 1.7: Methodology for innovative approach (e.g. net metering) is developed, published and disseminated	1.7.1. Development of the methodology 1.7.4. Organizing study tour for key stakeholders to get familiar with foreign schemes using net metering or other innovative schemes	The Consultant is expected to review and introduce successful foreign examples of net metering applications.
<b>COMPONENT 3: Replication and scaling up – Enhancement of the sustainable energy financing mechanism</b>		
Output 3.1: National Awareness Raising Programme for ORKOY Sustainable Energy Financing Mechanism addressing forest village end-users and cooperatives	3.1.1. Development of National Awareness Raising Programme	This output will be delivered in collaboration with LARC, and the SEFM Consultant is expected to provide technical inputs to development of the NARP.
Output 3.2: Solar PV Training Manual for actors in solar PV value chain (ORKOY officials, installers, utilities) on how to develop, finance, and implement solar PV projects is prepared, published and disseminated widely	3.2.1. Development of training manual	This deliverable will be produced jointly by SEFM Consultant, Awareness Raising Consultant and other relevant consultants working for the Project. The SEFM Consultant will be responsible for providing thematic inputs (regulatory, financial, etc.) in the field of financing mechanisms.
Output 3.3: Twenty National workshops held to promote the solar PV training manual targeting solar PV value chain (ORKOY officials, installers, utilities)	3.3.1. Development, printing and dissemination of training toolkits 3.3.2. Organization of 20 national workshops	This output will be delivered in collaboration with LARC. The SEFM Consultant is expected to support PMU in elaboration of the contents of these workshops, provide thematic inputs (regulatory, financial, etc.) to training toolkits in the field of financing

Outputs (from old PRF)	Activities	Proposed tasks for International Consultant
		mechanisms and to attend these workshops as needed by the PMU.
Output 3.4: MRV system and indicators designed and implemented to reliably track energy consumption	3.4.1 MRV system developed	The Consultant is expected to assist in the MRV design to support monetization of ITMOs generated from ORKOY's solar PV programmes (under Output 3.8)
Output 3.6: Workshops with domestic and international banks to consult, build familiarity, and integrate their lending to solar PV with ORKOY	3.6.1. Development, printing and dissemination of training toolkits 3.6.2. Organization of workshops	This output will be delivered in collaboration with LARC. The SEFM Consultant is expected to support PMU in elaboration of the contents of these workshops, provide thematic inputs (regulatory, financial, etc.) to training toolkits in the field of financing mechanisms and to attend these workshops as needed by the PMU.
Output 3.8: Programme of Activities (PoA) setup for carbon market for forest villages solar PV project	3.8.1 The programme trade model developed	The Consultant is expected to assist in the design of this programme that best suit the Paris Agreement Articles to generate ITMOs from ORKOY's solar PV programmes.
Output 3.9. 30 MW of Solar Projects successfully implemented	3.9.1. Dissemination and implementation of SEFM	The Consultant is expected to help PMU in mobilizing financing commitments and coordinating the implementation of the SEFM under the Project.

## APPENDIX J - EVALUATION CONSULTANT AGREEMENT FORM

### Evaluator 1:

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<sup>47</sup>

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

Name of Consultant: Roland Wong

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 Surrey, BC, Canada on 28 July 2019

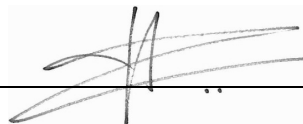


<sup>47</sup> [www.unevaluation.org/unegcodeofconduct](http://www.unevaluation.org/unegcodeofconduct)



**Evaluator 2:**

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.
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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<sup>48</sup>****Agreement to abide by the Code of Conduct for Evaluation in the UN System**Name of Consultant: Egbert LieseName of Consultancy Organization (where relevant): Walburg & Partners B.V.**I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation**Signed at Science Park Amsterdam, *Netherlands* on 28 July 2019


<sup>48</sup> [www.unevaluation.org/unegcodeofconduct](http://www.unevaluation.org/unegcodeofconduct)