



Final Report

Mid Size Sustainable Energy Financing Facility (MidSEFF)

Stars Solar Energy Power Plant: Non-Technical Summary (NTS)

July 2017

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Acronyms

BERN	Bern Convention
CITES	The Convention on International Trade in Endangered Species of Wild Fauna and Flora
EBRD	European Bank of Reconstruction and Development
ETL	Energy Transmission Line
HS	Health and Safety
IUCN	The International Union for Conservation of Nature
LC	Least Concern
MidSEFF	Mid-Size Sustainable Energy Financing Facility
OHS	Occupational Health and Safety
PC	Project Consultant
PIR	Project Information Report
SEPP	Solar Energy Power Plant
SPV	Special Purpose Vehicle
TEDAŞ	Turkish Electricity Distribution Corporation
TUIK	Turkish Statistical Institute
VU	Vulnerable

1. General Plant Description

The Stars SEPP project (the Project) consists of 7 different unlicensed solar projects that will be realized under the legal status of 4 SPVs (Special Purpose Vehicle) established to build and operate solar energy power plants located in the Province of Ankara. The sponsor of the Project is Aloha Group.

The Stars SEPP Project consists of the Paşa 1-2-3 SEPPs with a total capacity of 3MWe and the Sümer 1-2-3-4 SEPPs with a total capacity of 4MWe.

The Paşa 1-2-3 SEPPs (Paşa SEPP) are located at the Büyükkışla neighbourhood of the Şereflikoçhisar District in Ankara Province.

The Paşa 1-2-3 SEPP sub-projects will have 3 MWe capacity in total. The projects will be located on an area of approximately 58,000 m². The site is located 1.4 km north of the Büyükkışla neighbourhood and access to the site is possible from the Büyükkışla neighbourhood via the existing village road.

The Sümer 1-2-3-4 SEPPs (Sümer SEPP) are located at the Fadıllı neighbourhood of the Şereflikoçhisar District in Ankara Province. The Sümer SEPP consists of four individually designed unlicensed projects each with a capacity of 1000 KWe.

The Sümer 1-2-3-4 SEPP sub-projects will have a total capacity of 4 MWe. The projects will be located on an area of approximately 64,298 m². The site is located 0.5 km north of the Fadıllı neighbourhood and access to the site is possible from the Fadıllı neighbourhood through an existing road.

There need to be Energy Transmission Lines (ETLs) for both the Paşa and Sümer SEPPs to ensure the connection from the SEPPs to the nearest grid connection points. The estimated total length of the ETL to be constructed for the Paşa 1-2-3 SEPPs is about 3 km and the estimated total length of ETL for the Sümer 1-2-3-4 SEPPs is about 0.5 km. Both ETLs will be 34.5 kV lines. The ETLs will be connected to the 154/34.5 kV Şereflikoçhisar Transformer Station. The connection agreements have been signed for the ETLs and the construction projects of the ETLs are approved by TEDAŞ. However, design studies for ETL routes are ongoing and in case of any change the connection agreements must be amended by the related authority for all sub-projects.

During the project activities, existing roads will be used. There is no need for the construction of new access road for these SEPPs.

Project location of each sub project are given in below figures.

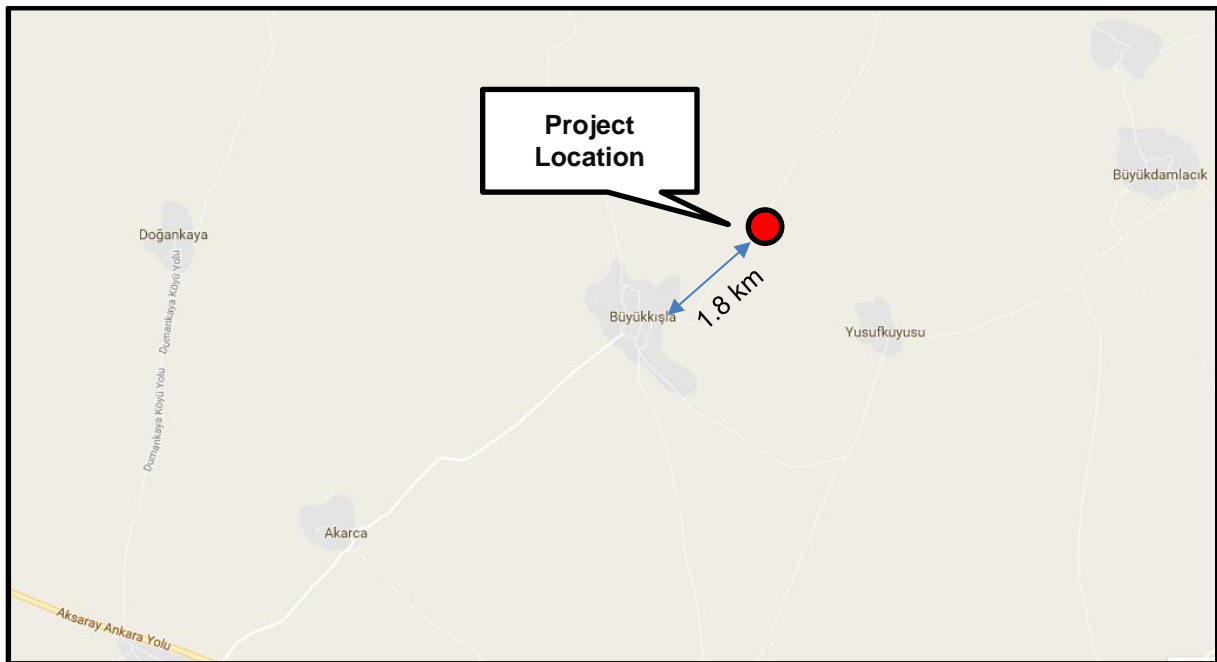


Figure 1-1: The Paşa SEPP's Project Location

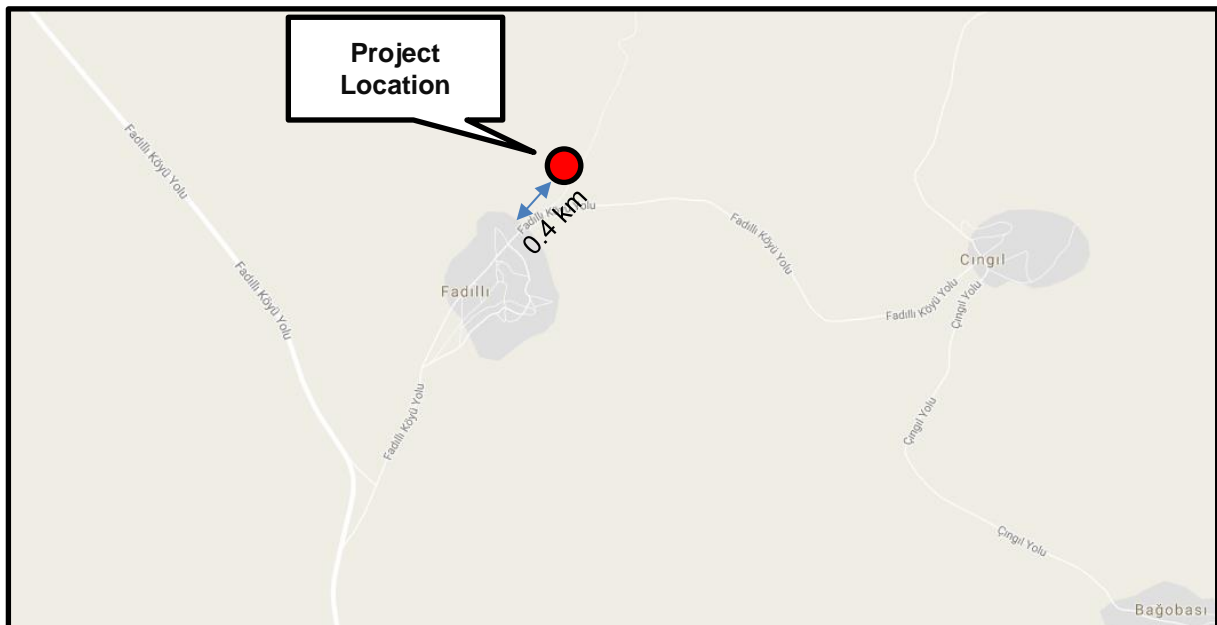


Figure 1-2: The Sümer SEPP's Project Location

A table with the summary of each project is presented below.

Table 1.1: The Summary of "Stars SEPP" PV Plant Projects

Location	Project Name /Company Name	Installed Capacity, kWe	Total Capacity of the Projects MWe	Type of the Project
Location 1	The Paşa 1 / Pulsar Elektrik ve Enerji A.Ş.	999 KWe	3 MWe	Unlicensed
	The Paşa 2 / Yeen Enerji Üretim A.Ş.	999 KWe		Unlicensed
	The Paşa 3 / Oddo Elektrik Üretim A.Ş.	999 KWe		Unlicensed

Location 2	The Sümer 1, 2 ,3, 4 / Tulpar Elektrik Üretim A.Ş.	4,000 KWe	4 MWe	Unlicensed
Total Capacity of the Investment			7 MWe	

2. Environmental and Social Baseline

2.1 Environmental Description of the Project Area

The Paşa 1-2-3 SEPP sub-projects will have 3 MWe capacity in total. The projects will be located on an area of approximately 58,000 m². The site is located 1.4 km north of the Büyükkışla neighbourhood and access to the site is possible from the Büyükkışla neighbourhood via the existing village road.

At the Paşa 1-2-3 project location, the land is private and consists of pasture and agricultural land. The depth of topsoil is less than 30 cm. The project area has an overall slope of 30% and mainly contains sand, soil and gravel. The area is a green field site and there are no trees, buildings and other features on the site. The land is owned by the Sponsor and rented out to the SPVs.

The Sümer 1-2-3-4 SEPP sub-projects will have a total capacity of 4 MWe. The projects will be located on an area of approximately 64,298 m². The site is located 0.5 km north of the Fadıllı neighbourhood and access to the site is possible from the Fadıllı neighbourhood through an existing road.

At the Sümer 1-2-3-4 project location, the land is privately owned pasture land. The depth of topsoil is less than 30 cm. The project area has an overall slope of 20% and mainly contains sand, soil and gravel. The area is a green field site and there are no trees, buildings and other features.

There is the “Tuz Gölü Special Environment Protection Area” in the Şereflikoçhisar region. The boundary of the Protection area is approximately 7 km distant from the Paşa 1-2-3 SEPP project area and 10 km from the Sümer 1-2-3-4 SEPP project area. According to GIS data of the Ministry of Forestry and Water Affairs, there is not any other natural or protected area close to the Paşa and the Sümer SEPP project areas.

The Peçenek Dam is located about 2 km south of the Sümer 1-2-3-4 SEPP’s project location. Hirfanlı Dam is another sensitive area which is about 15 km distant from the Paşa 1-2-3 SEPPs.

An Ecological Impact Assessment study was conducted for the Sümer 1-2-3-4 sub-projects, which is included in the PIR. According to this study, there are 3 endemic flora species (*Lepidium caespitosum*, *Microcnemum coralleides*, *Linaria corifolia*) in the project area; this is based on literature research. *Lepidium caespitosum* desv. and *Microcnemum coralleides* species are classified as “VU” (Vulnerable) and the other species is classified as “LC” (Lower Risk - Least Concern) according to the International Union for Conservation of Nature (IUCN) Red List.

No endemic or endangered fauna species was found in the project area. In the PIR, 2 amphibian, 6 reptilian, 16 aves and mammalia species are categorized in the Appendix-2 of the Bern Convention.

No flora and fauna species in the PIR are listed in The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendixes.

Table 2-1: Summary of environmental characteristics

ENVIRONMENTAL ASPECTS	PRESENCE /DISTRIBUTION	COMMENTS
Land use	The project land consists of agricultural land.	The project land has been classified as ‘dry marginal agricultural land’ by the Ankara Provincial Directorate of Food, Husbandry and Agriculture. The related authority has provided the permission relating the use of the lands for the establishment of the SEPP projects.
Water surfaces	The closest water surface is the Peçenek Dam located 2 km south of the Sümer SEPP.	There will not be any interaction with any water surface area during project works.

Protected areas	There is the “Tuz Gölü Special Environment Protection Area” approximately 7 km distant from the Paşa SEPPs.	There will not be any interaction with any protected area during project works.
Flora and Fauna	An Ecological Impact Assessment study was conducted for the Sümer 1-2-3-4 sub-projects, which is included in the PIR. According to this study, there are 3 endemic flora species in the project area.	Biannual flora and fauna monitoring must be conducted for the Sümer SEPP during the construction period and in the first two years of the operation period. The monitoring studies shall also cover the Paşa SEPP site since no flora/fauna study is available.

2.2 Social Condition of the Project Area

The population of the Şereflikoçhisar District is 33,420 according to the 2016 data of the Turkish Statistical Institute (TSI). The population of the Şereflikoçhisar District has decreased between 2011 and 2017 (36,071 people according to the 2011 TSI data).

In the Şereflikoçhisar District, there is Tuz Gölü (Salt Lake) which is one of the main sources of salt production in Turkey. There are no other industrial activities in the region. The main economic activity in the district and the project area is agriculture.

The Paşa 1-2-3 SEPPs are located in Büyükkışla neighbourhood. The nearest settlement to the project area is the Büyükkışla neighbourhood center itself, and the nearest residential building is about 1.8 km distant from the project area.

The Sümer 1-2-3-4 SEPPs are located in the Fadıllı neighbourhood. The nearest settlement to the project area is the Fadıllı neighbourhood center itself, and the nearest residential building is about 0.4 km distant from the project area.

According to the official letters of the Ministry of Culture and Tourism, there is no cultural heritage site in the project area of the Paşa SEPPs and Sümer SEPPs.

3. Social and Environmental Impacts

3.1 Land Use

The project land has been classified as dry marginal agricultural land by the Ankara Provincial Directorate of Food, Husbandry and Agriculture. The related authority has provided the permission relating the use of the lands for the establishment of the SEPP projects. The estimated total length of the ETL to be constructed for the Paşa 1-2-3 SEPPs is about 3 km and the estimated total length of ETL for the Sümer 1-2-3-4 SEPPs is about 0.5 km. There are connection agreements signed with TEDAŞ for the ETLs and the construction projects of the ETL's are approved by TEDAŞ.

There is no settlement on the sub-project areas. There will be no involuntary resettlement nor economic displacement as part of this project.

3.2 Water Use & Wastewater Management

During the construction period of the project, approximately 10 people will be employed. During construction, water will be used for dust suppression, construction and domestic purposes. Assuming that daily water consumption per person would be 150 litres, daily 1.5 m³ domestic water would be used during the construction period. Drinking water will be provided from suppliers (large and small bottled water) and water used for construction activities will be supplied from the nearest settlements.

During the operation period of the project, approximately 8 people will be employed. 1.2 m³ domestic water would be used during operation. Similar to the construction phase, drinking water will be provided from suppliers (large and small bottled water).

Only wastewater generated during the project activities will be domestic wastewater. Domestic waste water produced during both construction and operation phases of the project should be disposed properly based on the related regulation. The septic tanks used as a disposal method must be impermeable, possibly concrete, and emptied by vacuum trucks regularly. Any discharge of wastewater to the receiving environment will be prevented in all phases of the Project.

Dust generation has not been observed around the project areas during the site visits; therefore, the sponsor predicts that there will be no need to clean the solar panels. Based on the information provided by the Sponsor; only "cleaning" activity will be snow removal during the winter. In case the need for cleaning/washing arises, pure water will be purchased and brought to the sites via tanks and the panels will be cleaned by brushes and pure water in order to remove the dust. The wastewater will not include any chemical or hazardous material. Water discharge from the panels is likely to evaporate or be absorbed by the soil after falling from the panels.

3.3 Waste Production and Management

Main types of the wastes generated during the operation phase of the project are domestic solid waste and packaging waste.

Temporary waste storage areas shall be constructed in the project areas. The storage areas must have impermeable ground to prevent a possible leakage. Different types of wastes must be stored separately in the waste storage area and a register of waste generation, storage and disposal must be kept during construction and facility operation.

The volume of domestic solid waste depends on the number of persons to be employed. Assuming that the amount of solid waste per person would be 1.14 kg/person/day, approximately 11.4 kg/day domestic solid waste (5.7 kg/day for each Paşa and Sümer SEPP projects) will be generated during construction and 9.12 kg/day (4.56 kg/day for each Paşa and Sümer SEPPs projects) will be generated during the operation phase of the Stars SEPP Project. Domestic wastes will be collected and disposed of by the Municipality. Other types of wastes must be collected and disposed by authorised companies. A register of all wastes and their disposal must be kept.

3.4 Emissions: Noise and Particulate

The expected noise level during construction works has been calculated in the PIR of the Sümer SEPPs. Noise level will be 70 dBA at 50 m, which is the regulatory limit. A similar result is expected for the Paşa SEPPs, because the same construction works will be done and similar equipment and machinery will be used. The closest residential building is at a distance of 400 m from the Sümer SEPPs and 1.8 from the Paşa SEPPs; unacceptable noise impacts are therefore not expected during construction.

The following measures must be taken into account to prevent noise impact during construction activities:

- Appropriate personal protective equipment and materials such as helmets, ear protectors or ear plugs must be provided to protect workers from noise.
- construction vehicles can not pass through settlement areas during the night time (between 23:00 to 07:00) in week days and weekends.
- The following control measures must be applied;
 - selection of equipment with lower sound levels;
 - installing suitable mufflers on engine exhausts and compressor components;
 - limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas;
 - reducing project traffic routing through community areas wherever possible;
 - developing a mechanism to record and respond to complaints.

In addition, regular maintenance will be carried out on all construction equipment to ensure that noise levels are kept to a minimum.

Possible impacts on air quality can arise from the use of construction & earthmoving machinery and from trucks & cars. Impacts will be mainly air pollutants from combustion engines and dust generation/release.

Construction activities will affect air quality mainly through emissions of dust from excavation and storage of soil, transport of soil and vehicle traffic on unpaved roads. There will also be particulates from vehicle exhausts (mainly diesel engines) and from stationary sources such as power generators. Emissions of gaseous pollutants, particularly NO_x and SO₂, will be from vehicle and machinery exhausts and also from stationary sources (power generators).

Air quality calculations have been included in PIR of the Sümer SEPPs. Mass flow rates of gaseous pollutants, which are generated from diesel usage in construction (CO, HC, NO_x, SO_x and dust) and dust from excavation works were calculated. According to the report, mass flow rates of the pollutants are lower than the regulatory limits and therefore air quality modelling has not been carried out. A similar result is expected for the Paşa SEPPs, because the same type of construction works will be carried out and similar equipment and machinery will be used during construction.

The following mitigation measures must be considered relevant during construction phase to mitigate dust and exhaust gas dispersion during construction activities;

- wetting and covering powdery materials transported on trucks (e.g. excavation spoil);
- reduce truck and vehicle speed;
- periodic wetting of the stockpiled material to maintain a humidity of about 5%;
- periodic wetting of the construction areas and site access roads;
- use of working machinery with low emissions (and good maintenance);
- vehicles must be maintained in good condition to ensure they are no louder than similar vehicles on the roadways;
- use of diesel with low sulphur content;

3.5 Landscape

The local landscape is characterised by an open and relatively flat topography, with partial grass vegetation. The project areas are more elevated than the neighbouring settlements. The projects will change the current landscape with the placement of large areas of dark coloured flat solar panel arrays. As arrays will not exceed 3-4 m in height and the closest settlement is 400 m away (from the Sümer SEPPs), views across the wider landscape are unlikely to be significantly changed. During construction of the project, excavated materials will be used for filling and top soil will be spread to the project area in order to preserve current soil condition and landscape.

The PC requires preparation of the Visual Impact Assessment studies prior to the construction works to assess visual intrusion and potential for glare, and to identify any necessary remedial measures for all project locations. In the Visual Impact Assessment, measures and methods as listed in the Soil Protection Project of the Sümer 1-2-3-4 SEPPs shall also be considered.

Possible impacts on topsoil and upper soil will be caused by construction activities. During the construction phase, impacts on the soil and subsoil characteristics will be mainly caused by top soil and lower soil removal and potentially pollutant discharges to the soil. The amount of excavated material will not be high due to limited excavation works, and most of the amount will be used on site for refilling. Any negative impacts regarding the soil protection from the projects shall be minimized through the implementation of the Environmental and Social Management Plan for both of the project sites and the prepared Soil Protection Project for the Sümer SEPP project site.

3.6 Summary of Environmental and Social Impacts

A summary of the impacts with their quantifications is given in Table 3-1.

Table 3-1: Impact Quantification

COMPONENT	IMPACT	QUANTIFICATION
Land use	<u>Use of agricultural land</u>	The Ankara Provincial Directorate of Food, Husbandry and Agriculture has permitted the use of these lands for the establishment of the Paşa SEPP (58,000 m ²) and Sümer SEPP (64,298 m ²).
Wastewater	<u>Utilization and Discharge</u>	1.5 m ³ /day domestic wastewater during the construction phase and 1.2 m ³ /day domestic wastewater during the operation phase (assuming 10 workers in the construction and 8 workers in the operation phase)
Waste	<u>Production of solid waste</u>	11.4 kg/day domestic waste during the construction phase and 9.12 kg/day domestic waste during the operation phase (assuming 10 workers in the construction and 8 workers in the operation phase)
	<u>Excavation waste</u>	The amount of excavated material will not be high due to limited excavation works, and most of the amount will be used on site for refilling.
Fauna and flora	<u>Interference with flora-fauna species</u>	There are 3 endemic flora species in the Sümer SEPPs project area. Biannual flora and fauna monitoring must be conducted for both the Paşa SEPPs and Sümer SEPPs projects.
Emissions	<u>Noise</u>	Noise level will be 70 dBA at 50 m, which is the regulatory limit. There is no residential area nearby at a distance closer than 50 m. Therefore the noise level at the residential areas will be lower than the regulatory limit.

	<u>Particulate</u>	Particulate matter emissions will be lower than the regulatory limit.
Landscape	<u>Changes in the aspect of the area</u>	The Visual Impact Assessment must be prepared for all project locations.

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