



Final Report

Mid-Size Sustainable Energy Financing Facility (MidSEFF)

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

November 2018

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Acronyms

| | |
|---------|--|
| CIA | Cumulative Impact Assessment |
| DSİ | State Hydraulic Works |
| EIA | Environmental Impact Assessment |
| GIS | Geographical Information System |
| ha | Hectare |
| kWe | Kilowatt electrical |
| kWp | Kilowatt Peak |
| kg | Kilogram |
| km | Kilometer |
| kV | Kilovolt |
| m | meter |
| MidSEFF | Mid-Size Sustainable Energy Financing Facility |
| MW | Megawatt |
| MWe | Megawatt electrical |
| PA | Project Advisor |
| PC | Project Consultant |
| PIR | Project Information Report |
| PV | Photovoltaic |
| SEPP | Solar Energy Power Plant |
| Sponsor | İven İnşaat Marina Yatırımları İşl. Mad. İth. İhr. San. ve Tic. A.Ş. |
| TEİAŞ | Turkish Electricity Transmission Company |
| TÜİK | Turkish Statistical Institute |
| VIA | Visual Impact Assessment |
| WLDA | Wildlife Development Area |
| Wp | Watt Peak |

1. General Plant Description

The İven Solar Energy Power Plant (SEPP) Project has been established to build and operate 6 separate unlicensed SEPP sub-projects, each with 969 kWe capacity and located in the Göllüce Neighbourhood, Torbalı District, İzmir Province, Turkey. The İven SEPP Project with 5.814 MWe total installed capacity consists of following Photovoltaic (PV) SEPP sub-projects under operation, namely:

- TKM SEPP;
- KA SEPP;
- Melike SEPP;
- Dilay SEPP;
- Mirza SEPP and
- Bahşi SEPP.

Construction of these sub-projects began on 1st October 2017 and was completed by the pre-investor (Sepiciler A.Ş.). İven İnşaat A.Ş. (the Sponsor) has taken over the operation rights of the sub-projects from the pre-investor. After starting operation in March and April 2018, the Sponsor acquired the unlicensed sub-projects.

According to the Environmental Impact Assessment (EIA) Regulation (published in the Official Journal numbered 29186 and dated 25th November 2014), there is no EIA permitting requirement for the SEPP projects with capacity of under 1 MWe. 'EIA Exemption' decisions have been obtained for each sub-project. The Sponsor has taken over the projects after relevant decisions were obtained. After the takeover, EIA Exemption letters and system connection agreement letters were renewed.

An underground Energy Transmission Line (ETL) has been constructed for the project to ensure the connection of the project to the nearest grid connection point. The total length of the ETL for the project is about 9.5 km with a 34.5 kV voltage. The connection point is the Substation Center in the Subaşı Region, near a food factory. There is no EIA permitting requirement for 34.5 kV ETLs.

The details of technical characteristics of the project are given below:

| | |
|---------------------------|--|
| PV Module Model | : Premium Solarstrommodul P270 (German) |
| Module Power (Pmax) | : 6 x 270 Wp |
| Number of Modules | : 23,760 (6 x 3,960; in series 20 modules and in parallel 198 strings) |
| DC Power | : 6 x 1,080 kWp = 6.48 MWp |
| Total Module Area | : 6,478 m ² |
| Total Cell Area | : 5,783 m ² |
| Inverter Model | : RPI M50A_12s |
| DC (Direct Current) Input | : 200-1000 Vdc, MPPT 520-800 Vdc |
| Inverters | : 120 x 50 kW |
| Electricity Production | : 6 x 1,650,000 kWh/year = 9,900,000 kWh/year |

A table with details of each sub-project is presented below.

Table 1-1: İven SEPP Project Detail Information

| # | Sub-project Name | Sponsor Name | Parcel | EIA Decision | Date of EIA Decision ¹ | Capacity (kWe) | Call Letter Date | TEDAŞ Approval Date | Connection Agreement Date ² |
|---------------------------------|------------------|--|--------|---------------|-----------------------------------|------------------|------------------|---------------------|--|
| 1 | TKM SEPP | İven İnşaat Marina Yatırımları İşl. Mad. İth. İhr. San. ve Tic. A.Ş. | 287 | EIA Exemption | 26.07.2018 | 969 | 15.07.2015 | 07.04.2016 | 31.07.2018 |
| 2 | KA SEPP | | 287 | EIA Exemption | 26.07.2018 | 969 | 15.07.2015 | 07.04.2016 | 31.07.2018 |
| 3 | Melike SEPP | | 287 | EIA Exemption | 26.07.2018 | 969 | 15.07.2015 | 07.04.2016 | 31.07.2018 |
| 4 | Dilay SEPP | | 287 | EIA Exemption | 26.07.2018 | 969 | 15.07.2015 | 07.04.2016 | 31.07.2018 |
| 5 | Mirza SEPP | | 287 | EIA Exemption | 26.07.2018 | 969 | 15.07.2015 | 07.04.2016 | 31.07.2018 |
| 6 | Bahşi SEPP | | 287 | EIA Exemption | 26.07.2018 | 969 | 15.07.2015 | 07.04.2016 | 31.07.2018 |
| Total Installed Capacity | | | | | | 5.814 MWe | | | |

¹ The EIA exemption letters were renewed on July 26th 2018 after the Sponsor acquired the right of use of the sub-projects.

² The connection agreements were renewed on July 31st 2018 after the Sponsor acquired the right of use of the sub-projects.

The nearest settlements to the project site are; the Bülbüdere Neighbourhood located at the east-northeast, at approximately 150 m distance; and the Göllüce Neighbourhood located at the south-southwest, at approximately 600 m distance. The closest water source to the project area is the Küçükmenderes River which passes the site at a distance of approximately 50 m away from the project boundary. A chicken farm is located at the southern border of the project area (Figure 1-1).

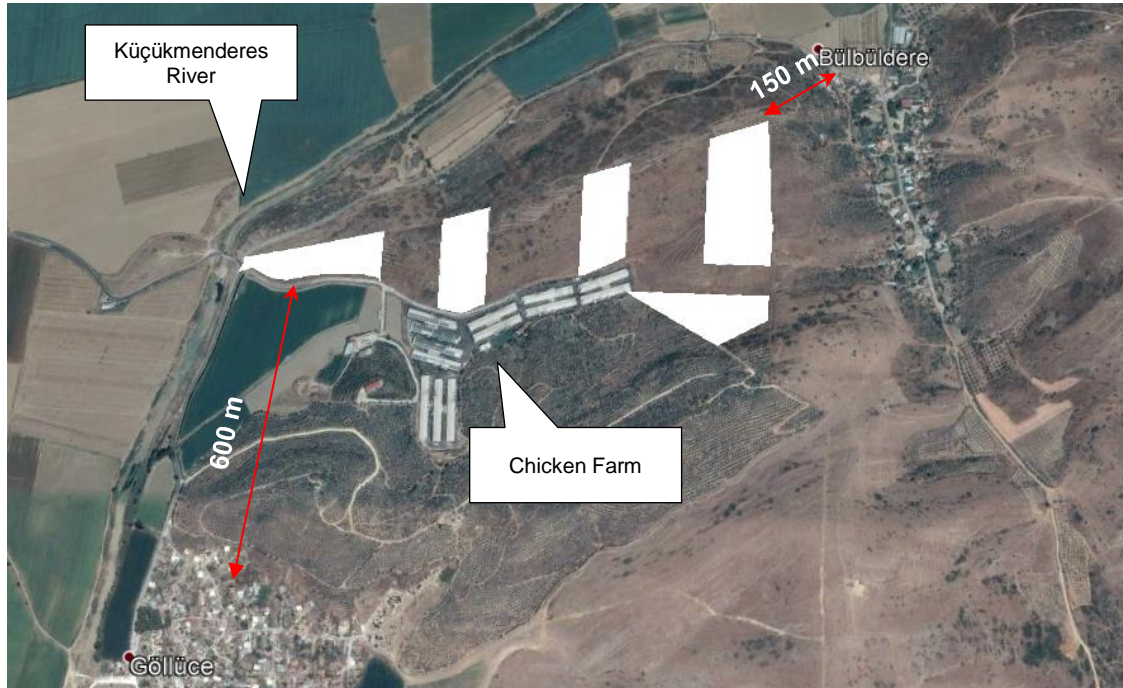


Figure 1-1: Location of the Project

A neighbouring 6 MW SEPP in the same parcel, Sepiciler SEPP (Figure 1-2), operated by the pre-investor of the İven SEPP project, consists of 6 unlicensed sub-projects. The workers of the İven SEPP and Sepiciler SEPP share the same office building.

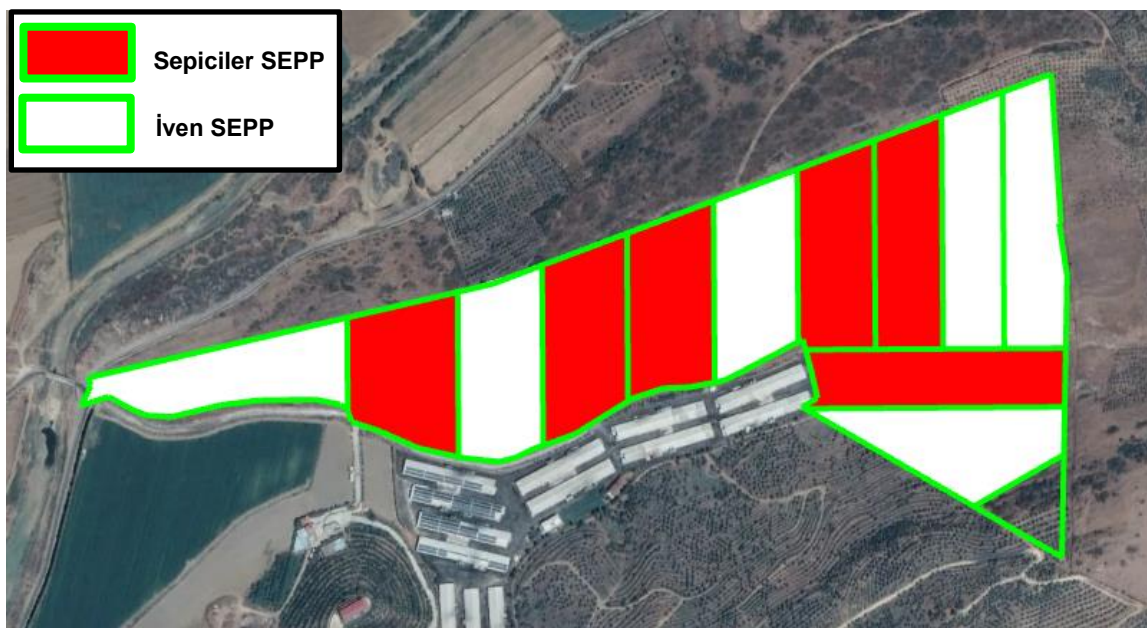


Figure 1-2: Project Area and Neighbouring Sepiciler SEPP Project

2. Environmental and Social Baseline

2.1 Environmental Description of the Project Area

The İven SEPP Project has been established to build and operate 6 separate unlicensed solar sub-projects, each with 969 kWe capacity and located in the Göllüce Neighbourhood, Torbalı District, İzmir Province, Turkey. The İven SEPP Project with 5.814 MWe total installed capacity consists of 6 photovoltaic (PV) SEPP sub-projects under operation.

According to the formal opinion letter obtained on 16th April 2015 from the Provincial Directorate of Food, Agricultural and Livestock, the project site is classified as a dry marginal agricultural area. There are olive trees on 0.55 ha area of the parcel and the Authority states that agricultural status of the area must be protected. This area is subsequently not being used for the project.

The project has been constructed within the borders of private-registered land with a total area of about 11 ha. The land acquisition process has been completed prior to the construction by the pre-investor. According to the land register provided by the Sponsor, half of the parcel is owned by the Sponsor after takeover of the Project. The area used for the ETL consist of private agricultural land as well. Land acquisition and any expropriation for the ETL was completed by TEİAŞ (Turkish Electricity Transmission Company) and the ETL is now in operation.

The nearest settlements to the project site are; the Bülbüldere Neighbourhood located at the east-northeast, at approximately 150 m distance; and the Göllüce Neighbourhood located at the south-southwest, at approximately 600 m distance. Besides, a chicken farm is located at the southern border of the project area. A neighbouring 6 MW SEPP in the same parcel, Sepiciler SEPP, consists of 6 unlicensed sub-projects (Figure 1-2).

The Küçükmenderes River is located to the north of the project site and passes the site at a distance of approximately 50 m (with the north western side as the closest project boundary to it – see Figure 1-1). The project area has a 20-30% slope and is approximately 10 m higher than the river bed at the closest point. According to the Geographical Information System (GIS) data of the Ministry of Agriculture and Forestry, the Küçükmenderes River does not have a legal protection status, the river is classified as a “wetland”. On the other hand, due to its close location to the project site, an opinion letter referring to “a flood risk could occur” was obtained from the Regional Directorate of DSİ (State Hydraulic Works) on 3rd June 2017, in which it states that no negative issues are expected due to project implementation as long as the project is located at an elevation of 20 meters or above the sea level. However, it is also stated in the same letter that despite of these calculations (based on a 1000-year flow), climate change has greatly affected the predictability of any major precipitation events. The Authority recommended that some protective measures should be implemented, e.g. the construction of a perimeter or plinth wall. The Directorate states that no responsibility will be accepted for damages that may be incurred if the said flood mitigation measures are not taken. Therefore, based on the DSİ’s request, a plinth wall has been constructed between the project area and river.

According to the above-mentioned GIS data, the nearest protection area is the Gebekirse Lake Wildlife Development Area (WLDA) at a 20 km distance from the project area.

A summary of the environmental characteristics of the İven SEPP Project is given below in Table 2-1.

Table 2-1: Summary of the environmental characteristics

| ENVIRONMENTAL ASPECTS | PRESENCE /DISTRIBUTION | COMMENTS |
|------------------------|---|---|
| Land use | The project site and the area where the ETL has been constructed consist of private agricultural land. | The project areas have been classified as 'dry marginal agricultural land' by the Provincial Directorates of Food, Husbandry and Agriculture. The related Authority has provided the permission relating the use of the lands for the establishment of the SEPP sub-projects prior to the zoning plan permit. Land acquisition and any expropriation for the area where ETL has been constructed was completed by TEİAŞ (Turkish Electricity Transmission Company). |
| Water surfaces | The Küçük Menderes River is located to the north of the Project area and passes the site at approximately 50 m (with the north western side as the closest project boundary to it). The Project area has a 20-30% slope and is approximately 10 m higher than the river bed at the closest point. | A plinth wall has been constructed between the project area and river based on the DSI' request. |
| Protected areas | The nearest protection area is the Gebekirse Lake Wildlife Development Area (WLDA) at a 20 km distance from the project area. | There will not be any interaction with any protected area during the project works. |
| Flora and Fauna | Since Environmental Impact Assessment (EIA) Exemption Decisions" have been obtained by the Sponsor for each sub-project from the related Authority; no Project Information Reports (PIR) or EIA Reports have been prepared and no ecological assessments have been conducted for the project. | A desk-based flora/fauna study must be prepared by the Sponsor for the project since there are no studies available. Monitoring may become necessary based on the results of this study. This should include any impact of the project on birds and bats. |

2.2 Social Condition of the Project Areas

The population of the Torbalı District is 164,981 according to the Turkish Statistical Institute (TÜİK) data of the year 2016. The population of the nearest settlements, the Bülbüldere and Göllüce Neighbourhoods, were 183 and 614 respectively, according to TÜİK data for the year 2016.

There are rural settlements, agricultural land and pasture land around the project area. A chicken farm is located at the southern border of the project area.

The main economic activities in the Torbalı District and the relevant settlements are agriculture, animal husbandry, industry and trade. Main agricultural products in the district are tomato, leek, cauliflower, olive, grape, fig, peach, corn and various kinds of fruits and vegetables. Tobacco, food, furniture, chemicals, machinery, metal, textile, plastic and marble are the main industrial activities in the district.

The İven SEPP project has created job opportunities during its construction and operation phases. Most of the employees who worked there during the construction phase lived in the region, i.e. Torbalı District and İzmir Province.

According to the formal opinion letter obtained from the İzmir Regional Directorate of Prevention of Cultural Heritage on 28th April 2016, 2 tumulus have been discovered in the parcel numbered 287, which covers the project area. In addition, a mound has been discovered in the neighbouring parcel, which is located at the other site of the Küçükmenderes River. According to the decision dated 14th April 2016, the zoning plan of the project area can be prepared on condition that the SEPP Project will be planned out of tumuli borders. During the project design, any project unit have not been placed in the borders of these cultural heritages. In addition, any cultural heritage has not been found during the excavation works according to the representative of the Sponsor.

3. Social and Environmental Impacts

3.1 Land Use

According to the formal opinion letter obtained on 16th April 2015 from the Provincial Directorate of Food, Agricultural and Livestock, the project site is classified as a dry marginal agricultural area. There are olive trees on 0.55 ha area of the parcel and the Authority states that agricultural status of the area must be protected. This area is subsequently not being used for the project.

The land acquisition process has been completed prior to the construction. According to the land register provided by the Sponsor, half of the parcel is owned by the Sponsor after takeover of the Project. The area used for the ETL consist of private agricultural land. Land acquisition and any expropriation for the ETL was completed by TEİAŞ (Turkish Electricity Transmission Company) and the ETL is now in operation.

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 operation period of the project, a total of 4 people is employed. Assuming that daily water consumption per person would be 150 litres, 600 litres of domestic water is used during the operation period per day. Drinking water is provided from suppliers (bottled water).

The only wastewater generated during the project operation activities is domestic wastewater. This domestic waste water produced during the operation phases of the project is collected in septic tanks. The septic tanks must be impermeable, possibly concrete, and emptied regularly by vacuum trucks. Any discharge of wastewater to the receiving environment must be prevented during the operation period of the project.

The Sponsor predicts that there will be no need to clean the solar panels since the project site is in a rainy area. In case the need for cleaning/washing arises, clean water will be purchased and brought to the sites via tankers. The panels will be cleaned by brushes and pure water in order to remove the dust. The generated wastewater as a consequence of panel cleaning/washing process will not include any chemical or hazardous material and it is likely to evaporate or be absorbed into the soil after draining from the panels.

3.3 Waste Production and Management

The main types of the wastes generated during the operation phase of the project are:

- Domestic solid waste
- Packaging waste

The volume of domestic solid waste depends on the number of persons employed. Assuming that the amount of solid waste per person is 1.14 kg/person/day, a total of approximately 4.56 kg/day (for 4 people) is generated during the operation phase of the İven SEPP Project. Domestic waste is collected and disposed of by the Torbalı Municipality. Packaging waste must be collected by licensed companies. Waste delivery forms must be kept by the Sponsor.

All staff must be trained in order to comply with waste management requirements.

In addition to the above-mentioned waste types, some wastes from maintenance works, i.e. repairs and panel replacement can be generated during the lifespan of the project. These types of wastes must be collected by licensed disposal companies.

3.4 Emissions: Noise and Particulate

There will not be air emissions or significant noise generated during the operation phase.

3.5 Landscape

The local landscape is characterised by an open and relatively flat topography, with partial grass & forest vegetation. The project area has a 20-30% slope and higher than local settlements. The project has changed the current landscape with the placement of large areas of dark coloured flat solar panel arrays.

The Sponsor informed the (Project Advisor) PA that reflection caused by the PV panels will be insignificant due to the anti-reflective coatings on solar PV panels. Based on the aerial/satellite images, there is no sensitive receptor (airport, high road, etc.) in the neighbourhood of the project site. Therefore, no significant adverse impact is expected resulting from glint and glare. In case of complaints, the need for screening must be assessed.

However, visual impacts can be significant for solar projects as large land areas (15,000-20,000 m²/MW capacity) are required for solar panel arrays. Although there is no national regulatory requirement, a Visual Impact Assessment (VIA) must be conducted for the project. VIA must be presented to the relevant stakeholders during the Stakeholder Engagement Meeting as the total area required for panels for all sub-projects on the same parcel of land is significant.

3.6 Summary of Environmental and Social Impacts

A summary of the impacts with their quantifications is given below.

Table 3-1: Impact Quantification

| COMPONENT | IMPACT | QUANTIFICATION |
|---------------------------------|--|--|
| Land use | <u>Use of agricultural land</u> | The Provincial Directorates of Food, Husbandry and Agriculture have provided the permission relating the use of the lands for the establishment of the SEPP projects prior to the zoning plan permit. Land acquisition and any expropriation for the area where ETL has been constructed was completed by TEİAŞ (Turkish Electricity Transmission Company). |
| Wastewater | <u>Utilization and Discharge</u> | 600 L/day domestic wastewater is generated during the operation phase (assuming 4 workers in the operation phase). |
| Waste | <u>Production of solid waste</u> | 4.56 kg/day domestic waste is generated during the operation phase (assuming 4 workers in the operation phase). |
| Fauna and flora | <u>Interference with flora-fauna species</u> | An ecological (flora-fauna) assessment has not been conducted for the project area. A desk-based flora/fauna study must be prepared. Monitoring may be requested according to the results of the study. |
| Emissions | <u>Noise</u> | There will not be air emissions or significant noise generated during the operation phase. |
| | <u>Particulate</u> | |
| Landscape | <u>Changes in the aspect of the area</u> | A VIA must be prepared for the Project. |
| Other existing/planned projects | <u>Cumulative impacts</u> | A neighbouring 6 MW SEPP in the same parcel, Sepiciler SEPP, consists of 6 unlicensed sub-projects. Thus, a Cumulative Impact Assessment (CIA) study must be prepared for the project. |
| Cultural Heritage | <u>Disturbance of the cultural heritage</u> | The tumuli and mound around the Project area must be protected during the lifespan of the project. Therefore, an Archeological Chance Find Procedure must be prepared for describing the actions in case of an archeological chance find. |

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