



## **REPUBLIC OF TURKEY**

**MINISTRY OF ENVIRONMENT, URBANIZATION AND CLIMATE CHANGE (MOEUC)**

**GENERAL DIRECTORATE OF CONSTRUCTION AFFAIRS (GDCA)**

**“Public and Municipal Renewable Energy Project”**

**Project ID: 179867**

**Loan/Credit/TF Info.: IBRD-9550; TF0C1420**

**CONSULTANCY SERVICES FOR**

**PREPARATION OF FEASIBILITY STUDIES FOR RENEWABLE ENERGY FACILITIES IN CENTRAL  
GOVERNMENT BUILDINGS**

**Reference No:**

**PUMREP/WB/CS-FS-PV 01**

## **TERMS OF REFERENCE**

***“For Feasibility Studies of Renewable Energy Systems”***

*Issued on: July ...., 2023*

**TERMS OF REFERENCE (TOR)  
FOR LUMP SUM CONTRACT**

**CONSULTING SERVICES FOR PREPARATION OF FEASIBILITY STUDIES FOR RENEWABLE ENERGY  
FACILITIES IN CENTRAL GOVERNMENT BUILDINGS**

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## 1. Introduction

The Public and Municipal Renewable Energy Project aims to support the government in decarbonizing the public building sector and scaling up the development of distributed Renewable Energy (RE) sources. The Project will be financed by a USD\$549 million IBRD loan, US\$3 million Energy Sector Management Assistance Program (ESMAP) grant. The Project will support investments in central government and central-government-affiliated facilities (e.g., public buildings under central ministries, universities, dormitories and hospitals) and will be implemented by the General Directorate of Construction Affairs (GDCA) under the Ministry of Environment, Urban and Climate Change (MoEUCC). Buildings will be identified through the application list of public buildings, which can then be prioritized based on eligibility criteria.

The Project will include three components: (i) RE investments in central government buildings, to be implemented by MoEUCC; (ii) RE investments in municipal buildings, to be implemented by İlbank; and (iii) technical assistance (TA) and implementation support, for both MoEUCC and İlbank.

The Terms of Reference (ToRs) is referred to Component 1. Renewable Energy investments in central government buildings (US\$270 million IBRD loan): This subcomponent will support investments in RE technologies, primarily solar Photovoltaic (PV). RE installations will be primarily used to offset the facilities' electricity (i.e.. for self-consumption purposes rather than to generate power to sell to the grid). An initial pipeline of about 291 subprojects in central government facilities (e.g.. state universities, sports buildings and hospitals) distributed across most provinces in the country and amounting to a total generation capacity of nearly 136 MW has already been identified. This pipeline includes rooftop, car park canopies and ground mounted solar PV installations, ranging from a few kW to several MW. Additional subprojects will be financed in subsequent implementation rounds, including potential support to distributed RE installations for central government facilities during reconstruction in the areas affected by the February 2023 earthquake. RE technologies other than solar PV are also eligible under this subcomponent, as per the eligibility criteria.

The facilities in the subcomponents have been gathered in different packages considering the geographic location and the electricity distribution company's authority zone. Each of these packages will include several facilities. The package of facilities subject to this Terms of Reference are located in Kayseri, Sivas, Yozgat, Tokat, Çorum, Amasya, Ordu, Samsun, Sinop as shown in Figure 1. The list of these facilities are presented under Section 4. Scope in Table 1.

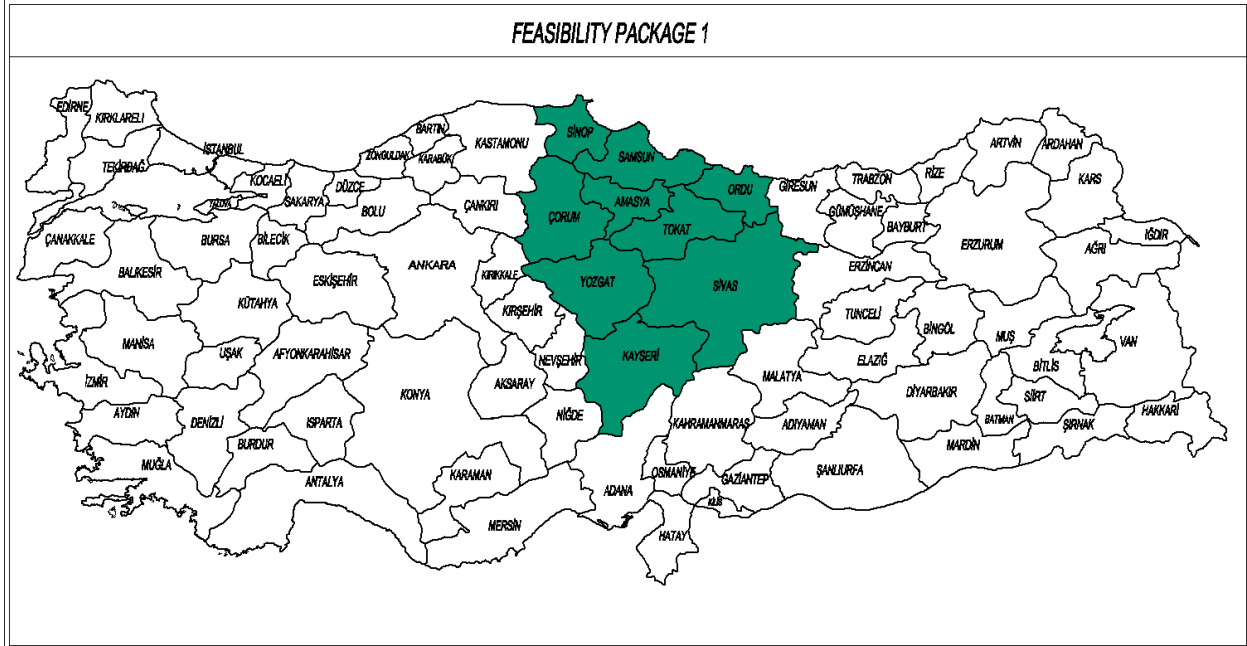


Figure 1: The provinces where the facilities are located

## 2. Technology consideration

Initially, the project covers solar PV and solar thermal) and associated Battery Energy Storage System (BESS). However, most of the facilities will be prescribed for solar PV only including rooftop solar PV, ground-mounted PV, and car park canopy PV. However, the consultant shall preliminarily assess the adequacy and feasibility of installing BESS coupled with the renewable generation technology. Therefore, the installation of BESS is not initially prescribed but should be analyzed by the Consultant in the initial stages of the feasibility for all the facilities. Thereafter, the consultant will propose a reasoned decision to the Client during the preparation of the feasibility analysis in order to confirm the final configuration in the study (with or without BESS).

## 3. Objective

The objective of the assignment is to assess the technical and financial viability of installing RE power generation (solar PV and solar thermal) in public facilities to be developed under Component 1 described above. The Feasibility Studies should assess the RE installation under the unlicensed generation scheme.

The Consultant shall use a solar resource mapping from a reputable source, such as the Solar Energy Potential Atlas (GEPA) prepared by Ministry of Energy and Natural Resources (MENR) in order to evaluate the proposed facilities. These sites shall be appraised for proposing a final configuration. From this information, the Consultant will produce the feasibility studies for each of the selected projects.

The feasibility studies will provide an assessment of the project using as reference the resource mapping results, the available databases, land use analysis (if needed), and grid connection assessment, the capacity of the transformer, contract capacity, self-consumption values, installation area. The studies will focus on main aspects of the project such as the adequacy of the solar resource, grid connection and construction costs, and savings in order to decide whether the projects are worth taking forward and

prioritize the order of development of those that are technically, Environmentally and economically viable.

The Consultant shall identify the optimal generation profile for the RE (+BESS) plants and facilities. The Consultant shall study the local load profile and define the optimal RE (+BESS), if any limitation exists.

#### 4. Scope

Table1 below includes the facilities covered by this Terms of Reference (ToR) including the preliminary proposed size of the facilities, to be confirmed under the feasibility studies. There might be slight changes in the list keeping the cities.

Table 1 List of Facilities

PACKAGE 1							
Group 1 Facilities							
No	Institution	Beneficiary	City	total power (kW) committed in the contract	Installation area (m2)	Type of PV	Self Consumption/Year (Kwh)
1	Ministry Of Environment Urbanization And Climate Change	Kayseri Tapu Kadastro Genel Müdürlüğü	Kayseri	1250,00	2240,00	Carpark	345.527,00
2	Ministry of Interior	Kayseri İncesu Kaymakamlığı	Kayseri	N/A	400,00	Carpark	31.519,00
3	University	Kayseri Erciyes University	Kayseri	20000,00	14896,00	Land	28.008.360,00
4	University	Kayseri University	Kayseri	2818,00	16143,00	Land	2.457.559,00
5	Ministry Of Environment Urbanization And Climate Change	Sivas İl Müdürlüğü	Sivas	444,00	1.800,00	Carpark	254.803,00
6	Ministry of Youth and Sports	Sivas Binali Yıldırım Yerleşkesi (Yıldız Yurt Müdürlüğü)	Sivas	4.218,00	46.800,00	Land	1.908.361,35
7	Ministry of Interior	Sivas Akıncılar Kaymakamlığı	Sivas	96,00	5.158,00	Carpark	65.752,00
8	Ministry of Interior	Sivas Divriği Kaymakamlığı	Sivas	N/A	N/A	Carpark	N/A
9	Ministry of Interior	Sivas İmranlı Kaymakamlığı	Sivas	N/A	1.115,00	Carpark	51.965,00
10	Ministry of Agriculture and Forest	Sivas DSİ 19. Bölge Müdürlüğü	Sivas	215,00	6.850,00	Carpark /Roof	494.410,00
11	University	Sivas Cumhuriyet Üniversitesi	Sivas	5.000,00	19.430,00	Land	19.685.483,00
12	Ministry Of Family And Social Services	Tokat Aile Ve Sosyal Hizmetler İl Müdürlüğü	Tokat	630,00	1.463,00	Roof	52.422,00
13	Ministry Of Family And Social Services	Tokat Huzurevi Müdürlüğü	Tokat	630,00	1.000,00	Roof	321.735,00
14	University	Tokat Gaziosmanpaşa University	Tokat	5.000,00	246.363,00	Land	3.391.150,00
15	Ministry Of Environment Urbanization And Climate Change	Yozgat İl Müdürlüğü	Yozgat	150,00	1.200,00	Carpark	79.600,00
16	Ministry Of Environment Urbanization And Climate Change	Yozgat Tapu Kadastro Genel Müdürlüğü	Yozgat	258,00	900,00	Roof	604.297,00
17	Ministry of Youth and Sports	Yozgat Sürmeli Yurt Müdürlüğü	Yozgat	9.600,00	8.000,00	Land	191.071,40
18	University	Yozgat Bozok Universitysi	Yozgat	2.718,00	5.357,00	Carpark	3.592.763,00
<b>Toplam</b>							<b>61.536.777,75</b>
Group 2 Facilities							
No	Institution	Beneficiary	City	total power (kW) committed in the contract	Contract Capacity (Kw)	Type of PV	Self Consumption/Year (Kwh)

1	Ministry Of Environment Urbanization And Climate Change	Amasya Tapu Kadastro Genel Müdürlüğü	Amasya	240,00	700,00	Roof	163.470,00
2	University	Amasya Universitysi	Amasya	8.674,00	21.072,00	Land	2.818.249,71
3	Ministry Of Family And Social Services	Çorum Engelsiz Yaşam Merkezi	Çorum	246,00	1.000,00	Roof	101.375,00
4	Ministry Of Family And Social Services	Çorum Huzurevi	Çorum	N/A	875,00	Carpark	190.821,00
5	University	Çorum Hitit Universitysi	Çorum	7.168,00	9.517,00	Land/Ro of	2.132.000,00
6	Ministry of Youth and Sports	Sinop Gençlik Ve Spor İl Müdürlüğü/Seyyid Bilal Yurdu	Sinop	960,00	2.000,00	Land	750.539,63
7	Ministry of Youth and Sports	Sinop Gençlik Ve Spor İl Müdürlüğü/Sinop Gençlik Merkezi	Sinop	240,00	1.500,00	Land	362.378,62
8	Ministry of Youth and Sports	Sinop Gençlik Ve Spor İl Müdürlüğü/Sinop Merkez Spor Salonu	Sinop	750,00	800,00	Land	258.800,53
9	Ministry of Youth and Sports	Sinop Yurdu	Sinop	480,00	500,00	Roof	538.357,65
10	University	Sinop Universitysi	Sinop	6.208,00	N/A	Carpark	2.217.044,00
						TOTAL	9.533.036,14

**Group 3 Facilities**

No	Institution	Beneficiary	City	total power (kW) committed in the contract	Contract Capacity (Kw)	Type of PV	Self Consumption/Year (Kwh)
1	Ministry Of Family And Social Services	ORDU FATSA HUZUREVİ MÜDÜRLÜĞÜ	ORDU	N/A	20.185,00	ROOF	107.976,00
2	Ministry Of Environment Urbanization And Climate Change	ORDU TAPU KADASTRO GENEL MÜDÜRLÜĞÜ	ORDU	291,00	950,00	CARPAR K	144.188,00
3	Ministry Of Interior	ORDU AKKUŞ KAYMAKAMLIĞI	ORDU	N/A	512,00	ROOF	54.295,00
4	Ministry Of Interior	ORDU VALİLİĞİ	ORDU	1.425,00	7.365,00	CARPAR K/ROOF	N/A
5	UNIVERSITY	ORDU UNIVERSITYSİ	ORDU	960,00	17.680,00	CARPAR K	3.525.000,00
6	Ministry Of Justice	SAMSUN ADALET SARAYI	SAMSUN	N/A	5.000,00	ROOF	2.710.000,00
7	Ministry of Labour	SAMSUN SOSYAL GÜVENLİK İL MÜDÜRLÜĞÜ	SAMSUN	1.000,00	2.400,00	ROOF	696.219,00
8	Ministry of Youth and Sports	SAMSUN ALAÇAM YURT MÜDÜRLÜĞÜ	SAMSUN	630,00	690,00	ROOF	181.637,00
9	MINISTRY OF TREASURY AND FINANCE	SAMSUN VERGİ DAİRESİ BAŞKANLIĞI	SAMSUN	985,00	960,00	ROOF	571.500,00
10	Ministry Of Interior	SAMSUN 19 MAYIS KAYMAKAMLIĞI	SAMSUN	87,00	1.500,00	CARPAR K	98.985,00
11	Ministry Of Interior	SAMSUN ALAÇAM KAYMAKAMLIĞI	SAMSUN	400,00	500,00	ROOF	156.351,00
12	Ministry Of Interior	SAMSUN ASARCİK KAYMAKAMLIĞI	SAMSUN	160,00	1.000,00	CARPAR K/ROOF	140.291,00
13	Ministry Of Interior	SAMSUN İLKADİM KAYMAKAMLIĞI	SAMSUN	400,00	680,00	CARPAR K	133.315,00
14	Ministry Of Interior	SAMSUN SALIPAZARI KAYMAKAMLIĞI	SAMSUN	96,00	750,00	CARPAR K	74.500,00
15	Ministry Of Health	SAMSUN BAFRA DEVLET HASTANESİ	SAMSUN	N/A	14.000,00	CARPAR K	7.304.000,00
16	Ministry of Agriculture and Forest	SAMSUN KARADENİZ TARIMSAL ARAŞTIRMALAR ENSTİTÜSÜ MÜDÜRLÜĞÜ	SAMSUN	250,00	1.500,00	ROOF	423.489,00
17	Ministry Of Trade	SAMSUN ORTA KARADENİZ GÜMRÜK VE DIŞ TİCARET BÖLGE MÜDÜRLÜĞÜ	SAMSUN	630,00	1.000,00	ROOF	216.758,00
18	UNIVERSITY	SAMSUN ON DOKUZ MAYIS UNIVERSITYSİ	SAMSUN	28.000,00	122.740,00	LAND/C ARPARK	29.073.504,00

19	UNIVERSITY	SAMSUN UNIVERSITY	SAMSUN	1.817,00	30.000,00	LAND	730.000,00
						TOTAL	46.342.008,00
	TOTAL NUMBER OF FACILITY: 47					GRAND TOTAL	117.342.008,00

**5. Activities to be performed by the Consultant**

The consultant will be assigned with a package of facilities in different locations that are listed in Table 1. The Consultant will work in parallel with all the facilities but will develop an independent and separate study for each of the facilities.

**Task 1: Project Inception and implementation planning**

This task will include the following key activities: Within 1-3 weeks of the contract signing, the Consultant shall carry out an Inception Mission to the place of the listed facilities in Table 1 in coordination with the MoEUCC project team. The objective of this mission should be to explain and refine the proposed methodology and timeline, identify and meet the interested stakeholders and gather all the information required to conduct the study. The excel sheet that contains the basic information of the facility (the template of the excel sheet is given in Annex 2) will be given to the to the consultant at project inception. The Consultant will be responsible for their own logistics (including getting to/from meetings and site visit locations).

**Task 2: Analysis of existing grid and generation/demand profiles**

Based on information gathered during the inception phase, the Consultant will analyze the generation profile, installation method, transformer capacity for transmission and distribution for the proposed facility and the grid stability in the area:

- a) **Preliminary stability assessment:** The Consultant will assess the existing transmission infrastructure to understand (i) Transformer capacity, (ii) the grid ability to absorb intermittent energy and identify necessary upgrades including cost estimate; and (iii) optimal installed capacity of solar PV including cost estimates.
- b) **Optimal RE + BESS capacity:** The Consultant shall define an optimal capacity for a RE (+BESS) plant to be installed in the respective facilities. This definition will take into consideration a techno-economic analysis to minimize electricity cost while maximizing the adaptation to the required profile (if any) and connection capacity.

**Task 3: Renewable energy resource assessment**

The Consultant shall provide a high-resolution assessment of the solar and wind resources for RE generation in the area of the projects, focusing in the specific area proposed for the facility.

For solar resource, the assessment should utilize a minimum of ten (10) years of Global Horizontal Irradiance (GHI) data derived from second generation satellite data with 1 km x 1 km nadir resolution and auxiliary atmospheric data sets. The influence of topography on solar irradiation at the surface is to be analyzed using a digital elevation model to derive slope and azimuth maps. Moreover, the methodology applied (e.g., satellites use to retrieve data, models) as well as the related accuracy and distribution statistics have to be clearly described.

For wind resource assessment shall include the assessment of the mean wind speed, turbulence intensity, extreme wind speed, shear, complexity of the terrain and the others site climatic conditions (such as air

density and temperature). For each Wind Site, the Consultant shall also provide the directional A and k values of the Weibull approximation of the wind speed distribution and determine the suitable turbine IEC Class and design parameters for each Wind Site.

#### **Task 4: Economic and Financial Analysis**

The consultant shall conduct a comparative financial analysis – leveled cost per kWh of energy delivery basis as well as 20-year life cycle cost - of the RE installation together with the needed structure to install the PV panels in the car park / rooftop / ground compared to existing supply cost. The financial analysis should include the analysis of the payback period, Net Present Value (NPV) and Internal Rate of Return (IRR) of the RE investment. This analysis should also reflect the cost of connection to the grid and its maintenance costs. Calculations should be done for 0%, 6% and 12% discount rates. The analysis shall also estimate the annual savings in energy tariff.

The financial analysis should analyze the RE installation (possibly several options if the circumstances require) with and without BESS.

#### **Task 5: Structural Analysis**

The consultant shall conduct visual inspection of the existing roof structure (existing timber roof structure, etc.) against deformation, to identify if the roof being able to safely bear rooftop PV systems, solar hot water collectors, etc. The structural analysis should assess if any structural / integrity measures need to be performed prior to the implementation of RE systems. (i.e. frame systems supporting rooftop PV system, solar hot water collectors, etc.).

#### **Task 6: Risk Analysis and Mitigation Plan**

The consultant shall identify all major risks associated with the grid-connected RE related to design, procurement and operations and indicate in each case the extent of all principal risks and how and to what extent they are being mitigated via the project design developed in the feasibility study via specific features of the project design, specifications and associated capacity building and service and maintenance services contract.

Risks include but are not limited to: (i) site climate and Environmental factors including as appropriate weather related phenomenon such as cyclones, flood, earthquakes; (ii) volatility in solar PV module prices and impact on project cost estimate and likely bidder pricing; (iii) risk of delay in supply of invertors and PV panels, construction risk; technology performance risks; operations and maintenance risks such as potentially corrosive maritime Environment, soil brackishness and conductivity at the power station site and effects on panel array support structure/footings; (iv) capacity of recipient institution personnel given a new technology for plant operations; (v) sourcing time for key components that need replacement periodically.

Further there are three conceivable climate change risks, neither predictable nor plannable: (i) Increased occurrence of climate-related natural disasters which could lead to migration of people and businesses, which in turn could reduce the electricity demand below today's levels. (ii) Natural changes in cloud and rainfall patterns may affect solar insolation levels all over the world. (iii) Increased risk of flooding and heavy rain occurrences which could have a direct impact on the project equipment installed on-site. The above risks need to be accounted for in the Risk Analysis and Mitigation Plan.

#### **Task 7: Global Environmental Benefits**

The consultant shall estimate the annual carbon reduction benefits attributable to the RE station operations for each of the facilities.



### **Task 8: Post-installation maintenance requirements and 1-year operational support program**

The consultant shall determine and scope and specify the key elements of operation and maintenance (O&M) services that would need to be provided by the Design Supply and Installation (DSI) contractor to manage technology performance and related operational risks; while the recipient institution gains experience in O&M and builds its capacity to initiate and manage future such investments and operations. In this task, the consultant shall delineate in detail the scope of the O&M services for the one-year period following plant installation to ensure efficient and reliable operational performance of the solar installation according to design standards and expectations. An output of this task shall be a clear delineation of the respective responsibilities and accountabilities of the recipient institution and the DSI contractor.

### **Task 9: Feasibility studies for grid connected RE (+BESS)**

Based on the information gathered under Task 2 and the solar resource assessment carried out under Task 3, the Consultant will prepare the feasibility studies assessing potential RE installation (with storage or without). As a minimum, the feasibility study for each modality and suitable site should include:

- The project site and boundary area and approximated site plan and layout.
- Facility/institution consumption profile and RE requirement
- A conceptual design of the project, including estimation of installed capacity of RE (and BESS).
- Simplified cost-benefit analysis for different technological options (to be agreed with the Client) depending on module type, mounting options (i.e, fixed vs. tracking system for solar PV), and inverter type and storage technology.
- Preliminary shading analysis report
- Estimated energy yields for RE technologies(solar PV, solar heating) that are most suitable for the identified sites. The energy yield should include:
  - An assessment of the inter-annual variation and yield confidence levels.
  - Consideration of site-specific factors, including soiling or snow, and the cleaning regime.
  - Shading analysis including near and far shading.
  - Electrical losses Influence of temperature variances on the efficiency of the plant
  - Global plant annual efficiency, including BESS
  - Optimal dispatching strategy
- The minimum performance requirements to be requested from a DSI contractor
- The approximate costs for development, construction and operation of the project and predicted savings, based on the available resource data, as well as indicative quotes or comparison with similar projects.
- The land ownership and land use status. The Consultant should advise the Client whether the preferred option is for the Government to provide the land to the project or require the winning bidder to acquire the land.
- Connection requirements and connection agreement requirements (preliminary assessment) and potential barriers to achieve grid connection.
- Other permitting requirements and expected timeline and estimated costs for achieving these.
- Identification of structural/ integrity measures which need to be performed prior to the implementation of RE types (solar PV and solar thermal)
- Financial modelling detailing financial assumptions, energy yield, and evaluation of results

- Environmental and Social consideration, including requirements for the Environmental and Social Management Plans (ESMP):)p
  - For the proposed sub-projects, detailed relevant audits will be carried out by a Feasibility Study Consultant Company, in order to evaluate the proposal for solar system installation, estimate energy savings, assess their financial viability, and identify potential Environmental and social impacts that the proposed installation may cause at a regional level.
  - After the audit is completed, the consultant will prepare feasibility studies including cost-benefit analysis, sub-project specific ESMP/ESMP Checklist, sub-project specific SEPs, and OHS Plan according to World Bank Environmental and Social Standards (ESS) and relevant national/international regulations and latest best practices.
  - Feasibility study consultants shall be responsible for ensuring that respective provisions of subproject specific ESMPs/ESMP Checklist and OHS Plan are duly incorporated into the project design if the study is feasible for the investment.
  - The feasibility consultant is also responsible for organizing and holding stakeholder engagement meetings (SEPs).
  - The feasibility consultant will be required to retain qualified Environment, Social, and Occupational Health and Safety (ESOHS) staff.
  - The sub-project feasibility study consultants will visit each sub-project site at least once, or more if needed, during the preparation of technical documentation.
  - Considering all relevant aspects, the feasibility study consultant must comply with the World Bank's ESS as underlined in ESMF to be applied to sub-projects and national/international relevant legislation specified in the tender documents.
- Implementation plan, including estimated schedule for Design, Supply and Installation, and O&M
- Risk Analysis with proposed mitigation measures,
- Recycling plan for all the facilities proposed under the study,

A preliminary Table of Content has been proposed as Annex 1.

#### **Task 10: Assist the PIU with the bidding process**

The consultant shall assist the PIU on preparation of bidding documents, the pre-bid meeting in answering the question raised by bidders, clarifications to questions about the feasibility reports, amendments, updating cost estimates, also assisting the evaluation committee in the debriefing meeting. etc. until construction contract award.

The consultant shall also assist the Evaluation Committee with technical advice on contractor selection. Following the bidding process and submission of proposals, the Consultant, shall assist the Evaluation Committee with technical evaluation of submitted proposals for renewable energy systems or respond to any question raised by the Committee in terms of bidder compliance with the requirements, feasibility of any alternative technical solutions, etc.

## **6. Deliverables and reporting**

During the different tasks, the Consultant will issue at least the following deliverables:

- **Inception report:** The Consultant should deliver a detailed report on implementation plans for all tasks and each facilities and confirm the timing and planning of the task components with the Client.
- **Feasibility Study Deliverables and Format:** The Final Feasibility Study Reports, comprising all the analysis carried out under tasks above, must be compiled in independent reports in Word format (with relevant annexes) (one for each facility), and delivered as both electronic and hard copy documents. All financial models must be in Excel format, and must clearly set out all assumptions; sensitivity analyses carried out; and model outputs. The financial models must be sufficiently adaptable for use by others at later stages. The Feasibility Studies must be presented with a thorough executive summary and must be accompanied by a short standard PowerPoint presentation that encapsulates all the key features of the study. The executive summary and PowerPoint presentation must be compiled in such a manner that they can be used by the senior government officials for decision-making purposes.

### Periodical reporting

The Consultant shall issue periodical reports to the Client in order to inform about the works development and incidences. After the inception report, the Consultant will issue monthly reports that will outline the Consultant’s works within the period, the advance of the works, the deliverables issues in the period, the staff workload and an update of the project Gantt schedule.

## 7. Team Composition and Qualification Requirements of the Key Staff

The working language of the project is English. All the team members assigned by the Consultant must possess proficiency in English language. Day-to-day communication language will be Turkish at the field level to ensure smooth communication among all participants, direct and indirect, of the Project.

All key staff and support staff shall be mobilized immediately after the contract signature.

Key staff’s qualifications shall include but not limited to the following:

*Table 2 Key staff’s qualifications shall include but not limited to the following:*

Specialist	Requirements
Project Director (1)	Bachelor Degree in major engineering disciplines (civil, mechanical, electrical, electronic) together with a Master’s Degree in Economics, Business or Finance is an asset. The Project Director should have at least ten years of experience in power plant design and construction including five years site experience of solar power plant construction. Experience working with IFIs financed projects is an asset The Project Director will lead and manage the Feasibility Study team. It is possible that the Project Director’s role could be combined with one of the roles of Civil Engineer, Mechanical Engineer or Electrical/Electronic Engineer within the Feasibility Study Team. This may provide an overall cost saving.
Solar PV/ /Solar/BESS expert and/or Electrical	Bachelor Degree in a related Engineering specialization including at least five years of experience in solar PV/Wind/BESS power plant

Engineer (this role can be developed by the same person) (1)	<p>development covering design, procurement or construction. The solar expert should have good command of solar PV/ /BESS standards and proven experience on resource assessment and calculation of energy yield for solar PV/ BESS projects.</p> <p>For the Electrical Engineer, the candidate should also good command of PV and storage technologies and standards and proven experience on grid stability analysis and renewable integration planning.</p>
Civil Engineer (1)	At least Bachelor Degree in Civil Engineering with a minimum of five years of experience in structural engineering and seismic analysis.
Environmental and Social Specialist (1)	<p>A Bachelor Degree in Natural Science; at least five (5) years of relevant work experience in Environmental and/or social assessment of infrastructure and energy projects. Good command of International E&amp;S standards, including World Bank Environmental and Social Framework, is also asset.</p> <p>The Consultant team will need to make available a social specialist if some of the proposed sites are in private or community-owned lands, or if proposed government-owned lands are being privately used.</p>
Occupational Health and Safety Specialist (1):	Occupational Health and Safety Specialist with minimum five (5) years of professional experience , having A or B Class Occupational Safety Expert certificate received from the Directorate General of Occupational Health and Safety or equivalent international certificate. experience in OHS assessment and management in construction projects financed by international finance institutions or other international donors, preferably the World Bank and with a knowledge in ESSs of the World Bank’s ESF or other international financial institutions is an asset.,
Financial Analyst (1)	Bachelor or Master’s Degree in Finance, Business or Economics together with at least five years of experience developing and analyzing financial models for power generation facilities, together with tariff analysis.

## 8. Time Schedule for Deliverables

The Client has envisaged a general project schedule but the final one will be subject to the development of different processes with public entities. Therefore, the time schedule included in this section is only for information purposes to allow the Consultant to perform its estimation. However, in case of extension of timelines due to any potential delay, the Consultant would not be entitled to claim for any compensation or extension on its fees, beyond the actualizations rates that may be granted by the Contract.

This assignment is expected to initiate in the 4th quarter of 2023 and be finalized in a period of 6 months. The Consultant shall submit all the documents in a timely manner to complete the services on time

without any delay. To achieve this, the Consultant shall carry out the necessary arrangements in field/home teams.

A tentative time schedule for the completion of the consultants’ services (including Client’s review and approval durations) for the various parts of the Project is given below:

Table 3 Tentative Timeline\*

N°	Tender Package	Months														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1 <sup>st</sup> Group of Facilities															
2	2 <sup>nd</sup> Group of Facilities															
3	3 <sup>rd</sup> Group of Facilities															

\*The Group of facilities are given in Table 1



The deliverables for each task will be submitted to and approved by the Client. The Consultant must obtain approval for each deliverable before moving to subsequent tasks. The Client shall give a decision within 15 days of receipt of a review or approval request. The table below summarizes the deliverables and includes an indicative timeline. The deadlines stated in the table mean calendar days after the effectiveness of the contract.

Table 4 Deliverables

Tasks	Deliverables	Submission Deadline (after effectiveness of the contract)
1	Inception Report	1-3 weeks
9	Feasibility Study Report 1 <sup>st</sup> Group of Facilities	4 months
9	Feasibility Study Report 2 <sup>nd</sup> Group of Facilities	5 months
9	Feasibility Study Report 3 <sup>rd</sup> Group of Facilities	6 months

### 9. Documentation format requirements

The Consultant shall deliver all data, drawings, and documents generated in the Consultants designed system of choice to the Client in the following public domain formats:

- Data: the Consultant shall supply spread sheets in Excel (Office 2013 compatible format).

- Drawings: drawings shall be delivered in digital format DWG (version 2012 or later). These deliverables shall contain sufficient graphical detail, engineering intelligence, and be of proper configuration to allow the list specified in the data deliverables to be digitally extracted. In addition drawing list shall be delivered in Excel format that contains the following fields: drawing name, drawing type and such other data as the Client may require.
- Documents: documents shall be delivered in electronic format (MSOffice 2013 compatible files).

All deliverables need to be prepared in Turkish. The Feasibility Study Report of one of the buildings will be translated into English.

All deliverables will be submitted as (i) one hard copy (signed and stamped), (ii) soft copy (on a SSD (Solid State Drive)), and (iii) uploaded to an online platform, which the Client addresses.

As indicated in the General Conditions of Contract all the drawings, reports, plans, specifications, and any other documents produced under this Contract are the property of the Client.

#### **Facilities provided by the consultant**

The Consultant must ensure that its professional staff has adequate support and equipment. All costs for equipment and administrative and logistic support must be covered by the Consultant and included in the bid price, including:

- All costs arising from the activities of its staff during the contract period, including accommodation, allowances, transportation, insurance, etc.
- Automotive, equipment, equipment for field and lab tests, office supplies, hardware and software (software for modeling and static/dynamic analysis of critical structures) etc.
- All communication costs, including fax, email, telephone, etc.
- All the equipment, instruments, services and logistical support required for the implementation of the contract, and any costs incurred during its preparation of documents and drafts, copying, printing, qualified translation, interpretation etc.
- Technical equipment at the monitoring site.

#### **VI. Support to be provided by the client to the consultants**

- The Client provides inputs, project data, reports etc. about the buildings with the RFP if exist. The consultants shall verify the provided inputs during the field studies and in all cases; the assignment shall be undertaken according to the consultant's own inputs.
- If any delay or no response received from the beneficiary or other third parties during the execution of aforementioned tasks, the Consultant shall inform the Client in a timely manner with indicating the possible grounds. The Client will accelerate the process or give consent to proceed the task.

## Annex 1 : Feasibility Study table of content

### Public and Municipal Renewable Energy Project Feasibility Study Table of Content

#### Executive Summary

##### 1. Introduction

- 1.1. Project Summary
- 1.2. Project Objectives
- 1.3. Project Scope
- 1.4. Compliance of the Project with Policy Documents
- 1.5. Legal Framework
- 1.6. Stakeholder Analysis

##### 2. Project Location

- 2.1. Location and Topography
- 2.2. Geographical Conditions
- 2.3. Information about Soil and Land Composition (if applicable)
- 2.4. Climate
- 2.5. Project Planned Location, Land Use Characteristics and Ownership Status
- 2.6. Project Land Use Rights and Acquisition Analysis [only if relevant]
- 2.7. Other Natural and Cultural Resources
- 2.8. History and Potential of Natural Disasters
- 2.9. Approval Required by Other Public Agencies
- 2.10. Geological Survey / Roof Static Report
- 2.11. Power & Energy Consumption / Generation Settlement

##### 3. Project Justification

- 3.1. **General Overview of Photovoltaic Power Plants**
- 3.3. Project Location Photovoltaic Potential
- 3.2. Current Energy Consumption Analysis and Energy Profile
- 3.4 Sizing analysis and technology selection
- 4.5 Connection agreement (or equivalent section to justify the necessary connection permits)

##### 4. Environmental and Social Considerations

- 4.2. Environmental and Social Risks/Impacts of the Project
- 4.3 Associated Facilities Assessment
- 4.4. Climate Risks
- 4.5. Carbon Footprint

##### 5. Occupational Health and Safety Plan

- 5.1. Legal Framework
- 5.2. Evaluation of the Project in Terms of Occupational Health and Safety
- 5.3. OHS Risk Evaluation

## 6. Implementation of the Project

- 6.1 Time Schedule
- 6.2 Purchase and Procurement Plan
- 6.3 Project Management and Audit
- 6.4 Investment Plan

## 7. Risk and Sensitivity Analysis

- 7.1 Risk Analysis
- 7.2 Technology Related, Economic Risks and Risk Mitigation
- 7.3 Sensitivity Analysis

## 8. Recycling Plan

- 8.1. Disposal Of Waste Crystal Silicone Photovoltaic Modules
- 8.2. Recycling of Project Equipment/Materials

## 9. Financial and Economic Analysis

- 9.1. Financial Analysis
- 9.2. Economic Analysis

## 10. Structural Analysis

## 11. Operation and Maintenance

## 12. Conclusion

References

Appendix

## Annex 2 : Data Request Form Template

Data Request Form	
Beneficiary Name	:
City / District	:
Address	:
Ownership/Allocation Status	:
Installation Area of The PV Area (m <sup>2</sup> )	:
Installation Type (Parking, Land)	:
Renewable Energy System (PV, Hot Water Collector)	:



Shading Condition for PV Installation Area	:	
Is there existing RE system on site or any plans and feasibility report available?	:	
Corporate Contracting Power (KWp)	:	
PV Installed Capacity (KWp) (If Exists)	:	
PV Production/Annual (KWh) (If Any)	:	
Annual Energy Consumption Data (KWh) for the last 3 years	2020: 2022:	2021:
Does the building have Energy Performance Certificate obtained within the last 10 years		
Contact Person		
Name / Surname	:	
Title	:	
Telephone Number	:	
e-mail	:	