Non-Technical Summary (NTS)

500 MWh/ 250 MW Horus BESS Project in Egypt

REV-2

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ABBREVIATIONS AND ACRONYMS

Acronym	Definition
AC	Alternating Current
BESS	Battery Energy Storage System
BFDs	Bird Flight Diverters
BMS	Battery Management System
BOO	Build-Own-Operate
COD	Commercial Operation Date
CPA	Capacity Purchase Agreement
DC	Direct Current
E&S	Environmental and Social
EEAA	Egyptian Environmental Affairs Agency
EETC	Egyptian Electricity Transmission Company
EHS	Environment, Health and Safety
EHSMP	Environment, Health and Safety Management Plan
EMF	Electromagnetic Fields
EMS	Energy Management System
EPC	Engineering, Procurement, and Construction
EPRP	Emergency Preparedness and Response Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
FACP	Fire Alarm Control Panel
GBVH	Gender-Based Violence and Harassment
GDP	Gross Domestic Product
GoE	Government of Egypt
GoS	Gulf of Suez
HV	High Voltage
HVAC	Heating, Ventilation, and Air Conditioning
IFI	International Financial Institution
ISES	Integrated Sustainable Energy Strategy
LILO	Line-In Line-Out
LRP	Livelihood Restoration Plan
LV	Low Voltage
LWCMP	Labor and Working Conditions Management Plan
MSB	Migratory Soaring Bird
MSDS	Material Safety Data Sheet
MW	Megawatt
MWh	Megawatt-hour
NREA	New and Renewable Energy Authority
NTS	Non-Technical Summary
O&M	Operation and Maintenance
ODSs	Ozone-Depleting Substances

OEM	Original Equipment Manufacturer
OHSP	Occupational Health and Safety Plan
OHTL	Overhead Transmission Line
PCS	Power Conversion System
PPE	Personal Protective Equipment
SEAH	Sexual Exploitation, Abuse and Harassment
SEP	Stakeholder Engagement Plan
SMP	Security Management Plan
SOC	State of Charge
SOH	State of Health
SPV	Special Purpose Vehicle
WBG	World Bank Group
WWTP	Wastewater Treatment Plant

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1. INTRODUCTION

The energy sector is a key driver for the socio-economic development of Egypt, representing around 13% of current Gross Domestic Product (GDP) and thus making economic growth in the country contingent upon the security and stability of energy supply.

Since 2007, Egypt has experienced an energy supply deficit due to the rapid increase in energy consumption and the depletion of domestic oil and gas resources, shifting its position as a net hydrocarbon exporter for the last three decades to that of a net importer.

This has brought a set of challenges to the energy sector, including electricity shortages, caused in part by the decline of domestic gas production, as natural gas is the main source of electricity, accompanied by highly subsidized energy prices, with negative financial implications for already dwindling government revenues.[1]

In response, the Government of Egypt (GoE) has taken bold steps to adopt an energy diversification strategy with increased development of renewable energy and implementation of energy efficiency, including assertive rehabilitation and maintenance programs in the power sector.[2]

To this extent, in 2013, the Arab Republic of Egypt (through the Ministry of Electricity and Renewable Energy) had developed and adopted the Integrated Sustainable Energy Strategy (ISES) 2015 – 2035, which provides an ambitious plan to increase the contribution of renewable energy to 42% of the electricity generated by the year 2035.[3]

In that respect, the GoE issued the Renewable Energy Law (Decree Law 203/2014) to support the creation of a favorable economic environment for a significant increase in renewable energy investment in the country. The law allows private companies to develop and operate renewable energy projects, such as solar and wind farms, in Egypt. Under this approach, the Egyptian Electricity Transmission Company (EETC) invites private investors to submit their offers for solar and wind development projects, for specific capacities. In addition, the GoE (through the New and Renewable Energy Authority (NREA)) provides the land for the investors.

These national efforts to expand renewable energy make the role of Battery Energy Storage Systems (BESS) increasingly important. The primary purposes of the BESS are energy shifting and grid support, both of which play a critical role in facilitating the integration of renewable energy into Egypt's power grid by shifting the energy load to peak demand periods; particularly important as the country continues to expand its renewable energy capacity.

In accordance with the above, AMEA Power has been selected to develop a 500 MWh Battery Energy Storage System along with a 535 m Overhead Transmission Line (OHTL) (hereafter referred to as the 'Project') located within Zaafarana Wind Farm, in the Gulf of Suez (GoS) region. The Project is to be developed under the Build-Own-Operate (BOO)) (meaning AMEA Power will build, own, and operate the Project) mechanism, under which a Capacity Purchase Agreement (CPA) has been established. AMEA Power established a Special Purpose Vehicle (SPV) known as Horus (a dedicated company created for this Project) that is wholly owned by AMEA Power and that will be responsible for development of this project (hereafter referred to as the 'Developer').

[1] UNIDO – Low-Carbon Hydrogen Assessments in Egypt Highlights (PDF)
[2] Renewable Energy Outlook, Egypt (IRENA, 2018)
[3] Egypt - Countries & Regions - IEA

This document, the Non-Technical Summary (NTS), provides a summary in non-technical language of the findings presented in the Environmental and Social Impact Assessment (ESIA) Report. The ESIA Report contains detailed information on the Project and the environmental and social considerations involved (see "Section 6" for information on ESIA Report disclosure). It includes a description of the Project's purpose, an assessment of potential environmental and social impacts, and any necessary mitigation measures for significant adverse effects. Additionally, the report includes an Environmental and Social Management Plan (ESMP), outlining monitoring and mitigation measures, responsibilities, and legal requirements for the Project's duration, all of which the Developer is committed to implementing.

A Stakeholder Engagement Plan (SEP) has also been developed, detailing the planned stakeholder consultation activities and engagement process, as well as a grievance mechanism to address complaints from affected stakeholders and communities (refer to "Section 6" in the ESIA for information on SEP disclosure).

2. PROJECT DESCRIPTION

2.1 Project Location

Administratively, Egypt is divided into 27 Governorates. Governorates are then divided into Aqsam (singular: Qism[4]) or Marakez[5] (Districts) which are then subdivided into local units, which are finally divided into cities, villages and hamlets.

The Project site is located in Suez Governorate around 160 km southeast of the capital city of Cairo. The Project site is entirely located within the Ataqa Qism which is the largest district in the Suez Governorate. Ataqa Qism is further divided into four (4) Shiyakhat[6] that are El Semad, El Adabya, El Kabenon, Ain Sokhna. The Project site is located in Ain Sokhna Shiyakha. The Ain Sokhna Town is located around 60 km to the north of the Project site.

It is important to note that the Project site is also located to the east border of an existing wind farm called the Zaafarana Wind Farm.

Although the Project site falls within the administrative boundaries of Suez Governorate, the nearest community settlement is Zaafarana Village, located in the Red Sea Governorate around 5.5 km southeast of the Project site. In contrast, the nearest settlement within Suez Governorate is Suez City, situated about 80 km to the north of the Project site.

Please note that contact details for the public to submit complaints and inquiries are provided in Section 6 of this NTS below.

[4] Qism. In the administrative division of Egypt, the Qism is an urban district made up of neighborhoods and residential blocks (not villages). It usually has more commercial and government services than smaller neighborhoods and functions as the main local administrative unit in urban governorates and large cities.

[5] Markaz. In the administrative division of Egypt, the Markaz is the main city or village followed by a group of villages in agricultural areas (not urban), and often the most important city is a Markaz for a total of villages. The Markaz has more commercial markets than villages, and there may also be branches of government service institutions and agencies serving villages. Each Governorate of the Delta and Upper Egypt includes a number of Markaz, Cities and villages.

[6] Shiyakha (plural: Shiyakhat): The smallest administrative unit in Egypt's urban areas, equivalent to a neighborhood or quarter within a city district (Qism). Shiyakhat are primarily used for administrative, census, and service delivery purposes. In rural areas, the equivalent unit is the village or hamlet.

2.2 Local Communities

Throughout the NTS report, the term local communities will be used. This will refer to Zaafarana Village that is located around 5.5 km southeast of the Project site. In addition, Tourist Resorts – Ain Sokhna are located around 1 km to the north of the Project site. Therefore, the Tourist Resorts will be considered as a sensitive receptor, even though they are not classified as a community.

Zaafarana Village have been selected as affected communities based on the following rationale:

- Proximity to Site: the closest settlement was considered as local community. Although at an around 5.5 km distance from the Project site, however, this is the community that is most likely to be impacted (positivity or negatively) in some way by the Project.

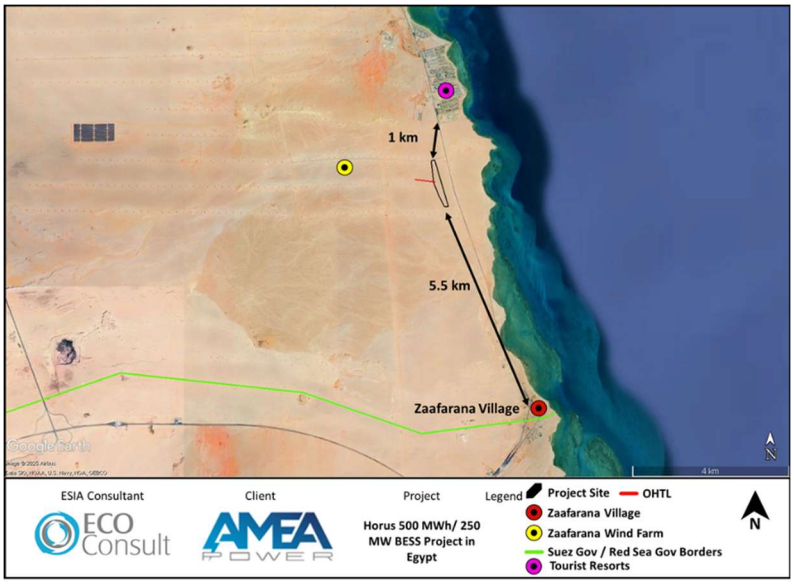

Figure 1: Project Site in Relation to Zaafarana Village and Tourist Resorts – Ain Sokhna

2.3 Project Components

2.3.1 Outline of BESS Technology

The Project will connect a battery storage system to the national grid to help store excess electricity and release it when needed, improving the reliability of electricity supply and supporting renewable energy.

The system can provide electricity for up to eight hours, depending on demand. Stored electricity is converted into a suitable form and delivered to the grid through dedicated connection equipment.

Overall, the Project will help balance electricity supply and demand and support a more stable and flexible energy system. The figure below presents the key components of a BESS:

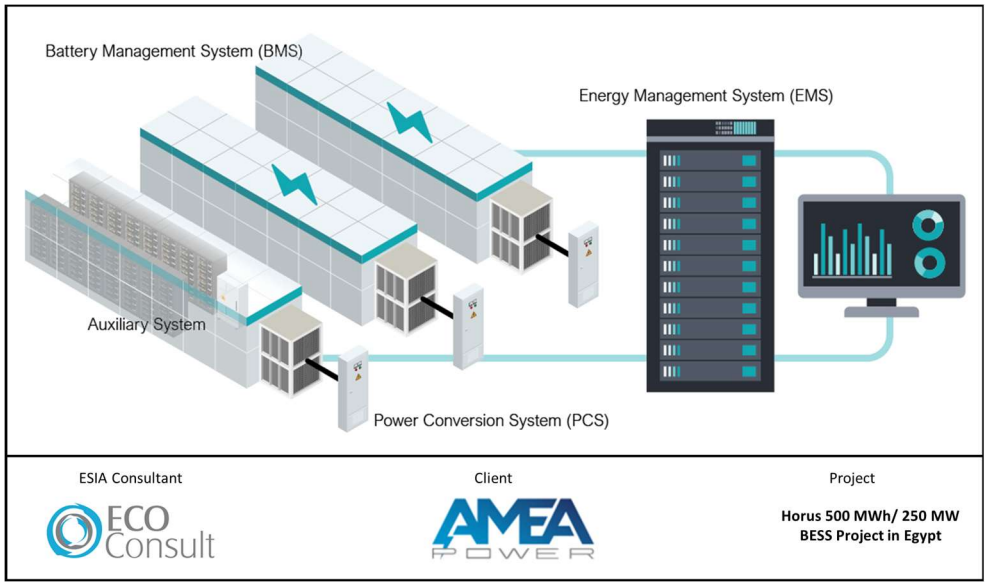

Figure 2: BESS key components

2.3.2 Infrastructure and Utilities

- Substation (including associated civils works and buildings): A substation will be built within the Project site to manage the output from the BESS facility. It will include the necessary equipment to prepare the electricity for export to the grid.
- Grid Connection: The Egyptian Electricity Holding Company (EETC) will be responsible for offsite connection works from the onsite substation to the National Grid. This is likely to be through an Overhead Transmission Line (OHTL). EETC will be responsible for preparing the detailed design (including identification of the OHTL route), construction activities as well as operation and maintenance activities. It is important to note that at this stage there are no details available by EETC on the OHTL specifications – other than the OHTL route as shown in the figure below (information such as height, number of electrical towers, etc.). However, the OHTL will be connected to an existing 220 kilovolt (kV) OHTL (which is also located within the existing Zaafarana Wind Farm site) around 535 m to the west of the Project site through a Line-in Line-out (LILO) configuration.
- Amenities Building: Utility infrastructure will be provided to meet project needs and comply with applicable standards. The building will include offices and up to three toilets and one shower.
- Access route and internal road: The Project will be accessed via a single exiting route that connects to the existing highway (Hurghada – Cairo Highway) outside the Project boundary.
- Drainage and Stormwater Management: Appropriate drainage infrastructure will be incorporated to manage surface runoff within the Project site.
- Telecommunications: Communication systems will be installed for operational control, data transfer, and emergency response, in line with utility and regulatory requirements.
- Water supply: Water will be supplied from through Water trucks to the site. The water will subsequently be stored on-site in storage tanks for construction activities use.

Figure 3: Horus BESS Project Layout

2.3.3 Other Temporary Components

There are additional Project components that will be required on a temporary basis throughout the construction phase of the Project in particular. Those are identified below. The location of such components will be within the Project footprint.

- Site Offices: temporary offices that will be used by Developer and EPC Contractor staff during the construction phase.
- Laydown areas: this is a temporary storage area where tools, materials, equipment and vehicles are stored when not in use.
- Generators: generators will be used for supply of electricity throughout the construction phase of the Project for various power supply requirements. There will be no temporary power supply lines erected before or during the construction period.
- Transport Vehicles and Machinery: During the construction phase, a fleet of machinery—including excavators, Tractor-Loader-Backhoes (TLBs), concrete mixers, concrete pumps, cranes, compaction rollers, and water trucks—will be mobilized.

The Project will provide around 380 job opportunities at peak during the construction phase. The duration of the construction phase will be approximately 12 months, which will include engineers, technicians, consultants, surveyors, etc. as well as unskilled workers. During operation, the Project will provide approximately 30 jobs for a duration of 20 years, which will include skilled labor (such as a plant manager, production manager, control engineer, plant administrator, business manager, accountant, etc.) and unskilled labor (such as security personnel, drivers, etc.).

2.4 Overview of Project Activities

- *Planning and Design Phase* that will include: (i) Completion of all required studies for Project development. This will include but not limited to ESIA, topography study, geotechnical study, etc.; (ii) Obtaining and finalizing required financing from IFIs; (iii) Obtaining required permits; (iv) Appointment of EPC Contractor; and (v) Preparation of detailed design and layout requirements.

- *Construction Phase* that will include: (i) Mobilization of Project team and equipment to the site and recruitment of workers; (ii) Undertake mobilization works for temporary facilities which will involve deployment of site offices and laydown areas; (iii) Shipment of the BESS components (i.e. containers) by road from the nearest port to the Project site. This will be through hauling trucks. Each container (i.e. each PCS and BESS) will require one (1) vehicle and one (1) trip to transport with no abnormal loads. It will be a heavy load, however, not an abnormal load, but inside a standard 20-foot shipping container for the BESS and 40-foot shipping container for the PCS. No more than 150 truck trips containers in total are expected to be required; (iv) Site preparation for the installation of battery container foundations, involving survey works, site clearing, grading, levelling, excavation, and cement works; (v) Excavation and backfilling activities for foundations and cable trenches; (vi) Installation of BESS components, including battery containers, associated electrical and power conversion systems, transformers, and auxiliary infrastructure, likely using onsite mobile cranes; (vii) Construction works to include civil works, electrical works and mechanical works for the development of the substation and building infrastructure, etc.; and (viii) Decommissioning of temporary facilities.

- *Operation Phase* that will include: (i) BESS projects generally require regular preventative, predictive, and corrective maintenance as recommended by the Original Equipment Manufacturer (OEM); (ii) Maintenance activities are performed on a weekly, monthly, semi-annual, and annual basis to ensure optimal performance and safety; (iii) The BESS facility will maintain interconnection to the grid continuously, except during interruptions or maintenance periods, with the system actively charging and discharging for approximately 8 hours daily; and (iv) Maintenance will also take place through a dedicated team. Typical routine maintenance time for a modern BESS is approximately 40 hours per year. Non-routine maintenance may be of a similar order. Although minimal, maintenance activities may include battery system checks, thermal management system servicing, inverter and electrical component inspections, software updates, and safety system testing.

- *Decommissioning Phase:* Following a 20-year operational period (as per CPA with Egyptian Electricity Transmission Company (EETC), the Developer (AMEA Power), and the Ministry of Electricity and Renewable Energy), BESS components will be de-energized, dismantled, and removed. Components may be refurbished, recycled, or disposed of in accordance with regulations. Foundations will be removed, land restored, and infrastructure such as fences and gates dismantled, while internal roads may be retained.

2.5 Project Schedule

According to the current timeline, the Project schedule includes a Planning and Design phase during Q1 2026, followed by Construction from Q1 2026 to end of Q1 2027. The Commercial Operation Date (COD) is expected in Q1 2027. The Project is designed to operate for a period of 20 years following the start of operations.

3. SUMMARY OF ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS AND IMPACTS

3.1 Introduction

The Environmental and Social Impact Assessment (ESIA) included comprehensive environmental and social baseline studies, as well as an assessment of potential impacts. Where significant effects were identified, appropriate mitigation measures were developed and incorporated into the Environmental and Social Management Plan (ESMP), with the significance of residual effects also evaluated. The impact assessment utilized a methodology reflecting current best practices.

The ESIA provided engineers and designers with valuable insights into the sensitivities of baseline environmental and social resources that could be affected by the proposed development. As a result, the design proposal was developed to consider these sensitivities, aiming to avoid adverse environmental impacts wherever feasible. Key baseline findings and impact assessments are further detailed below.

3.2 Environmental and Social Baseline Conditions and Impacts

3.2.1 Landscape and Visual

The Project site in general can be characterized as relatively flat to gently sloped with an elevation ranging between 18–23 meters above sea level across the Project area. It lies about 1 km inland from the Gulf of Suez shoreline. The terrain permits intermittent long-distance views toward the sea, although the coastal highway and associated infrastructure may at times limit visibility.

The Project site is located within the existing Zaafarana Wind Farm. Therefore, existing wind turbines, OHTLs, and substations are located in the area adjacent to the Project.

In addition, the Project site is completely vacant and no key structures or man-made features appearing above ground were noted such as roads, electricity lines, pipelines, transmission lines, tracks, etc.

Typical views from the Project site are mainly limited to the Wind Turbines, OHTLs, and substations in the vicinity of the Project site as well as open landscape and topography.

Figure 4: Typical Views from the Project Site

Key Anticipated Impacts

Visual and landscape impacts due to presence of elements typical of a construction site such as equipment and machinery.

Mitigation Measures

Ensure proper general housekeeping and personnel management measures are implemented which could include: (i) ensure the construction site is left in an orderly state at the end of each work day, (ii) to the greatest extent possible construction machinery, equipment, and vehicles not in use should be removed in a timely manner, (iii) ensure proper storage, collection, and disposal of waste streams generated.

3.2.2 Land Use

History of Land Ownership

Land tenure of the Project area, which includes both Project boundary and OHTL Route has been under Governmental property and was allocated in 2017 to NREA for renewable energy development projects through Prime Ministerial Decree No. 466 of 2017. In addition, the land is under governmental ownership and is not allocated for any specific developments such as housing or agriculture. Based on the above, NREA granted the Developer full usufruct agreement to the specific site for the development of a BESS Facility. Therefore, there are no land acquisition measures considered applicable for the Project development.

Current Land Use

- No physical structures were noted onsite (such as human settlements or structures). In addition, no man-made features appearing above ground were noted such as roads, electricity lines, tracks, etc.
- No evidence of any economic activities both formal and informal to include in particular agriculture activities or grazing activities which are common practices undertaken by local communities. In particular, no ploughing marks were noted within the Project area (which would be indicative of agricultural activities) nor any livestock fecal remains (which could be indicative of grazing activities).
- No nomadic or Bedouin activity was noted within the Project site or evidence of such activities.
- Based on consultations undertaken with local communities, it was also confirmed that there are no physical and/or economic land use activities undertaken within the Project area.

Taking the above into account, the development of the Project will not result in any issues related to land use of the site and therefore there are no specific requirements to be implemented.

3.2.3 Geology, Hydrology and Hydrogeology

The Project site is underlain by Quaternary wadi and coastal deposits consisting mainly of gravel, sand, silt, and clay overlying older sandstone and claystone of Cretaceous age. The Project site is located within the Zaafarana Wind Farm area along the northern Red Sea coast, within the Gulf of Suez rift zone characterized by stable geological conditions and absence of major faults. The Project site falls in the Zaafarana catchment of a hyper-arid region where rainfall is very limited and groundwater represents the main water source, occurring within shallow Quaternary deposits and deeper Cretaceous formations, with groundwater flow generally directed eastward toward the Gulf of Suez.

Key Anticipated Impacts

- Potential soil contamination from improper waste, wastewater and hazardous materials management during construction and operation.
- Risk of groundwater contamination from improper storage or disposal of waste streams and hazardous substances during construction and operation.
- Soil disturbance, erosion and sediment run off into nearby canals during construction.
- Risk of accidental spills and leakages during construction and operation from improper handling, storage, or transportation of hazardous substances such as fuel, lubricating oils, hydraulic fluids and cooling agents used for batteries and power conversion systems.

Mitigation Measures

The Developer will implement mitigation measures to prevent and control these risks to include but not limited to the following:

- Coordinate for the collection of waste streams from the site to approved landfills or for recycling for solid waste and hazardous waste and Wastewater Treatment Plants (WWTPs) for wastewater.
- Prohibit fly-dumping of any waste to the land (solid, wastewater, hazardous waste, etc.)
- Establish a secure, hard-surfaced onsite waste management area with proper labelling and containers for municipal and construction waste, including recycling;
- Distribute sufficient number of litter bins and containers properly marked as "Municipal Waste";
- Ensure septic tanks are well contained and impermeable to prevent leakage of wastewater into soil.
- Ensure hazardous materials are stored in proper areas and in a location where they cannot reach the land or the canal in case of accidental spillage. This includes storage facilities that are of hard impermeable surface, with a hard roof, flame-proof, accessible to authorized personnel only, locked when not in use, and prevents incompatible materials from coming in contact with one another.
- Implement proper housekeeping practices on the construction site at all times.
- Maintain records and manifests that indicate volume of waste generated onsite, collected by contractor, and disposed of at final location (landfills, WWTP, etc.).
- Salvage and store topsoil and subsoil before areas are excavated, with topsoil stripped and stockpiled separately.
- Erect erosion and sediment control barriers.
- Design and maintain drainage systems to divert surface runoff and mimic natural drainage where practicable.
- Ensure that all fuels, oils, lubricants, and chemicals are stored in properly designed storage facilities constructed of hard, impermeable surfaces, with roof cover and secondary containment (bunded areas) capable of holding at least 110% of the largest container.
- Maintain an updated Material Safety Data Sheet (MSDS) register onsite for all hazardous materials, accessible to all staff.
- Prohibit any refueling or oil handling activities outside designated, hard-surfaced, and contained areas.

- Equip all relevant areas (storage, refueling, battery rooms, and maintenance zones) with spill kits and ensure that personnel are trained in their use.
- In case of accidental spillage, contain the spill immediately, recover the leaked material using non-reactive absorbents, and dispose of contaminated soil and absorbents as hazardous waste.
- Maintain emergency spill response procedures as part of the Project's Environmental, Health, and Safety Management Plan (EHSMP).
- Conduct regular inspection and maintenance of all equipment, storage containers, and transfer systems to identify early signs of leaks or deterioration.
- Ensure that BESS units are housed in sealed containers or enclosures with integrated drip trays or containment sumps to prevent leakage from reaching the ground.
- Maintain a Battery Management System (BMS) capable of real-time monitoring of temperature, voltage, and leakage current to detect early signs of failure or electrolyte loss.
- Develop and implement a BESS Fire and Spill Response Procedure that includes isolation, cooling, and safe removal of damaged battery modules.
- Collect and dispose of any spilled electrolyte, contaminated absorbents, or damaged battery cells as hazardous waste through an EEAA-approved contractor.
- Prevent the washing of spilled material or firewater runoff into soil or stormwater drains.
- Conduct specialized emergency response training for the O&M team focusing on chemical spill containment, first aid, and safe handling of battery incidents.

3.2.4 Biodiversity

Baseline biodiversity within the Project site and its surroundings has been assessed through desktop studies and two field surveys to the Project site in July, and August of 2025 by local biodiversity experts to record habitats, flora, fauna, and avifauna.

The biodiversity baseline assessment for Habitats, Flora and Fauna concluded the following:

- The Project site in general is considered of low ecological significance due to its setting that is characterized by having low vegetation cover in an arid environment with low level of diversity
- The vegetation cover is minimal across the site.
- No endemic and one near-endemic species were recorded.
- No key or sensitive habitats were recorded within the Project site, and all faunal species recorded were in general considered common and typical to such habitats and generally of least concern.

The biodiversity baseline assessment for the Avifauna Survey concluded the following:

- The Project site in general is considered of low ecological significance for resident avifauna due to its setting that is characterized by having low vegetation cover in an arid environment with low level of diversity.

- Migratory bird species are unlikely to use the Project site as a roosting area following migration as the site is adjacent to a large, existing wind farm and there is more suitable open land close to the cost which would provide rest and roosting opportunities for Migratory Soaring Birds (MSBs).
- Migratory bird species could be impacted by the proposed OHTL as birds migrate in large numbers in proximity of the site. Species such as Lanner Falcon and Saker Falcon are thought to be a medium sensitivity species by Avistep, while White Stork and Honey Buzzard are known to cross the areas in large numbers. Other OHTLs within the area will be used to perform an impact assessment for MSBs.
- Two IUCN Least Concern avifauna species were recorded within the AoI (House Crow and Rock Dove)
- The Project site is located in close proximity to the Gulf of Suez, making resting of migratory species more likely to occur.

Key Anticipated Impacts

The Project will involve a 535 m OHTL and therefore it is likely to have a minor impact on birds as they are a proven mortality factor via collision and electrocution. In most cases, impacts from over-head powerlines lead to severe injuries or immediate death. In case of collision incidents, birds crash at high flight speed into cables or wires. The resulting injuries vary widely and are comparable to trauma caused by collisions with cars. Electrocution harms birds perching on the live components or having ground contact, but this is less of an issue with high power OHTL such as the one proposed here due to relevant components being insulated.

It is anticipated that most birds will be at insignificant risk to collisions due to their flight behavior, i.e. smaller and more maneuverable birds (such as falcon) will actively avoid the OHTL. Any MSB species are likely to be present in such low numbers that this in combination with the small scale of the OHTL means that risks are considered to be negligible.

Mitigation Measures

Key impacts on biodiversity are mainly from improper conduct and housekeeping practices by workers (i.e. hunting of animals, discharge of hazardous waste to land, etc.) during the construction and operation phase. The ESIA has identified adequate mitigation measures which aim to control such impacts and ensure proper conduct and housekeeping practices are implemented. In addition, Bird Flight Diverters (BFDs) are to be installed every 10 m along the entire length of the OHTLs on the shield wire. With the implementation of such measures the impact is considered not significant.

3.2.5 Archeology and Cultural Heritage

A field survey was undertaken by an archaeology and cultural heritage expert in August 2025 to verify the presence of any surface archaeological or cultural heritage remains within the Project site.

The assessment concludes that there are no records of any sites of interest or significance within the Project area.

Key Anticipated Impacts

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.

Mitigation Measures

There is a chance that throughout construction activities, archaeological remains buried in the ground are discovered. Improper management (if such sites are discovered) could potentially disturb or damage such sites. Nevertheless, the ESIA identifies appropriate mitigation measures (i.e. implementation of chance find procedures) which should be implemented should such remains in the ground be discovered throughout the construction phase. With the implementation of such measures the impact is considered not significant.

3.2.6 Air Quality and Noise

An air quality and noise baseline monitoring program was conducted in August 2025 by the E&S Team for the Project site. Air quality results show low pollutant levels, with average particulate matter (PM_{10}) at around 21.3 µg/m³ and fine particles ($PM_{2.5}$) at approximately 8.2 µg/m³, both well below applicable limits. Other pollutants such as nitrogen dioxide (NO_2 ~6.5 µg/m³) and sulphur dioxide (SO_2 ~1.36 µg/m³) were also low. Noise levels ranged between approximately 41 and 60 dB, with a maximum of 59.8 dB, and average daytime and nighttime levels at around 53.2 dB and 51.0 dB, respectively. Noise levels remain within the allowable daytime limit of 55 dB but slightly exceed the nighttime limit of 45 dB due to wind conditions and the operation of existing wind turbines at the site. Overall, air quality complies with national and international standards, and noise levels are generally representative of typical conditions within an operational wind farm.

Key Anticipated Impacts

Construction activities for the Project do not generate major pollutant or noise sources. During the construction phase, site preparation activities, including land clearing, leveling, limited excavation, grading, may result in temporary increases in dust and particulate matter, which could affect ambient air quality in the immediate surroundings. In addition, the use of construction machinery and equipment, such as generators, compressors, and vehicles, is also expected to generate some emissions (e.g., NO_2, SO_2) and localized noise and vibration, potentially impacting nearby receptors, including the Tourist Resorts around 1 km to the northeast of the Project, Hurghada – Cairo Highway 280 m from the Project site.

Mitigation Measures

Regular watering of active construction areas, proper management and covering of stockpiles, adherence to speed limits, use of well-maintained mufflers and noise suppressants, and provision of appropriate PPE (masks and earmuffs) for workers. The stakeholder grievance mechanism will be fully implemented for nearby receptors.

Monitoring programs are also planned to ensure that mitigation measures are effective to include dust and noise monitoring.

During operation, BESS systems could be associated with release of Polychlorinated Biphenyl (PCBs) or Ozone Depleting Substances (ODSs); however, the Project will not use such substances as they are banned by international conventions to which Egypt is a signatory.

Noise during operation may arise from the Power Conversion System (PCS) and ventilation and cooling systems. A noise impact assessment using worst-case assumptions confirms that noise levels are within allowable limits during daytime and nighttime, in accordance with local limits and WBG General EHS

Guidelines. [7] Monitoring will be undertaken during the operational phase to verify and confirm the model outcomes.

3.2.7 Infrastructure and Utilities

Water Resources and Utilities – water requirements for the Project during construction and operation are rather minimal. Consultations were undertaken with Suez Water and Wastewater Company which indicated that they will be able to provide such water requirements easily without affecting water services and requirements in Suez Governorate, through proper coordination with the Developer. Such water requirements can be supplied through water tankers. If a water well is utilized, Developer will undertake regular monitoring to ensure water requirements do not affect local resources, and regular reporting to relevant stakeholders will be undertaken.

Wastewater and Solid Waste – Wastewater and solid waste will be minimal and handled by the nearest WWTP. The contractor and operator will coordinate with the Environment Department in Suez Governorate for solid waste collection and disposal.

Hazardous Waste Utilities: Hazardous waste generated during the construction and operation will be minimal and is expected to be easily handled by the the Nasreya Hazardous Waste Treatment Center in Alexandria Governorate which is currently the only certified government facility for hazardous waste disposal with coordination with the Egyptian Environmental Affairs Agency (EEAA) in Suez Governorate.

All waste will be transported to licensed facilities, with documented transfer and records maintained to ensure compliance.

Road Networks: The Project site is located around 280 m south of the Hurghada - Cairo Highway. This is a vital highway connecting Ain Sokhna and Zaafarana to the rest of the Red Sea Governorate. The road in this area is a two-way, single-lane road. From there an asphalt road branches from the highway to the Project site, after which existing dirt tracks serving the Zaafarana Wind Farm provide internal access to the Project site as shown in the figure below.

[7] https://documents1.worldbank.org/curated/en/157871484635724258/pdf/112110-WP-Final-General-EHS-Guidelines.pdf

Figure 5: Road Network

A Traffic and Transport Plan will be developed before commencement of any transportation activities to ensure that the transportation process for all Project components is properly and adequately managed. In addition, the plan will also identify appropriate traffic management procedures (both onsite and offsite).

Battery Waste Management during Operation / End of Life Disposal: Battery waste during the operation and decommissioning phases could lead to environmental contamination, health risks, and resource loss if not properly managed. Key impacts include potential soil and water pollution from hazardous substances, risks to human health, and non-compliance with waste disposal regulations.

The ESIA requires before commencement of any decommissioning activities and/or in the event of damage or defects to the batteries, that a Disposal Plan is prepared. The plan should consider the following options and compare the costs/benefits of each:

- Evaluate recycling options for E-waste, including the identification of appropriate licensed waste processing facilities for this type of waste within Egypt, if available.
- The Project will ensure that all potential battery-related waste, is managed through authorized channels. In Egypt, the Nasreya Hazardous Waste Treatment Center in Alexandria Governorate is currently the only certified government facility for the treatment and disposal of hazardous waste. Coordination will occur directly with this facility and the Egyptian Environmental Affairs Agency (EEAA) in Suez Governorate to ensure all waste streams are transported and disposed of at licensed facilities in compliance with national regulations set forth by EEAA.
- Cost estimation for recycling and collecting
- Provide suitable proof that the recycling concept is in compliance with international conventions (Basel Convention).
- Include a written confirmation by the Original Equipment Manufacturer (OEM) of the BESS that the following works regarding the Battery System are included:
    - Check-up of the Battery System regarding safe transport

- Decommissioning and disassembly
- Safe packaging and transport to the designated recycling site
- Recycling and disposal according to the state of the art of technology

3.2.8 Worker Welfare, Health and Safety

Key Anticipated Impacts

During the construction and operation phases, potential impacts are mainly associated with occupational health and safety risks, worker accommodation, and workforce management.

Mitigation Measures

The ESIA identified mitigation measures to be applied by the EPC Contractor during the construction phase and which include:

- Occupational health and safety risks are inherent to large-scale construction and operation activities, including those associated with working at heights, moving machinery, confined spaces, handling hazardous materials, and exposure to electric shock or fire. The ESIA requires the Contractor and Project Operator to develop and implement a project- and site-specific Occupational Health and Safety Plan (OHSP) and Emergency Preparedness and Response Plan (EPRP) to prevent accidents, protect workers, and maintain safe operations.
- Inadequate worker accommodation will negatively impact on worker welfare, through for example lack of essential services like adequate temperature control, proper food and beverage including drinking water, emergency response, gender-segregated facilities, washing facilities, and others. Additionally, accommodation that disregards social and cultural needs will affect workers' well-being. ESIA requires the development of an Accommodation Management Plan to ensure personnel welfare and safety in line with local requirements as well as international standards.
- Labor and human rights risks may arise if workforce management is not handled appropriately, including breaches of core labor standards (e.g., child labor, forced labor, excessive hours, unfair contracts, or passport retention). Risks of discrimination, harassment, and abuse (including Gender Based Violence and Harassment (GBVH) or Sexual Exploitation, Abuse and Harassment (SEAH). GBVH/SEAH may also occur within a diverse workforce. The ESIA requires the development of a Labor and Working Conditions Management Plan (LWCMP), which will include an HR Policy, fair working conditions, worker grievance mechanisms as outlined in the SEP, codes of conduct, and procedures to prevent and address GBVH/SEAH.

3.2.9 Community Health, Safety and Security

Key Anticipated Impacts

- There could be potential impacts from emergency situations during operation. Potential risks include fire/thermal runaway (a condition where a battery overheats uncontrollably and may lead to fire), explosion, arc-flash (a sudden electrical discharge producing intense heat and light), electric shock, and hazardous gas release (release of potentially harmful gases if batteries are damaged or overheated). However, the BESS will incorporate multi-layer prevention and protection: cell/module propagation control (to prevent a failure in one battery unit from spreading to others), gas/smoke/heat detection (to provide early warning of abnormal conditions), clean-agent suppression (fire

suppression using non-water-based systems to quickly control fires), HVAC isolation (to stop air movement and limit the spread of fire or gases), and 24/7 monitoring.

- Potential impacts from trespassing of unauthorized personnel during construction and operation, which could result in risks from hazards such as electric shocks, thermal burns, traffic accidents, or chemical exposure.
- Impacts from security guards related to inappropriate management of security issues and incidents by security personnel towards local communities, which could result in resentment, distrust and escalation of events.
- Impacts from worker influx during construction which will increase risk of diseases and social vices as well as inappropriate conduct by workers towards local communities.
- Potential impacts from Electromagnetic Fields (EMFs) from the BESS facility and associated 220 kV OHTL. Given the enclosed nature of the BESS equipment, and shielding/ burial of the transmission line, Project is expected to have minimal EMF and well below public exposure limits identified within international standards.

Mitigation Measures

The ESIA identified mitigation measures to be applied by the EPC Contractor during the construction phase and which include:

- Develop of an Emergency Preparedness and Response Plan (EPRP) which will include measures such as trained emergency responders, emergency drills, coordination with emergency service providers (e.g. Civil Defense –Suez Governorate), safety barriers, etc..
- Develop a Security Management Plan (SMP) which should identify site control access measures such as fencing checkpoints and also entail stakeholder engagement to raise awareness about risks from unauthorized access.
- The SMP should also addresses such issues. This will include requirements such as proper vetting of security guards, establishing a code of conduct for security workers and associated disciplinary measures, induction training for security personnel to include training on use of force as well as principles on security and human rights[8] and others. The Project Operator will develop a similar plan as well for the operation phase.

Develop a worker influx plan which addresses such issues. This will include requirements such as: (i) manage workers in a centralized location; (ii) medical examination programs prior to appointment and repeated routinely during construction; (iii) procedures for ensuring and maintaining hygienic conditions onsite at all times; (iv) training and self-awareness raising sessions on risks associated to the most common contagious and communicable diseases.

3.2.10 Socioeconomics

Key Anticipated Impacts

The main impact anticipated on socio-economic conditions is related to potential job opportunities from the Project. However, such impacts are limited, taking into account the nature of activities for the Project.

[8] The Voluntary Principles on Security and Human Rights : Voluntary Principles on Security and Human Rights

During the construction and operation phases, the Project is expected at a minimum to provide job opportunities for local communities. The Project will create the following job opportunities as discussed earlier:

- Around 380 job opportunities, at peak during the construction phase for a duration of approximately 12 months. This will mainly include 80 skilled job opportunities (to include engineers, technicians, consultants, surveyors, etc.) and 300 semi-skilled and unskilled job opportunities (such as laborers, security personnel, housekeeping, etc.).
- Around 30 job opportunities during the operation phase for a duration of 20 years. This will include around 20 skilled job opportunities (such as engineers, technicians, administrative employees, etc.). and 10 unskilled job opportunities (such as security personnel, drivers, etc.).

Mitigation Measures

A local recruitment procedure will be developed which will identify the number of job opportunities targeted for the local communities and details on how job opportunities will be announced as well as a selection process that is fair and transparent and provides equal opportunities for all, including females.

Communication and updates will be provided through Ras Gharib City Council and Zaafarana Local Unit for engagement, disclosure, and grievance management, ensuring ongoing transparency and trust. To manage community expectations and ensure transparency, recruitment will be conducted in strict accordance with the Local Employment and Procurement Plan. This plan defines the hiring criteria and priority areas for local communities, ensuring that the recruitment process is fair and clearly communicated to prevent unrealistic expectations regarding the scale and duration of available work.

In addition, the Project Environmental and Social Action Plan (ESAP) includes further specific mitigation and management measures, with defined responsibilities, timelines, and monitoring requirements. These measures are aligned with the ESIA mitigation framework and will be implemented and tracked throughout the Project lifecycle. A summary of key measures is presented below, with full details provided in the ESAP.

4. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING

The ESIA includes an Environmental and Social Management Plan (ESMP) that provides a structured approach for managing and monitoring environmental and social impacts during the Project's construction, operation, and decommissioning phases. The ESMP outlines mitigation measures designed to eliminate or reduce potential impacts to acceptable levels, as well as monitoring actions to ensure these measures are implemented effectively.

Throughout construction and operation, specific activities, indicators, and environmental and social receptors will be monitored. This monitoring may involve observation and recording or more detailed data gathering and sampling. Monitoring reports will be required from the Contractor and Operator during the construction and operational phases. The monitoring results will be useful for assessing the long-term cumulative effects, if any. If on-going problems occur, adaptive mitigation measures can be developed and implemented.

5. ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM (ESMS)

An Environmental and Social Management System will be prepared that is project and site specific and builds on and takes into account the requirements of the ESMP. Summarized below is the overall framework, structure and key requirements of the ESMS for the key entities involved in the Project.

Developer

- ESIA including ESMP.
- ESMS Manual that will include: (i) E&S Policy; (ii) Human Resources Policy and Procedures; (iii) Organizational Structure and Responsibilities; (iv) Monitoring and Reporting Requirements; (v) Meeting Requirements; (Vi) Training Requirements.
- Stakeholder Engagement Plan (SEP) including stakeholder grievance mechanism.
- Subcontractor and Supplier Management Plan.

EPC Contractor

- ESIA including ESMP.
- ESMS Manual (in line with Developer) that will include: (i) E&S Policy; (ii) Human Resources Policy and Procedures; (iii) Organizational Structure and Responsibilities; (iv) Monitoring and Reporting Requirements; (v) Meeting Requirements; (Vi) Training Requirements.
- Water Management Plan.
- Hazardous Material Management Plan.
- Waste and Wastewater Management Plan.
- Air Quality and Noise Management Plan.
- Traffic and Transport Management Plan.
- Training Management Plan.
- Fire Safety Management Plan.
- Occupational Health and Safety Plan.
- Emergency Preparedness and Response Plan.
- Security Management Plan.
- Chance Find Procedure.
- Worker Accommodation Plan.
- Worker Influx Plan.
- Subcontractor and Supplier Management Plan.
- Labor and Working Conditions Management Plan.
- Gender Equality Plan.

- Workers Demobilization Management Plan.

Project Operator

- ESIA including ESMP.
- ESMS Manual (in line with Developer) that will include: (i) E&S Policy; (ii) Human Resources Policy and Procedures; (iii) Organizational Structure and Responsibilities; (iv) Monitoring and Reporting Requirements; (v) Meeting Requirements; (Vi) Training Requirements.
- Water Management Plan.
- Hazardous Material and Waste Management Plan.
- Occupational Health and Safety Plan.
- Emergency Preparedness and Response Plan.
- Security Management Plan.
- Labor and Working Conditions Management Plan.
- Subcontractor and Supplier Management Plan.
- BESS Disposal Plan.

6. FURTHER INFORMATION AND CONTACT DETAILS

The Developer intends to provide all relevant information to the public and which will include but not limited to the following:

- Stakeholder Engagement Plan (SEP) – including the grievance mechanism for affected stakeholders and communities; and
- Non-Technical Summary (NTS).

The above is provided at the Developer's website at the following link: www.ameapower.com

In addition, hard copies of the above will be available at the following locations. These documents will remain in the public domain for the duration of the Project and will be updated as appropriate.

Name of the Location

Location: Suez Governorate, within Ataqa Qism (district), Ain Sokhna Shiyakha, near the eastern boundary of the Zaafarana Wind Farm.

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