

# **AL MASA'A \_ 1000 MW SOLAR PV POWER**

## **NON-TECHNICAL SUMMARY (NTS) IN ENGLISH**



**February 2026**

**REV 0**

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## 1 INTRODUCTION

In the Kingdom of Saudi Arabia (KSA), the production of electricity is predominantly dependent on natural gas and petroleum as its principal sources. In 2022, natural gas played a major role in the energy sector, accounting for almost 67% of the total electricity generation. Concurrently, oil constituted approximately 33% of the total, while renewable energy sources remained a negligible portion, providing less than 1%.

In the months with higher temperatures, there was a clear 9% rise in the production of electricity from oil, reaching a maximum of 1.1 million barrels per day in the year 2022. This surge was intended to supplement the current supply from natural gas in order to fulfill the increased seasonal demand. However, Saudi Arabia is committed to decreasing carbon dioxide emissions and transitioning to a more sustainable energy framework.

The National Renewable Energy Program (NREP) is a key component of Vision 2030 for the Kingdom of Saudi Arabia (KSA). It is a comprehensive and long-term plan aimed at diversifying the country's power sources by incorporating renewable energy. The ultimate goal of this program is to achieve economic stability in the long run. One of the main goals of the NREP is to broaden the range of energy sources used in generating electricity, with the aim of raising the proportion of renewable energy to around 50% by 2030.

In accordance with the above, based on a Build, Own, Operate (BOO) Scheme, EDF Renewables (hereafter referred to as the 'Developer') signed a Memorandum of Understanding (MoU) with the Ministry of Energy (MoE) to develop a 1000 Mega Watt (MW) solar photovoltaic (PV) project to be located in Ha'il Province within an area of around 25 km<sup>2</sup> (hereafter referred to as the 'Project').

The Saudi Power Procurement Company (SPPC) has signed a Power Purchase Agreement (PPA) with the Developer for the 1000 MW Al Masa'a Solar PV Project. The Developer signed a 30-year Power Purchase Agreement (PPA) with the MoE (as the off-taker of the electricity) with an agreed fixed tariff.

This NTS provides a summary in non-technical language of the findings contained in the ESIA Report. The ESIA Report contains more detailed information on the Project and the environmental and social issues considered. It includes a description of the need for the Project; details of the Project and the main alternatives considered; the assessment of the potential effects from the proposed development upon the environment and community; and details of any required procedures to mitigate significantly adverse environmental effects. It includes an Environmental and Social Management Plan (ESMP) which describes the monitoring and mitigation requirements for the duration of the project, including responsibilities and any legal requirements. The Developer commits to the ESMP.

A Stakeholder Engagement Plan (SEP) has also been developed for the Project, which describes the planned stakeholder consultation activities and engagement process as well as a grievance mechanism to ensure that it is responsive to any concerns and complaints particularly from affected stakeholders and communities.

## 2 PROJECT DESCRIPTION

### 2.1 Project Setting

KSA is administratively divided into 13 regions. These are further divided into governorates, sub-governorates, administrative centers, and districts. The Law of Provinces (Royal Decree No. A/92 of 1992) classifies these areas into Class A and Class B based on factors like population, urban development, demographics, geography, housing, security, transport, environment, and history.

The Project site is located in the Ha'il Region (or Province), more specifically, within Al Shamli Governorate around 1 km to the east of Dharghat town, around 5.5 km north of Dhauriegat City, 3.6 km east of Al Masa'a, and around 154 km southwest of Ha'il, as shown in the figure below.

The Ha'il Region is further subdivided into eight (8) governorates. As previously mentioned, the Project site is located in Al Shamli Governorate which neighbors Mawqaaq Governorate to the north, and Al Hait Governorate to the south. Moreover, there are 7 administrative centers (cities, villages and towns) under Al Shamli Governorate. The closest administrative center to the Project site is Dhauriegat City which is located around 5.5 km to the north of the Project site. The Project site has a total area of 25 km<sup>2</sup> and is located within government

owned land approximately 1 km east of Highway 7900, which the site will be accessed through during construction and operation as portrayed in the figure below.

As per the 2022 ESIA assessment, the project layout originally covered an area of 33.9 km<sup>2</sup>. Whereas, the current revised project layout, shown in red in the Figure below covers an area of 25 km<sup>2</sup>, resulting in a 26% reduction in total project area, leading to a smaller footprint.

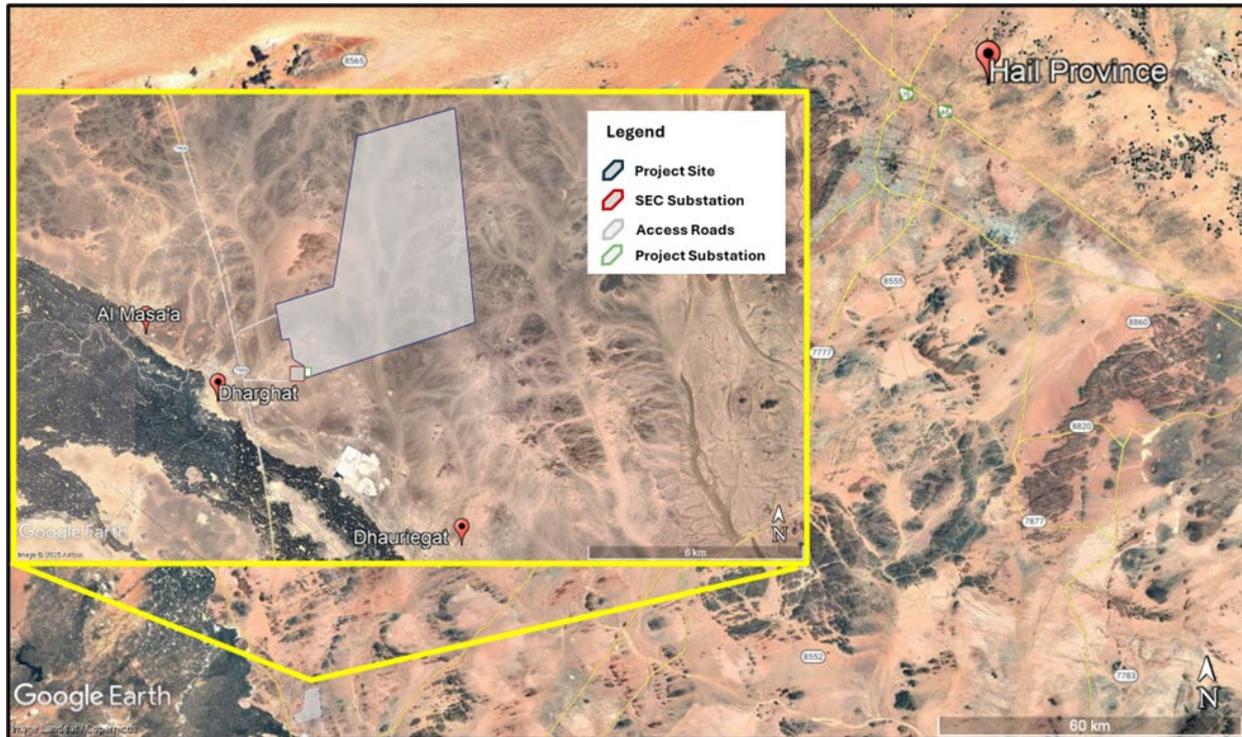


Figure 1: Project Location (Google Earth, 2023)



Figure 2: Site Access (Google Earth, 2023)

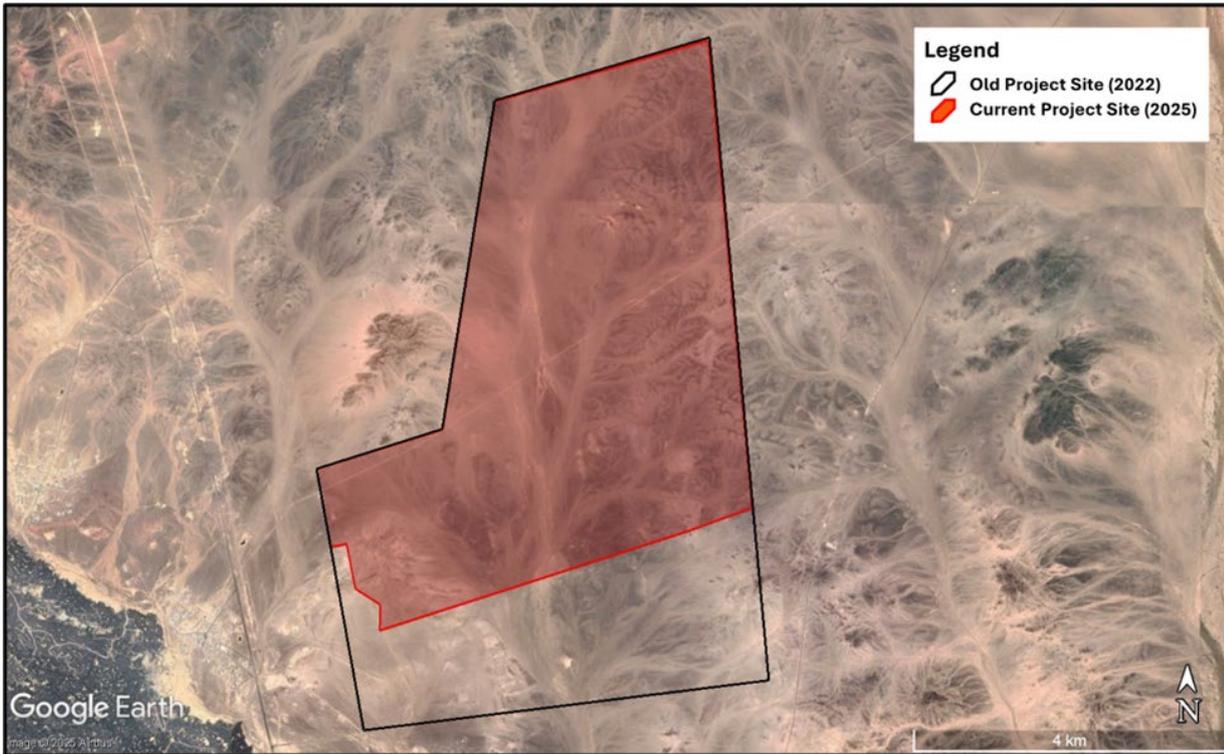


Figure 3: Project Layout – Current vs Old (Google earth, 2023)

The Project will result in crucial positive environmental and economic impacts on the national level. Such positive impacts underpin the rationale for the Project. These include the following:

- Commitment of the Government to meeting the set targets for renewable energy sources;
- Contribute to increasing energy security through reliance on an inexhaustible and independent energy resources. The Project will serve the annual electricity needs of more than 193,491 households in KSA;
- Generating electricity through PV power is pollution-free during operation and will help in reducing greenhouse gas emissions as well as air pollutant emissions. The Project is expected to displace more than 1,801,800 metric tons of CO<sub>2</sub> emissions annually.

## 2.2 Project Components

The key components of the Project are the power arrays which are composed of PV panels which convert solar energy (radiation from the sun) into electricity (figure below). Each array is equipped with a horizontal single-axis beam tracker which carries the array and orients it towards the sun throughout the day to maximize the amount of energy produced.



**Figure 4: Typical Power Arrays Composed of PV Panels**

Other buildings and infrastructure needed onsite include:

- Central inverter stations which convert electricity from the panels from Direct Current (DC) to Alternating Current (AC). Inverter stations connect to a substation through underground cables;
- Switching substation and high voltage OHTL which converts voltage to an appropriate level for connection with the National Grid;
- Building Infrastructure will mostly include offices for normal daily operational related work, as well as a warehouse for storage of equipment and machinery, and water reservoirs;
- Road network to include an internal road network for ease of access to the arrays for operation and maintenance purposes as well as security road around the perimeter of the Project site for security patrolling; and
- Fencing around the entire facility and security will be required to ensure safety from criminal activity and trespassing of unauthorized personnel.

Around 700-800 job opportunities at peak during the construction phase for a duration of approximately 18-24 months. This will mainly include both skilled job opportunities (to include engineers, technicians, consultants, surveyors, etc.) and semi-skilled and unskilled job opportunities (mainly laborers but will also include a number of security personnel).

The expected lifetime of the proposed project is 30 years, requiring a workforce of around 60 to carry out the operational activities.

### **2.3 Project Phases**

- Planning and Construction Phase: This phase includes planning and preparation of a detailed design for the Project, transportation of the various Project components to the site (e.g., PV modules), on-site preparation activities for installation of the PV arrays, and various other components. Site preparation activities could include excavations, grading, and land-clearing activities. Commissioning tests are done at the end of the construction phase to determine if the PV plant is operating satisfactorily. Such tests involve standard electrical tests for electrical infrastructure and the panels and inspection of routine civil engineering quality records;
- Operations Phase: This phase involves installing and maintaining the PV Power Arrays and various electrical equipment. This includes, for example, regular PV module cleaning to prevent dust build-up, which could affect their performance. Maintenance can be divided into preventive and corrective maintenance. The preventive maintenance follows a routine service schedule to prevent faults from occurring and keep the

plant operating at its optimum level. The corrective maintenance is carried out in response to failures, for example, the repair/ exchange of damaged equipment or inverter faults; and

- **Decommissioning Phase:** The lifetime of the PV plant is 30 years, after which the plant is decommissioned and the panels are dismantled. Decommissioning activities could include the disconnection of the various Project components (PV array, central inverter stations, delivery station, etc.) for final disposal. In addition, the internal road network will be restored, and gates and fences will be removed.

### 3 SUMMARY OF ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS & IMPACTS

#### 3.1 Introduction

The ESIA comprised of environmental and social baseline studies and an assessment of impacts. Mitigation measures, which are included in the ESMP, were identified for potential significant effects and the significance of residual effects determined. The impact assessment followed an assessment methodology developed to reflect current best practice.

The ESIA has provided the engineers and designers with important information regarding the sensitivities of baseline environmental and social resources that could be affected by the proposed development. The resulting design proposal has been developed to take account of these sensitivities and avoid negative environmental effects wherever possible. The key baseline and impact assessment findings are further discussed below.

#### 3.2 Environmental & Social Baseline Conditions & Impacts

##### (i) *Landscape and Visual*

The project area is characterized by flat terrain and undeveloped landscape, with minimal variations in topography. The elevation ranges from 1104.6 m in the northeast to 1045.6 m in the southwest above sea level. The site is predominantly a barren desert with widespread gravel coverage and sparse vegetation and is completely vacant, with no visible key structures or above-ground man-made features, such as roads, electricity lines, pipelines, transmission lines, or tracks. Also, there are no permanent settlements within a 1 km radius of the project area, with the nearest urban center, Dharghat Town, located over 1 km west of the project. The Project site is bordered to the east by open, undeveloped land, while the following were identified within the Project and surrounding areas:

- A waste disposal area 50 m north of the access road leading to SEC substation (a single waste pile most likely linked to substation construction activities);
- A temporary construction camp, 250 m west of the SEC substation;
- A batching plant located 250 m west of the SEC substation and adjacent to the temporary construction camp;
- Herding activities, southwest of Project site;
- Groundwater borehole, northeast of Project site;
- Ghazala Mine, 2 km south of the project site;
- OHTLs and underground telecommunication cables;
- A sign for an underground fiber optic cable located 1,500 m southwest of Project site;

All as portrayed in the figure below:

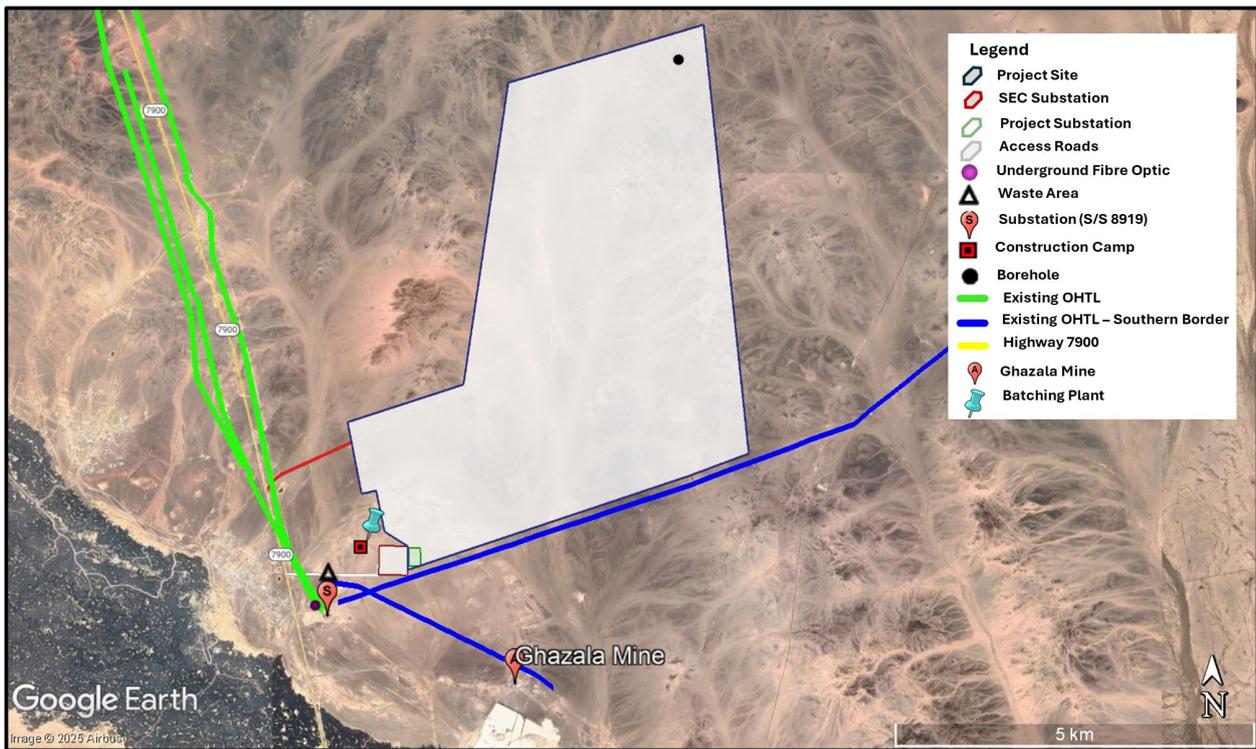


Figure 5 Site Conditions and Land Use (Google Earth, 2023)

The primary visual receptors include road users of Highway 7900, aircrafts that may be flying at low altitude close to the site occasionally, informal grazers, herders, and mining workers. However, these receptors are temporary or transient, and no key sensitive visual receptors, such as recreational areas, cultural sites, or environmental reserves, are present in the project vicinity.

Therefore, the key potential visual impacts from the Project development for both the construction and operation phases are discussed below, all of which have a minor or no significance rating:

- **Construction Phase** - the presence of elements typical of construction sites, such as equipment and machinery, including excavators, trucks, front-end loaders, compactors, etc., can cause visual impacts. The impacts are considered to be **not significant**.
- **Operation Phase** - potential impacts include (i) project visibility, (ii) potential impacts from glare, and (iii) potential island effects.

Given the maximum height of the PV arrays (2 - 3m only), the Project is expected to be visible within the immediate vicinity and up to some hundred meters around the Project site, thus likely to create visual impacts. However, given that no key sensitive visual receptors are within the surrounding vicinity, such impacts are considered of **minor significance**.

There is potential for glare caused by sunlight being reflected off the PV panel modules and the metal mounting structure. The amount of sun reflected depends on several factors, such as the amount of sunlight hitting the surface of the panels, surface reflectivity, geographic location, time of year, cloud cover, and solar panel orientation. However, glare is likely to occur when the sun is not perpendicular to the panel or is low on the horizon (during sunrise and sunset) because the solar panels absorb much less of the incoming light. This may impact aircrafts that may be flying at a low altitude, close to the site. However, since the nearest airport is at a distance of 140 km, visual impact on aviation is not anticipated. The figure below shows the typical glare from PV Panels. PV modules reflect much less light and have a lower potential for glare when compared to other materials widely used in other human developments, such as steel, standard glass, and plastic, and even when compared to snow and smooth water. To reduce the potential impacts from glare, the PV modules for this Project are designed with anti-reflective coatings to capture maximum sunlight and minimize reflections, thus reducing the potential for glare. Potential receptors of the impacts of glare are the desert dirt road users, who

will temporarily be affected during sunrise and sunset hours when solar absorption is minimal. However, the potential impacts are considered **insignificant** because of their low magnitude and the low sensitivity of the receiving environment.

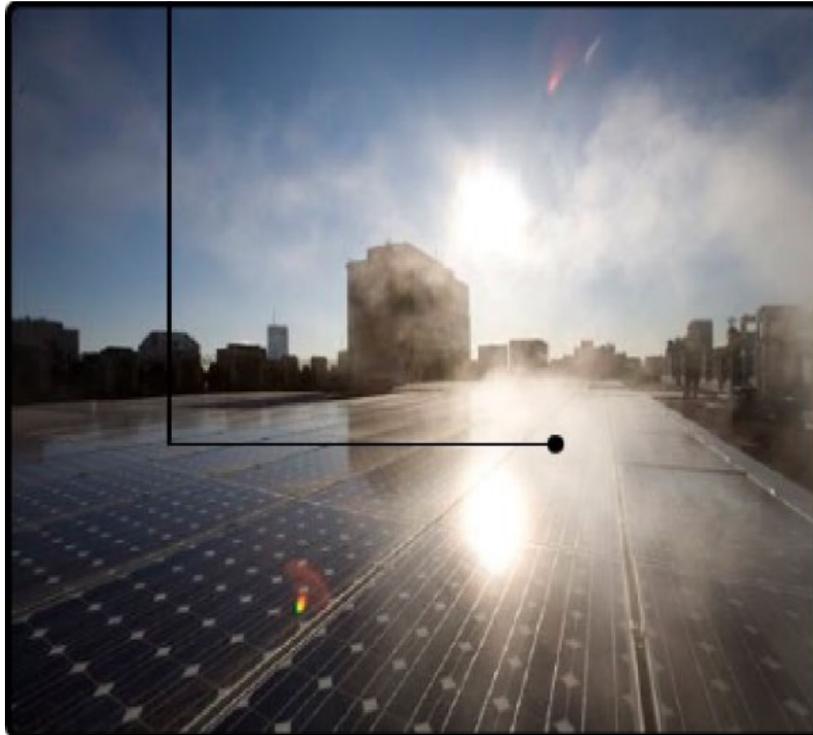


Figure 6: Typical Glare from PV Panels

Lastly, recent concerns about the Photovoltaic Heat Island Effect (PVHI) with solar PV developments exist. All available studies and work (most of which is conflicting) on the PVHI effect have been theoretical or based on simulated models. The available studies show the potential for PV power plants to create warmer environments; however, the lateral or vertical extent of such PVHI effects is unknown due to a lack of data. If the PVHI effects are real, they may be constrained to a small area within the PV installation that quickly dissipates within the surrounding areas. Given the available information on the PVHI effect, the impacts are considered **insignificant** due to their low magnitude and low sensitivity of the receiving environment.

## **(ii) Land Use**

### History of Land Ownership

The land plot where the Project site is located is under the ownership of the Ministry of Municipal, Rural Affairs and Housing (MoMRAH). MoMRAH has entered into a head land lease agreement with Saudi Power Procurement Company (SPPC). In turn, SPPC entered into a sublease agreement with the Special Purpose Vehicle (SPV) Company for the entire Project duration period.

### Current Land Use

According to the 2022 ESIA, land use activities such as seasonal grazing were observed alongside human activity evidence (tracks, pathways, and areas of waste disposal) and land demarcation pillars. As part of the ESIA Addendum, a land survey was conducted in February and March 2025. During the site visits, a single herder with camels (less than 10) was observed southwest the Project site. It was stated that he is from Sudan and currently working in the area as a grazer, but declined to provide further details. The site survey confirmed that there are no existing permanent structures within the Project Site. However, it must be noted that during the 2025 site survey, the small temporary camps used by herders that were recorded in the 2022 ESIA, were not observed.

During the consultations held in March 2025 with Al Shamli Municipality and Al Shamli Governorate Municipality, it was confirmed that the project site is government-owned and designated for renewable energy development, with no ongoing land use, infrastructure, or recorded land disputes. Also, grazing and herding activities in the Project site and surrounding areas is prohibited and illegal. While some informal grazing continues in the wider region, the project site does not provide a unique or critical habitat for grazing. The surrounding land consists of vast, undeveloped areas with similar characteristics, allowing alternative grazing opportunities. Given the low sensitivity of the receiving environment and the availability of extensive alternative grazing lands, no economic displacement impacts are expected, and the impact is considered of **minor significance**.

During the planning phase, the Developer will implement several measures, including conducting a socio-economic and asset inventory census for displaced persons. Engagement activities will be carried out with grazers to inform them about the Project, its schedule, and restrictions on grazing within the site due to safety and operational constraints. However, it will be explained in detail that such grazing activities can continue within the extensive available land and areas surrounding the Project site. Also, collaboration with the Al Shamli Governorate Municipality will ensure the relocation of grazers to a suitable alternative location with access to grazing lands and necessary resources. The Developer bears all expenses related to the smooth relocation process, covering livestock, equipment, shelters, and other essential belongings of the grazers. This comprehensive approach aims to mitigate any adverse impacts resulting from the Project, and after implementation, residual impacts are deemed not significant.

Considering the above, the Project development will not result in any significant land use issues. However, as part of the Stakeholder Engagement Plan (SEP), during the construction and operation phase the Community Liaison Officer (CLO) of the Developer team should aim to document grazers if they visit the area. In this case if they are encountered, engagement activities should be undertaken with the objective of providing information on the project, activities, footprint etc. In addition, it should be emphasized that any grazing activities (if any) can continue within the surrounding areas of the Project.

**(iii) Hydrology and Hydrogeology (Soil and Groundwater)**

Key impacts related to the Project are mainly from improper housekeeping practices during construction and operation (such as illegal/improper disposal of solid waste, hazardous waste and/or wastewater), which could contaminate and pollute the soil and groundwater resources. Construction activities could disturb the soil, exposing it to increased erosion during rainfall, leading to siltation. Implementing general best practice housekeeping measures can also adequately control such impacts. The ESIA has identified adequate mitigation and monitoring measures to reduce these potential impacts and implement proper housekeeping practices. With such mitigation measures in place, the effects of improper management of waste streams and erosion on soil and groundwater are considered **not significant**.

**(iv) Biodiversity**

The biodiversity baseline assessment concludes that the Project site is barren and of low ecological significance and sensitivity. The Project site is not located within or near areas of critical environmental concern, such as protected areas (PAs), Key Biodiversity Areas (KBAs), and Important Bird Areas (IBAs).

Several flora and fauna species were recorded during the assessment, most of which are classified as Least Concern. No sensitive habitats were identified within the Project site or its Aol. With regards to avifauna in particular, the site is considered of low sensitivity due to it being located within a migratory flyway and the potential to host a minimal number of soaring birds based on the outcomes of the IBAT Migratory Soaring Bird Sensitivity Mapping Tool.

Also, several burrows and one individual Egyptian spiny-tailed lizard (STL) were observed on site. To confirm the status of the burrow and validate the presence of the species, an additional STL survey will be undertaken during the active season. Findings from the STL survey will be submitted in a standalone report.

Potential impacts include (i) the ‘lake effect’ that can disorient migratory birds, (ii) improper conduct of workers, including the hunting of animals and birds, (iii) improper management of hazardous waste by workers, and (iv) health and safety risks due to the potential presence of snakes on some parts of the site (v) disturbance to

burrows and STLs during site clearance and construction activities. The ESIA has identified adequate mitigation measures to control such impacts and ensure proper conduct and housekeeping practices are implemented. This includes conducting a pre-construction survey and relocating any identified Egyptian spiny-tailed lizards (STLs) in accordance with the STL Relocation Plan. With the implementation of these measures, the impacts are considered to be of minor significance. With the implementation of such measures, the impacts are considered of **minor significance**.

**(v) Archaeology and Cultural Heritage**

An archaeology and cultural survey was carried out in 2022 and updated as part of the Addendum ESIA in 2025 to ascertain the presence of any surface archaeological or cultural heritage remains within the Project site. No records of any sites of interest or significance were found within the Project area, nor were any archaeological or cultural heritage sites located within a 1 km radius of the Project.

The main impact anticipated is during the construction phase from site preparation activities. As noted earlier, there are no archaeological remains on the surface of the Project site, and therefore there are no anticipated impacts. However, there is a chance that throughout such construction activities, archaeological remains buried in the ground are discovered. In such cases, the ESIA recommends the 'chance find procedure,' which entails immediately stopping construction activities and fencing out the area until the Ministry of Culture and Heritage Commission of Ha'il Province and Saudi Arabia's Heritage Commission has assessed it. With the implementation of such measures, the impact is considered **not significant**.

**(vi) Air Quality and Noise**

Construction and operation activities of solar PV Projects are passive in nature and do not result in any adverse air emissions or significant noise sources. However, construction activities may increase dust and particulate matter emissions, temporarily impacting ambient air quality. Moreover, machinery and equipment use are expected to be a source of noise and vibration within the Project site and its surroundings.

As part of the ESIA, appropriate mitigation measures have been identified for dust suppression and noise control, and these will be implemented during the construction phase. This includes regular watering of all active construction areas, proper stockpile management, and use of well-maintained mufflers and noise suppressants for high noise generating equipment and machinery. With the implementation of such measures, the impacts are considered of **minor significance**.

**(vii) Infrastructures and Utilities**

Water Resources and Utilities – Consultations were undertaken with the Ministry of Environment, Water, and Agriculture where it was indicated that the main water supply for the Al Shamli Governorate is groundwater (depth 70-120 meters) as the agricultural and industrial demand is limited. It was stated that the Project can be supplied with its water requirements through water tankers delivering the water needs to the Project site by the National Water Company (NWC). Project applications must be submitted via the Ministry's digital service platform;

Wastewater and Solid Waste – Wastewater and solid waste generated during the construction and operation phase will be minimal and are expected to be easily handled by the closest Wastewater Treatment Plant (WWTP) and Landfill. During a consultation with the Al Shamli Governorate Municipality in February 2025, it was confirmed that a nearby landfill exists to accommodate general (non-hazardous) solid waste that must be transported by a MWAN-registered company. Wastewater treatment is carried out through the transportation of sewage by tanker trucks to a nearby wastewater treatment plant in Al Shamli Governorate that has a current capacity of 1,700 m<sup>3</sup>/day and is managed by the NWC;

Hazardous Waste Utilities: There are no hazardous waste facilities in Al Shamli Governorate in general. Nevertheless, the waste must be managed by a licensed contractor via the MWAN system. The NCEC confirmed the ability to handle project waste using existing licensed infrastructure, and emphasized that the key governmental entity to be coordinated with in this regard is the National Waste Management Center of the Ministry of Environment, Water and Agriculture; and

**Road Networks:** A Traffic and Transport Plan will be developed before the commencement of any transportation activities to ensure that the transportation process for all project components is appropriately and adequately managed. In addition, the plan will also identify appropriate traffic management procedures (both on-site and offsite).

**(viii) Socio-economic Conditions**

The main impacts anticipated on socio-economic conditions are related to potential job opportunities from the Project. These are **positive** impacts that are expected to benefit the local communities primarily. However, most jobs will only last until construction is done. The Project will create the following job opportunities:

- Approximately 700-800 job opportunities are expected during the construction phase (at peak) for roughly 18-24 months. This will include skilled job opportunities (e.g., engineers, technicians, consultants, surveyors, etc.) and semi-skilled and unskilled job opportunities (mostly laborers and security personnel).
- Approximately 60 jobs will be created during the operation phase for 30 years. This will include skilled job opportunities (such as technicians) and unskilled job opportunities (such as security personnel and drivers).

The Developer aims to hire local community members for skilled and unskilled jobs to the greatest extent possible throughout the construction and operation phases. The Developer is also committed to adhering to transparent recruitment and procurement procedures that will be developed and implemented in coordination with local authorities.

**(ix) Occupational Health and Safety**

During the construction and operation phases, there will be generic occupational health and safety risks to workers that can be minor or severe and are not limited to the following:

- Workers working under dusty and hot conditions, exposure to electric shock hazards during maintenance activities, etc. The ESIA requires that the contractor and operator of the Project to prepare an Occupational Health and Safety Plan (OHSP) tailored to the Project’s site and activities;
- Risks to personnel health and safety during the construction and operation of the project. The ESIA requires the employers to enforce heat stress protections, safety training, and accessible grievance mechanisms to protect worker rights; and
- The potential influx of workers during construction could increase the risk of diseases, social vices, inappropriate conduct by workers within the project’s site. The ESIA recommends the following mitigation measures: (i) medical examination of all workers, (ii) development of a code of conduct and associated disciplinary procedures for workers, (iii) provision of details and procedures for ensuring and maintaining hygienic conditions on-site and conducting training and awareness campaigns for workers. With the implementation of such measures, the residual impacts are considered of minor significance.

Such plans aim to ensure the health and safety of all personnel to maintain a smooth and proper progress of work at the site and prevent accidents. With the implementation of appropriate mitigation measures, the potential OHS risks can be of **minor significance**.

**(x) Community Health, Safety, and Security**

During the construction phase, there could be potential impacts mainly limited to dust, noise, and traffic related risks to nearby communities that can be easily mitigated through measures like dust suppression, vehicle maintenance, speed control, construction traffic scheduling and most importantly a traffic management plan. **No long-term impacts** are anticipated during the operational phase as traffic is expected to be minimal and limited to maintenance vehicles only.

**(xi) Climate Change Risk Assessment**

A high-level Climate Change Risk Assessment (CCRA) related to the Project’s development was undertaken, and key physical risks that have been investigated which are relevant for the Project development that include floods, sand and dust storms, volcanic eruptions, water scarcity and drought, temperature increase and heat waves, and lastly strong winds. This section also provides a high-level estimation of the GHG emissions and

avoidance rates from the Project activities. The Project is expected to provide around 3,276 Gigawatt Hour (GWh) of electricity annually. The Project will likely displace more than 1,801,800 metric tons of CO<sub>2</sub> annually.

The proposed Project aligns with Saudi Arabia's climate change commitments, as outlined in various national programs and strategies. It supports the objectives of Saudi Vision 2030, aiming for 50% renewable energy in the total energy mix by 2030. Additionally, it adheres to the National Environmental Strategy, emphasizing climate change adaptation, private sector participation, and national capability strengthening. The Project's compatibility is further reinforced by Saudi Arabia's Updated Nationally Determined Contribution to the UNFCCC, aiming to reduce greenhouse gas emissions by 278 million tons of CO<sub>2eq</sub> by 2030.

Saudi Arabia faces multiple climate change risks, including floods, sand and dust storms, volcanic eruptions, water scarcity, and heatwaves. The Kingdom, with a predominantly arid climate, experiences frequent floods and is vulnerable to the impacts of climate change, such as decreased precipitation and increased temperatures. KSA's water scarcity, dependence on desalination, and susceptibility to sand and dust storms pose significant challenges. Furthermore, the region is at risk of extreme heatwaves, impacting both project efficiency and the health and safety of outdoor workers. Despite these risks, the project site in Ha'il Region is assessed to have high yet manageable water scarcity concerns and is not affected by volcanic hazards. A flood risk assessment conducted for the Al Masa'a Solar PV Park in 2022 concluded that the entire site has very low flash flood hazard potential, with the flows being shallow and slow. Therefore, the overall flood hazard rating remains low, provided that recommended mitigation measures, such as re-grading, diversion channels, and bund walls, are implemented. Once these measures are in place, flood-related impacts are expected to be **negligible**. Also, the Project must continue to address the high risk of sand and dust storms and extreme heat through preparing an Emergency Preparedness and Response (ERP) Plan, emphasizing worker safety and considering long-term climate change projections.

**(xii) Human Rights and Gender Assessment**

Saudi Arabia presents a dual narrative in human rights, with a commendable Human Development Index (HDI) ranking of 40 out of 193 countries, yet ongoing restrictions on civil liberties. The Freedom House Global Freedom Status rates the country poorly at 8 out of 100, highlighting limitations on political rights, freedom of expression, and labor rights, despite recent reforms.

While Saudi labor laws provide worker protections, challenges persist, particularly regarding independent labor unions, migrant worker rights, and wage security. The sponsorship (Kafala) system has undergone reforms yet concerns remain regarding enforcement and the vulnerability of low-wage workers to exploitation. Gender disparities persist, as reflected in the Global Gender Gap Index ranking of 126 out of 146 countries. However, workforce participation for women has improved, exceeding the Vision 2030 goal of 30% by reaching 37% in 2022. Despite legal strides, social norms continue to shape career advancement, and gender pay gaps remain.

To mitigate potential human rights and gender-related risks, the EPC Contractor will implement several management plans, as outlined in the ESIA. These include a Labor and Working Conditions Management Plan (LWCMP) to ensure compliance with Saudi labor laws and IFC PS 2, a Worker Code of Conduct addressing labor rights and non-discrimination, and a Grievance Mechanism for both workers and external stakeholders to address concerns, Worker Influx Plan and Worker Accommodation Management Plan. In addition, an Occupational Health and Safety (OHS) Plan to safeguard worker welfare.

**(xiii) Ecosystem Services**

The ecosystem services assessment for the project site identified key provisioning regulating, and supporting services. Provisioning services primarily include livestock grazing, with informal herding observed in the area. However, its significance is limited due to sparse vegetation and the availability of alternative grazing lands. Regulating services include air quality regulation, as the limited vegetation helps trap dust and pollutants, and water flow regulation, with wadi channels contributing to surface runoff and minor groundwater recharge, though recharge potential remains low due to the arid climate. The supporting services include biodiversity support with local wildlife identified, including but not limited to spiny-tailed lizards, Isabelline Wheater and native desert vegetation, as well as, vegetation growth as it plays a role in supporting soil stability, preventing erosion, and native plants contribute to carbon sequestration and nutrient cycling, supporting overall ecosystem functions.

Cultural services were not identified as significant, as the site lacks historical, and cultural features. Potential impacts from the project include the permanent loss of grazing areas due to development of project and site fencing, minor disruption to air quality regulation from vegetation clearance, and localized alterations to surface water flow and plant growth patterns.

To mitigate these impacts, the project will implement hydrological management measures, ensure construction activities remain strictly within the project site, and engage with local herders through a structured grievance mechanism. Given these mitigation measures, residual impacts on ecosystem services are expected to be minimal and **not significant**.

#### 4 ENVIRONMENTAL & SOCIAL MANAGEMENT & MONITORING

The 2022 ESIA includes an Environmental and Social Management Plan (ESMP), which outlines adequate measures and controls to minimize and mitigate the potential environmental and social risks and impacts identified for the construction, operation, and decommissioning phases of the Project. To address all the potential risks and impacts of a project, the ESMP utilizes the mitigation hierarchy. After managing impacts, there is a need to monitor for compliance. Monitoring may include observation and recording or data gathering and sampling. Monitoring reports will be required from the Contractor and Operator during the construction and operational phases. The monitoring results will help assess compliance and the long-term cumulative effects, if any. If ongoing problems occur, adaptive mitigation measures can be developed and implemented.

#### 5 ASSOCIATED FACILITIES

The SPPC will be responsible for offsite connection works from the onsite substation to the National Grid. SPPC will be responsible for preparing the detailed design (including identification of the OHTL route), construction activities as well operation and maintenance activities. The SEC substation that will be developed by the SPPC is located adjacent to the Project site to the southwest. Therefore, associated facilities such as OHTL or underground cables will be developed within the Project site boundary. The specific details regarding the type of connection to the grid substation will be developed during the detailed design stage.

Six (6) 132 kV OHTL lines will be constructed for evacuating the plant generated power and connecting the plant to SEC substation. A total of almost 0.9 km OHTL will be installed containing three (3) double circuit towers of 2x400 mm<sup>2</sup> GTACSR conductors, conductor fittings, insulators and concrete for towers foundations.

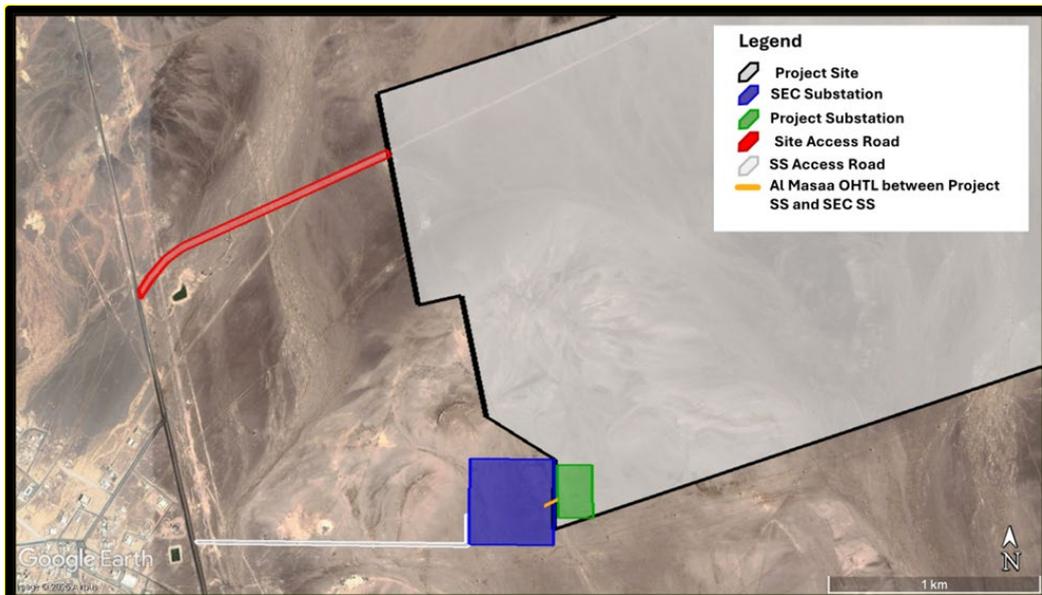


Figure 7: OHTL Connections (Google Earth, 2023)