

Energy Valley

ESIA Nagaa Hammadi Battery Energy Storage System and OHTL - Energy Valley

(Non-Technical Executive Summary)

Prepared by:



6 Dokki St. 12th Floor, Giza 12311
Tel.: (+2010) 164 81 84 – (+202) 376 015 95 – 374 956 86 / 96
Fax: (+202) 333 605 99
Email: environics@environics.org
Website: www.environics.org

September 2026

Table of Contents

1.	Introduction	2
2.	Institutional and Legal frameworks	3
3.	Project Description	6
4.	Baseline conditions.....	9
5.	Analyses of Project Alternatives.....	11
6.	Assessment of Environmental and Social Risks and Impacts	13
7.	Stakeholders' Consultation	24
8.	Environmental and Social Management Plan	24
9.	Conclusion.....	36

Executive Summery

1. Introduction

Energy Valley is an integrated renewable-energy and electricity-storage development comprising four geographically separate but financially and operationally linked components in Minya, Qena and Alexandria Governorates. The overall development includes: (i) the Minya Hybrid Facility, comprising a 1.95 GWp solar PV plant, a nameplate capacity of 1,500 MWh BESS, the on-site generation substation and associated grid-connection infrastructure; (ii) the Naseeg Saririya (Consumer) Substation and associated 500 kV grid connections in Minya Governorate; (iii) a nameplate capacity 1,000 MWh BESS at Nagaa Hammadi, together with a shared 33/220 kV substation and associated 220 kV loop-in/loop-out connection; and (iv) a nameplate capacity 1,435 MWh BESS and 33/220 kV step-up substation at Abu Qir, with the external 220 kV grid connection, which is an Associated Facility under the responsibility of the Egyptian Electricity Transmission Company.

The four components form part of the same Energy Valley development and financing package but are assessed through separate site-specific ESIA's due to their different locations, receptors and risk profiles.

This ESIA addresses the Nagaa Hammadi BESS, the shared 33/220 kV substation and the associated 220 kV loop-in/loop-out connection. The remaining components of the Energy Valley development are addressed under their respective site-specific ESIA's.

The Project aims to contribute to Egypt's renewable energy and grid stability objectives by providing utility-scale battery storage capacity to support renewable energy integration, load shifting and energy management.

The broad goal of the ESIA is to provide decision-makers, regulators, lenders and the Project proponent with information on the potential environmental and social risks and impacts associated with the proposed BESS, shared substation and OHTL components.

The specific objectives are:

- To identify potential positive and negative environmental and social impacts of the proposed Project;
- To assess the significance of potential impacts during construction, operation and decommissioning;
- To identify mitigation, management and enhancement measures for adverse and beneficial impacts;
- To provide an Environmental and Social Management Plan (ESMP), including monitoring measures and responsibilities;
- To support stakeholder engagement and disclosure in a proportionate and meaningful manner; and
- To ensure that the proposed Project complies with Egyptian environmental regulations and applicable international financing institution requirements.

The Project is being developed in accordance with the requirements of the Egyptian Environmental Affairs Agency (EEAA), as well as the environmental and social requirements of the international financial institutions, including the European Bank for Reconstruction and Development, the European Investment Bank, the African Development Bank, and Cassa Depositi e Prestiti. The IFC Performance Standards are also considered as supplementary benchmarks, where applicable.

According to the initial meeting conducted with the EEAA on 6 January 2026, the substation and OHTLs associated with the Nagaa Hammadi component have been classified as Category Scoped-B projects.

In accordance with the EBRD categorization framework, the overall Energy Valley project could initially be classified as Category A. According to the African Development Bank's (AfDB) Integrated Safeguards System (ISS), the Energy Valley Programme is classified as Category 1 (high risk) due to its scale and complexity, comprising multiple components, including a utility-scale photovoltaic power plant, overhead transmission lines, a step-down substation, and battery energy storage systems. However, this overall categorisation does not apply to the individual project components, including the Nagaa Hammadi BESS, its connecting OHTL, and the shared substation, which, based on their nature, size, and location, are classified as Category B projects.

The national EEAA categorisation is considered separately for the individual project components. According to the initial meeting conducted with the Egyptian Environmental Affairs Agency on 6 January 2026, the BESS, substation and OHTLs associated with the Nagaa Hammadi component have been classified as Category Scoped-B projects.

Environics has been commissioned by Energy Valley Company to prepare the ESIA for the Energy Valley Nagaa Hammadi BESS Project, including the 1,000 MWh BESS, shared 33/220 kV step-up substation and associated 220 kV overhead transmission lines. The Nagaa Hammadi BESS is located within the wider site allocated for the Dandara Solar PV Project in Qena Governorate. The Dandara PV Project is a separate development, although the two projects will share the 33/220 kV substation and associated electrical infrastructure.

2. Institutional and Legal frameworks

This framework includes both national legislation and international standards and guidelines.

National Legislation

The project must comply with Egyptian environmental and social laws and regulations, including:

Environmental Impact Assessment (EIA): The national Environmental Law 4/1994 (as amended by Laws 9/2009 and 105/2015) and its Executive Regulations require an EIA study for new projects. The EIA is to be submitted to the environmental authority for review and approval. According to the national regulations, this project is categorised as a Category Scoped-B projects.

Air Quality and Atmospheric Emissions: Law 4/1994 and its associated regulations set maximum limits for ambient air pollutants and exhaust gases. The project will need to comply with these limits during both construction and operation.

Noise and Vibration: Environmental Law No. 4/1994 specifies maximum permissible noise levels for occupational and ambient environments.

Waste Management: The Waste Management Law 202/2020 and its Executive Regulations set requirements for managing non-hazardous and hazardous waste generated from the different activities.

Biodiversity Protection and Nature Conservation: Article 28 of Environmental Law 4/1994 prohibits activities that harm specific wild animals and plants and their habitats. Annex 4 of this law lists protected species. The project site is located within a desert environment of relatively low ecological sensitivity; however, biodiversity protection measures will be implemented where required.

Cultural Heritage: Law No. 117 of 1983 for the Protection of Antiquities, as amended by Law No. 3 of 2010, protects archaeological and cultural heritage resources. Chance-find procedures will be implemented during construction, and coordination with the Ministry of Tourism and Antiquities will be maintained where necessary.

Occupational Health and Safety: Labour Law No. 14 of 2025 and its associated ministerial decrees establish requirements for worker welfare, occupational health and safety, working hours, emergency preparedness, and the prevention of occupational hazards. These requirements apply to all project contractors and subcontractors.

Land Allocation and Renewable Energy Development: The project is being developed on land allocated by the New and Renewable Energy Authority (NREA) in accordance with national regulations governing renewable energy projects and land use in desert areas.

Community Health and Safety: Relevant provisions of Environmental Law No. 4/1994, Labour Law No. 14/2025, and other applicable legislation establish requirements for protecting nearby communities and road users from construction-related risks, traffic impacts, dust, noise, and emergency situations.

Institutional Framework

Several governmental entities have regulatory and oversight responsibilities for the project, including:

- **Egyptian Environmental Affairs Agency (EEAA):** Responsible for reviewing and approving the ESIA and monitoring environmental compliance.
- **New and Renewable Energy Authority (NREA):** Responsible for land allocation and oversight of renewable energy developments.
- **Egyptian Electricity Transmission Company (EETC):** Responsible for grid connection arrangements and electricity transmission infrastructure.
- **Ministry of Electricity and Renewable Energy (MoERE):** Provides strategic oversight of the electricity sector and renewable energy development.

- **Ministry of Labour:** Responsible for enforcement of labour and occupational health and safety requirements.
- **Waste Management Regulatory Authority (WMRA):** responsible for regulation and permitting of waste management activities.
- **Civil Defence and Emergency Responders:** responsible for fire safety and emergency response coordination.
- **Qena Governorate and Local Authorities:** Responsible for local administrative coordination and permitting requirements.
- **Ministry of Tourism and Antiquities (MOTA):** Responsible for the protection of archaeological and cultural heritage resources.

International Standards and Guidelines

In addition to national legislation, the project will align with international standards and guidelines, particularly those of international financing institutions:

CDP Sustainability Framework (2020): The Project will apply the CDP Sustainability Framework (2020) to CDP-financed activities, as applicable.

EBRD Performance Requirements: The project will adhere to the EBRD Environmental and Social Policy and associated Performance Requirements governing environmental and social management, labour, resource efficiency, biodiversity, cultural heritage, and stakeholder engagement.

African Development Bank Group's Operational Safeguards (AFDB OS): The project will comply with the African Development Bank's Operational Safeguards and Environmental and Social Assessment Procedures, including requirements relating to environmental and social risk management, labour conditions, biodiversity conservation, pollution prevention, community health and safety, and stakeholder engagement.

European Investment Bank (EIB) Environmental and Social Standards: The project will be designed and implemented in accordance with applicable EIB Environmental and Social Standards, including those relating to environmental assessment, biodiversity, climate action, labour standards, and community health and safety.

IFC Performance Standards (PS): The IFC Performance Standards will be applied solely as an environmental and social reference framework for the assessment and management of E&S risks and impacts. Their application does not indicate that IFC is a lender or financier to the Project

World Bank EHS Guidelines: The General EHS Guidelines and relevant sector-specific guidance will be applied as Good International Industry Practice (GIIP) throughout the project lifecycle.

International Labour Organization (ILO) Conventions: The project will respect applicable ILO conventions ratified by Egypt, including those relating to occupational health and safety, non-discrimination, forced labour, child labour, freedom of association, and collective bargaining.

3. Project Description

Project location

The Nagaa Hammadi BESS Project is located in Qena Governorate, within the desert hinterland of Nagaa Hammadi, approximately 16 km southeast of Nagaa Hammadi town. The Project will be developed within / adjacent to the Dandara PV Power Plant Project area and within an existing renewable energy / utility development context.

The nearest residential settlement is Baraka Village, located approximately 2.8 km northwest of the Project Site. Other surrounding features include the Obelisk PV Project, located approximately 2 km southwest; the Dandara PV Project, bordering the Project Site to the north and east; the Nile Valley, approximately 11 km north; and Qena City, approximately 45 km northeast.

The Project land requirement is approximately 194,288 m², comprising approximately 25,468 m² for the BESS, 29,885 m² for the shared substation, 120,800 m² for the OHTL right-of-way, and 18,135 m² for laydown areas and roads.

Table 1: Coordinates of the Project Site (Africa_Lambert_Conformal_Conic)

Points	Latitude (N)	Longitude (E)
Naga Hammadi BESS		
1	2783461.394616753	769680.2875735309
2	2783288.608535677	769680.5736761187
3	2783288.3183054626	769540.9864060887
4	2783117.4745749235	769541.140526375
5	2783117.380414486	769572.0346908272
6	2782925.301310003	769572.354213905
7	2782925.0819173753	769440.8904367206
8	2783090.392588258	769419.0912364512
9	2783064.17148301	769147.1504593793
10	2783460.50069052	769089.6132877459
Shared Substation		
1	2783342.5772506595	769395.074916218
2	2783342.8208433986	769540.7650960417
3	2783288.3183054626	769540.9864060887
4	2783117.4745749235	769541.140526375
5	2783117.231103331	769395.452907633
OHTL (opening existing Obelisk OHTL)		
1	2783322.8126595914	768497.4499838825
2	2783351.7612946033	768630.8980950158
3	2783340.526999265	768830.6919441563
4	2783293.9203641415	769038.9087141189
5	2783279.735473752	769268.2176393371
6	2783288.707302332	769394.4987259954
OHTL (opening existing Naga Hammadi Industrial OHTL)		
1	2783198.9771317244	768593.0058898054
2	2783206.5204039514	768806.5511225817
3	2783195.613176942	769045.9467630284
4	2783195.8623732626	769280.7430346524
5	2783200.6241021454	769396.1315332904

Figure 1 below illustrates the surrounding land uses and activities in the vicinity of the proposed Project Site.

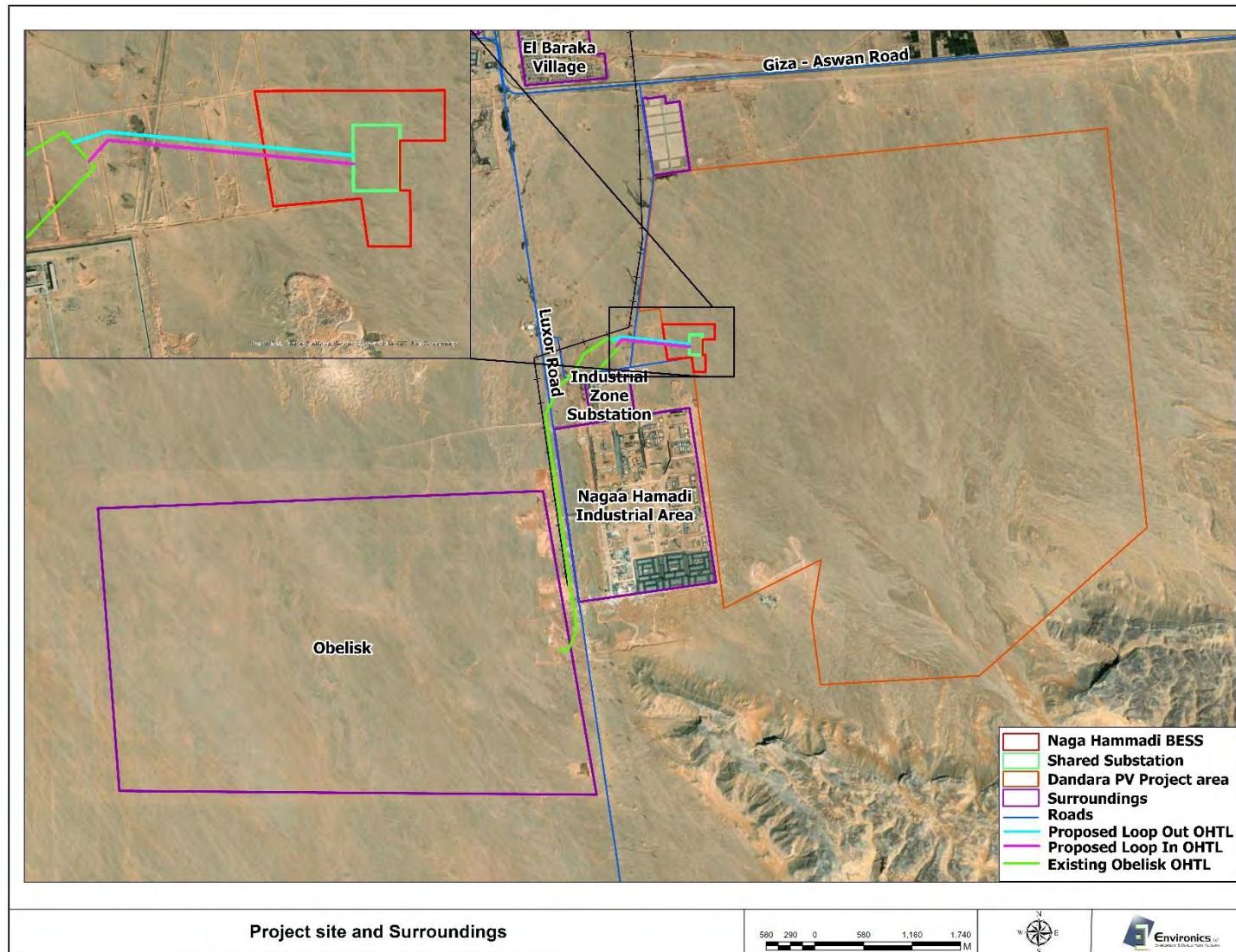


Figure 1: Activities/land uses surrounding the proposed site

Project components and main activities

The proposed Nagaa Hammadi BESS Project comprises three main components:

Battery Energy Storage System (BESS):

The BESS will have an installed storage capacity of approximately 1,000 MWh and a dispatchable AC capacity of approximately 210 MW for 4 hours. It will comprise lithium-ion battery modules, expected to be based on LFP chemistry, housed in prefabricated weatherproof containers. The system will include Battery Management Systems (BMS), Power Conversion Systems (PCS), cooling and ventilation systems, SCADA, fire detection and suppression, access control and auxiliary systems.

Shared 33/220 kV Step-Up Substation:

The Project will utilize a shared 33/220 kV step-up substation serving both the Dandara PV Project and Energy Valley BESS Project. The substation will include three power transformers with a total installed capacity of approximately 850 MVA, including one 250 MVA transformer serving Energy Valley. The substation will include transformers, switchgear, circuit breakers, protection and control systems, telecommunications, metering, auxiliary AC/DC systems and a control building.

220 kV Overhead Transmission Lines:

The Project will connect to the existing national transmission network through approximately 1 km of 220 kV double-circuit OHTLs using a LILO arrangement on the existing Nagaa Hammadi Industrial Zone Substation – Obelisk Substation 220 kV line. The OHTL will include lattice towers, conductors, insulators, spacers, dampers, grounding systems and a right-of-way of 25 m on each side of the transmission line.

Construction and Operational Facilities

Construction activities will include site preparation, grading, excavation, foundations, BESS container installation, substation installation, OHTL tower foundations and erection, electrical installation, testing and commissioning. Temporary construction facilities will include site offices, laydown areas, storage areas, sanitary facilities and worker welfare facilities.

During operation, the facility will be monitored through BMS and SCADA systems, with limited personnel required for operation and maintenance. The BESS cooling system will use a closed-loop liquid cooling circuit with air-based heat rejection through dry coolers. The coolant will be managed under the Project hazardous materials management procedures, including Safety Data Sheet availability, spill response and licensed disposal of any spent or contaminated coolant.

4. Baseline conditions

Physical Environment**Climate and Meteorology:**

The Project area is characterized by a hot, arid climate typical of Qena Governorate, with very hot summers, mild winters, low rainfall and high solar radiation. The annual average temperature recorded at Qena meteorological station is approximately 23.9°C, with average

highs reaching approximately 37.9°C in July. Average annual rainfall is very low, approximately 1.6 mm/year.

Air Quality:

The Project Site is located within a desert / utility development setting with limited local emission sources. Ambient air quality is expected to be generally good with respect to anthropogenic pollutants. However, windblown dust and particulate matter may be naturally elevated due to the arid desert environment, exposed surfaces and unpaved access roads.

Ambient Noise:

The baseline noise environment is influenced mainly by occasional traffic on the Giza–Luxor Road, local vehicle movements, the nearby Nagaa Hammadi Industrial Zone, existing electrical infrastructure, and activities associated with Dandara and Obelisk project areas. The nearest residential receptor, Baraka Village, is located approximately 2.8 km northwest, and no significant community noise sensitivity is expected within the immediate Project footprint.

Geology, Geomorphology and Topography:

The Project Site is located within Quaternary wadi and playa deposits between Nile alluvial deposits and Eocene limestone formations. The site is characterized by desert terrain, sandy loam and shallow stony soils developed mainly from limestone. Elevations generally increase toward the south and range broadly between approximately 130–170 m above mean sea level, with higher elevations in the wider surrounding area.

Hydrology and Hydrogeology:

There are no surface water bodies within the Project footprint. The nearest water bodies are located to the north within the Nile Valley, including irrigation canals and the River Nile. Groundwater occurs mainly within the Quaternary aquifer of the wider Nile Valley area. The Project does not propose groundwater abstraction or wastewater discharge to ground.

Biological Environment:

The Project Site is located in a desert / utility development setting with limited habitat value. The footprint consists mainly of bare desert land and areas associated with existing and planned renewable energy and electrical infrastructure.

No protected areas, Key Biodiversity Areas, Important Bird Areas or Plant Important Areas are located within the Project footprint. The Upper Nile Important Bird Area is located approximately 33 km east of the Project Site, while Dababia Protected Area is located approximately 45.6 km southeast and is separated from the Project area by the Nile Valley.

The Project Site does not contain wetlands, water bodies, dense vegetation, roosting sites, stopover habitats or other features likely to attract significant wildlife or migratory bird activity. The Migratory Soaring Bird Tool assessment indicates that the Project Site is not an important location for migratory birds, with a very low sensitivity index. Bird collision and electrocution risks associated with the short OHTL are assessed as low /insignificant and will be managed through the measures identified in the ESIA, including bird-safe design for electrocution risk and operational monitoring for bird mortality.

Socio-Economic Environment:

The Project is located within the desert hinterland of Markaz Nagaa Hammadi, Qena Governorate. There are no residential settlements or local communities within the Project footprint. The nearest settlement is Baraka Village, approximately 2.8 km northwest.

Qena Governorate has a total population of approximately 3.16 million, while Markaz Nagaa Hammadi has a population of approximately 578,237, with a balanced gender distribution. The labour force in Qena Governorate is approximately 927,102, while Markaz Nagaa Hammadi has a labour force of approximately 182,451. Labour force participation is higher among males than females.

The Project Site is located in desert / utility land and is not used for residential, agricultural, commercial, recreational or other productive purposes. No physical displacement, economic displacement, loss of livelihood or loss of access to productive land is anticipated. Therefore, impacts related to land acquisition and involuntary resettlement are scoped out from further assessment.

Cultural Heritage:

No registered antiquities or cultural heritage sites are located within the Project footprint. However, given that construction will involve ground disturbance, excavation and foundation works, a Chance Find Procedure will be implemented. In the event of any suspected cultural heritage find, works will be stopped in the relevant area, the location will be secured, and the Ministry of Tourism and Antiquities will be notified.

5. Analyses of Project Alternatives

The analysis of alternatives evaluates feasible Project options in line with Egyptian legislation and applicable international standards.

A. No Project Alternative:

Under the No Project Alternative, the BESS, shared substation and OHTL would not be developed. This would avoid localized construction and operational impacts, but the benefits of grid flexibility, improved renewable energy integration, reduced reliance on fossil-fuel peak generation, and local employment / procurement opportunities would not be realized. The No Project Alternative is therefore not considered suitable.

B. Alternative Site Location:

The selected site is located within / adjacent to the Dandara PV Project area, allowing shared use of the 33/220 kV substation and connection to existing transmission infrastructure. Alternative sites farther from Dandara would require longer grid connections, additional land disturbance and duplication of electrical infrastructure. The selected location is therefore considered the preferred option.

C. Project Design Alternatives

Project design alternatives were evaluated during the conceptual and pre-feasibility stages to identify the configuration that best meets the project's technical, operational, environmental, and safety objectives. The assessment considered the arrangement of the Battery Energy Storage System (BESS), power conversion systems, transformers, internal infrastructure, fire protection systems, and the interface with the shared 33/220 kV substation.

A modular containerized BESS using lithium iron phosphate (LFP) battery technology was selected as the preferred design because it provides high operational reliability, improved safety, simplified construction and maintenance, and flexibility for future expansion. Alternative layouts and non-standardized configurations were not selected as they would increase construction complexity, reduce operational flexibility, or present higher operational risks.

D. System-Level Alternatives

System-level alternatives were assessed to determine the most suitable approach for achieving the project objectives. The options considered included grid reinforcement without storage, renewable energy curtailment, conventional dispatchable generation, demand-side management, and battery energy storage.

A utility-scale BESS was selected as the preferred option because it provides rapid response, supports renewable energy integration, enhances grid stability, and improves operational flexibility while avoiding the greenhouse gas emissions and fuel consumption associated with conventional generation. Compared with the other alternatives, the selected solution offers the most effective balance between technical performance, environmental sustainability, and operational reliability.

E. Grid Connection / OHTL Alternatives:

The selected grid connection is a short LILLO arrangement connecting the shared substation to the existing 220 kV line between Nagaa Hammadi Industrial Zone Substation and Obelisk Substation. Alternative options, including longer OHTL routes, direct connection to more distant substations or underground cabling, would increase route length, cost, construction disturbance and maintenance complexity. The selected OHTL option is therefore preferred.

F. BESS Technology Alternatives:

Several BESS technologies were considered, including lithium-ion batteries, vanadium redox flow batteries, molten metal batteries and sodium-ion / high-temperature sodium batteries. Containerized lithium-ion BESS using LFP chemistry was selected due to its technical maturity, high thermal stability, lower thermal runaway risk, long operational life, smaller footprint and suitability for utility-scale applications.

G. Cooling System Alternatives:

Cooling alternatives included forced air cooling, open-loop liquid cooling, closed-loop liquid cooling with water-based heat rejection, and closed-loop liquid cooling with air-based heat rejection. Closed-loop liquid cooling with air-based heat rejection / dry coolers was selected because it provides reliable thermal management for utility-scale BESS under hot climatic

conditions while avoiding process water consumption and wastewater discharge during normal operation.

6. Assessment of Environmental and Social Risks and Impacts

This chapter evaluates the potential environmental and social risks and impacts of the project. It includes a detailed analysis of the project's risks and impacts and emphasizing the mitigation hierarchy: avoiding, minimizing, mitigating for impacts.

Positive Impacts

The Project is expected to generate several positive impacts, including:

- Supporting integration of renewable energy into the national grid;
- Improving grid flexibility, reliability and operational stability;
- Enabling storage and dispatch of renewable electricity when required by the grid;
- Reducing indirect greenhouse gas emissions by supporting reduced reliance on fossil-fuel peak generation;
- Avoiding duplication of electrical infrastructure through use of a shared substation;
- Creating temporary employment opportunities during construction;
- Supporting local procurement where feasible; and
- Building local technical skills in BESS, substation and grid integration technologies.

Summary of the potential negative impacts on the environment and society during the construction, operation and decommissioning phases of the project illustrated in table below.

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
Construction phase			
Air quality			
Exhaust emissions from construction vehicles and mobile equipment operating on-site	Insignificant	- Minimize idling times of construction vehicles and machinery. - Maintain vehicles and construction equipment in good working condition. - Cover trucks transporting fine or loose materials. - Implement good housekeeping practices across the construction site.	No Residual Impact
Ambient noise			
- Equipment and machinery - Vehicle Movement - Power Generators	Insignificant	- Ensure regular maintenance of construction equipment and machinery to minimize noise emissions. - Use low-noise machinery and equipment where possible. - Schedule high-noise activities to avoid simultaneous operations that could amplify noise levels. - Provide hearing protection equipment to workers exposed to high noise levels.	No Residual Impact
Soil			
- Earthworks - Excavation activities - Management of domestic wastewater - Construction waste handling	Minor	- Conduct maintenance off-site to minimize spills and effluents. - Adopt spill prevention measures and make on-site spill kits available. - Proper collection of spills and disposal via licensed contractors. - Develop and implement Spill Management Plan (within ESMP). - Apply good housekeeping practices on-site. - Provide sealed tanks for collection of domestic wastewater. Dispose domestic wastewater off -site via licensed contractors. - Collect solid waste at designated locations and ensure segregation processes are applied. - Ensure proper handling of hazardous materials and wastes and provide secondary containment for hazardous material/waste storage areas	Insignificant

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
		- Utilize only licensed contractors for waste and hazardous waste disposal. - Establish marked and physically separated storage areas for hazardous waste.	
Biological Environment			
Disturbance to wildlife	Insignificant	- Develop, implement and update a solid waste, hazardous waste and wastewater management plan to avoid attraction of vermin and the potential consumption of waste from opportunistic species; - Provide awareness to the workers to prevent disturbance of wildlife that may occur in the wider surroundings. Also provide training on the identification and avoidance of sensitive biodiversity features; - Ensure proper housekeeping practices are followed; - Ensure the proper maintenance of construction equipment and any other equipment with high noise and vibration potential.	No residual Impacts.
Habitat loss	Minor	- Restrict construction activities strictly to the defined OHTL tower footprints and approved working areas. - Utilize existing tracks and previously disturbed corridors wherever possible. - Prohibit uncontrolled off-road driving and restrict vehicle movement to designated access routes, avoiding any vegetation patches identified during pre-construction inspections. - Clearly demarcate construction boundaries prior to work to prevent unnecessary ground disturbance.	Insignificant
Attraction of pests and propagation of invasive species	Insignificant	Develop, implement and update a solid waste, hazardous waste and wastewater management plan to include waste collection, storage, transport and disposal in an environmentally sustainable	No residual Impacts.

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
		manner to avoid attraction of vermin and the potential consumption of waste from opportunistic species; • Ensure proper housekeeping practices are followed; • Provide awareness to the workers on the negative impacts of improper solid waste and wastewater management.	
Socio Economic Environment			
Worker Influx*	Insignificant	• Prioritize hiring local workers where possible. • Prohibit informal or speculative hiring (“hiring at the gate”). • Implement a Labour Management Plan and Workers’ Code of Conduct. • Raise awareness among workers regarding local customs, social norms, and appropriate behavior. • Establish a worker grievance mechanism. • Establish a community’ grievance mechanism . accessible to affected stakeholders and capable of handling grievances related to gender based (BGV) violence and sexual exploitation, abuse, and harassment (SEAH) • Ensure the development and implementation of a stakeholder engagement plan that includes • Provide training on GBV and SEAH • Ensure contractor management plans include provisions for worker accommodation and influx, grievance mechanisms, etc and monitor these requirements	No Residual Impact
Site security	Minor	• Ensure security personnel are adequately trained on on Code of Conduct, human rights principles, use-of-force requirements, conflict de-escalation techniques, cultural awareness and are informed of grievance mechanism. • Ensure compliance with applicable national laws and human rights principles.	Insignificant

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
		- Implement and maintain a grievance mechanism accessible to workers and community members. - Establish and implement documented procedures for reporting, recording, investigating, and responding to all security-related incidents or complaints, including allegations of misconduct, use of force, or community complaints. - Clearly define roles, responsibilities, reporting lines, and accountability mechanisms for security personnel and contractors. - Ensure that the project grievance mechanism is accessible to workers, contractors, local communities, and other stakeholders, including vulnerable groups. - Publicize grievance channels through multiple communication methods and in locally appropriate languages. - Include specific procedures for receiving, documenting, investigating, and resolving security-related grievances confidentially and without retaliation.	
Change in land use	Insignificant	Restrict construction activities to the approved Project footprint and OHTL right-of-way.	No residual Impact
Construction Traffic*	Minor	- Develop and implement a Traffic Management Plan. - Coordinate material deliveries to avoid peak traffic hours where feasible. - Ensure safe vehicle operation and speed limits within and near the site.	Insignificant
Occupational health and safety			
OHS risks	Moderate	- Ensure that contractual obligations are in place for contractors to include the development and implementation of the construction environmental and social management plan (CESMP) for approval prior to commencement of construction activities - Implement OHS Management Plan, as part of the CESMP.	Minor

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
		• Provide appropriate PPE. • Conduct safety training and toolbox talks. • Enforce speed limits and equipment inspections. • Ensure that only approved working at height (particularly for OHTL) and lifting plans for BESS installation are adopted. Ensure robust HSSE measures as applied throughout those activities. • Establish crane/lifting exclusion zones. • Maintain safe access and control slip/trip risks. • Provide shaded rest areas and implement heat stress measures. • Restrict access to work zones; mark excavations. • Apply lock-out/tag-out procedures and restrict electrical works to qualified electricians	
Workplace Noise	Minor	• Comply with Law 4/1994 on noise exposure limits. • Conduct regular maintenance of equipment to reduce noise. • Schedule high-noise activities to avoid overlap. • Provide and enforce use of hearing PPE (earplugs).	Insignificant
Cultural Heritage	Minor	• Develop and implement Chance Find Procedures, indicating the actions to be taken in case of any significant findings during site leveling and construction activities. • Notify the Ministry of Tourism and Antiquities (MOTA) if an archaeological artifact is discovered during excavation.	Insignificant
Operation phase			
Ambient Air			
• Transport of people and supplies for maintenance	Minor	• Maintain vehicles used for periodic inspection and maintenance activities in good operating condition. • Minimize unnecessary vehicle idling during inspection and maintenance activities.	Insignificant

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
Impact on climate change			
Potential emission of SF6,	Insignificant	If SF6 is used as an insulator instead of air insulation, the mitigation measures will include leak detection and repair, use proper chamber vacuums during filling the SF6 into the GIS, and employee education/training.	
Ambient noise			
- Noise (buzzing or humming) from high-voltage power lines producing corona - Operation of the transformer and other components of the substation	Insignificant	No mitigation measures are required; however, the following management measures are proposed - Regular maintenance of transformers and cooling fans to prevent in compliant noise levels. - Prompt repair or replacement of faulty components causing excessive hum or vibration.	Insignificant
Workplace noise			
- Operations - routine inspection and periodic maintenance	Minor	- Routine maintenance of cooling systems, transformers, and electrical equipment to ensure proper functioning and reduce noise emissions. - Use equipment with sound-insulated housings, specifically designed for continuous industrial operation, as relevant, to lower operational noise levels. - Implement occupational health and safety procedures, including provision of hearing protection during maintenance activities.	Insignificant
Electromagnetic fields			
Operation of the shared substation and overhead transmission line	Insignificant	- Design, construct and operate the OHTL and shared substation in accordance with applicable Egyptian regulations and recognized international good practice, including relevant exposure guidelines for EMF. - Restrict access to energized electrical equipment and high-voltage areas to authorized personnel only.	Insignificant

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
		• Install warning signs and maintain appropriate physical barriers around electrical installations. • Implement lock-out/tag-out procedures and safe systems of work for maintenance activities involving energized equipment. • Provide training to workers regarding electrical hazards, EMF awareness and safe working distances. • Maintain electrical equipment in accordance with manufacturer specifications and preventive maintenance schedules.	
Soil			
• Potential spills	Minor	• Implement proper storage and handling procedures for oils, and lubricants. • Conduct maintenance activities in designated areas. • Provide spill response materials and train staff on spill management.	Insignificant
Non Hazard Solid waste			
• Solid waste	Insignificant	• Prepare waste management plans for routine maintenance activities. • Develop and implement a Project Decommissioning Plan	No residual impacts
Groundwater			
• Potential contamination sources	Minor	• Store fuels, oils, lubricants and other hazardous materials in designated areas with appropriate secondary containment capable of containing at least 110% of the largest container volume. • Ensure transformers are installed within bunded areas designed to contain potential oil leaks and spills. • Develop and implement a Spill Prevention and Response Plan as part of the ESMP. • Maintain spill response equipment and spill kits at locations where hazardous materials are stored or handled.	Insignificant

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
		• Train workers in spill prevention, emergency response and reporting procedures. • Inspect hazardous material storage areas regularly to identify leaks or deterioration. • Collect and dispose of contaminated soil, absorbent materials and other spill residues through licensed waste contractors. • Prohibit uncontrolled discharge of wastewater, oils or chemicals to the ground surface. • Ensure prompt clean-up and remediation of any spill incidents.	
Biological Environment			
• Attraction of pests and propagation of invasive species	Insignificant	• Develop, implement and update a solid waste, hazardous waste and wastewater management plan to include waste collection, storage, transport and disposal in an environmentally sustainable manner to avoid attraction of vermin and the potential consumption of waste from opportunistic species; • Ensure proper housekeeping practices are adopted; • Provide awareness to the workers on the negative impacts of improper solid waste disposal.	Insignificant
• Birds Electrocuting Risks	Insignificant	• Increase the number of insulators where conductors connect to each tower (to increase the gap between the conductor and the tower), using insulators that prevent birds from landing on them. • Cover the crossarms with insulating materials such as PVC strips to ensure that birds are not earthed when perched.	Insignificant
• Birds Collision Risk	Insignificant	• For bird collision risk, no mitigation measures are recommended. Nevertheless, the Project will undertake periodic inspections of the OHTL during routine maintenance activities and record any evidence of bird mortality. Should unexpected	Insignificant

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
		collision incidents be identified, additional mitigation measures, such as installation of bird flight diverters, will be evaluated and implemented as necessary	
Social environment			
Site security	Insignificant	- Train security personnel on proper conduct toward workers and community, in accordance with local laws, lender performance requirements and ILO guidelines. - Develop and maintain a grievance mechanism for the community to report concerns about security arrangements and personnel actions.	Insignificant
Operation-phase Traffic	Insignificant	No mitigation measures are required	Insignificant
Potential Fire and Thermal Runaway			
Potential BESS fire from BESS failure, including thermal runaway events	Minor	- Implement battery management and monitoring systems. - Maintain fire detection and suppression systems in accordance with manufacturer requirements. - Develop and implement emergency preparedness and response procedures. - Conduct periodic inspection and maintenance of battery systems and associated safety equipment.	Insignificant
Hazardous Waste			
Waste oils, electrical components, spent chemicals, and end-of-life lithium-ion batteries	Insignificant	- Collection of non-hazardous waste at designated points in appropriate containers and disposal through licensed contractors. - Establishment of segregated, clearly marked storage for hazardous waste, with collection and disposal by licensed contractors. - End-of-life batteries will be returned to suppliers or sent to authorized recycling facilities, following sustainable recycling strategies where available.	Insignificant

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
Occupational Health and Safety			
- Electrical hazards - Maintenance activities	Minor	- A health and safety policy will be applied. - Abide by all national occupational health and safety regulations; Labour Law 14/2025. - Provide suitable PPE and apply a robust permit-to-work system. - Ensure that the maintenance workers are properly trained, especially for working at height training - Establish and identify safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers.	Insignificant

7. Stakeholders' Consultation

Stakeholder engagement was undertaken in a proportionate manner, reflecting the **nature and scale of the Nagaa Hammadi BESS Project and its site-specific environmental and social impacts. Engagement for the Nagaa Hammadi BESS was undertaken within the context of the wider Energy Valley Project and ongoing stakeholder engagement associated with Scatec's developments in the area, including the Dandara and Obelisk projects.**

Stakeholder engagement activities were undertaken with community representatives, local mayors, government officials, representatives of the industrial zone, heads of local families and other relevant stakeholders in the Nagaa Hammadi area during 17–18 June 2026.

Stakeholders generally expressed a positive perception of Scatec / Energy Valley and welcomed continued investment in the area. Given the limited scale of the Nagaa Hammadi component, stakeholder interest was relatively low compared with larger renewable energy projects. Employment opportunities were the main topic of interest, with stakeholders emphasizing the importance of fair and transparent access to job opportunities for qualified candidates from surrounding communities. No major concerns, objections or project-related grievances were raised.

Stakeholder feedback has been incorporated into the ESIA and ESMP through commitments on local employment, transparent recruitment, prohibition of informal hiring at the gate, worker Code of Conduct, Labour Management Plan, worker and community grievance mechanisms, GBV/SEA/SH prevention, security conduct, and coordination with neighbouring projects and facilities.

Given the location of the BESS and shared substation within the Dandara Project area and the ongoing engagement in the wider area, future engagement will be undertaken in accordance with the Project-overall Stakeholder Engagement Plan (SEP) and will be proportionate to the nature and scale of the Project and the information needs of relevant stakeholders. Targeted engagement will be undertaken where additional stakeholder groups or issues are identified during Project implementation. Disclosure and engagement will continue during pre-construction, construction, operation and, where relevant, decommissioning, in accordance with the Project-wide Stakeholder Engagement Plan (SEP).

8. Environmental and Social Management Plan

The project will develop and implement an Environmental and Social Management Plan (ESMP) outlining specific mitigation and monitoring measures to ensure compliance with all applicable legal and institutional requirements.

It includes mitigation and monitoring measures to ensure environmental and social performance.

The ESMP encompasses the following key components:

- The Summary of Impacts and Mitigation Measures,

- Environmental and Social Management Plans include the following:
- Health, Safety and Environment (HSE) Plan
- Transportation Management Plan
- Noise Management plan
- Hazardous and Non-hazardous waste management plan
- Water and wastewater management
- Chance Find Procedure
- Preventive and corrective maintenance
- Wastewater Management Plan
- Housekeeping and Cleanliness
- Social management measures for labour, worker influx, worker conduct, GBV/SEA/SH, security and grievance management
- BESS safety and emergency response measures;
- OHTL bird collision and electrocution monitoring;
- Supply-chain due diligence requirements;
- Battery waste and end-of-life management requirements;
- Decommissioning management requirements; and
- Environmental and social monitoring plans.

Institutional Arrangements:

- Defined roles and responsibilities for implementing the ESMP, involving the project proponent, contractors, and relevant government agencies to ensure accountability and effective coordination among stakeholders.
- Energy Valley will retain overall responsibility for ESIA and ESMP implementation oversight, lender reporting, stakeholder engagement and contractor E&S performance monitoring. The EPC Contractor will be responsible for implementing construction-phase mitigation measures through a Construction Environmental and Social Management Plan (CESMP), while the O&M Contractor / Project Operator will be responsible for operational controls.
- An indicative ESMP implementation budget has been developed for environmental and social mitigation, monitoring, training, GRM implementation and independent E&S audits. The budget is preliminary and will be refined later based on detailed implementation planning.

Capacity Building:

- Provisions for training and capacity building for project staff and contractors on best practices in environmental and social management, enhancing their ability to effectively implement the ESMP.

The following tables provides an overview of the project environmental and social management plans

Table 2: Overview of the project management plan during construction

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required Completion Date
Air Quality	Dust emissions	- Reduce idling times for vehicles and machinery; - Maintaining machinery and vehicles in good working order - Speed restriction on sites; - Ensuring workers are aware of safe driving and maintaining good practices in machinery usage; and - Periodic measurements for stacks of generators	Construction contractor	- Monitoring plan - Air quality measurements	3,000 – 4,000 / year	Throughout the construction phase period
	working conditions of machinery	- Ensure good working conditions through frequent inspection of all construction equipment - Implementation of OHS plans	Construction contractor	Maintenance logs OHS plan	10,000 – 14,000 (included in EPC O&M allowance)	
Noise Level	working conditions of machinery	- Regular maintenance of construction equipment - Use low-noise equipment, where possible; - Schedule high-noise activities to avoid simultaneous operations that could amplify noise levels; - Schedule high-noise activities to take place in morning hours - Implementation of OHS plans	Construction contractor	OHS plan Noise measurements and Maintenance logs	2,000 – 3,000 / year	Throughout the construction phase period
	Provision of PPEs	- Providing necessary PPE for workers	Construction contractor		4,000 – 8,000 (PPE supply - total project period)	
Soil	housekeeping practices	- Develop and implement site management plan, solid waste management and wastewater management plans and spill prevention plan	Construction contractor Developer (include provisions in the construction contracts. Developers to ensure	- Waste and wastewater management plans - Solid/hazardous waste and	1,000 – 16,000 (depends on waste volume)	Throughout the construction phase period
	Waste/wastewater management					

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required Completion Date
		- Proper collection, containment, and disposal of sanitary wastewater - Proper collection, containment, and disposal of sanitary wastewater - hazardous materials storage and handling according to the WBG General EHS Guidelines, - Transportation and disposal to be carried out through authorized waste contractors - Develop and implement a Project Decommissioning Plan	contractors' compliance)	wastewater management contract - Contractor follow-up documents - Contracts with authorized waste contractors		
Occupational Health and Safety	Site Staff and Workplace Safety	- Developing OHS plan and HSE procedures according to national requirements and international standards	Contractor	OHS plan and procedures HSE provisions in the construction contracts	12,000 – 14,000	Before construction activities
Emergency Response plans	Site Staff and Workplace Safety	- Develop procedures for emergency control	Contractor	Emergency response plan	6,000 – 14,000	Before project commissioning
Waste management	Worker's health	- Developing a solid and hazardous waste management plans in line with the WBG General EHS Guidelines." - Developing OHS plans - Different types of waste to be stored in designated waste areas, and transported by licensed contractors	Construction contractor	Solid waste management contract with authorized contractors Waste manifest OHS plan	20,000–48,000 USD (hazardous and non-hazardous waste management and disposal)	Throughout the construction phase period
Biological Environment	Pests and invasive species	- Good housekeeping and proper waste management	Construction contractor	Waste management contract	2,000 – 5,000 (one-time)	Throughout the construction phase

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required Completion Date
	Disturbance to wildlife	- Awareness (toolbox talks and awareness signs) - Implementation of mitigation measures - Supervision and implementation of deterring measures	Construction contractor	Requirements specified in contracts		Throughout the construction phase
Social Environment	Workers influx	- Prioritize hiring local workers - Implement and maintain a community grievance mechanism; and, - Where accommodation is required for non-local workers, suitable existing accommodation will be used in accordance with applicable national and lender requirements. - Develop HR policies including GBV and SEAH plans	Developer/Construction contractors	Labour management plan, workers accommodation inspection checklist GBV and SEAH policies Workers Awareness	10,000 – 30,000 / year	Throughout the construction phase period
	Community health, safety and security- risks from road traffic accidents	- Develop Traffic Management Plan (TMP) and associated procedures	Construction contractors	TMP and procedures	8,000 – 20,000	
	Cultural heritage	- develop chance find procedure	Developer/Construction contractors	Developed procedures	1,000 – 5,000	Before construction activities
Total Estimated Cost (USD)					≈ 130,000 USD	

Table3: Overview of ESMP Plans During Operation

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required completion Date
Ambient Noise	Noise from transformers and cooling equipment and, to a lesser extent, corona discharge from the OHTL	- Maintain equipment in good operating condition. - Maintain the grievance mechanism for receiving and addressing noise complaints, where applicable.	Project Company	Noise measurements / maintenance records / grievance records	5,000–10,000 / year	Periodically throughout the operation stage
Workplace Noise	Operations, routine inspection and periodic maintenance	- Provide suitable PPE where required. - Maintain equipment in good operating condition.	Project Company	Noise measurements / OHS inspections	Included in OHS costs	Throughout the project lifetime
Hazardous Waste Management	Hazardous waste generated from maintenance activities	- Store hazardous waste in designated areas. - Dispose of hazardous waste through licensed contractors.	Project Company	Hazardous waste register, waste manifests	5,000–10,000 / year	Periodically throughout the operation stage
Spill Prevention	Accidental releases of oils and hazardous materials, with potential soil contamination	- Implement Spill Prevention Management Plan. - Maintain spill response equipment and procedures. - Record and investigate spills and implement corrective actions.	Project Company	Number of spills and corrective actions implemented	2,000–5,000 / year	Periodically throughout the operation stage
EMF Exposure	Operation of the shared substation and OHTL	- Establish and identify safety zones to differentiate areas with elevated EMF levels from areas acceptable for public exposure. - Restrict access to areas with elevated EMF to properly trained and authorized workers.	Project Company	EMF assessment/measurements; defined safety zones; access controls	Included in OHS costs	Throughout the project lifetime
Biodiversity	Attraction of pests and propagation of invasive species	- Maintain good housekeeping and proper waste management.	Project Company	Inspection records; absence/control of pests and invasive species	Included in waste management / O&M costs	Throughout the project lifetime

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required completion Date
Birds	Potential bird electrocution and collision with OHTL	- Conduct periodic inspections of the OHTL during routine maintenance. - Record any evidence of bird mortality. - If unexpected collision incidents are identified, evaluate and implement additional measures such as bird flight diverters, as necessary.	Project Company / O&M Contractor	OHTL inspection records; bird mortality records	Included in O&M allowance	Periodically throughout the operation stage
Traffic	Traffic associated with inspection and maintenance activities	- Maintain safe access and traffic arrangements for operational and maintenance activities.	Project Company / O&M Contractor	Traffic inspection records / incident records	Included in O&M allowance	Throughout the project lifetime
Site Security	Unauthorized access and inappropriate security conduct	- Maintain controlled access to the Project site. - Ensure security personnel are trained on appropriate conduct, community relations and applicable requirements. - Maintain a grievance mechanism for concerns related to security arrangements.	Project Company / Licensed Security Provider	Security procedures; training records; grievance records	Included in OPEX	Throughout the project lifetime
Labour Rights and Welfare	Working conditions	- Develop and implement Human Resources policies in accordance with applicable requirements.	Project Company	Employment contracts / HR policies	Included in OPEX (negligible direct ESMP cost)	Throughout the project lifetime
Training and Awareness	Competence of Project personnel	- Provide training to personnel according to their responsibilities, including BESS-specific safety and emergency response.	Project Company	Training plans and records	5,000–10,000 / year	Throughout the project lifetime
Occupational Health and Safety	Site staff and workplace safety	- Develop and implement HSE procedures. - Implement OHS Management Plan. - Conduct periodic training and refresher programmes. - Maintain incident reporting procedures.	Project Company	HSE policies; OHS inspections and audits; incident records	8,000–15,000 / year	Throughout the project lifetime
Emergency Preparedness and Response;	Operational risk management	- Implement battery safety procedures. - Maintain battery management, fire detection and suppression systems. -	Project Company	Emergency Response Plan; inspection and maintenance records; drill records	3,000–10,000 / year	Throughout the project lifetime

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required completion Date
Fire and Thermal Runaway		Maintain emergency preparedness and response procedures. - Conduct emergency drills and response training.				
Community Health and Safety	Potential community exposure to operational hazards and emergency events	- Maintain access control and safety exclusion zones. - Maintain emergency preparedness and response arrangements and coordination with relevant emergency services. - Maintain the community grievance mechanism and communicate relevant emergency/safety arrangements to affected stakeholders, where appropriate.	Project Company	Emergency response arrangements; access controls; community grievance records	Included in emergency preparedness / stakeholder engagement costs	Throughout the project lifetime
Groundwater	Potential contamination sources	- Store oils, lubricants and other hazardous materials in designated areas with appropriate secondary containment. - Ensure transformers are provided with appropriate bunding/containment. - Implement the Spill Prevention and Response Plan. - Maintain spill response equipment and spill kits. - Conduct regular inspections of storage and containment areas. - Ensure prompt clean-up and remediation of any spills.	Project Company	Inspection records; spill response equipment records; spill records and corrective action records	Included in spill prevention / hazardous materials management costs	Throughout the project lifetime
Stakeholder Engagement and Grievance Management	Stakeholder concerns, complaints and grievances	- Maintain the Project grievance mechanism. - Periodically review grievance trends and responses. - Continue stakeholder engagement in accordance with the SEP.	Project Company	Number of grievances received, resolved and pending; response times; engagement records	10,000–20,000 / year	Throughout the project lifetime
Total Estimated Cost						≈ 38,000–80,000 USD / year

Table 4: Overview of ESMP Plans During Decommissioning

Aspect	Issues of Concern	Actions	Party Implementing the Action	Indicator of Completion	Estimated Cost (USD)	Required Completion Date
Decommissioning Planning	Inadequate planning and coordination of decommissioning activities	Prepare and implement a detailed Decommissioning Plan covering the BESS, shared 33/220 kV substation, 220 kV OHTL and ancillary infrastructure, in accordance with applicable national legislation, lender requirements, GIIP and supplier-specific procedures, where applicable. The Plan will define the dismantling sequence, HSE requirements, waste management, transport, recycling/disposal arrangements, emergency preparedness and site restoration.	Energy Valley Company / Decommissioning Contractor	Approved Decommissioning Plan	10,000 – 20,000	Prior to commencement of decommissioning activities and sufficiently in advance to allow implementation arrangements to be established
BESS Deactivation and Removal	Risks associated with deactivation, dismantling and handling of battery modules and associated equipment, including residual energy and hazardous materials	Controlled discharge and isolation of battery modules; methodical disassembly and separation of battery components; safe handling and removal of BESS components; and recycling or proper disposal of battery materials through appropriate facilities. Follow the BESS equipment supplier's decommissioning procedure, where applicable and available.	Decommissioning Contractor under Energy Valley supervision	BESS safely isolated and dismantled; records of recycling/disposal	5,000 – 10,000	Throughout decommissioning

Aspect	Issues of Concern	Actions	Party Implementing the Action	Indicator of Completion	Estimated Cost (USD)	Required Completion Date
Shared Substation Decommissioning	Electrical hazards, transformer oils and dismantling of electrical infrastructure	Safely isolate and de-energize transformers, switchgear, protection systems, control buildings, busbars and associated electrical infrastructure. Drain, collect, test and appropriately manage transformer insulating oils and other operational fluids. Reuse, refurbish, recycle or dispose of equipment and materials as appropriate.	Decommissioning Contractor under Energy Valley supervision and in coordination with the relevant transmission system operator	De-energization and dismantling records; records of oil/fluid management and material recovery/disposal	15,000 – 30,000	Throughout decommissioning
OHTL Decommissioning	Electrical hazards, dismantling of towers and associated infrastructure, and disturbance of temporarily occupied areas	Safely isolate and decommission the OHTL in coordination with the relevant transmission system operator; remove conductors, insulators, towers, foundations and associated hardware, as required; segregate recoverable materials for recycling; and restore temporarily disturbed areas following dismantling.	Decommissioning Contractor under Energy Valley supervision and in coordination with the relevant transmission system operator	OHTL decommissioning records; material recovery/disposal records; restoration records	10,000 – 25,000	Throughout decommissioning
Waste Management and Traceability	Generation of hazardous and non-hazardous waste, including battery materials, oils and contaminated materials	Segregate, reuse, recycle and recover materials to the maximum extent practicable. Manage hazardous materials and wastes in accordance with applicable legal requirements and GIIP. Transport hazardous and	Decommissioning Contractor under Energy Valley supervision	Waste management records, manifests, chain-of-custody records and recycling/disposal evidence	20,000 – 48,000	Throughout decommissioning

Aspect	Issues of Concern	Actions	Party Implementing the Action	Indicator of Completion	Estimated Cost (USD)	Required Completion Date
		special wastes through licensed contractors to authorized facilities. Maintain waste tracking and chain-of-custody records covering waste type, quantity, source, transporter, destination and final disposal/recycling evidence.				
Occupational Health and Safety and Emergency Preparedness	Worker injuries and emergencies during dismantling, lifting, electrical isolation and battery handling	Implement task-specific risk assessments, method statements, lock-out/tag-out procedures, lifting plans, electrical safety controls, fire prevention measures and emergency response arrangements. Provide worker training and appropriate PPE. Apply specific controls for lithium-ion batteries, including residual energy, thermal runaway, fire, smoke release and handling of damaged or degraded battery modules.	Decommissioning Contractor under Energy Valley supervision	OHS procedures and risk assessments; training records; inspection records; emergency preparedness arrangements	12,000 – 20,000	Throughout decommissioning
Ambient Air Quality and Noise	Dust and noise generated by dismantling, demolition and equipment removal	Apply appropriate dust suppression measures, maintain decommissioning equipment in good working condition, and implement controls for noisy activities in accordance with applicable requirements.	Decommissioning Contractor	Monitoring/inspection records and compliance with applicable requirements	5,000 – 8,000	Throughout decommissioning

Aspect	Issues of Concern	Actions	Party Implementing the Action	Indicator of Completion	Estimated Cost (USD)	Required Completion Date
Site Restoration	Residual contamination and disturbed areas following removal of project infrastructure	Clear waste and remaining materials, inspect the site for contamination, remediate where required, and restore disturbed areas to a safe and stable condition. Grade and stabilize compacted areas where required to prevent erosion and support safe future land use.	Decommissioning Contractor under Energy Valley supervision	Site restoration completed; inspection and close-out records	20,000 – 50,000 (excluding major demolition or remediation works if required)	Following completion of dismantling and prior to project closure
Environmental and Social Monitoring and Reporting	Non-compliance with decommissioning E&S requirements and incomplete close-out of commitments	Conduct inspections, monitoring and reporting to verify implementation of the Decommissioning Plan and applicable E&S requirements, and prepare a decommissioning close-out record/report.	Energy Valley Company / Supervising Engineer	Monitoring records and decommissioning close-out report	8,000 – 20,000	Throughout decommissioning and prior to project closure
Total Estimated Decommissioning Cost						≈USD 105,000–231,000

9. Conclusion

The Energy Valley Naga Hammadi BESS Project will support Egypt's energy transition, grid stability, and integration of renewable energy through the development of a 1,000 MWh BESS, a shared 33/220 kV step-up substation, and a short 220 kV OHTL connection. The No-Project Alternative is therefore not considered viable, as it would forgo these strategic energy and socio-economic benefits. The ESIA has assessed the potential environmental and social impacts during construction, operation and decommissioning and concludes that, given the Project's limited footprint, desert / utility setting, absence of displacement impacts, and implementation of the proposed ESMP and monitoring measures, residual impacts are expected to remain within acceptable limits. The total estimated budget for implementation of the environmental and social measures, as developed in the ESMP, is approximately USD 130,000. The Project is therefore considered environmentally and socially feasible, provided that all ESIA and ESMP commitments are implemented and monitored throughout the Project lifecycle.