

Energy Valley

ESIA for the Energy Valley Project Abu Qir Battery Energy Storage System

Prepared by:



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List of Acronyms

The following abbreviations are used throughout this ESIA document, listed in alphabetical order.

Acronym	Full Name / Description
AfDB	African Development Bank Group
BESS	Battery Energy Storage System
BMS	Battery Management System
CAA	Competent Administrative Authority
CAPMAS	Central Agency for Public Mobilization and Statistics
CESMP	Construction Environmental and Social Management Plan
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
EBRD	European Bank for Reconstruction and Development
EEAA	Egyptian Environmental Affairs Agency
EETC	Egyptian Electricity Transmission Company
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EPC	Engineering, Procurement and Construction (Contractor)
ESHIA	Environmental, Social, Health and Social Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESR	Environmental and Social Requirement (EBRD)
EU	European Union
GBV	Gender-Based Violence
GER	Gross Enrolment Ratio
GIIP	Good International Industry Practice
GRM	Grievance Redress Mechanism
HSE	Health, Safety and Environment
HSMS	Health and Safety Management System
HSSE	Health, Safety, Security and Environment
IFC	International Finance Corporation
ILO	International Labour Organization
ISS	Integrated Safeguards System (AfDB)
LFP	Lithium Iron Phosphate (battery chemistry)
LTO	Lithium-Ion Titanate (battery chemistry)
MOTA	Ministry of Tourism and Antiquities
NCCS	National Climate Change Strategy (Egypt)
NMC	Lithium Nickel Manganese Cobalt (battery chemistry)
NREA	New and Renewable Energy Authority (Egypt)
OHS	Occupational Health and Safety

Acronym	Full Name / Description
OHTL	Overhead Transmission Line
PCS	Power Conversion System
SCADA	Supervisory Control and Data Acquisition
HVAC	Heating, Ventilation and Air Conditioning
WWTP	Wastewater Treatment Plant
SEAH	Sexual Exploitation, Abuse and Harassment
WBG	World Bank Group
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
ER	Executive Regulations
PRA	Probabilistic Risk Assessment
YEO	Youth Employment Office
AC	Alternating Current
AoI	Area of Influence
BAT	Best Available Techniques
CR	Critically Endangered
DC	Direct Current
DD	Data Deficient
E&S	Environmental and Social
EGP	Egyptian Pound
EN	Endangered
EUR	Euro
GHG	Greenhouse Gas
GPG	Gender Pay Gap
HR	Human Resources
HS	Hazardous Substances
HW	Hazardous Waste
kV	Kilovolt
kWh	Kilowatt-hour
MV	Medium Voltage
MVA	Mega-Volt Ampere
MW	Megawatt
MWh	Megawatt-hour
MWp	Megawatt-peak
NA	Not Applicable
NO₂	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPI	No Net Loss or Net Positive Impact
NT	Near Threatened
OS	Operational Safeguard
PPE	Personal Protective Equipment
RIR	Recordable injury rate
PS	Performance Standard

Acronym	Full Name / Description
SF6	Sulfur Hexafluoride
SO2	Sulfur Dioxide
TSP	Total Suspended Particulates
USD	United States Dollar
VU	Vulnerable

الملخص التنفيذي

مقدمة

تعتزم شركة فالي للطاقة المستدامة تنفيذ مشروع إنشاء نظام لتخزين الطاقة بالبطاريات بسعة تخزين اسمية تبلغ حوالي ١,٤٣٥ ميغاوات/ساعة، وبقدرة تيار متردد قابلة للإرسال تبلغ ٣٠٠ ميغاوات لمدة أربع ساعات، إلى جانب إنشاء محطة محولات رافعة مخصصة بجهد ٥٠٠/٣٣ كيلوفولت. ويقع المشروع داخل مقر محطة كهرباء أبو قير بمحافظة الإسكندرية على مساحة تبلغ حوالي ٥٠,٤١٠ م^٢.

ويهدف المشروع إلى تخزين الطاقة الكهربائية وتغذيتها إلى الشبكة القومية للكهرباء، بما يساهم في تعزيز استقرار الشبكة، وتحقيق التوازن في الأحمال، وتيسير دمج مصادر الطاقة المتجددة ضمن الشبكة الكهربائية المصرية.

يمثل المشروع جزءًا من برنامج أوسع تنفذه شركة فالي للطاقة المستدامة، ويضم عددًا من مشروعات الطاقة المتجددة وتخزين الطاقة الموزعة على عدة محافظات في جمهورية مصر العربية.

وسيتكون نظام تخزين الطاقة بالبطاريات من حوالي ٢٠١ وحدة بطاريات ليثيوم أيون معبأة داخل حاويات، تعتمد على تقنية بطاريات فوسفات حديد الليثيوم. كما يشمل المشروع أنظمة تحويل الطاقة، وأنظمة التبريد والتهوية، وأنظمة إدارة البطاريات، والمرافق المساعدة، بالإضافة إلى محطة محولات رافعة مخصصة بسعة مركبة تبلغ حوالي ٣٦٠ ميغا فولت أمبير.

وسيتربط المشروع بالشبكة القومية لنقل الكهرباء من خلال خط نقل كهرباء هوائي سيتم تنفيذه بواسطة الشركة المصرية لنقل الكهرباء. وسيتم إعداد دراسة مستقلة لتقييم الأثر البيئي والاجتماعي لخط النقل الهوائي، وذلك وفقًا للمتطلبات الوطنية ومتطلبات جهات التمويل الدولية ذات الصلة.

وقد كلفت شركة إنفايرونكس من قبل شركة فالي للطاقة المستدامة بإعداد دراسة تقييم الأثر البيئي والاجتماعي للمشروع، وفقًا لمتطلبات قانون البيئة المصري رقم ٤ لسنة ١٩٩٤ وتعديلاته، بالإضافة إلى المتطلبات البيئية والاجتماعية لمؤسسات التمويل الدولية، بما في ذلك معايير الأداء الخاصة بمؤسسة التمويل الدولية، ومتطلبات الأداء الخاصة بالبنك الأوروبي لإعادة الإعمار والتنمية، ونظام الضمانات المتكامل الخاص بالبنك الأفريقي للتنمية.

الغايات والأهداف المحددة

يهدف المشروع إلى دعم استقرار ومرونة وموثوقية الشبكة القومية للكهرباء من خلال إنشاء نظام لتخزين الطاقة بالبطاريات متصل مباشرة بالشبكة القومية للكهرباء. كما سيساهم المشروع في تعزيز دمج مصادر الطاقة المتجددة ضمن الشبكة القومية للكهرباء، من خلال تخزين الطاقة الكهربائية وتغذيتها إلى الشبكة وفقًا لاحتياجاتها التشغيلية، بما يدعم أهداف جمهورية مصر العربية في مجال التوسع في استخدام الطاقة المتجددة وخفض انبعاثات الكربون.

ويتمثل الهدف العام لدراسة تقييم الأثر البيئي والاجتماعي في إتاحة المعلومات اللازمة لصانعي القرار وجهات التمويل والجهة المطورة للمشروع حول الآثار والمخاطر البيئية والاجتماعية المحتملة ذات الأهمية المرتبطة بمشروع نظام تخزين الطاقة بالبطاريات في أبو قير والبنية التحتية المرتبطة به.

وتتمثل الأهداف المحددة للدراسة فيما يلي:

- تحديد الآثار البيئية والاجتماعية الإيجابية والسلبية المحتملة المرتبطة بمراحل الإنشاء والتشغيل وإيقاف المشروع.
- اقتراح تدابير مناسبة للتخفيف، بهدف تجنب الآثار السلبية أو الحد منها أو التخفيف من حدتها أو التعويض عنها، وتعزيز الآثار والفوائد الإيجابية المحتملة.
- إعداد خطط الإدارة والرصد البيئي والاجتماعي لتنفيذها على امتداد دورة حياة المشروع.
- ضمان التوافق مع التشريعات البيئية والاجتماعية المصرية السارية، وممارسات الصناعة الدولية الجيدة، ومتطلبات مؤسسات التمويل الدولية، بما في ذلك معايير الأداء الخاصة بمؤسسة التمويل الدولية، ومتطلبات الأداء الخاصة بالبنك الأوروبي لإعادة الإعمار والتنمية، ونظام الضمانات المتكامل الخاص بالبنك الأفريقي للتنمية.

الإطار المؤسسي والقانوني

يشمل هذا الإطار التشريعات الوطنية، إلى جانب المعايير والإرشادات الدولية ذات الصلة.

التشريعات الوطنية

يلتزم المشروع بالامتثال للتشريعات واللوائح البيئية والاجتماعية السارية في جمهورية مصر العربية، ومن أبرزها:

- تقييم الأثر البيئي: يوجب قانون البيئة رقم ٤ لسنة ١٩٩٤ وتعديلاته بالقانونين رقم ٩ لسنة ٢٠٠٩ ورقم ١٠٥ لسنة ٢٠١٥، ولأئحته التنفيذية وتعديلاتها، إعداد دراسة لتقييم الأثر البيئي للمشروعات الجديدة، وتقديمها إلى جهاز شؤون البيئة المصري للمراجعة والموافقة. ووفقاً للتشريعات الوطنية، صُنِفَ المشروع ضمن الفئة (ب) - محدد النطاق.
- جودة الهواء: يحدد قانون البيئة رقم ٤ لسنة ١٩٩٤ ولأئحته التنفيذية الحدود القصوى المسموح بها لملوثات الهواء المحيط وانبعاثات غازات العادم، ويلتزم المشروع بالامتثال لهذه الحدود خلال مرحلتي الإنشاء والتشغيل.
- الضوضاء: يحدد قانون البيئة ولأئحته التنفيذية الحدود المسموح بها لمستويات الضوضاء في البيئة المحيطة وأماكن العمل.
- إدارة النفايات: يحدد قانون تنظيم إدارة المخلفات رقم ٢٠٢ لسنة ٢٠٢٠ ولأئحته التنفيذية متطلبات إدارة المخلفات غير الخطرة والخطرة الناتجة عن مختلف أنشطة المشروع.
- حماية التنوع البيولوجي: يتضمن قانون البيئة رقم ٤ لسنة ١٩٩٤ أحكاماً لحماية التنوع البيولوجي والأنواع المحمية. ويقع موقع المشروع داخل منطقة صناعية سبق تطويرها، ومن غير المتوقع أن يؤثر على الموائل الطبيعية أو الموائل الحرجة.
- حماية التراث الثقافي: يحدد قانون حماية الآثار رقم ١١٧ لسنة ١٩٨٣ وتعديلاته المتطلبات الخاصة بحماية الموارد الأثرية والتراث الثقافي.
- قانون العمل: ينظم قانون العمل رقم ١٤ لسنة ٢٠٢٥ والتشريعات ذات الصلة علاقات العمل، وظروف العمل، والصحة والسلامة المهنية، وحقوق العاملين.

- الاستثمار المجتمعي: يشجع قانون الاستثمار رقم ٧٢ لسنة ٢٠١٧ المستثمرين على المساهمة في مبادرات التنمية المجتمعية، بما في ذلك حماية البيئة، والرعاية الصحية، والتعليم، والبحث العلمي.

الإطار المؤسسي

- تتولى عدة جهات حكومية مسؤوليات تنظيمية ورقابية تتعلق بالمشروع، وتشمل:
 - جهاز شؤون البيئة المصري: مراجعة واعتماد دراسة تقييم الأثر البيئي والاجتماعي، ومتابعة الالتزام بالمتطلبات البيئية.
 - هيئة الطاقة الجديدة والمتجددة: تخصيص الأراضي والإشراف على مشروعات الطاقة المتجددة.
 - الشركة المصرية لنقل الكهرباء: ترتيبات الربط بالشبكة القومية والبنية التحتية لنقل الكهرباء.
 - وزارة الكهرباء والطاقة المتجددة: تتولى الإشراف الاستراتيجي على قطاع الكهرباء وتطوير مشروعات الطاقة المتجددة.
 - وزارة العمل: متابعة تطبيق متطلبات العمل والصحة والسلامة المهنية.
 - محافظة الإسكندرية والجهات المحلية المختصة: التنسيق الإداري المحلي واستيفاء متطلبات التراخيص والتصاريح.
 - وزارة السياحة والآثار: مسؤولية حماية الموارد الأثرية والتراث الثقافي.

المعايير والإرشادات الدولية:

إلى جانب التشريعات الوطنية، يلتزم المشروع بالمعايير والإرشادات الدولية ذات الصلة وتشمل:

- متطلبات الأداء الخاصة بالبنك الأوروبي لإعادة الإعمار والتنمية: وتشمل المتطلبات المتعلقة بتقييم الأثر البيئي والاجتماعي، والعمالة وظروف العمل، والحفاظ على التنوع البيولوجي، وصحة وسلامة المجتمع.
- نظام الضمانات المتكامل الخاص بالبنك الأفريقي للتنمية: ويغطي موضوعات مماثلة لتلك الواردة في متطلبات الأداء الخاصة بالبنك الأوروبي لإعادة الإعمار والتنمية.
- معايير الأداء الخاصة بمؤسسة التمويل الدولية بشأن الاستدامة البيئية والاجتماعية: وتشمل متطلبات تتعلق بالعمالة وظروف العمل، وكفاءة استخدام الموارد، والوقاية من التلوث، وصحة وسلامة المجتمع، وإشراك أصحاب المصلحة.
- الإرشادات البيئية والصحية والسلامة الصادرة عن مجموعة البنك الدولي: والتي توفر إرشادات فنية تستند إلى ممارسات الصناعة الدولية الجيدة لمختلف القطاعات.
- اتفاقيات منظمة العمل الدولية: ويلتزم المشروع بالاتفاقيات ذات الصلة، بما يضمن توفير ظروف عمل عادلة وأمنة، واحترام حرية تكوين الجمعيات وحرية التنظيم، ومنع عمل الأطفال والعمل الجبري.

وصف المشروع

مكونات المشروع والأنشطة الرئيسية

يتكون المشروع المقترح من ثلاثة مكونات رئيسية، وهي:

نظام تخزين الطاقة بالبطاريات

يشمل المشروع إنشاء وتشغيل نظام لتخزين الطاقة بالبطاريات، بسعة تخزين اسمية تبلغ حوالي ١,٤٣٥ ميجاوات/ساعة، وبقدرة تيار متردد قابلة للإرسال تبلغ ٣٠٠ ميجاوات لمدة أربع ساعات. ومن المتوقع أن يعتمد النظام على تقنية بطاريات فوسفات حديد الليثيوم، وأن يضم حوالي ٢٠١ وحدة بطاريات معبأة داخل حاويات.

كما يشمل النظام أنظمة إدارة البطاريات، وأنظمة التبريد والتهوية، وأنظمة تحويل الطاقة، وأنظمة التحكم والمراقبة، بالإضافة إلى الأنظمة المساعدة وأنظمة السلامة المرتبطة بها.

محطة المحولات الرافعة

سيتم إنشاء محطة محولات رافعة مخصصة بجهد ٥٠٠/٣٣ كيلوفولت داخل موقع المشروع، لإتاحة نقل الطاقة الكهربائية بين نظام تخزين الطاقة بالبطاريات والشبكة القومية للكهرباء. ومن المتوقع أن تبلغ سعة المحطة حوالي ٣٦٠ ميجا فولت أمبير، وستضم محولات كهربائية، ومعدات المفاتيح الكهربائية، وأنظمة الحماية، والمعدات المساعدة المرتبطة بها.

الربط بالشبكة

سيتم ربط المشروع بالشبكة القومية لنقل الكهرباء من خلال خط نقل كهرباء هوائي يتم تنفيذه وتشغيله وصيانته بواسطة الشركة المصرية لنقل الكهرباء. وسيتم إعداد دراسة مستقلة لتقييم الأثر البيئي والاجتماعي لخط النقل الهوائي، وذلك وفقاً للمتطلبات الوطنية ومتطلبات جهات التمويل الدولية ذات الصلة.

موقع المشروع

يقع المشروع المقترح داخل مقر محطة كهرباء أبو قير بمحافظة الإسكندرية على مساحة تبلغ حوالي ٥٠,٤١٠ متراً مربعاً. ويحد موقع المشروع محطة كهرباء أبو قير من الغرب، ومناطق التخزين والخردة من الشمال، ومصرف زراعي وأراضي زراعية من الشرق، وطريق الطابية - رشيد وخط سكة حديد أبو قير من الجنوب.

وتُعد قرية عزبة الستين أقرب تجمع سكني إلى موقع المشروع، حيث تقع على بعد نحو ١٠٠ متر إلى الشرق منه. ويقع المشروع على أرض سبق استخدامها كمزرعة أسماك، كما أنها تعرضت لأعمال تطوير واستخدام سابق. ويمكن الوصول إلى موقع المشروع مباشرةً من خلال شبكة الطرق القائمة التي تخدم محطة كهرباء أبو قير.



الشكل (١): موقع المشروع المقترح

وصف البيئة الأساسية

البيئة الطبيعية (الفيزيائية):

- المناخ

يقع موقع المشروع ضمن المنطقة المناخية الساحلية المطلة على البحر المتوسط بمحافظة الإسكندرية. وتتميز المنطقة بدرجات حرارة معتدلة نسبياً، ورطوبة مرتفعة، وأمطار موسمية تتركز خلال أشهر الشتاء. وتسود الرياح الشمالية الغربية معظم أوقات العام، بمتوسط سرعة سنوي يبلغ حوالي ٢٥ كم/ساعة. ويصل متوسط درجة الحرارة العظمى إلى نحو ٣٠°م خلال فصل الصيف، بينما قد تنخفض درجة الحرارة الصغرى إلى حوالي ١٠°م خلال فصل الشتاء.

- جودة الهواء

يقع موقع المشروع داخل مقر محطة كهرباء أبو قير في منطقة صناعية، وتتأثر جودة الهواء بالأنشطة الصناعية المجاورة، وحركة المرور، والظروف المناخية المحلية. ولم تُظهر نتائج الدراسة وجود أي قيود تتعلق بجودة الهواء من شأنها أن تحول دون تنفيذ المشروع.

- الجيولوجيا والجيومورفولوجيا

- ✓ الجيولوجيا والتربة: يتكون الموقع من ترسبات رسوبية ساحلية نموذجية لمنطقة أبو قير، ويتميز بتربة طينية في المناطق المنخفضة.
- ✓ الطبوغرافيا: يتميز موقع المشروع بطبيعة أرض منبسطة ومنخفضة نسبياً، نتيجة لاستخدامه السابق كمزرعة أسماك. وتوجد تجمعات موضعية للمياه في أجزاء من الموقع.
- ✓ المياه السطحية: يقع البحر الأبيض المتوسط على بعد حوالي ١٨٠ متراً شمال موقع المشروع، بينما تقع بحيرة إيكو على بعد نحو ٢,٢ كيلومتر. كما يمر مصرف زراعي بمحاذاة الحد الشرقي للموقع. ولا يُتوقع أن تؤدي أنشطة المشروع إلى أي تفاعل مباشر مع المسطحات المائية السطحية المحيطة.
- ✓ المياه الجوفية: توجد المياه الجوفية ضمن البيئة الساحلية المحيطة، وقد أُخذت في الاعتبار ضمن دراسة البيئة الأساسية. كما أُدرجت أعمال خفض منسوب المياه الجوفية وتحسين التربة، عند الحاجة، ضمن تصميم المشروع.

البيئة البيولوجية:

- ✓ يقع موقع المشروع على أرض سبق استخدامها كمزرعة أسماك، ويتميز حالياً بانتشار نباتات القصب، ووجود تجمعات موضعية للمياه. وتُعد القيمة البيئية للموقع منخفضة إلى متوسطة.
- ✓ الموائل: تتكون الموائل داخل موقع المشروع بصورة رئيسية من أراضي سبق استخدامها من قبل، ومناطق يغلب عليها نبات القصب (*Phragmites australis*)، وتجمعات للمياه، وأراضي سبق تطويرها. ولا توجد أي موائل حرجة أو مناطق محمية داخل موقع المشروع.
- ✓ الغطاء النباتي: يقتصر الغطاء النباتي على أنواع نباتية شائعة وواسعة الانتشار ترتبط بالموائل المتأثرة بالأنشطة البشرية والمناطق الرطبة الموسمية.
- ✓ الحيوانات: لم تُسجل خلال المسوحات الميدانية أي أنواع ذات أهمية للحفاظ عليها داخل موقع المشروع. وتُعد القيمة البيئية للموقع محدودة نظراً لاستخداماته السابقة وقربه من الأنشطة الصناعية.

✓ الطيور: تقع المنطقة المحيطة ضمن أحد مسارات هجرة الطيور، إلا أن موقع المشروع نفسه لا يوفر موائيل مناسبة لتغذية الطيور أو تعشيشها أو أماكن استقرارها. ونظرًا لطبيعة المشروع وعدم وجود خطوط نقل كهرباء هوائية ضمن نطاق المشروع محل التقييم، فلا يُتوقع حدوث تأثيرات ذات أهمية على الطيور.

البيئة الاجتماعية والاقتصادية:

يقع موقع المشروع داخل المنطقة الصناعية بأبو قير، ويحيط به مزيج من الأنشطة الصناعية، والأراضي الزراعية، والبنية التحتية للنقل.

✓ السكان والتجمعات السكنية: تُعد قرية عزبة الستين أقرب تجمع سكني إلى موقع المشروع، حيث تقع على بعد حوالي ١٠٠ متر إلى الشرق منه.

✓ الأنشطة الاقتصادية واستخدامات الأراضي: تشمل استخدامات الأراضي المحيطة محطة كهرباء أبو قير، والأراضي الزراعية، ومصرفًا زراعيًا، والبنية التحتية للنقل، وأراضي فضاء. ويقع موقع المشروع على أرض سبق استخدامها وتطويرها، ولا يُتوقع أن يترتب على تنفيذ المشروع أي إزاحة مادية أو إزاحة اقتصادية.

✓ البنية التحتية والخدمات: يستفيد المشروع من شبكة الطرق القائمة، والبنية التحتية للكهرباء، وإمدادات المياه، وخدمات الصرف المتوافرة بمنطقة أبو قير، وتُعد هذه المرافق كافية لدعم مرحلتي الإنشاء والتشغيل.

✓ العمالة: من المتوقع أن توفر مرحلة الإنشاء فرص عمل مؤقتة، في حين ستطلب مرحلة التشغيل عددًا محدودًا من العاملين بصورة دائمة. وستُمنح الأولوية لتوظيف العمالة المحلية متى توافرت المؤهلات المناسبة.

التراث الثقافي المادي

وفقًا لدراسة البيئة الأساسية ومراجعة المعلومات الأثرية المتاحة، لا توجد مواقع أثرية مسجلة أو موارد للتراث الثقافي أو آثار محمية داخل موقع المشروع، ولا يُتوقع أن تترتب على المشروع أي تأثيرات على موارد التراث الثقافي المعروفة.

التراث الثقافي غير المادي

لم تُحدد أي عناصر للتراث الثقافي غير المادي داخل موقع المشروع، ولا يُتوقع أن يؤثر المشروع على الممارسات الثقافية المحلية أو التقاليد أو الموارد الثقافية للمجتمع المحلي.

تحليل بدائل المشروع

تناول تحليل البدائل دراسة الخيارات الممكنة للمشروع خلال مرحلة التصميم الأولي (ما قبل دراسة الجدوى)، مع مراعاة الجوانب الفنية والاقتصادية والبيئية والاجتماعية.

بديل عدم تنفيذ المشروع: يفترض هذا البديل عدم تنفيذ مشروع نظام تخزين الطاقة بالبطاريات. ورغم أن هذا الخيار من شأنه تجنب الآثار الموضعية المرتبطة بمرحلتي الإنشاء والتشغيل، فإنه يحول دون تحقيق الفوائد المتوقعة من المشروع، بما في ذلك تعزيز استقرار الشبكة القومية للكهرباء، وتحسين مرونتها التشغيلية، ودعم دمج مصادر الطاقة المتجددة ضمن الشبكة. لذلك، لم يُعتبر هذا البديل مناسبًا.

بديل موقع المشروع: يقع المشروع داخل مقر محطة كهرباء أبو قير على أرض سبق استخدامها، وبالقرب من البنية التحتية الكهربائية اللازمة للمشروع. ونظرًا لملاءمة الموقع المقترح وتوافقه مع الاستخدامات الصناعية المحيطة، لم تُعتبر المواقع البديلة خيارًا ضروريًا.

بدائل نظام تخزين الطاقة بالبطاريات: تم تقييم عدد من تقنيات تخزين الطاقة بالبطاريات، بما في ذلك تقنية فوسفات حديد الليثيوم، وتقنية أكسيد الليثيوم والنيكل والمنجنيز والكوبالت، وتقنية تيتانات الليثيوم، وبطاريات تدفق الفاناديوم والأكسدة والاختزال، وبطاريات المعادن المنصهرة، والبطاريات المعتمدة على الصوديوم. وتم اختيار تقنية فوسفات حديد الليثيوم لما تتميز به من استقرار حراري مرتفع، وانخفاض مخاطر الحريق، وطول العمر التشغيلي، وانخفاض المخاطر البيئية، وملاءمتها لتطبيقات تخزين الطاقة على مستوى المرافق.

بدائل أنظمة التبريد: تم تقييم عدد من تقنيات التبريد، شملت أنظمة التبريد بالهواء القسري، وأنظمة التبريد السائل ذات الدورة المفتوحة، وأنظمة التبريد السائل ذات الدورة المغلقة مع تبديد الحرارة باستخدام المياه، وأنظمة التبريد السائل ذات الدورة المغلقة مع تبديد الحرارة باستخدام الهواء. وقد تم اختيار نظام التبريد السائل ذو الدورة المغلقة مع تبديد الحرارة باستخدام الهواء (المبردات الجافة)، لما يوفره من إدارة حرارية فعالة وموثوقة، مع تجنب استهلاك مياه التشغيل، أو توليد مياه الصرف، أو التعقيدات التشغيلية المرتبطة بأنظمة التبريد المعتمدة على المياه.

التشاور العام

تم تنفيذ أنشطة إشراك أصحاب المصلحة ضمن عملية إعداد دراسة تقييم الأثر البيئي والاجتماعي، بهدف ضمان إطلاع أصحاب المصلحة المعنيين على المشروع، وإتاحة الفرصة لهم لإبداء آرائهم وطرح استفساراتهم وملاحظاتهم وتوصياتهم.

وشملت أنشطة التشاور الجهات الحكومية المعنية، وممثلي المجتمع المحلي، والمجتمعات المجاورة، وغيرهم من أصحاب المصلحة الواقعيين ضمن منطقة تأثير المشروع. وهدفت هذه الأنشطة إلى عرض معلومات المشروع، ومناقشة آثاره البيئية والاجتماعية المحتملة، والحصول على آراء وملاحظات أصحاب المصلحة.

وشملت أبرز الموضوعات التي أثّرت خلال أنشطة إشراك أصحاب المصلحة فرص العمل، والإدارة البيئية خلال مرحلة الإنشاء، وقضايا المرور والنقل، واعتبارات الصحة والسلامة المجتمعية. كما قدم فريق المشروع توضيحات بشأن أنشطة المشروع، وتدابير التخفيف المقترحة، وآلية تلقي الشكاوى المتاحة لأصحاب المصلحة.

وستستمر أنشطة إشراك أصحاب المصلحة طوال دورة حياة المشروع من خلال تنفيذ خطة إشراك أصحاب المصلحة وآلية الشكاوى الخاصة بالمشروع، بما يضمن استمرارية التواصل، وتعزيز الشفافية، والإدارة الفعالة لملاحظات وشكاوى أصحاب المصلحة.

تقييم المخاطر والآثار البيئية والاجتماعية

يتناول هذا الفصل تقييم المخاطر والآثار البيئية والاجتماعية المحتملة المرتبطة بمراحل الإنشاء والتشغيل وإيقاف تشغيل المشروع. وقد أُجري التقييم وفقاً للمتطلبات التنظيمية الوطنية ومتطلبات مؤسسات التمويل الدولية، مع مراعاة كلٍ من تأثيرات المشروع على المستقبلات البيئية والاجتماعية، والتأثيرات المحتملة للظروف البيئية على المشروع.

واعتمدت عملية التقييم على التسلسل الهرمي لتدابير التخفيف، والذي يركز على تجنب الآثار، والحد منها، والتخفيف من حدتها، وإدارتها.

ومن المتوقع أن يحقق المشروع عددًا من الفوائد البيئية والاجتماعية والاقتصادية، من أبرزها دعم استقرار ومرونة الشبكة القومية للكهرباء، وتعزيز دمج مصادر الطاقة المتجددة ضمن الشبكة، والحد من فاقد الطاقة المتجددة الناتج عن عدم القدرة على استيعابها، وتعزيز موثوقية إمدادات الكهرباء. كما سيوفر المشروع فرص عمل مؤقتة خلال مرحلة الإنشاء، ويسهم في تنمية المهارات الفنية وبناء القدرات في مجال تقنيات تخزين الطاقة بالبطاريات.

أما الآثار السلبية المحتملة التي تم تحديدها، فترتبط بصفة رئيسية بأنشطة الإنشاء، وتشمل انبعاثات الهواء، والضوضاء، وإدارة المخلفات، ومخاطر السلامة والصحة المهنية، وحركة المرور، والتغيرات المؤقتة في حالة الموقع القائمة. وخلال مرحلة التشغيل، تتركز الآثار المحتملة بصورة رئيسية في مخاطر السلامة والصحة المهنية، وإدارة المواد الخطرة والمخلفات، وحالات الطوارئ، بما في ذلك حرائق البطاريات وظاهرة الانفلات الحراري، بالإضافة إلى أنشطة تشغيل وإدارة المرافق. وقد تم تحديد تدابير مناسبة للتخفيف والإدارة للحد من هذه الآثار والوصول بها إلى مستويات مقبولة.

ويعرض الجدول التالي ملخصاً لأهم الآثار البيئية والاجتماعية السلبية المحتملة خلال مرحلتي الإنشاء والتشغيل، إلى جانب تدابير التخفيف المقترحة.

الجدول ١: ملخص التأثيرات السلبية المحتملة

التأثيرات المتبقية	ملخص تدابير التخفيف	المخاطر والتأثيرات المتوقعة	الجانب البيئي
مرحلة البناء			
جودة الهواء			
جودة الهواء	ضئيل	تتفيذ سياسات للحد من فترات تشغيل المعدات دون استخدام، وإجراء الصيانة الدورية للآلات والمعدات، وفرض حدود للسرعة داخل موقع المشروع، وتوعية العاملين بالممارسات البيئية السليمة، وإجراء قياسات دورية لانبعاثات مولدات الكهرباء للتأكد من الالتزام بالحدود المسموح بها.	غير ملحوظ
الضوضاء المحيطة			
المعدات والآلات حركة المركبات مولدات الكهرباء	ضئيل	إجراء الصيانة الدورية للمعدات، واستخدام معدات منخفضة الضوضاء متى أمكن، وتجنب تشغيل الأنشطة عالية الضوضاء في الوقت نفسه، وتوفير وسائل حماية السمع للعاملين المعرضين لمستويات ضوضاء مرتفعة.	غير ملحوظ
التأثيرات على التربة			
التأثيرات على التربة • خزانات تجميع مياه الصرف الصحي • تخزين المواد والمخلفات • الانسكابات العرضية	ضئيل	إجراء أعمال الصيانة خارج موقع المشروع، والتخلص من المخلفات الخطرة من خلال جهات معتمدة، وتطبيق ممارسات النظافة والترتيب الجيدة بالموقع، وضمان الإدارة السليمة لمياه الصرف الصحي، وحماية الحياة البرية، والاستعانة بمقاولين معتمدين لإدارة المخلفات.	غير ملحوظ
أنشطة نزح المياه	ضئيل	جمع المياه الناتجة عن أعمال خفض منسوب المياه الجوفية ونقلها إلى محطة معالجة مياه صرف صحي عامة معتمدة للتخلص منها وفقاً للاشتراطات المعمول بها.	غير ملحوظ

التأثيرات المتبقية	ملخص تدابير التخفيف	المخاطر والتأثيرات المتوقعة	الجانب البيئي
المخاطر والتأثيرات على البيئة البيولوجية			
لا توجد آثار متبقية	إعداد وتنفيذ وتحديث خطة لإدارة المخلفات الصلبة بما يضمن الإدارة السليمة للمخلفات ومنع جذب القوارض والآفات والطيور .	غير ملحوظ	الموائل الغطاء النباتي الحيوانات الطيور
المخاطر والتأثيرات على البيئة الاجتماعية			
لا توجد آثار متبقية	إعداد وتنفيذ خطة متكاملة لإدارة المياه.	غير ملحوظ	الموارد المائية
غير ملحوظ	إعطاء الأولوية لتوظيف العمالة المحلية، وتطبيق آلية لتلقي شكاوى المجتمع، واختيار مواقع إقامة العمال بعيداً عن التجمعات السكنية، مع إمكانية إنشاء معسكر للعمال داخل موقع المشروع عند الحاجة.	ضئيل	تدفق العمالة
البنية التحتية			
لا توجد آثار متبقية	تطبيق إجراءات إدارة النقل بالمشروع، وتنفيذ خطة لإدارة المرور خلال مرحلة الإنشاء، بما يضمن سلامة حركة المركبات والالتزام بالاشتراطات المرورية.	غير ملحوظ	استخدامات الأراضي
طفيف	تطبيق إجراءات إدارة النقل للمشروع، والتي تحدد الحد الأدنى لمتطلبات السلامة لأنشطة النقل، بما يتوافق مع التشريعات الوطنية ومواصفات المشروع.	متوسط	حركة المرور
السلامة والصحة المهنية			
طفيف	تأمين مواقع الحفر بعلامات تحذيرية، والإشراف المستمر على العاملين، وتوفير التدريب المناسب، وإجراء الصيانة الدورية للمعدات، وتوفير مياه الشرب والاستراحات المظللة، وتطبيق حدود السرعة، واستخدام معدات الوقاية الشخصية، وفحص المعدات،	متوسط	التأثيرات على السلامة والصحة المهنية للعاملين

التأثيرات المتبقية	ملخص تدابير التخفيف	المخاطر والتأثيرات المتوقعة	الجانب البيئي
	والحد من الضوضاء، وتدريب العاملين على أعمال الرفع، وتطبيق إجراءات الوقاية من الحرائق.		
مرحلة التشغيل			
جودة الهواء			
غير ملحوظ	تحسين تشغيل مولدات الطوارئ والحد من استخدامها بما يقلل الانبعاثات.	ضئيل	انبعاثات مولدات الطوارئ
الضوضاء المحيطة والاهتزاز			
غير ملحوظ	الالتزام بالحدود القانونية للضوضاء، وتوفير معدات الوقاية الشخصية للعاملين، وتطبيق آلية لتلقي الشكاوى.	ضئيل	تشغيل المحولات الكهربائية ونظام تخزين الطاقة بالبطاريات تشغيل مولدات الطوارئ
المخاطر والأثر على البيئة الاجتماعية			
لا توجد آثار متبقية	جمع مياه الصرف الناتجة خلال التشغيل بواسطة جهة معتمدة ونقلها إلى محطات المعالجة المخصصة.	غير ملحوظ	الموارد المائية
المخاطر والتأثيرات على الصحة والسلامة المهنية			
غير ملحوظ	تطبيق سياسة السلامة والصحة المهنية، مع توفير معدات الوقاية الشخصية المناسبة وإمدادات كافية من مياه الشرب للعاملين.	ضئيل	التأثيرات على السلامة والصحة المهنية بموقع العمل
غير ملحوظ	تطبيق أنظمة إدارة البطاريات ومراقبتها لضمان التشغيل الآمن والكشف المبكر عن أي أعطال.	ضئيل	مخاطر الحرائق والانفلات الحراري للبطاريات

يمكن الحد من هذه الآثار والمخاطر السلبية المحتملة بفعالية من خلال تنفيذ تدابير التخفيف والإدارة المناسبة الواردة في خطة الإدارة البيئية والاجتماعية.

التأثيرات التراكمية

تم إجراء تقييم للتأثيرات التراكمية وفقاً لمعيار الأداء الأول لمؤسسة التمويل الدولية، وبما يتوافق مع ممارسات الصناعة الدولية الجيدة. وقد تناول التقييم الآثار التراكمية المحتملة الناتجة عن تفاعل المشروع مع المشروعات القائمة والمشروعات المتوقعة تنفيذها مستقبلاً بصورة معقولة ضمن منطقة تأثير المشروع، بما في ذلك التأثيرات المحتملة المتعلقة بجودة الهواء، وحركة المرور، وإدارة المخلفات، والموارد المائية، والتنوع البيولوجي، وتدفق العمالة.

وخلص التقييم إلى أن مشروعات نظم تخزين الطاقة بالبطاريات لا ينتج عنها، بوجه عام، آثار بيئية سلبية غير ملحوظة خلال مرحلة التشغيل. وتقتصر التأثيرات التراكمية المحتملة بصورة رئيسية على مرحلة الإنشاء، ومن المتوقع أن تكون موضعية ومؤقتة ومحدودة. ومع تطبيق تدابير التخفيف والإدارة المقترحة، يُتوقع أن تكون التأثيرات التراكمية المتبقية غير ملحوظة.

خطة الإدارة البيئية والاجتماعية

سيقوم المشروع بإعداد وتنفيذ خطة الإدارة البيئية والاجتماعية لضمان الإدارة الفعالة للمخاطر والآثار البيئية والاجتماعية طوال دورة حياة المشروع، وضمان التوافق مع التشريعات الوطنية السارية ومتطلبات مؤسسات التمويل الدولية. وتتضمن الخطة تدابير للتخفيف، والرصد، والإبلاغ، والإدارة، بهدف تجنب الآثار البيئية والاجتماعية المحددة أو الحد منها أو إدارتها.

وتشمل خطة الإدارة البيئية والاجتماعية المكونات الرئيسية التالية:

- ✓ ملخص الآثار البيئية والاجتماعية وتدابير التخفيف.
- ✓ خطة الإدارة البيئية والاجتماعية لمرحلة الإنشاء.
- ✓ خطة السلامة والصحة المهنية.
- ✓ خطة إدارة جودة الهواء.
- ✓ خطة إدارة الضوضاء.
- ✓ خطة إدارة المخلفات الخطرة.
- ✓ خطة إدارة المخلفات الصلبة.
- ✓ خطة الوقاية من الانسكابات وإدارتها.
- ✓ خطة الاستجابة للطوارئ.
- ✓ السجل البيئي وإدارة الالتزام.
- ✓ إجراءات الصيانة الوقائية والتصحيحية.
- ✓ خطة إشراك أصحاب المصلحة وآلية تلقي الشكاوى.
- ✓ متطلبات إعداد خطة إيقاف تشغيل المشروع.

الترتيبات المؤسسية:

سيتم تحديد الأدوار والمسؤوليات الخاصة بتنفيذ خطة الإدارة البيئية والاجتماعية، ومتابعة تنفيذها، وإعداد التقارير المتعلقة بها. كما ستحدد مسؤوليات كل من شركة المشروع، والمقاولين، والمقاولين من الباطن، والجهات المعنية، بما يضمن الإدارة الفعالة للجوانب البيئية والاجتماعية طوال دورة حياة المشروع.

بناء القدرات والمهارات:

سيتم تنفيذ برامج للتدريب والتوعية لضمان امتلاك العاملين بالمشروع والمقاولين الكفاءة اللازمة لتطبيق المتطلبات البيئية والاجتماعية ومتطلبات السلامة والصحة المهنية. وستغطي هذه البرامج موضوعات تشمل السلامة والصحة المهنية، وإدارة المخلفات، والاستعداد والاستجابة لحالات الطوارئ، والتعامل الآمن مع المواد الخطرة، وإدارة الشكاوى، وغيرها من الموضوعات البيئية والاجتماعية ذات الصلة.

خطة الرصد البيئي والاجتماعي

سينفذ المشروع برنامجاً للرصد البيئي والاجتماعي للتحقق من الالتزام بالمتطلبات المطبقة، وتقييم فعالية تدابير التخفيف. وتشمل أنشطة الرصد، حسب الاقتضاء، جودة الهواء، والضوضاء، وإدارة المخلفات، وأداء السلامة والصحة المهنية، والإبلاغ عن الحوادث، والاستعداد لحالات الطوارئ، ومتابعة تنفيذ تدابير الإدارة البيئية والاجتماعية.

وسيتم توثيق نتائج الرصد، وحالة تنفيذ خطة الإدارة البيئية والاجتماعية، وإعداد تقارير دورية بشأنها، وذلك وفقاً لمتطلبات جهات التمويل الدولية ذات الصلة.

الجدول ٢: خطط الإدارة البيئية والاجتماعية خلال مرحلة الإنشاء

الجانب	القضايا محل الاهتمام	الإجراءات	المسؤول	مؤشر التنفيذ	التكلفة المقدرة (دولار)	التاريخ
مرحلة الإنشاء						
جودة الهواء	انبعاثات الأتربة وانبعاثات العادم من المركبات والمعدات	- الحد من تشغيل المركبات والمعدات دون داعٍ. - المحافظة على المعدات والمركبات في حالة تشغيل جيدة. - تغطية الشاحنات الناقلة للمواد القابلة للتطاير. - تطبيق حدود السرعة وممارسات النظافة والترتيب الجيدة بالموقع.	مقاول الإنشاء	- خطة الرصد البيئي. - نتائج قياسات جودة الهواء. - سجلات الصيانة.	١٠,٠٠٠ - ٢٥,٠٠٠ سنويا	خلال فترة مرحلة الإنشاء
الضوضاء	الضوضاء الناتجة عن معدات ومركبات الإنشاء	- إجراء الصيانة الدورية للمعدات. - دولة الأنشطة مرتفعة الضوضاء بصورة مناسبة. - توفير وسائل حماية السمع للعاملين.	مقاول الإنشاء	- الالتزام بالحدود المسموح بها للضوضاء. - استخدام معدات الوقاية الشخصية.	١٠,٠٠٠ - ٥,٠٠٠ في السنة	خلال فترة مرحلة الإنشاء
	توفير معدات الوقاية الشخصية	توفير معدات الوقاية الشخصية المناسبة للعاملين.	مقاول الإنشاء	- نتائج قياسات الضوضاء. - سجلات الصيانة. - سجلات توزيع معدات الوقاية الشخصية.	٢٠,٠٠٠ - ١٠,٠٠٠ (إمداد معدات الحماية الشخصية - إجمالي فترة المشروع)	

الجانب	القضايا محل الاهتمام	الإجراءات	المسؤول	مؤشر التنفيذ	التكلفة المقدرة (دولار)	التاريخ
مرحلة الإنشاء						
التربة	تلوث التربة	- تنفيذ خطة الوقاية من الإنسكابات. تطبيق ممارسات النظافة والترتيب الجيدة بالموقع. - التخزين السليم للوقود والمواد الكيميائية. - جمع والتخلص من المواد الملوثة بواسطة مقاولين معتمدين.	مقاول الإنشاء / شركة فالي للطاقة المستدامة	- خطط إدارة المخلفات. - سجلات إدارة المخلفات الصلبة والخطرة. - عدم وقوع انسكابات كبيرة. - سجلات متابعة المقاولين. - عقود مع مقاولين معتمدين لإدارة المخلفات.	٦,٠٠٠ - ٢٠,٠٠٠ (يعتمد على حجم النفايات)	خلال فترة مرحلة الإنشاء
المياه السطحية ومياه الصرف	أنشطة نزح المياه وإدارة مياه الصرف	- جمع المياه الناتجة عن أعمال نزح المياه ونقلها إلى محطة معالجة مياه صرف صحي عامة معتمدة. - منع تصريف المياه بصورة غير خاضعة للسيطرة إلى المستقبلات المحيطة.	مقاول الإنشاء	سجلات جمع ونقل مياه الصرف.	٥,٠٠٠ - ١٥,٠٠٠	
السلامة المهنية والصحة	سلامة العاملين بموقع العمل	- إعداد خطة السلامة والصحة المهنية وإجراءات البيئة والصحة والسلامة وفقًا للمتطلبات الوطنية والمعايير الدولية.	مقاول الإنشاء	خطة السلامة والصحة المهنية وتضمن متطلبات البيئة والاجتماعية والسلامة العامة في عقود الإنشاء.	٢٠,٠٠٠ - ٤٠,٠٠٠	قبل الأنشطة الإنشائية
خطط الطوارئ والاستجابة	سلامة العاملين بموقع العمل	- إعداد خطة الاستعداد والاستجابة لحالات الطوارئ.	مقاول الإنشاء	خطة الاستعداد والاستجابة لحالات الطوارئ.	١٠,٠٠٠ - ٢٥,٠٠٠	قبل بدء تشغيل المشروع

الجانب	القضايا محل الاهتمام	الإجراءات	المسؤول	مؤشر التنفيذ	التكلفة المقدرة (دولار)	التاريخ
مرحلة الإنشاء						
إدارة النفايات	صحة العاملين	- إعداد خطط لإدارة المخلفات الصلبة والخطرة وفقًا للإرشادات العامة للبنك الدولي للصحة والسلامة والبيئة. - إعداد خطة السلامة والصحة المهنية. - تخزين المخلفات في أماكن مخصصة ونقلها بواسطة مقاولين معتمدين.	مقاول الإنشاء	- عقود إدارة المخلفات. - سجلات نقل المخلفات. - خطة السلامة والصحة المهنية.	١٠,٠٠٠ - ٣٠,٠٠٠	خلال فترة مرحلة الإنشاء
البيئة الاجتماعية	توافد العمالة	- إعطاء الأولوية لتوظيف العمالة المحلية. - تنفيذ آلية تلقي شكاوى المجتمع. - اختيار أماكن إقامة العمال بعيدًا عن التجمعات السكنية قدر الإمكان، مع دراسة إنشاء معسكر للعمال داخل الموقع عند الحاجة. - إعداد سياسات الموارد البشرية، بما في ذلك خطط العنف القائم على النوع الاجتماعي والاستغلال والاعتداء والتحرش الجنسي.	شركة فالي للطاقة المستدامة / مقاولو الإنشاء	- خطة إدارة العمالة. - قائمة فحص أماكن إقامة العمال. - سياسات العنف القائم على النوع الاجتماعي والاستغلال والاعتداء والتحرش الجنسي. - سجلات التوعية للعاملين.	١٥,٠٠٠ - ٤٠,٠٠٠ سنويًا	خلال فترة مرحلة الإنشاء
	الصحة والسلامة والأمن المجتمعي (مخاطر حوادث المرور)	- إعداد خطة إدارة المرور والإجراءات المرتبطة بها.	مقاولو الإنشاء	خطة إدارة المرور وإجراءاتها.	١٠,٠٠٠ - ٢٥,٠٠٠	

دراسة تقييم التأثير البيئي والاجتماعي لمشروع فالي للطاقة المستدامة - محطة أبو قير لتخزين الطاقة بالبطاريات

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الجانب	القضايا محل الاهتمام	الإجراءات	المسؤول	مؤشر التنفيذ	التكلفة المقدرة (دولار)	التاريخ
مرحلة الإنشاء						
	التراث الثقافي	إعداد إجراءات الاكتشافات الأثرية العرضية.	شركة فالي للطاقة المستدامة / مقاولو الإنشاء	إجراءات الاكتشافات الأثرية العرضية المعتمدة.	٥,٠٠٠ - ٢,٠٠٠	قبل الأنشطة الإنشائية
التكلفة المقدرة الإجمالية	(دولار أمريكي)	-			≈ ١٠٠,٠٠٠ - ≈ ٢٥٠,٠٠٠ دولار	
	(EGP)				≈ ٥,٠٠٠,٠٠٠ - ≈ ١٢,٥٠٠,٠٠٠ جنيه مصري	

الجدول ٢: خطط الإدارة البيئية والاجتماعية خلال مرحلة التشغيل

الجانب	القضايا محل الاهتمام	الإجراءات	المسئول	مؤشر التنفيذ	التكلفة المقدرة (دولار)	التاريخ
مرحلة التشغيل						
الضوضاء	المحولات ومعدات التبريد	- توفير معدات الوقاية الشخصية المناسبة للعاملين المعرضين لمصادر الضوضاء. - المحافظة على المعدات في حالة تشغيل جيدة. - تطبيق آلية لتلقي الشكاوى ومتابعتها.	شركة فالي للطاقة المستدامة	نتائج قياسات الضوضاء.	٥,٠٠٠ - ١٠,٠٠٠	بشكل دوري طوال مرحلة التشغيل
إدارة المخلفات الخطرة	النفائات الخطرة الناتجة عن أنشطة الصيانة	- تخزين المخلفات الخطرة في الأماكن المخصصة. - التخلص منها من خلال مقاولين معتمدين.	شركة فالي للطاقة المستدامة	سجل المخلفات الخطرة وسجلات نقل المخلفات.	٥,٠٠٠ - ١٠,٠٠٠ دولار أمريكي/سنوي	بشكل دوري طوال مرحلة التشغيل
منع الانسكابات	الانسكابات العرضية للزيوت والمواد الخطرة	- تنفيذ خطة الوقاية من الانسكابات. - صيانة معدات وإجراءات الاستجابة للانسكابات.	شركة فالي للطاقة المستدامة	عدد الانسكابات والإجراءات التصحيحية المتعلقة.	٢,٠٠٠ - ٥,٠٠٠ دولار أمريكي/سنة	بشكل دوري طوال مرحلة التشغيل
حقوق العمل والرفاهية	ظروف العمل	- إعداد وتطبيق سياسة الموارد البشرية.	شركة فالي للطاقة المستدامة	عقود العمل وسياسة الموارد البشرية.	مشمول في OPEX (تكلفة ESMP مباشرة ضئيلة)	طوال فترة المشروع
التدريب والتوعية	كفاءة موظفي المشروع	- تنفيذ برامج تدريب للعاملين وفقاً لمهامهم ومسؤولياتهم.	شركة فالي للطاقة المستدامة	خطط التدريب وسجلات التنفيذ.	٥,٠٠٠ - ١٠,٠٠٠ سنوياً	طوال فترة المشروع

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الجانب	القضايا محل الاهتمام	الإجراءات	المسئول	مؤشر التنفيذ	التكلفة المقدرة (دولار)	التاريخ
السلامة والصحة المهنية	سلامة العاملين بموقع العمل	- إعداد وتطبيق إجراءات البيئة والصحة والسلامة. - تنفيذ خطة السلامة والصحة المهنية. - تنفيذ برامج تدريب دورية وبرامج تنشيطية. - المحافظة على إجراءات الإبلاغ عن الحوادث.	شركة فالي للطاقة المستدامة	- سياسات وإجراءات البيئة والصحة والسلامة. - تقارير التفتيش والتدقيق الخاصة بالسلامة والصحة المهنية.	٨,٠٠٠ - ١٥,٠٠٠ سنويا	طوال فترة المشروع
الاستعداد والاستجابة لحالات الطوارئ ومخاطر الحرائق والانفلات الحراري للبطاريات	إدارة المخاطر التشغيلية	- تطبيق إجراءات تقييم المخاطر. - تنفيذ إجراءات سلامة البطاريات. - المحافظة على أنظمة الكشف عن الحرائق وإخمادها. - تنفيذ تدريبات الطوارئ والتدريب على الاستجابة لها.	شركة فالي للطاقة المستدامة	خطة الاستعداد والاستجابة لحالات الطوارئ.	٣,٠٠٠ - ١٠,٠٠٠ سنويا	طوال فترة المشروع
إشراك أصحاب المصلحة وآلية تلقي الشكاوى	ملاحظات أصحاب المصلحة، والشكاوى	- المحافظة على آلية تلقي الشكاوى الخاصة بالمشروع. - مراجعة الشكاوى وتحليل اتجاهاتها بصورة دورية واتخاذ الإجراءات اللازمة.	شركة فالي للطاقة المستدامة	عدد الشكاوى المستلمة، والمعالجة، والقيد المتابعة، ومتوسط زمن الاستجابة.	١٠,٠٠٠ - ٢٠,٠٠٠ سنويا	طوال فترة المشروع
التكلفة المقدرة الإجمالية	(دولار أمريكي)				٣٨,٠٠٠ ≈ - ٨٠,٠٠٠ دولار أمريكي سنويا	

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ث

التاريخ	التكلفة المقدرة (دولار)	مؤشر التنفيذ	المسئول	الإجراءات	القضايا محل الاهتمام	الجانب	
	≈ ١,٩٠٠,٠٠٠ - ٤,٠٠٠,٠٠٠ جنيه مصري سنويا					(EGP)	

الجدول ٣: خطط الإدارة البيئية والاجتماعية خلال إيقاف التشغيل

الجانب	القضايا محل الاهتمام	الإجراءات	المسئول	مؤشر التنفيذ	التكلفة المقدرة (دولار)	التاريخ
تخطيط إيقاف التشغيل	عدم كفاية التخطيط والتنسيق	إعداد وتنفيذ خطة إيقاف التشغيل وفقاً للتشريعات المصرية، ومتطلبات جهات التمويل، وممارسات الصناعة الدولية الجيدة. (GIIP)	شركة فالي للطاقة المستدامة / الشركة المصرية لنقل الكهرباء	اعتماد خطة إيقاف التشغيل.	٢٠,٠٠٠-١٠,٠٠٠	قبل بدء أعمال إيقاف التشغيل
جودة الهواء	انبعاثات الأتربة والهواء الناتجة عن أعمال التفكيك والهدم	تطبيق تدابير الحد من الأتربة والالتزام بإجراءات التفكيك المعتمدة.	مقاول إيقاف التشغيل	عدم وجود شكاوى جوهرية متعلقة بالأتربة، وسجلات الرصد البيئي.	١٠,٠٠٠-٥,٠٠٠	طوال مرحلة إيقاف التشغيل
الضوضاء	الضوضاء الناتجة عن أعمال الهدم وإزالة المعدات	الحد من الأنشطة مرتفعة الضوضاء، والمحافظة على المعدات في حالة تشغيل جيدة، وتوفير معدات الوقاية الشخصية عند الحاجة.	مقاول إيقاف التشغيل	الالتزام بالحدود المسموح بها للضوضاء.	٨,٠٠٠-٣,٠٠٠	طوال مرحلة إيقاف التشغيل
إدارة المخلفات	تولد المخلفات الخطرة وغير الخطرة	فرز المخلفات، وإعادة استخدامها أو تدويرها حيثما أمكن، والتخلص منها من خلال جهات معتمدة.	مقاول إيقاف التشغيل	- عقود إدارة المخلفات الصلبة والخطرة ومياه الصرف. - سجلات متابعة المقاول. - عقود مع جهات معتمدة لإدارة المخلفات.	٢٠,٠٠٠-٦٠,٠٠٠ (وفقاً لكميات المخلفات الخطرة ومتطلبات التخلص منها)	طوال مرحلة إيقاف التشغيل

الجانب	القضايا محل الاهتمام	الإجراءات	المسؤول	مؤشر التنفيذ	التكلفة المقدرة (دولار)	التاريخ
السلامة والصحة المهنية	إصابات العاملين أثناء أعمال التفكيك والهدم	تطبيق إجراءات السلامة والصحة المهنية، وتوفير معدات الوقاية الشخصية، وتنفيذ برامج التدريب، و خطة الاستعداد والاستجابة لحالات الطوارئ.	مقاول إيقاف التشغيل	عدم وقوع حوادث جسيمة، وسجلات التفتيش الخاصة بالسلامة والصحة المهنية.	٣٥,٠٠٠-١٥,٠٠٠	طوال مرحلة إيقاف التشغيل
إعادة تأهيل الموقع	التلوث المتبقي والأراضي المتأثرة	إزالة المنشآت المتبقية، وتنظيف الموقع، وتنفيذ أعمال المعالجة عند الحاجة، وإعادة تأهيل الموقع قدر الإمكان.	مقاول إيقاف التشغيل / شركة فالي للطاقة المستدامة	استكمال أعمال إعادة تأهيل الموقع واعتمادها.	٥٠,٠٠٠-٢٠,٠٠٠ (باستثناء أعمال الهدم أو المعالجة الرئيسية إذا لزم الأمر)	قبل إغلاق المشروع
المراقبة والتقارير	عدم الامتثال للمتطلبات البيئية والاجتماعية	تنفيذ أعمال التفتيش والرصد وإعداد التقارير بصورة دورية للتحقق من تنفيذ خطة إيقاف التشغيل.	شركة فالي للطاقة المستدامة / المهندس المشرف	تقارير الرصد وتقارير الإغلاق النهائي.	٢٠,٠٠٠-٨,٠٠٠	طوال مرحلة إيقاف التشغيل وحتى إغلاق المشروع
التكلفة المقدرة الإجمالية	(دولار أمريكي)					≈ ٨١,٠٠٠ - ٢٠٣,٠٠٠ دولار

الخاتمة

يمثل مشروع شركة فالي للطاقة المستدامة لنظام تخزين الطاقة بالبطاريات في أبو قير مساهمةً استراتيجية في دعم أهداف جمهورية مصر العربية المتعلقة بتعزيز استقرار الشبكة القومية للكهرباء، وزيادة مرونتها، ورفع قدرتها على دمج مصادر الطاقة المتجددة، بما يسهم في دعم التحول نحو نظام طاقة أكثر استدامة وكفاءة. وفي هذا السياق، لا يُعد بديل عدم تنفيذ المشروع خيارًا مناسبًا، لما يترتب عليه من فقدان الفوائد البيئية والاجتماعية والاقتصادية المتوقعة من تنفيذ المشروع.

حددت دراسة تقييم الأثر البيئي والاجتماعي الآثار والمخاطر البيئية والاجتماعية المحتملة المرتبطة بالمشروع خلال مراحل الإنشاء والتشغيل وإيقاف التشغيل، كما حددت تدابير التخفيف والإدارة المناسبة، بما يتوافق مع التشريعات الوطنية ومتطلبات مؤسسات التمويل الدولية، لضمان تجنب هذه الآثار أو الحد منها أو السيطرة عليها بفعالية.

ولضمان الاستدامة البيئية والاجتماعية خلال مرحلة الإنشاء، سيطبق المشروع مجموعة متكاملة من تدابير التخفيف، تشمل الحد من الأتربة والضوضاء، وإدارة المخلفات ومياه الصرف، والوقاية من الانسكابات، وإدارة حركة المرور، وتطبيق إجراءات السلامة والصحة المهنية، وحماية التنوع البيولوجي، وإدارة الجوانب العمالية والمجتمعية من خلال تنفيذ خطة إشراك أصحاب المصلحة وآلية تلقي الشكاوى.

كما سيتم الحد من المخاطر التشغيلية من خلال تطبيق إجراءات السلامة والصحة المهنية، وتنفيذ تدابير سلامة البطاريات، وتشغيل أنظمة الكشف المبكر عن الحرائق وإخمادها، وتنفيذ ترتيبات الاستعداد والاستجابة لحالات الطوارئ، وتطبيق إجراءات الوقاية من الانسكابات، والإدارة السليمة للمخلفات الخطرة. وسيُعدم الأداء الاجتماعي للمشروع من خلال تطبيق سياسة الموارد البشرية، وتنفيذ برامج التدريب والتوعية للعاملين، وتفعيل آلية شفافة لإشراك أصحاب المصلحة وتلقي الشكاوى، بما يضمن الاستجابة الفعالة للملاحظات والشكاوى طوال فترة تشغيل المشروع.

ولدعم التنفيذ الفعال لجميع تدابير التخفيف، والرصد، والإدارة، والإبلاغ البيئي والاجتماعي المحددة في خطة الإدارة البيئية والاجتماعية، خصص المشروع الموارد المالية اللازمة. وتبلغ الميزانية التقديرية لتنفيذ الخطة حوالي ١٧٥,٠٠٠ دولار أمريكي خلال مرحلة الإنشاء، وحوالي ٦٠,٠٠٠ دولار أمريكي سنوياً خلال مرحلة التشغيل، وتشمل أنشطة الرصد البيئي، والسلامة والصحة المهنية، وإدارة المخلفات، وحماية التنوع البيولوجي، وإشراك أصحاب المصلحة، والاستعداد لحالات الطوارئ، والتدريب، وغيرها من متطلبات الإدارة البيئية والاجتماعية.

ومع تنفيذ خطة الإدارة البيئية والاجتماعية، وتطبيق برامج الرصد، وتنفيذ جميع تدابير التخفيف المقترحة، يُتوقع أن تظل الآثار البيئية والاجتماعية المتبقية ضمن الحدود المقبولة.

وبناءً على نتائج دراسة تقييم الأثر البيئي والاجتماعي، يُعد المشروع قابلاً للتنفيذ من الناحيتين البيئية والاجتماعية، شريطة الالتزام بتنفيذ جميع متطلبات الدراسة وخطة الإدارة البيئية والاجتماعية، ومتابعة تنفيذها بانتظام طوال دورة حياة المشروع.

Executive Summary

Introduction

Energy Valley intends to develop a Battery Energy Storage System (BESS) with an installed nameplate storage capacity of approximately 1,435 MWh and a dispatchable AC capacity of 300 MW for 4 hours, together with a dedicated 33/500 kV step-up substation. The Project is located within the Abu Qir Power Plant premises in Alexandria Governorate on a land area of approximately 50,410 m².

The Project is designed to store electrical energy and discharge it to the national electricity grid, thereby supporting grid stability, load balancing, and the integration of renewable energy into the Egyptian electricity network. The Project forms part of the wider Energy Valley development portfolio, which includes renewable energy and energy storage facilities in several governorates across Egypt.

The Battery Energy Storage System will comprise approximately 201 containerized lithium-ion battery units, utilizing Lithium Iron Phosphate (LFP) battery technology. The Project will also include power conversion systems, cooling and ventilation systems, battery management systems, auxiliary facilities, and a dedicated step-up substation with an installed capacity of approximately 360 MVA.

The Project will be connected to the national electricity transmission network through an overhead transmission line (OHTL) to be developed by the Egyptian Electricity Transmission Company (EETC). A separate Environmental and Social Impact Assessment (ESIA) will be prepared for the OHTL in accordance with applicable national and lender requirements.

Environics has been assigned by Energy Valley to prepare the Environmental and Social Impact Assessment (ESIA) for the Project in accordance with the requirements of the Egyptian Environmental Law No. 4 of 1994 and its amendments, as well as the environmental and social requirements of the international financing institutions, including the International Finance Corporation (IFC) Performance Standards, the European Bank for Reconstruction and Development (EBRD) Performance Requirements, and the African Development Bank (AfDB) Integrated Safeguards System.

Goals and Specific Objectives

The Project aims to support the stability, flexibility, and reliability of the national electricity grid through the deployment of a utility-scale Battery Energy Storage System (BESS). The Project will facilitate the integration of renewable energy into the national grid by storing electricity and discharging it in accordance with grid requirements, thereby supporting Egypt's renewable energy and decarbonization objectives.

The broad goal of the Environmental and Social Impact Assessment (ESIA) is to provide decision-makers, lenders, and project proponents with information on the potentially

significant environmental and social impacts and risks associated with the proposed Abu Qir Battery Energy Storage System (BESS) Project and its associated infrastructure.

The specific objectives are:

- To identify the potential positive and negative environmental and social impacts associated with the construction, operation, and decommissioning phases of the Project.
- To propose appropriate mitigation and enhancement measures to avoid, minimize, mitigate, or compensate for adverse impacts and enhance potential benefits.
- To develop Environmental and Social Management and Monitoring Plans for implementation throughout the Project lifecycle.
- To ensure compliance with applicable Egyptian environmental and social legislation, Good International Industry Practice (GIIP), and the requirements of international financing institutions, including the IFC Performance Standards, EBRD Performance Requirements, and AfDB Integrated Safeguards System.

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 under Category Scoped B projects.

Air Quality: 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: Law 4/1994 and its regulations define permissible ambient and work noise levels.

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: Environmental Law No. 4 of 1994 includes provisions for the protection of biodiversity and protected species. The Project site is located within a previously disturbed industrial area and is not expected to affect natural or critical habitats.

Cultural Heritage: Law No. 117 of 1983 for the Protection of Antiquities, as amended, provides requirements for the protection of archaeological and cultural heritage resources.

Labor Law: Labour Law No. 14 of 2025 and other applicable regulations govern labour relations, working conditions, occupational health and safety, and workers' rights.

Community Investment: The Egyptian Investment Law 72/2017 encourages investors to contribute to social development initiatives, including environmental protection, healthcare, education, and research.

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.
- Minya 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:

EBRD Performance Requirements: The project must adhere to the European Bank for Reconstruction and Development's (EBRD) Performance Requirements (PRs), including those related to environmental and social impact assessment, labor and working conditions, biodiversity conservation, and community health and safety.

African Development Bank Group's Operational Safeguards (AfDB OS): The project must also comply with the African Development Bank's (AfDB) Operational Safeguards, which cover similar areas as the EBRD PRs.

International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability: Including requirements related to labour and working conditions, resource efficiency and pollution prevention, community health and safety, and stakeholder engagement

World Bank EHS Guidelines: The World Bank Group's Environmental Health and Safety (EHS) Guidelines provide technical guidance on Good International Industry Practice (GIIP) for various sectors.

International Labour Organization (ILO) Conventions: The project will adhere to relevant ILO conventions, ensuring fair and safe working conditions, freedom of association, and the prevention of child and forced labor.

Project Description

Project components and main activities

The proposed project comprises three broad components as follows:

Battery Energy Storage System (BESS): The Project includes the installation and operation of a utility-scale Battery Energy Storage System (BESS) with an installed nameplate storage capacity of approximately 1,435 MWh and a dispatchable AC capacity of 300 MW for 4 hours. The BESS is expected to utilize Lithium Iron Phosphate (LFP) battery technology and will comprise approximately 201 containerized battery units. The system will include Battery Management Systems (BMS), cooling and ventilation systems, power conversion systems (PCS), control and monitoring systems (SCADA), and associated auxiliary and safety systems.

Step-up substation: A dedicated 33/500 kV step-up substation will be constructed within the Project area to facilitate the import and export of electricity between the BESS and the national electricity grid. The substation is expected to have an installed capacity of approximately 360 MVA and will include transformers, switchgear, protection systems, and associated auxiliary equipment.

Connection to the grid: The Project will be connected to the national electricity transmission network through an overhead transmission line (OHTL) to be developed, operated, and maintained by the Egyptian Electricity Transmission Company (EETC). A separate Environmental and Social Impact Assessment (ESIA) will be prepared for the OHTL in accordance with applicable national and lender requirements.

Project location

The proposed Project is located within the Abu Qir Power Plant premises in Alexandria Governorate on a land area of approximately 50,410 m². The Project site is bordered by the Abu Qir Power Plant to the west, storage and scrap areas to the north, an agricultural drain and agricultural lands to the east, and the El Tabia–Rashid Road and Abu Qir railway line to the south.

The nearest residential area is Ezbet El Setin village, located approximately 100 m east of the Project Site. The Project site is situated on previously disturbed land that was formerly used as a fish farm and can be accessed directly through the existing road network serving the Abu Qir Power Plant.



Figure (1): Proposed Project Location

Baseline Conditions

Physical Environment:

- **Climate and Meteorology:**

The Project Site is located within the Mediterranean coastal climatic zone of Alexandria Governorate. The area is characterized by relatively moderate temperatures, high humidity, and seasonal rainfall concentrated during the winter months. Prevailing winds are predominantly northwesterly, with an annual average wind speed of approximately 25 km/h. The maximum average temperature reaches approximately 30°C during summer, while minimum temperatures may reach approximately 10°C during winter.

- **Air Quality:**

The Project Site is located within the Abu Qir Power Plant premises in an industrial setting. Air quality is influenced by nearby industrial activities, road traffic, and local climatic conditions. No significant air quality constraints were identified that would preclude the development of the Project.

Geology and Geomorphology:

- ✓ Geology and soil: The site consists of coastal sedimentary deposits typical of the Abu Qir area and is characterized by clayey soils in the low-lying sections.
- ✓ Topography: The Project Site is generally flat and low-lying, reflecting its previous use as a fish farm. Localized water accumulation and ponded areas are present within parts of the site.
- ✓ Surface water: The Mediterranean Sea is located approximately 180 m north of the Project Site, while Lake Idku is located approximately 2.2 km away. An agricultural drain runs along the eastern boundary of the Project Site. Project activities are not expected to result in direct interaction with surrounding surface water bodies.
- ✓ Ground Water: Groundwater is present within the wider coastal environment and was considered in the baseline assessment. Site preparation measures, including dewatering and ground improvement works, have been incorporated into the Project design where required.

Biological Environment:

- ✓ The Project Site is located within a previously disturbed area that was formerly used as a fish farm and is currently characterized by reed-dominated vegetation, localized standing water, and disturbed habitats. The ecological value of the site is considered low to moderate.
- ✓ Habitats: Habitats within the Project Site consist primarily of disturbed land, reed patches dominated by *Phragmites australis*, ponded areas, and previously modified terrain. No critical habitats or protected areas occur within the Project Site.
- ✓ Flora: Vegetation is limited and dominated by common and widespread species associated with disturbed habitats and seasonal wet areas.
- ✓ Fauna: No species of significant conservation importance were recorded within the Project Site during the field surveys. The site provides limited ecological value due to its disturbed nature and proximity to industrial activities.
- ✓ Avifauna: The wider area lies within a region crossed by migratory birds; however, the Project Site itself does not provide significant feeding, nesting, or roosting habitats. Given

the nature of the Project and the absence of overhead structures within the assessed Project scope, significant impacts on avifauna are not anticipated.

Socio-Economic Environment:

The Project Site is located within the Abu Qir industrial area and is surrounded by a mixture of industrial, agricultural, and transport infrastructure.

- ✓ Population and Settlements: The nearest residential area is Ezbet El Setin village, located approximately 100 m east of the Project Site.
- ✓ Economic Activities and Land Use: Surrounding land uses include the Abu Qir Power Plant, agricultural lands, an agricultural drain, transport infrastructure, and vacant land. The Project Site itself is located on previously disturbed land and no physical displacement or economic displacement is anticipated.
- ✓ Infrastructure and Services: The Project benefits from existing road access, electricity infrastructure, water supply, and wastewater services available within the Abu Qir area. The existing infrastructure is considered adequate to support Project construction and operation.
- ✓ Employment: Construction activities are expected to create temporary employment opportunities, while a limited permanent workforce will be required during operation. Preference will be given to local workers where suitable qualifications are available.

Tangible Cultural Heritage

According to the baseline assessment and review of available archaeological information, no registered archaeological sites, cultural heritage resources, or protected monuments are located within the Project Site. No impacts on known cultural heritage resources are anticipated.

Intangible Cultural Heritage

No intangible cultural heritage elements were identified within the Project Site. The Project is not expected to affect local cultural practices, traditions, or community cultural resources.

Analyses of Project Alternatives

The analysis of alternatives considered feasible project options during the conceptual and pre-feasibility design stages, taking into account technical, economic, environmental, and social considerations.

No Project Alternative: Under this alternative, the proposed BESS Project would not be developed. While this option would avoid the localized impacts associated with construction and operation activities, it would also prevent the realization of the Project's benefits, including enhanced grid stability, improved operational flexibility, and support for the integration of electricity into the national grid. Therefore, the no-project alternative was not considered suitable.

Site Location: The proposed Project is located within the Abu Qir Power Plant premises on previously modified land and in close proximity to the required electrical infrastructure. Given the suitability of the site and its compatibility with the surrounding industrial setting, alternative site locations were not considered necessary.

BESS Alternatives: Several battery storage technologies were evaluated, including Lithium Iron Phosphate (LFP), Lithium Nickel Manganese Cobalt Oxide (NMC), Lithium Titanate (LTO), Vanadium Redox Flow Batteries (VRFB), molten metal batteries, and sodium-based batteries. Following the assessment, Lithium Iron Phosphate (LFP) technology was selected due to its high thermal stability, lower fire risk, long cycle life, favorable environmental risk profile, and suitability for utility-scale energy storage applications.

Cooling system alternatives: Alternative cooling technologies were assessed, including forced air-cooled systems, open-loop liquid cooling systems, closed-loop liquid cooling with water-based heat rejection, and closed-loop liquid cooling with air-based heat rejection. The selected option is a closed-loop liquid cooling system with air-based heat rejection (dry coolers), as it provides reliable thermal management while avoiding process water consumption, wastewater generation, and the operational complexities associated with water-based cooling systems.

Stakeholder Engagement Activities and Consultation

Stakeholder engagement has been undertaken as part of the ESIA process to ensure that relevant stakeholders are informed about the Project and provided with opportunities to raise questions, concerns, and recommendations.

Consultation activities were conducted with relevant governmental entities, local representatives, nearby communities, and other stakeholders located within the Project Area of Influence. The engagement process aimed to present Project information, discuss potential environmental and social impacts, and obtain stakeholder feedback.

The key issues raised during stakeholder engagement activities included employment opportunities, environmental management during construction, traffic and transportation issues, and community health and safety considerations. The Project team provided clarifications regarding Project activities, proposed mitigation measures, and the grievance mechanism available for stakeholders.

Stakeholder engagement will continue throughout the Project lifecycle through the implementation of the Stakeholder Engagement Plan (SEP) and the Project Grievance Mechanism, ensuring ongoing communication, transparency, and effective management of stakeholder concerns.

Assessment of Environmental and social Risks and Impacts

This chapter assesses the potential environmental and social impacts and risks associated with the construction, operation, and decommissioning phases of the Project. The assessment was undertaken in accordance with national regulatory requirements and international lender standards and considered both the impacts of the Project on environmental and social receptors and the potential influence of environmental conditions on the Project. The assessment process followed the mitigation hierarchy, with emphasis on impact avoidance, minimization, mitigation, and management.

The Project is expected to generate a number of positive environmental and socio-economic benefits. These include supporting the stability and flexibility of the national electricity grid, facilitating the integration of renewable energy into the electricity network, reducing renewable energy curtailment, and enhancing the reliability of electricity supply. The Project will also create temporary employment opportunities during the construction phase and contribute to the development of technical skills and capacity in battery energy storage technologies.

Potential adverse impacts identified during the assessment are generally associated with construction activities, including air emissions, noise generation, waste management, occupational health and safety risks, traffic movement, and temporary disturbance of the existing site conditions. During operation, potential impacts are primarily related to occupational health and safety, hazardous materials and waste management, emergency situations including battery fire and thermal runaway events, and routine facility management activities. Appropriate mitigation and management measures have been identified to reduce these impacts to acceptable levels.

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

Table 1: Summary of the potential negative impacts

Environmental Aspect	Expected risks and Impacts	Mitigation Measures Summary	Residual Impacts
Construction Phase			
Air Quality			
• Air Quality	MINOR	Implement policies to reduce idling, maintain machinery, impose site speed restrictions, ensure worker awareness of safe practices, and conduct periodic generator compliance measurements.	INSIGNIFICANT
Ambient Noise			
Equipment and machinery Vehicles Movement Power Generators	MINOR	Ensure regular maintenance, use low-noise machinery where possible, avoid simultaneous high-noise activities, and provide hearing protection for workers exposed to high noise levels.	INSIGNIFICANT
Impacts on Soil			
Domestic wastewater tanks, material and wastes storage, and accidental spills	MINOR	Conduct off-site maintenance, dispose of hazardous waste properly, and maintain good housekeeping. Ensure proper wastewater disposal and protect local wildlife. Use licensed contractors for waste management.	INSIGNIFICANT
Dewatering activities	Minor	Collect water generated from dewatering activities and transport it to an authorized public wastewater treatment plant for treatment and disposal.	INSIGNIFICANT
Risks and Impacts on the Biological Environment			
Habitat disruption, flora, fauna, and avifauna	INSIGNIFICANT	Develop, implement, and update a solid waste management plan to ensure environmentally sustainable waste management, preventing vermin and avifauna attraction.	No residual impact
Risks and Impacts on the Social Environment			
Water Resources	INSIGNIFICANT	A comprehensive water management plan will be developed	No residual impact
Worker Influx	Minor	Prioritize hiring local workers, implement and maintain a community grievance mechanism, and select labor accommodation away from existing communities, considering establishing a labor camp on-site.	INSIGNIFICANT
Infrastructure			
• Land use	INSIGNIFICANT	Obelisk has developed Transportation Management Procedures for project, operations, contractors, and subcontractors, defining minimum safety requirements that supplement national regulations and project specifications. Also, implementation of a traffic management plan for the construction phase is required.	No residual impact

Environmental Aspect	Expected risks and Impacts	Mitigation Measures Summary	Residual Impacts
• Traffic	MODERATE	Obelisk has developed Transportation Management Procedures for projects, operations, contractors, and subcontractors. These procedures define the minimum safety requirements for transportation activities, supplementing national regulations and project specifications.	MINOR
Occupational Health and Safety			
• Impacts on workforce health and safety	MODERATE	Surround excavation sites with warning signs and ensure continuous supervision of workers. Provide proper training, regular maintenance, hydration, shaded breaks, and enforce speed limits. Use PPE, inspect equipment, control noise, offer lifting training, and implement fire prevention measures.	MINOR
Operation Phase			
Air Quality			
• Emissions from emergency generator	MINOR	Optimize the operation of backup generators to reduce usage and emissions.	INSIGNIFICANT
Ambient Noise & Vibration			
Operation of Transformers, BESS Use of backup generators during power outages	MINOR	Noise-generating machines and equipment will comply with statutory regulations, and workers will be provided with appropriate PPE. A grievance mechanism will be established to handle complaints.	INSIGNIFICANT
Risk and Impact on the Social Environment			
• Water Resources	INSIGNIFICANT	Wastewater generated during the operation phase is minimal and will be collected by an approved contractor and discharged to designated treatment plants.	No residual impact
Risks and Impacts on Occupational Health and Safety			
• Impacts on workplace	Minor	A health and safety policy will be implemented, ensuring the provision of appropriate personal protective equipment (PPE) and an adequate supply of drinking water.	INSIGNIFICANT
• Potential fire and thermal runaway risks	Minor	Implement battery management and monitoring systems.	INSIGNIFICANT

These potential negative impacts and risks can be effectively mitigated through the implementation of appropriate measures outlined in the Environmental and Social Management Plan.

Cumulative Impacts

A cumulative impact assessment was undertaken in accordance with IFC Performance Standard 1 and relevant international good practice. The assessment considered potential cumulative effects that may arise from the interaction of the Project with existing and reasonably foreseeable developments within the Area of Influence, including potential effects related to air quality, traffic, waste management, water resources, biodiversity, and workforce influx.

The assessment concluded that Battery Energy Storage System (BESS) projects generally do not result in significant adverse environmental impacts during operation. Potential cumulative impacts are primarily associated with construction activities and are expected to be localized, temporary, and of limited magnitude. With the implementation of the proposed mitigation and management measures, the residual cumulative impacts are expected to be insignificant.

Environmental and Social Management Plan

The Project will develop and implement an Environmental and Social Management Plan (ESMP) to ensure that environmental and social risks and impacts are effectively managed throughout the Project lifecycle and that the Project remains compliant with applicable national legislation and international lender requirements.

The ESMP includes mitigation, monitoring, reporting, and management measures designed to avoid, minimize, and manage identified environmental and social impacts and risks.

The ESMP encompasses the following key components:

The Summary of Impacts and Mitigation Measures,

Environmental and Social Management Plans include the following:

- Construction Environmental and Social Management Plan (CESMP)
- Occupational Health and Safety (OHS) Management Plan
- Air Quality Management Plan
- Noise Management Plan
- Hazardous Waste Management Plan
- Solid Waste Management Plan
- Spill Prevention and Management Plan
- Emergency Response Plan
- Environmental Register and Compliance Management
- Preventive and Corrective Maintenance Procedures
- Stakeholder Engagement and Grievance Management Mechanism
- Decommissioning Planning Requirements

Institutional Arrangements:

Defined roles and responsibilities will be established for the implementation, monitoring, and reporting of the ESMP. The Project Company, contractors, subcontractors, and relevant authorities will have clearly assigned responsibilities to ensure effective environmental and social management throughout the Project lifecycle.

Capacity Building:

Training and awareness programs will be implemented to ensure that Project personnel and contractors are competent in applying environmental, social, health, and safety requirements. Training will cover occupational health and safety, waste management, emergency preparedness and response, hazardous materials handling, grievance management, and other relevant environmental and social topics.

Environmental and Social Monitoring Plan

The Project will implement an Environmental and Social Monitoring Program to verify compliance with applicable requirements and assess the effectiveness of mitigation measures. Monitoring activities will include, as applicable, air quality, noise, waste management, occupational health and safety performance, incident reporting, emergency preparedness, and the implementation of environmental and social management measures. Monitoring results and ESMP implementation status will be documented and periodically reported in accordance with applicable lender requirements.

Table 2: ESMP Plans During Construction

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required Completion Date
Construction Phase						
Air Quality	Dust emissions and exhaust emissions from vehicles and machinery	- Restrict unnecessary idling of vehicles and equipment. - Maintain construction machinery and vehicles in good working condition. - Cover trucks transporting friable materials. - Apply speed restrictions and good housekeeping measures.	Construction contractor	- Monitoring plan - Air quality measurements - Maintenance logs	10,000 – 25,000/ year	Throughout the construction phase period
Noise	Noise generated from construction equipment and vehicles	- Maintain equipment regularly. - Schedule high-noise activities appropriately. - Provide workers with suitable hearing protection.	Construction contractor	Compliance with applicable noise limits; PPE usage Noise measurements and Maintenance logs	10,000 – 5,000 / year	Throughout the construction phase period
	Provision of PPEs	- Providing necessary PPE for workers	Construction contractor		20,000 – 10,000 (PPE supply - total project period)	
Soil	Soil disturbance and potential contamination	- Implement Spill Prevention Management Plan. - Maintain good housekeeping practices. - Store fuels and chemicals appropriately. - Collect and dispose of contaminated materials through licensed contractors.	Construction contractor Energy Valley (include provisions in the construction contracts. Energy Valley s to ensure contractors' compliance)	- Waste management plans - Solid/hazardous waste - No significant spills; contract - Contractor follow-up documents - Contracts with authorized waste contractors	6,000 – 20,000 (depends on waste volume)	Throughout the construction phase period

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required Completion Date
Construction Phase						
Surface Water and Dewatering	Dewatering activities and wastewater management	- Collect dewatering water and transport it to an authorized public wastewater treatment plant. - Prevent uncontrolled discharge to surrounding receptors.		Records of wastewater collection and disposal	5,000 – 15,000	
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	20,000 – 40,000	Before construction activities
Emergency Response plans	Site Staff and Workplace Safety	- Develop procedures for emergency control	Contractor	Emergency response plan	10,000 – 25,000	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	10,000 – 30,000	Throughout the construction phase period
Social Environment	Workers influx	- Prioritize hiring local workers - Implement and maintain a community grievance mechanism; and, - Selection of labour accommodation, away from existing communities, as possible, and considering establishing a labour camp on site. - Develop HR policies including GBV and SEAH plans	Energy Valley /Construction contractors	Labour management plan, workers accommodation inspection checklist GBV and SEAH policies Workers Awareness	15,000 – 40,000/ year	Throughout the construction phase period

Aspect		Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required Completion Date
Construction Phase							
		Community health, safety and security- risks from road traffic accidents	- Develop Traffic Management Plan (TMP) and associated procedures	Construction contractors	TMP and procedures	10,000 – 25,000	
		Cultural heritage	- develop chance find procedure	Energy Valley /Construction contractors	Developed procedures	2,000 – 5,000	Before construction activities
Total Estimated Cost	(USD)		-			≈ ≈ 100,000 – 250,000 USD	
	(EGP)					≈ ≈ 5,000,000 – 12,500,000 EGP	

Table 3: Overview of ESMP Plans During Operation

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required completion Date
Operation Phase						
Noise	Transformers and cooling equipment	- Provide workers at noise generating machinery and equipment will be provided with suitable (PPEs). - Maintain equipment is good operation conditions - A grievance mechanism will be adopted for assessing complaints,	Project Company	Noise measurements	5,000 – 10,000	Periodically throughout the operation stage
Hazard waste management	Hazard waste generated from maintenance activities	- Store hazardous waste in designated areas. - Dispose of hazardous waste through licensed contractors.	Project Company	Hazard waste register, waste manifest	5,000 – 10,000 USD/year	Periodically throughout the operation stage
Spill Prevention	Accidental releases of oils and hazard materials	- Implement Spill Prevention Management Plan. - Maintain spill response equipment and procedures.	Project Company	Number of spills and corrective actions implemented	2,000 – 5,000 USD/year	Periodically throughout the operation stage
Labour rights and welfare	working conditions	Develop Human Resources policy	Project Company	Contracts (with workers)	Included in OPEX (negligible direct ESMP cost)	Throughout the project lifetime
Training and Awareness	competence of the project personnel	training for the personnel according to their responsibilities	Project Company	Training plans	5,000 – 10,000/ year	Throughout the project lifetime
Occupational Health and Safety	Site Staff and Workplace Safety	- Developing HSE procedures - Implement OHS Management Plan. - Conduct periodic training and refresher programs. - Maintain incident reporting procedures	Project Company	Development of HSE policies OHS inspections and audits	8,000 – 15,000/ year	Throughout the project lifetime
Emergency Preparedness and Response; and Fire and Thermal Runway	Operational risk management	- Adopt a probabilistic risk assessment framework - Implement battery safety procedures.	Project Company	Emergency response plan	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
			- Maintain fire detection and suppression systems. - Conduct emergency drills and response training				
Stakeholder Engagement and Grievance Management		- Stakeholder concerns, complaints and grievances	- Maintain the project grievance mechanism - Periodically review grievances trends and response	Project Company	- Number of grievances received, resolved and pending; response times	10,000 – 20,000/ year	Throughout the project lifetime
Total Estimated Cost	(USD)					≈ 38,000 – 80,000 USD / year	
	(EGP)					≈ 1,900,000 – 4,000,000 EGP / 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	Prepare and implement a Decommissioning Plan in accordance with Egyptian regulations, lender requirements, and GIIP.	(EETC/Energy Valley)	Approved Decommissioning Plan	10,000 – 20,000	Prior to decommissioning
Air Quality	Dust and air emissions from dismantling and demolition	Apply dust suppression measures and follow approved dismantling procedures.	Decommissioning Contractor	No significant dust complaints; monitoring records	5,000 – 10,000	Throughout decommissioning
Noise	Noise from demolition and equipment removal	Limit noisy activities, maintain equipment in a good working conditions , and provide PPE where required.	Decommissioning Contractor	Compliance with applicable noise requirements	3,000 – 8,000	Throughout decommissioning
Waste Management	Generation of hazardous and non-hazardous waste	Segregate, reuse/recycle where feasible, and dispose of wastes through licensed facilities.	Decommissioning Contractor	-Solid/hazardous waste and wastewater management contract -Contractor follow-up documents Contracts with authorized waste contractors	20,000 – 60,000 (depends largely on hazardous waste quantities and disposal requirements)	Throughout decommissioning
Occupational Health and Safety	Worker injuries during dismantling and demolition	Implement OHS procedures, provide PPE, training, and emergency preparedness.	Decommissioning Contractor	No major incidents; OHS inspection records	15,000 – 35,000	Throughout decommissioning
Site Restoration	Residual contamination and disturbed land	Remove remaining structures, clean up the site, remediate if	Decommissioning Contractor /	Site restoration completed and approved	20,000 – 50,000 (excluding major demolition or	Before project closure

		required, and restore the site where feasible.	Project Proponent		<i>remediation works if required)</i>	
Monitoring and Reporting	Non-compliance with environmental and social requirements	Conduct regular inspections, monitoring, and reporting to verify implementation of the Decommissioning Plan.	Energy Valley / Supervising Engineer	Monitoring reports and close-out report	8,000 – 20,000	Throughout decommissioning and prior to project closure
Total Estimated Cost	(USD)				≈ 81,000–203,000 USD	
	(EGP)				≈ 4,050,000–10,150,000 EGP	

Conclusion

The Energy Valley Battery Storage Project represents a strategic contribution to Egypt's national objectives for energy diversification, security of supply, and increased penetration of renewable energy resources, thereby reducing reliance on imported fossil fuels. In this context, the No-Project Alternative is not considered a viable option, as it would forego significant environmental and socio-economic benefits associated with the development.

The Environmental and Social Impact Assessment has identified and evaluated the potential environmental and social impacts associated with the Project across its construction, operation, and decommissioning phases. Appropriate mitigation and management measures have been defined in line with national legislation and applicable international standards to ensure that these impacts are effectively avoided, minimized, or controlled.

To ensure environmental and social sustainability during construction, the Project will implement comprehensive mitigation measures, including dust and noise control, waste and wastewater management, spill prevention, traffic management, occupational health and safety procedures, biodiversity protection, and labour and community management through stakeholder engagement and grievance mechanisms.

Operational risks will be mitigated through the implementation of OHS procedures, battery safety measures, continuous fire detection and suppression systems, emergency preparedness and response arrangements, spill prevention measures, and proper hazardous waste management. Social performance is supported through the implementation of a Human Resources Policy, personnel training and awareness programs, and a transparent stakeholder engagement and grievance mechanism to address concerns and complaints throughout project operation.

To support the effective implementation of all Environmental and Social (E&S) mitigation, monitoring, management, and reporting measures identified in the Environmental and Social Management Plan (ESMP), the Project has allocated adequate financial resources. The estimated ESMP implementation budget is approximately USD 175,000 during the construction phase and approximately USD 60,000 per year during the operation phase, covering environmental monitoring, occupational health and safety, waste management, biodiversity conservation, stakeholder engagement, emergency preparedness, training, and other environmental and social management requirements.

With the implementation of the proposed Environmental and Social Management Plans (ESMPs), monitoring frameworks, and mitigation measures, the residual impacts are expected to remain within acceptable limits.

The Project is therefore considered environmentally and socially feasible, provided that all ESIA commitments are fully implemented and continuously monitored throughout its lifecycle.

1. Introduction

1.1 Project Overview

Energy Valley company intends to establish a 1,435 MWh Battery Energy Storage System (BESS) within an approximate land area of 50,410 m², located east of the West Delta Electricity Production Company. In addition, a 400 MVA and 33/500 KV Step-up substation will be installed within the area of the BESS storage component.

The BESS is designed to store and discharge electricity through a direct connection to the national electricity grid, thereby supporting grid stability, load balancing, and the effective integration of renewable energy into the national grid.

This project is part of the Energy Valley Project, which comprises multiple components across several governorates, including a PV+BESS plant in Minya, the Naseeg Sarirya Substation in Minya, and a BESS +substation facility in Naga Hammadi. The current ESIA is concerned only with BESS and the step-up substation located in Abu Qir area. Separate ESIAs will be developed for the other components.

The project will be built on a land owned by West Delta Electricity Production Company, located in Abu Qir City on the Tabia – Rashid Road, at the administrative borders between Alexandria and Beheira Governorates. The closest settlement is the village of Ezbet El-Settin located southeast and east of the Project Site. The project site can be accessed via Tabia – Rashid Road. The land will be leased through a usufruct agreement with the West Electricity Production Company.

The project is being implemented in collaboration with international financing institutions, including the European Bank for Reconstruction and Development (EBRD), the African Development Bank (AfDB), European Investment Bank (EIB) and Cassa depositi e prestiti S.p.A. (CDP). This demonstrates international partners' confidence in Egypt's sustainable investment climate and its capacity to deliver projects with lasting environmental and economic benefits.

Figure 1-1 below shows Energy Valley - Abu Qir BESS Project and the surrounding activities in the study area.

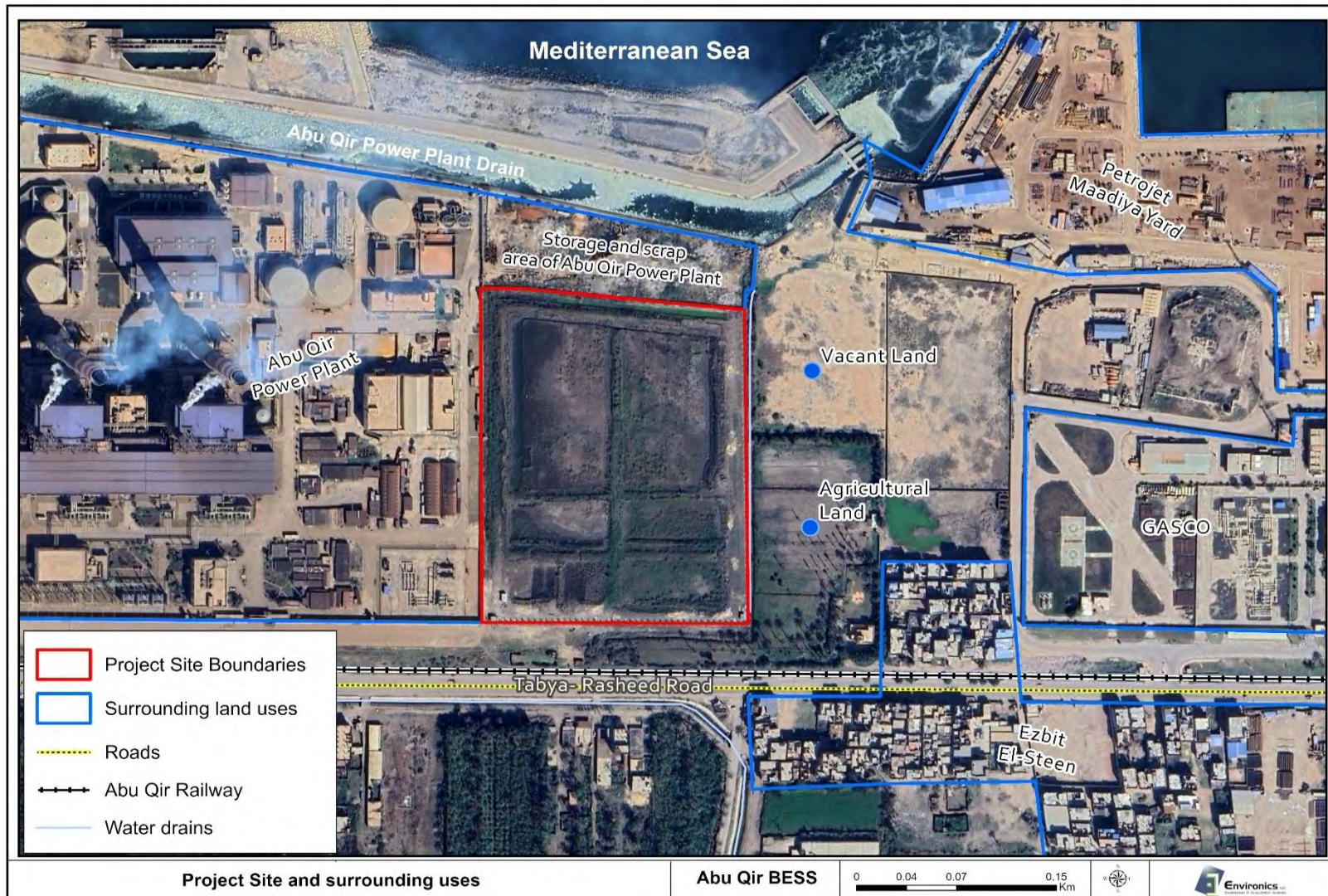


Figure 1-1: Proposed Project Location and Surrounding Activities

In accordance with Environment Law 4/1994 (as amended by Laws 9/2009 and 105/2015) and its revised Executive Regulations ERs, this Environmental Impact Assessment (EIA) study is prepared for the construction and operation of Energy Valley – Abu Qir BESS.

According to the initial meeting conducted with the Egyptian Environmental Affairs Agency (EEAA) on 6 January 2026, the BESS has been classified as Category Scoped-B project. In addition, according to the Lenders' categorization, the project is a Category B project.

This classification reflects that the proposed BESS, with a total capacity of 1,435 MWh, is expected to have limited, site-specific environmental and social impacts, including manageable battery hazards without significant impacts, as detailed in the current ESIA.

1.2 Objective of the ESIA

The objective of the ESIA is to ensure that the project is environmentally sound and socially sustainable and that any potential negative environmental and social consequences are recognized early in the project cycle and taken into account before project implementation. It also aims to propose appropriate mitigation measures to prevent/reduce potential negative impacts during the construction and operation of the proposed project, to be within the limits of legal environmental and social requirements.

Moreover, the ESIA aims to satisfy the environmental legal requirements of the Egyptian Environmental Law 4/1994 modified by Law 9/2009 and Law 105/2015 as well as its executive regulations (ER) modified in 2005, 2011, 2012, 2017 and 2024.

Moreover, the ESIA is also intended to satisfy the environmental and social requirements of the international funding institutions, including specifically the IFC, EBRD, and AfDB.

1.3 Scope of Work

The ESIA of the proposed project would assess the potential environmental and social risks and impacts across all project stages, including construction, operation, and decommissioning. The assessment will establish baseline environmental and social conditions within the project's area of influence.

The assessment will review relevant national, international standards and lender requirements. Potential impacts will be identified, evaluated and addressed through mitigation measures documented in an Environmental and Social Management Plan (ESMP), including monitoring and responsibilities.

1.4 Structure of ESIA study

This ESIA report includes:

- **Chapter 1: (the current chapter):** Introduction and Background on the project for which the ESIA is developed as well as the scope and objectives of the ESIA study
- **Chapter 2:** Description of the intended BESS construction and operation phases and the expected environmental and social aspects

- **Chapter 3:** Description of the environmental baseline and social context in the project area
- **Chapter 4:** Description of the local regulatory framework as well as the International Environmental and Social standards and requirements applicable to the project activities
- **Chapter 5:** Discussion of alternatives for different project components.
- **Chapter 6:** Assessment of the potential environmental and social risks and impacts and their mitigation measures.
- **Chapter 7:** The environmental and social management and monitoring plan for the BESS
- **Chapter 8:** Stakeholder Engagement

2. Project Description

The proposed project comprises the construction and operation phases of a utility-scale BESS with an installed nameplate storage capacity of approximately 1,435 MWh. The BESS will be developed on an approximate land area of 50,410 m², located within the Abu Qir Power Plant premises in Alexandria Governorate.

The Project is designed to store and discharge electrical energy through a direct connection to the national electricity grid.

The BESS system includes battery storage units, power conversion systems, internal electrical infrastructure, auxiliary systems, and a dedicated 33/500 kV step-up substation with a capacity of approximately 360 MVA.

The primary functions of the BESS are to:

- *Store renewable electricity generated by the PV power plant located in NREA concession East of Minya through the national grid;*
- *Discharge stored energy in accordance with grid requirements and operational arrangements;*
- *Support grid stability, provide load shifting and energy management;*
- *Enhance the integration of renewable energy into the national grid; and*
- *Contribute to national renewable energy targets and decarbonization objectives.*

2.1 Project Location

The proposed BESS project is located on land owned by West Delta Electricity Production Company. The project occupies an area of approximately 50,410 m² and is situated within the Abu Qir Power Plant premises. The land will be leased through a usufruct agreement with the West Electricity Generation Company.

The proposed project site is bordered by the following land uses:

North: Abu Qir Power Plant storage and scrap area.

East: agriculture drain, followed by vacant land, agricultural land, And Ezbet El Setin village.

South: El Tabia–Rashid Road and the Abu Qir railway line.

West: Abu Qir Power Plant.

Figure 2-1 below shows the activities/land uses surrounding the proposed site.

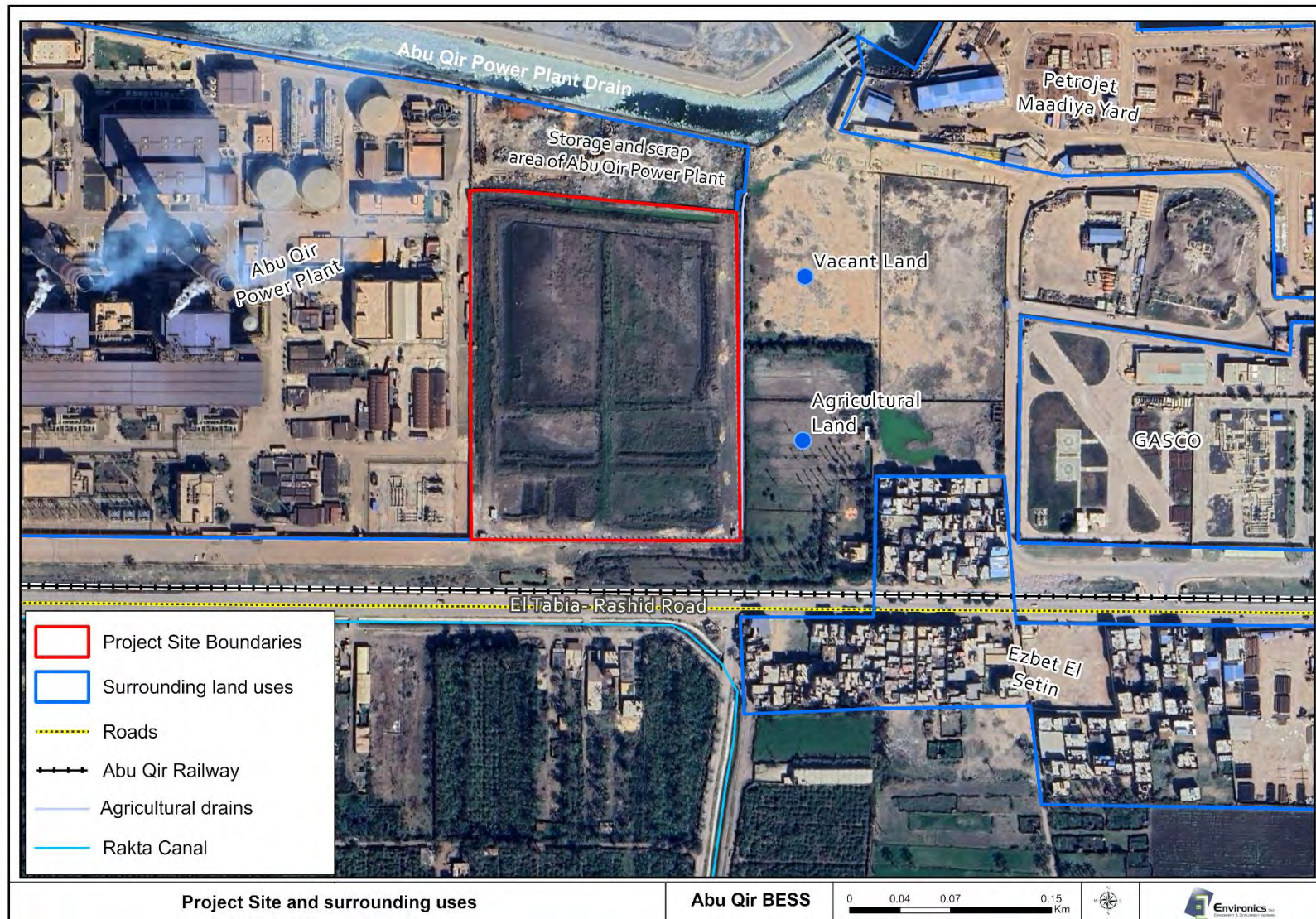


Figure 2-1: Activities/land uses surrounding the proposed site

2.2 Process Description

The project involves the installation and operation of a lithium-ion Battery Energy Storage System that stores electrical energy in chemical form during charging periods and releases it as electrical energy during discharge periods. It will operate automatically through integrated control, protection, and monitoring systems.

2.3 Project Components

The BESS consists of a lithium-ion battery energy storage system composed of multiple battery cells assembled into modules, racks, and containerized units. Each battery cell comprises of an encased cathode, anode, and electrolyte.

The BESS is expected to utilize lithium iron phosphate (LFP) chemistry, which is widely adopted in utility-scale energy storage projects due to its operational reliability, safety characteristics, and performance.

Battery modules will be housed within prefabricated, weatherproof containers, delivered to the site as pre-assembled units and arranged within the designated BESS compound. Containers will be installed on engineered and elevated foundations to reduce the risk of water accumulation and ensure long-term structural stability.

The total installed nameplate storage capacity of the BESS is approximately 1,435 MWh, distributed across approximately 201 containerized battery units.

A. BESS Battery Modules

- Lithium-ion battery modules with a total nameplate energy capacity of approximately 1,435 MWh and dispatchable AC capacity of 300MW for 4 hours.
- Battery modules are connected in series and parallel arrangements to achieve the required system voltage and capacity.
- Modules installed within insulated, weatherproof containers designed to withstand local climatic and environmental conditions.
- The BESS is expected to operate at up to one full charge–discharge cycle per day, subject to grid requirements and operational agreements.

Figure 2-2 shows the expected integrated lithium-ion battery storage system.

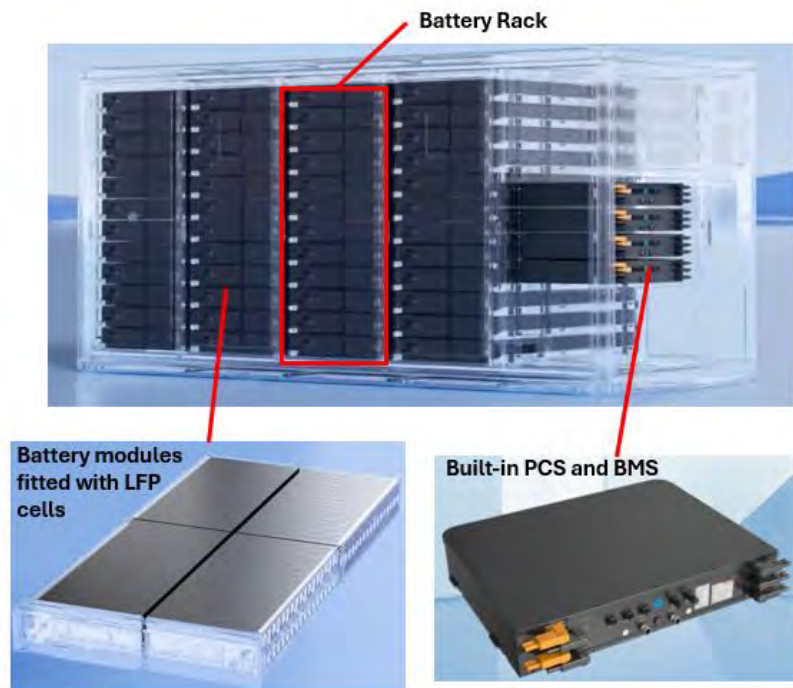


Figure 2-2: Lithium-ion battery storage system

B. Battery Management System (BMS)

The BMS is an essential component of the battery-based energy storage system. This system aims to monitor and manage the performance of batteries, ensuring they operate efficiently and safely. Some of the main tasks performed by the BMS include:

- *Voltage and Current Monitoring: to ensure they operate within safe limits.*
- *Charge Balancing: ensures balanced charging among all cells in the battery, which helps improve performance and extend battery life.*
- *Temperature Monitoring: The BMS monitors the battery temperatures and activates cooling or heating systems as needed to maintain optimal temperatures.*
- *Protection system: It protects against abnormal conditions such as overcharging, over-discharging, short circuits and over temperature.*
- *Diagnostics and Maintenance: The BMS provides regular reports on the battery status and helps detect potential faults before they cause significant problems.*

C. Cooling and Ventilation Systems

Lithium-ion battery modules generate heat during normal charging and discharging operations. To maintain battery temperatures within manufacturer-specified safe operating limits, the BESS will be equipped with a closed loop liquid-based primary cooling circuit combined with air-based secondary heat rejection and ventilation.

- **Primary (Liquid) Cooling Circuit**

A liquid coolant circulates through integrated cooling plates or heat exchangers installed in close thermal contact with the battery cells. Heat generated by the battery cells during charging and discharging is transferred to the circulating coolant. The heated coolant is then

conveyed through a closed-loop system using electrically driven circulation pumps to an external heat rejection stage for cooling before being returned to the battery modules.

- **Secondary (Air) Cooling and Ventilation**

Heat absorbed by the liquid coolant is dissipated to the ambient environment through air-cooled heat exchangers, commonly referred to as dry coolers, where ambient air is forced across these exchangers to remove heat from the coolant.

After passing through the dry coolers, the cooled liquid is recirculated back to the battery modules as part of the same closed-loop cooling system. In addition, ventilation within the battery containers supports internal air circulation, preventing localized heat accumulation and maintaining suitable internal environmental conditions.

All components are monitored and controlled through the BMS and the site's Supervisory Control and Data Acquisition (SCADA) system.

Figure 2-3 illustrates the described closed loop liquid-based cooling system.

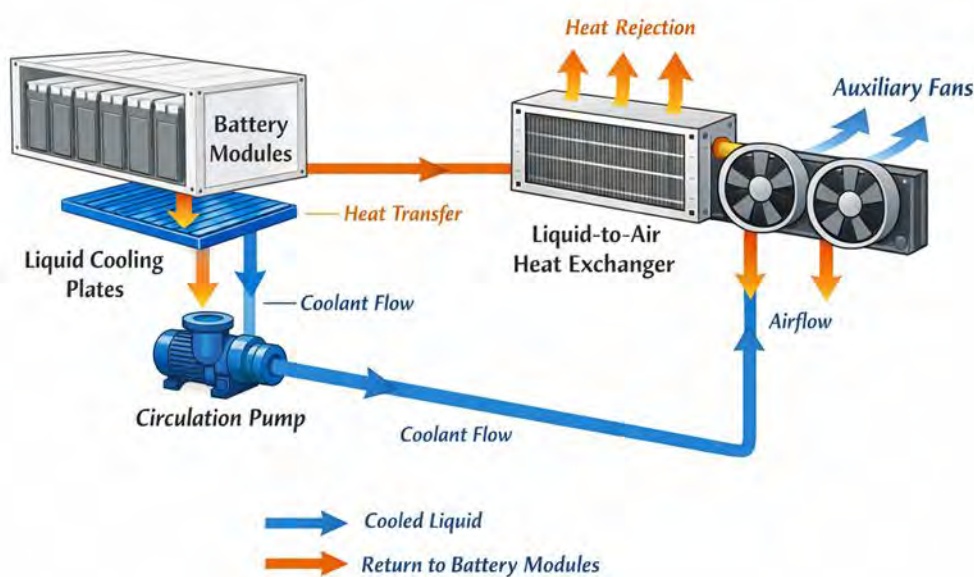


Figure 2-3: Closed loop liquid-based cooling system

D. Power Conversion and Medium Voltage Step-Up

- Power Conversion Systems (PCS) convert DC electricity from the batteries to AC electricity for grid export and vice versa during charging.
- PCS's are integrated into the containerized BESS units providing a combined low voltage AC output.
- The low voltage AC output of each BESS unit is connected to a containerized medium voltage step-up station, consisting of an LV/MV transformer and switchgear for protection.
- The output of MV step-up stations is reticulated via MV cables to the Project's step-up substation.

E. Control and Monitoring Systems

- A centralized SCADA-based control and monitoring system provides real-time system operation, performance monitoring, alarm management, and remote control.
- Sensors and communication interfaces with the BMS enable automated and safe operation of the BESS.

F. Step-Up Substation

A dedicated step-up substation will be constructed within the BESS project area to facilitate power export and import between the BESS and the national electricity grid. The substation is considered an integral component of the project and is included within the scope of this ESIA.

The step-up substation is expected to have an installed capacity of approximately 360 MVA and operate at 33/33/500 kV.

The substation will comprise of one 360 MVA power transformer, associated high- and medium-voltage gas insulated (SF6) switchgear, protection and control systems, and auxiliary equipment required for safe and reliable operation. The power transformer is expected to operate using oil-based insulation and cooling.

The transformer is expected to be loaded with maximum 90% of its ONAF rating and utilize an Oil Natural Air Forced (ONAF) cooling configuration, maintaining voltage regulation from – 15% to +15%. In this configuration, the heat generated within the transformer is dissipated through natural oil circulation and externally forced air cooling. This arrangement enhances operational efficiency and maintains transformer temperatures within acceptable operating limits.

The number, individual capacity, and detailed configuration of the transformers, including cooling fan arrangements, will be confirmed by the Company during detailed engineering design.

G. Electrical Connection to the Grid

The proposed BESS project will be connected to the national electricity transmission network through an external overhead transmission line (OHTL) to be constructed and operated by the Egyptian Electricity Transmission Company (EETC).

The proposed OHTL alignment originates from the 33/500 kV step-up substation located within the project site and extends southwards to connect with the existing electricity transmission network in the vicinity of the Abu Qir Power Plant.

The construction, operation, and maintenance of the OHTL will fall under the responsibility of EETC. The final route alignment and tower configuration will be confirmed during the detailed engineering design phase.

A separate Environmental and Social Impact Assessment (ESIA) will be prepared for the OHTL prior to construction, in accordance with applicable national and lender requirements.

H. Auxiliary and Safety Systems

- Fire detection and automatic aerosol suppression and exhaust ventilation systems are integrated within lithium-ion battery units.
- Emergency power supply systems (e.g. UPS and/or small backup power units for safety-critical equipment)
- Site lighting, security systems, and access control

The installation of the BESS for the proposed project will adhere to the following standards and regulations:

- NFPA 855: Ensuring installations are performed appropriately with vital life safety considerations.
- ISO 45001: Emphasizing occupational health and safety management.
- EN 62485-2: Covering safety requirements for secondary batteries and battery installations.
- Local Building and Fire Codes: Complying with local regulations for safety and construction.

2.4 Construction Activities

At the time of ESIA preparation, the project site is vacant, fully fenced, and free of permanent structures or active operations within the BESS footprint. The site contains a series of ponded areas, reflecting its previous use as a fish farm approximately three years ago. The area is characterized by localized reed vegetation dominated by *Phragmites australis*, and temporary water accumulation, primarily associated with rainfall. The site is predominantly low-lying, with slightly elevated walkways along the site perimeter.

The observed vegetation and surface water are confined within the project boundary and are addressed through the key construction activities described below.

A detailed description of baseline environmental and social conditions is provided in Chapter 3 Environmental and Social Baseline.

Construction of the BESS will commence following receipt of all required permits and approvals. The construction duration is expected to be approximately 20 months.

Key construction activities include:

- **Site preparation and Dewatering**

Site preparation will include clearance of vegetation within the defined footprint and management of rainwater accumulation currently present within ponded and low-lying clayey areas.

Vegetation clearance will be undertaken strictly within the fenced boundary using mechanical methods only, with no open burning permitted.

Topsoil containing organic matter will be stripped to an approximate depth of 15–30 cm, stockpiled separately within the site, and protected against erosion, sediment transport, and runoff for potential reuse or disposal at approved locations, in accordance with applicable national regulations and Good International Industry Practice (GIIP).

Where rainwater accumulation is present within existing ponded areas or low-lying clayey ground, controlled site dewatering of accumulated standing water, where required, will be undertaken prior to site preparation activities. Any water generated from dewatering activities will be collected and transported to an authorized public wastewater treatment plant for treatment and disposal.

- **Ground improvement and foundation works**

Ground improvement and foundation works will include raising and leveling all BESS infrastructure on engineered fill and/or reinforced foundations.

- **Container installation**

Battery containers will be installed on prepared foundations using cranes and controlled lifting procedures. Adequate spacing between containers will be maintained to facilitate site drainage, fire access, and maintenance activities, consistent with the overall site stormwater management approach.

- **Electrical and mechanical installation**

Electrical and mechanical works, including internal cabling, power conversion systems, and auxiliary equipment, will be undertaken on stabilized and dry working platforms.

- **Testing and commissioning**

Testing and commissioning activities, including system integrity checks, electrical testing, and functional commissioning, will be conducted in accordance with manufacturer requirements and applicable safety procedures.

Installation of the BESS will be implemented in accordance with Good International Industry Practice (GIIP). Specific mitigation measures will be applied to manage existing vegetation, saturated soils, and temporary surface water accumulation observed at the project site. Site preparation, drainage control, and ground improvement measures will ensure stable foundations, prevent water ingress into BESS infrastructure, minimize erosion, and protect soil, surface water, and surrounding environmental receptors throughout the construction phase.

2.5 Service Units

- **Temporary structures (during construction phase)**

During the construction phase, only minimal temporary facilities will be provided within the project site, commensurate with the limited workforce size and the short-duration construction activities.

The on-site facilities will be limited to:

- *A small temporary site office or site cabin, used by the contractor and the Employer's representatives for supervision and coordination.*
- *Basic sanitary facilities (portable toilets and handwashing units), provided in accordance with Egyptian health and safety requirements.*
- *Designated laydown and material storage areas for construction equipment and materials.*

The construction workforce is expected to commute daily to and from the site, as suitable residential areas are available within reasonable commuting distance from the project location.

No permanent mess or catering facilities will be established on site. Workers will rely on off-site food arrangements and nearby services during working hours.

All temporary facilities will be installed, operated, and maintained in compliance with applicable international occupational health and safety requirements and relevant Egyptian regulations.

Upon completion of construction activities, all temporary facilities will be removed, and the site will be reinstated to its pre-construction condition, where applicable.

- ***Labor and Working Conditions***

The project will strictly adhere to the Egyptian Labor Law 14/2025 and international standards, including the ILO's "Minimum Age Convention, 1973 (No. 138)" and the "Forced Labor Convention, 1930 (No. 29)," to ensure the prevention of child labour and forced labour. The project will ensure that contractors are committed to abiding by the national minimum wage rate.

Additionally, the project will respect the workers' right to freedom of association and collective bargaining as per the ILO's "Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)" and the "Right to Organize and Collective Bargaining Convention, 1949 (No. 98)".

- ***Permanent Buildings (Operation Phase)***

During the operation phase, limited permanent buildings will be established within the substation of the Project to support control, monitoring, security, and routine operation and maintenance (O&M) activities. Given the highly automated nature of the BESS, staffing levels during operation will be low, and facilities will be sized accordingly.

The main permanent structure will consist of a control building associated with the substation. The control building will be constructed using reinforced concrete and masonry. The building will house control, monitoring, and O&M functions. The facility will be designed and constructed in accordance with Good International Industry Practice (GIIP) and applicable Egyptian codes and standards.

2.5.1 Water and Wastewater Tanks

A. Water Supply and Storage

Construction Phase :

Water required during construction will be limited to basic sanitary uses for the workforce, Daily water consumption during construction is expected to be approximately 10 m³/day. Water will be supplied through water tankers sourced from approved suppliers and stored in small, prefabricated water tanks installed on site.

Operation Phase:

During operation, water demand will be limited to office sanitary purposes only. Water consumption during the operation phase is expected to be approximately 0.3 m³/day.

The BESS does not require process water. Battery thermal management is achieved through a closed-loop liquid cooling system using a circulating coolant, which is not consumed or discharged during normal operation.

Water supply during operation will be provided through a connection to the available public water network.

B. Wastewater

Construction Phase:

Wastewater generation during construction will consist of domestic wastewater generated from sanitary facilities used by the construction workforce, in addition to existing standing water present within the project footprint at the start of construction.

Domestic wastewater will be collected in temporary septic tanks installed on site and will be removed by licensed contractors for treatment and disposal at approved wastewater treatment facilities.

Wastewater volumes during construction (domestic wastewater only) are expected to be approximately 8.5 m³/day.

Operation Phase:

During operation, wastewater generation will be limited to domestic wastewater from offices and sanitary facilities.

Estimated wastewater generation during operation is approximately 0.26 m³/day. Wastewater will be managed through the available wastewater infrastructure, via a connection to the public wastewater network.

C. Electricity supply

Construction Phase:

Electricity required during the construction phase will be supplied through temporary diesel-powered generators.

Temporary electricity supply will be used to serve:

- *Small site offices*
- *Site lighting*

- *Limited construction equipment*

Total electricity consumption during construction is estimated at approximately 10–20 MWh.

Operation Phase:

During operation, electricity required for auxiliary loads of the BESS (including control systems, cooling systems, lighting, and offices) will be supplied directly from the national grid and/or internally from the BESS itself, in accordance with the system design.

D. Fuel supply

Construction Phase:

Fuel required for construction vehicles and mobile equipment will be supplied off-site from licensed fuel stations.

- *No fuel storage will be provided within the project site.*
- *No refueling activities will take place on site.*

Operation Phase:

Due to the availability of a reliable grid connection, routine fuel use during operation is not anticipated.

For safety-critical systems (such as control systems, fire detection, security, and communications), a small emergency power source—such as a compact backup generator or an Uninterruptible Power Supply (UPS)—may be provided, subject to confirmation during detailed design.

E. Labour

The direct labour force required for the project construction could reach 250 workers at peak construction months, including skilled and unskilled labour. The contractors will hire workers from the local communities.

Permanent employees during operation are expected to be up to 8 workers. According to the company's employment policy, preference will be given to workers from neighboring areas, depending on the availability of suitable qualifications.

2.6 Decommissioning Phase

A. BESS Deactivation

- *Controlled discharge and isolation of battery modules.*
- *Methodical disassembly and separation of battery components.*
- *Recycling or proper disposal of battery materials (e.g., lithium-ion) in compliance with environmental regulations and best practice/international and/or EU guidelines.*
- *Follow the standard decommission procedure provided by the BESS equipment supplier, where applicable and available.*

B. Electrical Component Deactivation

- Safe isolation and deactivation of transformers, and switchgear.
- Comprehensive testing and assessment of electrical components to determine suitability for reuse or recycling.
- Environmentally responsible disposal of any hazardous materials contained within electrical equipment.

2.7 Environmental and Social Aspects**2.7.1 Construction and operation of the BESS****A. Construction phase**

- **Wastes**

Soil and Vegetation:

Site preparation activities, including limited vegetation clearance and ground improvement will generate:

- o Stripped topsoil containing organic matter
- o Cleared vegetation (e.g. grasses and reeds present within the footprint)
- o Topsoil will be disposed of at approved locations. Cleared vegetation will be managed separately and reused where practicable or disposed of at authorized facilities. No vegetation removal will occur outside the project boundary.

Wastewater:

Accumulated water, including pre-existing standing water and rainwater within the project footprint. As part of site preparation and construction activities, this water will be collected through temporary drainage channels and sump pits and pumped in a controlled manner for removal by licensed contractors and disposal at approved wastewater treatment facilities.

Domestic wastewater, generated from sanitary facilities used by the construction workforce, which will be collected in temporary septic tanks and removed by licensed contractors for treatment and disposal at approved wastewater treatment facilities.

Construction Debris: Includes concrete, metals, plastics, and packaging materials.

Hazardous Wastes: Potentially includes solvents, paints, and other chemicals used during construction.

- **Air Emissions**

- o Emissions from construction equipment exhaust, such as nitrogen oxides, sulphur oxides, and carbon monoxide.
- o Greenhouse gas (GHG) from construction vehicles and machinery.
- o Localized dust and particulate matter emissions, which may arise intermittently from site preparation activities, handling and stockpiling of excavated or imported materials, and vehicle movement within the site. Given the presence of wet soils and surface water at the site, dust generation is expected to be limited and temporary.

- **Noise**

The primary sources of noise during construction are transport vehicles, foundation installation activities, heavy equipment/machinery, cutting machines, and vehicle movement.

2.7.2 Operation Phase

Noise at the workplace:

- Power Conversion Systems (PCS / inverters)
- Auxiliary cooling units (hybrid liquid/air cooling system)
- Control and auxiliary electrical equipment

Wastes:

- Maintenance-related wastes, including small quantities of: Used lubricants and oils, cleaning materials, and replaced electrical or mechanical components
- Hazardous waste, including end-of-life battery modules and electronic components, generated infrequently and managed in accordance with applicable regulations.
- Wastewater, limited to domestic wastewater from office and sanitary facilities during operation.

2.7.3 Decommissioning phase

The decommissioning process, while expected to have a minimal environmental footprint, will generate some waste streams. These include

- Non-hazardous waste, such as scrap metals, cabling, structural components, and container materials.
- Hazardous waste, including lithium-ion battery modules, electronic components, and residual hazardous materials, which will be handled, transported, and disposed of or recycled in accordance with national regulations and international best practice.
- Dust emissions associated with dismantling and removal activities.
- Temporary noise from dismantling equipment and vehicle movements.

2.8 Area of Influence

A. Construction Phase

During the construction phase, the Area of Influence (AoI) includes the project site and its immediate surroundings, where temporary and localized impacts associated with construction activities may occur. All construction activities, installations, material storage, and vegetation clearance will be confined within the fenced project boundary, while the surrounding area is considered only for the assessment of short-term construction-related effects, such as noise and movement of construction vehicles and equipment.

B. Operation Phase

During the operation phase, the AOI is confined to the project footprint only. The presence of a permanent perimeter fence and the controlled nature of project activities ensure that environmental and social impacts outside the site boundary are minimal.

3. Baseline Environment

3.1 Physical Environment

Information was gathered from published material, previous reports, online meteorological data such as Meteoblue and Weatherbase, interpretation of geological and hydrogeological maps, analysis of satellite images and application of GIS analysis tools. Topographic maps and groundwater information are based on the Geotechnical Encyclopedia of Egypt (2003) and other local sources.

3.1.1 Project Site

The proposed BESS project is located on land owned by new Abu Qir Power Plant. The proposed project area approximately 50,410 square meters, about 180 m south of the Mediterranean Sea, approximately 2.2 km from Lake Idku, about 10 km from Abu Qir City, and about 25 km from Alexandria.

Administratively, this land is located within the boundaries of El Tabia village, Montazah II District, Alexandria Governorate, on the administrative border between Alexandria and Beheira Governorates. The proposed project site can be accessed via the El Tabia- Rashid Road.

According to information obtained during the site visit conducted by the Consulting Team on January 22, 2026, and the photographs taken during the visit as shown in Figure 3-2, the site was previously leased by Abu Qir Power Plant to a private investor for the establishment of a fish farm; however, the project operated for only around six months before being abandoned, after which the land reverted to Abu Qir Power Plant.

The proposed project site is bordered by the following:

- North: Abu Qir Power Plant storage and scrap area.
- East: An agricultural drain, then vacant land, agricultural land, and Ezbet El Setin
- South: El Tabia- Rashid Road and the Abu Qir railway line.
- West: Abu Qir Power Plant.

The nearest residential area is Ezbet El Setin village, located about 100 m east of the project, as shown in Figure 3-1.

Table 3-1: Coordinates of Project Site

Point	Longitude (East)	Latitude (North)
1	541817.1	3420210
2	541825.5	3420210
3	541851.8	3420209
4	542035.4	3420185
5	542030.2	3419915
6	541809.4	3419923

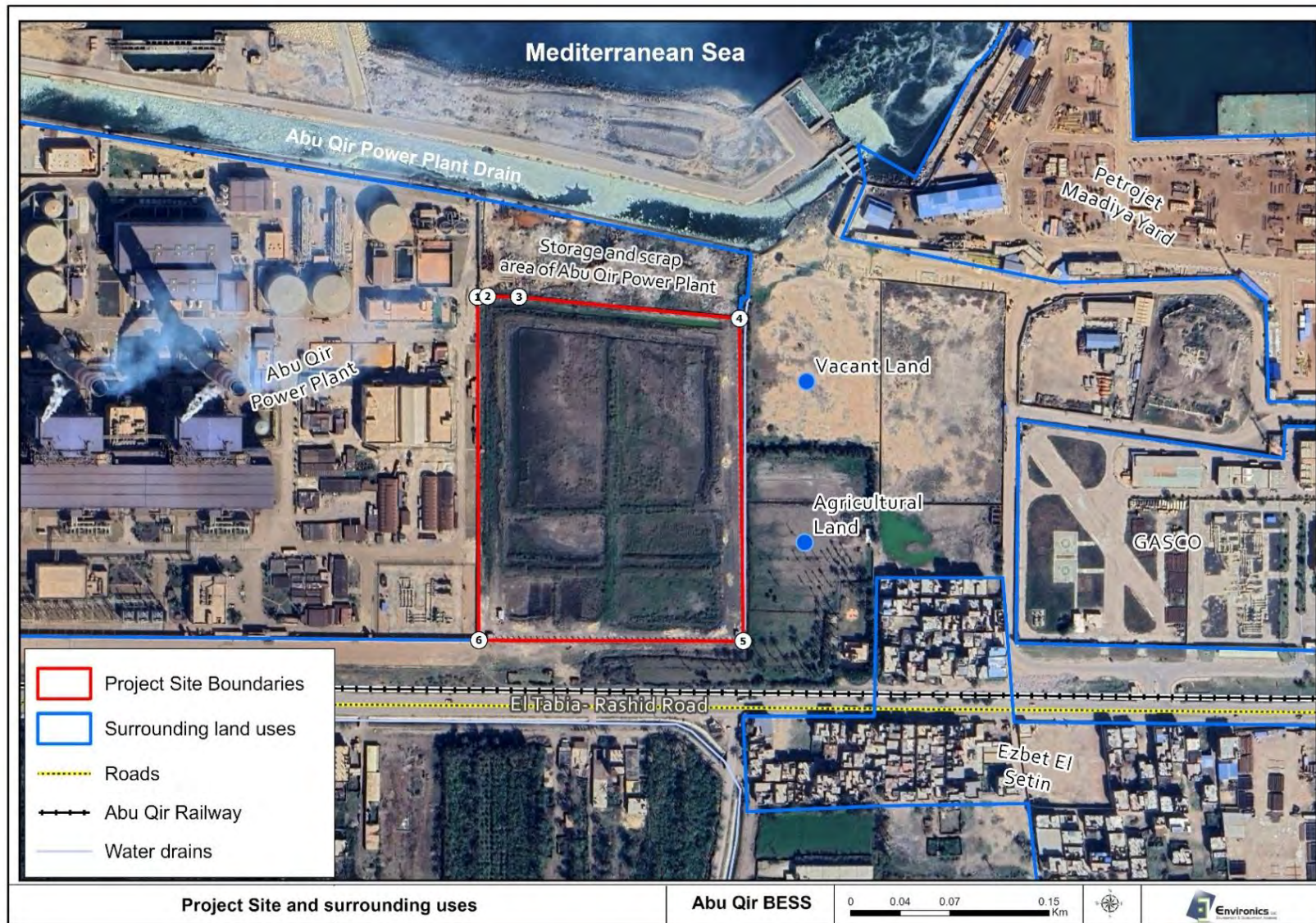


Figure 3-1: Project site and surrounding uses



The northwestern part of the project site

The northeastern part of the project site

Figure 3-2: Image of the proposed project site

Source: Environics site visit on January 22, 2026

3.1.2 Climate

This section summarizes information pertaining to wind speed and direction, maximum and minimum air temperatures, rainfall and relative humidity at and Abu Qir Fertilizer Company region. The climatic data presented below are extracted from the Central Agency for Public Mobilization and Statistics (CAPMAS) (2025) and the Meteoblue database (2026) of Alexandria governorate.

a. Wind

Alexandria Governorate experiences notable variability in wind speeds throughout the year, with an annual average of approximately 25 km/h. The prevailing wind direction is northwesterly, as shown in Figure 3-3.

Alexandria
31.20°N, 29.92°E (9 m asl).
Model: ERA5T.

meteoblue®

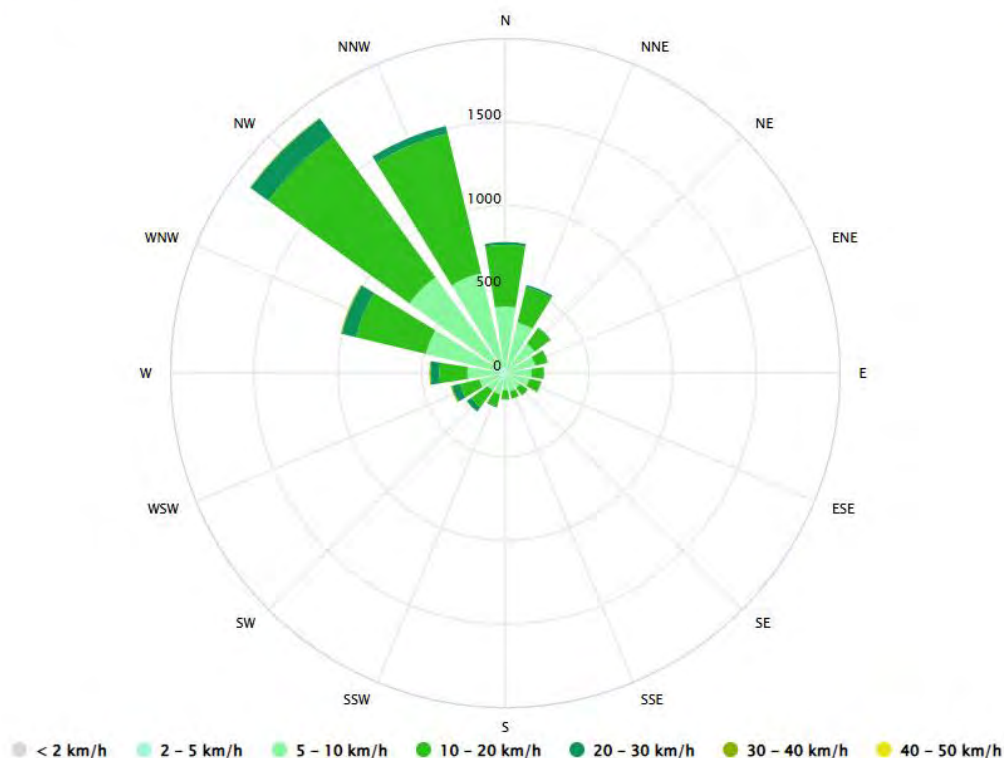


Figure 3-3: Wind Rose for Alexandria Governorate

Source: Meteoblue database (2026)

b. Temperature

Records from the Alexandria meteorological station indicate that the highest temperature (maximum) was recorded during August at 30°C, while the lowest temperature (minimum) was recorded in January and February at 10°C table 3-2 shows Maximum and minimum monthly air temperatures

Table 3-2: Maximum and Minimum Monthly Air Temperatures

Air Temp. (°C)	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum	17	18	20	23	26	28	28	30	28	27	23	19
Minimum	10	10	11	14	17	20	22	23	22	18	15	11

Source: CAPMAS 2025

c. Rainfall

Alexandria is located in a coastal climatic region characterized by a relatively moderate climate with high humidity levels. The city experiences varying amounts of rainfall during the winter season, while precipitation is significantly lower in the summer. As shown in Table 3-3, the maximum rainfall occurs in January with 10mm, followed by February with 9mm.

Table 3-3: Average Monthly Amount of Rainfall

Month											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
10.0	9.0	5.0	2.0	1.0	0.0	0.0	0.0	1.0	2.0	5.0	8.0

Source: CAPMAS 2025

d. Relative Humidity

The average monthly relative humidity in Alexandria is 71.3%. The highest value is observed in August, at 75%, while the lowest is in May, at 53%. Table 3-4 presents the monthly average of relative humidity.

Table 3-4: Relative Humidity (%)

Parameter	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Relative Humidity (%)	61	59	57	57	53	67	56	71	59	60	58	59

Source: CAPMAS 2025

3.1.3 Topography

According to the Geotechnical Encyclopedia of Egypt (2003), The governorate's topography generally slopes gradually from south to north, where ground elevations exceed 140 meters above mean sea level in the southern areas and gradually decrease northward to reach sea level. The land surface across the governorate is generally flat, with a gentle and gradual slope from south to north.

The project site is located on a semi-level terrain, with an average ground elevation of approximately 2 m above mean sea level as shown in Figure 3-4. Results of the site visit indicate that most of the Project Site is low-lying due to the previous presence of fishponds, while the side walkways are flat and levelled.

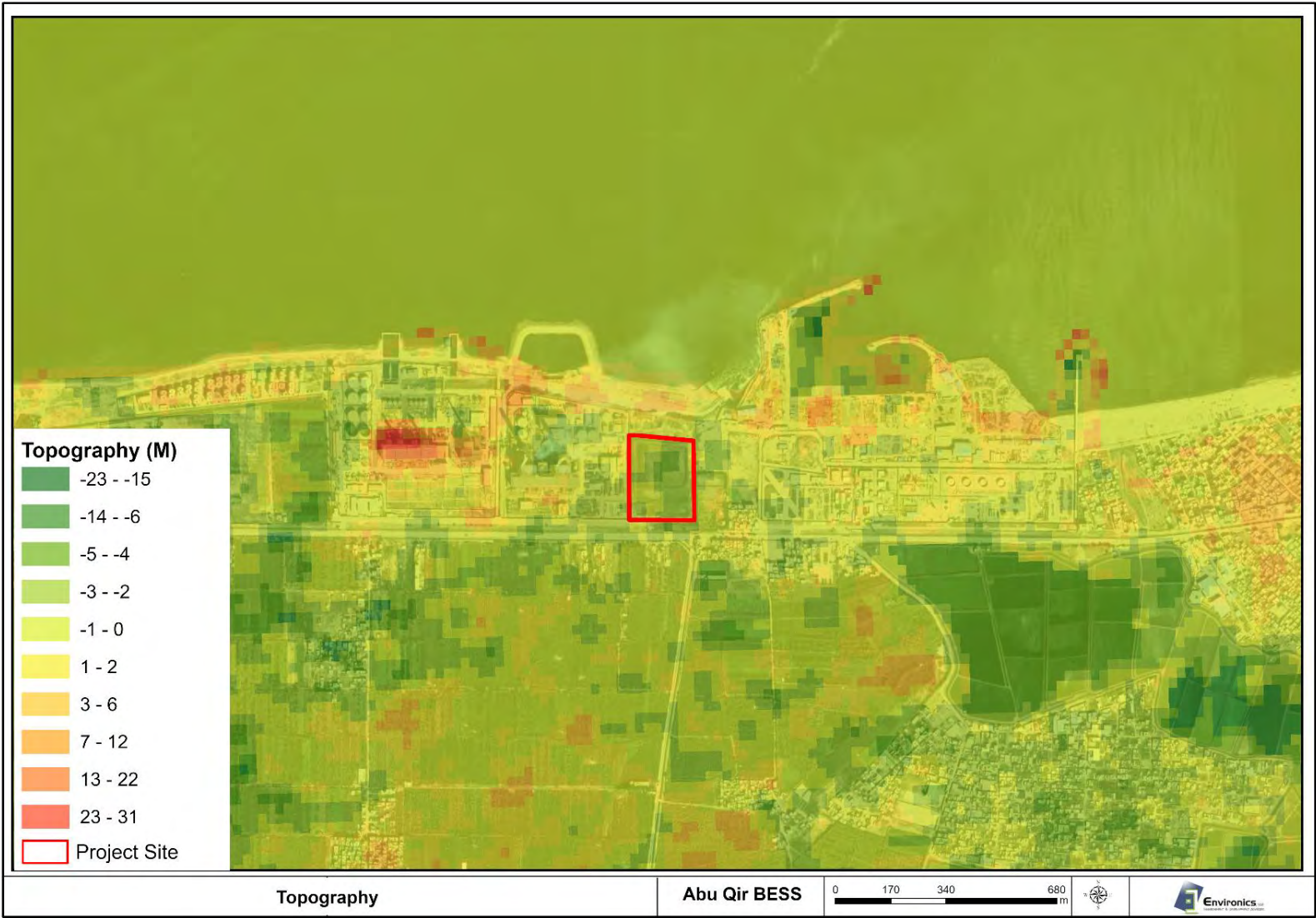


Figure 3-4: The topographic map of the project site

3.1.4 Soil

According to the Geotechnical Encyclopedia of Egypt (2003), the soil composition at the project site is a layer of poor to moderate strength clay loam soil. This layer may be interspersed with, or underneath, veins or layers of sand with different proportions of clay, with a thickness ranging from 1 meter to 5 meters. The thickness of this layer ranges from 6 to 19 meters. Figure 3-5 presents the soil classification map of the project site; Figure 3-6 shows two photographs of the observed soil.

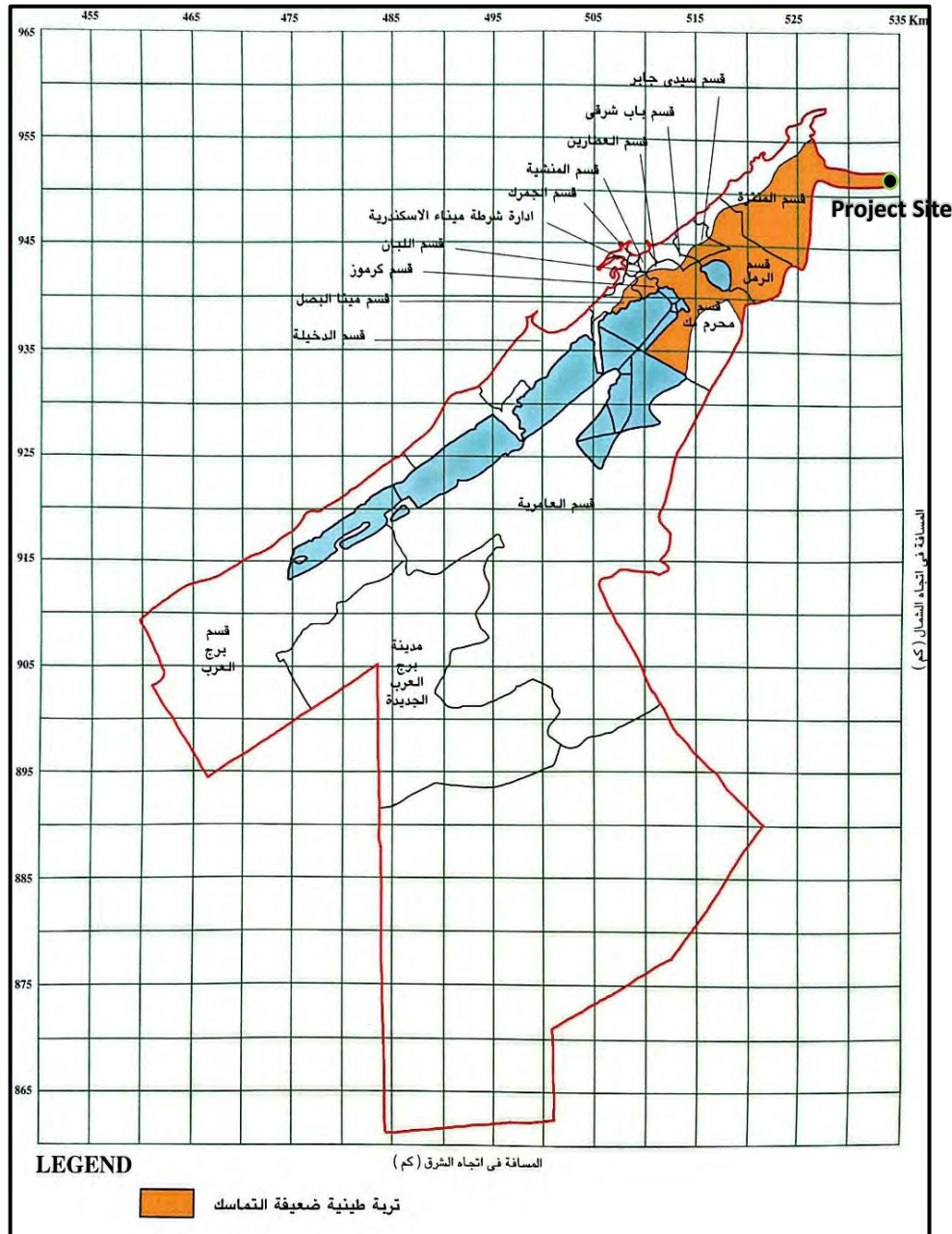


Figure 3-5: The soil map of the project site

Source: Geotechnical Encyclopedia of Egypt, 2003, Cairo University



Figure 3-6: Image of the observed soil at the project site

Source: Environics site visit on January 22, 2026

3.1.5 Geology

According to the Geological map of Egypt shown in Figure 3-7, most of Alexandria Governorate is covered by Quaternary sediments, which include two geological formations as follows:

- Holocene Deposits (The upper layer): These deposits are composed of clay and silt, with thickness ranging from 20 to 25 m. These deposits could be found at a depth of more than 20 meters below the surface.
- Pleistocene sediments (The lower layer): These deposits are composed of sand and gravel, with some clay lenses, with thickness ranging from approximately 60 m to 120 m. These deposits could be found on the surface of the soil.

The lithological units in the project area are mainly of Quaternary deposits and belong to the Holocene age. They are composed of clay and silt.



Figure 3-7: The Geological map of the project site

Source: Geological map of Egypt, 1981

3.1.6 Geomorphology

According to the Geotechnical Encyclopedia of Egypt (published by Cairo University in 2003), Alexandria Governorate is characterized by six types of geomorphological units, which are as follows:

- The coastal plains parallel to the Mediterranean Sea
- Old alluvial plains
- Abu Mena Depression
- Southern Highlands

The project site is located on the coastal plains parallel to the Mediterranean Sea (Figure 3-8), which consists of Nile deposits of silt, clay, and sabkha deposits.

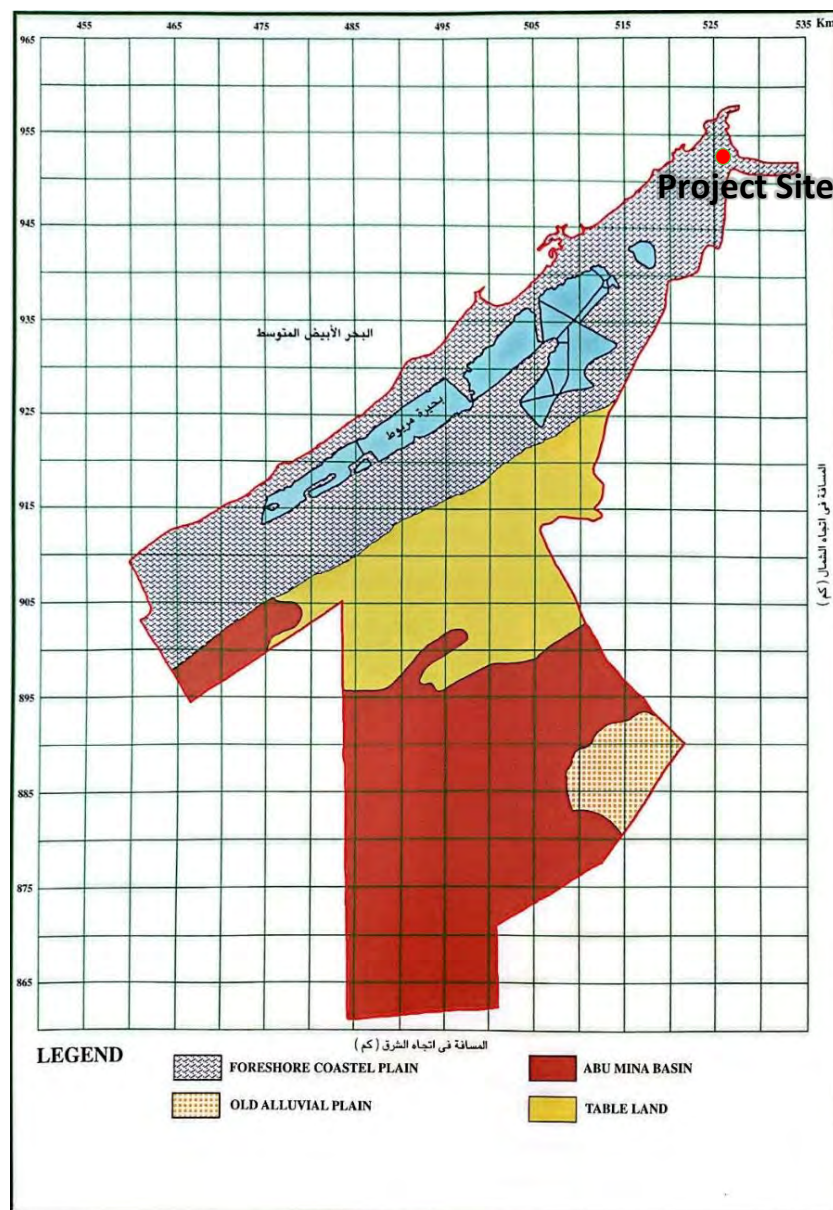


Figure 3-8: The Geomorphological map of the project site
Source: Geotechnical Encyclopedia of Egypt, 2003, Cairo University

3.1.7 Surface Water (Water Bodies)

The closest surface water resources to the project site, as illustrated in Figure 3-9, are as follows:

- Rakta canal: It is about 65 m south of project site and flows westwards and then south to the Mahmudiyya Canal.
- The Mediterranean Sea: it is about 180 m north of project site.

The water quality of both water bodies ranges from moderate to poor. According to (Ramadan, 2005)¹, the Rakta Canal suffers from significant water quality deterioration due to the direct discharge of industrial wastewater from the El-Tabia industrial Zone. Meanwhile, the water quality of the Mediterranean Sea near the project site, according to (Mohamed et al., 2021)², shows a moderate and spatially variable quality, with localized pollution hot spots exhibiting higher organic matter and heavy metal contamination near the El-Tabia outfall and the Rosetta branch discharge point.

¹ Mohamed Ramadan, 2005, Study on Industrial Wastewater Characteristics in New Borg El-Arab City, Alexandria, Egypt, Journal of King Abdulaziz University-Meteorology, Environment and Arid Land Agriculture Sciences
https://www.academia.edu/84304350/Study_on_Industrial_Wastewater_Characteristics_in_New_Borg_El_Arab_City_Alexandria_Egypt

² Mohamed, L., Salem, D., Radwan, A. (2021). "Evaluation of Heavy Metals Pollution in Seawater, Suspended Particulate Matter and Sediment from Abu-Qir Bay, Alexandria, Egypt." Egyptian Journal of Aquatic Biology and Fisheries, 25(2), 875-896. DOI: 10.21608/ejabf.2021.170057 —
https://ejabf.journals.ekb.eg/article_170057.html



Figure 3-9: Surface water resources around the project site

3.1.8 Groundwater

According to the Geotechnical Encyclopedia of Egypt, as shown in Figure 3-10, the project site is located within the Quaternary aquifer, which is characterized by moderate productivity. The depth to groundwater in the project area ranges from approximately 5 to 10 m below ground surface.

This aquifer is replenished primarily by rainfall, surface water runoff, seawater intrusion, and agricultural irrigation return flow. Groundwater from this aquifer is discharged naturally through hydraulic connection with drainage channels and adjacent surface water bodies, as well as by upward leakage through the overlying semi-permeable layer.

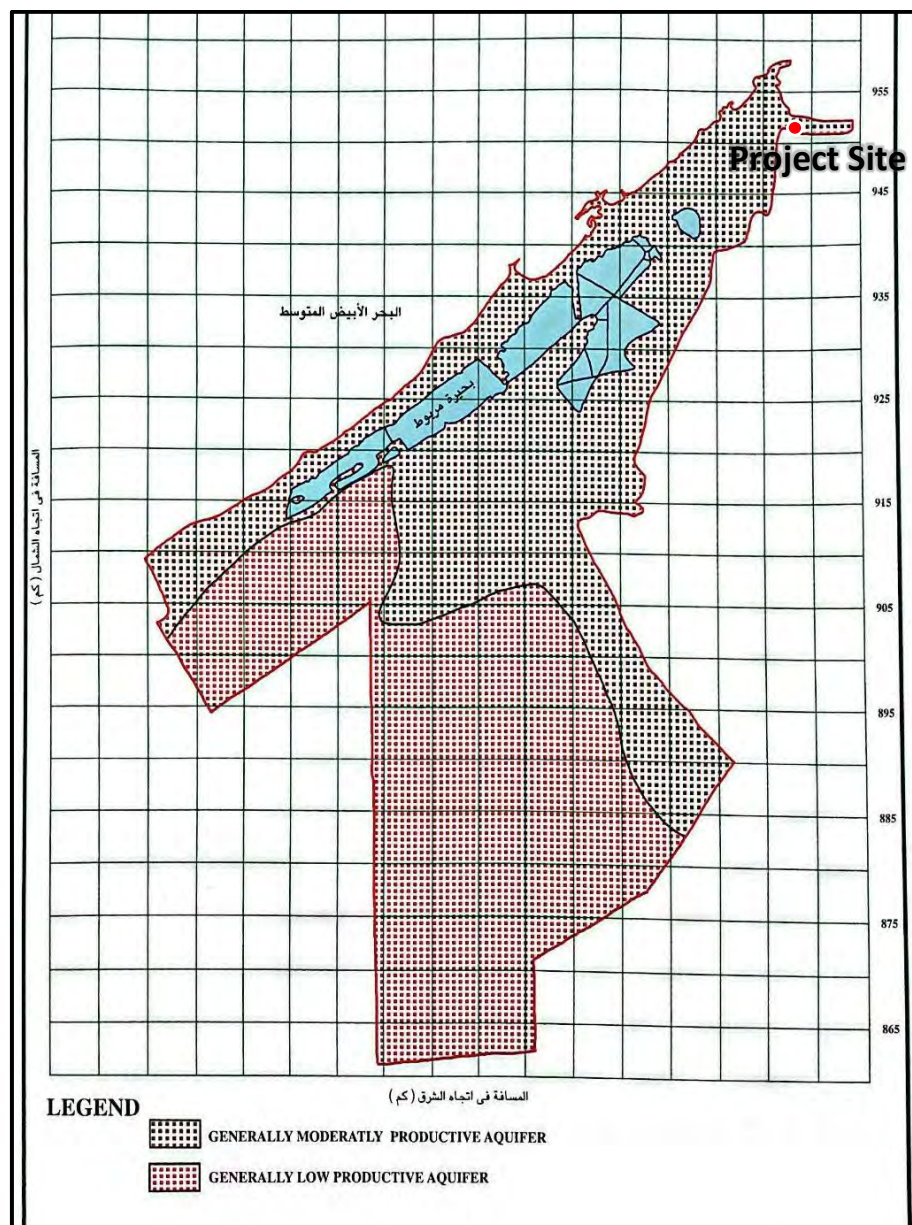


Figure 3-10: The Groundwater map of the project site

Source: Geotechnical Encyclopedia of Egypt, 2003, Cairo University

3.1.9 Natural Hazards

- **Flash Flood Risks**

In general, Alexandria Governorate is characterized by a relatively flat topography, and there are no mountains that may cause the risk of flash floods. Moreover, there are also no depressions inside or near the project site. Therefore, the Flash Flood Risks are unlikely to occur.

- **Earthquakes**

Seismic intensity in Egypt is generally low, except in some areas affected by relatively active faults, particularly in the Gulf of Suez, the Red Sea, and the Eastern Mediterranean. The project area lies within a low-risk seismic zone, with data from the 2022 Seismic Bulletin issued by the National Research Institute of Astronomy and Geophysics (NRIAG) indicating that the nearest seismic focus is approximately 190 km northeast of the site, with a magnitude 2-3 on the Moment Magnitude Scale – (Mw)³ as shown in Figure 3-11.

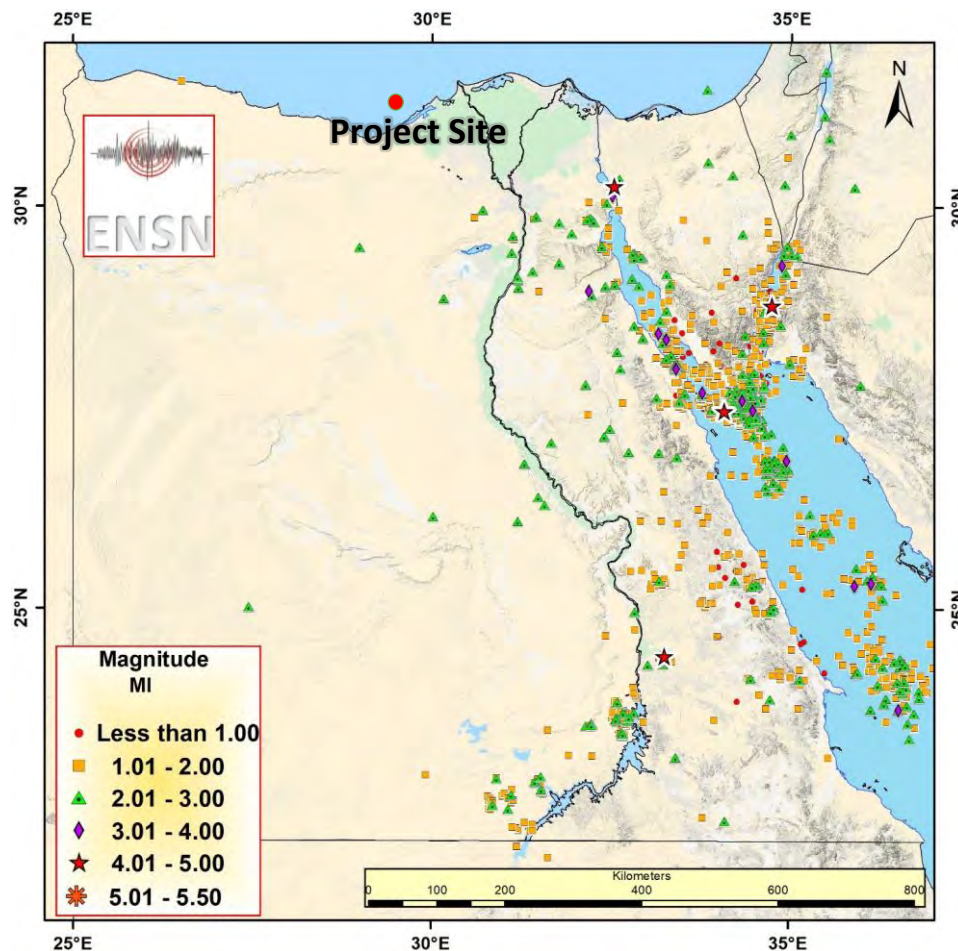


Figure 3-11: Earthquake Map of Egypt

Source: Extracted from the Annual Seismic Bulletin, Egypt (2023)

³ The Moment Magnitude Scale (Mw) is the standard scientific scale used to quantify earthquake size based on the total seismic energy released. It is derived from the seismic moment, which is calculated as the product of rock rigidity, average fault slip, and the rupture area. This scale provides more accurate and consistent measurements than the Richter scale, particularly for moderate to large earthquakes.

3.2 Biological Environment

Information and data on the species/features of the wider area⁴ that could be also present in the project's Area of Influence were gathered from direct observations, published material and previous reports, analysis of satellite images and from recent studies performed by Environics and other entities.

A site visit to the project site and its close surroundings was undertaken on the 22nd of January 2026 by three Environics team members. Characteristic features were photographed and their location recorded using a GPS. The survey included an active search to record the main species of flora and signs indicating the presence of fauna (markings, urine, scats, tracks, trails, burrows and dens, carcasses, remains of prey or direct observation of the animal). Field notes were taken, and photographic records of flora and fauna were obtained, whenever possible.

3.2.1 Project Location

The Project Site is in Abu Qir City along the Tabia – Rashid Road, in a land belonging to the new Abu Qir Power Plant, at the administrative borders between Alexandria and Beheira Governorates. It is located about 160 meters away from Abu Qir Bay and about 2,200 m from Lake Idku. The closest settlement is the village of Ezbet El-Settin located southeast and east of the Project Site. The project site can be accessed via Tabia – Rashid Road. Figure 3-12 shows the project site

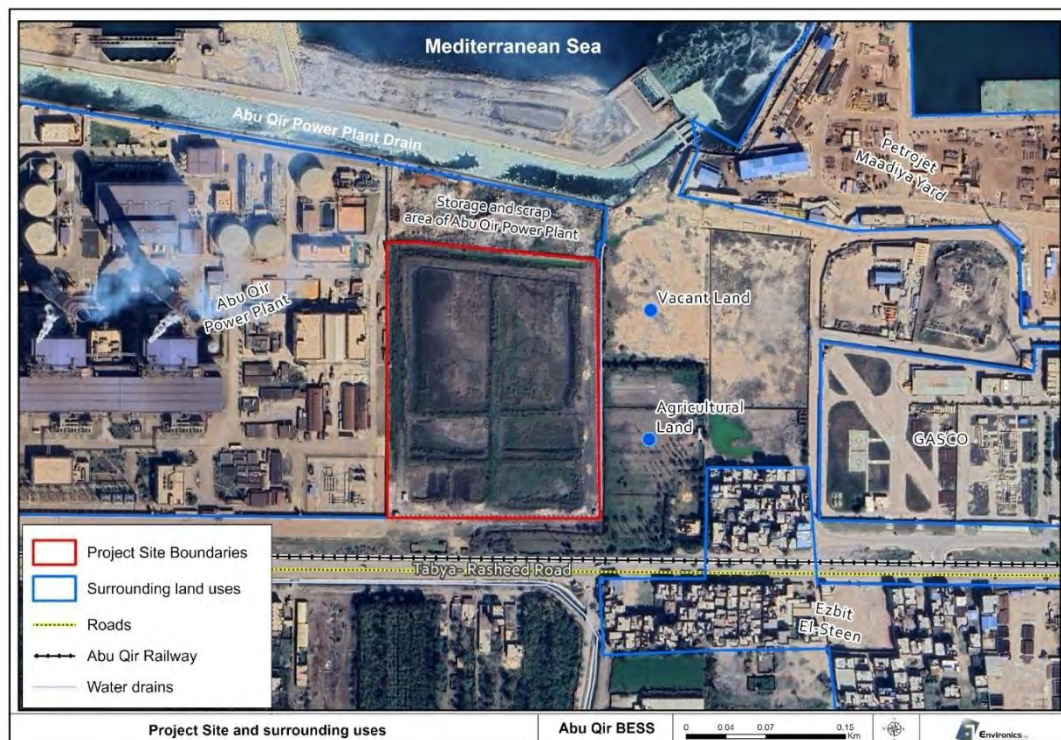


Figure 3-12: BESS project site and the surroundings

⁴ The wider area includes the area surrounding the project site which encompasses the same habitat and features of the project site and having a reasonable geographical extent to include all environmental and social aspects/receptors that might interact with project activities.

3.2.2 Project Wider Area

The proposed project site is located in an entirely modified habitat. Moreover, the area surrounding the Project Site includes different habitat types: marine environment (not relevant to the present project), coastal area, arable (agricultural) land, urban and industrial areas, wastelands, and the nearby wetland of Lake Idku. Each of the aforementioned habitats encompasses its own set of fauna and flora.

A brief description of the main habitats of the wider area and their characteristic biodiversity is herein provided.

- **Agricultural Lands**

Agriculture is the main activity of residents in rural areas and there are essentially two types of cultivations: open fields with crops and palm plantations. The main cultivated crops are tomato, cauliflower, cabbage, squash, clover and chards in winter. In summer, tomato, pepper, eggplant and fodder are the main crops. Date palm plantations and orchards are abundant in the area as well.

These farmlands are essentially completely modified habitats, nevertheless, they provide habitat for a variety of weeds and ruderal plants in the fields, canal and drain banks.



Figure 3-13: Palm plantations located south of the Project Site

There is a small agricultural plot (El Shazly Land) located on the eastern borders of the Project Site (Figure 3-14), with a small agricultural ditch running parallel to the eastern fence of the site (Figure 3-15).



Figure 3-14: Agricultural plot located on the eastern borders of the Project Site



Figure 3-15: Agricultural ditch running parallel to the eastern fence of the Project Site

- **Wastelands**

Wastelands with extensive flora are present on the southern borders of the project site (3-16), probably due to the relatively frequent rainfalls characterizing the area and possibly due to the presence of irrigation water from the nearby agricultural lands.



Figure 3-16: Wastelands located on the southern borders of the Project Site

- **Urban and industrial Environment**

In addition to the Abu Qir Power Plant (3-17), the coastal area is characterized by the presence of numerous other industrial facilities such as Abu Qir Fertilizers Company, GASCO, etc.



Figure 3-17: Abu Qir Power Plant

Moreover, there are urban settlements scattered throughout the farmlands, Ezbet El-Settin being the closest to the Project Site. This village is located southeast of the Project Site and extends northwards, to the east of the Project Site (Figure 3-18).



Figure 3-18: Northern extension of Ezbet El-Settin, east of the Project Site

The built environment of the area also includes irrigation canals and drains, roads and roadsides, a railway and other constructions. These habitats are home to exotic plants and trees introduced for ornamental purposes, as well as opportunistic fauna associated with human activities (e.g., feral dogs and cats, rats, mice, and several species of birds).

- **Littoral Area**

The beach at Abu Qir Bay is characterized by gravel or sand deposit although silty and muddy tidal flats are within this zone. Ancient sediments in this zone contain organisms typical of the tidal flat such as worms, crabs and clams (Shehata, 1987).

- **Lake Idku**

Lake Idku is a shallow coastal wetland located west of the Rosetta Nile branch. Three main drains discharge into the lake, while Bughaz El Maadia provides a connection with the sea. The water in the lake is mainly fresh but increases in salinity towards the Bughaz and during the summer. Most of the lake margins are covered with dense growths of *Typha* and *Phragmites*, which cover about 50% of the lake's area. Saltmarshes, salinas and high dunes, as well as some orchards, are found on the sandbar separating the lake from the Mediterranean. Lake Idku supports a fishery of moderate importance. (KBA, 2026). The lake proper (open waters) is located at a distance of about 2,200 m southeast of the Project Site. In addition, fish farms are present within the lake, extending to a distance of approximately 600 m southeast of the Project Site.

3.2.3 The Project Site

The Project Site covers an area of about 50,410 m² and is completely fenced. It is a totally man-made habitat, which was used as a fish farm approximately three years ago and then abandoned. Accordingly, the site layout was developed for this purpose. Currently, the site is divided into ponds, where the invasive reed *Phragmites australis* dominate (Figure 3-19). No buildings related to the previous project are present.

To support accurate spatial referencing of the Project Site, the coordinate system used is Africa Lambert Conformal Conic, as presented below.

Table 3-5: Coordinates of the Project Site (Africa Lambert Conformal Conic)

PointID	Easting	Northing
1	541817.1	3420210
2	541825.5	3420210
3	541851.8	3420209
4	542035.4	3420185
5	542030.2	3419915
6	541809.4	3419923



Figure 3-19: View of the reed-dominated site

Accordingly, the site is mostly low-lying, except for the walkways bordering the site fence (Figure 3-20).



Figure 3-20: Western walkway bordering the fence of the Abu Qir Power Plant

Evidence of rainwater accumulation and potential seawater intrusion was observed across the low-lying parts of the site (Figure 3-21). The existing ponds facilitate the collection and retention of rainwater and, possibly, groundwater rise, allowing to the growth of extensive reed vegetation.



Figure 3-21: Water accumulation in the low-lying parts of the Project Site

The surface soil of the walkways is mostly composed of wet clay (clayey soil), with scattered sand and gravel (Figure 3-22).



Figure 3-22: View of the topsoil of the Project Site at the eastern walkway

- **Natural and Modified Habitats**

In accordance with IFC PS6, habitat types are natural, modified and critical habitat (irrespective of whether it is natural or modified). The Project Site is located in a modified habitat with industrial and agricultural uses, and it is not considered as a critical habitat (IFC, 2012) & (EBRD, 2023). The proposed project site is located in an entirely modified habitat.

3.2.4 Biodiversity

Information on the biodiversity of the Project Site is based on the site visit carried out on the 22nd of January 2026. Information on the wider area is based on literature review and previous knowledge of the surrounding habitats.

- **Flora**

The specific site location is dominated by the invasive Common Reed (*Phragmites australis*), forming a reed swamp. Other recorded species included the Common Knotgrass (*Polygonum aviculare*), Field Wormwood (*Artemisia campestris*), Small Mallow (*Malva pusilla*), Egyptian Mallow (*Malva parviflora*), Vimba (*Pluchea dioscoridis*) and Quincy Pride (*Pluchea ovalis*).



Figure 3-23: Common Knotgrass (*Polygonum aviculare*)



Figure 3-24: Field Wormwood (*Artemisia campestris*)



Figure 3-25: Small Mallow (*Malva pusilla*)



Figure 3-26: Egyptian Mallow (*Malva parviflora*)



Figure 3-27: Vimba (*Pluchea dioscoridis*)



Figure 3-28: Quincy Pride (*Pluchea ovalis*)

- **Fauna**

Reptiles and Amphibians

Amphibians, such as the Egyptian Toad (*Sclerophrys regularis*), are common in the nearby agricultural fields and in the irrigation and drainage network of the area and are probably present among the reeds of the Project Site. The endemic Nile Delta Toad (*Sclerophrys kassasii*) is also reported from the area. It is a highly aquatic species that prefers densely vegetated microhabitats such as reed swamps, overgrown canals and waterways (Baha El Din, 2006). Therefore, *Sclerophrys kassasii* might also occur within the man-made reed swamp of the site.

Typical snakes found in the agricultural fields of the area include the African Beauty Snake (*Psammophis sibilans*), Diced Water Snake (*Natrix tessellata*), Eastern Montpellier Snake (*Malpolon insignitus*) and the highly venomous Egyptian Cobra (*Naja haje*). The presence of snakes onsite was also reported by officials from the Abu Qir Power Plant.

Avifauna

Birds recorded during the January 2026 site visit include the House Sparrow (*Passer domesticus*), Barn Swallow (*Hirundo rustica*), Hooded Crow (*Corvus cornix*) and Cattle Egret (*Bubulcus ibis*). Numerous other birds typical of agricultural areas are also present, such as the Palm Dove (*Spilopelia senegalensis*), Spur-Winged Lapwing (*Vanellus spinosus*), Black-winged Kite (*Elanus caeruleus*), Common Kestrel (*Falco tinnunculus*), Common Barn-owl (*Tyto alba*) and many others (EEAA/UNEP, 1993; A. Sarwat, personal observations, 2026).

According to the Migratory Soaring Bird Sensitivity Tool (MSBT), 13 species of migratory birds, a number of which are soaring birds, may pass over the project site as indicated in the following table (Table 3-6) (MSBT, 2026). Yet, the results of the MSBT show that no soaring bird tracks have been recorded even within a 5-km diameter buffer around the site. The reason is mainly that the MSBT takes into consideration the Low Concentration/Density of the birds, as it focuses on large-scale, high-density migration corridors. Accordingly, while soaring birds may pass over the area, they might be scattered or migrate in low numbers, which the model classifies as low sensitivity. Therefore, the sensitivity to migratory soaring birds is considered negligible (0).

Table 3-6: the migratory birds around the Project Site

Scientific name	Common name	Habitat	IUCN Category
<i>Milvus migrans</i> (Boddaert, 1783)	Black Kite	Migratory landbird	LC
<i>Elanus caeruleus</i> (Desfontaines, 1789)	Black-winged Kite or Black-shouldered Kite	Resident breeding landbird, found in cultivated lands	LC
<i>Grus grus</i> (Linnaeus, 1758)	Common Crane	Migratory waterbird	LC
<i>Falco tinnunculus</i> Linnaeus, 1758	Kestrel	Migratory & resident landbird, found in coastal, wetlands, cultivations and urban areas of New Damietta	LC
<i>Pelecanus crispus</i> Bruch, 1832	Dalmation Pelican	Migratory waterbird	NT
<i>Buteo buteo</i> (Linnaeus, 1758)	Eurasian Buzzard	Migratory landbird	LC
<i>Accipiter nisus</i> (Linnaeus, 1758)	Eurasian Sparrowhawk	Migratory landbird	LC
<i>Plegadis falcinellus</i> (Linnaeus, 1766)	Glossy Ibis	Migratory waterbird	LC
<i>Clanga clanga</i> (Pallas, 1811)	Greater Spotted Eagle	Migratory landbird	VU
<i>Circus cyaneus</i> (Linnaeus, 1766)	Hen Harrier	Migratory landbird	LC
<i>Buteo rufinus</i>	Long-legged Buzzard	Migratory landbird	LC
<i>Falco columbarius</i> Linnaeus, 1758	Merlin	Migratory landbird	LC
<i>Pandion haliaetus</i> (Linnaeus, 1758)	Osprey	Migratory landbird	LC

Source: MSBT (2026)

Mammals

Mammalian fauna of the area common in urban areas and nearby agricultural fields is mainly composed of commensal species such as the Black Rat (*Rattus rattus*), Brown Rat (*Rattus norvegicus*), House Mouse (*Mus musculus*), Egyptian Weasel (*Mustela subpalmata*) and Red Fox (*Vulpes vulpes*). The Egyptian Slit-faced Bat (*Nycteris thebaica*) and Kuhl's Pipistrelle (*Pipistrellus kuhlii*) have a wide habitat range and roost in caves, tombs, houses and old buildings. *Pipistrellus kuhlii* is found even in buildings located in busy streets (Hoath, 2009).

3.2.5 Ecological Value and Sensitivities

• Habitats

The area is an entirely modified habitat, which includes numerous coastal industrial facilities, as well as human settlements, agricultural areas and palm plantations in the close surroundings, particularly south of the Project Site. The site itself is also a modified habitat of insignificant ecological value.

• Flora

Vegetation densely covers the project area, except for walkways. However, the dominant species is the common reed (*Phragmites australis*), an invasive species of no ecological or economic importance, resulting from the former use of the site as a fish farm. Other plant species occur only sparsely and have no significant economic value. On the other hand, the adjacent agricultural lands contain crop species of expected economic importance. However, given the type and location of the project, agricultural areas are not expected to be affected by the project construction and operation activities.

• Fauna

All amphibian, reptile, and mammal species potentially present in the area are classified by the IUCN as "Least Concern" and are not considered to be of conservation priority. Avifauna around the site includes few resident bird species, as previously described, in addition to

some passing migratory birds, reflecting the relative proximity of the project site to the Important Bird Area (IBA) of Lake Idku.

According to the Migratory Soaring Bird Tool (MSBT) map, the sensitivity of the project site to migratory soaring birds is considered to be totally negligible (0 sensitivity). However, 13 non-soaring migratory bird species may pass over the project site or within a distance of less than 1 km, as mentioned earlier. Most of these species are classified by the IUCN as “Least Concern.” Only two species fall under threatened categories: the Greater Spotted Eagle (*Clanga clanga*), classified as Vulnerable, and the Dalmatian Pelican (*Pelecanus crispus*), classified as Near Threatened.

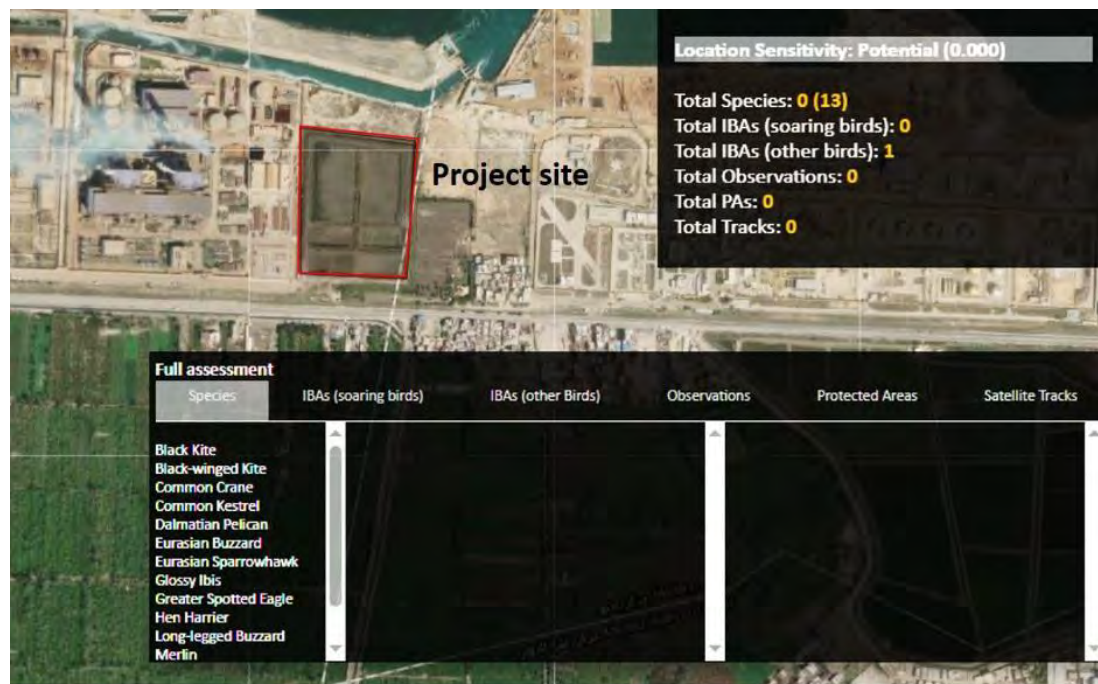


Figure 3-29: Sensitivity to soaring migratory birds map

On the other hand, due to the type and nature of the project, there will be no interaction between the Project Site and local avifauna, even in the case of birds passing over the Project Site.

In fact, a key point relevant to considering the airspace utilized by avifauna is that the airspace is “anchored” to an important terrestrial area from which avifauna could take advantage. In other words, the airspace is typically considered with respect to the ecological use of the terrestrial habitat and not “on its own” (IFC, 2023). In the present case, the Project Site is located within an industrial area, which is unattractive to avifauna and does not provide any resources in terms of food and resting areas. Accordingly, the project is not expected to affect birds passing over the area

• Key Biodiversity Areas

The Project Site does not encompass any Key Biodiversity Areas (KBAs), including Protected Areas (PAs) legally protected by the Egyptian Government, BirdLife International designated Important Bird Area (IBAs), or PlantLife International designated Important Plant Areas (IPAs).

The nearest ecologically sensitive area—an Important Bird Area (IBA)—is Lake Idku, covering an area of 18.23km². Lake Idku is of moderate importance for both wintering and breeding waterbirds. In winter 1989/90, a total of 22,549 waterbirds was counted.

The project site is located within a modified habitat inside the proposed land Energy Valley for the project in Abu Qir. Therefore, the faunal species present in the area are most likely to avoid the disturbance caused by the adjacent Abu Qir power plant. Despite the project site being located approximately 2.2 km away from Lake Idku, passing birds are expected to show negligible attraction to the site due to the absence of suitable foraging elements and the availability of water and food resources in the adjacent natural and agricultural habitats.

3.3 Economic and Social Environment

To ensure both accuracy and relevance, this report relies on multiple official data sources. The 2017 Population Census was used in sections requiring detailed and disaggregated information, particularly for education, infrastructure, economic activities, and statistics at the district and center level since it provides the most comprehensive dataset available.

Meanwhile, the 2025 Annual Population Estimates were used to reflect the most recent population figures and employment at the governorate level. This approach ensures a balance between detailed structural data and up-to-date demographic information.

The proposed project is located within the boundaries of the New Abu Qir Power Plant on land owned by the facility. The site was used as a fish farm divided into a series of abandoned ponds. The surrounding area comprises a mix of industrial, agricultural, and residential land uses in addition to transportation infrastructure, including the Abu Qir railway line and El Tabia–Rashid Road. The site is located within an existing industrial facility and is separated from nearby residential and agricultural receptors by existing infrastructure and physical features.

The surrounding area comprises a mix of industrial, agricultural, and residential land uses, in addition to transportation infrastructure, including the Abu Qir railway line and El Tabia–Rashid Road. The site is located within an existing industrial facility and is separated from nearby residential and agricultural receptors by existing infrastructure and physical features.

3.3.1 Demographic Profile

- **Population**

The total area of Alexandria Governorate is 2300 km², while the total area of Montazah II District is approximately 51 km². According to CAPMAS, 2025, The population of the governorate reached 5,618,134 capita. The total population of Montazah II District is 585,005 capita, representing 10.41% of the total population in Alexandria Governorate.

- **Employment and Unemployment rates**

According to CAPMAS (2025), the employment rate (above +15 years old) in Alexandria Governorate is approximately 5.5% (81% males, 19% females), leaving approximately 8.1% unemployed. The rates of unemployed females (19.1%) are higher than those of unemployed males (5.1%).

- **Education**

According to CAPMAS (2017), the literacy rate in Alexandria Governorate reached 82% of the total population, while the illiteracy rate reached 18% of the total population of the governorate. The literacy rate in Montazah II District reached 88% of the total population, while the illiteracy rate reached 12% of the total population of the district.

3.3.2 Economic activities

As previously mentioned, the project area is administratively affiliated to Montazah II District, which includes a variety of economic activities, where many tourists and citizens flock to this region. The Montazah II District is also considered the center of trade and economic activities in Alexandria, as it is witnessing an active commercial movement. These vital economic activities reflect the area's role as a major trade center in the city, contribute to the development of the local economy, and provide job opportunities for residents.

According to CAPMAS (2017), the most important economic activities in Montazah II District include:

- Agriculture and fishing
- Manufacturing
- Commerce
- Transportation and storage
- Services

3.3.3 Land Uses

The Project Site is located within the Abu Qir Power Plant premises on land owned by the West Delta Electricity Production Company. The site is not currently utilized for any anthropogenic purposes, . However, land use types in proximity to the Project Site (Figure 3-30) include the following:

- Abu Qir Power Plant (adjacent to the western boundary of the project site)
- Storage and scrap area of Abu Qir Power Plant (adjacent to the northern boundary of the project site)
- Agricultural drain (2m east of the Project Site)
- Agricultural land (6m east of the Project Site)
- Vacant land (10m east of the Project Site)
- Abu Qir railway line (40m south of the Project Site)
- El Tabia- Rashid Road (50m south of the Project Site)
- Rakta canal (65 m south of the project site)
- Ezbet El Setin village (100m east of the project site)
- The Mediterranean Sea (180m north of the Project Site)



Figure 3-30: Land uses around the project site

3.3.4 Infrastructure and Utilities

- **Electricity**

According to CAPMAS (2017), approximately 97% of the population in Montazah II District are beneficiaries of electricity services, while around 3% are not connected to the electricity network. Abu Qir Power Plant supplies the electrical energy required to meet the demand of Montazah II District.

- **Potable Water**

According to CAPMAS (2017), approximately 96% of the population in Montazah II District are beneficiaries of potable water services, while about 4% are not connected to the public water supply network. The district's drinking water demand is met through the existing public water supply infrastructure serving the area.

- **Sanitary Sewer Network**

According to CAPMAS (2017), approximately 91% of the population in Montazah II District are connected to the public sanitary sewer network, while about 9% are not served by the system. The district's wastewater is managed through the existing public sanitation infrastructure serving the area.

- **Natural Gas Network**

According to CAPMAS (2017), approximately 35% of the population in Montazah II District are connected to the natural gas network, while around 65% are not served by the system. The district's natural gas supply is provided through the existing distribution network serving the area.

- **Railway and Road Network**

The project site is strategically located near the main transportation network, which facilitates easy accessibility. The site lies approximately 50 meters from El Tabia- Rashid Road, providing direct connection to the surrounding road network and ensuring smooth vehicular access. In addition, it is situated about 40 meters from an Abu Qir railway line, further enhancing connectivity and access to public transportation infrastructure, as shown in Figure 3-31. This advantageous location supports efficient movement of personnel, equipment, and materials, and ensures that the site can be readily accessed through established road and transport networks.



Figure 3-31: Railway and Road Network around the project site

3.3.5 Cultural Heritage

According to the Egyptian Archaeological Map (2026), there are no registered ancient remains or cultural heritage sites within or near the project site.

However, the Egyptian archaeological map (2026), as shown in Figure 3-32, contains several registered archaeological sites located within 10 km of the project site, as shown below:

Kom El-Dahab (iii): about 5km south of the project site. This site is now under a village of the same name. It is comprised of one main mound with several outlying areas.

Roman Bath (Abu Qir), Bath of Cleopatra: about 8km west of the project site. This heavily ruined site includes a big bath built of limestone with six steps and is covered with badly preserved plaster from the inside. It includes a group of damaged buildings, maybe baths, and a room that contains an altar for offerings. Potsherds of different sizes and types scattered on the surface of the site date it to the Roman Period.

Tabyet el-Raml: about 8km west of the project site. Tabyet El-Raml is a sandy mound that is located immediately on Abu Qir Bay. A basin with three steps for pressing grapes covered with red plaster on the inside was found at the site. Its construction suggests that it dates to the Byzantine Period.

Abu-Qir – Menouthis: about 8km west of the project site. Menouthis was a sacred Greek city located in the Canopic Region (Abu Qir Bay). This legendary city was famous for its great wealth and lifestyle and for its numerous temples. Today, the city is submerged under the sea due to the climatic and geological changes in the Nile Delta. A temple for Isis was found in Menouthis, and in the 4th century, a basilica was built near the temple.



Figure 3-32: Archeological Sites around the project site

4. Policy, Legal, and Administrative Framework

This section summarizes the environmental and social legislation and regulations relevant to the proposed Battery Energy Storage System project. The applicable requirements were identified based on the nature of the proposed activity (described in detail in chapter 2), the geographic location of the project, and the anticipated environmental and social risks and impacts.

Consideration is first given to national environmental legislation, followed by a review of international financial institution (IFI) requirements, particularly those of the International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD) and the African Development Bank (AfDB), as well as relevant company-level sustainability, environmental, health and safety frameworks, where applicable.

4.1 National Legislation Pertaining to EIA

In accordance with Article 29 of Law of the Environment No. 4/1994, as amended by Laws No. 9/2009 and No. 105/2015, and its Executive Regulations (ERs), the project proponent is required to prepare an Environmental Impact Assessment (EIA) for new projects, as well as expansions or modifications to existing facilities.

The Egyptian Environmental Affairs Agency (EEAA) is the national authority responsible for reviewing and approving Environmental Impact Assessment (EIA) studies and monitoring compliance with applicable environmental legislation and permit conditions throughout project implementation and operation.

Pursuant to Law No. 4/1994 and its ERs, the proponent is required to submit the EIA study to the Competent Administrative Authority (CAA) or the licensing authority prior to commencement of project activities. The CAA is responsible for verifying the completeness of the submitted documentation before forwarding the study to the Egyptian Environmental Affairs Agency (EEAA) for technical review.

For the BESS project, the CAA is the New and Renewable Energy Authority (NREA).

EEAA may request the project proponent to provide additional data or clarifications once only, and if the requested information is not submitted within 15 working days, EEAA will return the study to the CAA for completion and resubmission.

EEAA will issue its opinion within 30 working days from the date of receipt of all required information.

The CAA shall notify the project proponent of EEAA's decision. The proponent retains the right to submit a written appeal within 30 days from the date of notification, after which non-response constitutes implicit approval, in accordance with the law.

Based on the EEAA projects categorization lists issued in June 2023, projects are classified into four categories according to their environmental impacts:

- Category A: Projects with minor or limited environmental impacts.
- Category B: Projects that may result in moderate environmental impacts.
- Category Scoped B: Projects with potentially significant environmental impacts due to certain components, but not the project type itself. An EIA study is required, focusing on the major component, but without public consultation.
- Category C: Projects with potentially significant environmental impacts. This category requires a full-scale EIA study, including public consultation and disclosure as a main component.

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 (PV) power plant, overhead transmission lines, a step-down substation, and battery energy storage systems (BESS). The Programme has the potential to generate significant environmental and social impacts during construction and operation. Although these impacts are expected to be site-specific and can be effectively mitigated through appropriate design and management measures, the Programme requires a comprehensive Environmental and Social Impact Assessment (ESIA), together with supporting environmental and social management plans, stakeholder engagement, and monitoring measures, in accordance with AfDB ISS requirements.

According to the initial meeting conducted with the Egyptian Environmental Affairs Agency (EEAA) on 6 January 2026, the BESS has been classified as Category Scoped-B project. In addition, according to the Lenders' categorization, the project is a Category B project.

4.2 Applicable Egyptian Environmental Regulations pertaining to the project

4.2.1 Air Quality

Article 36 of Law 4/1994 and Article 37 of ER 1095/2011 set the maximum permissible limits for exhaust gases from engines and vehicles.

Article 35 of Law 4/1994, Article 34 of its modified ER 1741/2005, and Annex (5) of modified ER 710/2012 provide the maximum limits for ambient air pollutants. The applicable limits are summarized in the Table 4-1.

Table 4-1: Maximum Limits of Ambient Air Pollutants according to Annex (5) of the Modified ERs of Law 4/1994 as well as the EU Maximum Limits

Pollutant	Area	Maximum Allowable limits			
		1 hr	8 hrs	24 hrs	1 year
Sulfur Dioxide ($\mu\text{g}/\text{m}^3$)	Urban Areas	300	-	125	50
EU ⁵		350	-	125	20
WHO		-	-	125	-
Carbon Monoxide (mg/m^3)	Urban Areas	30	10	-	-
EU		-	10	-	-
WHO		-	-	7	-
Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)	Urban Areas	300	-	150	60

⁵ <https://www.europarl.europa.eu/factsheets/en/section/193/environment-policy>

Pollutant	Area	Maximum Allowable limits			
		1 hr	8 hrs	24 hrs	1 year
EU		200	-	-	40
WHO		-		120	40
Total Suspended Particles ($\mu\text{g}/\text{m}^3$)	Urban Areas	-	-	230	125
EU		-	-	-	-
WHO		-	-	-	-
PM ₁₀ ($\mu\text{g}/\text{m}^3$)	Urban Areas	-	-	150	70
EU		-	-	50	40
WHO		-		150	70

* The specified maximum limits of ambient air pollutants outlined above apply mainly to the construction phase of the proposed project.

* In cases where discrepancies exist between the national regulations and the EU Maximum Limits, projects are required to adhere to the more stringent standards.

This applies only during Construction phase. The BESS operations and do not generate air emissions.

4.2.2 Ambient Noise

Article 42 of Law 9/2009 and Article 44 of its modified ER (1095/2011), provide the maximum permissible limits for noise levels. Table 4-2 below provides the maximum permissible limits for noise intensity in different areas according to Annex 7 of the ER replaced by Decree 2466/2024, and the EU Environmental Noise Directive 2002/49/EC.

Table 4-2: Maximum Limit Permissible for Noise Level in the Different Zones according to Annex (7) of the Modified ERs of Law 4/1994 as well as EU Maximum Limits

Type of zone	The permissible limit for noise level, dB (A)		
	Day time 7 am – 10 pm	Night 10 pm – 7 am	
Areas on roads whose width is 12 m or more, or industrial areas which comprise light industries and other activities	70	60	
EU (Mixed commercial and industrial areas)	Day-time	Evening-time	Night-time
	68	63	58
	During Construction Activities: Up to 70 dBA during the day.		

* The specified maximum limits outlined above apply to the construction phase of the Proposed Project.

* In cases where discrepancies exist between the national regulations and the EU Maximum Limits, projects are required to adhere to the more stringent standards.

Noise requirements apply throughout the project lifecycle, from construction through operation and decommissioning phases.

4.2.3 Non-Hazardous Solid Wastes

Chapter 4 of Egypt's Waste Management Law 202/2020 and its ERs 722/2022 and 1113/2024 address the requirements for the solid waste management framework, including collection, transportation, storage, and disposal:

- Article 15: Waste generators must minimize waste, promote reuse, ensure recycling and safe disposal, and manage waste without harming public health or the environment.

- Article 16: Waste generators bear the cost of integrated, safe waste management.
- Article 20: Open burning of waste is prohibited.
- Article 36 of the executive regulation addresses construction waste management through contracting licensed contractors and proper storage of construction material/waste.

Additionally, Law 9/2009 and its ERs (Articles 39 and 41) address precautionary measures, ensuring proper waste handling and environmental protection.

Non-hazardous waste management requirements apply throughout the project lifecycle, from construction through operation and decommissioning phases.

4.2.4 Hazardous Materials and Wastes

Law No. 202/2020 and its ERs, Nos. 722/2022 and 1113/2024, introduced specific requirements for hazardous waste management.

Chapter Five of Law No. 202/2020 and Articles 50 to 54 of ERs No. 722/2022, delineates the protocols for hazardous waste management process, including comprehensive record-keeping and disposal methodologies.

Hazardous material management apply throughout the construction, operation phases, and decommissioning of the proposed project.

4.2.5 Registers/ Records

Environmental Register:

According to Article 22 of Law No. 9 of 2009, amending Law No. 4 of 1994, and Article 17 of its modified ER 2466/2024, all establishments are mandated to maintain comprehensive environmental registers. The specific content of these registers is outlined in Article 17 and Annex 3 of the Executive Regulation.

Hazardous Materials & Waste Register:

According to Article 56 of Law No. 202 of 2020 and Article 50 and appendix 7 of its Executive Regulations (Decree No. 722 of 2022), establishments generating hazardous waste are required to maintain a hazardous materials and waste register documenting the types and quantities generated, the methods of storage, treatment, and disposal, and the licensed entities contracted to undertake waste management activities.

4.2.6 Biodiversity Protection

Article 28 of Environmental Law No. 4 of 1994 is a key provision for biodiversity protection, as it prohibits the hunting, killing, capturing, possession, transport, trade, import, or export of wild birds, animals, plants, or their derivatives, particularly those listed in Annex 4 of the Executive Regulations as amended by Decree No. 1095 of 2011, due to their ecological importance.

The prohibition also applies to activities that may result in the destruction or alteration of natural habitats, including wetlands, natural lakes, the Nile River system, migration routes,

areas important for resident and migratory birds, Ramsar sites, and natural protectorates declared under Law No. 102 of 1983, as well as their surrounding zones.

Protected flora and fauna listed under Annex 4 of the Executive Regulations of Environmental Law No. 4 of 1994 (as amended)—which reflects Egypt’s obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)—are prohibited from collection, possession, trade, transport, import, export, breeding, or cultivation except with prior authorization from the Egyptian Environmental Affairs Agency (EEAA).

Complementary protection is also provided under Law No. 102 of 1983 concerning Natural Protected Areas and Agricultural Law No. 53 of 1966 (Article 117) and its related ministerial decrees, which prohibit the hunting or destruction of birds and wild animals beneficial to agriculture and their nests.

These requirements apply to the proposed project. However, the environmental baseline presented in Chapter 4 indicates that the project site lies within the existing Abu Qir Power Plant boundary, occupies previously disturbed land formerly used as fish farms, and does not support significant biodiversity.

4.2.7 Cultural Heritage

Law 117 of 1983 promulgating the Antiquities’ Protection Law, as amended by Law 3/2010, 61/2010, 91/2018, and 20/2020, serves as the cornerstone for safeguarding archaeological and historical sites.

The Ministry of Tourism and Antiquities (MOTA) is the primary authority responsible for overseeing all archaeological activities.

This legislation provides the primary legal framework for the preservation of archaeological and historical sites.

According to Article 5 of the law, MOTA is the designated authority responsible for supervising all archaeological activities and sites within the country.

Additionally, Article 23 assigns the MOTA the responsibility for the discovery and exploration of antiquities across Egyptian territory. It mandates that any person who discovers an unregistered archaeological artifact is obligated to notify the MOTA. The artifact shall be considered state property, and the MOTA must take the necessary measures to preserve it.

Within three months, the MOTA must either remove the artifact found on private property, or take the necessary procedures to expropriate the land on which it was found, or leave it in place and register it following the provisions of this law.

These requirements do not apply to the proposed project. No cultural heritage components are expected, as the site is located on previously disturbed land. Moreover, there are no registered archeological sites, and the nearest registered archaeological sites are located at distances of approximately 4–8 km from the project location. However, chance finds plan would be developed for the construction activities.

4.2.8 Work Environment

A. Occupational health and safety

The Egyptian Labor Law 14/2025⁶, alongside Minister of Manpower and Immigration's Decree 211/2003, establish comprehensive guidelines in Egypt for occupational safety, health, and a safe work environment.

Besides, Ministerial Decree 211/2003 of the Ministry of Manpower addresses the requirements to prevent adverse physical, chemical, and mechanical hazards and dynamic electricity hazards in the workplace and requires keeping medical surveillance records for the employees.

B. Work Environment Health and Safety

The Egyptian Labour Law number 14/2025 organizes working conditions and management of worker relationships. The law in its different articles; addresses the individual labour contracts, terms of employment, wages and leaves, collective negotiations and collective labour agreements, and litigations as well as vocational training are addressed in sections one to four. The occupational health and safety requirements are addressed in Book Four of the Labour Law.

C. Workplace Noise

Law 4 /1994 (amended by Law 105/2015) sets the maximum permissible noise levels within the workplace (in dB) in Annex 7 of the Executive Regulation (amended by decrees 710/2012, 964/2015, and 2466/2024).

Table 4-3 provides the maximum noise levels in the workplace, as indicated in Table 1 in Annex 7 of the ER 710/2012 of Law 4/1994.

Table 4-3: Maximum Noise Levels within Workplace (dB (LAeq))

Type of Place and Activity	Exposure Period (hours)	Maximum Noise Level dB (LAeq))
Workplace (workshops and factories) (licensed starting from 2014)	8	85
Administrative offices - Workrooms for computers, typewriters, and similar equipment	--	65
Workrooms for activities requiring routine mental concentration - control rooms	--	60

If the noise level is more than 85 dB in workplaces with up to 8 working hours, the facility is obliged to reduce the exposure time by half with each increase in noise level by 3 dB with appropriate earplugs.

D. Employment organization

The Egyptian Labour Law 14/2025 organizes employment terms, working conditions, and management in Book 2 and Book 3 of the Labour Law, as follows:

⁶ The new labor law 14/2025 is entered into force by 1 September 2025, replacing the previous Law No. 12 of 2003. The updated executive decrees of the law are not issued yet.

Book 2 – Employment Organization:

- Definition and classification of employment contracts (fixed-term, unlimited-term)
- Conditions for employment and required contract formalities
- Work patterns including emerging/non-traditional forms (e.g., part-time, remote, job-sharing)
- Employer and employee registration obligations, data submission, and record-keeping
- Equal opportunity, non-discrimination, and prohibition of forced labour
- Employee file maintenance, electronic format recognition, retention periods
- Working hours, overtime arrangements, rest periods
- Leave entitlements (annual leave, maternity, paternity, casual)
- Health, safety, and welfare obligations of the employer toward employees
- Provisions concerning persons with disabilities or “people of determination”

Book 3 – Termination, Disputes & Special Employment Cases:

- Termination of employment contracts: notice periods, severance, end-of-service benefits
- Grounds for summary dismissal (gross misconduct) and procedural safeguards
- Resignation procedures and right of withdrawal
- Treatment of absence without justification (voluntary resignation concept)
- Recognition of work arrangements in the context of termination and rights
- Labour dispute resolution: specialized labour courts, timelines, and processes
- Employment of foreign workers: permits, terms, regulations
- Special employment categories and protections (women, minors, workers with disabilities)
- Employer obligations in organizational changes (downsizing, restructuring)
- Transitional provisions and application of the law to existing contracts

E. Child labour

According to Articles 62, 63, 64, and 65 of the Labour Law 14/2024, Chapter 4 of Book 2: Rules for the Employment and Training of Children, it is prohibited to employ children before the age of 15. However, they may be trained once they reach the age of 14, provided that this does not prevent them from continuing their education. The employment or training of children must be in accordance with a decree issued by the competent minister in coordination with the National Council for Childhood and Motherhood.

It is also prohibited to employ or train children in jobs, professions, and industries that may endanger their physical or psychological health, safety, or morals. These jobs, professions, and industries, according to different age groups, will be issued by the decree of the competent minister, in coordination with the National Council for Childhood and Motherhood. Until the updated decree is issued, Decree 215/2021 regarding the child employment and training system is implemented.

According to Article 66 of Labour Law 14/2025, It is the responsibility of the employer who employs one or more children to consider the following:

1. To post a copy of the provisions of this chapter in a visible place at the workplace.
2. To prepare a record indicating working hours and rest periods, approved by the relevant administrative authority (labour office).
3. To inform the relevant administrative authority of the names of the working children, the tasks assigned to them, and the names of the individuals responsible for monitoring their work.

4. To provide separate accommodation for children away from adults, in accordance with the regulations and provisions issued by the competent minister, and it is strictly prohibited for the child to stay overnight at the workplace.

F. Persons with Disabilities

Egyptian Law No. 10 of 2018 amended by Law 156/2021 on the Rights of Persons with Disabilities aims to ensure the rights and inclusion of persons with disabilities in society. The law mandates non-discrimination, equal opportunities equal employment opportunities based on their qualifications, and accessibility in various aspects of life, including education, employment, and public services. Key provisions of articles 21,22, and 23 from Law No. 10 of 2018, include:

- o Job Placement: The Ministry of Manpower is responsible for creating a registry of job-seeking individuals with disabilities and assisting them in finding suitable employment.
- o Employer Quotas: Employers with 20 or more employees must hire at least 5% of their workforce from people with disabilities.
- o Tax Incentives: it includes a 50% increase in the personal exemption for persons with disabilities or their caregivers. Employers who hire beyond the 5% quota receive additional tax benefits.

In addition, Article 37 of Labour Law 14/2025 requires facilities to keep a special register of persons with disabilities and dwarfism and report on their employment and wages. The facility must also notify the authority with a statement that includes the total number of employees, the number of jobs occupied by people with disabilities and dwarfism, and the wages they receive, following a template and schedule set by the minister.

G. Equal opportunities

Article 9 of the Egyptian Constitution stipulates that the country is committed to achieving equal opportunities for all citizens, without any form of discrimination.

Article 35 of Labour law 14/2025 states that it is prohibited to cluster wages based on cultural, religious, or gender.

Law 10/2018 related to the rights of people with disabilities is concerned with provision of equal rights to this group. It includes their rights to have a life insurance, social insurance, freedom in choices, chances of work opportunities that do not surpass their physical disability limit.

H. Women's Workplace Safety and Night Shifts

According to the Labour Law 14/2025:

Article 53: Applies all employment provisions to women without discrimination; mandates equal pay for equal value of work among men and women.

Article 59: Requires employers who employ one or more female workers to post the "Women's Employment Regulations" in the workplace, which must address flexible working hours or remote work for women caring for children with disabilities or dwarfism.

In addition, Decree No. 44 of 2021 issued by Egypt's Ministry of Manpower permits women, upon their request, to work night shifts in any establishment, provided that employers implement appropriate health, safety and transportation measures.

I. Protection from Harassment

Article 254 of Labour Law 14/2025 stipulates that facilities and their branches shall be obligated to provide a safe and non-hostile work environment, free from harassment, bullying, and violence, and to ensure the availability of effective means for prevention against such behaviours.

Anti-harassment Law No. 141/2021: This law, which modifies the 58/1937 Penal Law, strengthens legal protections against sexual harassment. It provides comprehensive safeguards for women against various forms of harassment, including unwanted sexual advances, physical or verbal conduct, online and electronic harassment, stalking behaviours, workplace harassment, and public transportation harassment. It also imposes stricter penalties on perpetrators, reflecting a growing recognition of the seriousness of this issue in Egypt.

J. Grievance

Article 103 of the Environmental law 4/1994

Grants every citizen and organization concerned with environmental protection the right to report any violations of the provisions of this law.

Article 85 of the Egyptian Constitution

All citizens have the right to address public authorities in writing and signed, but should not address it on behalf of groups, only as juridical persons.

K. Community Investment:

According to the Egyptian Investment Law 72/2017 indicated that towards achieving the goals of the sustainable development, investors may dedicate a percentage of their annual profits for social developments in one or more of the following fields:

- Environmental protection
- Areas of healthcare, social care, or cultural care;
- Support the technical education or the funding of research, studies in cooperation with any of the universities or scientific research institutions; and
- Training and scientific research.

Where investors have undertaken/implemented any community development investments, investors are required to submit to the General Authority for Investment and Free Zones an annual report supported by documents on community development activities.

4.3 Strategic National Initiatives

▪ Egypt National Climate Change Strategy (NCCS) 2050

Egypt launched on 19/5/2022 the National Climate Change Strategy 2050. NCCS is a comprehensive roadmap designed to guide Egypt's efforts in addressing climate change. The strategy lays out five overarching goals, encompassing mitigation, adaptation, governance, financing, and scientific research. These goals are further divided into objectives and specific directions, each with corresponding performance indicators to track progress.

The contribution of the PV and BESS projects to the Egypt's National NCCS 2050 include:

- Contribution to Renewable Energy Goals: PV and BESS projects are expected to significantly contribute to the national goal of increasing the share of renewable energy in the energy mix. The strategy aims to increase the contribution of renewable energy sources to 42% of the total electrical energy produced by 2035.
- Enhancing Climate Resilience: These projects are to integrate climate resilience into their design and operations. These would include measures to withstand extreme weather conditions, such as high temperatures and flash floods, which are common in regions like Qena governorate.
- Reducing GHG Emissions: By transitioning to renewable energy sources, PV and BESS projects contribute to reducing GHG emissions associated with fossil fuel consumption if the same amount of energy were generated from conventional power plants.
- Supporting Sustainable Development Goals: PV and BESS projects should align with Egypt's Vision 2030 and support sustainable economic growth with low-emission development.

▪ **Nationally Determined Contribution (NDC)**

After Egypt signed the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement on the 22nd of April 2016 and ratified it on the 29th of June 2017, the Intended Nationally Determined Contribution (INDC) was considered Egypt's first NDC.

Egypt's updated NDC to the UNFCCC. It outlines Egypt's commitments to reducing GHG emissions and adapting to the effects of climate change between 2020 and 2030.

The NDC highlights Egypt's national circumstances, including its vulnerability to climate change impacts, especially in the Nile Delta, and its ambitious economic development goals. It presents a series of mitigation actions, focused on energy, oil and gas, transport, industry, buildings and urban cities, waste management, and tourism, with projected emission reductions for each sector.

In June 2023, Egypt revised its NDC. As part of its second revised NDC, Egypt has committed to reducing GHG emissions in the oil and gas sector by 2030 from 2,575 GgCO₂-eq under a business-as-usual (BAU) scenario to 0,89 GgCO₂-eq under a mitigation scenario. Egypt intends to reach this target through improving access to clean fuel in households and increasing the production and use of alternative green fuels (such as biofuels).

▪ **Egypt's National Strategy for the Empowerment of Egyptian Women 2030:**

Launched in 2017, this comprehensive strategy aims to advance women's empowerment across political, economic, and social domains, aligning with national and international development goals. Key pillars include:

- Political Empowerment: Increasing women's representation in leadership and decision-making positions.
- Economic Empowerment: Expanding economic opportunities for women through improved employment prospects and support for female entrepreneurship.
- Social Empowerment: Enhancing women's access to quality education, healthcare, and social services.
- Protection and Response: Preventing and addressing violence against women through multi-stakeholder efforts.

4.4 International Conventions

4.4.1 Biodiversity

Egypt has a long-standing commitment to biodiversity conservation through participation in several international conventions, including the Convention on the Conservation of African-Eurasian Migratory Waterbirds (AEWA, 1995), the United Nations Convention on Biological Diversity (UNCBD, 1992), the Convention on the Conservation of Migratory Species of Wild Animals (CMS, 1979), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 1973), and the African Convention on the Conservation of Nature and Natural Resources (1968).

These agreements collectively require the protection of migratory species and wetlands, conservation of biodiversity and ecosystem services, regulation of international wildlife trade, sustainable management of natural resources, and prevention of land degradation and pollution.

4.4.2 Climate change

- **Paris Agreement for strengthening global response to climate change threats, 2016**
Brings together nations to fight climate change and adapt to it while helping developing countries to do so without ignoring their national objectives. It globally aims to keep an overall temperature rise of less than 2° C this year and to pursue more efforts to lower the increase of rise even further by 1.5 ° C. Although the agriculture sector is not mentioned explicitly in the agreement, it does mention efforts to adapt to climate change and resilience in a manner that do not hinder food production. Egypt signed the agreement on the 22nd of April 2016 and ratified it on the 29th of June 2017.
- **United Nations Framework Convention on Climate Change, 1992**
It provides an intergovernmental framework to face climate change issues. Recognizing that the climate is a common shared resource affected by anthropogenic human emissions. It recognizes the importance of marine environments as well as terrestrial ones in acting as reservoirs for Carbon and GHG. It also emphasizes the importance of scientific, economic and practical sectors in tackling climate change problems and the importance of continuous monitoring and assessment. In addition, it promotes the diffusion and transfer of technologies that reduce anthropogenic emissions of GHG in sectors including agriculture and industry. Egypt signed this convention on the 9th of June 1992 and ratified it on the 5th of December 1994. It entered into force on the 5th of March 1995.
- **Kyoto Protocol setting internationally binding emission reduction targets, 1997**
The protocol aims to commit its joined parties to specific international emission targets and aims to strengthen the global response to the temperature rise. It recognizes that currently developed countries are the main cause of the presently high emissions of GHG in the atmosphere, a result of 150 years. It provides flexibility on how the countries reach their target (e.g., increase in forests to compensate for their emissions). In addition, the protocol requires parties to promote sustainable agriculture practices while taking into consideration the climate change factor. Egypt signed this protocol on the 15th of March 1999 and ratified it on the 12th of January 2005. It entered into force on the 12th of April 2005 as an agreement to the UNFCCC convention.

4.4.3 Cultural Heritage

- **Convention for the Safeguarding of the Intangible Cultural Heritage, 2003**

The Convention for the Safeguarding of the Intangible Cultural Heritage is a United Nations Educational, Scientific and Cultural Organization UNESCO treaty adopted by the UNESCO General Conference on 17 October 2003, which entered into force in 2006. The “intangible cultural heritage” means the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artifacts, and cultural spaces associated therewith – that communities, groups, and in some cases, individuals recognize as part of their cultural heritage. The purposes of the convention are: (a) to safeguard the intangible cultural heritage; (b) to ensure respect for the intangible cultural heritage of the communities, groups, and individuals concerned; (c) to raise awareness at the local, national, and international levels of the importance of the intangible cultural heritage, and of ensuring mutual appreciation thereof; and (d) to provide for international cooperation and assistance. Egypt ratified the convention on 3 August 2005. Article 13 of the convention states that “to ensure the safeguarding, development, and promotion of the intangible cultural heritage present in its territory, each State Party shall endeavor to adopt a general policy aimed at promoting the function of the intangible cultural heritage in society, and at integrating the safeguarding of such heritage into planning programs”.

- **Convention for the Protection of the World Cultural and Natural Heritage, 1972**

The General Conference of the UNESCO meeting was held in Paris from 17 October to 21 November 1972, at its seventeenth session.

- Egypt ratified the convention on the 7th of February 1974.
- The convention sets guidelines for parties to help them identify locations that can be world heritage sites and means to conserve them.
- The convention provides management guidelines and possibly financial assistance.
- Moreover, raising awareness and education is also encouraged to improve the protection of those sites.

4.4.4 Work Environment

The ILO conventions are international standards that complement national labor laws. The following international standards are crucial in creating a safe, fair, and non-discriminatory work environment that respects and protects the rights of all workers.

Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87):

This convention guarantees workers and employers the right to form and join organizations of their choosing without prior authorization.

Right to Organise and Collective Bargaining Convention, 1949 (No. 98):

This convention provides protection against anti-union discrimination and promotes voluntary negotiations between employers and workers to determine wages and working conditions through collective bargaining.

Forced Labour Convention, 1930 (No. 29) and its 2014 Protocol:

This convention aims to suppress all forms of forced or compulsory labour. The 2014 Protocol strengthens the measures to prevent forced labour and provides protection and remedies for victims.

Abolition of Forced Labour Convention, 1957 (No. 105):

This convention calls for the immediate and complete abolition of forced or compulsory labour in all its forms, particularly for political coercion, economic development, labour discipline, or racial, social, national, or religious discrimination.

Minimum Age Convention, 1973 (No. 138):

This convention sets the minimum age for admission to employment and work, ensuring that children are not exposed to work environments that can harm their health, safety, or morals.

Worst Forms of Child Labour Convention, 1999 (No. 182):

This convention focuses on eliminating the worst forms of child labour, including slavery, forced labour, trafficking, prostitution, and any work that is likely to harm the health, safety, or morals of children.

Equal Remuneration Convention, 1951 (No. 100):

This convention mandates equal remuneration for men and women workers for work of equal value, aiming to reduce gender pay gaps and promote economic justice.

Discrimination (Employment and Occupation) Convention, 1958 (No. 111):

This convention seeks to eliminate discrimination in employment and occupation based on race, color, sex, religion, political opinion, national extraction, or social origin.

Occupational Safety and Health Convention, 1981 (No. 155):

This convention aims to ensure that occupational safety and health measures are in place to protect workers from workplace hazards and promote safe working environments.

Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187):

This convention provides a framework for continuously improving occupational safety and health systems to prevent workplace accidents and diseases, fostering a culture of prevention.

4.5 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.
- **Minya 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.

4.6 International Standards and Guidelines

In addition to complying with Law 4/1994, the ESIA study has been prepared in accordance with the requirements of international financial institutions, particularly the EBRD and the AfDB for projects seeking funding.

In this context, the section below provides a summary of the applicable international environmental and social requirements.

These institutions include the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and Cassa Depositi e Prestiti S.p.A. (CDP). This cooperation reflects the confidence of international partners in Egypt's sustainable investment climate and in its ability to implement projects that deliver long-term environmental and economic benefits.

4.6.1 African Development Bank Group's Operational Safeguards (AFDB OS)

The Bank has defined the E&S Operational Safeguards (OSs), as part of its Integrated Safeguards System (ISS 2023), which are designed to maximize positive impacts and to avoid, minimize, reduce, mitigate or compensate for the adverse E&S risks and impacts of projects, including those related to climate change.

OS1: Assessment and Management of Environmental and Social Risks and Impacts

It addresses how the borrower will address the environmental and social risks and impacts of the project throughout the project life cycle to meet the requirements of the Environmental and Social Safeguards (ESSs) in a manner and within a time frame acceptable to the Bank.

This safeguard is applicable to most projects and applies to the current one.

OS2: Labor and Working Conditions

It recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. Also, the importance of treating workers in the project fairly and providing safe and healthy working conditions and respect of workers' rights to promote sound worker-management relationships and enhance the development benefits of a project.

This safeguard is applicable to the proposed project during the construction and operation phases.

OS3: Resources Efficiency and Pollution Prevention and Management

It recognizes that economic activities often cause air, water, and land pollution and consume finite resources that may threaten people, ecosystem services, and the environment at the local, regional, and global levels. It sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life cycle in a manner consistent with GIIP.

This safeguard is applicable on the construction and operation phases of the project.

OS4: Community Health, Safety and Security

It recognizes that projects, activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to a project or activities. It addresses the health, safety, and security risks to and impacts on project-affected communities and the corresponding responsibility of the Borrower to avoid or minimize them.

This safeguard is applicable on the construction and operation phases of the project.

OS5: Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement

It recognizes that involuntary resettlement should be avoided, and where involuntary resettlement is unavoidable, it will be minimized, and appropriate measures to mitigate adverse impacts on displaced persons (and on host communities receiving displaced persons) will be carefully planned and implemented.

This safeguard does not apply to the proposed project since the activities will not involve any involuntary resettlement or change in the land use.

OS6: Habitat and Biodiversity Conservation, and Sustainable Management of Living Natural Resources

It recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. Also, recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support in a changing climate, and the need to consider the livelihoods of project-affected parties. Also, addresses the sustainable management of primary production and harvesting.

This safeguard is applicable to the project. However, the project components are located within a previously disturbed industrial area and are not expected to result in significant impacts on natural habitats, critical habitats, or other biodiversity-sensitive areas.

OS7: Vulnerable Groups

OS7 requires assessment and mitigation of impacts on vulnerable groups, including women, children, the elderly, and indigenous peoples. It contributes to poverty reduction and sustainable development by ensuring that projects supported by the Bank enhance opportunities for vulnerable groups to participate in, and benefit from, the development process in ways that do not threaten their unique cultural identities and well-being.

This safeguard is applicable on the construction and operation phases of the project.

OS8: Cultural Heritage

It sets out measures designed to protect cultural heritage throughout the project life cycle.

In case of chance finds, the procedures outlined in the Egyptian Antiquities Law No. 117 of 1983 will be followed.

Although no cultural heritage components are anticipated within the project site, the archaeological sites near the proposed project location will be addressed in the ESIA.

OS9: Financial Intermediaries

It recognizes that strong domestic capital and financial markets, and access to finance are important for economic development, growth, and poverty reduction. Also, it addresses the E&S requirements associated with intermediated financing through financial and nonfinancial institutions.

This safeguard is not applicable to the present project.

OS10: Stakeholder Engagement and Information Disclosure

It recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice.

This safeguard is applicable to the Project. Stakeholder engagement activities have been undertaken as part of the Project development process, and relevant stakeholders have been identified and engaged in accordance with the Project's level of environmental and social risks and impacts. Ongoing stakeholder engagement and information disclosure will be undertaken as required by applicable lender requirements and Good International Industry Practice (GIIP). A gap analysis between the applicable African Development Bank (AfDB) Operational Safeguards (OSs) under the Integrated Safeguards System (ISS, 2023) and the relevant Egyptian environmental and social regulatory framework is presented in Annex (1).

4.6.2 EBRD Performance Requirements

The Project will comply with the European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (2024). The project is anticipated to be classified as a Category A undertaking, due to the potential for significant environmental and social risks. Accordingly, a full ESIA, robust stakeholder engagement process, and public disclosure are required.

Below summarizes the relevance and applicability of each EBRD Environmental and Social Requirement (ESR) to the proposed project.

ESR 1: Assessment and Management of Environmental and Social Risks and Impacts

This requirement establishes the overarching framework for identifying, evaluating, and managing environmental and social risks. It mandates the development of an Environmental and Social Management System (ESMS), supported by an ESIA and Environmental and Social Management Plan (ESMP). Stakeholder engagement and application of the mitigation hierarchy are fundamental components.

This requirement is relevant to most projects and applies to the current one.

ESR 2: Labour and Working Conditions

This ESR emphasizes the relation between the economic growth and the well-being of a company in one side and establishing a relationship with the workers as a valuable asset that requires a healthy and safe work environment as well as protection for basic rights of workers. It also recognizes the need for employment creation and income generation as an approach for economic growth. It pertains to issues around labour and working conditions, occupational health and safety, migrant labour, etc.

This ESR applies to the proposed project during the different phases; more specifically regarding employment opportunities as well as ensuring the safe environment of the workplace. The PR also addresses suppliers and contractors monitoring⁷. In this respect, companies should identify the roles, impacts, and risks associated with their supply chain concerning labour issues (child and forced labour and significant occupational health and safety risks).

ESR 3: Resource Efficiency and Pollution Prevention and Control

This ESR promotes pollution prevention, efficient resource use, and adherence to Good GIIP. It addresses air and water emissions, waste management, and greenhouse gas mitigation.

The requirement applies to the potential emissions and wastes (solid and liquid) from different sources during the construction and operation phases and their potential impacts.

ESR 4: Health, Safety, and Security

This ESR recognizes that the project activities and infrastructure can increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failure, and releases of hazardous materials. Impacts may also occur from exposure to diseases and the use of safety and security personnel. Additionally, the EBRD mandates a risk assessment for gender-based violence and harassment (GBVH), recognizing its severe impact on women's health and wellbeing. This includes identifying and mitigating risks related to physical, mental, or sexual harm and ensuring safe, inclusive working conditions.

The proposed project comprises a Battery Energy Storage System located within the premises of the Abu Qir Power Plant, an existing industrial and utility area. The project will be implemented within a fenced and controlled site, with no land acquisition and no direct interaction with surrounding communities during construction or operation.

Accordingly, potential health, safety, and security risks to external communities and road users are expected to be limited, localized, and manageable through standard design, operational controls, and good international industry practice. Potential impacts during the operational phase are anticipated to be insignificant. Nevertheless, the ESIA assesses these risks and defines appropriate mitigation measures in line with national regulations and lender requirements.

⁷ Where the companies can reasonably exercise control, the client should collaborate with its primary suppliers to propose mitigation measures proportionate to identified risks on a case-by-case basis, while recognizing that assessing and addressing supply chain implications beyond the first or the second-tier suppliers may not be practical or meaningful to the client or the supplier. IFC Guidance Note 1, 2012

ESR5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement

This ESR ensures that any displacement is minimized and that affected individuals are compensated fairly. It mandates meaningful consultation and livelihood restoration where applicable.

The provisions of this requirement do not apply to the proposed project, as the activities will not involve any involuntary resettlement or changes in land use.

ESR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

This performance requirements addresses how projects⁸ can avoid or mitigate threats to biodiversity arising from their operations as well as sustainably manage renewable natural resources.

As part of the ESIA process, a screening-level biological baseline is undertaken for the project area. Preliminary information indicates that the project site is classified as a modified habitat within an existing industrial facility, with no significant ecological diversity identified. The ESIA therefore focuses on describing the general environmental context and surrounding habitats, and assesses potential project-related impacts on biodiversity where applicable.

ESR 7: Indigenous Peoples

This performance requirement aims at preventing adverse impacts of the projects on communities of Indigenous Peoples and to provide opportunities for development benefits.

Provisions of this ESR do not apply to the proposed project since there are no indigenous communities in the area.

ESR8: Cultural Heritage

The objective of this performance standard is to protect the cultural heritage from the adverse impacts of the project activities and support its preservation.

There are no registered antiquities or cultural heritage sites within the Project Site. However, the archaeological sites and monuments located in close proximity to the Project Site will be addressed in the ESIA.

ESR10: Information Disclosure and Stakeholder Engagement

Sets out the principles and requirements for meaningful stakeholder engagement throughout the lifecycle of a project. It aims to ensure transparency, inclusivity, and responsiveness by requiring the early disclosure of relevant project information, ongoing consultation with affected communities and stakeholders, and the establishment of accessible grievance mechanisms.

ESR-10 is not applicable to the Project.

⁸ Where a client is purchasing primary production (especially but not exclusively food and fiber commodities) that is known to be produced in regions where there is a risk of significant conversion of natural and/or critical habitats, systems and verification practices will be adopted as part of the client's ESMS to evaluate its primary suppliers.²¹

- **European Investment Bank (EIB)**

The European Investment Bank (EIB) applies eleven Environmental and Social Standards (2023) to ensure that projects it finances are environmentally sound, socially responsible, and aligned with EU and international commitments.

Standard 1: Environmental and Social Impacts and Risks

This Standard promotes an integrated approach to impact assessment and risk management, ensuring environmental, climate, social, and human rights considerations are addressed in decision-making. It mandates the establishment of an ESMS by the promoter. The process involves: Identifying and assessing likely significant effects, including direct, indirect, secondary, cumulative, and transboundary effects. Applying the mitigation hierarchy (avoid, prevent, reduce, and, if necessary, remedy/compensate) to manage adverse effects. Integrating human rights risks into the assessment. Ensuring consistency with the "Do Not Significant Harm" (DNSH) and "Minimum Safeguards" (MS) principles. Projects likely to have significant impacts must undergo an EIA (in the EU) or ESIA (in the rest of the world).

This standard is relevant to most projects and applies to the proposed project.

Standard 2: Stakeholder Engagement

This Standard recognizes the importance of stakeholder engagement for effective assessment, management, and monitoring of risks, enhancing project sustainability. It outlines the promoter's responsibility for transparent and continuous engagement. The core objectives are: Adopting an inclusive and systematic approach to engaging constructively with affected persons and communities. Ensuring stakeholders have timely access to information about project risks/impacts in a culturally appropriate and understandable manner. Promoting meaningful and free participation in decision-making. Providing rights-holders with effective grievance and remedy mechanisms. The nature and extent of engagement must be commensurate with the project's likely impacts and risks.

This Standard do not apply to the proposed project.

Standard 3: Resource Efficiency and Pollution Prevention

This Standard promotes the goal of zero pollution and transitioning to a circular economy. The primary responsibility is ensuring an integrated approach to resource efficiency and control of emissions (air, water, land, noise). Key areas of focus include: Assessing the effectiveness and efficiency of resource use (materials, land, soil, water, energy). Promoting waste prevention, reuse, and recycling in accordance with the waste hierarchy. Using Best Available Techniques (BAT). Establishing management systems for Emergency Prevention, Preparedness and Response to major accidents (e.g., related to dangerous substances). Ensuring the sound management of hazardous substances and materials.

The standard applies to the project during the construction and operation phases.

Standard 4: Biodiversity and Ecosystems

This Standard focuses on protecting and conserving biodiversity and maintaining ecological functions. It recognizes the link between ecosystem degradation and disproportionate impacts on vulnerable communities. The objectives are: Applying the precautionary approach to avoid irreversible impacts. Applying the mitigation hierarchy (avoid, minimize, restore,

compensate) to achieve No Net Loss or a Net Positive Impact (NPI) on biodiversity where required. Promoting the use of an ecosystem-based approach. Prohibiting project-related activities in areas of critical habitat unless rigorous conditions are met, ensuring no measurable adverse impacts or net reduction in vulnerable species population.

This Standard applies to the proposed project.

Standard 5: Climate Change

This Standard addresses the urgency of combating climate change through mitigation (reducing GHG emissions) and adaptation (building resilience). It promotes alignment with the Paris Agreement goals. Promoter responsibilities include: Assessing project-related GHG emissions and alignment with low-carbon pathways. Assessing the project's resilience to physical climate risks (acute and chronic hazards). Where a project is at risk, carrying out a Climate Risk and Vulnerability Assessment (CRVA) to identify commensurate adaptation measures. Ensuring consistency with the "Do No Significant Harm" (DNSH) principle to climate objectives.

This Standard applies to the proposed project.

Standard 6: Involuntary Resettlement

This Standard applies to displacement—both physical displacement (loss of residence) and economic displacement (loss of income/livelihood)—resulting from involuntary land acquisition or use restriction. The primary goals are: To avoid or minimize involuntary resettlement. To avoid any forced evictions (which are considered a gross violation of human rights). To improve or at least restore displaced persons' livelihoods and living standards to pre-project levels. Mandating timely compensation for loss of assets at the full replacement cost. Planning documents must be prepared, such as a Resettlement Action Plan (RAP) or Livelihood Restoration Plan (LRP).

This standard does not apply to the proposed project.

Standard 7: Vulnerable Groups, Indigenous Peoples and Gender

This Standard addresses individuals and groups who may be disproportionately affected by risks due to systematic discrimination, marginalisation, and/or exclusion based on socioeconomic characteristics (e.g., gender, age, disability, ethnicity). The objectives are: To address inequalities and facilitate equitable access to mitigation and benefits. Requiring promoters to adopt a gender-responsive approach to identifying, managing, and monitoring impacts. For Indigenous Peoples: Ensuring respect for their rights, identity, culture, and livelihoods. In required cases (e.g., impacts on customary lands or cultural resources), promoters must obtain Free, Prior and Informed Consent (FPIC).

Provisions of this standard do not apply to the proposed project since there are no indigenous communities in the area.

Standard 8: Labour Rights

This Standard establishes minimum requirements aligned with the principles of the ILO Fundamental Conventions and the European Pillar of Social Rights. It applies to direct

workers, third-party workers (contractors/intermediaries), and supply chain workers. Key requirements include: Ensuring non-discrimination and equal opportunity in employment decisions. Implementing zero tolerance for forced labor and child labor. Respecting the rights to freedom of association and collective bargaining. Establishing a written employment contract for all workers. Setting up an effective, gender-responsive grievance mechanism for workplace concerns.

This standard applies to the proposed project during the different phases; more specifically regarding employment opportunities as well as ensuring the safe environment of the workplace.

Standard 9: Health, Safety and Security

This Standard covers occupational and public health, safety, and security risks arising from project activities. It requires promoters to put in place a Health and Safety Management System (HSMS). The objectives focus on: Protecting the health, safety, and security of project workers (including third parties and considering gender-specific risks). Managing risks to project-affected people and communities (including sexual harassment, exploitation, and abuse). Ensuring the use of public or private security forces is consistent with international human rights standards (e.g., the UN Voluntary Principles on Security and Human Rights)

This Standard applies to the proposed project.

Standard 10: Cultural Heritage

This Standard emphasizes the protection and conservation of both tangible and intangible cultural heritage. The core objective is the application of a precautionary approach to managing and protecting cultural heritage. Key actions include: Avoiding significant adverse impacts on cultural heritage; if unavoidable, minimizing them and providing compensation as a last resort. Engaging professionals to compile a baseline inventory and assess cultural significance. Establishing chance finding procedures for unexpected discoveries during implementation. Ensuring equitable sharing of benefits when commercializing cultural resources used by local communities

This Standard applies to the proposed project. Although there are no registered antiquities or cultural heritage sites within the Project Site. However, the archaeological sites and monuments located in close proximity to the Project Site will be addressed in the ESIA.

Standard 11: Intermediated Finance

This Standard applies when EIB financing is channelled through Financial Intermediaries (FIs) to support smaller sub-projects. The FI's process for assessing, managing, and monitoring ECS risks must be commensurate with the sub-project's risk level. General requirements for FIs include: Respecting their own employees' labour rights and providing a safe working environment. Requiring final beneficiaries to comply with applicable national and EU legislation (or EIB ESS outside the EU). Operating processes to screen sub-projects against the EIB's excluded activities list. Ensuring rights-holders have access to stakeholder engagement and grievance mechanisms.

This standard is not applicable to the present project.

- **CDP Sustainability Framework (2020)**

CDP Sustainability Framework (Version 1.0, 2020) establishes a comprehensive environmental, social, and governance (ESG) system that applies to all projects and entities benefiting from CDP financing.

The Framework aligns with international sustainability principles and ensures that all CDP-supported activities respect human rights, prevent adverse environmental and social impacts, and contribute positively to sustainable development objectives

A. Environmental Commitments

In accordance with Sections 6.1 and 6.4 of the CDP Sustainability Framework, every financed project is subject to a Sustainable Development Assessment (SDA), which evaluates ex-ante the potential positive and negative environmental impacts across key dimensions such as climate change, resource efficiency, biodiversity, pollution prevention, and waste management.

An ex-post assessment is then conducted to verify the actual environmental and social performance of financed activities, based on annual reporting and the aggregation of new lending data across CDP's operational lines. **Funded projects are required to:**

- Comply with internationally recognized environmental standards, including:
 - IFC Performance Standards on Environmental and Social Sustainability.
 - World Bank Group Environmental, Health and Safety (EHS) Guidelines.
 - European Union environmental directives, where applicable.
- Avoid, minimize, or mitigate adverse impacts and implement corrective actions when required. CDP expects beneficiaries to manage environmental risks proactively and report any identified non-compliance or incidents.
- Promote positive environmental outcomes through initiatives that enhance sustainability performance, such as renewable energy adoption, energy efficiency improvement, low-carbon transition, climate adaptation, and conservation of natural ecosystems.
- Monitor and disclose environmental results periodically through sustainability reporting mechanisms defined under Sections 6.5 and 7 of the Framework.

B. Social Commitments

CDP's social standards are grounded in internationally recognized human rights and labor conventions and apply to all operations and relationships arising from CDP-financed projects. As stated in Section 6.4, CDP periodically evaluates the human rights implications and social risks associated with its activities, considering external contexts such as country risk, regulatory developments, and stakeholder feedback. Funded entities are expected to:

- Respect and uphold international human rights standards, in line with:
 - The Universal Declaration of Human Rights;
 - The International Covenant on Civil and Political Rights;
 - The International Covenant on Economic, Social, and Cultural Rights;
 - The ILO Fundamental Conventions (Nos. 29, 87, 98, 100, 105, 111, 138, 182).

C. Health and Safety Commitments

As outlined in Sections 6.4 and 6.5, CDP requires that all financed projects maintain high standards of occupational health and safety (OHS) and community protection, consistent with the World Bank Group Environmental, Health and Safety Guidelines and relevant EU Directives.

4.6.3 IFC E&S Performance Standards

PS1: Assessment and Management of Environmental and Social Risks and Impacts

This performance standard establishes the importance of:

- i. Integrated assessment to identify the social and environmental impacts, risks, and opportunities of projects;
- ii. Effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them;
- iii. The client's management of social and environmental performance throughout the life of the project.

This PS is relevant to the current project. The ESIA has been prepared in accordance with PS1 requirements. Given the project's industrial location, limited and site-specific impacts, and absence of direct impacts on surrounding communities, formal public consultation is not required, and stakeholder engagement is limited to appropriate information disclosure, consistent with national regulations and IFC guidance.

PS2: Labor and Working Conditions

This performance standard emphasizes the relation between the economic growth and the well-being of a company in one side, and establishing a relationship with the workers as a valuable asset that requires a healthy and safe work environment as well as protection for basic rights of workers. It also recognizes the need for employment creation and income generation as an approach for economic growth.

This PS applies to the current project; more specifically related to the creation of job opportunities as well as ensuring the safe environment of the workplace.

PS3: Resource Efficiency and Pollution Prevention

This performance standard recognizes that industrial activities often generate increased levels of pollution to air, water, and land, which can have a potential adverse impact on the surrounding environment.

This Performance Standard is applicable to the project, as it addresses the prevention and management of potential pollution sources during construction and operation.

PS4: Community Health, Safety, and Security

This performance standard recognizes that the project activities and infrastructure can increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failure, and releases of hazardous materials. Impacts may also arise from exposure to diseases and the use of safety and security personnel.

This PS applies to the proposed project during the construction and operation phase of the project.

PS5: Land Acquisition and Involuntary Resettlement

This performance standard recognizes that the project design minimizes economic and physical displacement, balancing social, environmental, and financial costs and benefits.

This PS does not apply to the proposed project since the activities will not involve any involuntary resettlement.

PS6: Biodiversity Conservation and Sustainable Natural Resource Management

This performance standard addresses how projects can avoid or mitigate threats to biodiversity arising from their operations as well as sustainably manage renewable natural resources.

This Performance Standard is not applicable to the proposed project, as all project components are located within a previously disturbed industrial area, and no natural habitats, critical habitats, or renewable natural resources are present or affected.

PS7: Indigenous Peoples

This performance standard aims at preventing adverse impacts of the projects on communities of Indigenous peoples and to provide opportunities for development benefits.

This PS does not apply to the proposed project since there are no indigenous communities in Egypt.

PS8: Cultural Heritage

The objective of this performance standard is to protect the cultural heritage from the adverse impacts of the project activities and support its preservation.

This PS does not apply to the proposed project as there are no recorded archaeological sites within the Project site.

4.6.4 World Bank EHS Guidelines

The World Bank Group members are committed to abiding by the general EHS Guidelines for different projects where they are involved. These are complemented by industry-specific guidelines for complex projects.

The EHS Guidelines are technical reference documents with general and industry-specific examples of GIIP. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors.

The EHS Guidelines include performance measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate timetable for achieving them. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are taken into account.

5. Analysis of Alternatives

The analysis of alternatives involves evaluating various project options during the conceptual and pre-feasibility design phases. Emphasis is placed on both the environmental and social implications, ensuring that the selected option is technically and economically viable, environmentally sound, and complies with Egyptian laws, regulations and international requirements.

5.1 No Project Alternative

The “no project” alternative assumes that the proposed Battery Energy Storage System (BESS) will not be developed. Under this alternative, the intended benefits of the BESS would not be realized, including support to the stability and reliability of the electricity grid through energy storage, enhanced system flexibility, and more efficient integration and management of electricity supply within the national grid. In addition, opportunities for local employment and procurement during the construction and operation phases would not occur.

From an environmental perspective, the “no project” alternative would avoid the localized and manageable impacts identified during the construction and operation phases. However, it would also forego the broader environmental benefits associated with improved energy system efficiency and the optimized use of existing power infrastructure.

Considering the project’s industrial location, limited footprint, and limited environmental and social impacts, as well as its role in supporting national energy system performance, *the “no project” alternative is not considered a suitable alternative for this project.*

5.2 Alternative Site Location

The proposed project is located within the premises of the Abu Qir Power Plant in Alexandria Governorate, occupying an area of approximately 50,410 m². The site is located within a previously modified area inside the existing power generation facility and in close proximity to the required electrical infrastructure for grid connection.

Therefore, alternative site location options were not considered, and the selected site is suitable for the establishment of the project.

5.3 BESS Alternatives

- *Lithium-Ion Containerized Batteries*
Lithium-ion Battery Energy Storage Systems (BESS) consist of multiple electrochemical cells assembled into modules, racks, and containerized units. Each cell contains a positive electrode (cathode), negative electrode (anode), and electrolyte, enabling the storage and release of electrical energy through reversible electrochemical reactions, as shown in Figure 5-1 below.

Several lithium-ion chemistries are commercially available for grid-scale applications, including:

- Lithium Iron Phosphate (LFP)
- Lithium Nickel Manganese Cobalt Oxide (NMC)
- Lithium Titanate (LTO)

Among these:

- LFP batteries provide high thermal stability, lower fire risk, long cycle life, and comparatively lower cost, although with lower energy density.
- NMC batteries provide higher energy density and balanced performance, but with higher thermal runaway risk and greater material criticality.
- LTO batteries provide very long cycle life and rapid charging, but significantly lower energy density and higher cost, limiting grid-scale deployment.

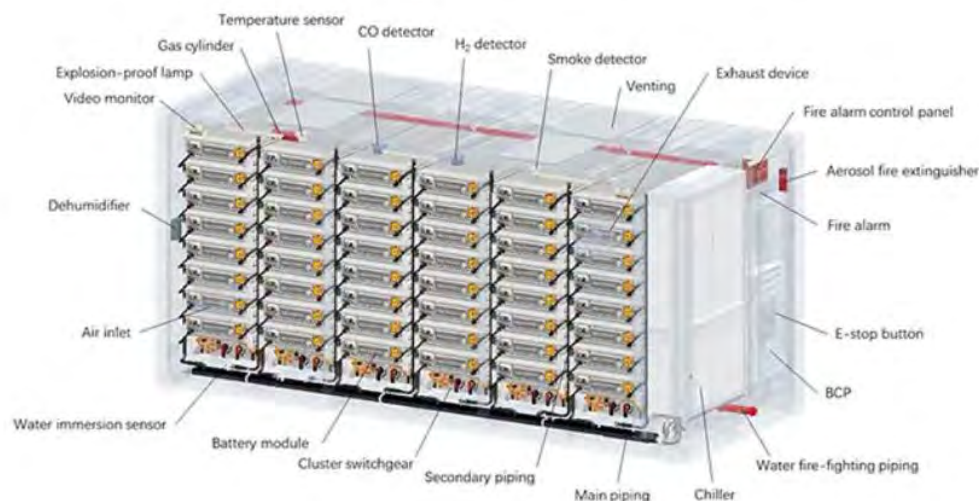


Figure 5-1: BESS systems

- **Vanadium Redox Flow Batteries (VRFB)**

Vanadium redox flow batteries store energy in liquid electrolytes contained in external tanks, requiring:

- Significantly larger land area due to low energy density
- Management of corrosive liquid electrolytes and spill risk

Given the site footprint constraints and hazardous liquid handling considerations, VRFB technology was not selected.

- **Molten Metal Batteries**

Molten metal batteries operate at elevated temperatures requiring:

- Continuous heating to maintain molten state

- Permanent auxiliary energy consumption
- Increased thermal and operational safety considerations

Due to energy inefficiency and operational complexity, this technology was not selected.

- **Sodium-Ion / High-Temperature Sodium Batteries**

High-temperature sodium-based batteries require operating temperatures of approximately 300–400 °C, necessitating:

- Continuous heating systems
- Elevated fire and safety risks
- Additional energy consumption and maintenance

Accordingly, this technology was not considered suitable for the Project.

Based on technical feasibility, safety performance, environmental risk profile, land requirements, lifecycle cost, and alignment with Good International Industry Practice, the Project has selected containerized lithium-ion Battery Energy Storage Systems using Lithium Iron Phosphate (LFP) chemistry as the preferred and implemented technology.

5.4 Cooling System Alternatives

Thermal management is a critical design element of Battery Energy Storage Systems (BESS), as battery performance, safety, and service life are strongly influenced by operating temperature. In accordance with Good International Industry Practice (GIIP), cooling system selection depends on factors such as system size, heat generation rate, ambient conditions, and operational requirements. For BESS applications, the most commonly considered cooling approaches are air cooling and liquid cooling.

- **Forced Air-Cooled Systems**

Forced air-cooled systems use fans to circulate ambient air within battery enclosures to remove heat generated by battery modules. These systems have a relatively simple design, do not require liquid coolant, and generally involve lower installation costs.

However, air cooling is less effective at maintaining uniform battery temperatures, particularly in large containerized BESS and under high ambient temperature conditions. The low thermal conductivity of air limits its ability to dissipate high heat loads, which may result in temperature gradients within battery modules. Continuous fan operation may also increase auxiliary power consumption and noise levels.

Air-cooled systems are therefore more suitable for small-scale or low heat-load applications and are not considered optimal for utility-scale BESS installations requiring reliable and consistent thermal control.

Given the site's climatic conditions and the need for reliable thermal management, air-cooled systems were not selected.

- **Open-Loop Liquid Cooling Systems**

Open-loop liquid cooling systems involve the intake of water or another liquid for cooling purposes, followed by discharge after use. Such systems are not commonly applied in containerized BESS projects and are not consistent with GIIP, as they introduce environmental risks related to water abstraction, wastewater generation, and potential contamination, in addition to increased regulatory requirements.

- **Closed-Loop Liquid Cooling with Water-Based Heat Rejection**

This option transfers heat from the battery coolant to a secondary water circuit through liquid-to-liquid heat exchangers. While technically feasible, it requires a reliable source of clean cooling water and introduces water consumption, potential discharge, and additional permitting and operational complexity. Such systems are typically applied in industrial facilities with established cooling water infrastructure.

The cooling process will require water pre-treatment and brine discharge, increasing the project's cost. Given the project's objective to avoid process water use and discharge, this option was excluded from the project design and not retained for further consideration.

- **Closed-Loop Liquid Cooling with Air-Based Heat Rejection (dry coolers)**

In this configuration, a liquid coolant circulates in a closed loop through cooling plates or heat exchangers in direct thermal contact with the battery modules. Heat absorbed by the coolant is rejected to the ambient environment through air-assisted heat exchangers (dry coolers) equipped with fans. The cooled liquid is then recirculated back to the battery modules. This system provides uniform temperature control across battery cells, which is essential for battery performance, safety, and lifespan. The closed-loop design avoids process water consumption and wastewater generation and is widely adopted in containerized, utility-scale BESS projects.

Based on the above assessment and consistent with GIIP, the project will utilize a closed-loop liquid cooling system with air-based heat rejection using dry coolers. Other cooling alternatives were not retained for further consideration.

6. Assessment of Environmental and Social Risks/Impacts and Mitigation Measures

6.1 Methodology

The environmental assessment was carried out to cover potential impacts of the project on the environment as well as impacts of the environment on the project. The assessment was carried out in four main steps, as follows:

1. Identification and classification of impacts into irrelevant (scoped out), positive, and negative;
2. Assessment of potentially significant environmental and social impacts and risks;
3. Identifying and proposing suitable mitigation measures for minimizing the effects of negative impacts; and
4. Evaluation of residual impacts.

The main cumulative impacts have also been assessed using the same methodology utilized to assess potential negative impacts.

• **Identification and Classification of Impacts**

Interaction between the different project activities and the environmental receptors, identified through the baseline information, was carried out. Such interactions may result in negative or positive impacts. The different types of impacts were identified.

Based on the analysis of the baseline environmental conditions and the nature of the receiving environment, some aspects were found to be irrelevant to specific activities of this particular project. These are identified as "scoped out impacts".

Potentially relevant aspects were subject to a process of impact evaluation, based on the analysis of the proposed project components and activities, in order to determine the significance of the different impacts. The evaluation process takes into account the information collected in the field, available in the literature and/or based on the professional judgment of the consulting team and stakeholder engagement activities.

Aspects evaluation is based on pre-set criteria including, aspect magnitude, duration, planned mitigation measures, regulatory standards and the susceptibility of environmental receptors.

• **Assessment of Negative Impacts**

The procedure to assess the "significance" of negative impacts is outlined below. It should be noted that the significance of each potential negative impact is determined before and after implementing the mitigation measures and/or applying mitigation, management and monitoring practices (i.e. residual impacts).

The magnitude of an aspect will be determined according to the following criteria:

- The temporal scale or timeframe within which the aspect t can occur;
- The spatial scale or size of the aspect; and
- The severity scale or intensity of the aspect.

Temporal scale + spatial scale + intensity scale = Magnitude of aspect

The overall significance of the aspect will consider the magnitude of an aspect in combination with the susceptibility/vulnerability/value of the receptor or resource, in the absence of quantified standards, as shown in the following table.

Assessment of the overall significance of impacts			
Magnitude of aspect	susceptibility / Vulnerability / Value of Resource / Receptor		
	Low	Medium	High
Negligible	Insignificant	Insignificant	Insignificant
Small	Insignificant	Minor	Moderate
Medium	Minor	Moderate	Major
Large	Moderate	Major	Extreme

• **Mitigation Measures**

The mitigation of impacts follows a hierarchy of actions, referred to as the “Mitigation Hierarchy”, which comprises the following sequential steps:

- **Avoidance:** actions taken to fully prevent impacts, such as relocating a project or changing its spatial layout to prevent impacts in specific locations;
- **Minimization:** actions taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided;
- **Restoration:** actions taken to assist in the recovery of a feature that has been degraded, damaged, or destroyed; and
- **Offset:** measurable outcomes resulting from actions designed to compensate for significant residual adverse impacts arising from project development and persisting after appropriate avoidance, minimization, and restoration measures have been taken. These could be applied in both biodiversity conservation (e.g., restore and protect areas degraded by impacts unrelated to the planned development or avert the loss of biodiversity from impacts unrelated to the planned development) and pollution loads (e.g., by investing in pollution abatement in an adjacent industrial facility emitting pollutants in the same air shed).

Mitigation measures are either incorporated as integral part of the project design or through management and monitoring measures. By implementing mitigation measures, the residual impacts, which are those potentially, remaining after implementing the mitigation measures, should be minimal and acceptable.

Based on the impact identification and evaluation process, mitigation measures are proposed for significant impacts, while minor impacts are usually integrated within the management plans of the project. As much as possible, the avoidance and prevention of impacts is favoured over minimization, restoration or offset.

• **Residual Impacts**

Residual impacts have been evaluated, and their significance is stated in this chapter after the implementation of relevant mitigation measures.

6.2 Impacts and Risks Identification

Interaction between the different activities and the environmental and social receptors, identified through the baseline information, was carried out. Such interactions may result in negative or positive impacts. The different types of risk and impacts were identified.

Based on the analysis of the baseline environmental and social conditions and the nature of the receiving environment, some aspects were found to be irrelevant to the specific activities of this particular project. These are identified as "scoped out impacts".

Potentially relevant aspect was subject to a process of impact evaluation, based on the analysis of the proposed project components and activities, to determine the significance of the different impacts. The evaluation process takes into account the information collected in the field, available in the literature, and/or based on the professional judgment of the consulting team and public consultation. Impact evaluation is based on pre-set criteria including, impact magnitude, duration, planned mitigation measures, regulatory standards, and susceptibility of environmental receptors.

• **Scoped Out Impacts**

The potential impacts of the project were identified based on the analysis of impacts of surrounding environment and social aspects. This step would facilitate eliminating and scoping out irrelevant impacts taking into consideration the following:

- Type of project
- Location
- Characteristics of the surrounding environment.
- Receptor susceptibility or importance: depends on its nature, value, scarcity, etc.

Examination of the environmental setting of the area and the operational processes has shown that the impact on the following resources/receptors is irrelevant:

Air Emissions during Operation

The BESS operates electrically and does not involve combustion processes during operation. No boilers, generators, stacks, or continuous emission sources are included in the project scope. Accordingly, no operational air emissions (including NO_x, SO_x, particulate matter, or greenhouse gases) are expected, and air emissions during operation are out of scope.

Visual Impact

The project involves the construction of a BESS comprising containerized units and associated electrical equipment, with no OHTL present. The project site is located within the premises of the Abu Qir Power Plant, an area designated for industrial and utility use, and the BESS will be constructed within a fenced plot inside the power plant property. Accordingly, visual impacts are not expected to be significant and are considered out of scope for further assessment.

Impact on land Acquisition/Resettlement

The project will be built on land belonging to the new Abu Qir Power Plant. In addition, the site has been previously rented to an investor to develop a fish farm. However, the fish farm lasted

for about six months, and the site was then abandoned. The site does not currently support residential, agricultural, or commercial activities and is already fenced. No land acquisition, displacement, or loss of livelihoods is anticipated. Accordingly, impacts on land use are considered out of scope for further assessment.

- **Positive Impacts**

Environmental Impacts

1. Support for the integration of renewable energy into the national grid.
2. Reduction of indirect greenhouse gas emissions across the electricity grid through improved energy balancing and reduced dispatch of fossil-fuel based peak generation.
3. No operational air emissions (no combustion processes).
4. avoidance of new land disturbance by locating the project within the existing Abu Qir Power Plant.
5. Reduces reliance on fossil-fuel-fired power plants during periods of high electricity demand.

Socio Economic Impacts

1. Improved grid stability and operational flexibility, by acting as a reliable emergency power source during grid disruptions or blackouts, ensuring critical infrastructure remains operational.
2. Captures energy from solar and releases it when generation drops (e.g., at night or on cloudy days).
3. Storing renewable energy that would otherwise be rejected by a saturated grid
4. Temporary employment opportunities during construction. Contractors will be encouraged to maximize the inclusion of workers from local communities, targeting more than the 50% local hiring threshold established by the Project.
5. Development of technical skills and capacity in energy storage systems.
6. The Project will not directly supply electricity to specific households, industries, or essential services. Rather, the stored energy will be transferred to the national electricity grid, which serves all categories of consumers across Egypt. Accordingly, the Project's benefits are expected to be indirect and national in nature.

6.3 Assessment of Potential Negative Impacts and Proposed Mitigation Measures

6.3.1 Potential Impacts during Construction Phase

In general, mitigation measures at the construction phase of any project depend mainly on environmental management procedures, which include preventive maintenance procedures for construction equipment, and material transport trucks, proper waste management procedures, continuous monitoring, supervision and follow-up procedures.

These measures will be implemented through the Contractor's Construction Environmental and Social Management Plan (CESMP), including the Occupational Health and Safety (OHS) Management Plan.

A. Potential Risks and Impact on the Physical Environment

• *Potential risks/Impacts on Air Quality*

Potential impacts on air quality during the construction phase are mainly associated with exhaust emissions from construction vehicles and mobile equipment operating on-site. Exhaust emissions may include nitrogen oxides (NO_x), carbon monoxide (CO), sulphur oxides (SO₂), hydrocarbons (HC), and particulate matter. In addition, particulate emissions may occur from handling of construction materials and temporary stockpiling of imported materials. These emissions are expected to be intermittent.

Construction activities will be carried out within the BESS project footprint. The construction phase is expected to last approximately 20 months, during which temporary and localized impacts may occur.

Based on the short-term temporal scale, localized spatial extent, and slight intensity, the overall magnitude of the air quality impact is assessed as **SMALL**.

The surrounding environment is predominantly characterized by developed and modified land uses with separation distances limiting exposure beyond the immediate project boundary. Therefore, air quality in the surrounding area is considered to have **LOW** susceptibility to construction-related emissions. Accordingly, the overall significance of the impact on air quality impacts during the construction phase is assessed as **INSIGNIFICANT**.

Mitigation Measures

Although the impacts before mitigation are insignificant, the project will implement the following mitigation measures.

- Minimize idling times of construction vehicles and machinery.
- Maintain vehicles and construction equipment in good working condition.
- Cover trucks that transporting fine or loose materials.
- Implement good housekeeping practices across the construction site.

Residual Impacts

No residual impacts.

• *Potential Impacts on Ambient Noise*

Surrounding land uses include industrial facilities, vacant land, agricultural land, and a residential settlement (Ezbit El-Stein) located south of the project site and physically separated by Tabya–Rasheed Road. Considering the limited spatial scale of the project, and the temporary nature of construction activities, construction-related noise levels are expected to decrease with distance and remain largely confined to the project footprint and its immediate surroundings.

Based on the short-term duration, localized spatial extent, and moderate intensity of construction noise sources, the overall magnitude of impact on ambient noise levels is assessed as **SMALL**.

Off-site receptors in the surrounding area are characterized by predominantly developed and modified land uses and are therefore considered to have **LOW** susceptibility to temporary construction noise. Accordingly, the significance of construction-phase noise impacts is assessed as **INSIGNIFICANT**.

Mitigation Measures

Although the impacts before mitigation are insignificant, the following mitigation measures will be included in the contracts of the construction contractors:

- Ensuring 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.

Residual Impacts

No residual impacts

• **Potential Impacts on Soil**

Potential impacts on soil during the construction phase are mainly associated with earthworks and excavation activities, management of domestic wastewater, construction waste handling, and the potential for accidental spills or leaks of fuels, oils, lubricants, and other chemicals from construction vehicles and equipment operating within the site.

Construction activities are expected to result in localized and temporary soil disturbance, primarily related to excavation and backfilling, compaction, and handling of excavated material. Given the controlled nature of construction activities, and the absence of long-term soil-intensive uses, the likelihood of soil contamination requiring future remediation or clean-up is considered low.

The potential impacts on soil are expected to be localized and short-term, limited to the construction phase. The intensity of the impact is considered moderate. Accordingly, the overall magnitude of the impact is assessed as **SMALL**.

The soil receptor susceptibility is considered **MODERATE**, given the previously disturbed condition of the site and its location within an industrial area. Therefore, the overall significance of construction-phase impacts on soil is assessed as **MINOR**.

Mitigation Measures

The following mitigation measures will be implemented to manage and minimize potential impacts:

- Conduct maintenance of vehicles, trucks, and construction equipment off-site where practicable, to minimize on-site spills and effluents.
- Implement spill prevention and response measures, including the availability of spill kits on-site.

- Collect and dispose of any spillages or contaminated materials through licensed and authorized waste contractors.
- Develop and implement a spill management plan as part of the site Environmental and Social Management Plan (ESMP).
- Maintain good housekeeping practices to ensure a clean and orderly construction site.
- Collect domestic wastewater in sealed tanks and transport it off-site via authorized contractors for proper disposal, preventing soil contamination.
- Collect solid waste at designated collection points and store it in appropriate containers following regulations.
- Use licensed contractors for the collection and disposal of non-hazardous waste.
- Establish marked and physically separated storage areas for hazardous waste.
- Use licensed contractors for the collection and disposal of hazardous waste.

Residual Impacts

With the implementation of the above mitigation measures, the residual impacts of construction activities on soil are expected to be **INSIGNIFICANT**.

• **Potential Impacts associated with Dewatering Activities**

Site preparation activities will include dewatering of the accumulated water within the existing ponded areas. The dewatering activity will be temporary, localized within the Project Site, and limited to the construction phase. Water generated from dewatering activities will be collected and transported to an authorized public wastewater treatment plant for treatment and disposal and will not be discharged directly to the surrounding environment.

Given the temporary nature of the activity and the proposed management measures, the magnitude of the impact is assessed as **SMALL**. The sensitivity of the potentially affected receptors is considered **slight**. Therefore, the significance of the impact is assessed as **MINOR**.

Mitigation Measures

- Collect water generated from dewatering activities and transport it to an authorized public wastewater treatment plant for treatment and disposal.
- Maintain records of wastewater transportation and disposal.

Residual Impacts

With implementation of the above mitigation measures, residual impacts are expected to be **INSIGNIFICANT**.

B. Risks and Impacts on the Biological Environment

The project will be built on a land belonging to the Abu Qir Power Plant. It is an entirely modified habitat, which was previously used as a fish farm. Except for the walkways bordering the site fence, it consists of low-lying ponds where water accumulates, thus resulting in the growth of extensive reed vegetation.

Moreover, the surrounding area is entirely composed of modified habitats, which include numerous coastal industrial facilities, as well as human settlements, agricultural areas and palm plantations in the close surroundings, particularly south of the Project Site.

- **Habitat loss and modification**

The site will turn from a vacant modified land dominated by the invasive reed *Phragmites australis*, into an industrial site. The impact is deemed permanent and irreversible and involves the *study area* but is considered *slight* given that the site has no ecological value. The magnitude is considered **SMALL**. Given the **LOW** value of the receptor (a modified site located within industrial facilities), this impact is deemed **INSIGNIFICANT**.

Mitigation Measures

Mitigation measures will focus on avoiding the degradation of offsite habitats:

- Ensure proper housekeeping onsite and offsite to avoid the degradation of surrounding areas;
- Avoid offsite areas with vegetation cover to prevent further degradation of surrounding areas;
- Provide awareness to the workers on the negative impacts of affecting flora and disturbing wild fauna.

Residual Impacts

No residual impacts.

- **Disturbance to wildlife**

During the construction phase, air emissions, noise and vibrations, and light emissions, may affect local wildlife. Increased human presence due to construction activities is deemed insignificant as the area is already largely populated. Potential wildlife receptors are mainly found in the agricultural areas located south of the Project Site (out of the reach of potential impacts). Moreover, the project site has no recorded migratory soaring bird tracks and its sensitivity to migratory soaring birds is negligible. On the other hand, 13 species of non-soaring migratory birds may pass over the project site or within less than 1 km of it (MSBT, 2026). However, non-soaring migratory avifauna is not expected to be affected as there is no correlation between the airspace utilized by avifauna and the terrestrial area of the site, which does not provide any resources in terms of resting and feeding areas.

Given the nature of the site, these impacts are *slight* in intensity, of short term and at the *study area* level. Their magnitude is considered **SMALL**. Receptors are considered of **LOW** vulnerability to these impacts as they are not confined to project sit and/or its AoI and, therefore, will be unaffected. Accordingly, the overall significance of these impacts is deemed **MINOR**.

Mitigation Measures

Mitigation measures will mainly include the following:

- Develop, implement and update a solid waste, hazardous waste and waste water 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;
- Provide awareness to the workers on the negative impacts of disturbing wild fauna located offsite;
- Ensure proper housekeeping practice;
- Ensure the proper maintenance of construction equipment and any other equipment with high noise and vibration potential.

Residual Impacts

With the proper implementation of the mitigation and management measures the residual impacts will be **INSIGNIFICANT**.

- ***Attraction of pests and propagation of invasive species***

Solid waste and sewage wastewater mismanagement may result in the presence of water and the growth of marginal vegetation, which may in turn attract pests (such as insects and rodents), which may be disease vectors. This impact is *slight* in intensity, of short term and at the *study area* level. The magnitude is considered **SMALL** as this is not a continuous and persistent impact and with a low probability of occurrence. Given the **LOW** ecological value of the site, this impact is deemed **INSIGNIFICANT**.

Mitigation Measures

Mitigation measures will mainly include the following:

- 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; and
- Provide awareness to the workers on the negative impacts of improper solid waste and wastewater disposal.

Residual Impacts

No residual Impacts.

C. Impact on Cultural Heritage

As indicated in chapter 3 of this ESIA, the nearest registered archaeological site is Kom el-Dahab, around 5km south of the project site. No direct or indirect impact pathways (such as vibration, dust, or visual intrusion) are associated with the project.

The project site is located on previously disturbed land, and no surface indicators of archaeological remains were identified during the site visit.

Accordingly, no impacts on cultural heritage are expected; however, a Chance Find Procedure will be implemented during construction as a precautionary measure.

D. Impacts on Socio Economic Environment

- ***Worker Influx***

The construction phase will require a temporary workforce comprising both skilled and unskilled labor. The project will prioritize local employment where feasible, while specialized roles may be filled by non-local workers if necessary. No permanent workers' camps will be established within or near neighboring communities, and most workers are expected to commute daily from their existing places of residence using transportation provided by the project company.

Given the hiring of the workforce will be from the same governorate, a substantial influx of non-local workers is not anticipated. Consequently, there is no pressure on local housing,

water supply, food availability, and public services. The potential for social disruption, rental inflation, or strain on local infrastructure is therefore considered low. Risks related to Gender-Based Violence (GBV) and sexual harassment are unlikely to occur at the community level and, if any incidents arise, would be isolated rather than indicative of project-induced patterns. Accordingly, the aspect is localized and short-term with a **SMALL** magnitude.

Sensitive receptors include nearby activities. Considering the limited interaction between the temporary workforce and surrounding activities, receptor susceptibility is **LOW**. Therefore, the overall significance of worker influx impacts is assessed as **INSIGNIFICANT**.

Mitigation Measures

Although the impacts before mitigation are insignificant, the project will implement the following mitigation measures.

- 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 and ensure that it is implemented by all contractors and sub-contractors
- Establish monitoring of social impacts;
- Raise awareness among workers regarding local customs, social norms, and appropriate behavior.
- Establish a community’ grievance mechanism.

Residual Impacts

No residual impacts.

- **Impact of site security**

Security services will be provided by a licensed security company contracted to safeguard the project site. Security personnel will operate on a shift basis and will be responsible for controlling access to the fenced premises.

The presence of security personnel may result in minor interactions with nearby communities, workers and road users. If not properly managed, inappropriate behavior could potentially result in community concerns. However, the impact is expected to be localized and short-term, with a **SMALL** magnitude

Sensitive receptors include nearby communities, site workers, and road users. Given the limited nature of interactions and the controlled security arrangements, receptor susceptibility is considered **LOW**. Accordingly, the overall significance of the impact is assessed as **MINOR**.

Mitigation Measures

- Ensure security personnel are adequately trained in professional conduct and community relations.
- Require compliance with applicable national laws and human rights principles.
- Implement a grievance mechanism accessible to community members.

Residual Impacts

With the above measures, residual impacts related to site security are expected to be **INSIGNIFICANT**.

- **Construction Traffic**

Construction activities will require periodic transportation of equipment, materials, and personnel to and from the project site using existing road infrastructure, including Tabya–Rasheed Road. Traffic volumes are expected to vary over the construction period but remain limited in scale.

The impact is localized and short-term. The magnitude of traffic aspect is assessed as **MEDIUM**.

The susceptibility of receptors (road users) is **MODERATE**. Therefore, the overall significance of traffic impacts during construction is assessed as **MODERATE**.

Mitigation Measures

- 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.

Residual Impacts

With mitigation measures implemented, residual traffic impacts are expected to be **MINOR**.

E. Occupational health and safety

OHS Risks

Construction activities present typical occupational health and safety risks, these include accidents involving heavy machinery during vegetation clearance, earthworks, and foundation preparation; crushing and lifting hazards associated with the delivery and installation of prefabricated BESS containers, as well as slips, trips, and falls.

Additional risks include electrical hazards during installation, testing, and commissioning of electrical systems.

These risks are inherent to construction activities and are expected to occur within the project site boundary during the construction period. The impacts are localized, short-term, and of moderate intensity. Accordingly, the overall magnitude of occupational health and safety risk is assessed as **MEDIUM**.

Sensitive receptors include construction workers and on-site personnel. Given that the identified risks are confined to routine construction activities within a controlled work environment, receptor susceptibility is considered **MODERATE**. Therefore, the overall significance of occupational health and safety impacts is assessed as **MODERATE** prior to the implementation of mitigation and control measures.

Mitigation Measures

- Implement the Construction Environmental and Social Management Plan (CESMP), including the occupational Health and Safety (OHS) Management Plan that is to be developed prior commencement of the construction activities .
- Provide appropriate personal protective equipment (PPE).
- Conduct regular safety training and toolbox talks.
- Enforce site speed limits and equipment inspections.
- Prepare and implement approved lifting plans for installation of prefabricated BESS containers.
- Establish exclusion zones during crane and lifting operations.
- Maintain safe access routes and control slip, trip, and fall risks on wet clayey ground.
- Provide shaded rest areas, hydration, and heat stress management measures.
- Restrict access to active work zones and clearly mark excavation and dewatering areas.
- Apply lock-out/tag-out procedures and restrict electrical works to qualified electricians.

Residual Risks

With mitigation measures in place, residual occupational health and safety risks are expected to be **MINOR**.

Workplace Noise

The predominant sources of noise during the construction phase will arise from the operation of construction machinery and equipment, including excavators, loaders, backhoes, cranes, concrete works, and vehicle movement within the site. Noise may also be generated during foundation works and other civil activities associated with the installation of BESS components.

Table 6-1 shows typical noise levels, in decibels, expected at various distances from construction machinery.

Table 6-1: Average Noise Levels from Construction Equipment

Equipment Type	Distance from Noise Source (dBA)		
	10m	50m	100m
Ramming Machines ⁹	100	88	80
Bulldozer	74	60	54
Generator	76	62	56
Backhoe	79	65	59

These noise-generating activities will occur within the BESS project boundary, covering a limited area of approximately 0.06 km², over a short-term duration corresponding to the construction period of the BESS project. The intensity of noise impacts is considered moderate, as noise levels from heavy equipment can be noticeable within the immediate work area but will reduce significantly with distance.

⁹ [Noise Reduction System - IQIP](#)

Based on the combination of short-term temporal scale, localized spatial extent, and moderate intensity, the overall magnitude of construction-phase noise impacts is assessed as **SMALL**.

The primary receptors are the on-site construction workforce, whose susceptibility is considered **MODERATE**, given occupational exposure and the availability of protective measures. Accordingly, the significance of construction-phase noise impacts is assessed as **MINOR**.

Mitigation Measures

- Compliance with the requirements of Law 4/1994 regarding the exposure period to different levels of noise, whether continuous or intermittent;
- Ensuring regular maintenance of construction equipment and machinery to minimize noise emissions.
- Schedule high-noise activities to avoid simultaneous operations that could amplify noise levels.
- Workers shall be provided with adequate PPE (earplugs), and ensuring that workers are always wearing PPE while working near equipment that emit high noise levels.

Residual impacts

With mitigation measures in place, residual noise impacts are expected to be **Insignificant**.

Table 6-2 shows the risk and impact assessment matrix for the construction

Table 6-2: The Impact Assessment Matrix for the Construction Phase

Impacts/Risks		Without Mitigation					Significance of Residual Impacts after Mitigation	
		Temporal scale	Spatial Scale	intensity	Magnitude	Susceptibility / Vulnerability / Value of Resource / Receptor		Significance of Impact before Mitigation
Construction Phase (20 months)								
Air Quality		Short term	Localized	Slight	Small	Low	Insignificant	No residual impact
Ambient Noise		Short term	Localized	Moderate	Small	Low	Insignificant	No residual impact
Soil	spill management	Short term	Localized	Moderate	Small	Moderate	Minor	Insignificant
	Waste generation							
Dewatering Activities		Short term	Localized	Slight	Small	Moderate	Minor	Insignificant
Biological Environment	Habitat Loss and Modification	Short term	Localized	Slight	Small	Low	Insignificant	No residual impact
	Disturbance to Wildlife	Short term	Localized	Slight	Small	Low	Minor	Insignificant
	Attraction of Pests and Propagation of Invasive Species	Short term	Localized	Slight	Small	Low	Insignificant	No residual impact
Socio economic	Worker Influx	Short term	Localized	Moderate	Small	Low	Insignificant	No residual impact
	Site security	Short term	Localized	Moderate	Small	Low	Minor	Insignificant
	Traffic	Short term	Localized	Moderate	Medium	Moderate	Moderate	Minor
Occupational Health and Safety	OHS Risks	Short term	Localized	Moderate	Medium	Moderate	Moderate	Minor
	Workplace Noise	Short term	Localized	Moderate	Small	Moderate	Minor	Insignificant

6.3.2 Potential risks and impacts during the Operation Phase

A. Potential risks and impact on the Physical Environment

Potential Impacts on Ambient Noise

During operation, the BESS and step-up substation will generate continuous, low-level operational noise associated with mechanical and electrical equipment. Typical sound power levels for these components are presented in Table 6-3 below.

Table 6-3: Typical Sound Power Levels of Main BESS Operational Noise Sources¹⁰

Equipment / Source	Typical Sound Power Level, LW (dB)
Power transformers	60–71
Power Conversion System – Inverter (≈3 MVA)	92.6
Cooling equipment for battery container (fans, pumps, chillers)	~73

Noise generation during operation will occur within the fenced BESS project boundary and will be localized, covering the limited project footprint. Operational activities are continuous over the long term, corresponding to the operational life of the facility.

Based on the localized spatial extent, long-term temporal scale, and slight intensity, the overall magnitude of operational noise impacts is assessed as **SMALL**.

Potential ambient noise receptors include surrounding industrial land uses and the nearest residential settlement (*Ezbit-El-Steen) located south of the project site and separated by Tabya-Rasheed Road. Given the distance to residential receptor, the susceptibility of the ambient receptors is considered **LOW**. Accordingly, the significance of operational-phase ambient noise impacts is assessed as **INSIGNIFICANT**.

Mitigation Measures

No mitigation measures are required

Residual Impacts

No residual impacts

Potential Impacts on Workplace Noise

Within the project site, operational noise exposure may occur for operation and maintenance personnel during routine inspection and periodic maintenance activities near operating equipment.

Based on the localized spatial extent, long-term temporal scale, and slight intensity, the overall magnitude of operational noise impacts is assessed as **SMALL**.

given limited number of staff present during operation, and the controlled nature of activities, as the Power Conversion System (PCS/inverters) is remotely monitored and operates automatically mainly during charging and discharging; therefore, the susceptibility of

¹⁰ Similar BESS in Boa Vista Island, Cabo Verde: CABEOLICA EXPANSION PROJECT – Component 5, Boa Vista Island, Cabo Verde

workplace receptors is considered **Medium**, accordingly, the significance of operational-phase workplace noise impacts is assessed as **MINOR**.

Mitigation Measures

The following mitigation measures will be applied during the operation phase:

- Routine maintenance of cooling systems, transformers, and electrical equipment to ensure proper functioning and minimize noise emissions.
- Use of equipment installed within sound-insulated housings, designed for continuous operation in industrial environments, to reduce operational noise levels.
- Implementation of occupational health and safety procedures, including provision of hearing protection where required during maintenance activities.

Residual Impacts

With the implementation of the above measures, the residual impacts of operation-phase workplace and ambient noise associated with the BESS and step-up substation are expected to be **INSIGNIFICANT**.

Potential Impacts on Soil

During the operation phase, potential impacts on soil are very limited, as all Battery Energy Storage System (BESS) units, cooling systems, and step-up substation components are installed on engineered foundations and concrete bases, which effectively isolate the underlying soil from operational activities.

Based on the localized spatial extent, long-term temporal scale, and Slight intensity of potential soil impacts, the overall magnitude of soil impacts during operation is assessed as **SMALL**.

The susceptibility of the soil receptor is considered **LOW**. Considering the low likelihood of spills and the limited extent of maintenance activities, and the physical isolation provided by engineered foundations, the potential impact on soil remains limited, accordingly, the significance of operational-phase soil impacts is assessed as **MINOR**.

Mitigation Measures

- Implement proper storage and handling procedures for oils, and lubricants.
- Conduct maintenance activities in designated areas.
- Provide spill response materials and train staff in spill management.

Residual Impacts

With the implementation of the above measures, the residual impacts on soil during operation are expected to be **INSIGNIFICANT**.

- **Solid Waste**

Non-hazardous waste generated during the operation phase will be limited to small quantities associated with routine site activities and the presence of operational staff. This includes domestic waste (e.g. food waste, paper, plastic) from office and control facilities, as well as minor packaging waste from spare parts and consumables used during routine maintenance.

No routine hazardous waste generation is expected during operation of the BESS or step-up substation. Hazardous waste generation is expected to be limited and intermittent, mainly associated with non-routine maintenance activities. Potentially hazardous waste streams may include used absorbent materials, contaminated rags, filters, empty chemical containers, or small quantities of waste oils.

Based on the localized spatial extent, long-term duration, and slight intensity of waste generation during operation, the overall magnitude of waste-related impacts is assessed as **SMALL**.

Considering the industrial setting of the site, the limited quantities involved, and the use of licensed waste management services, the susceptibility of receptors is considered **LOW**.

With the implementation of appropriate waste segregation, storage, and disposal measures in accordance with applicable regulations and Good International Industry Practice, the residual impacts of both hazardous and non-hazardous waste generation during operation are assessed as **INSIGNIFICANT**.

Mitigation Measures

Not required, except for routine maintenance.

Residual Impacts

No residual impacts

B. Risks and Impacts on Biological Environment

- **Disturbance to wildlife**

Operational noise is the only source of potential impacts on local biodiversity during the Operation Phase. This impact is **slight** in intensity, of long term but highly *localized* within the project footprint. The magnitude is considered **SMALL**. Receptors are considered of Low vulnerability to these impact as they are not confined to project sit and/or its AoI and, therefore, will be unaffected. Accordingly, the overall significance of these impacts is deemed **INSIGNIFICANT**.

Mitigation Measures

Not required, except for routine maintenance.

Residual Impacts

No Residual impact

- ***Attraction of pests and propagation of invasive species***

Domestic and other waste may attract pests (such as insects and rodents), which are potential disease vectors. This impact is *slight* in intensity, of long term and localized to areas of potential improper waste disposal. The magnitude is considered **SMALL** as this is not a continuous and persistent impact. Overall, impact is deemed **INSIGNIFICANT**.

Mitigation Measures

Mitigation measures will mainly include the following:

- 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; and
- Provide awareness to the workers on the negative impacts of improper solid waste disposal.

Residual Impacts

No residual impacts.

C. Risks and Impacts on Social Environment

Impact of site security

For security measures, the project will assign an annually contracted security company to provide security services for the site premises. Security guards will be stationed on site and will operate on a shift basis to control access and protect project assets and personnel.

Security activities are Localized to the project footprint and will continue throughout the long-term operational period the intensity is considered Slight; therefore, the magnitude of site security impacts is assessed as **SMALL**.

Sensitive receptors include onsite workers and nearby communities. Given the controlled nature of security arrangements and the limited interaction with external receptors, susceptibility is considered **LOW**. Therefore, the overall significance of site security impacts is assessed as **Insignificant**.

Mitigation measures

The security personnel will be adequately trained, have appropriate conduct toward workers and community and to act within the applicable law. Furthermore, a grievance mechanism will be developed to allow the potentially affected community to express concerns about the security arrangements and acts of security personnel .

Residual impacts

No residual impacts

Operation-phase Traffic

During the operational phase, the BESS will be monitored and maintained by a very limited number of personnel, with no regular delivery of materials or heavy vehicle movements expected.

Traffic effects are confined to the study area, comprising the project area and its immediate surroundings, and persist throughout the long-term operational period. Due to the absence of regular vehicle movements and the very low level of traffic activity, the proposed development is not expected to adversely affect the surrounding system or parties; therefore, the impact intensity is considered to have no effect, and the magnitude of operational traffic impacts is assessed as **SMALL**.

Sensitive receptors include onsite workers and nearby communities. Receptor susceptibility is considered **LOW**. Therefore, the overall significance of operational traffic impacts is assessed as **INSIGNIFICANT**.

Mitigation Measures

No mitigation measures are required

Residual Impacts

No residual impacts

D. Occupational Health and Safety

Impacts on workplace during operation are primarily associated with electrical hazards and maintenance activities, including inspection or replacement of modules, converters, and transformers etc. However, the probability of replacement of these units is considered as minor due to their expected lifetime.

These aspects are confined to the project site and occur throughout the long-term operational period. The impact intensity is considered slight; therefore, the magnitude of operational occupational health and safety impacts is assessed as **SMALL**.

Sensitive receptors include operation and maintenance personnel working within the facility. Given the controlled working environment and medium susceptibility of exposed personnel, the overall significance of occupational health and safety impacts during operation is assessed as **Minor**.

Mitigation measures

- A health and safety policy will be applied;
- Abide by all national occupational health and safety regulations; Labour Law 14/2025; and
- Provision of suitable PPE.

Residual impacts

By implementing the above mitigation measures, the residual impacts are **INSIGNIFICANT**.

Table 6-4 shows the impact assessment matrix for the operation phase.

E. Potential Fire and Thermal Runaway Risks

During operation of the BESS facility, there is a potential risk of fire resulting from battery system failure, including thermal runaway events. Thermal runaway refers to a rapid and uncontrolled increase in battery temperature that may result in the release of heat, smoke, and gases, and in extreme cases may lead to fire.

The likelihood of such events is considered low due to the incorporation of battery management systems, continuous monitoring systems, fire detection systems, fire suppression systems, and emergency response procedures as part of the Project design and operation. In addition, the BESS will be designed and operated in accordance with applicable international industry standards and manufacturer requirements.

The impact is expected to be localized and limited to emergency situations. The intensity of the impact is considered Slight due to the low likelihood of occurrence and the incorporation of multiple preventive and protective measures. Accordingly, the magnitude of the impact is assessed as **SMALL**.

The sensitivity of nearby receptors is considered **Medium**. Therefore, the significance of the impact is assessed as **MINOR**.

Mitigation Measures

- 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.

Residual Impacts

With implementation of the above mitigation measures, residual impacts are expected to be **INSIGNIFICANT**.

6.3.3 Potential Impacts during decommissioning

The anticipated impacts during the decommissioning phase are similar to the impacts assessed during the construction phase particularly with respect to:

- Soil and surface water, due to potential risks associated with improper handling of waste streams;
- Air quality and noise, resulting from dismantling activities and equipment movement;
- Occupational health and safety, related to electrical isolation, dismantling of equipment, and handling of batteries and substation components.

Decommissioning activities will involve removal of battery containers, electrical equipment, and substation infrastructure, including end-of-life batteries and transformer components, which may generate hazardous and non-hazardous waste streams.

The mitigation measures for the potential impacts during decommissioning are also similar specifically related to proper management and disposal of non-hazardous and the hazardous waste. Therefore, the assessment of impacts for those receptors and mitigation identified during the construction phase is assumed to apply to this phase in particular without the need to reiterate.

Table 6-4: impact assessment matrix for the operation phase

Impacts/Riks		Without Mitigation						Level of Residual Impacts after Mitigation
		Temporal scale	Spatial Scale	intensity	Magnitude	Susceptibility / Vulnerability / Value of Resource / Receptor	Level of Impact Before Mitigation	
Operation Phase								
Work place Noise		Long term	Localized	Slight	Small	Medium	Minor	Insignificant
Ambient Noise		<u>Long term</u>	<i>Localized</i>	<i>Slight</i>	<i>Small</i>	<i>Low</i>	<i>Insignificant</i>	<i>No residual Impact</i>
Soil	Potential spills	<u>Long term</u>	<i>Localized</i>	<i>Slight</i>	<i>Small</i>	<i>Low</i>	<i>Minor</i>	<i>Insignificant</i>
	Solid waste	<u>Long term</u>	Localized	<i>Slight</i>	<i>Small</i>	<i>Low</i>	<i>Insignificant</i>	<i>No residual Impact</i>
Biological Environment	Disturbance to wildlife	<u>Long term</u>	Localized	<i>Slight</i>	<i>Small</i>	<i>Low</i>	<i>Insignificant</i>	<i>No residual Impact</i>
	Attraction of pets and propagation of invasive species	<u>Long term</u>	Localized	<i>Slight</i>	<i>Small</i>	<i>Low</i>	<i>Insignificant</i>	<i>No residual Impact</i>
Social Environment	Traffic	<u>Long term</u>	Study Area	No Effect	Small	Low	Insignificant	<i>No residual Impact</i>
	Site Security	<u>Long term</u>	<i>Localized</i>	Slight	<i>Small</i>	<i>Low</i>	<i>Insignificant</i>	<i>No residual Impact</i>
Occupational Health and Safety		<u>Long term</u>	<i>Localized</i>	<i>Slight</i>	<i>Small</i>	<i>Medium</i>	<i>Minor</i>	<i>Insignificant</i>
Potential Fire and Thermal Runaway Risks		<u>Long term</u>	<i>Localized</i>	<i>Slight</i>	<i>Small</i>	<i>Medium</i>	<i>Minor</i>	<i>Insignificant</i>

6.4 Risks and Impacts of the Environment on the project

• *Climate and Meteorological Conditions*

Alexandria is periodically affected by severe winter weather events (Nawat), characterized by intense rainfall, strong winds, and elevated humidity levels. Although the project site is located approximately 180 m inland from the Mediterranean coastline, direct inundation by seawater during storm events is considered unlikely. However, the project may still be exposed to indirect impacts associated with Nawat, including temporary surface water accumulation due to heavy rainfall, wind-driven rain, salt-laden air, and increased corrosion potential. Considering the project type (BESS) and the proposed engineering design measures, the overall risk posed by extreme weather events to the project is assessed as low to moderate.

Mitigation measures:

To mitigate these potential impacts, the project design will incorporate appropriate drainage systems, elevated equipment foundations, waterproof and corrosion-resistant enclosures, and adherence to relevant international standards for electrical safety. In addition, routine inspection and maintenance procedures will be implemented to ensure system integrity and operational reliability under adverse weather conditions.

6.5 Cumulative Impacts

The IFC Performance Standard 1 emphasises addressing the cumulative impacts that are generally recognized as important on the basis of scientific concerns and/or concerns from affected communities. The methodology used to assess cumulative impacts is the same utilized to assess negative impacts.

According to the IFC “Good Practice Handbook Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets”, examples of cumulative impacts may include:

- Incremental contribution of gaseous emissions to an airshed;
- Reduction of water flows in a watershed due to multiple withdrawals; increases in sediment loads to a watershed;
- Interference with migratory routes or wildlife movement; or
- More traffic congestion and accidents due to increases in vehicular traffic on community roadways.
- Influx of workers

In this context, it is important to point out that BESS projects generally do not pose environmental adverse impacts during operation activities, and the potential impacts during construction are localized and short term and their residual impacts are insignificant.

7. Stakeholders Engagement

Engagement with the community and stakeholders is an important element in the ESIA process. The current chapter presents the details of the individual consultations carried out during preparation of the ESIA.

The consultation methodology followed for the proposed project complies with both national requirements, as outlined in the ESIA Procedures Guidelines issued by the Egyptian Environmental Affairs Agency (EEAA) in January 2010, and international best practices, particularly the European Bank for Reconstruction and Development (EBRD) Performance Requirement 10: Information Disclosure and Stakeholder Engagement.

In accordance with these guidelines and standards, the consultation process included:

- Early identification of stakeholders during the scoping phase of the ESIA;
- Ongoing consultation throughout the preparation of the ESIA to ensure stakeholder concerns were adequately addressed;
- Transparent information disclosure tailored to the local context, ensuring accessibility and meaningful participation.

7.1 E&S Scoping activities

The stakeholders scoping meetings with different stakeholders categories took place at the E&S scoping phase to support the process of assessing the effects of the different projects' aspects on the environmental and social attributes within the project Area of Influence (AoI) and the determination of the irrelevant impacts (scoped out) and relevant impacts (scoped in) to be further considered in the project's detailed ESIA.

The Project's Area of Influence (AoI), associated infrastructure, the extent of the anticipated impacts, and the areas potentially affected by the induced and cumulative impacts of the Project were considered to identify stakeholders at this scoping stage. Stakeholder groups can broadly be divided into stakeholders who:

- May be directly and/or indirectly affected by the project.
- May have an interest in the project or the areas that may be affected.
- Have the potential to influence project outcomes or operations.

Scoping consultation meetings took place with stakeholders during the period May and June 2026 with the purpose of scoping the ESIA activities and identifying potential additional stakeholders.

The scoping meetings took place via a coordination call with Alexandria Vice Governor Assistant and a physical meeting with Abu Qir Power Plant.

7.1.1 Key Discussion Points:

All discussions with the stakeholders were conducted in Arabic and all stakeholders had the opportunity to ask questions and express their view regarding the project.

The key message received that stakeholders were supporting the national efforts taken to enhance the infrastructure that would secure the national energy supply to meet the domestic and industrial growing needs. Meeting this growing demand with energy generated from renewable sources was specifically welcome as it cleaner and more reliable. Stakeholders also supported the project as it will provide work opportunities to the community members.

The topics raised during discussions can be summarized as follows:

- Hiring procedures and employment strategy, where the commitment to prioritize local workforce engagement and ensure transparent, inclusive recruitment processes was emphasized. The project's approach to maximizing employment opportunities for residents of neighboring communities was highlighted.
- The project's grievance mechanism and complaint resolution framework where the GRM was presented in detail, establishing a clear pathway for addressing community concerns and worker-related issues throughout the project lifecycle.
- The Vice Governor Assistant demonstrated high potential for cooperation and support. During the call, he requested that the project team prepare a comprehensive proposal containing project recommendations for stakeholder engagement strategies to be formally presented to the Governor for review and endorsement.
- The Vice Governor Assistant promised to arrange and facilitate a physical meeting with the full project team to further discuss, review, and confirm both the hiring procedures and the grievance mechanism, ensuring full alignment and gubernatorial support for project implementation.
- Possible assistance that could be provided by the Abou Qir Power Plant, as they the owner of the land and leased the land to Energy Valley project through usufruct agreement through the West Delta Electricity company.
- Proposed other neighboring stakeholders that need to be considered within the stakeholders engagement plan, including:
 - Abou Qir Petroleum
 - Abou Qir Gas (Gasco)
 - Petrojet
 - Other neighboring families and entities

7.2 GRM

Minimizing grievances is realized through managing impacts and through pre-emptive stakeholder engagement designed to anticipate and address potential issues before they become grievances.

A grievance is defined as an issue, concern, problem or claim (perceived or actual) that an individual or community group wants a company or contractor to address and resolve. In alignment with the EBRD PRs (2019), the Grievance Mechanism (GM) will “seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate and readily accessible, and at no cost and without retribution to the

party that originated the issue of concern¹¹¹. The mechanism will also allow for anonymous complaints to be raised and addressed.

The process covers all components and activities of the Project, including those activities undertaken by contractors and subcontractors on behalf of the Project. A detailed Stakeholders engagement plan including details of the GRM has been prepared for the overall Energy Valley project.

Figure 7-1 shows the proposed project's grievance mechanism system.

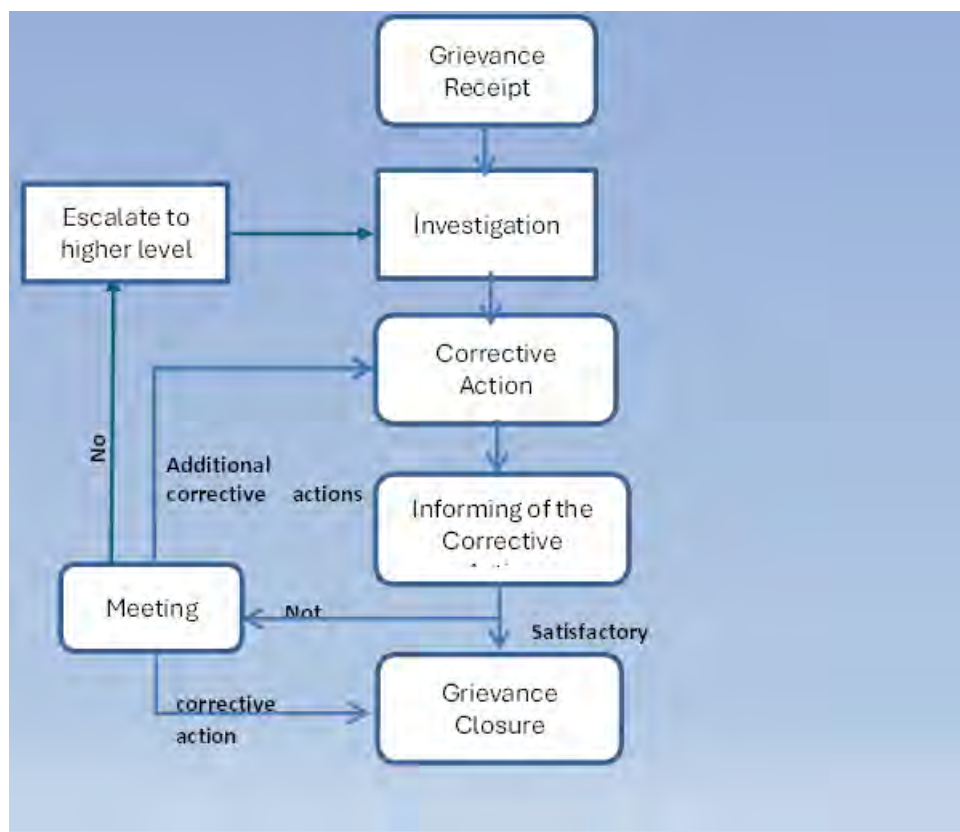


Figure 7-1: Proposed grievance mechanism system

- Grievances can be lodged in writing or verbally, as appropriate.
- Grievances may also be lodged anonymously.
- A Grievance form will be disclosed at key locations as well as on the company website. The Grievance form will inform the communities on how and where to submit a grievance.
- Women will be offered the opportunity to report grievances to and receive feedback from a female representative.
- Grievances may be submitted anonymously through multiple channels. For workers, a grievance box will be installed at the construction site and other designated project locations to allow submission of written complaints. For surrounding communities, grievances may be submitted through the project website and/or other established communication channels to ensure accessible and transparent grievance handling.

¹¹¹¹ IFC PS 2012, para. 35 (Grievance Mechanism for Affected Communities)

- All grievances will be recorded in the grievance register, indicating details of the grievant, status and address of the person, type of stakeholder, the date on which the grievance happened and was recorded, a brief description of the grievance, detail on whether the grievance is a once-off or ongoing / repeated matter, and the outcome that is being sought;
- Grievance investigation will be recorded.
- After the grievance has been resolved, the resolution will be communicated to the grievant. The date on which the matter was resolved and a summary of the resolution will be recorded in the grievance register. Should the complainant still be dissatisfied, the complainant may appeal.
- The GRM will be communicated to all stakeholders.
- All grievances received will be recorded in a Grievance Register and assigned a unique reference number. The register will include details of the complainant (where disclosed), stakeholder category, date received, nature of the grievance, actions taken, current status, and resolution outcome.
- On a monthly basis, the grievance register will be reviewed to ensure all grievances are captured, and responded to. Implementation of the measures proposed to address the grievance should be checked and the close-out of the grievance monitored.

7.2.1 Grievance Handling Process

The grievance management process will include the following steps:

Step	Responsibility	Timeframe
Receipt and registration of grievance	CLO ¹² / Site HSE Officer	Within 2 working days
Acknowledgement of receipt to the complainant	CLO	Within 5 working days
Assessment, investigation, and assignment of responsibility	Contractor and Project E&S Team	Within 10 working days
Development and communication of the proposed resolution	Project E&S Manager	Within 30 calendar days
Implementation of corrective actions	Responsible Department / Contractor	As agreed during the resolution process
Close-out and documentation	Project E&S Team	Following the complainant's acceptance
Appeal and escalation (if required)	Project Management	Within 15 working days of appeal submission

Where a grievance cannot be resolved within the specified timeframe, the complainant will be informed of the reasons for the delay and provided with an updated timeframe for resolution.

If the complainant is not satisfied with the proposed resolution, an appeal may be submitted and reviewed by Project Management. Stakeholders retain the right to seek resolution through available administrative or judicial mechanisms at any stage.

¹² The Community Liaison Officer (CLO) will serve as the primary focal point for receiving, recording, and communicating grievances.

7.2.2 Monitoring

The GRM will be monitored through regular stakeholder engagement meetings. During these meetings, community members will be asked for feedback on the stakeholder engagement program. The indicators that will be used to monitor the implementation of the GRM will include, but not be limited to the following:

- Issues raised by NGOs and other Stakeholders, actions agreed and status of those actions
- Number of grievances received from affected people and from external stakeholders
- Number of community grievances (i) open, (ii) open during more than 30 days, (iii) resolved, (iv) closed, and (v) number of responses that satisfied the complainants, during the reporting period disaggregated by category of grievance, gender, age and location of complainant.
- Categorization of grievances (by topic – e.g. noise/ safety), disaggregated by complainant's gender
- Number of grievances raised by workers, disaggregated by gender of workers and worksite
- Number of workers grievances (i) opened, (ii) open during more than 30 days, (iii) resolved, (iv) closed, and (v) number of responses that satisfied the workers, during the reporting period disaggregated by category of grievance, gender, age of workers and worksite.

8. Environmental and Social Management Plan

This ESMP has been developed in accordance with national laws and international standards for the proposed BESS project.

The project's ESMP consists of a set of mitigation and monitoring measures that will be considered during the construction, operation phases and decommissioning to ensure the sound environmental and social performance of the project. The plan also includes the actions needed to be taken to implement these measures.

Decommissioning considerations are integrated into the overall environmental and social management framework, ensuring that potential impacts are minimized throughout the project lifecycle, from initial construction to final site restoration.

The purpose of the project's ESMP is to:

- Ensure continuing compliance with the relevant legislation and laws;
- Outline the ways in which the potential impacts identified in this ESIA report will be managed;
- Provide assurance to regulators and other stakeholders that the local requirements with respect to environmental and social performance are being met;
- Ensure that appropriate monitoring is undertaken, including the establishment of a monitoring plan; and
- Provide a framework for the compliance auditing programs that ensures the efficient environmental and social performance of the Project.

In general, the project's ESMP consists of the following components:

- **Summary of Impacts and Mitigation Measures** as identified in Chapter (6) of the ESIA.
- **Environmental and Social Organizational Arrangements** identify the components of the Environmental and Social Management System (ESMS), as well as the roles and responsibilities for its implementation.
- **Environmental and Social Management Plans** to ensure environmental protection and maintain efficient environmental and social performance and compliance with the relevant legislation, laws and international E&S standards.
- **Environmental Monitoring Plan** during project implementation to provide information of the key environmental aspects of the project.

8.1 Summary of Risks and Impacts, and Mitigation Measures

Table 8-1 below summarizes the social and environmental aspects, mitigation measures, and residual impacts as assessed for the different project phases.

Table 8-1: Summary of the social and Environmental Aspects, Mitigation Measures, and Residual risks and Impacts

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 that 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	- Ensuring 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	- Off-site maintenance to minimize spills and effluents. - Spill prevention measures and on-site spill kits. - Proper collection/disposal of spills via licensed contractors. - Implement Spill Management Plan (within ESMP). - Good housekeeping practices on-site. - Domestic wastewater collected in sealed tanks and off-site disposal. - Solid waste collected at designated points. - Licensed contractors for non-hazardous waste disposal.	Insignificant
Dewatering activities	Minor	- Collect water generated from dewatering activities and transport it to an authorized public wastewater treatment plant for treatment and disposal. - Maintain records of wastewater transportation and disposal.	Insignificant

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
Biological Environment			
Habitat loss and modification	Insignificant	- Ensure proper housekeeping onsite and offsite to avoid the degradation of surrounding areas; - Avoid offsite areas with vegetation cover to prevent further degradation of surrounding areas; - Provide awareness to the workers on the negative impacts of affecting flora and disturbing wild fauna.	No residual Impacts.
Disturbance to wildlife	Minor	- 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; - Provide awareness to the workers on the negative impacts of disturbing wild fauna located offsite; - Ensure proper housekeeping practice; - Ensure the proper maintenance of construction equipment and any other equipment with high noise and vibration potential.	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 manner to avoid attraction of vermin and the potential consumption of waste from opportunistic species; - Ensure proper housekeeping practices; and - Provide awareness to the workers on the negative impacts of improper solid waste and wastewater disposal.	No residual Impacts.
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.	No Residual Impact

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
		- Raise awareness among workers regarding local customs, social norms, and appropriate behavior. - Establish a community' grievance mechanism.	
Site security	Minor	- Ensure security personnel are adequately trained in professional conduct and community relations. - Require compliance with applicable national laws and human rights principles. - Implement a grievance mechanism accessible to community members.	Insignificant
Construction Traffic	Moderate	- 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.	Minor
Occupational health and safety			
OHS risks	Moderate	- Implement OHS Management Plan. - Provide appropriate PPE. - Conduct safety training and toolbox talks. - Enforce speed limits and equipment inspections. - Approved lifting plans for BESS installation. - Establish crane/lifting exclusion zones. - Maintain safe access and control slip/trip risks. - Provide shaded rest areas and heat stress measures. - Restrict access to work zones; mark excavations.	Minor
Workplace Noise	Minor	- Comply with Law 4/1994 on noise exposure limits. - Regular maintenance of equipment to reduce noise. - Schedule high-noise activities to avoid overlap. - Provide and enforce use of hearing PPE (earplugs).	Insignificant

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
Operation phase			
Ambient noise			
- BESS - step-up substation	Insignificant	No mitigation measures are required	No Residual Impact
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 of equipment with sound-insulated housings, specifically designed for continuous industrial operation, to lower operational noise levels. - Implementation of occupational health and safety procedures, including provision of hearing protection during maintenance activities.	Insignificant
Soil			
- Potential spills - Solid Waste	Minor	- Implement proper storage and handling procedures for oils, and lubricants. - Conduct maintenance activities in designated areas. - Provide spill response materials and train staff in spill management.	Insignificant
Solid waste	Insignificant	Not required, except for routine maintenance.	No residual impacts
Biological Environment			
Disturbance to wildlife	Insignificant	Not required, except for routine maintenance.	No residual impacts
Attraction of pets 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; and - Provide awareness to the workers on the negative impacts of improper solid waste disposal.	No residual impacts

Environmental and social aspect	Significance of Impact before Mitigation	Mitigation measures	Significance of Residual Impacts after Mitigation
Social environment			
Site security	Insignificant	- Trained security personnel with proper conduct toward workers and community, operating within the law. - Grievance mechanism for the community to report concerns about security arrangements and personnel actions.	No residual impacts
Operation-phase Traffic	Insignificant	No mitigation measures are required	No residual impacts
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. - Provision of suitable PPE.	Insignificant
Potential fire and thermal runaway risks	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

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8.2 Environmental and Social Organizational Arrangements

8.2.1 Environmental and social management system and HSSE responsibilities

Energy Valley has an established Environmental and Social Management System (ESMS) that applies to all Energy Valley employees and projects. The ESMS is aligned with international good practice and incorporates corporate-level environmental and social policies that define Energy Valley's commitments to environmental protection, social responsibility, and risk management. The ESMS provides a structured framework for identifying, assessing, managing, and monitoring potential environmental and social risks and impacts, with the objective of avoiding, minimizing, mitigating, and, where feasible, enhancing positive impacts .

For the BESS Project, Energy Valley will implement the ESMS, according to the nature and scale of the Project, throughout the project lifecycle, including the construction, operation, and decommissioning phases .

During the construction phase, the EPC contractor will be required to establish, implement, and maintain a construction-phase ESMP that is consistent with international Requirements and aligned with Energy Valley's corporate ESMS .

During the operation and maintenance (O&M) phase, Energy Valley will implement and maintain its corporate ESMS, adapted as necessary to address Project-specific risks and impacts. The ESMS will comprise, at a minimum: (i) environmental and social policies; (ii) procedures for the identification and assessment of environmental and social risks and impacts; (iii) management plans and operational controls; (iv) organizational capacity and defined roles and responsibilities; (v) training and competency requirements; (vi) grievance management mechanisms; (vii) emergency preparedness and response; and (viii) monitoring, reporting, and corrective action processes.

International standards require a clear definition of roles and responsibilities for the implementation and oversight of the Project's ESMS. According to the nature and scale of the project, an HSSE supervisor will be appointed for the project.

The HSSE personnel will be responsible for daily safety work (walks-over) at the site, for inspecting safety, housekeeping, personal protection, controlling unsafe practices/conditions, updating the environmental register, and assessing the environmental performance of the facility. When construction and operation work pose a high risk that threatens the workers' safety and health, the HS officer has the right to end the activity in order to prevent a potential hazard. The HSEE Officer will also be responsible for follow-up on compliance with labour issues as part of their role regarding contractors' monitoring and management.

The Project Company will be responsible for preparing, reviewing, and submitting periodic Environmental and Social (E&S) performance reports to the lenders, including the AfDB, in accordance with the applicable financing requirements and agreed reporting arrangements.

8.2.2 Environmental and Social Reporting to AfDB

Energy Valley shall establish and implement a periodic Environmental and Social (E&S) reporting mechanism throughout the construction and operation phases of the Project. The reporting process shall document the implementation status of mitigation measures, environmental and social monitoring results, stakeholder engagement activities, grievance management, occupational health and safety performance, incidents and accidents, corrective actions, and compliance with applicable national requirements and lender standards.

E&S Team of Energy Valley shall be responsible for the preparation of the reports, while the E&S Manager shall review and approve the reports prior to submission.

Periodic E&S performance reports shall be submitted to AfDB in accordance with the reporting requirements specified in the Financing Agreement and applicable AfDB requirements. In addition, any significant environmental, social, health and safety incidents shall be reported to AfDB promptly in accordance with lender notification requirements.

8.2.3 Environmental and Social Policy

An overarching policy will be developed defining the environmental and social (E&S) objectives and principles to achieve a sound E&S performance. The E&S policy may include environmental and social commitments of the project, such as compliance with international protocols or industry-specific codes of practice.

In this context, the outline of the E&S policy requirements is summarized as follows:

- Ensuring that all HS personnel responsible are properly trained and competent to fulfill their respective duties.
- Ensuring the availability of adequate resources and continuous support from top management.
- Communicating E&S policy to all employees and other relevant stakeholders.
- Ensuring the provision of safe working conditions for all employees.
- Evaluating HS risks and taking appropriate action to minimize potential risks.
- Setting up objectives with the aim of reducing and eliminating HS related incidents.
- Ensuring that all labor rights stipulated in Egyptian laws, as well as the ILO requirements and the international PSs are fulfilled for all employees. This, in addition to implementing a grievance mechanism for all workers.
- Ensuring the continuous monitoring and assessment of HS performance, both internally and through third-party external audits/monitoring.

8.2.4 Risk assessment and hazard identification

The Contractor and the Subcontractors performing construction work shall carry out risk assessments prior to the commencement and during the construction works.

The risk assessments shall form part of the HS plan to be implemented on the site and shall include at least:

1. The identification of the risks and hazards to which workers may be exposed;
2. The analysis and evaluation of the risks and hazards identified;
3. A documented plan of safe work procedure to mitigate, reduce, or control the risks and hazards that have been identified;
4. A monitoring plan.

Hazards shall be eliminated when possible and can be minimized through awareness training, engineering controls, the use of personal protective equipment, and/or monitoring devices.

Workers shall be familiar with the risk assessment, use the existing controls and preventive measures while performing the tasks, and provide input to their supervisors to ensure that the risk assessment procedures reflect all hazards identified.

A pre-task risk assessment must be completed prior to the start of any job/task by those involved in the task.

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8.3 Environmental and Social Management Plans (EMPs)

Within its commitment to ensure environmental protection and maintain efficient environmental performance as well as social integrity, the company will develop various environmental and social management plans addressing the different E&S aspects and impacts of the project during its construction, operation and decommissioning phases.

Decommissioning considerations are integrated into the overall E&S management framework, ensuring that potential impacts are minimized throughout the project lifecycle, from initial construction to final site restoration.

In accordance with Law No. 4/1994 and its Executive Regulations, as amended, the Project will be subject to routine and ad hoc environmental inspections by the Egyptian Environmental Affairs Agency (EEAA) and relevant competent authorities to ensure compliance with the environmental permit conditions and applicable national environmental regulations during all project phases.

In this regard, the ESMPs to be developed will address:

8.3.1 EMPs During the Construction Phase

The main objectives of the Construction Environmental and Social Management Plan (CESMP) are to:

- Address environmental, cultural and social issues identified as part of the present ESIA study and any additional issues considered to be important;
- Minimize the residual environmental impacts of construction activities;
- Prepare an achievable environmental management plan for implementation;
- Detail management and monitoring tasks to be completed;
- State the timing for implementation of each task;
- Provide details of reporting requirements;
- Identify roles and responsibilities for ensuring that relevant tasks are completed;
- Provide contingency plans that can be followed in an event of non-compliance or complaint; and
- Detail registers and standards reporting forms for documenting complaints, non-compliances, unplanned exceedances and discharges etc.

For each plan the following structure will be followed:

- Scope and objective of the ESMP.
- Compliance Requirements and regulatory requirements.
- Roles and Responsibilities.
- Communication, training and awareness.
- Record Keeping.
- Monitoring.
- Reporting.

8.3.1.1 OHS Management Plan

A comprehensive OHS Management Plan will be developed and implemented for the construction phase by the Contractor, based on detailed task-specific risk assessments. This plan will be separate from, but aligned with, the Construction Environmental and Social Management Plan (CESMP), which focuses on broader environmental and social mitigation measures.

The OHS Management Plan will provide a structured framework to ensure the health and safety of all workers and will address, inter alia:

- Identification, assessment, and control of construction-related occupational health and safety risks;
- Definition and enforcement of OHS requirements applicable to contractors and subcontractors;
- Workforce health and safety arrangements, including training, supervision, and provision of appropriate PPE;
- Safe management of activities undertaken in close proximity to workers, including the storage, handling, and use of hazardous substances and materials; and
- Emergency preparedness and response procedures for construction-related incidents.

All contractors and subcontractors will be informed of, and required to comply with, the provisions of the OHS Management Plan. The Project HSE Manager will be responsible for overseeing contractor compliance, monitoring OHS performance, and ensuring that construction activities are conducted in a safe and environmentally sound manner. Contractors will also be required to regularly report on OHS performance as part of the periodic construction progress reporting process, enabling continuous monitoring and improvement throughout the construction phase.

8.3.1.2 Air management

- Restrict unnecessary idling of construction vehicles and mobile equipment through site rules and supervision.
- Ensure all construction vehicles and machinery are regularly inspected and maintained in accordance with manufacturers' specifications to minimize exhaust emissions.
- Use well-maintained, low-emission equipment that complies with applicable national air quality and emission standards.
- Cover trucks transporting fine, loose, or friable materials to prevent dust dispersion during transport.
- Implement effective material handling and storage practices, including minimizing drop heights and limiting the size and duration of temporary stockpiles.

- Apply good housekeeping measures across the site, including regular cleaning of work areas and prompt removal of excess materials and waste.
- Limit vehicle speeds within the construction site to reduce dust generation.
- Conduct periodic visual inspections to identify excessive exhaust emissions or dust generation and implement corrective actions as required.

8.3.1.3 Noise Management

- Compliance with the requirements of Law 4/1994 regarding the exposure period to different levels of noise, whether continuous or intermittent.
- Ensuring regular maintenance of construction equipment and machinery to minimize noise emissions.
- Schedule high-noise activities to avoid simultaneous operations that could amplify noise levels.
- Workers shall be provided with adequate PPE (earplugs), and ensuring that workers are always wearing PPE while working near equipment that emit high noise levels.

8.3.1.4 Solid waste management

Construction waste will be collected in a separate onsite location and periodically disposed of off-site by the contractor and will be safely transported to officially designated sites. Recyclable waste will be reused by the contractor.

Solid waste management will be conducted in accordance with the requirements of laws 4/1994 and 202/2020.

8.3.1.5 Hazardous waste management

The following briefs the management plan concerning hazardous waste (HW) of the proposed project.

HW generation

Potential hazardous waste generated during the construction phase may include solvents, paints, and other chemicals associated with construction activities.

HW segregation and on-site storage

HW will be separated from other types of non-hazardous waste. Proper identification of hazardous waste forms a basis for waste segregation. It is therefore essential that all personnel are familiar with waste identification.

HW will be stored in the storage area in a specifically categorized zone (e.g. labelled HW zone, providing secondary containment where necessary), which would be provided with suitable fire extinguishers and other safety equipment. Furthermore, each HW type will have color-coding and will be labelled with the container's content and the required precaution instructions.

HW disposal

The HW will be transported to a WMRA/EEAA licensed facility, such as El Nassreya HW landfill in Alexandria, via a certified contractor.

8.3.1.6 Spill Prevention Management Plan

The Spill Prevention Management Plan will address spill prevention, preparedness, and response requirements to ensure the safe and effective management of accidental spills, leaks, or releases of fuels, lubricants, and other hazardous substances associated with diesel generators and construction equipment during the construction phase. The Plan aims to prevent spills where possible and, in the event of an incident, to promptly contain and remediate releases in order to minimize adverse environmental impacts and protect workers' health and safety.

8.3.1.7 Wastewater Management

Where temporary dewatering is required during site preparation activities, accumulated water will be collected and transported to an authorized public wastewater treatment plant for treatment and disposal. The Contractor will maintain records of transportation and disposal and ensure compliance with applicable regulatory requirements.

8.3.1.8 Emergency Response Plan

The contractors will have a written Emergency Response Plan to respond to and mitigate any incident to minimize its impact on employees, community, and environment. Employees will be trained on the implementation of the plan and on response activities that could be required in the event of an emergency.

The project company will ensure that the contractors have developed preparedness program to respond to and mitigate any emergency situation to minimize the impact on employees, community, and environment according to national laws and the international EHS guidelines.

The contractor will be committed to the following:

- A knowledgeable, highly trained, and motivated employee group;
- A safety and accident record;
- Preparation and training for emergency response and mitigation measures; and
- Awareness among the workforce through education and training.

In addition, the written emergency plan will be prepared to address the following phases:

- Preparedness: the activities that are communicated for rescuing and minimizing damage.
- Response: the actions necessary to minimize loss of life and property damage and provide emergency assistance.
- Recovery: short- and long-term activities which restore the construction activities and help return it to its normal state.
- Mitigation: the activities that eliminate or reduce the probability of disaster.

8.3.1.9 Chance Find Procedure

As indicated in chapter 4 above, there are no registered antiquities or cultural heritage sites within the project site based on the Egyptian Archeological Map (2022) and the UNESCO World Heritage List of Egypt. However, Although the site is located on previously disturbed land, chance find procedures will be developed to address potential cases of encountering cultural heritage components during the project's construction activities.

The chance find procedure defines the actions to be taken in case of any finds during the construction activity excavations. Such finds could include Non-archaeological/Natural/Cultural Find, Insignificant Chance Finds, Potentially Significant Archaeological Finds or Human remains and/or Burial-related Material.

In general, the Ministry of Tourism and Antiquities (MOTA) has the responsibility for the discovery and exploration of antiquities across Egyptian territory. According to Law No. 117 of 1983, as amended by Law No. 3 of 2010, any person who discovers an unregistered archaeological artifact is obligated to notify the MOTA. The artifact shall be considered state property, and the MOTA must take the necessary measures to preserve it. Within three months, the MOTA must either remove the artifact found on private property or take the necessary procedures to expropriate the land on which it was found, or leave it in place and register it following the provisions of this law.

8.3.1.10 Staff Training and Awareness

Construction workers will be trained and educated according to their respective responsibilities and assigned tasks. A workers' training program will include training on the safe handling of equipment, wastes, and on the use of equipment. Moreover, they will be trained on the safe operation of equipment and spill clean-up. They will also be trained on the use of fire hose reels and fire extinguishers. The training program will also tend to increase workers' awareness of the potential environmental impacts of various construction activities. Awareness will also include issues related to GBVH / SEAH, and measures for reporting such cases need to be established.

The project will undertake an induction program to advise contractors and site visitors of basic health, safety, and emergency procedures, such as emergency signals and evacuation routes. Contractors and vendors on short-term assignments that do not have safety and emergency response training will work under the supervision of the Company staff.

8.3.2 Environmental Management Plans During the Operation Phase

The company will be responsible for the preparation, implementation, and monitoring of the environmental management plan during the operation phase. The management plan will also comply with the world Bank E&S "General Environmental, Health, and Safety Guidelines".

The following shows the minimum set of environmental management procedures that the facility operator will establish and follow.

- **Environmental Register**

During the operation phase, an Environmental Register will be developed for the project activities and the compliance status. The Environmental Register and the Hazardous Materials and Waste Register will be prepared in accordance with the requirements of Annex 3 of the ERs of Law 4/1994 and its amendments, as relevant to the project nature and activities.

- **OHS Management Plan**

During the operation phase, the company will implement an OHS Management Plan to ensure the health and safety of all employees, contractors, and visitors. The plan will be aligned with the international Standards, and applicable national legislation.

The OHS Management Plan will be based on hazard identification and risk assessment for operational activities, including electrical works, routine and non-routine maintenance, waste handling, battery-related hazards (including thermal runaway events), and emergency situations. It will define safe operating procedures, permit-to-work systems where required, and the mandatory use of task-specific PPE.

The plan will also include OHS training and induction, incident and near-miss reporting, emergency preparedness coordination, and periodic inspections to monitor compliance. Overall responsibility for implementation and monitoring will rest with project's designated OHS/HSE Officer.

- **Hazardous Wastes (HW) Management**

Hazardous waste generated from maintenance activities of the proposed project will be collected by an authorized contractor to be disposed of in designated safe disposal sites. HW will be stored in a specific storage area until safe disposal.

HW will be recorded in the hazardous wastes register in accordance with the legal requirements stipulated in Article 33 of the Environment Law 4/1994.

- **Solid Wastes Management**

solid waste generation will be limited and mainly associated with routine site activities. This includes small quantities of domestic waste generated by operational staff, as well as packaging waste such as cardboard, plastic wrapping, and wooden pallets arising from the delivery of spare parts and routine maintenance materials.

- **Preventive and corrective maintenance**

The main objective of maintenance is to maximize the utilization of the equipment in its proper operating conditions.

Planned maintenance

Maintenance will be carried out in accordance with:

- Equipment manufacturers' suggested requirements.
- Scheduled inspections according to good maintenance practices.
- Maintenance programs and procedures developed by the company.

Preventive Maintenance

The preventive maintenance guidelines are based on:

- A general maintenance plan according to which all maintenance activities are scheduled.
- Regular visual inspections will be conducted for the BESS modules, transformer switchgear, the electric system, the monitoring system, and the security system to detect existing and potential defects. It is particularly important to inspect all plant equipment exposed to the weather.

Corrective Maintenance Plan and Response Times

Preventive maintenance reduces the frequency of breakdowns but cannot avoid them. Unplanned maintenance involves corrective maintenance and emergency repairs resulting from equipment problems, required as a result of equipment breakdowns or deficiencies. Once a problem occurs, the plant maintenance staff is trained enough to carry out the repairs

in a quick response time to return to normal operation levels. Corrective maintenance may involve the participation of specialized maintenance contractors.

- **Spill Prevention Management Plan**

The plan will address the spill prevention, preparedness, and response requirements to support the safe response to accidental spills, leaks, or releases of both hazardous and non-hazardous materials to the environment to eliminate or minimize the adverse effects should a spill occur and to protect the health and safety of employees.

- **Training and Capacity Building**

To ensure the competence of the project's employees in undertaking the environmental management procedures and plans, training will be delivered by the HSSE supervisor to the maintenance personnel according to their particular responsibilities.

A workers' training program will cover key thematic areas such as occupational health and safety (OHS), safe handling of equipment and material, waste management, emergency preparedness and response, fire safety (including the use of fire hose reels and fire extinguishers), and environmental awareness related to project operations. Workers will also be informed of potential health and safety risks associated with project activities.

Moreover, Training plans will include the following minimum requirements::

- Ensure that all visitors and site personnel undergo a site-specific HSE Induction training session; and
- Ensure that all records of attendance are kept on file.
- Ensure that all visitors and personnel are issued with an access card as proof of site induction.
- Provide a list of site-specific hazards identified.
- Ensure that Sub-Contractors will conduct their own task-specific risk assessments and keep records in the Health and Safety file.

- **Emergency response plans**

Identify specific risks

The identification of risks includes potential risks related to equipment, devices, materials, buildings, and operation procedures. Risk identification is carried out to estimate the type, quantity, and magnitude of risks that could induce fire, personnel fatality, or building collapse. The Project also includes a utility-scale Battery Energy Storage System (BESS). Under abnormal operating conditions, lithium-ion batteries may experience thermal runaway, which could result in localized fire events and the release of smoke and combustion gases. However, such events are expected to be rare due to the incorporation of battery management systems, thermal monitoring systems, fire detection and suppression systems, and compliance with recognized international standards for battery system safety and fire protection. Thermal runaway is therefore considered a potential operational risk requiring specific emergency preparedness and response measures rather than a routine source of GHG emissions.

These risks include the following:

- Activities that may pose risks to the workers.
- Quantities and types of hazardous materials/waste used or stored.
- Potential failure of the safety measures and procedures, including battery-related incidents such as thermal runaway events, fire, smoke generation, and the release of hazardous gases.

Preparedness

Identify human, administrative, and organizational resources, as well as equipment and sites needed to combat risks. The following activities will be carried out:

- Identify the required training for staff and implementation schedule;
- Identify the essential tools/procedures for the protection of individuals and groups, and also determine the requirements for rescue and medical treatment;
- Prepare maps and detailed plans that include gathering points and escape routes, and evacuation plans in case of emergency, and determine the timeline for implementation;
- Identify the affected parties and stakeholders, provide the emergency support and services, and determine the type of assistance needed; and
- Determine fire prevention and control requirements.

Implementation

The plan should include the level of implementation carried out by individuals or groups according to the following steps:

Warning and alarm plan

The selected warning method should be effective in terms of communicating the warning message to all employees of the site and making sure that they are aware of the nature of the risk and provide them with the opportunity to confront or escape from it. The alarm must be visible and audible to reach all employees on the site.

Response

Responses are carried out according to the type, rate of spread, damages and consequences of the hazard through trained personnel, either directly or manually, using smart devices or through offsite control.

Medical assistance and services

A communication line for access to ambulances shall be available to provide medical care for the potential injured workers and transfer them immediately to hospitals, if needed.

Documentation

A record/report including time, duration of implementation, cost, expenditure, efficiency, effectiveness, and responsible personnel of each of the above measures shall be maintained. The company will develop a reporting system for accidents, including injuries, damage to property, and environmental damage. The information and records mentioned will be used to improve response procedures and to decrease and control potential hazards. General information to be recorded is as follows:

- Date, place of incident or emergency;
- The affected individual or groups;
- Description of the situation and conditions surrounding the site;
- Identify and assess the magnitude of injury, loss, damage or pollution;
- Actions taken to reduce the severity and degree of the situation; and
- Record the treatment or cleaning procedures that have been carried out.

Follow-up procedures

Once the hazard is managed, a throughout survey of the affected site must be carried out to ensure that the hazard is eliminated, and that the situation is restored to its original state.

Follow-up procedures include the following:

- Identify the causes of the emergency.
- Assess the efficiency of emergency response procedures;
- Propose corrective action and remedial measures necessary to prevent recurrence of such incidents; and
- Identify the level of need to implement any treatment and/or monitor procedures to restore the site to its original state;

Update the emergency response plan and staff training program

The emergency plan will be updated every year or at the event that needs improvement of the plan and the staff training program.

8.3.3 Social Management Plan During Construction and Operation Phases

a. Labour and Working Conditions

Recruitment procedures for the Energy Valley project will be implemented by contractors in accordance with principles of equal opportunity, transparency, and non-discrimination, promoting local employment and female inclusion where feasible. During Construction, the Project will ensure that contractors apply appropriate occupational health and safety measures and fully prohibit forced, compulsory, and child labour during construction. During operation, labour and workplace health and safety practices will comply with Egyptian Labour Law No. 14/2025 and relevant international occupational health and safety guidelines.

b. Site Security Management

Site security during the construction phase will be provided by a licensed contractor-appointed security company under the supervision of the Energy Valley, while responsibility during operation will rest with Energy Valley through an annually contracted licensed security provider. Security personnel will control access to the fenced premises and operate on a shift basis. Although interactions with workers, nearby communities, and road users are expected to be limited and localized, inappropriate conduct could create community concerns if not properly managed. Accordingly, all security personnel will receive training on professional conduct, community relations, applicable national laws, and relevant human rights principles consistent with GIIP.

c. Ongoing Consultation

Scatec has already undertaken various activities to communicate and engage with key stakeholders and is willing to continue its engagement activities. Annex 4 includes the stakeholders' consultation activities.

As part of their CSR commitment, Scatec has an ongoing CSR programme that aims at supporting the community with specific focus on vulnerable groups in the eastern part of Minya governorate.

d. Information Disclosure

Information regarding the Project shall be publicly available on an ongoing basis and updated semi-annually at a minimum. Information will be at an appropriate level of details and presented in an accessible mean (e.g., in Arabic with infographics used where beneficial).

This information is expected to include, but not be limited to, project progress updates; proposed future engagement and grievance mechanism; information about project activities; key contacts for the project; and other information, as needed.

e. Grievance Management

Minimizing grievances is realized through managing impacts and through pre-emptive stakeholder engagement designed to anticipate and address potential issues before they become grievances. The Procedures in details described in Section 8 .

8.3.4 Project Decommissioning Plans

Decommissioning is defined as the close down of operations, the removal of process equipment, buildings, and structures, and the carrying out of site cleanup and remediation, if required. The expected lifetime of the project ranges between 25 to 30 years, which will be renewable as long as the proper predictive maintenance measures are taken, and all the necessary revamps and upgrades are done.

Prior to commencement of decommissioning activities, Energy Valley will prepare and implement a detailed Decommissioning Plan in accordance with applicable Egyptian regulations, lender requirements, equipment supplier recommendations, and Good International Industry Practice (GIIP). The Decommissioning Plan will define the decommissioning methodology, health and safety requirements, waste management procedures, recycling and disposal arrangements, transportation requirements, and site restoration measures applicable at the time of decommissioning.

The following are the main issues addressed by the facility's decommissioning plan:

- Development of the decommissioning plan according to international and best practices guidelines.
- Removal procedures for all above-ground structures, equipment, and infrastructure associated with the BESS facility.
- Disassemble of project components, including battery containers, electrical equipment, and auxiliary systems.
- Reuse and recycled (where possible) or disposed of in accordance with regulatory requirements.
- Final site clean-up to ensure that no residual contamination or safety hazard remains.

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8.3.5 Summary of ESMP

Below provides a comprehensive overview of the project management plan, including potential environmental aspects identified in the ESIA for both the construction and operation phases of the project, as well as the proposed mitigation measures designed to minimize these impacts.

Table 8-2: Overview of ESMP Plans During Construction

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required Completion Date
Construction Phase						
Air Quality	Dust emissions and exhaust emissions from vehicles and machinery	- Restrict unnecessary idling of vehicles and equipment. - Maintain construction machinery and vehicles in good working condition. - Cover trucks transporting friable materials. - Apply speed restrictions and good housekeeping measures.	Construction contractor	- Monitoring plan - Air quality measurements - Maintenance logs	10,000 – 25,000/ year	Throughout the construction phase period
Noise	Noise generated from construction equipment and vehicles	- Maintain equipment regularly. - Schedule high-noise activities appropriately. - Provide workers with suitable hearing protection.	Construction contractor	Compliance with applicable noise limits; PPE usage Noise measurements and Maintenance logs	10,000 – 5,000 / year	Throughout the construction phase period
	Provision of PPEs	- Providing necessary PPE for workers	Construction contractor		20,000 – 10,000 (PPE supply - total project period)	
Soil	Soil disturbance and potential contamination	- Implement Spill Prevention Management Plan. - Maintain good housekeeping practices. - Store fuels and chemicals appropriately. - Collect and dispose of contaminated materials through licensed contractors.	Construction contractor Energy Valley (include provisions in the construction contracts. Energy Valley s to ensure contractors' compliance)	- Waste management plans - Solid/hazardous waste - No significant spills; contract - Contractor follow-up documents - Contracts with authorized waste contractors	6,000 – 20,000 (depends on waste volume)	Throughout the construction phase period

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required Completion Date
Construction Phase						
Surface Water and Dewatering	Dewatering activities and wastewater management	- Collect dewatering water and transport it to an authorized public wastewater treatment plant. - Prevent uncontrolled discharge to surrounding receptors.		Records of wastewater collection and disposal	5,000 – 15,000	
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	20,000 – 40,000	Before construction activities
Emergency Response plans	Site Staff and Workplace Safety	- Develop procedures for emergency control	Contractor	Emergency response plan	10,000 – 25,000	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	10,000 – 30,000	Throughout the construction phase period
Social Environment	Workers influx	- Prioritize hiring local workers - Implement and maintain a community grievance mechanism; and, - Selection of labour accommodation, away from existing communities, as possible, and considering establishing a labour camp on site. - Develop HR policies including GBV and SEAH plans	Energy Valley /Construction contractors	Labour management plan, workers accommodation inspection checklist GBV and SEAH policies Workers Awareness	15,000 – 40,000/ year	Throughout the construction phase period

Aspect		Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required Completion Date
Construction Phase							
		Community health, safety and security- risks from road traffic accidents	- Develop Traffic Management Plan (TMP) and associated procedures	Construction contractors	TMP and procedures	10,000 – 25,000	
		Cultural heritage	- develop chance find procedure	Energy Valley /Construction contractors	Developed procedures	2,000 – 5,000	Before construction activities
Total Estimated Cost	(USD)		-			≈ ≈ 100,000 – 250,000 USD	
	(EGP)					≈ ≈ 5,000,000 – 12,500,000 EGP	

Table 8-3: Overview of ESMP Plans During Operation

Aspect	Issues of concern	Actions	Party Implementing the Action	Indicator of completion	Estimated Cost (USD)	Required completion Date
Operation Phase						
Noise	Transformers and cooling equipment	- Provide workers at noise generating machinery and equipment will be provided with suitable (PPEs). - Maintain equipment is good operation conditions - A grievance mechanism will be adopted for assessing complaints,	Project Company	Noise measurements	5,000 – 10,000	Periodically throughout the operation stage
Hazard waste management	Hazard waste generated from maintenance activities	- Store hazardous waste in designated areas. - Dispose of hazardous waste through licensed contractors.	Project Company	Hazard waste register, waste manifest	5,000 – 10,000 USD/year	Periodically throughout the operation stage
Spill Prevention	Accidental releases of oils and hazard materials	- Implement Spill Prevention Management Plan. - Maintain spill response equipment and procedures.	Project Company	Number of spills and corrective actions implemented	2,000 – 5,000 USD/year	Periodically throughout the operation stage
Labour rights and welfare	working conditions	Develop Human Resources policy	Project Company	Contracts (with workers)	Included in OPEX (negligible direct ESMP cost)	Throughout the project lifetime
Training and Awareness	competence of the project personnel	training for the personnel according to their responsibilities	Project Company	Training plans	5,000 – 10,000/ year	Throughout the project lifetime
Occupational Health and Safety	Site Staff and Workplace Safety	- Developing HSE procedures - Implement OHS Management Plan. - Conduct periodic training and refresher programs. - Maintain incident reporting procedures	Project Company	Development of HSE policies OHS inspections and audits	8,000 – 15,000/ year	Throughout the project lifetime
Emergency Preparedness and Response; and Fire and Thermal Runway	Operational risk management	- Adopt a probabilistic risk assessment framework - Implement battery safety procedures.	Project Company	Emergency response plan	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
			- Maintain fire detection and suppression systems. - Conduct emergency drills and response training				
Stakeholder Engagement and Grievance Management		- Stakeholder concerns, complaints and grievances	- Maintain the project grievance mechanism - Periodically review grievances trends and response	Project Company	- Number of grievances received, resolved and pending; response times	10,000 – 20,000/ year	Throughout the project lifetime
Total Estimated Cost	(USD)					≈ 38,000 – 80,000 USD / year	
	(EGP)					≈ 1,900,000 – 4,000,000 EGP / year	

Table 8-4: 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	Prepare and implement a Decommissioning Plan in accordance with Egyptian regulations, lender requirements, and GIIP.	(EETC/Energy Valley)	Approved Decommissioning Plan	10,000 – 20,000	Prior to decommissioning
Air Quality	Dust and air emissions from dismantling and demolition	Apply dust suppression measures and follow approved dismantling procedures.	Decommissioning Contractor	No significant dust complaints; monitoring records	5,000 – 10,000	Throughout decommissioning
Noise	Noise from demolition and equipment removal	Limit noisy activities, maintain equipment in a good working conditions , and provide PPE where required.	Decommissioning Contractor	Compliance with applicable noise requirements	3,000 – 8,000	Throughout decommissioning
Waste Management	Generation of hazardous and non-hazardous waste	Segregate, reuse/recycle where feasible, and dispose of wastes through licensed facilities.	Decommissioning Contractor	-Solid/hazardous waste and wastewater management contract -Contractor follow-up documents Contracts with authorized waste contractors	20,000 – 60,000 (depends largely on hazardous waste quantities and disposal requirements)	Throughout decommissioning
Occupational Health and Safety	Worker injuries during dismantling and demolition	Implement OHS procedures, provide PPE, training, and emergency preparedness.	Decommissioning Contractor	No major incidents; OHS inspection records	15,000 – 35,000	Throughout decommissioning
Site Restoration	Residual contamination and disturbed land	Remove remaining structures, clean up the site, remediate if required, and restore the site where feasible.	Decommissioning Contractor / Project Proponent	Site restoration completed and approved	20,000 – 50,000 (excluding major demolition or remediation works if required)	Before project closure
Monitoring and Reporting	Non-compliance with environmental and social requirements	Conduct regular inspections, monitoring, and reporting to verify implementation of the Decommissioning Plan.	Energy Valley / Supervising Engineer	Monitoring reports and close-out report	8,000 – 20,000	Throughout decommissioning and prior to project closure

8.4 Environmental and Social Monitoring Plan

Environmental and Social (E&S) monitoring will be undertaken throughout the construction and operation phases to verify compliance with applicable environmental and social requirements, assess the effectiveness of mitigation measures, and support the continual improvement of Project performance. Monitoring activities will cover environmental, occupational health and safety, labour and working conditions, emergency preparedness and response, stakeholder engagement, grievance management, and other relevant environmental and social aspects identified in this ESIA.

Monitoring results and the implementation status of the ESMP will be documented and incorporated into periodic Environmental and Social (E&S) reports. These reports will be prepared by the Project Company's HSSE team, reviewed by Project Management, and submitted to the lenders, including the AfDB, in accordance with the agreed reporting arrangements and reporting frequency. The reports will include, as applicable, monitoring results, implementation status of mitigation measures, incidents and accidents, grievances received and resolved, stakeholder engagement activities, corrective actions, and compliance status with applicable environmental and social requirements.

In accordance with Law No. 4/1994 and its Executive Regulations, the Project Company will maintain the environmental registers required under Egyptian legislation and update them periodically throughout the operational phase. In addition, a detailed monitoring programme will be developed prior to the commencement of operation and updated, as necessary, based on monitoring results, operational experience, and any changes to Project activities or applicable requirements.

The Project Company will also monitor and maintain records of worker and stakeholder grievances, including response times, corrective actions, and resolution status, as well as key occupational health and safety indicators, emergency preparedness and response performance, and stakeholder engagement activities.

In addition to routine monitoring activities, an annual independent Environmental and Social Performance Audit will be undertaken by a qualified external consultant or auditing firm. The audit will assess compliance with applicable legal requirements, lender requirements, ESMP commitments, and the effectiveness of the implemented mitigation measures and management systems. Audit findings and corrective actions will be tracked and incorporated into the Project's environmental and social management processes, as appropriate.

The following Table 8-4 provides the proposed Environmental and Social Monitoring Plan for the construction and operation phases

Table 8-4: Environmental Monitoring Plan

Receptors / Source of impact/risk	Type of monitoring	Monitoring location	Target / Indicators	Reference Standard / Requirement	Frequency of monitoring	Responsibility	Implementation	Approximate annual costs
Construction phase								
Workplace and neighboring industrial area	Noise measurements	Project site	Compliance of noise intensity with standards	Law No. 4/1994 (Annex 7); IFC/WBG General EHS Guidelines; EBRD PR4; AfDB OS4; EIB ESS3	Measurement at two locations quarterly	All contractors and subcontractors, supervised by Energy valley	Third party (research entity or certified lab)	~10,000 EGP
	Air emissions	Project site	Compliance with air emission standards	Law No. 4/1994 (Annex 6); IFC/WBG General EHS Guidelines; EBRD PR3; AfDB OS4; EIB ESS3	Measurement at two locations quarterly	All contractors and subcontractors, supervised by Energy valley	Third party (research entity or certified lab)	~ 35,000 EGP
	Spills	Fuel, oil and chemicals storage areas	Number of spill incidents, response actions and corrective measures	EHS Guidelines	Monthly and after incident	All contractors and subcontractors, supervised by Energy valley	contractors' EHS personnel	Included in salaries
	Waste management	Project site and waste storage areas	Proper management of the different types of waste	Waste Management Law No. 202/2020; Law No. 4/1994; IFC PS3; EBRD	Monthly	All contractors and sub-contractors, supervised by Energy Valley company	Energy Valley Company and contractors EHS personnel	200 – 600 EUR/ton (hazardous waste) 80 – 150 EUR/ton (non-hazardous)

Receptors / Source of impact/risk	Type of monitoring	Monitoring location	Target / Indicators	Reference Standard / Requirement	Frequency of monitoring	Responsibility	Implementation	Approximate annual costs
	Wastewater management	Dewatering collection and storage location	Records of wastewater collection and disposal through authorized facilities	PR3; AfDB OS4; EIB ESS3	Throughout dewatering activities	All contractors and sub-contractors, supervised by Energy Valley company	contractor under Energy Valley Company supervision	10,000–30,000 USD
Social management	Workers influx	Project site and offsite accommodation	Number of community grievance	Egyptian Labour Law No. 14/2025; IFC PS2; EBRD PR2; AfDB OS5; EIB ESS8	Regular	All contractors and sub-contractors, supervised by the Energy Valley company	Energy Valley Company and contractors' EHS personnel	USD 2,000–5,000/year
	Traffic management	Project site and Vicinity (Aol)	-	No road accidents		Traffic management	Project site and Vicinity (Aol)	-
Stockholders and nearby receptors	Stakeholder engagement and grievances monitoring	Project site	Number of grievances received, resolved and pending response time	IFC PS1; EBRD PR10; AfDB OS10	Ongoing	All contractors and sub-contractors, supervised by Energy Valley company	Energy Valley Company and contractors EHS/HR personnel	Included in salaries
workers	OHS	Construction site	Number of incidents, near misses, RIRs, training records	Labour law 14/2025; IFC/WBG EHS Guidelines; EBRD PR2; AfDB OS2	Monthly	All contractors and sub-contractors, supervised by Energy Valley company	contractors EHS/HR personnel	Included in salaries
Operation phase								
Workplace	Noise measurements	Site boundary and near major noise-generation equipment's	Compliance of noise intensity with standards	Law No. 4/1994 (Annex 7); IFC/WBG General EHS	Annually	Energy Valley company	Third party (research entity or certified lab)	~10,000 EGP

Receptors / Source of impact/risk	Type of monitoring	Monitoring location	Target / Indicators	Reference Standard / Requirement	Frequency of monitoring	Responsibility	Implementation	Approximate annual costs
				Guidelines; EBRD PR4; AfDB OS4; EIB ESS3				
workers	OHS	Project site	Number of incidents , near misses, RIRs, training records	Labour law 14/2025; IFC/WBG EHS Guidelines; EBRD PR2; AfDB OS2	Monthly	Energy Valley company	HSSE personnel	Included in salaries
Emergency and BESS operation	Emergency preparedness and response monitoring	Project site	Emergency drills conducted, emergency response readiness, incidents and corrective actions	IFC/WBG EHS Guidelines; EBRD PR4; AfDB OS4	Annually and following emergency events	Energy Valley company	HSSE personnel	Included in salaries
Stakeholders and nearby receptors	GM monitoring	AOI	– Grievance management plan developed for internal and external grievances. – Compliance with EBRD good practice for GBV and SEAH grievances.	IFC PS1; EBRD PR10; AfDBOS10	Quarterly	Energy Valley company	HSSE personnel	Included in salaries
	Stakeholder engagement monitoring	AOI	– Publicly available information. – Semi-annual updates provided.	IFC PS1; EBRD PR10; AfDBOS10	Annual	Energy Valley company	HSSE personnel	Included in salaries

Receptors / Source of impact/risk	Type of monitoring	Monitoring location	Target / Indicators	Reference Standard / Requirement	Frequency of monitoring	Responsibility	Implementation	Approximate annual costs
			– Information in Arabic with infographics where beneficial.					
Overall Project E&S Performance	Independent Environmental and Social Performance Audit	Project site and associated facilities	– Compliance with ESMP commitments. – ESMS requirements. – lender requirements. – corrective actions. – stakeholder engagement. – Grievance management. – OHS performance. – incident management and applicable legal requirements	AfDB Integrated Safeguards System (ISS); AfDB OSs; IFC Performance Standards; EBRD PRs; Applicable National Legislation	Annually	Energy Valley company	Independent external E&S consultant/auditing firm	USD 10,000–20,000 per audit
Decommissioning								
Air quality (dust from demolition and dismantling)	Visual inspections and dust monitoring (if required)	Active decommissioning areas, access roads, nearby sensitive receptors	No excessive dust emissions or dust-related complaints; implementation of dust suppression measures –	Law No. 4/1994 (Annex 6); IFC/WBG General EHS Guidelines; EBRD PR3; AfDB OS4; EIB ESS3	Weekly and following complaints	Energy Valley	Decommissioning Contractor	2,000–5,000

Receptors / Source of impact/risk	Type of monitoring	Monitoring location	Target / Indicators	Reference Standard / Requirement	Frequency of monitoring	Responsibility	Implementation	Approximate annual costs
Noise from dismantling activities	Noise monitoring and site inspections	Site boundary and nearest sensitive receptors (where applicable)	– Compliance with applicable noise limits; no justified complaints	Law No. 4/1994 (Annex 7); IFC/WBG General EHS Guidelines; EBRD PR3; AfDB OS4; EIB ESS3	Monthly and following complaints	Energy Valley	Qualified Environmental Consultant / Contractor	2,000–5,000
Hazardous and non-hazardous waste	Waste management inspections and documentation review	Waste storage areas and disposal/recycling facilities	– Proper segregation, storage, transport, recycling, and disposal; waste manifests maintained	Waste Management Law No. 202/2020; Law No. 4/1994; IFC PS3; EBRD PR3; AfDB OS4; EIB ESS3	Weekly	Energy Valley	Decommissioning Contractor	3,000–8,000
Soil contamination from waste, fuels, oils, or transformer components	Site inspections and spill monitoring	Fuel storage areas, dismantling areas, transformer removal locations	– No evidence of spills or contamination; spill response records available	Law No. 4/1994 and law 202/2020 / IFC/WBG General EHS Guidelines; EBRD PR3; AfDB OS4; EIB ESS3	Weekly and after any spill	Energy Valley	Decommissioning Contractor	2,000–5,000
Occupational Health and Safety (OHS)	OHS inspections and	Entire project site	– PPE compliance; work permits; training records;	Egyptian Labour Law No. 14/2025; IFC PS2; IFC	Daily inspections; monthly reporting	Energy Valley	Decommissioning Contractor	Included in contractor's HSE budget

Receptors / Source of impact/risk	Type of monitoring	Monitoring location	Target / Indicators	Reference Standard / Requirement	Frequency of monitoring	Responsibility	Implementation	Approximate annual costs
	incident reporting		number of incidents/LTIs	PS4; EBRD PR2 & PR4; AfDB OS5; EIB ESS9				
Community Health and Safety	Inspection of traffic management, access control, and public safety measures	Site entrances, access roads, surrounding communities	– No unauthorized access; effective traffic management; no community incidents	IFC PS4; EBRD PR4; AfDB OS4; EIB ESS9	Weekly	Energy Valley	Decommissioning Contractor	Included in contractor's ESMP implementation
Site restoration	Visual inspection and site verification	Entire project footprint	– Removal of infrastructure completed; site restored; no residual contamination or safety hazards	Law 4/1994 and Waste Management law 202/2020; IFC/WBG General EHS Guidelines; AfDB ISS; EIB ESS3	Upon completion of decommissioning and before site handover	Energy Valley	Decommissioning Contractor	5,000–10,000 <i>(final inspection and verification, including any sampling if required)</i>
Consolidated Estimated Annual Environmental and Social Monitoring Budget								
		Construction Phase	Decommissioning	Operation Phase				
Estimated Total Annual Cost*	(USD)	≈ USD 15,000–35,000		Approx. ≈ USD 10,000–20,000				
	(EGP)	Approx. ≈ EGP 750,000–1,750,000		Approx. ≈ EGP 500,000–1,000,000				

*The above costs are indicative estimates intended to provide an order-of-magnitude assessment of environmental and social monitoring expenditures at the current stage of project development.

9. Conclusion

The Energy Valley Battery Storage Project represents a strategic contribution to Egypt's national objectives for energy diversification, security of supply, and increased penetration of renewable energy resources, thereby reducing reliance on imported fossil fuels. In this context, the No-Project Alternative is not considered a viable option, as it would forego significant environmental and socio-economic benefits associated with the development.

The Environmental and Social Impact Assessment has identified and evaluated the potential environmental and social impacts associated with the Project across its construction, operation, and decommissioning phases. Appropriate mitigation and management measures have been defined in line with national legislation and applicable international standards to ensure that these impacts are effectively avoided, minimized, or controlled.

To ensure environmental and social sustainability during construction, the Project will implement comprehensive mitigation measures, including dust and noise control, waste and wastewater management, spill prevention, traffic management, occupational health and safety procedures, biodiversity protection, and labour and community management through stakeholder engagement and grievance mechanisms.

Operational risks will be mitigated through the implementation of OHS procedures, battery safety measures, continuous fire detection and suppression systems, emergency preparedness and response arrangements, spill prevention measures, and proper hazardous waste management. Social performance is supported through the implementation of a Human Resources Policy, personnel training and awareness programs, and a transparent stakeholder engagement and grievance mechanism to address concerns and complaints throughout project operation.

To support the effective implementation of all Environmental and Social (E&S) mitigation, monitoring, management, and reporting measures identified in the Environmental and Social Management Plan (ESMP), the Project has allocated adequate financial resources. The estimated ESMP implementation budget is approximately USD 175,000 during the construction phase and approximately USD 60,000 per year during the operation phase, covering environmental monitoring, occupational health and safety, waste management, biodiversity conservation, stakeholder engagement, emergency preparedness, training, and other environmental and social management requirements.

With the implementation of the proposed Environmental and Social Management Plans (ESMPs), monitoring frameworks, and mitigation measures, the residual impacts are expected to remain within acceptable limits.

The Project is therefore considered environmentally and socially feasible, provided that all ESIA commitments are fully implemented and continuously monitored throughout its lifecycle.

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Annex 1: National and AfDB's Environmental and Social, Operational Safeguards Requirements Gap Analysis

**National and AfDB's Environmental and Social
Operational Safeguards Requirements Gap Analysis**
Updated in Accordance with the AfDB Integrated Safeguards System (ISS) 2023

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
OS 1: Assessment and Management of Environmental and Social Risk and Impact			
Environmental and Social Assessment (ESA)	An integrated ESA shall be conducted for the project encompassing direct, indirect, and cumulative E&S risks and impacts throughout the project life cycle (OS1, para. 19). The ESA must address all relevant OSs (OS1–OS10), including climate change vulnerability, gender inequalities, and impacts on vulnerable groups. The updated ISS 2023 expands the ESA scope to include: contextual risk assessment covering human rights, SEAH/GBV risks, labour influx, and conflict dynamics (OS1, Annex 1). For high-risk (Category 1) projects, independent specialists must conduct the ESA (OS1, para. 21).	According to Law 4/1994 and its Amendments Law 9/2009 and Law 105/2015, an Environmental Impact Assessment (EIA) should be prepared before project execution to assess the potential impacts resulting from the project.	The national EIA framework is largely aligned with the basic requirement for pre-project assessment. However, significant gaps remain: (i) national law does not require explicit assessment of cumulative or indirect impacts; (ii) climate change vulnerability assessment is not mandated; (iii) gender and vulnerability screening are not required under national law; (iv) contextual risk assessment covering SEAH/GBV, labour influx, and human rights is not addressed by Egyptian legislation. The updated ISS 2023 strengthens these requirements beyond what is captured in national law.
Environmental and Social Management Systems (ESMS)	An ESMS shall be in place to address E&S issues across the project life cycle (OS1, para. 12). ESMS requirements shall be incorporated into third-party contracts. The updated ISS 2023 requires the ESMS to include procedures addressing SEAH, GBV, modern slavery, and labour influx risks (OS1, Annex 2). Contractor compliance shall be monitored against contractual conditions.	--	The national laws do not obligate facilities to develop a documented ESMS. Such systems are usually voluntarily developed by facilities aiming to obtain international quality management certification (e.g. ISO). The updated ISS 2023 adds new requirements for the ESMS to explicitly address SEAH, GBV, and modern slavery — areas not covered by Egyptian law. This gap is significant for projects with large contracted workforces.
Environmental and Social Policy	An overarching E&S policy shall be in place to define the environmental and social objectives and principles guiding the project's E&S performance. This policy shall be communicated to all	--	The national laws do not obligate facilities to develop an E&S policy. However, such policies are usually developed for facilities seeking international quality management

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	employees. The updated ISS 2023 requires the policy to explicitly address non-discrimination, gender equality, and protection from SEAH/GBV (OS1, para. 12; OS2).		certification. The updated ISS 2023 adds a specific requirement to address SEAH/GBV and gender equality in E&S policies — a gap relative to Egyptian national requirements.
Environmental and Social Management Plans (ESMP)	An ESMP shall be developed to address identified environmental and social risks and impacts, appropriate to the nature and scale of the project. The ESMP is binding and referred to in the financing agreement (Bank Policy, para. 54). It shall include: mitigation and monitoring measures, climate adaptation measures, and measures to address SEAH/GBV and labour influx risks. Requirements shall be communicated to all levels of the organization including contractors.	According to the Egyptian Guidelines for EIA (EEAA, 2009), an ESMP should be developed as an essential part of the EIA. The ESMP should consist of a set of mitigation, monitoring and institutional measures to be performed during different phases of the project. Responsibilities for mitigation and monitoring should be clearly defined in the ESMP.	There is no binding law requiring communication of the ESMP to all workers, and no penalties in national law for non-compliance. The updated ISS 2023 adds new ESMP requirements covering climate adaptation and SEAH/GBV management — areas not addressed by Egyptian law. Since the ESMP is part of the EIA, environmental approval implies approval of the ESMP from the competent authority, but enforcement mechanisms remain weak.
Organizational E&S Capacity and Commitment	Specific in-house personnel with clear lines of responsibility and authority shall be designated for E&S issues. The E&S representative shall possess the requisite knowledge, skills, and experience. Relevant training programmes shall be conducted, including on SEAH/GBV prevention (updated ISS 2023).	Articles 1, 2 of Decree 134/2003 of Labour Law 14/2025 set the required number of responsible personnel for managing H&S aspects. Article 5 of Decree 134/2003 requires facilities employing more than 50 employees to establish a Safety Committee. Articles 14, 15, and 16 of Decree 134/2003 address qualifications of HSE responsible persons.	No national requirements for assigning specific personnel for environmental issues. The updated ISS 2023 adds the requirement for E&S personnel to receive training on SEAH/GBV prevention and response — a gap not addressed by Egyptian law.
Contextual Risk Assessment	The updated ISS 2023 introduces a new requirement for a contextual risk assessment to complement ESDD (OS1, Annex 1). This assessment covers: political economy dynamics; SEAH and GBV risks; labour influx and conflict risks; limitations on free speech and reprisal risks; corruption and rule of law issues; and land access and tenure conflicts.	--	There is no national legislative requirement for a contextual risk assessment covering SEAH/GBV, political economy, reprisal risks, or labour influx dynamics. This is an entirely new requirement introduced by the updated ISS 2023 that is not reflected in Egyptian environmental or social law. Projects will need to conduct this assessment as an additional step beyond national EIA requirements.

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
Supply Chain Management	Where there is a high risk of significant E&S issues in the supply chain (child labour, forced labour/modern slavery, significant OHS risks, biodiversity), primary suppliers shall be required to introduce corrective measures. The updated ISS 2023 explicitly adds 'modern slavery' and 'human trafficking' as supply chain risks to be assessed and managed (OS2, paras. 41–44). Where remedy is not possible, the Borrower shall within a reasonable period shift to compliant suppliers.	--	Supply chain E&S management is not addressed by Egyptian national law. The updated ISS 2023 has strengthened this requirement by explicitly adding modern slavery and human trafficking — not covered in either the 2013 ISS or Egyptian legislation. This represents a significant new compliance obligation for projects with complex supply chains.
Project Monitoring and Reporting	Procedures shall be in place to track and evaluate E&S performance throughout the project life cycle. The Borrower shall promptly notify the Bank within three working days of any materially adverse E&S event (updated ISS 2023, OS2, para. 45). E&S performance information shall be periodically reported internally to senior management and, as appropriate, to investors and affected communities.	The Egyptian Environmental Law 4/1994 requires activities with potential environmental impacts to maintain records/registers and report on their environmental performance. Records must be available for inspection by the competent authority. The Egyptian Guidelines for EIA (EEAA, 2009) require the ESMP to include monitoring and reporting provisions.	No requirements exist for periodic reporting to affected communities. The updated ISS 2023 introduces a new mandatory requirement to notify the Bank within three working days of materially adverse events — a stricter standard than Egyptian law. National law also does not require a systematic ESMP compliance monitoring system for the operational phase.
OS 2: Labour and Working Conditions			
General	Working conditions shall comply with national labour and employment laws and the requirements of OS2. The updated ISS 2023 introduces new Labour Management Procedures (LMPs) as a mandatory management tool, replacing less structured approaches. LMPs shall cover all categories of workers including direct workers, contracted workers, community workers, and primary supply workers.	The Egyptian Labour Law No. 14/2025 addresses working conditions and management of worker relationships, covering rights, duties, and occupational health and safety requirements.	The national law is broadly aligned with the general requirement, but does not mandate the preparation of formal Labour Management Procedures (LMPs). The LMP concept is new to the updated ISS 2023 and represents a gap relative to both the 2013 ISS and Egyptian law.
Human Resources Policies	HR policies shall be consistent with national law and international standards, and shall be clearly accessible to all	According to Article 58 of Labour Law (14/2025), internal regulation lists shall be in place covering rules of work and	The national laws do not specifically require development of procedures for managing and monitoring third-party

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	employees. Policies shall cover: protection from SEAH and GBV (new requirement under updated ISS 2023); non-discrimination; and management of third-party labour. Procedures shall be implemented for managing and monitoring third-party employers.	disciplinary sanctions. Decree 185/2003 describes the work regulation policy components including workers' complaints.	employer performance. The updated ISS 2023 adds an explicit requirement for HR policies to address SEAH and GBV — a gap not covered by Egyptian labour law.
Working Relationships	Terms and conditions of employment shall be documented and communicated in understandable language to all workers. The updated ISS 2023 requires this to include community workers and workers in fragile or conflict contexts. All wages, social security benefits, and entitlements shall be paid on termination of employment (OS2, para. 13).	Book 2 of Labour Law 14/2025 includes requirements for working relationships. Article 32 addresses contracts specifying job type, hours, rest days, wages, and vacations. Decree 211/2003 requires notification to labour offices prior to subcontracting. Article 36 addresses minimum wages. Social insurance is regulated under Law 63/1964, amended by Law 148/2019.	--
Child Labour and Forced Labour / Modern Slavery	The HR policy shall clearly prohibit child labour and forced labour. The updated ISS 2023 explicitly adds 'modern slavery' and 'human trafficking' as prohibited practices (OS2, para. 23). Young workers (under 18) shall not be employed in hazardous work. Regular monitoring of young workers' health, conditions, and hours is required. LMPs shall specify the minimum age for employment (14 unless national law specifies higher).	Article 2 of Child Law 126/2008 and Article 98 of Labour Law 14/2025 define a child as a person under 18. Article 99 of Labour Law 14/2025 prohibits engagement of children under 14. Decree 118/2003 lists work prohibited for children under 16 and 18. Article 12 of the Egyptian Constitution 2014 prohibits forced labour.	National law addresses child and forced labour, which is broadly aligned. However, Egyptian law does not explicitly prohibit 'modern slavery' and 'human trafficking' in the labour context as introduced by the updated ISS 2023. This is a gap requiring specific policy and LMP provisions.
SEAH and GBV Prevention	The updated ISS 2023 introduces explicit requirements for the Borrower to protect workers and communities from Sexual Exploitation, Abuse and Harassment (SEAH) and Gender-Based Violence (GBV). This includes: developing a SEAH/GBV prevention and response plan; integrating SEAH/GBV requirements into contractor contracts (OS1, Annex 2); training for workers; and establishing	--	There is no national legislative requirement in Egypt addressing SEAH and GBV in the context of project operations and labour management. This is an entirely new requirement introduced by the updated ISS 2023 and represents a significant compliance gap relative to Egyptian law. Projects will need to develop specific SEAH/GBV prevention and response frameworks.

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	confidential reporting mechanisms (OS2; OS4).		
Non-Discrimination and Equal Opportunity	Employment decisions shall not be made on the basis of personal characteristics unrelated to job requirements. The updated ISS 2023 expands protected characteristics to explicitly include sexual orientation and gender identity (OS2; OS7). Gender-responsive approaches shall be adopted throughout project implementation.	Article 35 of Labour Law 14/2025 prohibits discrimination against employees on grounds of gender, origin, culture, politics, religion, or beliefs.	Egyptian law addresses basic non-discrimination but does not explicitly cover sexual orientation and gender identity as protected characteristics — a gap relative to the updated ISS 2023 requirements.
Workers' Organizations	Workers shall be allowed to form and join workers' organizations. The Borrower shall not interfere with or control these organizations, and shall engage with workers' representatives for collective bargaining. The updated ISS 2023 clarifies that the Borrower shall not discriminate against or retaliate against workers participating in unions (OS2, para. 20).	Article 4 of Law 213/2017 (amended by Law 142/2019) concerning trade union organizations states that workers have the right to form trade union organizations and freely join or withdraw from them.	--
Retrenchment	Prior to implementing collective dismissals, the Borrower shall carry out an analysis of alternatives to retrenchment. A retrenchment plan shall be developed based on non-discrimination principles, consultation with workers, and compliance with national law (OS2, para. 18). This is a new explicit requirement under the updated ISS 2023.	Egyptian Labour Law provides for dismissal procedures and severance entitlements under Labour Law 14/2025.	While Egyptian law covers aspects of dismissal, it does not mandate a specific analysis of alternatives to retrenchment or a formal retrenchment plan as required by the updated ISS 2023. This represents a gap requiring additional management procedures.
Worker Accommodation	Worker accommodation shall be clean, safe, and meet basic needs, including water, sanitation, and medical care where appropriate. The updated ISS 2023 specifies that accommodation shall not restrict workers' freedom of movement or association, and shall provide	Article 221 of Labour Law 14/2025 requires projects in remote areas to provide accommodation and meals. Ministry of Labour Decree 200/2003 provides specifications.	Egyptian law addresses accommodation provisions in remote areas. The updated ISS 2023 adds requirements on non-restriction of freedom of movement and gender-segregated facilities — elements not explicitly covered by Egyptian law.

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	segregated facilities for women and men (OS2, para. 14).		
Grievance Mechanism (Workers)	A workers' grievance mechanism shall be in place, accessible to all project workers including contracted and non-employee workers, and shall be communicated at recruitment. The updated ISS 2023 requires the mechanism to operate without reprisal, independently and objectively, and to not impede access to judicial remedies (OS2, paras. 24–26).	According to Article 19 of Decree 185/2003, workers' complaints shall be raised to the head of department and then to management. All complaints shall be documented.	--
Labour Influx Management	The updated ISS 2023 introduces explicit provisions for managing the influx of project labour (OS4, paras. applicable). Where significant labour influx is anticipated, the Borrower shall prepare a Labour Influx Management Plan covering: community health impacts; SEAH/GBV risks; provision of services for incoming workers; and measures to avoid conflicts between workers and host communities.	--	Labour influx is not addressed in Egyptian national law. This is a new requirement introduced by the updated ISS 2023 that was not present in the 2013 ISS and is entirely absent from Egyptian legislation. For projects involving significant labour influx, a dedicated management plan will be required.
Non-Employee Workers	Contractors shall have their own policies and procedures addressing non-employee workers aligned with OS2. Risks associated with non-employee workers shall be assessed. Contracted workers shall have access to a grievance mechanism. The updated ISS 2023 requires explicit contractual provisions for SEAH/GBV protection and modern slavery prevention for contracted workers.	According to Decree 162/2019, the employer using non-employee workers (including contractors such as carpenters, welders, electricians) shall notify the labour office within ten days of commencement of work.	--
Occupational Health and Safety	A safe and healthy work environment shall be provided. Workers shall receive PPE at no cost. OHS procedures shall be established per Good International Industry Practice (GIIP). The updated ISS	Article 1 of Decree 211/2003 requires safe working areas. Decree 126/2003 addresses incident investigation and reporting. Article 217 of Law 14/2025 requires hazard awareness and PPE	--

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	2023 requires workplace processes to allow workers to report unsafe conditions without reprisal, and prohibits retaliation against workers who remove themselves from imminent danger (OS2, para. 30). OHS records shall include injury rates, occupational diseases, and fatalities.	provision. Article 1 of Decree 211/2003 requires owners and contractors to ensure OHS conditions.	
Security Personnel Requirements	Where security personnel are engaged, contract provisions shall include guidelines on their interaction with communities. A grievance mechanism shall allow affected communities and workers to express concerns about security arrangements. The updated ISS 2023 additionally requires that security personnel training include provisions on the use of force, non-discrimination, and SEAH/GBV prevention.	Law 86/2015 and its Executive Regulation 133/2016 define conditions for security personnel. Security companies are responsible for addressing grievances and compensating potentially affected persons.	--
OS 3: Resources Efficiency and Pollution Prevention and Management			
Resource Efficiency	Measures shall be adopted to minimize consumption and improve efficiency in the use of energy, water, and other resources. The updated ISS 2023 strengthens this requirement by linking it to climate change mitigation commitments and Sustainable Development Goals (SDGs). Use of resources and material inputs shall be tracked.	Articles 49 and 50 of Electricity Law No. 87/2015 concern annual energy efficiency planning and policies. No specific regulation for water resources efficiency exists, although a national water resources plan (2017) was developed. The Environmental Register required by Law 4/1994 requires facilities to record resource consumption.	--
Pollution Prevention and Control	Air, land, and water releases of pollutants shall be monitored. Procedures, practices, and techniques shall be introduced to avoid, or where avoidance is not feasible, minimize and/or control the intensity and mass flow of pollutant releases. The updated ISS 2023 requires explicit consideration of greenhouse gas	Law 4/1994 (amended by Laws 9/2009 and 105/2015) and its Executive Regulations (Decree 338/1995 and amendments) address pollution prevention to air, soil, and water. Law 93/1962 and Decree 44/2000 address discharge to public sewer networks.	No written management procedures are required by national law. The updated ISS 2023 adds an explicit requirement to account for GHG emissions — not addressed in Egyptian environmental law.

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	(GHG) emissions as part of pollution management.		
Waste Management	Procedures for storage, handling, and disposal of solid and hazardous wastes shall be in place. Third-party waste disposal contractors shall be reputable and licensed. Chain of custody documentation shall be maintained to the final destination. The updated ISS 2023 aligns waste management with the circular economy approach and SDGs.	Article 37 of Law 4/1994 (amended) and Articles 38 and 39 of its ERs address solid waste management. Articles 30 and 28 address hazardous waste. Law 202/2020 and its ER 722/2022 regulate solid and hazardous waste management. Article 49 requires segregation and delivery to authorized collectors. Chapter Five and Articles 50–54 of ER 722/2022 regulate hazardous waste.	No written management procedures are required by national law beyond compliance with waste regulations. Waste management plans are not mandated.
Safe Use and Management of Hazardous Substances	Procedures for storage, handling, transportation, and use of hazardous materials shall be in place. The updated ISS 2023 references the Stockholm Convention and Rotterdam Convention as international benchmarks for hazardous substances management.	Articles 29–33 of Law 4/1994 (amended) and Article 31 of its ERs address hazardous materials. Article 34 of Decree 211/2003 requires selection of chemicals that reduce hazard risk.	No written management procedures are required by national law. International conventions (Stockholm, Rotterdam) referenced in the updated ISS 2023 have not been fully integrated into Egyptian regulatory requirements.
Greenhouse Gas (GHG) Emissions Assessment	The updated ISS 2023 introduces an explicit requirement to assess and quantify GHG emissions associated with the project, including indirect emissions (OS1, para. 24). This is consistent with the Bank's Climate Change and Green Growth Strategic Framework (2021) and aligns with Sustainable Development Goals.	--	There are no national legislative requirements in Egypt for GHG emissions quantification or reporting for project-level activities. This is a new requirement introduced by the updated ISS 2023 that creates a gap relative to Egyptian environmental law. Projects will need to develop GHG assessments as a supplementary requirement.
OS 4: Community Health, Safety and Security			
General Requirements for Health and Safety Management	Preventive measures and plans shall be prepared and implemented to manage health and safety risks using the mitigation hierarchy approach and Good International Industry Practice (GIIP). The updated ISS 2023 adds requirements to address: risks from labour influx on community health (communicable diseases, SEAH/GBV); and risks from	The Egyptian Civil Law 131/1948 addresses community safety and security. Law 4/1994 also addresses community safety aspects related to hazardous waste management.	No written management procedures are required by national law. The updated ISS 2023 expands the scope of community health and safety management to include labour influx risks and pandemic preparedness — areas not addressed by Egyptian law.

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	large-scale emergency/pandemic situations.		
Community Health and Safety	Procedures shall be implemented to address community health and safety issues in the context of operations. Safety procedures shall deal with hazardous material release, transport, and disposal. The updated ISS 2023 adds an explicit requirement for Dam Safety Plans where applicable, and for community health risk management plans where labour influx could introduce communicable diseases.	Law 4/1994 requires projects to monitor pollutants to air and water to protect the surrounding environment and community. Article 34 of Decree 211/2003 requires selection of less hazardous chemicals.	No written management procedures required in national law to address community health and safety issues. The updated ISS 2023 introduces new requirements on dam safety and communicable disease management from labour influx — gaps not covered by Egyptian law.
Exposure to Hazardous Materials	Appropriate measures shall be taken to prevent or minimize potential worker and community exposure to hazardous materials released by the project.	Article 34 of Decree 211/2003 requires selection of less hazardous substances and evaluation of chemical risks with air concentration monitoring.	--
Traffic and Road Safety	Potential traffic and road safety risks shall be evaluated and monitored for workers and communities. The updated ISS 2023 requires this to include assessment of heavy vehicle traffic impacts on community roads and vulnerable road users.	Egyptian Guidelines for EIA (EEAA, 2009) require assessment of infrastructure use and traffic in the EIA.	No written management procedures required by national law. The updated ISS 2023 provides more detailed requirements for traffic management planning than current Egyptian requirements.
Exposure to Disease	Procedures shall deal with avoiding/minimizing communicable diseases (including those related to influx of project labour) that could result from the project. The updated ISS 2023 strengthens this to include epidemic and pandemic preparedness measures, informed by COVID-19 experience (OS1, para. 3; OS4).	--	Labour influx and disease exposure are not addressed in Egyptian national law. The updated ISS 2023 significantly expands this requirement — particularly regarding pandemic preparedness — creating a gap relative to Egyptian legislation.
Emergency Preparedness and Response	Emergency Preparedness and Response Plans (EPRPs) shall be developed considering risks and impacts from the project on local communities. The updated ISS 2023 requires EPRPs to include provisions for natural disasters,	Article 215 of Law 14/2025 and Article 3 of Decree 211/2003 require each facility to prepare an emergency response plan.	--

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	climate-related events, and pandemic situations as new explicit requirements.		
OS 5: Land Acquisition, Restrictions on Access to Land and Land Use, and Involuntary Resettlement			
Avoid or Minimize Displacement	Plans/procedures shall be developed to avoid or minimize economic and physical displacement, considering alternative designs. The updated ISS 2023 maintains this principle and emphasizes avoiding displacement as the highest priority, with compensation at full replacement cost as a last resort (OS5).	Law 10/1990 (amended by Laws 1/2015 and 24/2018) enables land acquisition for public investment projects. Compensation is estimated at prevailing market prices plus 20% based on Law 24/2018. Article 8 of Law 10/1990 allows affected communities to object to compensation values. The Egyptian Survey Authority is responsible for land acquisition and compensation estimation.	National laws do not include requirements for developing a written Land Acquisition and Resettlement Management Plan. Procedures are handled by government authorities. Eligibility criteria differ — Egyptian regulations assume legal titles, while the updated ISS 2023 requires compensation for property AND livelihood, regardless of legal title. The 20% premium under Egyptian law falls short of the full replacement cost standard required by the ISS. The updated ISS 2023 strengthens requirements for vulnerable group consideration in resettlement — a significant gap.
Consultation in Resettlement	All relevant information shall be disclosed and affected persons consulted. The updated ISS 2023 requires that consultation be conducted in a safe environment, free of reprisal, and in a culturally appropriate manner (OS5; OS10). Particular attention shall be given to vulnerable groups in consultation design.	--	There is no explicit consultation requirement in Egyptian law for resettlement. However, affected communities are usually informed about the project. The updated ISS 2023 introduces stronger requirements on the quality and safety of consultation, free of coercion or reprisal — a gap relative to Egyptian law.
Socio-Economic Assessment and Census	A detailed census shall be carried out to: identify displaced persons; determine eligible persons for compensation; and develop an inventory of affected land and property. The updated ISS 2023 requires the census to include documentation of informal land rights and customary tenure arrangements.	--	Egyptian law provides for a census/inventory through the Survey Authority. However, informal land rights and customary tenure are not recognized in Egyptian law — a gap relative to the updated ISS 2023 requirements.
Compensation for Displaced Persons	Compensation for loss of assets shall be provided at full replacement cost. The	--	Compensation under Egyptian law is based on market prices plus 20%

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	updated ISS 2023 clarifies that 'full replacement cost' means the market value of the assets plus transaction costs, and shall not be reduced by depreciation or salvage value (OS5).		premium, which does not necessarily equal full replacement cost as defined by the updated ISS 2023. This gap is particularly relevant when market prices undervalue affected assets.
Income Restoration	Loss of income resulting directly from project implementation shall be compensated. The updated ISS 2023 requires income restoration programmes to bring affected persons to pre-displacement income levels or better.	--	Egyptian regulations do not specify income restoration allowances for losses of business income. This is a gap relative to the ISS requirements.
Cut-Off Date	A cut-off date is required to prevent opportunistic in-migration to the project area. The updated ISS 2023 maintains this requirement and specifies that it shall be communicated publicly and transparently.	--	There is no cut-off date mechanism under Egyptian law. This is a gap relative to ISS requirements.
Grievance Mechanism (Resettlement)	An effective grievance mechanism shall be established for affected communities, accessible to all including vulnerable groups. The updated ISS 2023 requires the mechanism to operate without reprisal and to be linked to the Bank's Independent Recourse Mechanism (IRM).	--	No specific resettlement grievance mechanism is required by Egyptian law. The updated ISS 2023 introduces additional requirements regarding the IRM linkage that are entirely absent from Egyptian law.
Vulnerable Groups in Resettlement	Special attention shall be given to vulnerable groups affected by resettlement. Differentiated measures shall be provided to ensure adverse impacts do not fall disproportionately on the vulnerable. The updated ISS 2023 expands the definition of vulnerable groups to include those marginalized on the basis of sexual orientation and gender identity.	--	Egyptian regulations have not addressed how vulnerable groups affected by expropriation should be treated. The updated ISS 2023 expands the definition of vulnerability and strengthens protection requirements — a significant gap relative to Egyptian law.
Resettlement Action Plan (RAP) / Livelihood Restoration Plan	A RAP (if physical displacement) or Livelihood Restoration Plan (if economic displacement) shall be developed. The	--	National law does not require a RAP or Livelihood Restoration Plan. The updated ISS 2023 strengthens financial

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	updated ISS 2023 clarifies that RAP costs must be fully integrated into project costs and either bank-financed, co-financed, or confirmed as counterpart funding before disbursement (Bank Policy, para. 54 footnote).		arrangements for resettlement cost coverage — a gap relative to Egyptian law and practice.
OS 6: Habitat and Biodiversity Conservation, and Sustainable Management of Living Natural Resources			
Assessment of Issues and Impacts on Biodiversity	Impacts on biodiversity shall be identified and assessed as part of the ESIA. The updated ISS 2023 requires assessment to include ecosystem services, and to consider climate change impacts on biodiversity (OS6). The Bank exercises a precautionary approach to biodiversity offsets (OS1, footnote 68).	According to the EIA guidelines issued in 2009, the biological environment shall be described in the baseline EIA, covering fauna and flora, terrestrial and marine. Law 102/1983 addresses protection of natural protectorates.	--
Biodiversity Conservation Requirements	Types of habitats shall be identified by in-house or external experts. The ESIA shall study alternatives and include mitigation measures. In the case of critical habitat, a Biodiversity Management Plan (BMP) or Biodiversity Action Plan shall be developed. The updated ISS 2023 maintains the distinction between natural habitat, modified habitat, and critical habitat, and aligns with CITES requirements.	Law 4/1994 (amended by Laws 9/2009 and 105/2015) addresses biodiversity protection. Article 28 (as amended) and Annex 4 of the ERs define wild animals and plants prohibited from hunting, killing, or capturing.	National laws do not require a written BMP or Biodiversity Action Plan. The updated ISS 2023 maintains this requirement and adds explicit reference to climate change impacts on biodiversity assessment — a gap relative to Egyptian law.
Ecosystem Services	The updated ISS 2023 introduces an explicit requirement to assess and manage impacts on ecosystem services that underpin human well-being (OS6). This includes provisioning services (water, food), regulating services (flood control, carbon sequestration), and cultural services.	--	Ecosystem services assessment is not required under Egyptian environmental law. This is a new requirement introduced by the updated ISS 2023 that creates an additional compliance obligation not reflected in national legislation.
OS 7: Vulnerable Groups			
Identification and Protection of Vulnerable Groups	As early as possible in project planning, the Borrower shall identify individuals	Egyptian law does not contain specific provisions for protecting vulnerable	This OS was absent from the original Gap Analysis and represents a significant area

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	and groups who might be vulnerable, including: female-headed households, the landless, the elderly, youth and children, persons with disabilities, groups marginalized by ethnicity, religion, language, sexual orientation, and gender identity, and Highly Vulnerable Rural Minorities (HVRM) (OS7, para. 5). The updated ISS 2023 significantly expands this OS, introducing a comprehensive framework for HVRM and Indigenous Peoples management, including FPIC requirements.	groups in the context of project development.	where Egyptian law has no equivalent provisions. The updated ISS 2023 has substantially expanded OS7, introducing formal identification and management requirements for vulnerable groups — including women and girls, minorities, and HVRM. FPIC requirements for HVRM are entirely absent from Egyptian law.
Free, Prior, and Informed Consent (FPIC) for HVRM	Where Highly Vulnerable Rural Minorities (HVRM) are present in or have collective attachment to the project area, the Borrower shall obtain their Free, Prior and Informed Consent (FPIC) in three specific circumstances: (i) commercial use of cultural resources; (ii) physical relocation; and (iii) significant adverse impacts on critical cultural heritage (OS7, para. 36 as referenced in OS7).	--	There are no FPIC requirements under Egyptian law. HVRM groups are not recognized as a legal category in Egyptian legislation. This is a comprehensive new requirement under the updated ISS 2023 with no national law equivalent.
Gender-Responsive Approach	The updated ISS 2023 requires the Borrower to adopt a gender-responsive approach to E&S impact management, explicitly addressing the differentiated burden of impacts on women and girls (OS7, objective). Gender assessments shall be carried out for every project (Bank Vision, para. 7). This is a significantly expanded requirement compared to the 2013 ISS.	--	Egyptian law does not require gender impact assessment or gender-responsive project management in the context of E&S safeguards. This represents a gap relative to the updated ISS 2023 requirements.
Vulnerable Group Plans	Where project impacts on vulnerable groups are identified, the Borrower shall prepare a Vulnerable Group Plan or equivalent management plan detailing measures to avoid, minimize, or mitigate	--	No equivalent requirement exists under Egyptian law. Vulnerable group plans are an entirely new requirement with no national law basis.

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	adverse impacts and ensure equitable benefit-sharing.		
OS 8: Cultural Heritage			
Assessment of Cultural Heritage	The ESIA shall include assessment of cultural heritage in the project area. The updated ISS 2023 expands the scope to include intangible cultural heritage (living heritage, traditional knowledge, cultural practices) in addition to physical/tangible heritage (OS8).	According to EIA guidelines (EEAA, 2009), the baseline environment including tourist attractions shall be described in the EIA.	--
Managing Impacts on Cultural Heritage	Where cultural heritage may be found, a Chance Find Procedure shall be established. The updated ISS 2023 expands requirements for cultural heritage management to include explicit protection of intangible heritage and traditional knowledge associated with project activities (OS8).	Law 117/1983 (amended by Law 3/2010) addresses protection of antiquities. It requires that works stop and the archaeological authority be promptly informed in case of chance finds.	--
OS 9: Financial Intermediaries (NEW STANDALONE OS — ISS 2023)			
Financial Intermediary (FI) ESMS	Where the Bank provides support to a Financial Intermediary (FI), the FI shall put in place and maintain an Environmental and Social Management System (ESMS) to identify, assess, manage, and monitor E&S risks and impacts of FI subprojects on an ongoing basis (OS9; Bank Policy, para. 38). The updated ISS 2023 has elevated FI requirements into a standalone OS (OS9), reflecting their increased importance. The ESMS must be in place and reviewed by the Bank before any lending takes place.	--	Financial Intermediary E&S requirements are not addressed in Egyptian national law. OS9 is a new standalone safeguard in the updated ISS 2023, representing a new compliance category not addressed in the original Gap Analysis document and absent from Egyptian legislation.
FI Subproject Risk Categorization	The FI shall develop and maintain a risk rating/categorization system for subprojects (high, moderate, low risk). Subprojects involving resettlement,	--	No equivalent requirement exists under Egyptian law.

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	adverse impacts on vulnerable groups, or significant biodiversity or cultural heritage impacts shall be categorized as high risk regardless of the FI's own system (OS9, para. 19).		
OS 10: Stakeholder Engagement and Information Disclosure			
Stakeholder Identification	The Borrower shall have a mechanism to identify stakeholders (project-affected parties and other interested parties). The updated ISS 2023 requires early identification of vulnerable individuals and groups who may require differentiated engagement approaches (OS10, para. 13). Stakeholder identification and analysis shall be sufficiently detailed to determine appropriate communication levels.	According to EIA Guidelines 2009, public involvement is mandatory for Category C projects through public consultation with concerned parties. Formal public consultation is not required for Category A or B projects.	Egyptian EIA requirements for public consultation are limited to Category C projects. The updated ISS 2023 requires comprehensive stakeholder engagement for all project categories — a significant gap relative to Egyptian law.
Stakeholder Engagement Plan (SEP)	The Borrower shall develop and implement a Stakeholder Engagement Plan (SEP) proportionate to project risks and impacts. The SEP shall be disclosed as early as possible and before appraisal. The updated ISS 2023 requires the SEP to include specific provisions for: safe consultation free of reprisal; engagement with vulnerable groups; and a sufficient budget for all stakeholder engagement activities throughout the project life cycle (OS10, para. 15).	--	Egyptian law does not require a Stakeholder Engagement Plan. The SEP concept with its detailed requirements on budget, vulnerable group engagement, and reprisal-free consultation is entirely new in the updated ISS 2023 and represents a gap relative to Egyptian legislation.
Information Disclosure	Relevant E&S information shall be disclosed to affected communities in a timely, understandable, accessible, and appropriate manner. For high-risk (Category 1) projects, ESA documentation shall be disclosed at least 120 days before Board consideration (Bank Policy, para. 59). The updated ISS 2023 requires disclosure through the	EIA guidelines require publication of EIA results, but specific timelines for public disclosure are not clearly defined in national law.	Egyptian disclosure requirements are less prescriptive than the updated ISS 2023, which specifies the 120-day advance disclosure requirement for high-risk projects and mandatory ISTS use. These requirements represent a gap relative to Egyptian law.

African Development Bank's Environmental and Social Operational Safeguards requirements	International Requirements (AfDB ISS 2023)	National Requirements	Gap Description
	Integrated Safeguards Tracking System (ISTS).		
Grievance Redress Mechanism (Community)	The Borrower shall provide a grievance mechanism to receive and facilitate resolution of concerns from project-affected parties. The updated ISS 2023 links this to the Bank's Independent Recourse Mechanism (IRM) and requires the mechanism to operate safely, without reprisal (OS10; Bank Policy, paras. 73–75). The mechanism shall be communicated to communities clearly, including information on the IRM.	Egyptian law does not require a dedicated community grievance mechanism for project operations beyond general civil litigation recourse.	No written community grievance mechanism is required by Egyptian law. The updated ISS 2023 strengthens this requirement by: (i) requiring linkage to the Bank's IRM; (ii) mandating reprisal-free operation; and (iii) requiring communities to be informed of the IRM. All of these are gaps relative to Egyptian law.
Reprisal-Free Engagement	The updated ISS 2023 introduces an explicit requirement that all consultation and stakeholder engagement activities be conducted in an environment free of reprisal, intimidation, coercion, manipulation, or discrimination (OS10, para. 9). The Bank is committed to protecting all stakeholders against reprisals at any time during the project life cycle (Bank Policy, para. 27).	--	Protection against reprisals in the context of project consultations is not addressed by Egyptian law. This is a new explicit requirement in the updated ISS 2023 that creates an additional compliance obligation beyond Egyptian legal requirements.