

NON-TECHNICAL SUMMARY

SHAQRA 1 GW WIND PROJECT

Shaqra Governorate, Riyadh Region
Kingdom of Saudi Arabia

Prepared for public understanding and stakeholder communication

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Introduction

Electricity generation in the Kingdom of Saudi Arabia (KSA) has historically relied predominantly on natural gas and petroleum as its primary energy sources. In 2022, natural gas accounted for approximately 67% of total electricity generation, while oil contributed around 33%. Renewable energy sources represented less than 1% of the overall electricity generation mix during the same period. During periods of elevated temperatures, electricity demand increases significantly, resulting in a seasonal rise in oil consumption for power generation. In 2022, oil consumption for electricity generation increased by approximately 9%, reaching a peak of around 1.1 million barrels per day, to supplement natural gas-based generation and meet increased seasonal demand.

Recognizing the environmental implications of conventional energy sources and the importance of reducing greenhouse gas emissions, the Kingdom of Saudi Arabia has introduced strategic initiatives to diversify its energy mix and promote sustainable energy development. The National Renewable Energy Program (NREP), a key component of Saudi Vision 2030, aims to increase the contribution of renewable energy to the national electricity mix, with a target of approximately 50% by 2030. The program seeks to reduce reliance on conventional fossil fuels, support long-term economic diversification, and facilitate the transition towards a more sustainable energy framework. In line with these national objectives, shaqra first renewables project is developing a 1,000 megawatt (MW) onshore wind power project in Riyadh Province, Kingdom of Saudi Arabia. The Project occupies an area of approximately 170.2 km² and approximately 28 km south from the Almajma'ah within the Riyadh Governate in KSA. The development forms part of Round 5 of the National Renewable Energy Program.

The Saudi Power Procurement Company (SPPC), acting as the electricity off-taker, has entered into a 20-year Power Purchase Agreement (PPA) with the Developer at an agreed fixed tariff. The Project is intended to contribute to the Kingdom's renewable energy generation capacity and support the objectives of Vision 2030 and the NREP.

This Non-Technical Summary (NTS) presents the principal findings of the Environmental and Social Impact Assessment (ESIA) report in clear, accessible, and non-technical language. The ESIA examines the Project's background and justification, describes the proposed development and the alternatives considered, and assesses its potential environmental and social impacts on the surrounding environment, local communities, and other relevant receptors. It also identifies appropriate mitigation measures and management procedures to avoid, minimize, or manage potentially significant adverse impacts associated with the Project.

An Environmental and Social Management Plan (ESMP) has been developed as part of the ESIA to establish the environmental and social mitigation measures, monitoring requirements, implementation responsibilities, and applicable legal and regulatory obligations throughout the Project lifecycle. The developer is committed to implementing CESMP to ensure that the Project's environmental and social risks and impacts are appropriately managed.

Furthermore, a Stakeholder Engagement Plan (SEP) has been prepared to establish a systematic approach to stakeholder identification, consultation, information disclosure, and ongoing engagement throughout the Project lifecycle. SEP also incorporates a grievance mechanism through which stakeholders, particularly potentially affected individuals and local communities, can raise concerns or submit complaints and receive appropriate responses in a timely and transparent manner.

2. Project Description

The project is intended to generate electricity from wind and deliver it to the Saudi Electricity Company (SEC) grid through the project's electrical infrastructure and substation facilities.

The project's stated installed capacity is 1,000 MW (1 GW). The project has 103 wind turbine generators (WTGs), each with a rated capacity of 10.5 MW. It also identifies a rotor diameter of approximately 170 m, blade length of approximately 100 m, and tower height of approximately 148 m.

The ESIA anticipates a construction period of approximately 24 months and an operational life of at least 20 years. The final project schedule and workforce estimates should therefore be confirmed against the approved construction programmed.

The project's main purpose is to add renewable electricity generation capacity, diversify energy sources, and support the Kingdom's renewable energy and Vision 2030 objectives. Wind generation does not require combustion of fossil fuels during electricity generation, although construction, maintenance, transport and auxiliary equipment could still generate negligible emissions and other environmental effects.

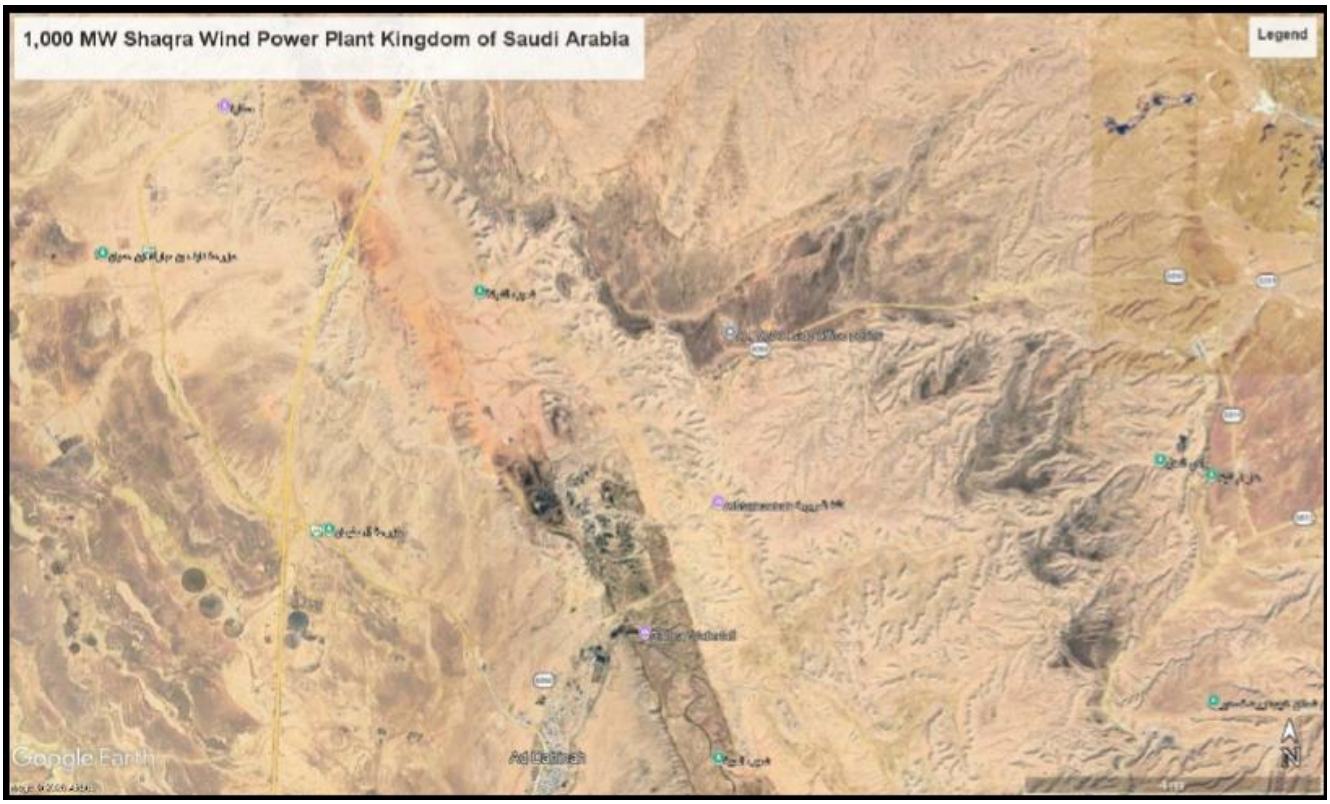


Figure 1 Project layout

3. Project Components

The main project components described in the ESIA include:

- Wind turbine generators, including foundations, towers, nacelles, hubs and rotor blades.
- Electrical transformers and collection cabling connecting turbines to the project electrical system.
- Substation facilities to increase voltage and connect generated electricity to the grid.
- Overhead transmission line infrastructure and associated towers/conductors, where required by the approved grid connection design.
- Internal access roads and connections to the wider road network.
- Control, office, storage and other operational buildings.
- Fencing, site access controls, security facilities and supporting infrastructure.
- Temporary construction areas, laydown and storage areas, construction equipment and workforce facilities as required.

The detailed layout, final number and type of transmission structures, and exact extent of temporary and permanent land take should be checked against the approved project design and permits.

3.1 Project Phases

Construction

Construction activities are expected to include site establishment, survey and demarcation, vegetation and topsoil clearance where necessary, earthworks and levelling, construction of foundations and access roads, installation of electrical cabling and substations, erection of turbine towers and components, transmission infrastructure works, testing and commissioning. Heavy vehicles and lifting equipment will be required for delivery and installation of large components.

Operation and Maintenance

During operation, the wind turbines will convert wind energy into electricity. Routine activities will include turbine inspections, maintenance and repair, cleaning, management of site infrastructure, electrical equipment maintenance, security, waste handling and emergency response.

Decommissioning

At the end of the project life, or if the facility is no longer required, equipment and structures will be dismantled or removed in accordance with an approved decommissioning plan and applicable requirements. The plan should address safe dismantling, waste classification and recycling, hazardous materials, traffic, dust and noise, worker safety, and restoration of temporary or disturbed areas where practicable.

4. What Is a Wind Power Plant?

A wind power plant uses the movement of air to turn turbine blades. The blades rotate a rotor connected to equipment inside the nacelle, where the mechanical energy is converted into electrical energy by a generator. Electrical equipment then conditions and raises the voltage of the electricity so it can be collected and transmitted to the grid.

Wind power produces electricity without burning fuel at the turbine. This can reduce greenhouse gas emissions compared with electricity generated from fossil fuels. However, wind projects still require careful planning and management to address land disturbance, dust, noise, traffic, waste, water use, workers and community safety, visual effects, and potential effects on birds and other wildlife.

4.1 Hybrid Tower Erection

A hybrid tower generally combines different tower construction materials or sections, commonly a concrete lower section and a steel upper section, to achieve the required height and structural performance. The exact tower configuration, erection sequence and lifting method must be confirmed from the project's approved turbine supplier documentation and method statements;

The hybrid towers are used for the erection would typically involve:

- Preparing and inspecting the foundation, anchor system and access/working area before lifting.
- Transporting and positioning tower sections using approved routes, lifting plans and traffic controls.

- Installing the lower tower sections in the specified sequence, followed by upper sections and the nacelle/rotor assembly as directed by the supplier.
- Using certified cranes, lifting accessories, competent personnel, exclusion zones, weather limits and approved working-at-height controls.
- Inspecting connections, alignment, torque/tension and completed works before proceeding to the next installation stage.
- Managing packaging, scrap, concrete residues, oils and other waste; preventing spills and controlling dust and noise.
- Protecting wildlife and vegetation by keeping equipment and vehicle movements within approved work areas and designated roads.

Erection activities should be performed only under approved statements, risk assessments, lifting plans, permits to work, emergency arrangements and manufacturer instructions. Work should be suspended when wind speed or other conditions exceed the limits established by the equipment manufacturer and approved lifting plan.



Figure 2 Hybrid tower

5. Summary of Environmental and Social Baseline Conditions and Impacts

5.1 Introduction

A baseline was established to describe the physical environment, ecology, cultural heritage and social setting before assessing potential changes caused by the project. The assessment used site observations,

available mapping and published information, environmental measurements, ecological surveys and stakeholder consultations. The ambient air quality and noise were monitored at two locations, and soil was sampled at four locations.

5.2 Environmental and Social Baseline Conditions and Impacts

Land, topography and soil

The project area is predominantly natural, with limited existing development and evidence of grazing. A depressed valley crosses the site from north to south. Construction may change landform locally, compact soil, disturb topsoil and alter drainage if works are not controlled. Fuel, oil, wastewater, chemicals and poorly managed waste could contaminate soil. The ESIA recommends keeping activities within designated areas, retaining or storing topsoil for restoration, maintaining natural drainage where possible, and using appropriate containment and spill controls.

Water resources

Water may be required for construction, dust suppression, domestic use and maintenance. The ESIA identifies potential concerns relating to water availability and contamination from wastewater, sediment, fuel or chemical spills. Water use should be monitored, unnecessary consumption avoided, and wastewater collected and managed through approved arrangements. Refueling, chemical storage and maintenance areas should have suitable containment and spill response provisions.

Air quality and dust

Earthworks, vehicle movements, material handling and construction machinery may generate dust and exhaust emissions. The ESIA identifies construction dust as a potential moderate impact before mitigation, reducing to minor residual significance when mitigation measures are applied. Controls include appropriate watering of exposed surfaces and roads, covering transported materials, maintaining equipment, controlling vehicle speeds, and stopping or adapting dusty activities when necessary.

Noise and vibration

Construction machinery, heavy vehicles, lifting operations and turbine operations can generate noise. The ESIA assessed the potential noise impacts as minor before mitigation and negligible after mitigation for construction and operation. Good equipment maintenance, appropriate work planning, limiting unnecessary idling, observing applicable noise requirements and responding to complaints are important controls. Any site-specific noise limits and monitoring locations should follow the approved monitoring plan and applicable requirements.

Ecology, biodiversity and birds

ESIA describes vegetation as generally sparse, with areas having no vegetation and others containing groups of perennial shrubs and trees. Site is generally arid with very low vegetation cover and wildlife species presence. No threatened flora species or sensitive habitats have been observed within the Project site, and all recorded floral species are of least concern. Two spiny-tailed lizard burrows were recorded in the northern part of the site. The ESIA recommends avoiding areas with greater vegetation cover

where practicable, minimizing removal of trees and perennial shrubs, restricting vehicles to designated roads, and addressing the presence of spiny-tailed lizards before disturbance.

Birds are a key consideration for wind projects because turbines and associated infrastructure may pose collision or disturbance risks, particularly during migration. The ESIA includes desk review and field bird surveys and identifies the need for ongoing attention to bird-related impacts. Bird monitoring, reporting of mortality or injured birds, and implementation of any additional measures required by the approved biodiversity plan should continue in accordance with project commitments and regulatory requirements.

Landscape and visual effects

Wind turbines are tall structures and will change the appearance of the landscape. The ESIA assesses landscape and visual impacts during operation as minor before mitigation and negligible after mitigation. The project should remain within the approved footprint, maintain site housekeeping, and restore temporary work areas where practicable.

Traffic and transport

Transport of turbine components, tower sections, cranes, construction materials and workforce can increase traffic and introduce risks on public and internal roads. The ESIA identifies construction traffic as a potential moderate impact before mitigation and minor after mitigation. Controls should include route and delivery planning, vehicle inspections, speed limits, driver induction, load security, traffic marshals where needed, and coordination with relevant authorities.

Cultural heritage and archaeology

The ESIA reports no identified impact on archaeology and cultural heritage based on its assessment. Nevertheless, if suspected archaeological objects, graves or heritage features are encountered during excavation, work in the immediate area should stop, the area should be protected, and the relevant project and competent authorities should be notified in accordance with the applicable chance-find procedure.

People, employment and community health and safety

The project may provide employment and business opportunities during construction and operation. The ESIA identifies employment as a positive impact. Potential adverse social and safety issues include road safety, interaction between the workforce and nearby communities, worker health and safety, workforce accommodation, and risks associated with the presence of temporary or migrant workers. These risks should be managed through fair and transparent employment practices, worker induction and training, safe accommodation and welfare arrangements, a code of conduct, community engagement, traffic controls and an accessible grievance mechanism.

Indigenous peoples

The ESIA assesses the potential impacts of the proposed Project on Indigenous Peoples who may inhabit or use the surrounding area. The baseline assessment indicates that no Indigenous Peoples, as defined under applicable international standards, have been identified as occupying the Project site or its immediate surroundings. However, the assessment notes the presence of expatriate herders engaged in

livestock grazing within the broader Project area. Although these herders are not identified as Indigenous Peoples, their presence and livelihood activities have been considered in relation to potential Project-related impacts. Appropriate stakeholder engagement, information sharing, and grievance mechanisms should be maintained to ensure that any concerns raised by herders or other potentially affected groups are identified and addressed in a timely and culturally appropriate manner.

Waste and hazardous materials

Construction and operation may generate general waste, packaging, scrap metal, used oils, filters, batteries, chemical containers and other hazardous or controlled waste streams. Improper storage or disposal can affect soil, water, wildlife and people. Waste should be segregated, labelled, stored securely, recorded and transferred only to appropriately authorized service providers or facilities. Spill kits and emergency response arrangements should be available where fuels, oils and chemicals are handled.

Climate change and renewable energy benefits

The project is based on power generation through Wind Technology. Wind technology is environment-friendly in terms of GHGs emission. Levels of carbon dioxide (CO2) and other greenhouse gases (GHG) in the atmosphere have increased dramatically in the past few decades. wind energy is a Renewable resource available with the great potential to significantly reduce GHG emissions.

The comparison of the GHGs emission caused by Wind Power plant with the GHGs emission that would have been caused by fossil fuel burned to make the same amount of electricity has been made. Thus, the purpose of the project activity is to generate power from zero emissions Wind power project and thereby reduce the emissions associated with the grid.

Climate change is a burning issue nowadays. The project will help in reduction of GHG emissions with the use of environmentally friendly technology for power generation. So, it would have a long-term beneficial impact on the project.

5.3 ESIA Birds Survey Findings

A two-season bird monitoring survey was conducted during the spring and autumn migration periods, covering 17 designated vantage points (VPs) across the Project Site. The survey aimed to assess the presence, movement, and activity of migratory and resident soaring birds and to evaluate potential risks associated with wind turbine collisions.

Survey results

Autumn season: During the Autumn survey only one target species was recorded within the site location: The eastern imperial eagle (Aquila heliacal). Two flights with three individuals of (Aquila heliacal) were recorded in the Vantage Point Number VP16. In addition to the target species, three Nontarget species were recorded in the site location None of those species are globally or regionally threatened: The White-crowned Wheatear (Oenanthe leucopyga), Desert Lark (Ammomanes desert) and Rock Dove (Columba livia).

Spring season: During the Spring survey only two target species were recorded within the site location: The Eastern Imperial Eagle (Aquila heliacal) and the Long-Legged Buzzard (Buteo rufinus). One

individual of the Eastern Imperial Eagle (Aquila heliacal) made two flights for 60 seconds. Two individuals of the Long-Legged Buzzard (Buteo rufinus) were recorded in Vantage Point VP 5. These individuals made three flights for 60 seconds each one. In addition to the target species, Seven (7) Non target species were recorded in the site location None of those species are globally or regionally threatened: The White-crowned Wheatear (Oenanthe leucopyga), Hoopoe (Upupa epops), The brown-necked raven (Corvus ruficollis), Desert Lark (Ammomanes desert), The crested lark (Galerida cristata), Barn swallow (Hirundo rustica) and Rock Dove (Columba livia).

- The number of target species and their flights across the survey period is extremely low.
- Only two target species of bird were observed at the site location. The eastern Imperial Eagle is classified as IUCN Vulnerable (VU) and the Long-Legged Buzzard (Buteo rufinus) classified as Least Concern (LC) according to IUCN.
- No flocks of migratory species were recorded throughout the survey.
- Seven Nontarget species were recorded in the site location None of those species are globally or regionally threatened.



Figure 3 Shaqra vantage points

6. Environmental and Social Management

The ESIA sets out an Environmental and Social Management Plan (ESMP) to identify mitigation measures, monitoring, responsibilities, training and recordkeeping. The EPC contractor and project company should implement the approved ESMP and related plans throughout the project lifecycle, with oversight and verification by the responsible project and regulatory parties.

Key management measures

- Limit land clearance and construction to approved boundaries, designated work areas and planned access routes.
- Protect vegetation and wildlife, implement applicable pre-clearance checks, and follow the approved biodiversity and bird monitoring requirements.
- Control dust through watering where appropriate, covering loads, maintaining equipment and enforcing site speed limits.
- Manage noise through equipment maintenance, work planning, compliance with applicable limits and investigation of complaints.
- Protect soil and water through bunded storage, spill prevention, spill response, wastewater controls and good housekeeping.
- Apply a waste management procedure covering segregation, storage, transport, recycling, disposal and documentation.
- Implement a traffic management plan for abnormal loads, heavy vehicles, worker transport and public-road interfaces.
- Provide suitable worker accommodation, welfare, occupational health and safety controls, emergency preparedness and job-specific training.
- Maintain stakeholder engagement and a grievance mechanism that can receive concerns verbally or in writing and provide a documented response process.
- Conduct inspections, monitoring and audits; assign corrective actions; retain training, waste, incident, monitoring and grievance records.

Stakeholder engagement and grievance mechanism

The ESIA includes a Stakeholder Engagement Plan intended to support ongoing communication with affected and interested stakeholders. Engagement should be culturally appropriate and accessible. The grievance mechanism described in the ESIA allows concerns to be submitted through channels such as post, email or an online form, and at the project gate. Verbal grievances should also be handled appropriately, including assistance for people who prefer or need to submit concerns verbally. The project should communicate how to submit grievance, who receives it, expected response arrangements and any applicable protections.

Monitoring, training and records

ESIA calls for environmental and social induction and job-specific training for project personnel, contractors and subcontractors. It also calls for regular monitoring, inspections and audits, with findings

documented and corrective actions followed up. Records should include, as applicable, permits and legal registers, inspection and monitoring results, waste transfer documents, incident reports, emergency procedures, training records, audit reports and grievance registers.

7. Greenhouse Gases

Wind power projects are considered to have a positive overall contribution to climate change mitigation by generating renewable electricity and reducing dependence on fossil fuel-based energy sources. Greenhouse gas (GHG) emissions associated with the project are primarily related to construction activities, including fuel consumption by construction equipment and vehicles, transportation of materials, and other supporting activities. These emissions are expected to be relatively low and the impact is negligible compared with the GHG emissions avoided through renewable electricity generation over the operational projects. Accordingly, the project is expected to deliver a net positive climate benefit by contributing to the reduction of GHG emissions and supporting Saudi Arabia's renewable energy and climate change mitigation objectives.

8. Impact Assessment

The ESIA evaluates impacts before and after mitigation. Its summary indicates that many anticipated adverse impacts are expected to reduce in significance when the specified measures are effectively implemented. The table below summarizes selected findings as reported in the ESIA.

Table 1 Impact assessment before and after mitigation as per ESIA

Impact topic	Before mitigation (ESIA)	Residual significance after mitigation (ESIA)
Construction dust / air quality	Moderate	Minor
Construction traffic and transport	Moderate	Minor
Construction occupational health and safety	Moderate	Minor
Construction land use, soil, noise and biodiversity	Generally minor	Generally negligible
Construction surface water availability	Moderate	Minor
Operation: accidental spills/leaks and waste generation	Moderate	Minor
Operation: water availability	Moderate	Minor
Operation: air quality, noise, biodiversity and visual effects	Generally minor	Generally negligible
Employment during construction and operation	Positive	Positive
Climate change contribution from renewable electricity	Positive	Positive
Greenhouse gasses emissions	Moderate	Minor
Archaeology and cultural heritage	No impact identified	No impact identified

The ESIA notes that residual impacts of minor to moderate significance may remain for some topics and that effective implementation of the ESMP is important. Actual impacts should be checked through site monitoring and updated assessments where project design, construction methods, environmental conditions or stakeholder concerns change.

The main adverse impacts requiring ongoing management are associated with land disturbance and drainage, dust and emissions, noise, water use and wastewater, waste and hazardous materials, traffic, workers and community safety, and biodiversity—especially birds. The main anticipated benefits are renewable electricity generation and employment opportunities.

8. Conclusion

The Shaqra 1 GW Wind Project is intended to generate electricity from a renewable resource and connect the output to the Saudi Electricity Company grid. ESIA identifies both potential benefits and potential environmental and social risks. It concludes that the identified adverse impacts are expected to be manageable through implementation of the recommended mitigation measures and the Environmental and Social Management Plan.

Effective implementation will require clear responsibilities, competent personnel, contractor oversight, stakeholder engagement, accessible grievance channels, monitoring, recordkeeping and timely corrective action. Biodiversity protection, bird monitoring, dust control, traffic safety, water and waste management, spill prevention, and worker health and safety should remain key priorities throughout construction and operation.