



PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: FULL-SIZED PROJECT

TYPE OF TRUST FUND:GEFTF

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PART I: PROJECT INFORMATION

Project Title:	Sustainable Energy Financing Mechanism for Solar PV in Forest Villages in Turkey		
Country(ies):	Turkey	GEF Project ID: ¹	5732
GEF Agency(ies):	UNDP	GEF Agency Project ID:	5323
Other Executing Partner(s):	Ministry of Forestry and Water Affairs, General Directorate of Forestry (GDF), Forest and Villagers Relations Department (ORKOY)	Submission Date: Resubmission Date:	7 th March 2014 31st March 2014
GEF Focal Area (s):	Climate Change	Project Duration (Months)	48 months
Name of parent program (if applicable): • For SFM/REDD+ <input type="checkbox"/> • For SGP <input type="checkbox"/> • For PPP <input type="checkbox"/>		Project Agency Fee (\$):	\$359,100

A. INDICATIVE FOCAL AREA STRATEGY FRAMEWORK²:

Focal Area Objectives	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
CCM-3 Promote Investment in Renewable Energy Technologies	GEFTF	3,780,000	18,330,000
(select) (select)	(select)		
(select) (select)	(select)		
(select) (select)	(select)		
(select) (select)	(select)		
(select) (select)	(select)		
(select) (select)	(select)		
(select) (select)	(select)		
	(select)		
Total Project Cost		3,780,000	18,330,000

B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To support the successful launching of a sustainable energy financing mechanism within the ORKOY social credit mechanism to ensure that by the end of the project 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

Project Component	Grant Type ³	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
1.Policy & Institutional Framework for supporting Sustainable energy financing mechanism for solar power in forest villages	TA	1.1 Enhanced enabling policy and environment , within which ORKOY's sustainable energy financing mechanism continues to	1.1. Evaluation and selection of public-private business models (ORKOY, solar PV installers, utilities, domestic banks) for provision of affordable, grid-connected residential	GEFTF	1,060,000	2,000,000

¹ Project ID number will be assigned by GEFSEC.

² Refer to the reference attached on the [Focal Area Results Framework and LDCF/SCCF Framework](#) when completing Table A.

³ TA includes capacity building, and research and development.

		operate beyond the lifetime of the project	<p>solar PV to forest villagers, using an individual household and/or cooperative model.</p> <p>1.2 Terms of Reference for ORKOY's Social Credit Programme are revised, agreed, published and disseminated</p> <p>1.3 Sustainable energy Financing unit established within ORKOY with dedicated full time staff</p> <p>1.4 Model contract for ORKOY soft loan developed and utilized</p> <p>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.</p> <p>1.6 Technical report on grid capacity and requirements to enable feed-in of grid-connected PV and to define technical information for the national grid code.</p> <p>1.7 Nationally Appropriate Mitigation Action (NAMA) prepared for solar PV projects in forest villages and registered with UNFCCC</p>			
2. Solar PV demonstration Projects	<p>TA \$230,000 GEF \$500,000 CoFinancing</p> <p>INV \$1,400,000 GEF \$14,100,000 Cofinancing</p>	2.1 Sustainable Energy Financing Mechanism of ORKOY successfully finances two solar PV demonstration projects (each up to 100 kW in total) & two hybrid (solar PV/solar hot water heating) demonstration projects (each up to	2.1 Business plans & feasibility studies prepared for a total of four demonstration projects in forest villages up to 300kW. 2.2 Two demonstration projects successfully implemented in forest villages, each up to a total of 100kW solar PV (either individual households or cooperative models)	GEFTF	1,630,000	14,600,000

		<p>50kW solar PV in total) in forest villages, using either individual household and/or cooperative models</p> <p>2.2 Sustainable Energy Finance Mechanism of ORKOY successfully disburses at least \$12.6 million in soft loans for additional projects during project lifetime</p>	<p>2.3 Two hybrid demonstration projects successfully implemented in forest villages (solar PV /Solar Hot Water heating) up to a total of 50kW solar PV (either individual households or cooperative models).</p> <p>2.4 Case Studies Prepared on each of the Demonstration Projects</p> <p>2.5 Short video documentary prepared on the demonstration projects</p>			
<p>3. Replication and scaling up – Enhancement of the sustainable energy financing mechanism</p>	TA	<p>3.1 Sustainable Energy Financing Mechanism of ORKOY successfully provides soft loans to contribute to the deployment of at least 30MW of solar PV during project lifetime</p> <p>3.2 Sustainable Energy Financing Mechanism of ORKOY has in place systems for M&E, quality standards, and certification systems and training programmes</p>	<p>3.1 National Awareness Raising Programme for ORKOY Sustainable Energy Financing Mechanism addressing forest village end-users and cooperatives</p> <p>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</p> <p>3.3 Twenty National workshops held to promote the solar PV training manual targeting solar PV value chain (ORKOY officials, installers, utilities)</p> <p>3.4 MRV system and indicators designed and implemented to reliably track energy consumption</p> <p>3.5 Quality standards and certification scheme designed and implemented for solar PV hardware and for skilled technicians</p>	GEFTF	940,000	1,405,000

			3.6 Workshops with domestic and international banks to consult, build familiarity and integrate their lending to solar PV with ORKOY 3.7 3.8 Project Website – Practical Guide to Investing in Solar PV in Turkey			
	(select)			(select)		
Subtotal					3,630,000	18,005,000
Project Management Cost (PMC) ⁴ (Direct project cost of \$ 20,000 included in PMC)				(select)	150,000	325,000
Total Project Cost					3,780,000	18,330,000

C. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME IF AVAILABLE, (\$)

Sources of Cofinancing	Name of Cofinancier	Type of Cofinancing	Amount (\$)
National Government	General Directorate of Forestry (ORKOY)	In-Kind	2,675,000
National Government	General Directorate of Forestry (ORKOY)	Soft Loan	12,600,000
Private Sector	Forest Cooperatives, Solar PV installers etc ...	Cash	2,730,000
GEF Agency	UNDP	Cash	100,000
GEF Agency	UNDP	In-Kind	100,000
NGO	Gunder		125,000
Total Cofinancing			18,330,000

D. INDICATIVE TRUST FUND RESOURCES (\$) REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY¹

GEF Agency	Type of Trust Fund	Focal Area	Country Name/Global	Grant Amount (\$) (a)	Agency Fee (\$) (b) ²	Total (\$) c=a+b
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total Grant Resources				0	0	0

¹ In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

² Indicate fees related to this project.

E. PROJECT PREPARATION GRANT (PPG)⁵

⁴ To be calculated as percent of subtotal.

Please check on the appropriate box for PPG as needed for the project according to the GEF Project Grant:

	<u>Amount Requested (\$)</u>	<u>Agency Fee for PPG (\$) ⁶</u>
• No PPG required.	_____	_____
• (upto) \$50k for projects up to & including \$1 million	_____	_____
• (upto)\$100k for projects up to & including \$3 million	\$100,000	\$9,500
• (upto)\$150k for projects up to & including \$6 million	_____	_____
• (upto)\$200k for projects up to & including \$10 million	_____	_____
• (upto)\$300k for projects above \$10 million	_____	_____

PPG AMOUNT REQUESTED BY AGENCY(IES), FOCAL AREA(S) AND COUNTRY(IES) FOR MFA AND/OR MTF PROJECT ONLY

Trust Fund	GEF Agency	Focal Area	Country Name/ Global	(in \$)		
				PPG (a)	Agency Fee (b)	Total c = a + b
(select)	(select)	(select)				0
(select)	(select)	(select)				0
(select)	(select)	(select)				0
Total PPG Amount				0	0	0

MFA: Multi-focal area projects; MTF: Multi-Trust Fund projects.

PART II: PROJECT JUSTIFICATION⁷

Project Overview

A.1. Project Description. Briefly describe the project, including ; 1) the global environmental problems, root causes and barriers that need to be addressed; 2) the baseline scenario and any associated baseline projects, 3) the proposed alternative scenario, with a brief description of expected outcomes and components of the project, 4) incremental/additional cost reasoning and expected contributions from the baseline , the GEFTF, LDCF/SCCF and co-financing; 5) global environmental benefits (GEFTF, NPIF) and/or adaptation benefits (LDCF/SCCF); 6) innovativeness, sustainability and potential for scaling up

1. Turkey became a Party to the UNFCCC on 24 May 2004 and an official Party to the Kyoto Protocol on 26 August 2009. Greenhouse gas emissions in Turkey have been growing at a rapid rate of between 8-10% per year in recent years. Total greenhouse gas emissions from Turkey in 1990 have doubled from about 187 million tons of CO₂e (when Land Use, Land Use Change and Forestry (LULUCF) were not taken into account, to 401 million tones of CO₂ eq in 2009. While sinks absorbed about 44 million tones of CO₂ eq of greenhouse gases emission in 1990, this value increased to about 82 million tones of CO₂ eq in 2009. In addition, Turkey has a high population growth rate of 1.27% which is above the OECD average and which contributes to further growth in GHG emissions in Turkey. GHG emissions per capita in Turkey increased from approximately 3.4 tonnes CO₂e per capita in 1990 to 5.2 tonnes CO₂e per capita in 2010.

⁵ On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

⁶ PPG fee percentage follows the percentage of the GEF Project Grant amount requested.

⁷ Part II should not be longer than 5 pages.

Taking into account its commitments under the UNFCCC and the Kyoto Protocol to reduce GHG emissions, the Turkish Government is committed towards implementing policies which reduce greenhouse gas emissions and enhance sinks and this includes promoting solar PV.

2. This project will assist Turkey with the promotion and financing of on-grid, residential solar PV in forest villages in Turkey, either to individual households or village cooperatives. Innovative public-private business models will be developed and implemented to provide affordable residential solar PV to forest villagers. The public support and involvement in the initiative will be led by the General Directorate of Forest Village Relations Department (aka ORKOY), 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. Turkey has committed itself to using low and zero emission greenhouse gas technologies with the goal of increasing the share of renewables by up to 30% by 2023 in accordance with the Electricity Energy Market and Supply Security Strategy Paper adopted in 2009. Despite the fact that Turkey is neighbors with countries who contain some three quarters of the world's proven natural gas and petroleum reserves there is a strong push towards renewable energy in Turkey. Currently, Turkey has approximately 4000 MW of installed capacity in renewable energy making up approximately 6.7% of total energy by installed capacity, the bulk of which comes from wind and hydro (including small hydro). Solar PV is estimated as having an installed capacity of only some 12 MW at the moment whereas the target for solar PV is estimated as some 3000 MW by 2023. This means that currently less than 1% of targeted solar PV is currently installed. Turkey has very good solar resource potential as its geographical location is highly favorable for the utilization of solar energy. Turkey's average annual sunshine amounts to some 2,640 hours (total daily 7.2 hours) which compares favorably with places with especially high total sunshine hours such as Los Angeles, California (3600 hours, total daily 8.7 hours) and Darwin, Australia (3060 hours, total daily 8.4 hours). In Turkey, the average total radiation intensity 1,311 kWh/m²-year (daily total of 3.6 kWh/m²) which is very close to the average in California measured at 1,361 kWh/m²-year. Solar energy technical potential for Turkey is huge and estimated as some 380 billion kWh/year.

3. A forest village is defined under Turkish Forest Law # 6832 as any village which is within or adjacent to any forest area. Forest villages are eligible for financial and technical support by the Department of Forest-Rural Relations (ORKOY) within the General Directorate of Forestry under the Ministry of Forestry and Water records. According to the 2010 census, there were 7,073,766 people living in 21,470 forest villages who constitute approximately 10.55% of the total population and 40.42% of the total rural population of the country. Forest villages in Turkey enjoy almost 100% grid-access and access to energy and intermittent energy supply, for the most part, is not an issue. Forests cover 27% of the surface area of Turkey and due to their limited land resources as well as lack of alternative sources of income, the communities living in forested areas in Turkey have traditionally been heavily dependent on utilizations from the forest areas and are among the poorest in Turkey. Due to their high level of dependency on fossil fuels and their weak capacity to finance solar PV on their own, forest villages are an excellent choice for a GEF project which aims to overcome barriers to promote greater investment in renewable energy. Greenhouse gas mitigation potential from forest villages is high given the fact that currently forest villagers are not able to easily finance and implement renewable energy electricity generation projects, despite feed-in tariffs that make investment in solar PV systems more attractive than in the past. Forest villages have been identified in the 5th National Communications to the UNFCCC of Turkey as being particularly vulnerable to the impacts of climate change, as well as having high mitigation potential and low capacity to reduce GHG emissions without additional incentives and assistance. Without this project, it is initially estimated that a maximum of 3MW of solar PV might be deployed in forest villages

over the next five years. This makes the choice of a renewable energy forest villages project in Turkey, which includes a sustainable energy financing mechanism particularly relevant.

4. The Turkish Law on “Utilization of RES for the Purpose of Generating Electrical Energy” was adopted in 2005 with the goal of promoting the development of renewable energy in Turkey. The law has been amended and improved in 2007, 2010, and 2012. Under the new law, there is preferential grid access for renewable energy projects, and a guaranteed feed-in tariffs which includes US \$0.133 per kWh for solar power. This increases to US \$0.189 per kWh when domestic equipment produced in Turkey is utilized. The higher feed-in tariff for domestic equipment is important because it can significantly shorten the payback period of solar pv projects and make them more attractive to investors. The current retail tariff to residential end-users is US \$0.12 per kWh. The law includes a provision for waived permitting for all solar PV systems, including residential systems, up to 1,000kW and this should help projects to be successfully realized. Despite these feed-in-tariffs, the penetration of solar power in Turkey remains limited and in forest villages it is almost zero. The reason for this low level of penetration can be attributed to a number of barriers such as low levels of awareness concerning the benefits of renewable energy in forest villages, low technical capacity, low ability to navigate complex bureaucratic and administrative hurdles for renewable energy projects and low capacity to finance projects or obtain loans.

5. The 10th five year Development Plan for Turkey, adopted in 2013, determines the road map for Turkey’s development policies until 2018 and aims to achieve a 5.5% increase in Turkish GNP and a 7.2% decrease in the unemployment rate. Included in the 10th five year development plan is the requirement that incentive tools need to be developed and enhanced in order to enable forest villages to enhance their development situation. As a result the General Directorate of Forest Village Relations Department (aka ORKOY) has been operating a micro-credit mechanism, (social credit programme) to improve the living conditions of villagers through various means. Currently, ORKOY which has an annual budget of US \$70 million focuses on support for economic development projects, including the social credit programme. In line with the “Regulation of Supporting Activities for Development of Forest Villagers No. 28322 of 2012”, the ORKOY social credit mechanism currently provides support, mainly through interest-free soft loans, to individual homeowners for insulation of households and for solar hot water heaters. The interest-free soft loans can cover up to 100% of the hardware cost. The ORKOY social credit mechanism also has the mandate to lend to village cooperatives. However, while Regulation No. 28322 also calls for increased use of renewable energy *power generation* in village communities, the ORKOY programme does not currently include any support with financing of renewable energy power generation projects.

6. At the current time there has been no major emphasis of the ORKOY programme on supporting renewable energy power generation projects and the capacity of ORKOY staff to support such activities is very low. The scale of such investments are much higher than for home insulation and for solar water heating and higher levels of due diligence are required so it is unlikely that in a business as usual scenario, the ORKOY programme would be expanded to also support solar PV. The key issue for forest villagers is the affordability of the residential solar PV system and the electricity it will generate. While the technology costs of solar PV have fallen dramatically in recent years, forest villagers have limited capital of their own available and very limited access to financing, and when financing is available it often costs (for example, bank interest rates in Turkey are typically 10% or more). A preliminary financial analysis of on-grid residential solar PV benefiting from Turkey’s feed-in-tariff, based on

current solar PV costs, indicates payback periods from 9 to 14 years, and IRRs from 6 to 10%⁸. In general the affordability of renewable energy is highly sensitive to financing costs due to renewable energy's upfront capital intensity. For this reason, the focus of ORKOY's mechanism on zero-interest loans is well suited, expressly reducing financing costs. During the PPG stage and for actual design of the mechanism, further financial analyses of the economics of solar PV for forest villagers will be performed. Always focusing on the issue of affordability, different levels of support from the mechanism will be explored, including full (100%) to partial coverage of hardware costs by ORKOY's zero interest loans. The aim in exploring different levels of support will be to incorporate private sector investment, ultimately leading to a long-term sustainable market for solar PV. It is also anticipated that in future years the technology costs of solar PV will continue to fall, further increasing its affordability and shortening the payback period. The ORKOY approach of providing a public financial mechanism to reduce financing costs for solar PV projects should therefore make a major difference in helping enable solar PV off the ground.

7. However, under a business as usual scenario, it is highly unlikely that ORKOY would easily be able to expand their Social Credit Programme to include grid connected renewable energy generation projects due to a number of barriers which can be summarized easily in the table below.

Table 1:1 - Barriers : ORKOY Social Credit Programme for financing renewable energy projects

Awareness Barriers	There is a lack of awareness both about the new laws to support renewable energy and about the benefits and economic feasibility of solar PV projects among forest villages. Demonstration projects will also help to raise awareness about the benefits of solar PV for forest villages. Component 1 and Component 3 of the project aims to overcome the awareness barriers.
Technical Barriers	There is a lack of capacity among the solar PV value chain actors (solar installers, utilities, ORKOY, end-users) to conduct proper due diligence on proposed renewable energy solar PV projects. In addition, within ORKOY, there is a lack of technical capacity to establish, run, monitor and evaluate the sustainable energy financing programme. Technical barriers need to be overcome by training and targeted capacity building activities. Component 1 and Component 3 of the project aim to overcome the technical barriers.
Institutional Barriers	There is a lack of an approved institutional framework / project assessment MRV systems, quality standards and approval procedure by which ORKOY can assess renewable energy solar PV projects. Component 1 assists with overcoming institutional barriers.
Financial Barriers	There is a lack of ability among the private sector to finance solar PV projects in forest villages due to lack of capital, lack of assets, and lack of ability to raise finance. In addition, risks of payment default are higher due to the fact that forest villages typically have high numbers of populations with poorer incomes. Soft loans (as proposed by this project) will instantly

⁸ The range is based on the feed-in tariffs of US \$ 0.133/kWh to US \$ 0.189/kWh.

	make the financing of solar PV projects in forest villages more attractive. Component 2 of the project aims to overcome the financial barriers.
Carbon Finance Barriers	There is a lack of awareness about how carbon finance might provide the stimulus towards additional investment in solar renewable energy. Development of a NAMA for solar PV in forest villages, under component 1, may provide strong support for scaling up of investment and helps to overcome carbon finance barriers.

8. With the assistance provided from GEF project and incremental financing, ORKOY will be able to overcome these barriers and to expand its Social Credit Programme to include a new sustainable energy financing mechanism to support the financing of solar PV projects for forest villagers through zero interest soft loans. The success of this expanded mechanism will build on ORKOY's previous experiences with home insulation and with solar hot water heating. The expansion of this programme will proceed in two phases, namely a pilot phase which involves the four demonstration projects envisaged under component 2 of this project and then a full-roll out which will involve the expansion to many other villages at a national level using ORKOY funds allocated for this purpose. With GEF support and with the replication of the proposed approach to forest villages across Turkey, it is estimated that at least 2.5% of all forest villagers in Turkey (approx 175,000 people) will be in a position to have their power supplied by solar PV by the end of the project. To achieve this result, it is estimated that at least 30MW of solar PV capacity will need to have been constructed or be under construction by the end of the project.

9. The expected contribution of the baseline to this project includes the cost of the ORKOY social credit mechanism that relates both to the establishment of the policy and institutional framework related to the establishment of the new sustainable energy financing facility for solar PV projects and solar pv/solar water heater hybrid projects including all staff and office costs for this unit (US \$2.675M). In addition, once the demonstration projects have proven their viability over the second half of the project, ORKOY has already indicated that it plans to commit additional funds (US \$12.6M) in order to achieve scaling up and replication, based upon the success of the demonstrations. Over time, as the soft loans will get paid back to ORKOY additional projects will be able to be financed thereby helping to ensure sustainability over time. Secondly, if the business model proves to be successful there is no reason why in future ORKOY might not allocate additional funding for more soft loans. The private sector (initially estimated at US \$2.73M) will also play an important role in contributing to the baseline funding for this project. Under component 2, private sector will provide matching funds for feasibility studies to ensure their commitment to project development, estimated at US \$0.3M. In addition, once the scaling up of the program takes place, the private sector will provide equity and debt (initially estimated at US \$2.43M) to be combined with the soft loans from ORKOY to enable the full project financing to take place. It is currently envisaged that ORKOY soft loans will be able to provide up to 100% of the project financing costs. However, there is likely to be a preference given to selecting projects that include some equity as part of the total project financing package. UNDP will provide a contribution of US \$200,000 to the project (half in-kind, half cash) which will cover the cost of staff time and travel as well the cost of building in ORKOY related trainings to other related UNDP projects in Turkey in order to build synergies and reduce costs. Finally, the International Solar Energy Society – Turkish Section (GUNDER), an umbrella organization serving not only governmental bodies but also the private sector, will provide technical support along with capacity development activities aimed at assisting with capacity building and awareness raising related to the sustainable

energy financing program.

10. Component 1 of the project is focused on developing and expanding the policy and institutional framework to promote on-grid, residential solar PV. The first step will involve evaluating and selecting possible public-private business models to provide residential solar PV to forest villagers, using either an individual household or a cooperative model. This will involve collaborating and consulting with all actors in the value chain, including private sector solar PV installers, utilities (transmission/distribution for on-grid connections), domestic banks (lending for solar PV) and the village end-users. The incentives of the various market players include: (i) for solar PV installers, making additional revenues as the soft loans should lead to more business; (ii) for the utility, fulfilling a mandated obligation under Turkish law to purchase the electricity under the FiT, (iii) for domestic banks, being able to lend more easily in future and therefore disburse more loans with lower risk assessment thereby enabling the banks to make more money,; and (iv) for village end users, benefitting from the economics of the FIT, contributing to the environment, and (depending on final design, e.g. cooperative models) benefitting from energy security in case of grid-based blackouts. is. One simple example of a possible business model might include the end-user (individual, cooperative) owning the solar PV system themselves, with ORKOY providing zero-interest loans to cover all or some of the cost.. The advantage of this business model is that the end-user will benefit from low-financing costs, which are a critical factor in the financial viability of renewable energy. A disadvantage of this model is that some consumers, even with zero interest soft loans, might not be able to afford the loan payments. Another example might be for the private sector solar PV installer to own and maintain the solar PV system, and then to effectively lease it back to the end-user (fee-for-service model). Subject to further exploration at the PPG stage, ORKOY may be able to subsidise the upfront cost that the private sector actor takes on, thereby reducing lease payments. An advantage of this business model is that it can provide a ‘win-win’ scenario as the forest villager can secure cheaper long-term energy pricing without having to invest significant capital into hardware and the system ‘owner’ (the leasing company) has a steady long-term revenue stream that makes it easier to finance systems and provide acceptable Returns on Investment. Such a model (fee-for-service) has already proven to be very successful in a number of markets, including the US. A disadvantage of this model is that it has not yet been tried in Turkey before and therefore there may be some difficulties related to providing attractive financing packages to consumers. Finally, a business model of developing a pipeline of bankable projects for commercial bank financing (without softloans) might also be explored as technology costs come down and make investment in solar pv more attractive over time. The assessment of various business models and the approach to be undertaken will be further explored during the PPG phase. This includes a thorough market assessment, development and selection of the most appropriate innovative business model or models, and a clear description of the supply chain, and clear description of financing options which are available and which are most likely to be successful. ORKOY, can tailor its financial assistance to the particular business model or models selected, lending directly or indirectly to the end-user (individual, cooperative). The key determinant of ORKOY’s terms (interest rate, loan tenor) will be to reduce the financing costs to a level that results in affordable electricity generation from solar PV for the forest villagers. ORKAY’s lending should also be evaluated in the context of other financial instruments, including the possibility of rebates and grants. A model contract for the ORKOY soft loans under the financing mechanism will also be developed by legal specialists. Component one will support the expansion of ORKOY’s social credit program through revised regulation and methodologies, a new Renewable Energy Financing Unit specialized not only in a phased performance based approach for credit loan disbursements, the development of technical specifications for the grid code for solar PV, and the formulation of a Nationally Appropriate Mitigation Action (NAMA) to further establish and support the medium term development of solar PV in Turkey. The outputs and outcomes to be achieved

under this component through the creation of an enabling environment within ORKOY for financing of sustainable energy projects in forest villages will be critical for the success of the demonstration projects under component 2 and to enable and ensure the scaling up and replication of the proposed approach and business model. A key outcome of component 1 will be therefore be that the institutional, policy, and regulatory framework is in place to enable the Renewable Energy Financing Unit to operate in a sustainable manner and to provide the soft loans for solar pv systems.

11. Component 2 of the project is focused on demonstrating the technical and economic viability as well as the business model of the ORKOY sustainable energy financing mechanism for solar PV systems. It is envisaged that demonstration projects in four forest villages will be carried out, comprising of: two solar PV demonstration projects, each of up to 100kW solar PV in total, using an individual household or cooperative model; and two solar PV/solar water heating hybrid demonstration projects, providing electricity and heating, each of up to 50kW PV in total, again using an individual household or cooperative model. The selection of the four villages will be made on the basis of a combination of technical and financial criteria. Technical criteria will relate to the solar irradiation potential of the selected sites with preference given to sites with higher number of sunshine hours. Financial criteria will relate to the ability of the forest villagers to provide co-financing for the demonstration projects. While in principle, ORKOY soft loans can be for up to 100% of the total project cost, preference will be given to those project which can demonstrate significant co-financing. The designs of the demonstration projects will expressly be selected to test different PV technologies and specifications, as well as different business models and partners. Overall, these demonstration projects will aim to demonstrate the viability of the business model as a means for scaling up. The estimated GEF contribution to the four demonstration projects is US \$1,000,000, not including some US \$150,000 for business plans and feasibility studies. In addition, private sector matching financing will be provided for the business plans and feasibility studies as well as for the roll out and expansion of the programme beyond the two demonstrations. Component 2 will be split into two phases. The first phase which will take place over the first half of the project will involve GEF funding for the 4 demonstration projects and the second phase which will take place over the second half of the project will involve roll-out and expansion to many more forest villages throughout Turkey. Demonstration activities will be used in conjunction with the outputs under component 1 to provide a platform for further replication and scaling up during the second half of the project and then also after the project finishes. In addition, the scaling up and replication that is envisaged under component 3 will benefit from the lessons learned in implementing the demonstration projects. Key to the success of the demonstration projects is that they are linked directly to the financing programme of the expanded ORKOY Social Credit programme through the Renewable Energy Financing Unit which will provide the soft loans and thereby facilitate the roll out of the programme. The key outcome of component 2 will be that the four demonstration projects have successfully paved the way for ORKOY to first allocate the additional US \$12.6 million for additional soft loans as the basis for scaling up the sustainable energy financing mechanism to the rest of the country during the second half of the project and after it finishes.

12. Component 3 of the project will focus on scaling up and replication at the national level. ORKOY's sustainable energy finance mechanism will be promoted at the national level through a national awareness campaign which will aim to significantly raise awareness among village communities of the benefits of the soft loans provided under the mechanism. This campaign will coordinate with solar PV installers, commercial banks and utilities, as necessary depending on the business models selected, to provide a seamless and coordinated front to consumers. The reason that commercial banks are important is that the ORKOY soft loan programme on its own will not be large enough to cover the hundreds of million dollars of

financing requirements that will be needed to replicate the business model to forest villagers all over Turkey. Over time, as technology costs of solar PV come down and as financing costs come down it is expected that commercial bank lending will also be attractive for small scale solar PV. Commercial bank lending will also benefit from the track-record and data on performance of solar PV that will be generated by the project. With reduced levels of project risk following the barrier removal and capacity building activities of this project, the ability of banks to lend for solar pv systems will be increased. A solar PV training manual covering both technical and financial aspects of solar pv financing will also be prepared for banks, solar pv installers, forest villagers, and utilities and presented at 20 workshops around the country designed to build capacity to implement projects. The workshops will also present the ORKOY sustainable energy programme to all key stakeholders in the value chain such as commercial banks, pv installers, utilities, and forest villagers and the workshops will focus on practical steps on how to develop, finance, and implement a solar pv project in a forest village in Turkey. The ORKOY programme will be presented throughout Turkey as a means of raising awareness and building knowledge about both the technical and economic aspects of the ORKOY programme. Workshops will also target commercial banks in Turkey, building their familiarity with residential solar PV in order to start to establish longer term private sector lending. In addition, component 3 will design MRV systems and indicators which can be used to help track GHG emissions at the national level and will help with the development of the NAMA under component 1. Component 3 will help with developing a national level strategy for deployment of solar PV systems, based upon the business model from the demonstration projects under component 1 and 2. GEF support will be used to help expand the ORKOY Sustainable Energy Financing Mechanism to the national level which will include support for strengthening and expanding the financial support mechanism of soft loans as it has been demonstrated under component 2 with the target by the end of the project of 30MW. The key outcome from component 3 is that the ORKOY sustainable energy financing mechanism has in place proper systems for quality assurance, testing, and MRV and that the programme has been expanded so that it has benefited at least 2.5% of all forest villagers in Turkey (approx. 175,000 people) by the end of the project.

13. Global Environment Benefits from this project are expected to be substantial once replication and scaling up of the sustainable energy financing mechanism is successful. It is estimated that approximately 3,600,000 MWh of electricity is consumed each year by approximately 7 million inhabitants of forest villages in Turkey. Given that these villages are all, or almost all, grid connected we can make an initial calculation that the total greenhouse gas emissions in Turkey from electricity generation in all forest villages are approximately 2,178,000 tonnes per annum from forest villagers using the grid emission factor for Turkey of 0.605 tonnes of CO₂e/MWh. In the event that all of these forest villages converted to using solar power for their electricity generation needs, it then follows that greenhouse gas emission reductions of approximately 2,178,000 could be expected if all forest villages in Turkey relied on solar power. While the direct GHG emission reductions from the two demonstration projects to be implemented by this project are expected to be small (1,752 MWh x 0.605 tones CO₂e/MWh x 30% load factor = 302 tonnes of CO₂e per annum) the real global environmental benefits will come from replication and scaling up. Our initial assumption is that over 2.5% of all forest villages in Turkey should be able to benefit from the ORKOY soft loans and planning to install or have installed 30MW of solar pv systems by the end of the project resulting in approximately 54,450 tonnes of CO₂e being reduced per annum by the end of the project or shortly thereafter. Over a 20 year lifetime of the solar PV systems this works out to approximately 1,089,000 tonnes of CO₂e reduced (54,450 x 20 = 1,089,000) which represents approximately US \$3 of GEF money spent per tonne of CO₂ reduced which, if achieved, is a highly cost-effective number.

14. The innovativeness behind this project comes through the use of zero interest soft loans to address the initial affordability of solar PV, combined with a major effort on awareness raising, training, and developing technical skills. Under current commercial bank financing conditions in Turkey, solar PV projects are not affordable for most forest villagers, and it is unlikely that there would be large scale investment in solar PV in forest villages. However, the use of interest free soft loans can increase affordability, therefore kick-starting residential use of solar PV, which can then be built on as technology costs continue to fall, and the private sector (installers, commercial banks) become more experienced and, over time, begin to lend to the market at lower rates. With interest free loans, a payback period of 8-9 years is likely to be acceptable to forest villagers. However, without such interest free loans of 10% it is clearly not commercially viable at the current time to be investing in small scale solar pv systems. The strategy for getting commercial banks more interested in making loans for small scale solar PV systems will be further elaborated during the PPG phase.

15. The proposed ORKOY sustainable energy financing mechanism for renewable energy is expected to be sustainable and be scaled up because once it has been proven to work (through the activities of this project under) it makes sense to scale up the programme and replicate activities to forest villages across Turkey including in future working with national and international banks. Past experience has shown with regard to financing of other investments (such as home insulation and solar hot water heaters) that once the business model has been proven to work, it can easily be replicated. Since the new financing scheme will be embedded in the existing ORKOY Social Credit Programme (which has been operating since 1974) it is highly likely and indeed probably that once the business model of soft loans plus technical assistance has been proven to work, that the new sustainable energy financing mechanism will be sustainable mechanism with at least US \$12.6M in additional funding from ORKOY for new soft loans to additional forest villagers.

A.2. Stakeholders. Identify key stakeholders (including civil society organizations, indigenous people, gender groups, and others as relevant) and describe how they will be engaged in project preparation:

16. Key stakeholders and their roles in the project are described in the table below.

Table 1:2 – Key Stakeholders of the Project

Project Stakeholder	Relationship With The Project
Ministry of Forestry and Water Affairs	Ministry of Forestry and Water Affairs (MoFWA), General Directorate of Forestry (GDF) embody Forest and Villagers Relations Department (ORKOY) which is responsible on supporting and development of forest villagers in Turkey, among other responsibilities. ORKOY has a 70 million USD budget of credits to improve development situation of forest villages identified in the Forest Village Development Plans. 35 million out of 70 million USD is allocated for energy needs of the forest villagers with a sustainable energy program which will be established with this project. ORKOY will be the Executing Partner of the GEF Project and will provide the soft loans (debt financing) necessary to make sure that the projects are successfully implemented.
Ministry of Environment and Urbanization.	Ministry of Environment and Urbanization (MoEU) has been released MRV legislation which directly links to this project. MoEU will support MRV and NAMA outputs of the project.
Forest Cooperatives (private sector)	Forest Cooperatives are legal non-governmental bodies consist of forest villagers with a mandate of development of forest villagers. Forest cooperatives are eligible to be supported by ORKOY. The GEF project will support forest cooperatives in terms of capacity building activities to maximize benefits of the sustainable energy financing program. The role of forest villagers will be to take out ORKOY soft

	loans with the goal of investing in small scale solar pv systems. Once the business model has been proven and replication and upscaling is taking place, forest villagers will also work with commercial banks (both domestic and international) to secure loans for further investment in solar pv systems in other forest villages.
Domestic and International Banks (private sector)	initially, it is expected that domestic and international banks would have no role in the project as they cannot compete with zero interest soft loans from ORKOY. However, the ORKOY soft loan programme (initially US \$12.6 million) is not going to be large enough to cover the financing needs for solar pv for all forest villagers and over time technology and financing costs are expected to come down. Therefore, under component 3 of the project it will be important to bring in domestic and international banks to see how they might provide financing for further investment in solar pv systems for forest villagers.
Solar PV installers (private sector)	The role of the solar PV installers will be to install and maintain solar PV equipment for forest villagers who will have successfully obtained financing either from the ORKOY soft loans or later from domestic and international banks. The solar PV installers should benefit from the fact that this project will lead to greater interest and uptake in solar pv systems.
Turkish Utilities (private sector)	Turkish utilities will purchase the electricity provided by the solar pv systems through power purchase agreements, either on the spot market or through longer term agreements. Electricity will be purchased in accordance with the Turkish legislation on preferential feed-in-tariffs for renewable energy.
Forest Village Legal Entity	Forest Village Legal Entities are the smallest governance body in Turkey. It is managed by the “Mukhtar”, Head of Village, who was elected for 5 years period during national elections. Forest village legal entities are eligible to be supported by ORKOY. The GEF project will support forest village legal entities in terms of capacity building activities. Two villages to be selected for demonstration component of the project will benefit from the sustainable energy finance program with GEF partial finance support and the Government co-finance. In return, the forest village legal entity will be responsible on running the system and serve as a training center for the deployment of the program.
International Solar Energy Society – Turkish Section GUNDER	International Solar Energy Society – Turkish Section (GUNDER) was founded in 2007. The aim of the society is to promote all activities directed at the better utilization of solar energy. Since GUNDER is an umbrella organization serving not only governmental bodies but also private sector, GUNDER is a partner of the GEF project. Technical and market based financial support will be provided by GUNDER along with capacity development activities for sustainable energy finance program.

A.3 Risk. Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable):

17. Key risks for the project are described in the following table:

Table 1:3 – Risks, including climate change, potential social and environmental risks

Description	Rating	Explanation
ORKOY Mechanism is not Sustainable	Low	The ORKOY financial scheme has been supporting villagers in Turkey since 1974. Law 2924 of 1984 requires ORKOY to support villagers with schemes that promote economic development. It is highly unlikely this law will be repealed. Experience with support for other investments shows that ORKOY has the capacity to expand the soft loan window once the initial demonstrations prove to be successful it is highly likely that it will be possible to replicate the business model given an expected payback period of

		less than 4 years (using soft loans).
Climate Change Risks	Low	Climate change is expected to lead to warmer summers and colder winters in Turkey, thereby increasing demand for energy which includes demand for renewable energy. Therefore, climate change risks are low.
Technical and Capacity Risks	Low	This project aims to build the capacity of both the private sector and ORKOY officials to develop, finance, and implement solar PV projects. This will reduce the technical and capacity risks and make it realistic to implement the proposed program.
Environmental and Social Risks	Low	Typical environmental impacts from solar PV systems which include land use and habitat loss, and increased water use are expected to be minimal due to the fact that this project is supporting small scale solar PV systems. However, the project will be implemented in accordance with UNDP's environmental and social screening policies to ensure that any environmental risks are minimized.
Increased dependence on natural gas will lead to less demand for renewable energy	Low	The Government of Turkey wants to achieve security of energy supply and wants to reduce its dependence on imported oil and gas. New laws to promote and support renewable energy and a stated national target of 30% renewable by 2023 mean this risk is low.
Co-financing does not materialize	Medium	ORKOY funding for the Social Credit Programme is already approved and it is not expected to be a problem to approve the additional US \$12.6 million soft loan facility once the demonstration projects have proven the viability of the proposed approach and the business model. Private sector financing (US \$2.73M) will be challenging. However, this financing is going to be much easier to obtain with zero interest soft loans for solar PV projects so the risk of private sector cofinancing is not seen as high.

A.4. Coordination. Outline the coordination with other relevant GEF financed and other initiatives:

18. While there are a number of other initiatives in Turkey aimed at supporting renewable energy, there are currently no other initiatives focused specifically on the support for and development of a renewable energy financing mechanism for forest villages. The following table highlights other relevant UNDP GEF projects with which this project will cooperate:

Table 1.4 – Coordination with other relevant GEF financed and other initiatives

UNDP-GEF Integrated Approach to Management of Forests in Turkey, with Demonstration in High Conservation Value Forests in the Mediterranean Region of Turkey	This UNDP GEF funded full scale project aims to ensure multiple benefits of forests focusing on climate change mitigation and biodiversity benefits at landscape level. Capacity building activities and a database on MRV and NAMA for forestry sector to be established will help ORKOY to establish MRV and NAMA for sustainable energy financing program. This will assist component 1 of this project. Participation of both the UNDP Project Management Unit and Ministry of Forestry and Water Affairs on Project Steering Committees of both projects will assist in enhancing coordination between the two projects.
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UNDP “Utilisation of Renewable Energy Resources and Increasing Energy Efficiency in Southeast Anatolia Region Support to the GAP Region”	A UNDP technical cooperation project, funded by the Government of Turkey through the Southeast Anatolia Regional Development Administration (GAP RDA), whose overall objective is to improve the competitiveness of the Southeast Anatolia Region in a sustainable and socially equitable manner. The renewable energy and energy efficiency investment and business potentials of the Region are being assessed and promoted, a renewable energy and energy efficiency strategy developed, and pilot demonstrative renewable energy investments established. Regional and local branches of ORKOY and Project Management Unit will participate technical studies to determine some of the best forest villages to partner with.
UNDP-EU “Support to Further Implementation of Local Administrative Reform in Turkey”	The project aims to contribute to the establishment of effective, transparent, inclusive and participatory local administration in Turkey, in particular through full implementation of the local government legislation adopted in 2003-2005. Areas of focus include improvement of local services by means of strengthening the capacity of elected representatives and professional managers and staff; and strengthening local participatory mechanisms to ensure transparency, accountability and participation at local level through the improvement of the functioning of citizens’ assemblies.
UNDP/UNIDO-GEF project “Improving Energy Efficiency in Industries”	This project is working to improve the energy-efficiency of industry in Turkey. There may be industrial companies working with this project that might be interested in the soft loan scheme.
UNDP-GEF project “Promoting Energy Efficiency in Buildings”	This project is working to raise Turkish building energy performance standards, improve enforcement of building codes, enhance building energy management and introduce the use of an integrated building design approach. Private sector companies working with this project may be interested in the soft loan scheme.
UNDP-GEF project “Market Transformation of Energy Efficiency Appliances”	This project is working to accelerate market transformation towards more energy efficient building appliances. Private sector companies working with this project may be interested in the soft loan scheme.

B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

B.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAs, NAPs, NBSAPs, national communications, TNAs, NCSAs, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.:

19. The project is strongly consistent with a number of national plans and strategies of the Government of Turkey, including the following:

Table 1.5 – Consistency with National Strategies, Plans & Reports

Electricity Energy Market and Supply Security Strategy Paper	This strategy was approved in 2009 and adopts a target for Turkey of 30% of all energy to be generated by renewable energy sources by 2023.
The 9 th and 10 th Development Plan, the General Directorate of Forestry Strategy for 2013-17, National Action Plan to Empower Women in rural areas (2012-	These plans all promote and encourage increased investment in renewable energy in Turkey. In particular, the national plan to empower women in rural areas calls for increased investment in renewable energy.

16), and the National Climate Change Strategy (May 2010) and subsequent National Climate Change Action Plans (NCCAPs)	
The Fifth National Communication (FNC) of Turkey to the UNFCCC	The 5 th National Communications of Turkey to the UNFCCC was formally published and submitted in October 2013, and places critical importance on low-emission pilot solutions for Turkey. The FNC also specifically identifies local governments as playing an important role in the implementation of greenhouse gas emission reduction projects, particularly in the transport, waste, and energy sectors. The FNC states that increased use of renewable energy is a priority for Turkey;
The Second GEF National Dialogue Workshop (May 2009)	The Second GEF National Dialogue Workshop (May 2009) included promotion of renewable energy as a priority for Turkey under GEF 5.
Turkey's Sustainable Development Report (June 2012)	This report outlines the country's approach to sustainable development. The report observes on page 6 that Turkey's energy supply, based upon fossil fuels and dependency on imports, is a critical threat for 'sustainable development'

B.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities:

20. The project is consistent with GEF Strategic Objective 3 – Promotion of Investment in Renewable Energy Technologies.

B.3 The GEF Agency's comparative advantage for implementing this project:

21. UNDP has a comparative advantage when dealing with issues related to poverty alleviation. UNDP's core mandate is aimed at poverty alleviation and this project is therefore very much consistent with UNDP's core mandate. Forest villagers are almost among some of the poorest communities in Turkey and this project will therefore help with energy supply in low income communities. Forest villages have the lowest share from the national income and such public services as health and education and therefore their capacity (on their own) to successfully deploy solar PV is going to be limited without external support. Initial estimates suggest that without this project only 3MW of additional solar PV might be installed over the next five years without this project taking place. In addition, UNDP has developed core expertise related to renewable energy projects working successfully to support the establishment and/or expansion of financial mechanisms for investment in renewable energy projects in Georgia, Zimbabwe and the Phillipines.

22. UNDP has been working in Turkey in close partnership with the Turkish Government for more than 50 years and this includes playing a transformational role in Turkey's climate change and local development agenda through extensive support, capacity building and concrete projects including support for each of the following:

- Preparation of the first and second national communications of Turkey to the UNFCCC with the participation of a wide range of NGOs and expert institutions alongside official institutions;
- Assistance with drafting Turkey's National Climate Change Action Plans in collaboration with the Ministry of Environment and Urbanisation, with the participation of a wide


- range of municipalities, NGOs, universities, private sector partners, and expert institutions;
- Drafting of “Registration procedures for projects that reduce Greenhouse Gas emissions’ that structure the MoEU’s national carbon registry system, which has accelerated Turkey’s participation in global voluntary carbon markets;
 - Capacity Development and Technical Support of the Government of Turkey in the international climate negotiations and with the Rio+20 conference;
 - Working in collaboration with the Capital Markets Board in helping set up a national carbon exchange;
 - Support to the Government in developing and preparing NAMAs in Turkey;
 - Managing UNDP/GEF projects related to energy-efficiency in buildings, energy-efficiency in appliances, and energy-efficiency in industry;
 - Establishment of a ‘National Clean Production and Eco-Efficiency Centre’ and promoting industrial symbiosis in organized industrial zones, to develop sustainable methods for managing natural resources used by both the public and private sectors, in line with Turkey’s development priorities
 - Development of the renewable energy and energy efficiency investment and business potentials of the Southeast Anatolia Region, including development of a renewable energy and energy-efficiency strategy, and establishment of pilot renewable energy investments;
 - Management of UNDP/GEF full scale project with multi-benefits on integrated forest management at the landscape level with climate change mitigation and biodiversity benefits, including a MRV system with a LULUCF database and a forestry sector NAMA

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

- A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Prof. Dr. Mr. Lutfi AKCA	GEF Operational Focal Point & Undersecretary Ministry of Forestry and Water Affairs	MINISTRY OF FORESTRY AND WATER AFFAIRS	12/18/2013

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for project identification and preparation.					
Agency Coordinator, Agency name	Signature	DATE (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Adriana Dinu, UNDP-GEF Executive Coordinator and Director a.i		03/21/2014	John O'Brien Regional Technical Advisor EITT	+421 917 415 017	John.obrien@undp.org