

1 EXECUTIVE SUMMARY

1.1 PROJECT DESCRIPTION

The consortium of EDF Renewables S.A. (EDF) and Jinko Power (HK) Company Limited (Jinko Power) is implementing the Photovoltaic (PV) Plant – PV2 IPP in Al Dhafra, Abu Dhabi (the Project) through a Power Purchase Agreement (PPA) with Emirates Water and Electricity Company (EWEC). The EDF and Jinko Power consortium holds a 40% stake of this IPP Project and the Abu Dhabi Local Holding Company [Abu Dhabi National Energy Company PJSC (TAQA) and Abu Dhabi Future Energy Company (Masdar)] retains 60% stake.

The proposed Project will involve the development of a Greenfield photovoltaic (PV) solar power plant with a total installed capacity of 1.584 GWac. The power plant will cover an area of 20.34 km² in Al Dhafra, approximately 35 km south from Abu Dhabi city (see Figure 1.1). The power plant is being constructed as a standalone Independent Power Producer (IPP) under a 30-year PPA with EWEC.

The implementation of the proposed Project is a significant contribution of the Emirate of Abu Dhabi to the UAE Energy Strategy 2050, which aims to increase the contribution of clean energy in the total energy to 50% by year 2050. It should be noted that currently Abu Dhabi has two (2) solar power plants (Shams 1 and Sweihan PV) with total installed capacity of 1.035 GW or just about 6% of the existing electricity generating capacity of the Emirate (i.e. 17.686 GW). The implementation of the Project will increase the current contribution of clean energy to the total energy mix in the Emirate to more than 13%.

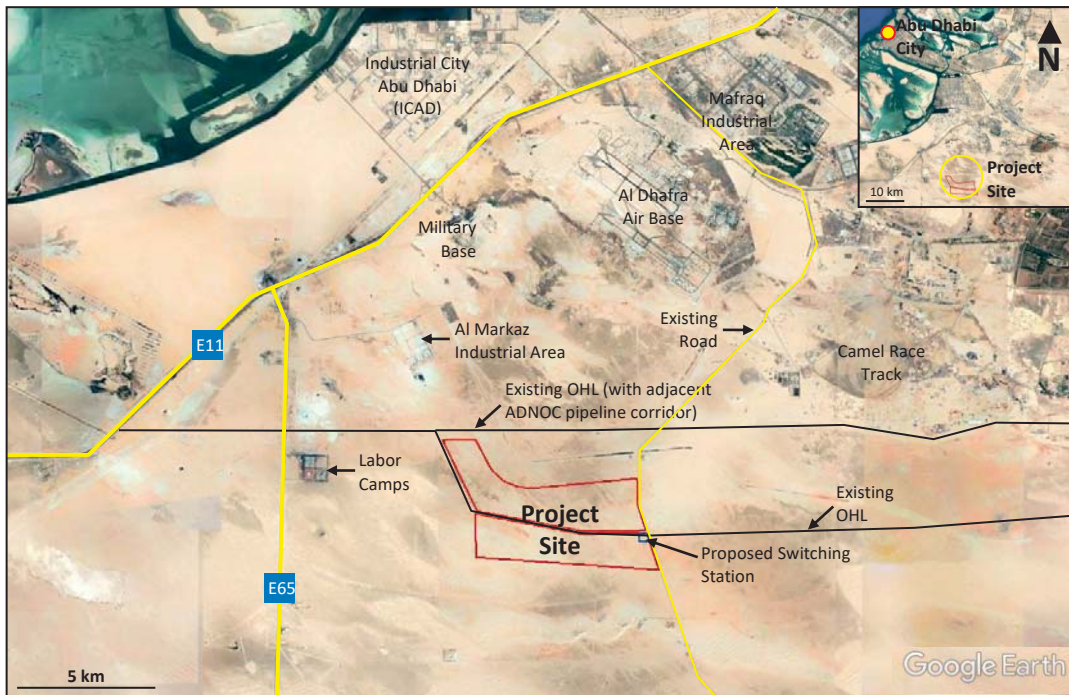


Figure 1.1 – Proposed Location for the PV2 IPP Power Plant

Project Overview

A photovoltaic (PV) power plant is a large-scale PV system designed for the supply of power into the electricity grid. The solar arrays are the subsystems which convert incoming light into electrical energy. They comprise a multitude of solar modules, mounted on support structures and interconnected to deliver a power output to electronic power conditioning subsystems.

The PV power plant consists of PV modules, inverters, step-up transformers and medium voltage (MV) or high-voltage (HV) switchgears. The output of the PV modules is direct current (DC) voltage and DC current. For the string inverters, they are firstly connected in series to form the strings, then connected through string inverters and inverted to low voltage (LV) alternating current (AC) power. Afterwards, the LV AC power would boost the voltage to MV or HV through MV transformers, MV collection cables, MV switchgears, HV/MV transformers and HV switchgears. The generated power is then transmitted to a newly built 400kV substation via 33kV connecting cables. Finally, the generated power of the PV farm is transmitted to 400kV OHL deliver the output power to the local grid.

Table 1.1 lists the main components and design details of the proposed PV power plant (PV2 IPP). The generated power of the plant (1.584 GWac) will be exported to the electrical transmission system through the Electrical Special Facilities (ESF, including step-up sub-station and switching station) to be constructed as part of the facility. The plant site will be divided in two (2) main facility areas, as follows:

- **PV Plant Area** – power generation based on solar PV technology with a maximum power export capacity of 1.584 GWac. 33 kV underground cables, FOC and associated equipment between the PV2 switching station and the ADDC substation for the auxiliary supply of the ESF.
- **Electrical Special Facilities (ESF) Area** – will comprise of a new 33/400kV substation (with 3 units of 560 MVA step-up transformers) and 400 kV switching station.

Table 1.1 – Main Components and Design Details of the PV2 IPP

Component	Design Details
Capacity	
AC Power (MWac)	1584
Peak Power (MWp)	2100
Maximum Power at Delivery Point (MW)	1500
DC/AC Ratio	1.4
Solar Modules	
Manufacturer	Jinko Solar, JA Solar, Suntech
Type	Monocrystalline, bifacial
Quantity	4.2 millions
Inverter	
Manufacturer	Huawei, Sungrow, TMEIC
Type	String inverter / central inverter
Quantity	9,900
Mounting Structure / Tracker	
Manufacturer	Soltec, Nclave, PV Hardware
Type	Single Axis Tracker, 2 modules in portrait
Quantity	50,000

1.2 SUMMARY OF FINDINGS

1.2.1 Environmental Baseline Conditions

The proposed Project site is currently uninhabited and barren. There are no existing structures or any evidence of previous site anthropogenic activities observed in the area during the site visit on 17th to 18th May 2020. The review of historical satellite imagery of the site (Google Earth) and as confirmed by the Project proponent, the site has not been subjected to any previous development or land uses.

However, the Project proponent noted that some parts of the site may have been used for military training due to its proximity to military bases. It should be noted, however, that there are no identifiable evidence of any military activities observed in the area during the site assessments. However, tire-tracks were observed all over the site (potentially associated with some off-road driving activities, which are common in desert areas of Abu Dhabi).

The proposed Project site is regionally surrounded by a number of military installations and some industrial facilities (see Figure 1.1). Military installations in the area include the Al Dhafra Air Base, a number of unnamed military facilities and a military training ground (all located within 1 to 8 km from the Project site, see Figure 1.1). Industrial land-uses in the general area include the Al Markaz Industrial Park (about 3 km north) and the Al Wathbah Sewage Treatment Plant (STP) (about 6 km northeast) [see Figure 1.1).

The nearest area with civilian population to the site is the labor camps compound located at about 4.5 km to the west (see Figure 1.1). The nearest residential community to the site is Al Wathbah, which is located at about 13 km northeast (north of the camel race track, see Figure 1.1). It should be noted, however, that a small livestock (mainly camels) holding farm was observed at about 500 m from the eastern boundary of the Project site. It should be noted that there were no people in the farm at the time of the visit.

The proposed Project site is note located within any terrestrial protected area in Abu Dhabi. The nearest protected area to the site is the Al Ghada Protected Area, which is located at about 7 km east. Based on the EAD ecological data (enviroportal.ead.ae), the site is primarily comprised of Coastal Sabkha, Including Sabkha Matti (3100) and Sand Sheets And Dunes With Perennial Herbs And Graminoids (4140) habitat typologies. It should be noted that the 4140 habitat typology is classified as sensitive habitat and in accordance with EAD guidelines, impacts to sensitive habitats should be appropriately mitigated to minimal or negligible.

The results of the site ecology survey undertaken in the area recorded very limited number of species present in the area. Mammal species that was recorded/actually observed in the area was an individual Cheesman’s Gerbil. Camels were observed at a nearby farm but are unlikely to graze in the area due to absence of vegetation (i.e. almost 80% of the site is *sabkha*). Droppings that could be related to Arabian Red Fox were also observed, but it is unlikely that this species permanently inhabit the area due to absence of suitable habitat and source of food. In terms of reptile, only individual Dune Sand Gecko species was recorded. Protected reptile species such as Spiny-tailed lizards (Dhub) is unlikely to be present in the area due to absence of suitable habitat (typically found on interdunal plains/gravel plains).

In terms of terrestrial flora, only *Haloxylon persicum* species is present during the survey undertaken and distribution was scarce (mainly attributed to the presence of shallow saline groundwater in the area). Other species may occur in the winter, but distribution would still be limited by the saline groundwater present in the area.

In terms of soil and groundwater quality, the results of the survey undertaken showed that the soil and groundwater in the area generally uncontaminated and complies with relevant limit. This is similar case for air quality and noise, wherein no exceedances were identified. It should be noted, however, that data from the nearest ambient air quality station by EAD showed that particulate matter concentrations is high within the general area, which is typical in Abu Dhabi and in UAE as a whole (mainly related to wind-blown particulates).

1.2.2 Key Environmental Issues

Electricity generation through solar power is generally regarded as a positive development, in particular due to its environmental benefits. If the potential emissions generated during the production of solar power plant components are to be excluded (i.e. solar modules, inverters, etc.), the actual operation of a solar power plant has negligible to zero carbon emissions (or generally called as neutral carbon emissions). Considering the prevailing arid conditions in the UAE (i.e. with very limited natural vegetation that could offset any carbon emissions), development of low carbon energy sources is a very important step towards sustainable development of the country.

During construction, potential impacts will include dust and gaseous emissions, noise generation and waste generation, etc., which are typical and can be managed through standard measures and best site practices. The key environmental concern associated with the development is its potential ecological impact, particularly habitat loss, disturbance to terrestrial fauna, etc. It is to be noted that ecology impacts, in particular due to land uptake is generally regarded as the key impact of solar plant development (i.e. the capacity of plant is directly proportional to the area to be covered).

In terms of habitat loss, it should be noted that the results of the baseline survey showed that the site has relative low biodiversity. In its current state, the Project site does not support dense vegetation or any specifically important wildlife species. The absence of wildlife and floral species in the area may generally be attributed to the following site specific conditions:

- Shallow saline groundwater and soil types that are unsuitable for agriculture and generally devoid of natural vegetation.
- Developed nature of the regional areas surrounding the site (including military installations and some industrial land-uses, see Figure 1.1).
- The site can also be considered to be generally fragmented from open desert areas due to presence of roads on both western and eastern side of the site (see Figure 1.1). There is also an existing military training ground south of the site, which further cuts its connection to vast open desert areas to the south. Furthermore, there is an existing OHL passing through the middle of the site (see Figure 1.1).

Nonetheless, the presence of an EAD-classified sensitive habitat in the area is a key concern (i.e. 20.11% of the site or about 4 km²). This is particularly due to the fact that loss of habitat is unavoidable and permanent (i.e. site would be graded and will be mostly covered by solar panels). In accordance with EAD Sensitive Habitat Protection Principles (Abu Dhabi Emirate Habitat Classification and Protection Guideline, 2017), *“any project that may have an adverse effect on environmentally sensitive habitat shall follow a protection and mitigation hierarchy of ‘research and restrict; mitigate and / or compensate’”*.

The aspect of research and restrict has already been covered by the site selection study undertaken for the Project and by this EIA study. It should be noted that the site has been specifically selected as a result of feasibility studies considering its potential for solar electricity generation and absence of any existing land-use. As previously noted, there are no farms or any other civilian activities observed within the area during the site visits. Based on the information provided by EDF and Jinko, the site is owned by Abu Dhabi Power and will be leased to the Project.

The aspect of mitigation is primarily limited to minimizing the impacts to adjacent areas as loss of habitat function within the site itself is an inherent impact associated with the Project implementation. In addition, the site will also be provided with security fence along its boundary.

In accordance with EAD Habitat guideline, *“if impact cannot be mitigated to minimal or negligible levels, the proponent will be requested to compensate for the habitat loss through contribution to an Abu Dhabi biodiversity (habitat or species) project commensurate with the habitat loss caused”*. Based on the guideline, this aspect shall be decided by EAD on a case to case basis. It should be noted, however, that considering the low biodiversity observed within the Project site during the survey and the generally abundant distribution of the specific sensitive habitat to be affected (i.e. habitat 4140 covers 47.6% of the Emirate or about 32,053 km², which means that actual area to be impacted will only be about 0.01% of the total), the actual ecological effect of the habitat to be lost is not expected to be significant. Furthermore, the actual need for compensation scheme by EAD should also take into consideration the overall positive impact of the Project; being a renewable energy source and its implementation that is in line with the government long-term sustainable energy strategy (i.e. its implementation will result in GHG emission avoidance of approximately 800 CO₂eq/kWh).

It is further recommended that an appropriate Construction Environmental Management Plan (CEMP) and Operation Environmental Management Plan (OEMP) be prepared during the implementation of the Project in accordance with EAD guidelines. These plans should provide detailed implementation procedures for all aspects and control measures identified in this EIA study, including the outlined EMP framework.