Preliminary Environmental Impact Assessment (EIA) for developing a 50 MWac PV Power Plant Project in KHBTDA - Al Mafraq

Non-Technical Summary

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ARABTECH JARDANEH
Define . Design . Deliver

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1 PROJECT DESCRIPTION

1.1 Introduction

Al Ambaratouria Li Taka Al Shamsia (referred to as Al Ambaratouria in this report) has been granted an approval from the Government of Jordan, represented by the Ministry of Energy and Mineral Resources (MEMR), to develop a 50 MW_{ac} grid connected Photovoltaic project in Mafraq.

Al Ambaratouria aims to develop the solar energy project using PV technology to generate electricity in Jordan. The project will help to decrease the country's dependency on traditional forms of energy by increasing the availability and use of solar energy. The generated electricity will be injected into the national grid, to support the country in meeting its renewable energy target of 10% by 2020.

MEMR and the National Electric Power Company (NEPCO) have successful track record with independent power projects (IPPs) that include top international power developers with active projects in Jordan.

Arabtech Jardaneh (AJ) was appointed by Al Ambaratouria to prepare the Preliminary Environment Impact Assessment (EIA) Study for the project activities during the three phases of the project namely: construction, operation and decommissioning. The Preliminary EIA will be prepared in accordance with the requirements of the Jordanian Environmental Impact Assessment (EIA) Regulation no. 37 of 2005, and the International Finance Corporation (IFC) Performance Standards as well as the European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (ESP) which consists of the EBRD Performance Requirements (PRs) in order to support the application for an environmental permit from the Ministry of Environment (MoEnv).

1.2 Project Location

King Hussain Bin Talal Development Area (KHBTDA) is located in north of Jordan at Al Mafraq Governorate, KHBTDA was created as trade and Logistics Hub and an Industrial City that serves the regional market and is complemented by housing and commercial & community services. The area allocated for KHBTDA spans over around 13971 Dunums and provide employment for around 33,795 workers by year 2029, at least 60% of whom are local employees, the area is divided into four major land use categories: the Industrial, the Transit Logistics, the Residential and Community Facilities (Source: Master Plan Report for king Hussain Bin Talal Development Area, June 2008).

Mafraq Development Company (MDC) allocated around 4200 Dunums within the industrial zone in order to develop solar power projects by interested national and/or international companies in this field. Al Ambaratouria Solar project area (plots S3-A and S3-B) is located within KHBTDA and spans over a total of 1,330 dunums (plot S3-A is 1030 dunums and plot S3-B is 300 dunums) within the solar power field as shown in **Figure 1** below.

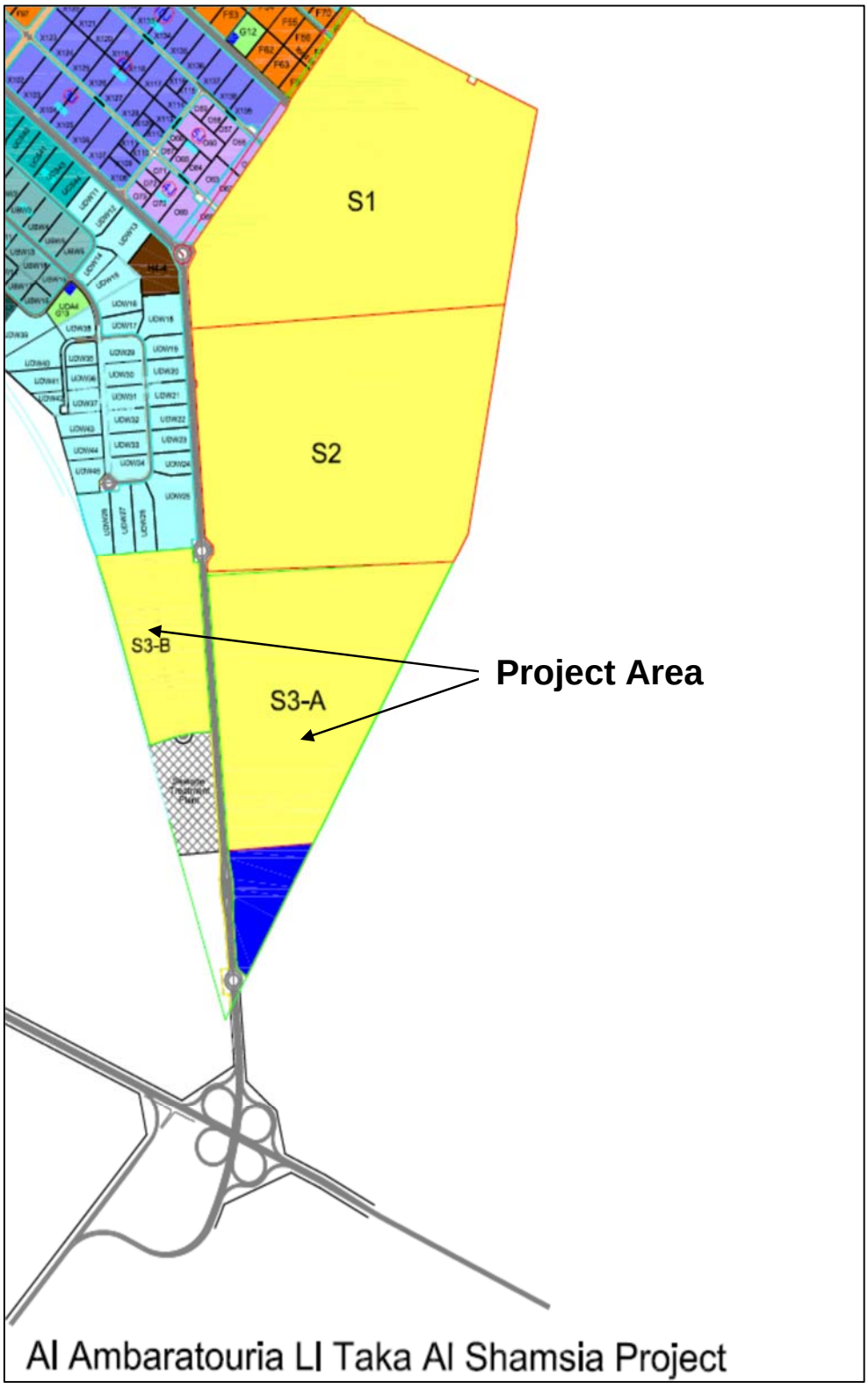

Figure 1: Project Area

As shown in the figure above, Plot No. S3- A+B was allocated for Al Ambaratouria to build 50MW PV plant. The nominal capacity of the plant is 50MW AC and will have peak capacity of approximately 65MW DC. Final detailed engineering design is ongoing and subject to compliance with all PV requirements and regulations in Jordan. A view of the project area is provided below in **Figure 2.**

Figure 2: View of the Project Area

The PV plant will be constructed with Polycrystalline PV modules and single axis trackers system to maximize the annual energy yield. The plant will be connected to NEPCO existing 33/132kV Substation which falls within the KHBTDA. The Plant will be connected via 5km of 33kV underground cables for evacuation to the grid. Interconnection is subject to final Interconnection Agreement to be received from NEPCO and MEMR.

Furthermore, the KHBTDA has 3 individual plots assigned for solar power projects:

- Plot S1, the Sunrise Project, being developed by ACWA Power.
- Plot S2, being developed by Fotowatio Renewable Ventures (FRV) Solar Holdings IX B.V./Jordan.
- Plot S3 (A + B plots), being developed by Al Ambaratouria Li Taka Al Shamsia.

Each project is to generate 50MW and has a similar delivery schedule.

1.3 Main Project Components

1.3.1 PV Modules

The PV module is the main element that composes the generator or solar field. It transforms the received solar radiation into usable electricity (DC, direct current) by means of the photovoltaic effect through its several silicon cells that form the module.

1.3.2 Inverters

The project shall consist of 42 inverters (65.52 MW), the power plant controller shall be installed in order to manage all the inverters and Grid Requirements.

1.3.3 Trackers

The proposed tracking system is the Axone horizontal single-axis tracker, manufactured by PV Hardware, which aims at minimizing the angle of incidence between the incoming irradiance and the panel, rotating on its axis back and forth in a single direction, with an inclination range of +45 to -45 degrees.

1.3.4 Connection Box

The solar field presents two association levels:

- Parallel association of strings (modules connected in series);
- Parallel association of buses.

The parallel association of strings will be made directly throughout the tracker by means of technology specialized for this purpose; both string poles shall be connected to their corresponding bus.

1.3.5 Wiring

The cable for communication shall be mainly a fiber optic cable (RS232 shall be also employed). The power cable for the tracker's motor shall be a three-phase 400 V. The MV and LV power cables shall be manufactured of high conductivity Aluminum.

1.3.6 Grounding and Lightning Protection

All materials will be of high conductivity copper with the sufficient section to assure the required safety principles, in compliance with local standards.

1.3.7 Control Station

The required infrastructure for the security system (UPS, recorders, etc.), communications and PV plant monitoring shall be located in this station.

In addition, the control station shall be equipped with the necessary equipment according to Occupational Risks Prevention national normative and to Fire Protection Standards.

1.3.8 Monitoring and Control System

The Monitoring and Control System shall be composed of a SCADA application (Supervisory Control and Data Acquisition), hosted in a local server installed in the Control Station of the plant and several Remote Terminal Units (RTU), installed in each inverter area, that acquire data generated by inverters, field metering, solar tracker and protection devices.

1.3.9 Security System

System designed to prevent the intrusion of outsiders and provide protection against theft and vandalism. This system is structured in different areas; the anti-intrusion system and camera system, which are continuously in operation and under surveillance.

The system shall cover the strategic locations and sensitive areas of the project, for comprehensive surveillance and monitoring from central control room.

A fence shall be installed in the perimeter of the site according to local standards. It shall be covered with the necessary number of cameras, maintaining the capability of anti-intrusion detection.

1.3.10 Communications

The installation shall be provided with the necessary infrastructure in order to accomplish the needed requirements with a sufficient bandwidth.

1.3.11 Uninterruptible Power Supply

There will be a back-up emergency system designed to supply energy during black out conditions to power auxiliary loads.

1.3.12 Civil Works

All construction activities shall occur within the site boundary limits with the exception of those activities related to the interconnections between the site and the common infrastructures.

Foundations and site conditioning shall be made according to the requirements, National Building Code, Topographical and Geotechnical study of the site. All the foundations shall endure any load or combination of loads due to wind, snow and earthquake.

1.3.13 Spare Parts

A dedicated warehouse for storing equipment and replacements shall be provided on site. The warehouse will be built according to the National Building Code in order to shelter and protect the spare parts.

2 DESCRIPTION OF BASELINE CONDITIONS

The project area is located within KHBTDA and classified as industrial area. The plots allocated for solar projects are currently empty of any official use according to KHBTDA. The project site can be reached through the international highway connecting Mafraq with the Syrian borders. Currently MDC is implementing an infrastructure project for the MDC area, the project will provide infrastructure services such as roads, combined water and firefighting network and wastewater. Moreover, the other services will be available within MDC area such as telecommunication and internet.

The project area belongs to the Arid Mediterranean-warm bioclimatic Zone. The initial meteorological characteristics have been obtained based on the data averages for the years (2004- 2013) recorded in Mafraq weather station. The data averages show that the average maximum temperature is 24.8 °C; the average minimum temperature is 10.2 °C; average mean temperature is 17.5 °C; average mean humidity is 59.8 %; average annual rainfall amount is 119.9 mm; average mean wind speed is 4.7 knot.

Geologically, the project site belongs to the Ajloun and Balqa group within the B4 and B3 formations (Umm Rijam and Muwaqqar formations), which fall within the palaeocene and upper cretaceous systems. In terms of sedimentary rocks, these formations consist of chalk, chert, limestone and marl, the B3 formation is sometimes bituminious. Limestone and chert layers are prolific aquifers in much of Jordan.

The project area is located in the Northern region of Jordan, where most parts of the project is located in an almost flat area. The elevations of the wadis and the run-on area are from about 670 m to about 687 m above the sea level (ASL). The wadis drain mostly south, southeastward and southeastward towards the existing and under construction roads.

The runoff producing areas are almost flat terrain in most localities. A part of the area consists of cultivated areas with silt clay transported by the wind and wadi flows. Four small wadis cross the project area as shown in **Figure 3** below. These wadis have only seasonal floods for short duration.

The general terrain of the project area is characterized by a considerably moderate flat slope in the upper parts and more gentle slopes in the lower parts which are almost flat in most of the project area.

According to the study prepared by Al Shamil Engineering Company, no groundwater exists in the KHBTDA down to the depth of 400 m. KHBTDA is currently supplied by its water needs for the from the groundwater which occurs in Amman-Zarqa basin, which is located to the east of KHBTDA.

The project area is characterized by the Desert Ecosystem, which is one of the three ecosystems presented in Jordan. This ecosystem is the most dominant at the national level, where it comprises more that 70% of Jordan's area.

The area is located at a transitional zone between two distinctive vegetation type zones, namely; Steppe Vegetation and Hamada vegetation. The natural vegetation at the project location is highly deteriorated due to two main reasons:

1. Part of the project area has been utilized for cultivating livestock fodder according to the rainy season in the area, since parts of the KHBTDA has no access control from the eastern side.

2. Random grazing has been observed inside the project area, such activity creates severe damage to the natural vegetation cover. Furthermore, such natural forage already has a very low productivity.

The project area is not located within or adjacent to any Bird Important Area (IBA), the nearest IBA is Irbid – Mafraq Plains where the project is 11km far from the border of the IBA.

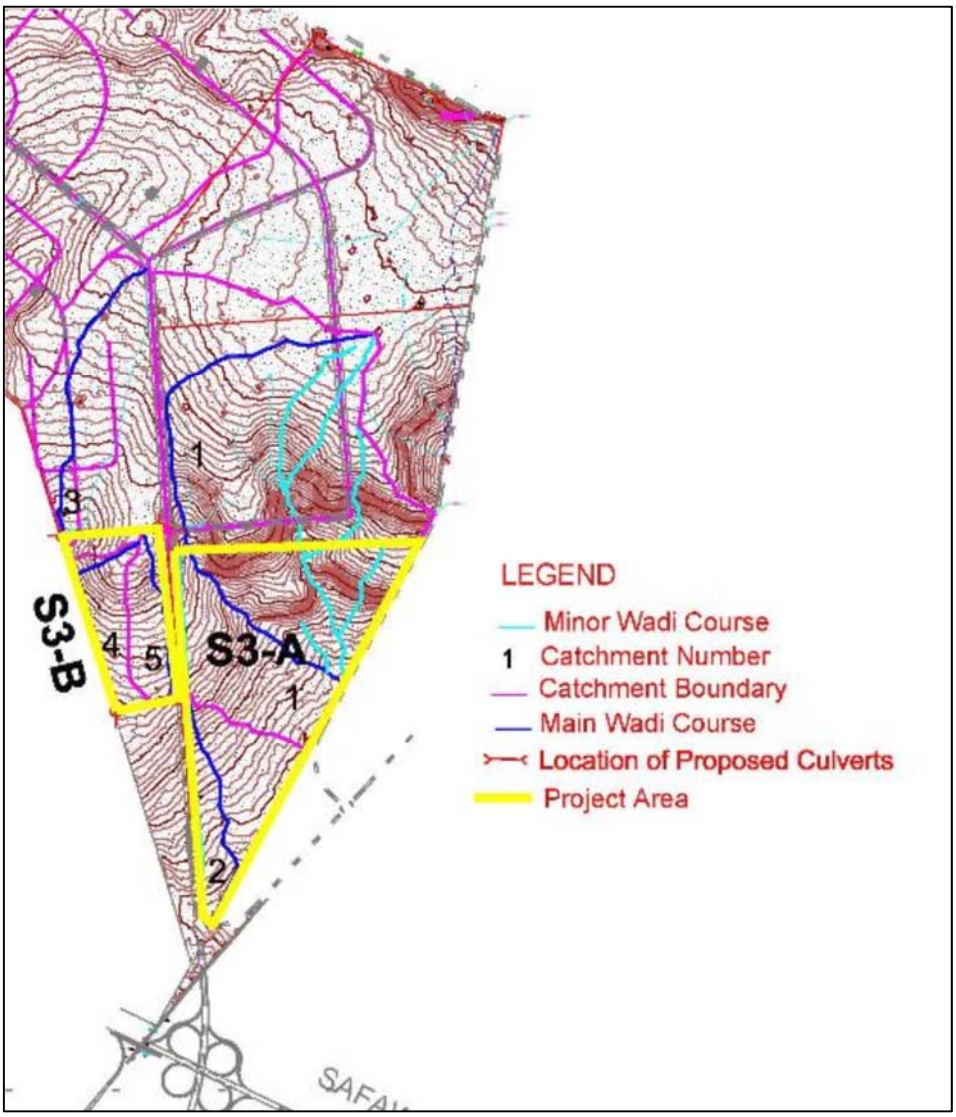

Figure 3: Catchments within the Project Area

The closest local communities to the project area along with their approximate distance have been identified and are illustrated in **Figure 4** below.

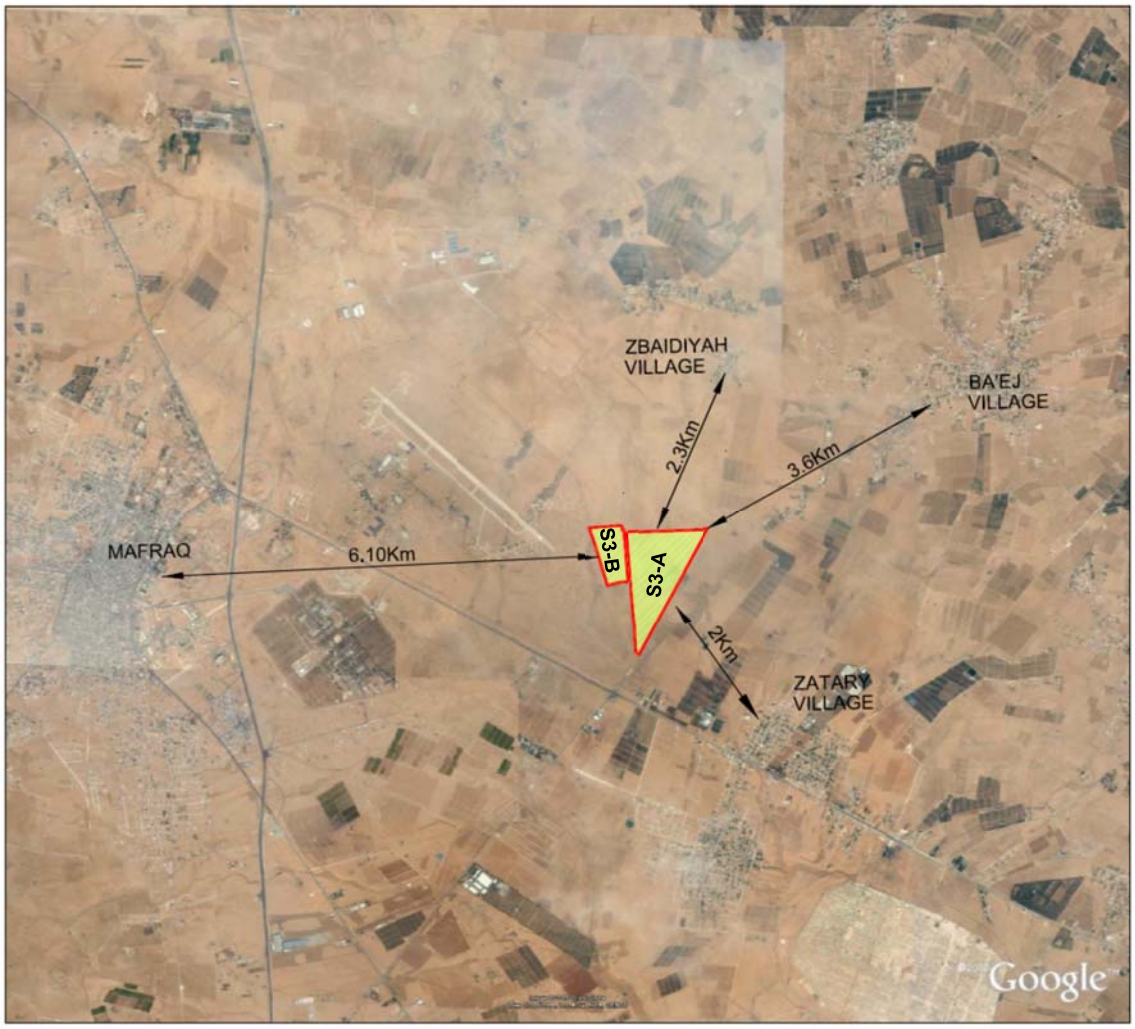

Figure 4: Closest local communities / villages to the project area

3 EXTENT OF THE PRELIMINARY EIA UNDERTAKEN

This project is classified as Category ''2'' With respect to the classification of the Ministry of Environment and as per the Environmental Impact Assessment (EIA) Regulation No. 37 / 2005 as confirmed by a letter from the Ministry no. 4/5/3189 dated April 13th 2016. According to the Regulation, Category "2" projects shall undergo a Preliminary EIA Study, where a scoping session workshop is not required.

In order to fully satisfy the requirements related to Preliminary EIA studies stated by the Jordanian Ministry of Environment EIA Regulation No. (37) For the Year 2005 in addition to EBRD's PRs, AJ is currently finalizing the Terms of Reference (ToR) of the Preliminary EIA, and is planning to submit it to the Ministry of Environment within the coming week for review and approval.

However, since this project will be conducted in accordance with EBRD guidelines therefore, relevant consultations with certain identified stakeholders with be conducted on a level that is commensurate with project nature and potential impacts.

The results of any consultation activity conducted for this project will be fully documented in the Preliminary EIA. Also since the project is a preliminary EIA study, the baseline description will rely on a comprehensive desk-top review and analysis of all available data and secondary sources such as credible published literature, reports and studies including the information, maps and studies provided by the Al Ambaratouria, in addition to the already existing data with AJ team who recently completed the comprehensive Environmental and Social Impact Assessment (ESIA) for the neighboring S-2 land plot within the KHBTDA.

The data sources will be clearly documented and cited to enable the sources to be identified.

The project team will consider proposed alternatives pertaining to project/no project, different location alternatives and/or adopting different design alternatives.

AJ team will assess the environmental and social impacts and benefits potentially arising from the project. As a first step, both project's aspects and receptors will be identified will allow for an assessment of the key environmental and socio-economic impacts associated with the project.

4 SUMMARY OF KEY ENVIRONMENTAL, SOCIAL AND HEALTH ISSUES

Based on AJ's experience and knowledge of the nature of the project's footprint and surrounding environmental and human receptors, and based on the information provided by Al Ambaratouria and other stakeholders for the purpose of this project so far, key environmental issues (negative and/or positive) associated with the project are found to be primarily related, but not limited, to:

- Potential Negative Impacts:
  - Air quality & Noise;
  - Soil and land management;
  - Health and Safety (OHS & PHS);
  - Local infrastructure use; and
- Potential Positive Impacts:
  - Local employment opportunities; however, this needs to be maximized by Al Ambaratouria to include local staff where required, and to train locals if the job type permits.
  - Technology transfer and capacity building,
  - Contract and procurement of goods and service,
  - Positive impacts on Public Health by reducing emissions from fuel,
  - Offset greenhouse gases produced by traditional plants, and
  - Improve Jordan's economy by reducing the dependency on imported fuel for power generation and transfer new technology.

Environmental, social and economic conditions may vary. However, many of the above issues may likely to be relevant to the project as a whole regardless of location.

The table below includes a summary of key impacts that are anticipated to be generated from all project phases. The below discussed impacts will be assessed and further elaborated on in the Final Preliminary EIA document for the project; where appropriate mitigation measures and monitoring requirements will be proposed in the Environmental Management Plan (EMP).

Table 1: Summary of Project Anticipated Impacts

Aspect	Key Potential Impact	Comments
Air Quality	Dust generation	Dust generation: resulting from earthworks such as leveling, grading, excavation works and movement of vehicles across dirt/unpaved roads, especially during windy conditions. The contractor shall be committed to control emitted dust from such operations through the proposed dust emission control procedures described in the environmental and management plan (EMP); and to implement proper health and safety measures on site to prevent potential effects on personnel on site.
	Exhaust emissions	Exhaust emissions of SO2, NOx, CO, CO2, and PM10 will be attributed predominantly to the operation of the construction plant and road vehicles such as movement of trucks and vehicles during construction works. These emissions will be limited to the project area (temporary & localized) and are anticipated to be generated in small concentrations and dispersed rapidly within the area. Therefore, it is highly unlikely that local community will be affected, the effects are more likely anticipated to workers on site; however, with proper health & safety practices implemented on site, the impact can be greatly reduced. No emissions are expected to be released during the operation phase, due to the fact that solar PV power plants do not release greenhouse gases or any toxic pollutants during their operation.
Noise	Increased noise levels	There will be several noise generating activities such as earthworks, trenching, haulage activities, excavation, backfilling, and installation of PV panels, and other equipment within the facility in addition to noise sources generated from machinery and equipment on site. Since the closest community / /village is 2 km away from the project site. It is anticipated that the only people who could potentially be impacted by the noise are the employees working within the project site; these increased noise levels are considered occupational noises that require occupational health and safety measures and shall comply with the occupational noise exposure limits. The project area is considered to be in an industrial area dedicated to solar projects given that it falls within KHBTDA as classified by Mafraq Development Corporation. As a result, industrial noise limits apply to the project area. As for operation, the PV power plant as a facility is not considered to exhibit any significant noisy operations.

Aspect	Key Potential Impact	Comments
Soil	Soil contamination	Construction activities are not expected to result in significant soil loss; however, excavation, leveling and other earthworks may disturb the soil due to the minimal removal of top soil during the construction of office buildings and inverter building; however, soil erosion triggered from such activities is considered minor. The top soil material will remain on site. The other source of impact to soil is waste generation from construction material, accidental leakage of fuel, oil, or chemicals stored within a bunded area causing direct contamination to soil which may degrade lower layers of soil depending on the amount of spills. However proper spill response procedures implemented by the contractor will minimize the impact magnitude. Soil impacts during operation phase are limited to accidental spillage of lubricant, fuel and other chemicals that may potentially cause soil degradation. However, the impact is not considered significant given the spill response procedures in place and the magnitude of the spill is expected to be minimal.
Visual Amenity	Visual impacts	The project site consists of areas that are sparsely vegetated or have no vegetative covers, and hence no trees or bushes will need to be removed as part of construction. Also, there are no close communities that would be within the visual radius of the project. Hence, the visual effects of the construction will be of low significance within the project area and potentially the employees. As for the operations phase, the presence of a large area of PV panels is not expected to constitute a risk for glare since: 1) Solar panels are designed to absorb light, as a result only reflect a small amount of the sunlight that falls on them compared to most other everyday objects. 2) Panels are usually treated with anti-reflective (AR) coating which reduces the sun's reflection from PV panels. As a result, PV panels treated with this material are expected to only reflect approximately a total of 2% of the light. 3) No nearby residential dwellings are present within the immediate vicinity of the project area.
Waste Generation	Improper management and handling of hazardous and non-hazardous waste	Improper management of non-hazardous and hazardous waste generated during construction may lead to impacts on soil, water, visual environment, in addition to health and safety of workers. Non-hazardous waste includes paper, wood, plastic, scrap metals, glass and mud. Hazardous waste includes absorbent material, batteries, tires, metal drums, empty chemical containers, waste oil from machinery lubricants, etc.

Aspect	Key Potential Impact	Comments
		All waste generated at the construction site will segregated, handled, stored and managed as per Contractor's Waste Management procedures. Domestic wastewater generated at site will be collected in septic tanks. These shall be transported to the nearest approved municipal wastewater treatment facility, and solid waste shall be disposed of in a secured area for trash. Waste generated during operation phase will be limited to wastewater from maintenance and cleaning activities in addition to domestic waste (due to workers' domestic activities). Also domestic wastewater generated at site will be collected in septic tanks, due to the fact that the existing wastewater treatment plant at KHBTDA is not functional at this point. Therefore, until the KHBTDA has its own domestic sewer system, the project will continue using septic tanks. The wastewater will be collected and transported to the nearest approved municipal wastewater treatment facility. Waste generation during the operation phase is considered part of daily operations, therefore, it is not considered to have any significant impacts
Water Resources	Potential surface water runoff / potential flood risks.	The project area is almost flat without any permanent natural water streams. Direct runoff from heavy rainfall is considered as the only source of water flowing. The impacts associated management of storm water and wastewater generation on site will be managed based on the proposed mitigation measures, and by implementing good construction practices and procedures on site, in addition and based on the hydrological investigation conducted for this project area, the water flood spread over wide areas, the flow is to be considered as sheet flow and has no damaging effect to any structure. However, Water is collects in gentle terrains at some catchments after heavy rain and for short period of time. As preliminary vision some of the streams need channelization and grouted riprap lining, it is recommended to define the wadi banks by means of creating depression within the flooding plain in order to guide the flood to run in a well-defined path. Earth cut ditch shall be constructed adjacent the roads since the level of the roads are higher than the levels of the land inside the plot.
	Potential Groundwater Contamination	The project activities during three phases: construction, operation, and decommissioning are not expected to impact the ground water since the water table level is deep.

Aspect	Key Potential Impact	Comments
		The hydrological analysis conducted for the KHBTDA area concluded that no ground water exists in the area down to the depth of 400 m.
	Water Cleaning Technology	Al Ambaratouria's will adopt the semi-automatic cleaning solution for cleaning solar panels, this will result in a water consumption being approximately 3,000 L/MWP for each cleaning activity (where two cleaning activities will be conducted per month), compared to conventional cleaning which will consume water of around 16,000L/MWp per cleaning activity.
Ecology	Potential disturbance to fauna	The project area does not encompass natural systems, which means that no significant flora and fauna are present. As a result, construction activities are not anticipated to pose any risks on the ecology of the vicinity of the project site. However, it may cause temporary disturbance to resident birds with ground nests due to noise, dust and particulate emissions, and possible illegal hunting by construction workers. Moreover, reptiles present within the project site may temporarily move to adjacent locations during construction activities, however are expected to return back as construction is completed. Furthermore, small bushes that are not expected to impact the PV panels. Due to this fact, the project plan for controlling any vegetation over-growth that may affect the PV panels will be performed manually. The anticipated impacts on terrestrial ecology is considered low during all project phases.
Health and Safety	Potential of exposure to incidents	The construction activities include site preparation, infrastructure utilities installation, building structures. As a result, will be potential impacts on workers' health and safety due to exposure to risks through construction activities that lead to accidents causing injuries and death. The most frequent risks cause of accidental death and injury are: • Safety risks such as: tripping; falling due to working at heights; potential fire due to hot work, smoking, failure in electrical installations; electric shocks. • Health risks: Injuries such as: lifting, lowering, pushing, pulling and carrying; temporary or hearing loss which usually comes from noise generated from machinery used for excavation or piling work and from compressors and concrete mixers etc.; heat stress and working during high temperatures; dermatitis that can arise from contact with substances that cause dermatitis such as wet cement, asphalt, solvents used in paints, glues or other surface coatings…etc.

Aspect	Key Potential Impact	Comments
		Therefore, the Contractor, under the supervision of Al Ambaratouria, will be committed to ensure all health and safety measures are in place to prevent accidents and\or reduce the consequences of non-conformance events. The contractor shall ensure all prospect risks during construction phase are assessed and all prevention and mitigation measures are in place accordingly. The contractor shall ensure all workers during construction comply with safety producers through training, awareness and supervising. During the operation phase, the risks will be quite limited due to nature of operation activities; the activities will be limited to guarding and on call and\or onsite technical support (Maintenance and cleaning). There will be potential impacts on personnel' health and safety during operation phase due to exposure to risks; as a result, Al Ambaratouria shall ensure all risks from operation activities to be assessed and to establish specific work procedures for tasks including all safety prevention and mitigation measures to avoid non-conformance events. Options for worker accommodation are still being explored, and if decided to be established, the International Labor Organization (ILO) conventions will be taken into consideration, together with IFC performance standards, EHS guidelines and EBRD Performance Requirements. Worker grievance mechanisms will be communicated clearly to all personnel during all project phases. The Grievance mechanism for workers will be covered in the Stakeholder Engagement Plan that will be prepared for this project at a later stage.
Traffic	Additional traffic load	During the Construction Phase traffic is expected to increase to a certain degree due to the nature of activities that will take place such as the transport of equipment and materials to and from the site through the surrounding road network. Additional traffic load will be evident at certain times during the day, especially if there are slow moving heavy vehicles transporting material to and from the site. The above potential traffic impacts are considered short-term. Impacts from traffic are not expected to occur during the operation phase due to minimal number of personnel present within the project site. Developing an effective traffic management plan for the project will minimize the magnitude of traffic during all project phases.

Aspect	Key Potential Impact	Comments
Socio-economics	Project socio-economic benefits	Positive benefits of the project may arise from short-term job opportunities during construction which may reach up to 120 jobs. It is important that jobs to be targeted to the local people within Mafraq Governorate where feasible in order to maximize this impact. The long-term operation of the PV power plant will provide specialized employment and training for a small local workforce. The detailed organization and nature of jobs i.e. skilled, semi-skilled, technical and managerial position will be provided by Al Ambaratouria in due course and will be included in the Preliminary EIA document that is underway for this project. It is worth noting that the job opportunities especially for the operation phase is considered minimal, however sourcing locals for specific jobs where applicable and where qualifications are present is strongly preferred. The project developer i.e. Al Ambaratouria may opt for training programs if such would maximize local employment within the project. Solar projects in Jordan are expected to improve Jordan's economy as more investors are attracted to Mafraq to establish clean energy projects, this will consequently provide electricity for the sectored communities within the northern parts of Jordan. The solar projects will also lead to upgrading the economic status of the local community in addition to potential increase in land prices and improvement in welfare conditions in the long run.
Archaeology & Cultural Resources	Only potential concern can be impacts on possible unseen archaeological sites/remains (chance finds)	MDC recently obtained a clearance from Al-Mafraq Department of Antiquities (DoA) for KHBTDA which is provided to all developers' prior starting the any construction activities within KHBTDA. The clearance letter (Ref: 5/4/2/369), dated: February 2nd 2016, states that the project area is clear of any archaeological resources visible on the ground, therefore Al Mafraq DoA does not have any objection to the commencement of construction activities in the project, however there shall be coordination with Al Mafraq DoA in case of any chance finds. As a result, it is highly unlikely that undiscovered archaeological remains are present, the consequence of finding such remains will be minor if construction was coupled with effective monitoring and early coordination with the Jordanian Department of Antiquities.

4.1 Cumulative Impacts

Cumulative impacts from the project will be considered in the Preliminary EIA combination with impacts from other relevant past, present and future operations and developments in addition to other unplanned activities that may occur at a later stage or in a nearby location.

4.2 Decommissioning

The solar power plant facility is considered a large scale long-term investment that will contribute to economic benefits to the country through provision of power supply, designed in accordance with best practice, taking into account all relevant national and internal codes and legislation.

The design life of the facility will cover the period of 20 years, and will be renewed upon mutual consent between NEPCO and Al Ambaratouria. Therefore, the post-design life is expected to involve rehabilitation, upgrading and modernization of the facility, with a possible expansion (retrofitting and addition of new technology).

No impacts with high significance are anticipated to take place during decommissioning of the project since all facilities will be removed, solar power plant decommissioned, and PV panels will be dismantled and sent for recycling.

5 ENVIRONMENTAL MANAGEMENT PLAN AND PROCEDURES

AJ team will ensure a systematic approach to managing environmental and social impacts and issues in addition, the potential opportunities associated with project activities will be provided in order to help Al Ambaratouria to comply with the EBRD PRs throughout the project life cycle.

Where environmental and/or social and health impacts or concerns are anticipated, AJ will develop cost effective, well-established and feasible Environmental Management Plan and procedures that will consist of mitigation measures and monitoring actions.

It is important to note that mitigation measures that are integral in the project design will be considered in the impact assessment process. Identified impacts of potential significance that remain will require additional mitigation measures to be adopted. These additional mitigation measures may be provided either by engineering solutions or by management procedures. However, it is expected that most impacts will be fully mitigated through proposing commitments related to developing project environmental and social plans.

All identified and assessed impacts and issues of concern as well as opportunities and benefits resulting from the project will be clearly listed, and relevant management and/or prevention measures and mitigation and monitoring actions will be proposed to all project phases accordingly.

This will be conducted in a tabular format to include institutional responsibilities and commitments.

It is worth noting that the development of relevant mitigation measures and monitoring actions will rely on Jordanian standards in addition to EBRD requirements.