EDF RENOUVELABLES- MASEN

Province of Fahs Anjra and M'diq-Fnideq

Environmental and Social Impact Assessment of wind farm repowering project Koudia El Baida

Environmental and Social Management Plan ESMP

Réf : C 399 / R453-04

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Environmental and Social Management Plan

ESMP

This document has been prepared with the collaboration of

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PREAMBLE

The new national energy strategy developed according to Highest Directives of His Majesty the King of Morocco sets the main priority on developing renewable energy and energy efficiency. It advocates these goals as being the best way for Morocco to take up the challenges of ensuring safe supplies, protecting the environment and achieving sustainable development.

The Moroccan Wind Power Project aims to achieve a total production capacity of 2 GW by 2020. By then, the plants run on renewable energy will be producing 42% of the total electric production capacity, divided between solar power, wind power and water power at a rate of 14% respectively.

They will help meet the rising energy demand bolstered by the acceleration of Morocco's economic and social development thanks to the large-scale projects already underway or scheduled in the agricultural, industrial, infrastructure, housing and tourism sectors. This unprecedented rise is making the energy demand climb at a regular pace of 5% a year on average.

The Moroccan Wind Power Project will allow Morocco to be less dependent on oil as the country is not rich in terms of fossil energy resources. It will develop some of Morocco's considerable potential in terms of wind power —an estimated 25,000 MW— pushing up the total wind power production from its present 280 MW en 2012 to 2,000 MW in 2020. The project will secure electricity supplies to consumers and enable Morocco to compete on the European and North African electricity markets.

It is in this context that EDF Renewables in a consortium with MASEN, is developing the repowering project for the Koudia Al Baida wind farm with a power of 100 MW(105 MW with turbines optimization) which consists of dismantling the existing wind turbines currently operated by EDF Renewables and implement new wind turbines on the currently operated ridge and on other neighboring ridges.

This document constitutes the specific environmental and social study of the project.

In the context of this ESIA, and following the current national regulations, the Consulting Engineer (CE) must essentially identify the main impacts or the positive and negative effects that may be generated by the realization of the project. A set of compensating and/or mitigating measures must also be proposed for each negative effect. Finally, a monitoring and environmental monitoring program must be developed.

In application of the EIA Law 49-17 and in accordance with the requirements of international donors and the Equator Principles, the objectives of this study are:

- To evaluate in a methodical and preliminary manner, the potential impacts, the direct and indirect, temporary and permanent effects of the project on the environment in particular, an on the human, biological and physical environments
- To remove, mitigate and compensate for the negative impacts of the project;
- To inform the population concerned about the negative impacts of the project on the environment.

The present report concerns the environmental and social impact assessment, of which the overall file will be composed of two volumes:

- Volume 1 - Including the ESIA main report;
- Volume 2 - Including the Environmental and Social Management Plan (ESMP).

This document corresponds to volume 2.

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ABREVIATION

Abreviations	Explanation
AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
AIDS	Acquired ImmunoDeficiency Syndrome
BAT	Best Available Technology
BREF	Best available techniques REFerence
CESMP	Environmental and Social Management Plan during Construction phase
CMS	Conservation Migratory Species
EHS	Environment, Health, Security
EP	Equator Principles
EPC	Engineering Procurement Construction
EPFI	Signatory financial institutions of EP
ERBD	European Bank for Reconstruction and Development
EHS	Environmental, Health and Safety
E&S	Environmental and Social
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and social management plan
ESMS	Environmental and Social Management System
ESS	Environmental and Social Standards
EU	European Union
HIV	human immunodeficiency virus
IFC	International Finance Cooperation
IFIs	International Financial Institutions
IUCN	International Union for Conservation of Nature
Km	Kilometre
kV	Kilovolt
M	Metre
MASEN	Moroccan Agency for Sustainable Energy
MEME	Ministère de l'Energie des Mines et de l'Environnement
MSDS	Material Safety data Sheet
MW	Mega Watt
NGO	Non-Governmental Organisation
NOx	Nitrogen oxides
NT	Near Threatened
OESMP	Environmental and Social Management Plan during the Operation phase
O&M	Operation and Maintenance
ONEE-BE	National Office of Electricity and Drinking Water (electricity branch)
PCOD	Project Commercial Operation Date
PM	Project Manager
PPE	Personal protection Equipment
PR	Environmental and Performance Requirement
PS	Performance standard
RN	National Road
RP	Provincial Road
STI	Sexually transmitted infections
SGBV	Sexual Gender Based Violence

1. Introduction

This Environmental and Social Management Plan (ESMP) is established in accordance with ESIA for the Koudia Al Baida wind farm repowering project developed by the Koudia SPV. The Koudia SPV will contract with an EPC (engineering, procurement, construction) structure responsible for design / construction. An O & M (operation and maintenance) structure will be responsible for operation and maintenance.

The present Environmental and Social Management Plan (ESMP) was developed based on the predictable impacts of Koudia Al Baida Wind farm repowering project, identified during the environmental assessment and the defined mitigating and reduction measures with the aim of reducing and mitigating the latter. Its objective is to ensure the respect of the implementation of these measures and the requirements derived from the regulations. The Koudia SPV remains entirely responsible for the implementation of the ESMP and must adopt an organization than can be able to ensure this mission.

It also permits verification of the accuracy of the predictions and assessments of certain impacts and the effectiveness of certain mitigating measures and, where appropriate, compensatory measures.

These measures concern all the installations and components of the Koudia Al Baida wind farm repowering project to be established directly by the Koudia SPV or in partnership with other national operators as needed.

2. ESMP purpose

2.1 General content

As it was mentioned, the Environmental and Social Management Plan (ESMP) is a detailed set of measures and procedures designed to ensure the implementation of the mitigation measures identified from legal framework and International Financial Institutions (IFIs) requirements. These measures will be implemented at all stages of the project development, from construction, commissioning, and operation to decommissioning.

The ESMP also outlines the environmental and social management structure, which will be responsible for implementing the procedures of the ESMP; therefore this structure includes roles and responsibilities of team members.

Finally, the management plan is iterative in nature and will be amended and configured prior to and during all phases as circumstances or activities change on site. The ESMP measures designed to ensure and assess the long-term effectiveness of the ESMP include:

- Program of audits and inspections;
- Procedure for recording and reporting environmental and social incidents;
- Procedures for recording complaints regarding environmental and social issues;
- System for liaising with the environmental regulatory authorities;
- Procedures for regular review of the ESMP; and
- Program for environmental and social monitoring.
- Environmental and social safeguards plan.

The Environmenal and Social Management Plan (ESMP) is detailed set of measures and procedures that are aligned with the Environmental and Social Action Plan (ESAP) of the project. The ESAP and the ESMP have to be implemented in parallel.

2.2 Environnemental and Social Policies

The project will have to be compliant with IFIs requirement and Moroccan regulations.

2.2.1 IFIs requirements

Each IFI has its own environmental and social requirements to ensure the sustainability of its operations, and all of these requirements have been reviewed in the main ESIA report. The ESMP is required by all IFI's.

◗ ERBD requirements

The ERBD performance requirements (PR) :

- PR 1 : Assessment and Management of Environmental and Social Risks and Impacts
- PR 2 : Labour and Working Conditions
- PR 3 : Resource Efficiency and Pollution Prevention and Control
- PR 4 : Health, Safety and Security
- PR 5 : Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- PR 6 : Biodiversity Conservation and Sustainable Management of Living Natural Resources
- PR 7 : Indigenous Peoples
- PR 8 : Cultural Heritage
- PR 9 : Financial Intermediaries
- PR 10 : Information Disclosure and Stakeholder Engagement

The environmental and performance requirement (PR) 1 *"outlines the responsibilities of the client in the process of assessing the potential environmental and social risks and impacts associated with the project, and developing and implementing procedures for managing and monitoring these risks and impacts".*

The PR 1 gives some specifications for Environmental and Social Management Plans :

"Taking into account the findings of the environmental and social assessment process and the outcomes of stakeholder engagement, the client will develop and implement a programme of actions to address the identified project's environmental and social risks and impacts and other performance improvement measures to meet the PRs. Depending on the project, the programme may consist of a combination of documented operational policies, management systems, procedures, plans, practices and capital investments, collectively known as environmental and social management plans (ESMP)."

The ESMP will reflect the mitigation hierarchy and, where technically and financially feasible, favour the avoidance and prevention of risks and impacts over minimisation, mitigation or compensation, and ensure that all relevant stages of the project are structured to meet applicable laws and regulatory requirements and the PRs.

The level of detail and complexity of the ESMP will be commensurate with the project's risks and impacts as well as any opportunities for project improvement. The ESMP will define outcomes measurable to the extent possible with targets and performance indicators that can be tracked over defined time periods. Recognising the dynamic nature of the project development and implementation process, the ESMP will be responsive to changes in project circumstances, unforeseen events, regulatory changes and the results of monitoring and review, and updated as necessary."

The ESMP will contain measures and actions that are measurable to the extent possible, including elements such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods. This includes allocation of resources, responsibilities and timeframe for its implementation, as well.

Organisation Capacity and Competencies

The promoter, will implement the ESMS and related ESMP. *"The client will establish, maintain, and strengthen, as necessary, an organisational structure that defines roles, responsibilities, and authority*

to implement the ESMS for ensuring on-going compliance with relevant national laws and regulatory requirements, and the PRs. The client will designate specific personnel, including management representative(s), with clear lines of responsibility and authority to maintain and implement the ESMS. Key environmental and social responsibilities will be defined and communicated to the relevant personnel. The client will provide adequate support and human and financial resources on an on-going basis to achieve effective and continuous environmental and social performance.25. The client will ensure that employees with direct responsibility for activities relevant to the environmental and social performance of the project are suitably qualified and trained."

◗ World Bank requirements

The World Bank's[1] Environmental and Social Standards (ESS)[2] are :

- ESS 1: Assessment and management of environmental and social risks and impacts
- ESS 2: Workforce and Working Conditions
- ESS 3: Rational Use of Resources and Pollution Prevention and Management
- ESS 4: Community Health and Safety
- ESS 5: Land Acquisition
- ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- ESS 7: Indigenous Peoples / Traditional Local Communities in Historically Disadvantaged Sub-Saharan Africa
- ESS 8: Cultural Heritage
- ESS 9: Financial Intermediaries (FIs)
- ESS 10: Stakeholder Consultation and Information Dissemination

The Environmental and Social Standard (ESS1) 1 underscores the importance of managing environmental and social performance throughout the life of a project.

According ESS1 : "*Borrowers will manage environmental and social risks and impacts of the project throughout the project life cycle in a systematic manner, proportionate to the nature and scale of the project and the potential risks and impacts."*

The ESMP is one of the tool used for E&S management. *The Environmental and social management plan (ESMP) is an instrument that details (i) the measures to be taken during the implementation and operation of a project to eliminate or offset adverse environmental and social impacts, or to reduce them to acceptable levels; and (ii) the actions needed to implement these measures.*

The project's ESMP (a stand-alone document or as captured in the ESCP) sets out the monitoring objectives and types of monitoring for the project's environmental and social impacts and mitigation measures. Establishing monitoring systems, resources, and personnel, and collecting baseline data early in project preparation, are useful for effective monitoring, reporting, and managing environmental and social performance throughout the project. Indicators selected for monitoring are based on the project's baseline data.

◗ IFC requirements[3]

The IFC's performances standards are :

[1] On August 4, 2016 the World Bank adopted a new Environmental and Social Framework (ESC) which replaces the Safeguard Policies since 2018. The ESC develops 10 environmental and social performance standards that set out the mandatory requirements for the World Bank on the projects it finances.

[2] https://www.banquemondiale.org/fr/projects-operations/environmental-and-social-framework/brief/environmental-and-social-standards

[3]https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/Performance-Standards/

- Performance Standard 1 (PS 1) : Assessment and Management of Environmental and Social Risks and Impacts
- PS2: Labour and working conditions
- PS3: Rational use of resources and pollution prevention
- PS4: Health, safety and security of communities
- PS5: Land acquisition and involuntary resettlement
- PS6: Biodiversity conservation and sustainable natural resource management
- PS7: Indigenous population
- PS8: Cultural heritage

The performance standard 1 (PS 1 underscores the importance of managing environmental and social performance throughout the life of a project.

According PS1, "*The client, in coordination will conduct a process of environmental and social assessment, and establish and maintain an ESMS appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts. The ESMS will incorporate the following elements: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review* ».

The PS1 gives specifications for Management Programs :

« *Consistent with the client's policy and the objectives and principles described therein, the client will establish management programs that, in sum, will describe mitigation and performance improvement measures and actions that address the identified environmental and social risks and impacts of the project.*

The management programs will establish environmental and social Action Plans,which will define desired outcomes and actions to address the issues raised in the risks and impacts identification process, as measurable events to the extent possible, with elements such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods, and with estimates of the resources and responsibilities for implementation. As appropriate, the management program will recognize and incorporate the role of relevant actions and events controlled by third parties to address identified risks and impacts. Recognizing the dynamic nature of the project, the management program will be responsive to changes in circumstances, unforeseen events, and the results of monitoring and review. »

◗ KfW requirements[4]

For category A project, KfW sustainble guidelines require « *A ESMP describing the measures needed to avoid, mitigate, compensate for and monitor the adverse effects ».* An appropriate follow-up system is also expected.

◗ Equator Principles[5]

The project will have to be compliant with Equator Principles :

- Principle 1: Review and categorization
- Principle 2: Environmental and Social Assessment
- Principle 3: Applicable environmental and social standards
- Principle 4: Action Plan and Management System
- Principle 5: Stakeholder Involvement
- Principle 6: Grievance Mechanism
- Principle 7: Independent Review

[4] https://www.kfw-entwicklungsbank.de/PDF/Download-Center/PDF-Dokumente-Richtlinien/Nachhaltigkeitsrichtlinie_EN.pdf
[5] https://equator-principles.com/wp-content/uploads/2020/05/The-Equator-Principles-July-2020-v2.pdf

- Principle 8: Do's and Don'ts ("Covenants")
- Principle 9: Independent Monitoring and Reporting
- Principle 10: Reporting by EPFIs

Principle 4 of the Equator Principles covers the requirements for an Action Plan and Management System for all Category A and Category B projects

Principle 4: Action Plan and Management System states the following:

Environmental and Social Management System (ESMS) and Equator Principles Action Plan (EP Action Plan)
For all Category A and B projects, EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS).

In addition, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address the issues raised during the assessment process and integrate the actions required to meet the applicable standards. If the applicable standards are not met to the satisfaction of EPFI, the client and EPFI will agree on an Action Plan based on the Equator Principles (the EP Action Plan). The EP Action Plan is intended to highlight gaps and commitments to meet EPFI requirements in accordance with the applicable standards.

◗ IFC Guidelines[6]

The measures identified to avoid, reduce, minimize and compensate the impacts will be in line with the following guidelines :

- EHS general guidelines (2007)
- EHS guidelines for wind energy (August 2015)
- EHS guidelines for Electric Power Transmission and Distribution (2007)

2.2.2 National legislation requirements

The Koudia SPV must be committed to respecting all legislative and regulatory dispositions provided by the national laws, as well as those of international agreements to which Morocco is a party. The most important are presented below.

◗ National regulation[7]

- Law 49-17 on environmental assessment (repeals 12-0303 on EIA (dahir1-03-06 of 12 May 2003)) (August 8, 2020) -;
- Law 99-12 related to National Global Charter on the Environment and Durable sustainable Development ;
- Law 11-03 on the protection and development of the environment (dahir 1-03-59 of 19 June 2003) ;
- Law 36-15 on water (dahir1-95-154 of 16th august 1995) ;
- Law 28-00 on solid waste (dahir 1-06-153 of 7 december 2006) ;
- Law 13-09 related to renewable energies (dahir 1-10-16 of 11 February 2010) ;
- Law 13-03 on air quality (dahir 1-03-61 of 12 May 2003) ;
- Law 67-15 on hydrocarbons storage ;
- Decree 2-97-377 on emissions due to gas leakage (28 January 1998) ;
- Dahir of 20 hija 1335 (10 October 1917) on the conservation and exploitation of forests (B.O. 29 October 1917)

[6] https://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/Sustainability-At-IFC/Policies-Standards/EHS-Guidelines/

[7] This list isn't not exhaustive and the EPC is responsible to be compliant with all Moroccan regulations.

- Law 29-05 related to the protection of wild flora and fauna species and to the control of their commerce. (dahir 1-11-84 of 21 July 2011) ;
- Law 57-09 creating the firm "Moroccan Agency for Solar Energy." (dahir1-10-18 of 18 March 2010) ;
- Laws 111-14, 112-14 et 113-14 related to territorial organization,
- Law 12-90 related to urban planning (dahir 1-92-31 of 17 June 1992) and law 66-12 ;
- Law 30-05 related to hazardous materials transportation ;
- Law 22-80 (dahir 1-80-341 of 25 December 1980) on cultural and historic heritage as modified and completed in 2006 Law 19-05 (dahir 1-06-102 of 8 June 2006) ;
- Decree 2-70-510 (8 October 1970) related to prophylactic measures to be taken on construction sites ;
- Order (November 23, 1950) relating to drugs and medical equipment to be provided on the site of 100 workers, permanently or sites located more than 10 km from a supply center;
- Law 65-99 on the Labor Code (Dahir 1-03-194 of 11 September 2003);
- Decrees and orders implementing the aforementioned laws.

International Conventions

- Rio Convention for the protection of biological diversity (1992) ;
- Berne Convention for the conservation of wildlife and the natural environment (1979) ;
- International Convention for the protection of birds (1950) ;
- Bonn Convention for the conservation of migratory species belonging to wild fauna (1979) and the Agreement on the Conservation of African-Eurasian Migratory Waterbirds guidelines CMS/AEWA ;
- Convention on the international commerce of endangered species of wild fauna and flora (1975) ;
- African Convention for the Conservation of Nature and Natural Resources (1968) ;
- Maghrebine Charter related to the protection of the environment and sustainable development (1992) ;
- International Convention on the protection of plant-life (1951) ;
- Convention on climate changes (1992) ;
- Kyoto Protocol;
- The World Heritage Convention (1972).
- International Conventions ratified by Morocco in the domain of labour.

2.3 ESMP objectives

The main objective of the ESMP is to ensure that the various adverse impacts associated with the project are properly mitigated. The objective of the ESMP at various stages of the project planning and implementation are as follows:

Construction (including dismantling activities) Phase

- To prevent and reduce the negative environmental and social impacts of the project by implementation of mitigation measures; and
- To ensure that the provisions of the ESMP are strictly followed and implemented.

Operation Phase

- To prevent deterioration of environmental and social components regarding air, water, soil, noise, community, society; and
- To improve the safety of the end users and communities.

2.4 Site description and baseline conditions

2.4.1 Project location

Geographical location and administrative organization

The Koudia El Baida wind farm project is administratively attached to the commune of Taghramt while powerlines are attached to the commune of Allyene. The details of the administrative situation are presented as follows:

The commune of Taghramt is administratively related to the following structures:

- Region of Tangier – Tetouan – Al Hoceima;
- Fahs Anjra Province;
- Circle of Anjra;
- Caidat of Taghramt.

The commune of Allyene come under the following administrative structures:

- Region of Tangier - Tetouan - Al Hoceima ;
- Province of M'diq - Fnideq;

Land status

The land of the Koudia Al Baida wind farm includes :

- The land of the existing 50MW windfarm which belongs to ONEE (242 ha);
- New neighbouring plots of land, necessary for repowering, which have already been the subject of surveys and preliminary studies.

The power lines will cross state, forest and private land. However, the installation of the power lines does not require land acquisition or displacement of the population, only the temporary occupation procedure for the installation of the pylons which will be carried out according to the regulations in force.

The land for the substation is also part of the land transferred by ONEE to MASEN.

For the additional 5ha of collective land, a lease application has been submitted by Masen to the province of Fahs-Anjra. After the agreement of the Nouabs and the competent authorities and following the meeting of the administrative commission of expertise, the lease contract was elaborated and signed jointly by the two parties concerned; the central management of the DAR (Rabat) and Masen.

This land is not intended for habitation by the local population, but is used very little by the rightful owners of the community concerned for the grazing needs of their livestock.

A resettlement process has been initiated by MASEN in order to move the 7 houses located in the centre of the A1 ridge at a distance varying from 219m to 500m from the wind turbines T29 and T28 in order to reduce the impact of the wind farm on the local population.

The amount for the acquisition of land for the Koudia Al Baida site is currently estimated at nearly 10,000,000.00 MAD. Concerning the compensation of the houses, an administrative evaluation commission met on 17/07/2020, at the headquarters of the Province of Fahs-Anjra, to determine the value of the surface rights and the compensation for displacement.

2.4.2 Environmental baseline

Climate

The study area relates to the wettest geographical areas in Morocco. Thus, on an annual scale, the average rainfall reaches 600 mm. On an intra-annual scale, the rainfall regime in the area shows notable irregularity,

often resulting in torrential rains. The rainfall peaks are generally in December or January. The driest months are always July and August, with almost zero rainfall.

Snow falls every year on the high peaks and can stay there until April.

On the other hand, the average temperatures (maximum and minimum daily) vary between 12.5 ° C and 25.5 ° C with a minimum in January and a maximum in August.

Two wet periods interspersed by a dry period extending from May to October, follow one another during the year.

The wind regime is very irregular and influenced by the double presence of the Atlantic and Mediterranean sea masses. Two types of strong winds thus predominate during the year:

- Westerly winds (Gharbi), of Atlantic origin often causing precipitation and predominant between November and March. These winds blow from May to October;
- Easterly winds, of Mediterranean origin, often predominant in summer and spring (October to February).

In the study area, the average wind speed is variable between 9 and 10 m / s. The prevailing winds blow there from the West and from the East South East.

Topography, geomorphology

At a local scale, the blocks of the wind farm studied are distributed from West to East on the ridges of the limestone chain : case of the southern part of A1 and A2, then on the low mountains of the units of the Ghomarides and Septides (belt of low mountains with rounded summits) for the remaining blocks.

The altitude at the level of the studied blocks goes from 370 m to 570 m.

The slopes of most of the ridges of the limestone chain are steep. The slopes facing east are often the steepest. The class of dominant slopes is included in a range of values going from 10 to 20%; slope values greater than 30% are recorded.

Geology

From a geological point of view, the entire study area is part of the Rif geological domain. The latter is subdivided into three main domains (Durand Delga et al., 1960 - 1962):

- Internal domain, north to the present Rif;
- Outer domain, to the south;
- Middle area, corresponding to the flysch layers[8], forming a shoal between the two previous sillons.

Within the internal domain, there are three major structural groups: the *Limestone Ridge*, the Sebtides and the Ghomarides:

- The *Limestone Ridge*: This chain is a set of small sheets or scales with triassic-liastic carbonate reinforcements with Jurassic-Cretaceous and Paleocene pelagic layers, to Oligo-Miocene terrigenous flyscho-molassic. It consists of the Haouz chain north of Tetouan and the limestone ridge between Tetouan and Assifane, limiting to the west and south the internal areas of the Northern Rif. The *limestone ridge* is subdivided into an inner, an intermediate and an outer ridge.
- The *Sebtides*: A group of metamorphic terrains, with ultrabasic rocks at their base (Beni Bousera peridotite massif). From bottom to top, we find peridotites, an aureole of kinzigites, gneisses and micaschists (Filali Unit), and upwards, Paleozoic and Triassic metasediments (Federico Unit).

[8] Or "sheets"

- The *Ghomarides*: they form a set of four Paleozoic ground waters with little or no metamorphism, these are the Aahaili, Koudiet Tizian, Blessed Hozmar and the upper Talembote table.

It should be pointed out that the foundation of existing wind turbines is generally rocky of dolomitic limestone nature and without disorders; but old or recent landslides can be observed on colluvium, shale, flysch or pelites with structures that are favourable to landslides.

Wind turbines at risk of instability are those located close to steep slopes or on rocky ground under which active landslides may overhang the land base.

Due to the high density of vegetation cover on both sides of the new turbine area, landslides are rarely observed. Nevertheless, the predominance of shale, colluvial and pelitic soils will be a trigger for landslides during and after earthworks.

Schist, pelitic and colluvial formations are very sensitive to water and air. Thus their alteration significantly reduces their intrinsic parameters (angle of friction and cohesion). These very unstable and erodible grounds can be destabilized by any modification of the slope at the level of the studied site.

Erosion is the central issue in soil degradation. The ridges with steep and unstable slopes (in particular due to fracturing) are subject to significant erosion phenomena.

These risks will have to be considered by the EPC.

Hydrography

The hydrographic network draining in the study area is dense. From the limestone chain running along the alignment of the main ridges of the wind farm being studied, the main tributaries and confluences of the catchment areas of the four main rivers – Negro, Fnideq, Amezzouk and R'mel as well as Marsa – which drain the study area.

These surface water resources make up the bulk of the water resources in the study area. In fact, the abundance of rainfall, the predominance of not very permeable facies (shale, clayey, etc.) and the steep slopes hinder underground infiltration and lead to the following consequences:

- Runoff is important and predominates in all the catchment areas;
- Rivers have an irregular hydrological regime with torrential flow during flood periods and very low to zero low flows.
- Maximum monthly inflows are recorded between December and February in the form of floods, which constitute the bulk of the river's inflow. On the other hand, low water levels are very pronounced with almost zero low-water flows, with the exception of rivers draining the limestone chain.

At the limestone chain (A2 ridge), the permeable and fractured carbonate formations promote water infiltration towards the compartments below the ground. Indeed, in the immediate vicinity of this chain, the study area does not contain a permanent watercourse. However, as this is a high ridge, many ditches and streams originate there. This chain is therefore not a watershed.

Ground water

The existing wind turbines are traversed towards the North-West and South-East by the Haouz de Tetouan ground water.

However, the new wind turbines area is not crossed by any regional ground water, except for a few small perched ground waters, with very limited extensions and reserves.

On this last area, the land is little to non-permeable, allowing the genesis of water sources whose installation can be explained by two theories:

- Either the location of these springs corresponds to contact areas between permeable limestones and shales, flyschs and marls of low permeability;
- Or due to the presence of fractures.

Generally these sources are of medium to low flow with small fluctuations between periods of floods and droughts with the exception of low flow sources (less than 0.05 l/s).

Some sources show an alignment that suggests a major fault that drains most of the deep water.

Air quality

The study area as a whole does not support significant point sources of air pollutant emissions. On the other hand, it should be noted the presence of several quarries for the extraction of construction materials scattered mainly along the hills of the limestone range. At the level of these units, emissions of dust and exhaust gases from machinery for extracting and transporting materials are very frequent. A big quarry is bordering the south of ridge A2.

Biodiversity, avifauna and bats[9]

The project site is part of the Rif mountain range (the western Rif). It is characterized by a subhumid bioclimate and a thermo-Mediterranean vegetation layer. This part of the western Rif influenced by both the Mediterranean and the Atlantic, provides the region with a very interesting diversity of biocenosis. The vegetation cover is also very diversified, it is made up of two large strata, the Erica arboria and cistus scrub and the pine-dominated forest.

As for migratory avifauna, the future Koudia Al Baida Wind Farm is located in the hinterland of the Strait of Gibraltar which represents one of the most important migration corridors known for millions of West Palearctic birds, especially birds of prey and other tall ships such as storks, which are very sensitive to the blades of wind turbines.

The area is also known for the great diversity of ecological habitats it presents:

- rugged terrain with ridges, cliffs and escarpments, valleys and ravines,
- karstic systems favoring the presence of caves, crevices, cracks,
- forests and shrub matorrals ...

Breeding avifauna

The most sensitive reproductive species towards the wind farm project are mainly represented by three species of Corvidae (Corvidae, Crave and Chocard), all unprotected in Morocco but of which the last two species are very localized; in fact, the nesting sites of these species are scattered throughout the main rocky ridge (A1 and A2 ridges).

This main rocky ridge therefore presents a certain sensitivity to the wind farm project.

The steppe species will see the surfaces of their nesting sites reduced to very little significance given the good representativeness of this type of habitat in the project area. These species will be especially affected during construction work by noise and dust emissions.

Forest species (including the Maghrebian Tit and the Obscure Hypolais, both endemic) are those that will be the least affected as their habitats will be mostly safe from destruction or disturbance during construction.

Migratory avifauna

The major issue relates to the potential impact on migrants given the geographical position of the settlement area near the Strait of Gibraltar. Indeed, several tens of thousands of Large Raptors and Storks (the birds most sensitive to wind farms) cross the Strait at the two migratory periods.

The analysis of the data collected allows us to draw the following conclusions:

[9] These conclusions come from the specific report made available to the bidders as "*Note d'enjeux environnementaux et sociaux*" .

During the two migratory phases, birds avoid flying over the main AïnJir-TlataTaghramt ridge (A1 and A2 ridges) except at a pass overflown by birds at low heights both in autumn and spring. So this is a very sensitive crossing point.

The valley to the north of the site is crossed from west to east or vice versa during particular windy situations forcing prenuptial migrants to seek crossing points either from the eastern part of the Strait or on the contrary from the western part. ; similarly, this valley is used by postnuptial migrants who must set out on migratory routes either along the eastern coast or along the western coast of the Tingitane Peninsula to their African winter quarters.

The creation and maintenance of a mass grave at Jbel Moussa to attract Vultures there who would no longer have to explore the surroundings of the future wind farm is an important measure.

During cloudy or foggy days (frequent cases in the area), the risk of collision could be quite high in an area well known for the passage of tens of thousands of birds vulnerable to wind farms (Large Gliding Birds : Raptors and Storks) but also a dormitory for Vultures in Jbel Moussa (less than 3 km) or the future mass grave for Vautours (about 2 km NNE of the site. The IUCN recommendation is to move away from the parks wind turbines with a distance of at least 4.5 to 5 kilometers.

Bats in the project area

Of the 19 species observed or likely in the region, 12 were found in the study area; another, the Euryale Horseshoe Bat, has been observed only in caves.

According to the data collected, the population of bats in the area is of average interest, both in number of species (3 dominant species, 4 more rare regular species, and 5 rare to very rare species), and in terms of attendance. (less than 150 sequences recorded per night). The often strong winds in the area, high rainfall and mists in calm weather probably limit the use of bats at the ridges, and activity should be more important in the valley bottoms, which are calmer.

The Great noctule, a Vulnerable species, seeming very rare in the study area, is highly threatened due to its high flight height.

The other 4 endangered species (IUCN NT categories), because of their flight habits, have little risk of mortality. Only one of them, the Schreibers Miniopter, is quite abundant on the site.

Among the endemic species, only one species, Serotin isabella, not threatened, is at serious risk of mortality.

Due to differences in wind speeds, and to a lesser extent differences in bat densities, 2 areas of different sensitivity are therefore identified:

- An insensitive zone, corresponding to the ridge (roughly corresponding to the location of the old wind turbines; crest A and D1), very strongly windy, whether by westerly or easterly wind, with densities of bats weak
- A moderately sensitive area, to the east of the previous one, of lower altitude, more wooded, with lower wind speeds, and in particular protected from westerly winds, with generally higher densities of bats . The ridge D1 is in this area.

Socio-economic activities and infrastructure

From a human point of view, the ridges constituting the project are located in rural areas where economic activity is family-type, organized around the breeding of goats and sheep for the production of cheese and meat

An important activity of extraction of construction materials in quarries (mainly along the ridges of the limestone chain).

The project is served mainly by the RN16 which connects the city Sebta to Tangier and then the RP4703 serving Tlat Taghremt. It should be noted that the RP4703 is in very deteriorated condition and is experiencing significant road traffic from trucks from quarries.

The dwellings identified are widely dispersed, the most dominant type of housing remains rural housing.

Landscape

From a landscape point of view, a panoramic view representative of the current landscape, we find the first wind turbines installed in the region, pylons for high voltage lines, a quarry for extracting construction materials, the road leading to Taghramt, the forest and scrub dominated by Mount Jbel Moussa and in the background the other side of the Mediterranean.

Residual noise

The figure hereafter presents the results of the measurement of residual noise for some potential sensitive receptor.

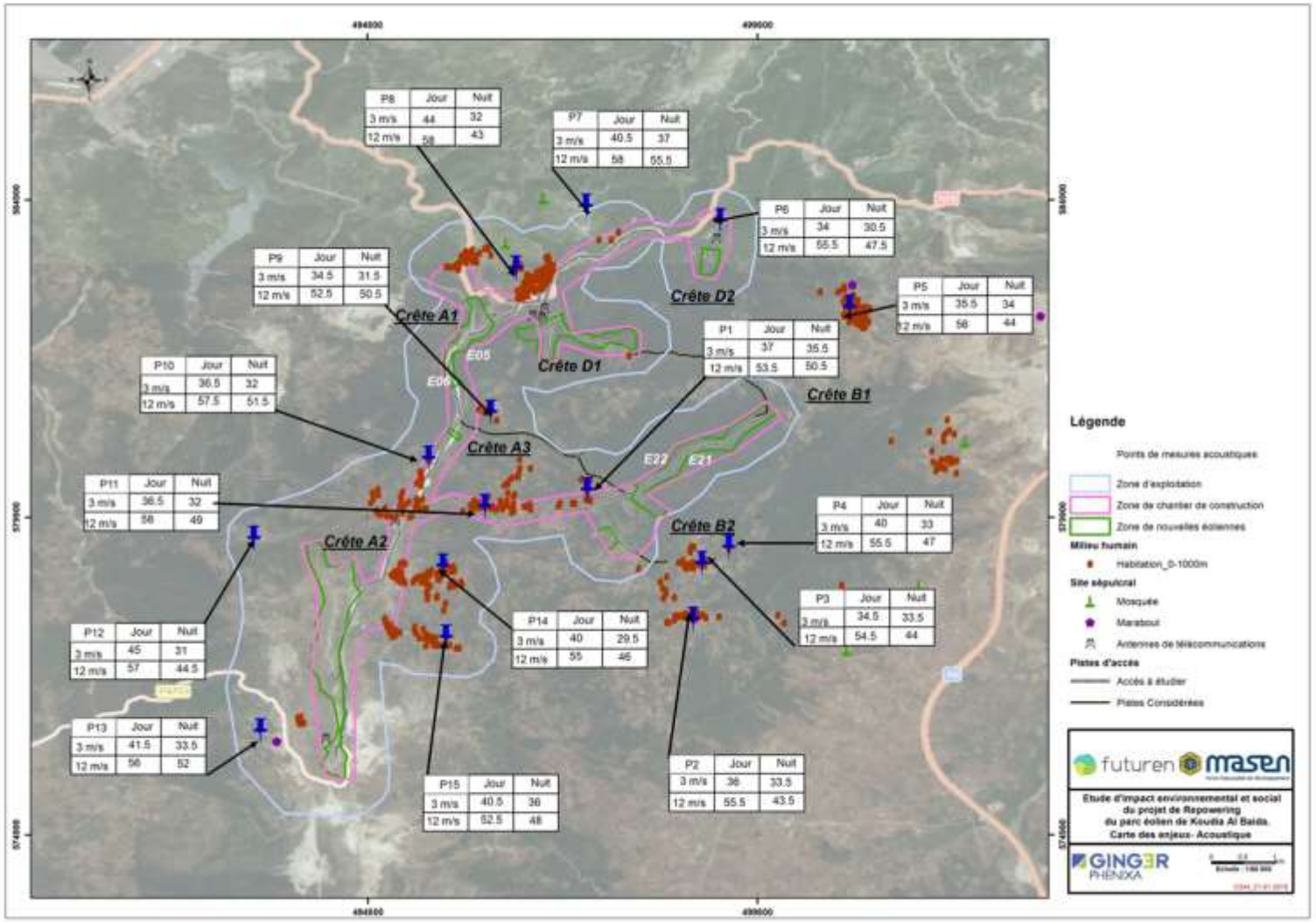

Figure 1 : Residual noise in the project area[10]

[10] Crest B1, B2 and D2 on the map are not part of the scope of the project.

2.5 Description of the project

The Koudia Al Baida Wind Farm Repowering Project consists of replacing the existing (83) eighty-three type V42/600 kW wind turbines and the existing (7) seven type E40 wind turbines at the Site, with Wind Turbines with a unitary power of 5 MW, increasing the total installed capacity to around 100MW.

During the operation of the Wind Farm, technical optimizations can increase the nominal power of the wind turbines to 5.2 MW, so the total power of the park can reach 105 MW.

An operation and service building suitable for the operation of the Wind Farm shall also be built as part of the Project.

The project includes also the construction of a substation for the windfarm and 2x225 kV powerlines between this substation and the Jbel Moussa 225 kV substation (about 8 km).

2.5.1 Project components

The most important components of the project are :

- New wind turbines with a unit capacity of 5 MW (which can go up to 5.2 MW);
- Underground electrical wiring network, internal to the "medium voltage" farm, connecting the wind turbines to each other;
- Control, command, measurement and protection devices;
- Access roads (some access roads exist, other have to be created on the new ridges) ;
- Operating buildings (office, workshop, spare parts store, etc.)
- Substation
- Powerlines

2.5.2 Main planned works

The main planned works are :

- Dismantling existing turbines
- Implementation of the new wind farm

2.5.2.1 Dismantling existing turbines

Dismantling of all equipment of the existing wind farm shall include:

- Documented depollution of the dismantled equipment according to the applicable regulation and environmental requirements;
- All equipment, materials and waste shall be removed from Site and managed according to the applicable regulation and environmental requirements with record of intermediate and final destination;

2.5.2.2 Implementation of the new windfarm

- **Delivery of the wind turbines**

The wind turbine (towers, blade, rotors) will have to be delivered from the manufacturing plant to the site. These elements are convoyed in special convoys. The transportation requires routes suitable for the size of these convoys (size and weight).

Floor space on the construction site

In addition to the wind turbines' floor space, lifting platforms will be set-up. These will operate throughout the duration of the project in order to operate on wind turbines (maintenance operations, assistance interventions).

Storage facilities during the construction will be temporary and will be removed at the end of the works.

Access roads are limited during the operation phase.

Working site installation

The works installations will be temporary modular units, serviced with water and electricity; they will include offices, meeting rooms, changing rooms and sanitary facilities in accordance with currently applicable regulations.

There will be technical areas used for offices (prefabricated buildings), waste skips, pollutant storing, receptacles placed on retention facilities, storing other products, water tanks and all the various tools and machinery necessary for the works.

The ground in these areas will not be rendered impermeable. They will be easy to dismount so that they can be removed once the site is in operation.

Material and equipment supplies will generate additional traffic and therefore air emissions (SOx, NOx, VOC, fine particles).

The following table presents the most important solid waste produced during the construction phase. The solid waste will be stored on site before removal outside the construction site. Licensed companies will be contracted to remove solid waste. Recycling and valorisation will be preferred to waste disposal. Storage facilities will be designed to avoid any contamination of soil, rainwater, air, etc.

Construction site's steps	Solid waste category
Earthworks/Levelling	Organic waste
Foundations	Ligatures, scrape
	Concrete
Wind turbines assembly	Waste oils
	Packaging
	Wooden pallets
Accomodations	NHIW (non-hazardous industrial waste)
	Packaging waste
	Hazardous waste
Grid connection	Copper and aluminum cable waste
Restoration construction site	Non used soil from earthworks (potential)

The effluent produced during the construction phase will result from:

- Sanitary waste water (showers and toilets in the living quarters). Septic tanks will be implemented according to the number of employees ;
- Concrete mixer washing water. A storage pond equipped with geo-textile membrane will be implemented.

During the construction phase, drinking water will be supplied by tank trucks from the nearest network of ONEE. Water for construction will be supplied from an authorised source.

Quarrying

The existing quarries only will be used for the Project.

Preparation of service roads

Access roads will be created if needed or upgraded when they exist (widened and stabilized) for use by trucks and machinery. The main work to be performed on the existing trails consists of widening, levelling, stabilising and increasing the bending radii so that turbine haulage trucks, cranes, concrete mixers and other machinery are able to use them. In their present conditions, only fairly powerful all-terrain vehicles can use the trails due to their steep slopes and severe erosion damage.

Drainage network

The drainage network must allow the collection of rainwater and wastewater. This system must be designed and constructed with respect to:

- Best practices and the regulations in force;
- The design assumptions and criteria for Wind Turbine foundations and other aspects of the civil engineering Works;
- The environmental requirements including ESIA requirements;
- The ongoing safety of personnel and structures.

The drainage system shall respect as much as possible the original natural drainage of the Site and any discharge point of drainage water shall be approved by the Client and the competent authority.

Preparation of erection bays

Erection bays or platforms will be set up for the erection of the wind turbines. They will be suitable for use by cranes and will allow the storage of unassembled components and assembly of the wind turbines. They will be stoned but will not be impermeable to runoff.

There will be an erection bay at the foot of each wind turbine.They will be compacted in preparation for the works so that they withstand the weight of the turbines.

The erection bays will be left in place while the wind farm is in operation. They will be used for turbine maintenance.

Foundations

The towers need to be anchored to foundations. The foundations are round, buried, made of reinforced concrete with a round stand on the top.

Turbine assembly

Each turbine will be mounted on the spot using two cranes. The main high-capacity crawler crane assisted by a secondary crane will unload the components from the haulage trucks and assemble them.

Cable trenches and substation

For the interconnecting cables between the wind turbines, trenches that are one-metre deep and 0.6m wide will be excavated on the hills. A concrete base will be put in place for the substation.

The substation will be built on a gravelled zone. It will comprise a fenced-off area for outdoor high voltage equipment for the connection to the 225 kV grid, and the main control building housing the controls of all the equipment.

The transformers will be equipped with oil retention pits and fire protection devices.

Overhead power lines

The facilities will be connected to the existing 225 kV grid to the SE of the project area by a 8 km long double circuit line.

3. ESMP in construction phase (CESMP)

CESMP concerns environmental management plan during construction phase including dismantling activities for the existing turbines . It aims to ensure that the commitments and recommendations of an environmental nature included in the ESIA are fully applied. At first, this monitoring activity includes the integration of the mitigating measures and other environmental considerations in the plans and estimations, then their implementation during the construction.

The Koudia SPV will validate study and execution documents presented by the contractors for the mitigating measures that the contractors must integrate.

3.1 Environmental management staff : roles and responsibilities

3.1.1 Organization

Before beginning of the construction, the contractor will define the respective roles and responsibilities with regard to the environment and identify the site's responsible Environmental Manager. Descriptions of individual environmental team responsibilities will also be detailed and include, but not be limited to, the following team members:

Project Director/Manager is responsible for the delivery of the project, which includes environmental and social management requirements.

Responsible for environment on Site is responsible for ensuring that Environment, Health and Safety (EH&S) measures are managed during construction and operational phases. The person could be an engineer in environment form consortium staff or an engineer in a consulting firm contracted by the consortium. The person will based on site and will be easily accessible. He has to ensure the CESMP mitigation measures are followed and resolve issues as and when they may arise. The responsible could have the help of experts of needed. This person will work under construction manager authority. Every incident or accident has to be reported to the Koudia SPV, to local authorities and MEME if appropriate.

Contractors and subcontractors are responsible for consistently implementing environmental and social management measures in accordance with the mitigation and monitoring measures outlined in the ESIA and are in compliance with the national and international applicable regulations.

The contracts placed on the Contractors will need to clearly specify the environmental and social requirements expected of contractors working on Koudia Al Baida wind farm project. Upon the arrival of new contractors, sub-contractors and/or suppliers on the work site, they will be presented with environmental protection and environmental emergency requirements in order to sensitize them. During work site meetings, one point, "The Environment," will be put on the agenda to monitor elements to be corrected and/or to be brought to particular attention.

In addition to watching over the implementation of all mitigating measures, the person responsible for environmental monitoring will point out derogations, propose corrections and direct the decision-making on the work site related to questions of the environment. The process of notification in case of non-compliance with the environmental measures will be presented during the first work site meeting, as well as the various environmental monitoring documents which must be produced before the start of the work and throughout the duration of the latter.

Throughout the duration of the work, the project company will advise the ministries or responsible organisms of the carrying out of the work and of important changes in the construction schedule. The ministries or responsible organisms can at any time come to ascertain the implementation of the planned mitigating measures.

The person responsible for environmental monitoring for construction will also have the responsibility of producing monthly reports of environmental monitoring and a final report at the end of the work.

In addition, the project company places great importance on his relations with the populations concerned by the construction of the project. Throughout the duration of the construction, the project company can

inform the population of the progress of the work site by use of his Internet website and by communicating with local and regional authorities.

In summary, the activities related to environmental surveillance will allow:

- To see to the application of the mitigating measures contained in the impact study into plans and estimates and to evaluate the performance of mitigation measures proposed in the ESMP;
- To carry out inspections on construction sites and point out any non-compliance to the person responsible for the work site ;
- To identify, in concert with the head of the work site, alternative measures to be put in place in order to resolve any problems not previously identified that might manifest themselves during the work ;
- To meet the requirements of the existing environmental regulatory guidelines (Moroccan and donors) and community obligations.

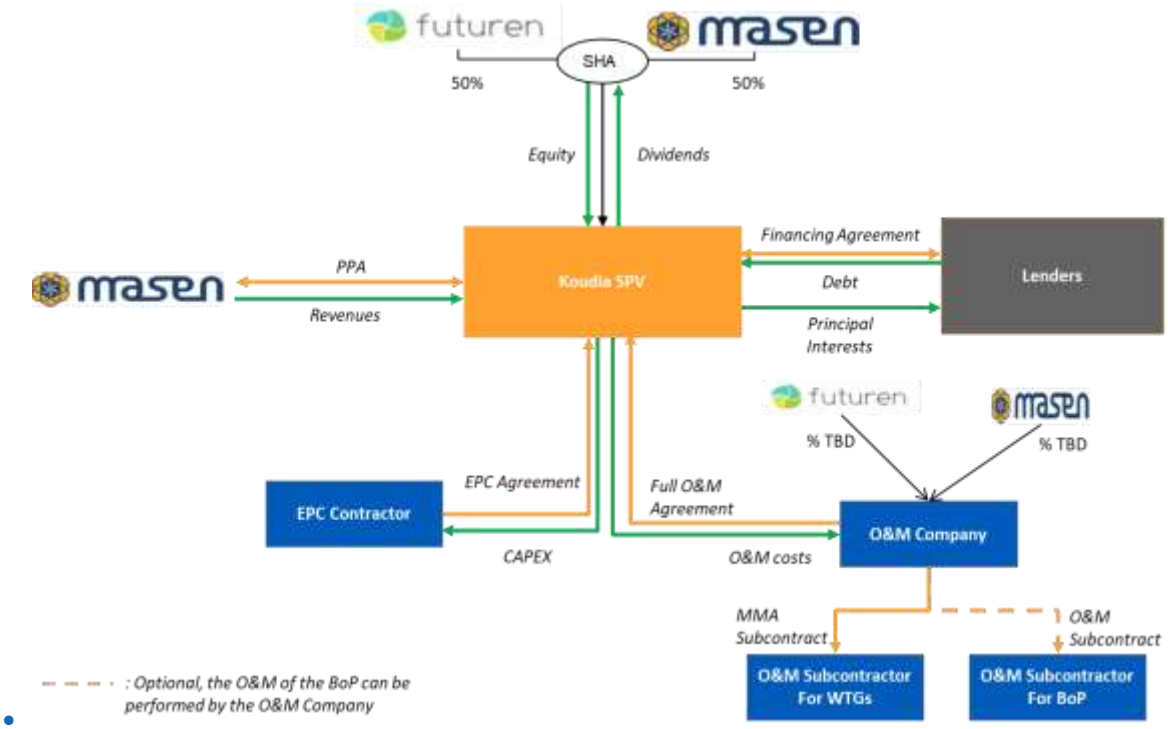

Figure 2: General organisation for the Koudia El Baid Wind Farm

3.1.2 Resources

All levels of management are accountable to ensure that the necessary resources are available for implementing and accomplishing environmental and social responsibilities. Therefore, the following issues will be provided and assured:

- Appointed Environmental/Social Managers will be competent and experienced in the relevant issues;
- Environmental and Community awareness training will be provided;
- Suitable documentation will be provided;
- Appropriate equipment will be provided; and
- Suitable budget will be allocated for managing environmental and social incidents.

3.2 Applicable Legislation, Policy and Environmental and Social guidelines

3.2.1 Applicable legislation

Legal texts identified in chapter 2.2 are applicable in construction phase.

3.2.2 Best environmental practices

Directly and through its subcontractors, the contractor is also committed to implement measures sound environmental management in the construction phase. Without being exhaustive, these include:

- To get all the necessary permits required by laws and regulations.
- Ensure compliance with health and safety measures site installations
- Establish and enforce a site regulations
- Protect surrounding properties of the site
- Ensure the continuity of traffic and access of local communities during construction
- Ensure solid waste collection and disposal of waste produced by work
- Inform and aware people prior to any degradation of private property.
- Adopt a speed limit for vehicles on site
- Perform signalization for works:
- Ensure respect to safety rules at work
- Educate field staff on STI /HIV / AIDS and any contagious disease (i.e. COVID 19)
- Organize storage of materials, parking and movement of machinery so as to avoid discomfort
- Respect cultural sites
- Organize the activities of the site taking into account the noise(noise, dust) and the safety of the surrounding population;
- Use the local labor in priority if they comply with the employers requirements
- Provide good quality of work, conducting check and choice of appropriate technologies.

These best practices will be reflected in a manual of environmental, social, health and safety management.

3.2.3 Environmental and social policies and guidelines

The Koudia SPV in charge to implement the Koudia Al Baida wind farm project, has developed an environmental policy for all its projects. The main elements are:

- Working to develop technologies in renewable energy and operating as a company that takes responsibility for its environmental impact;
- Preventing pollution risks in all phases of a project, improve environmental performance and meet regulatory requirements;
- Optimizing the organization to ensure effective management and monitoring of contractors and consulting with all stakeholders throughout project ;
- Periodically checking and continuously improving environmental performance.

See the environmental and social policy of EDF Renewables in the appendix.

3.3 Environnemental/social requirements and compliance

Compliance analysis will be performed according environmental regulation and best practices. Mitigation measures presented in tables in chapter 5 identify monitoring, checking, roles and responsibilities. In case of non-compliance, the responsible for environment will identify correctives measures to be implemented.

The responsible for environment will have to develop procedures for dealing with major pollution incidents that could unexpectedly occur during the construction phase (including the reporting to the relevant authorities) and which are particularly related to air quality (e.g. dust), cultural heritage (e.g. archaeological finds), ecology (e.g. protected fauna/flora), ground/soil quality (contamination issues), noise and vibration, water resources, waste management.

The ESMP and the CESMP will be approved by the authority in charge of the environment through the development of the environmental monitoring plan developed during the procedure for issuing the Environmental Acceptability.

3.4 Monitoring, recording, inspection and audits program

Daily inspections of work areas by the Contractor Supervisor and weekly inspections as a minimum by the Environmental/Social Coordinator will also need to be conducted to identify any issues or non-compliance with the CESMP and to monitor the daily work practices.

A weekly inspection checklist will be prepared and will be provided to the External Auditors for evaluation, which will involve all the subcontractors to discuss environmental and social issues and their rectifications.

External audits will also need to be undertaken quarterly by an external, independent auditor in order to satisfy the Equator Principles requirements. This audit will take place in order to ensure the following:

- Compliance with all standards and regulatory requirements, CESMP and method statements;
- Auditing the contractor and subcontractor activities for non-conformances,
- Checking monitoring records, inspection checklists, and other relevant documentation; and
- Identifying the requirements for corrective actions.

The outcomes of the audit will also need to be documented including the recommendations and corrective actions.

3.5 Environnement and social training and awareness program

The responsible of environment will develop the training and awareness program. All staff and laborers working on site will be required to attend an environmental/Social awareness and training program prior to commencing work, which will include:

- Induction training for general environmental and social awareness and the content of the CESMP;
- Site induction training that will highlight the specific environmental requirements and activities being undertaken at the worksite including hours of operation, noise and vibration limits, necessary mitigation measures, soil and water control measures, sensitive receptors and local community issues, traffic access, site entrance and exits etc.;
- Dealing with and handling hazardous and non-hazardous wastes;
- Dealing with biodiversity conservation ;
- The importance of waste recycling and associated procedures;
- Training on the emergency preparedness plan;
- Training on incident notification, investigation and reporting; and
- Induction training for construction site visitors.

It is recommended that this be incorporated with a safety training program, which will also be required for all employees working on the Koudia Al Baida windfarm project site.

3.6 Communication

Communication, both internally and externally, is an important aspect of successful project delivery. Internal communication includes arranging regular meetings for the Project team to review and co-ordinate project progress with regards to environmental and community issues.

External communications, with the local representatives will also need to be conducted regularly.

In addition, as a mechanism by which community members can have grievances aired, the site will need the provision of information on sign boards easily viewable in order for the local community to be able to contact the Project team. A mailbox will also be set up to allow local people to express their complaints and opinions.

3.7 Document control and review

All documents relevant to the CESMP will be controlled onsite. The controlled documents include the CESMP report, procedures, audit reports, incident reports, records, and community complaints.

The responsible for environment will be responsible for the quarterly review of the CESMP, its procedures and its implementation on site. If any new machinery or process is introduced on site, the existing CESMP will be updated accordingly.

3.8 Structure and process management

All personnel in the Project Team are responsible for protecting the environment and community by ensuring that appropriate protection measures are implemented.

The following table and the figure offer a general representation of the likely general management structure and assigned responsibilities. The consortium must assign these responsibilities to the concerned personnel and incorporate the roles within the CESMP.

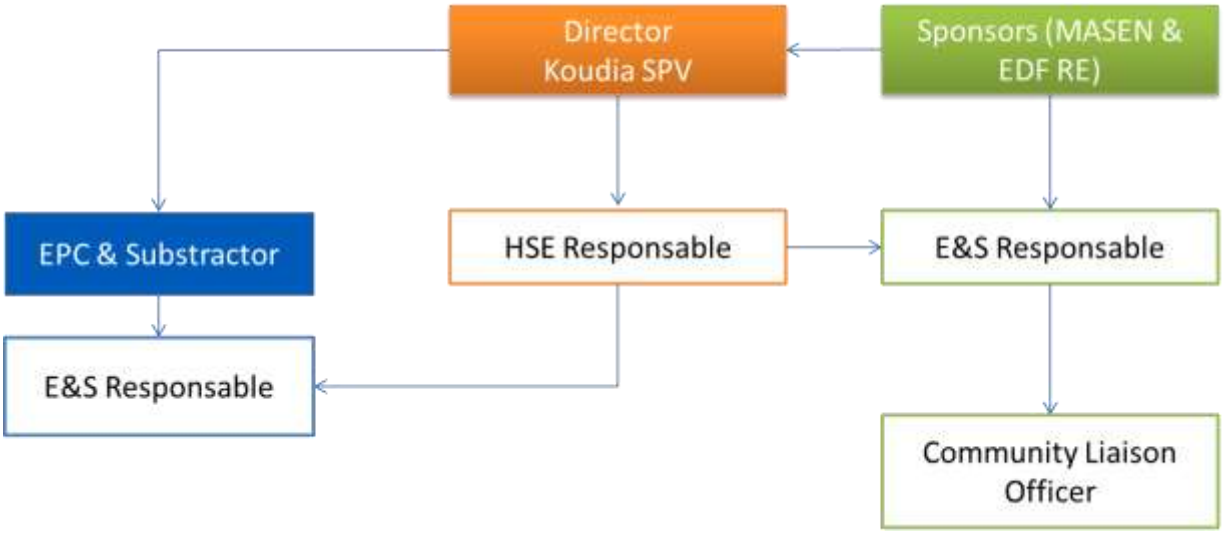

Figure 3: Projected organisation during the construction phase

Table 1 : Roles and responsibilities – Construction phase

Role	Environmental Responsibilities
Project Director/ Manager	• Understand the requirements and objectives of the CESMP; • Ensure resources (personnel and financial) are provided to prepare and implement the CESMP; • Overall responsibility for environmental and social performance; • Approve reports of environmental issues and non-conformance to the client in the regular reporting and when any issues arise; • Facilitate proactive communication between all role-players in the interest of effective environmental and social management; • Implement temporary work stoppages where serious environmental or social infringements and noncompliance occur; • Enforce compliance with CESMP and all legal regulations; • Ensure all employees undergo environmental and social training; and • Ensure the CESMP is updated and approves the final updates
Environmental /Social responsible[11]	• Set up program for regular monitoring; • Follow up community complaints; • Conduct inspections to monitor environmental performance and compliance with the CESMP by contractors; • Check CESMP compliance with legal requirements on regular basis; • Ensure the environmental and social meetings are held on a regular basis; • Communicate and advise PM and subcontractors on environmental and social aspects; • Report, investigate and follow up on incidents (environmental and social); • Establish corrective action plan for any non-compliance including action plan for prevention of such misconduct or incident; • Develop, implement and manage the environmental and social training program
Construction Manager and Site Manager	• Responsible for overall environmental performance of the contractor and subcontractors; • Allocate sufficient resources to ensure compliance and effectiveness of CESMP; • Ensure sub-contractors have a copy of the CESMP and are aware of their environmental obligations; • Enforce compliance with CESMP and all legal regulations; • Communicate environmental and social aspects with PM and HSSE managers; • Ensure Environmental training is undertaken; • Ensure community complaints are addressed; and • Maintain document registers for training, incidents, waste management and other related environmental reporting requirements.

[11] The Environmental and Social responsible should be hired by the EPC.

Role	Environmental Responsibilities
Site Manager	In addition to the above: • Enforce environmental measures on lower levels; • Ensure compliance with CESMP directly on site; • Communicate environmental and social aspects with Environmental/Social coordinator and lower level management and personnel; • Report all incidents and non-compliance to PM and Environmental/Social coordinator.
Sub Contractor - Foreman	• Implement the requirements of the CESMP; • Allocate the necessary resources to ensure compliance and effectiveness of the CESMP; • Cooperate with the Environmental/Social Coordinate to ensure that site inspections and training are conducted; • Comply with the observations and requirements for corrective actions, which are issued by the inspector; • Report all incidents and non-compliance to Site manager; • Notify the Construction Manager/Site Manger of any changes on the program, construction method which may affect the environmental mitigation measures and ability to comply with the CESMP and regulations; • Maintain a register of incidents and waste management for future audits; • Maintain a register of complaints and correction actions
Construction Workers	• Undergo environmental and social awareness training; • Understand environmental procedures and environmental /social aspects relevant to activities; • In case of any accident or non-compliance report that immediately to foreman.
Visitors	• All visitors must comply with the CESMP, must receive an induction before entering the site and must comply with the instructions given by site staff.

3.9 Mitigation measures, regulations and procedures

All precautions will be taken to minimize the effects of the construction of the various components of the Koudia Al Baida windfarm project surveyed on the various environmental components. To this end, various mitigation measures have been indentified to maximize the integration of these components in the environment and to minimize the effects in the short, medium and long term.

It will not be possible to precise most of the costs of the measures until the moment of the final estimation of the work. Many measures however will not involve additional expenditures since they constitute best practices to be followed during construction or operating.

Design phase mitigation measures have also been recommended for consideration during the detailed design of the Koudia Al Baida windfarm project. Typically, the recommendations involve the use of pollution and discomfort control technologies to minimize the environmental and social impacts.

These measures are presented in detail in tables in chapter 5 of this document.

The overall effectiveness of the mitigation measures will be assessed by site monitoring programs, which will be implemented during the construction and operation phases of the project. The monitoring activities will also be designed to evaluate the project's compliance against environmental and social guidelines.

3.10 Final CESMP

In order to ensure compliance with environmental legislation, both national and international, the CESMP will be developed to manage environmental risks during the construction phase. The complete CESMP will need to be prepared by the EPC and all sub-contractors will be obliged to adhere to procedures that are outlined. This also includes following and enacting proper management structures.

The CESMP will be required to cover all construction components of the proposed Koudia Al Baida windfarm project and will provide detailed specifications for individual activities. The purpose of these is to reduce the severity of impacts of the construction of the Project through avoidance, prevention, reduction and rectification. The actions to be set out in the CESMP are intended to act as a guide and tool for anticipating, recording and ameliorating any potential or actual impacts that may arise. In this regard, the CESMP will be designed to specify timing and technical aspects of optimising or reducing positive and negative impacts, respectively and will evolve as the construction progresses to ensure that its content reflects the current construction program.

As a more practical approach, the specific requirements of the CESMP may be finalised in accordance with the developing stages of construction.

Managers and supervisors are responsible for providing assurance that their work unit is following the CESMP, including actions in the work method statements and conducting regular audits of the management system. A documented auditable trail will be established for verification purposes.

The content of chapter 5 will be used as a basic structure to provide a foundation upon which the development of a CESMP can be achieved. The chapters describe the anticipated key contents of the full CESMP.

4. ESMP in operation phase (OESMP)

The environmental management plan for operational phase will serve as a general tool for managing all environmental aspects related to the operation processes of the Koudia Al Baida windfarm project.

The following chapter provides an outline of the environmental management plans, which will be required during the operational life of the proposed project.

4.1 OESMP requirements

The OESMP establishes mechanisms for the identification and implementation of environmental and social protection, mitigation, monitoring and institutional measures that will be taken during the operational phase of the proposed Koudia Al Badida windfarm project, which will be in accordance with the procedures outlined in the Equator Principles and WB/IFC EHS Guidelines.

The OESMP will have to be reviewed before the Project Commercial Operation Date (PCOD). It will need to:

- Fulfill statutory requirements;
- Highlight the applicable environmental guidelines, regulations/the legislative context;
- Highlight the agreed social and community mitigation actions and awareness programs
- Establish operational Environmental and Social Objectives;
- Establish significant Environmental and Social Aspects;
- Develop and implement relevant procedures;
- Develop a program of continuous environmental and social improvement
- Clearly specify roles and responsibilities; and
- Highlight the procedures to be considered in the event of an environmental monitoring trigger level being breached or an unforeseen impact arising.

The OESMP will also identify the operational briefing and training requirements. Training can be provided in different forms such as induction sessions, training packs detailing good practices, or ‘toolbox talks’.

In addition, it is important for the OESMP to accommodate changes in conditions and respond to any need for further assessment requirements. Changes are most likely to arise if

- A new environmental or social sensitivity is identified as a consequence of changing environmental and social conditions and more detailed survey work or
- Changes are introduced to the installations/development design.
- Documentation and communication protocols will also be required to be identified within the OESMP. Communication protocol will include
  - Incident/emergency communication procedure,
  - Internal communications, external communications,
  - Management of external/internal inquiries.

4.2 Mitigations measures, regulations and procedures

Mitigation measures are presented in chapter 5 of this document.

The overall effectiveness of the mitigation measures will be assessed by site monitoring programs, which will be implemented during the operation phases of the project. The monitoring activities will also be designed to evaluate the project’s compliance against environmental guidelines and community awareness initiatives.

4.3 Structure and process management

All personnel in the Project Team are responsible for protecting the environment and community by ensuring that appropriate protection measures are implemented.

The following figure offers a general representation of the likely general management structure and assigned responsibilities. The consortium must assign these responsibilities to the concerned personnel and incorporate the roles within the OESMP.

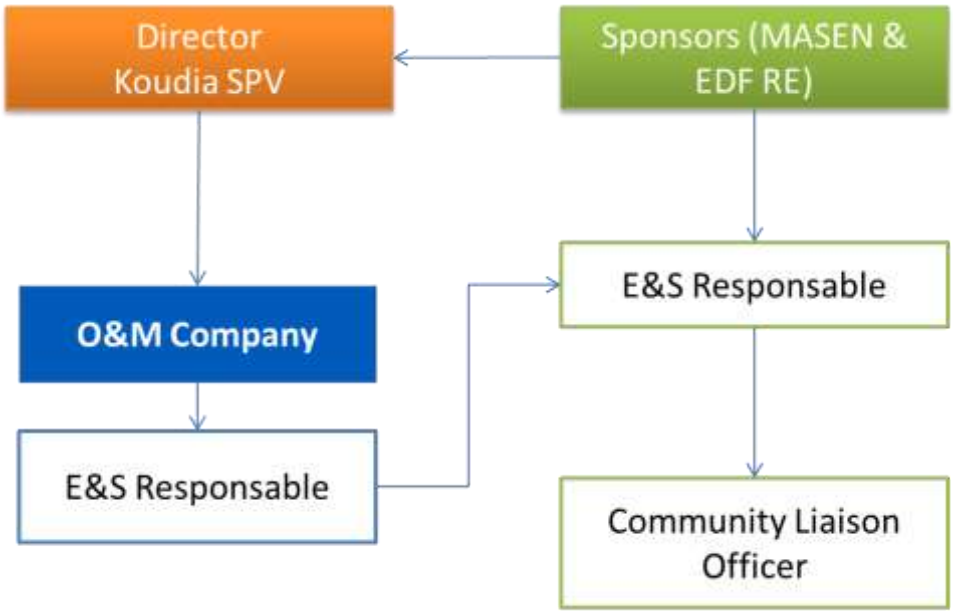

Figure 4: Projected organisation during the operation phase

5. ESMP in decommissioning phase

With regards to the decommissioning phase, it should be noted that the project will operate for 25 years. At the end of the 25 year period the responsibilities for the decommissioning of the plant will fall under the responsibility of Koudia SPV.

The decommissioning measures have only been discussed in general terms; and the proposed roles, responsibilities and monitoring activities that should be implemented by the decommissioning contractor during the decommissioning procedures have been taken from the construction phase mitigation measures and management plans.

The main important activities during decommissioning are described below. However, considering that decommissioning will occur beyond 25 years from operation of the plant, the management plans, regulatory requirements and BAT methodologies should be revised to ensure applicability with the industrial standard practice at the time of decommissioning.

5.1 Dismantling process identification

When wind turbines reach the end of their useful life, it can be difficult to find replacement parts; in addition, components can start to deteriorate quickly, resulting in excessively high maintenance costs.

Dismantling consists more and more of changing wind turbines by more powerful ones or by changing certain components. The complete abandonment of a wind farm is rarer. In fact, repowering makes it possible to conserve investments in infrastructure: land, roads, electricity connection.

A preliminary study should be carried out to identify dismantling solutions.

5.2 Deconstruction and cleaning-up

The aim is to prepare the deconstruction perimeter in order to work in safety conditions by preventing the fire risk, avoid migration of pollution, and make space for the further deconstruction operations.

◗ Deconstruction

The first steps are :

- identification of the facilities to be removed and those to be left on the spot;
- Identification of the depth below which the equipment will be left in place (cables between wind turbines, etc.);
- dismounting the overhead electric transmission lines and towers and the delivery substation;

Regardless of the method chosen, it may include the following activities:

- Improvements to secondary roads and feeder roads to suit heavy equipment (eg, cranes, trucks, and levelers).
- Establishment of crane platforms at each wind turbine.
- Sorting materials for proper disposal: Fiberglass blades, oil, grease and other liquids are sent to an appropriate disposal site; metal and electrical components are recycled or sold as scrap.

Once the deconstruction of the above-ground equipment is complete, all that remains is to remove the underground components, if possible, and rehabilitate the land. Usually the foundation and cables are removed to an adequate depth.

◗ Fluids depollution

In the depollution studies, it will be indicated all the necessary means to be set up:

- To separate the polluted materials and waste before dismantling
- To avoid any spread of the pollution, especially into the soil

5.3 Waste management

◗ Responsibility

All the waste management operations shall be performed in compliance with regulations in force and the best available practices (BAT & BREF) especially by being careful about the safety and environmental impacts of its activities.

The waste management activities includes namely:

- Waste sorting,
- Waste packing,
- Waste weighting,
- Waste labelling,
- Waste evacuation,
- Waste disposal.

◗ Waste prevention

Waste prevention is one of the main priorities during a deconstruction project. Therefore all appropriate measures will be taken to reduce at most the quantity, and the dangerousness of the produced waste during the works.

- **Selective sorting of waste**

It will be ensured that the waste is sorted, and that this is done in accordance with the regulatory requirements and the requirements of the company on the expected level of sorting.

- **General rules for waste storage**

All the necessary means for waste storage on site will be planned and provided.

5.4 General HSSE requirements

Appropriate safety barriers will be provided with hazard warning signs attached around all exposed openings and excavations when the work is in progress. Permanent or temporary covers to openings shall be replaced at all other times.

All necessary adequate actions will be taken (including training, risk assessment, method statement, safety audit & safety tours, etc) whenever dangerous situations may occur.

5.5 Structure and process management

All personnel in the Project Team are responsible for protecting the environment and community by ensuring that appropriate protection measures are implemented.

The following figure offers a general representation of the likely general management structure and assigned responsibilities. The consortium must assign these responsibilities to the concerned personnel and incorporate the roles within the DESMP.

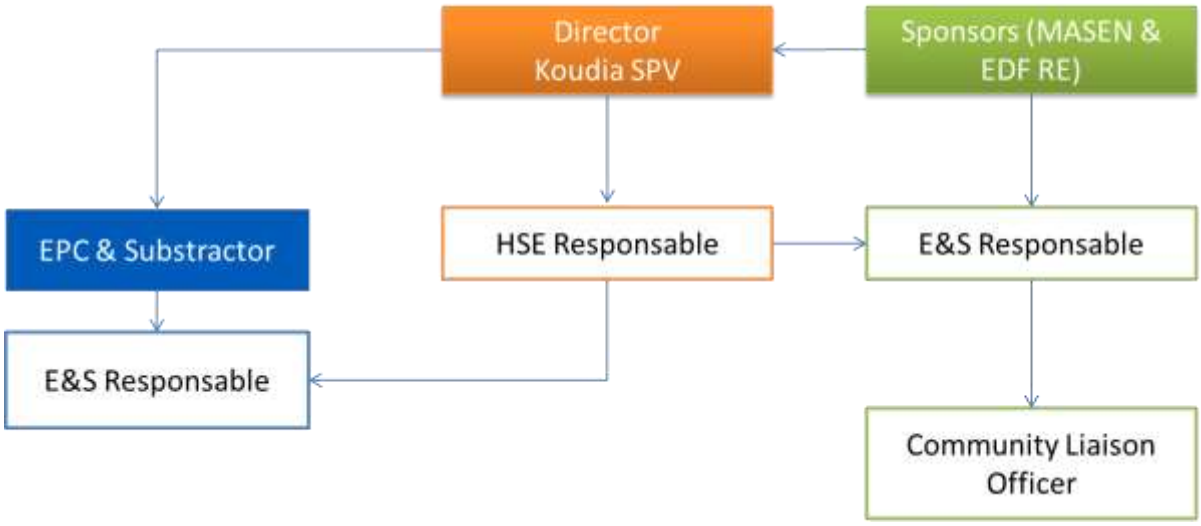

Figure 5: Projected organisation during the Dismantling phase

6. Synthesis of mitigation measures and / or compensation measures

When it is not specified, mitigation and/or compensation measures are applicable to windfarm,powerlines and substation. If applicable, specifics measures are identified for windfarm or powerlines and substation in a dedicated table.

6.1 Construction phase

The construction phase includes dismantling existing wind turbines and new turbines construction. The synthesis of project impacts and mitigation measures for dismantling existing turbines are detailed in the tables below.

6.1.1 Dismantling existing activities

6.1.1.1 Air quality

Table 2 : Synthesis of project impacts on air quality and mitigation and / or compensation measures

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
Dust production due to earthworks and site activities and vehicle dust	Large sand piles should be avoided where possible. Otherwise wind barriers, or covers for small piles should be utilized, particularly during periods where the wind speed exceeds 15km/h.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Powdery materials will be covered as much as possible.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Stockpiles of dusty materials will only be located on site and away from the site boundaries	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Where sand and other dusty materials are transported from the site, trucks will not be overloaded and will be appropriately covered to avoid any loss while moving forward.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Water spraying on roads from a tancker truck to minimise the dust generated from the vehicles and trucks	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
	Dusty materials (e.g. cements) will be stored and transported in sealed containers.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	No burning of waste or other materials will be allowed on site during the construction phase.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Undertake daily visual assessment of dust levels and take actions (dust suppression) to reduce emissions, when they are identified as excessive.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Transport of uncovered powdered loads (materials and waste) is strictly forbidden.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
Gaseous and particulate emissions from vehicles	On-site / off-site speed limits (30 km/h) are included in the Road safety and traffic section. In addition to road safety, these limits will help reduce exhaust emissions resulting from traffic movements.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Efficiently manage removal materials from the site, to reduce the number of trips.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Minimise exhaust fumes and particles emitted from trucks and vehicles by ensuring the use of vehicles in good condition. Vehicles entering the site for the first time will be inspected for their integrity and where necessary will not be permitted to enter the site. Vehicles will be turned off while waiting (more than 15 minutes and during loading and unloading) on site to minimise gas emissions	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The motors of vehicles and equipment will be turned off when they are not in use (e.g. during loading or unloading)	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
VOCs and other fugitive emissions	Hazardous materials stored and used on site with potential gas emissions (e.g. Volatile organic compounds) will be located in well-ventilated, secured and low-risk areas	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Fires and material burning is prohibited on the project's site.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
General	Personal Protection Equipment will be provided to all employees. Special attention will be given during site preparation and other activities that may result in significant dust levels. Informing the local population as well as the various other sensitive receptors of the work schedule.	EPC and Subcontractors	Dismantling activities	Included in the EPC costs	Minor

6.1.1.2 Noise and vibrations

Table 3 :Synthesis of project impacts on Noise and vibrations and mitigation and / or compensation measures

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
Construction noise and vibration	Carrying out work between 7:00 a.m. and 6:00 p.m. limiting and controlling night work. Informing the neighborhood about the work schedule.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Diesel compression equipment or generators will be equipped with effective silencers when necessary	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Electrically powered equipment will be preferred, where possible, to mechanically powered alternatives. The motorised mechanical equipment will be equipped with appropriate silencerswhen necessary	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	On site's facility units operating intermittently will be shut down during the intervening periods between uses	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Construction employees will, at all times, carry out all works in such a manner as to keep any disturbance from noise and vibration to a minimum within the industrial best practices limits Operators of vibrating hand held machinery will be provided with appropriate PPE (Protective gloves) and be given suitable breaks form using such equipment to reduce the impacts of vibration	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
	When the noise level exceeds 85dB (A) weighted average over 8 hours per day without hearing protection against noise, devices must be provided for site personnel (PPE Noise earphones ...). No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB (C)	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	All vehicles will be properly maintained to minimize noise emissions, Engines should not be running when vehicles are stopped.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
Construction noise and vibration	Informing the local population as well as the various other sensitive receptors of the work schedule (including the dismantling of the existing park)				
Vehicle noise	Vehicles will be equipped with effective mufflers where necessary	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Heavy vehicle traffic during the night will be reduced	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Fuel and material deliveries and waste disposal should be undertaken during the day whenever possible	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	All vehicles will be adequately maintained in order to minimise sound emissions	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	On-site/off-site speed limits are included in the section on traffic and road safety. In addition to road safety, these limits will help reduce noise levels resulting from traffic movements particularly in the	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
	project area. These limits will be included in the traffic management plan to be prepared by the EPC prior to construction.				

6.1.1.3 Soil and groundwater

Table 4: Synthesis of project impacts on soil and ground water and mitigation and / or compensation measures

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Soil Erosion	From the design phase, a geotechnical study must be carried out before the start of the works in order to adapt the foundations of the wind turbines as well as possible.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The data from the wind speed measurements will also be used to dimension the foundations according to the type of machines and the associated load drops	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Existing roads will be used as a priority; their renovation and widening according to the needs of the project are preferred to the creation of new roads.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	A detailed earth movement plan shall be prepared so as to ensure that all impacts are identified, assessed and addressed accordingly. This plan shall comply with the requirements applicable in the field at the time of preparation and with the applicable legal requirements.	EPC and subcontractors	Before starting construction phase	Included in the EPC costs	Minor
	Earth movements will be reduced as much as possible. In cases where these are unavoidable, the different soil layers will be stored separately. When the soil layers are restored to their initial state, the order of the layers before stripping must be respected, in particular topsoil will be brought back to the surface to increase the possibilities of regeneration of habitats and recolonisation of vegetation once the worksite is completed.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Revegetation with seeding is recommended for the rehabilitation of the decommissioned wind turbine platforms. Waiting for natural vegetation is to be avoided as it may lead to erosion phenomena on bare land.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	The removal of the excavated material related to the levelling of the platforms must be done in places approved by the project owner. As far as possible (i.e. if their characteristics allow them to be reused on site) these materials will be crushed and reused on site, particularly for foundation backfill or runway development work. Any rubble disposal sites will have to be developed in order to reduce environmental impacts. The rubble must be regularly compacted, the slopes of the embankments adapted to rainwater runoff and revegetated to mitigate erosion.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Excavation work will be interrupted when the soil is extremely wet or saturated.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	If particularly eroded areas appear, stone-made retaining walls will be built on the location of the maximum slope and/or geotextile and hydroseeded shrub and herbaceous attachments will be put in place.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The stability of the crane platforms must be ensured.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The extracted and non-reused materials will be evacuated as waste.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Special care will be taken to minimize tree cutting on other ridges.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Excavated material will be kept in the reserve for as short a period as possible and, once an area has been backfilled with soil material, that material will be compacted within a short period of time.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The height of embankments and slopes will be reduced.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Steep slopes will be avoided on lands susceptible to landslides.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Concrete gabions and barriers will be built for containment, wire mesh and nets, drains and gutters will be used in slopes for ground stability.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Work segment by segment, i.e. finish uprooting trees, and conduct all the widening, stabilising and drainage works on one segment before starting on the next segment.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Borrowing areas must be authorized in accordance with applicable law	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The company will have to identify areas where excavated material can be deposited without causing any harm to the environment; Borrowing areas will have to be authorized according to the local applicable laws.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The material borrowing sites will have to be identified by the EPC, validated by the Koudia SPV. These sites must have all the required authorizations including environmental authorizations.	EPC and subcontractors	Before starting construction	Included in the EPC costs	Minor
Reclamation work at the end of works	At the end of the work, the company will restore all the non usefull work sites (crane platform, materials storage platform, etc.). The areas will be covered with topsoil in order to promote revegetation and limit erosion.	EPC and subcontractors	End of construction phase	Included in the EPC costs	Minor
Soil and ground water pollution	Materials used to stabilize or create runways must be inert and (allow for) drainage, and similar to those existing on the site.	EPC and subcontractors	Before construction phase	Included in the EPC costs	Minor
	Metallic frames (including paint and guards) will be designed/selected to resist corrosion due to local environmental conditions. All outside structural steel will be hot-dipped galvanized in accordance with technical specifications.	EPC and subcontractors	Before construction phase	Included in the EPC costs	Minor
	At the beginning of the dismantling activities, a pre-development of the land will be carried out in order to materialize the traffic lanes or tracks.	EPC and subcontractors	Before construction phase	Included in the EPC costs	Minor
	Ensure good vehicle maintenance to limit any accidents. Vehicle maintenance areas will be equipped in such a way that there is no spill to the outside: protective measures, sealed areas with runoff water recovery system	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Maintenance and cleaning operations should be prohibited outside the machinery storage area	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Define the site's right-of-way with a boundary marker in order to reduce any impact on the environment.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Heavy and light vehicles will have to have a recent technical inspection.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Access to the site of dismantling activities will be forbidden to the public.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Chemicals products will not be released into the natural environment and will be reprocessed through appropriate channels in accordance with regulations.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Oils must be collected in sealed drums in sealed areas to reduce the risk of soil contamination	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The storage of potentially polluting products (fuel and engine oil) will be limited to a minimum on the site. Products will be stored in double-walled drums. If necessary, retention tanks with a regulatory volume will be used (at least equal to the volume of the storage tank). The discharge of these substances into the natural environment will be prohibited. They must be collected and evacuated in accordance with the regulations. In addition, the storage room or space for polluting products will be locked to prevent any intrusion or malicious act.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	As far as possible storage of potentially polluting products will be prohibited on karst areas especially on the southest zone of ridge A2.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Fuels, lubricants and used oils from dismantling activities will be stored in dedicated locations on impermeable surfaces to prevent leakage into the ground and will be contained inside a secondary containment (110% of the largest container). Additional mitigation measures are presented in the non-hazardous waste and hazardous materials section.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	The design and location of permanent/temporary storage areas will consider the potential ground contamination risks. Storm waterrunoff will not be able to enter areas where hazardous materials are stored, handled or transferred. If storm water runoff can enter potentially contaminated areas, there will be an oiler separator and then storage tank.. The tanks will be waterproof and potential leaks would be monitored.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Develop and implement an Emergency preparedness and Response Plan, to take immediate action in the affected area in the event of a spill or leakage of chemicals, fuels, paints, and any hazardous material	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	All chemicals will be handled in accordance with relevant instructions (MSDS).	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	To prevent tank overflow: (i) level gauges must be installed on tanks (ii) tanker pipe connections must be fully watertight; (iii) automatic shut-off valves must be installed; (iv) pipe connections must be equipped with overflow protection; (v) vent holes and safety valves must be fitted to prevent over-filling and over-pressure so that the excess overflows into a collecting receptacle	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Regularly check the content of tanks and inspect all visible parts of tanks and pipes in search of leaks.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Collectors and grease/hydrocarbon traps must be installed in supplies facilities, workshops, parking areas, fuel tanks and containment areas	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The company shall put in place – and be able to prove – the necessary means to limit sludge soiling outside the worksite (possible cleaning of wheels with water before leaving the site).	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	In the event of accidental dispersion (discharge or hose rupture), the site will have large watertight absorbent covers for hydrocarbons.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Training will have to be given to operators in the field of spill prevention and response thereto.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	The soiled soil will then be immediately collected by the available equipment and stored in the sealed area until it is treated in a suitable unit. All site personnel must be informed of the procedure to be followed in the event of a spill of polluting products or hydrocarbons on the soil/ground.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The production of waste will be limited as much as possible at the source, in particular by the use of recyclable elements.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The EPC and subcontractors are responsible for the collection, sorting and routing to the channels of recovery and/or treatment of the waste it generates, including packaging waste.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Site sanitation facilities must not generate any discharge into the natural environment. The toilets will be chemical toilet type and the sanitary water will be collected in a watertight tank for appropriate treatment through ad-hoc units. An approved operator will remove used wastewater.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

6.1.1.4 Storm water management

Table 5: Synthesis of project impacts on storm water management and mitigation and / or compensation measures for the wind farm

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Modification of the storm water drainage regime	Maintain the channels and ditches in good working order all along the Dismantling phase.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
Surface water pollution	Measures against water pollution will be the same than those for soil protection. In addition, other measures need to be adopted: • On the one hand, de-oiling basins will have to be installed at the level of the platform for washing and for the maintenance of the machines; • On the other hand, runoff and rainwater will run off the delivery stations and the foundations and will infiltrate directly into the ground.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	In addition, a drainage system will be put in place. This drainage system consisting of ditches will complement the existing system already in place. These ditches will be located on both sides of the roads in order to channel the runoff water. Once the water is channeled, it could be channeled to the lower part of the slope through catch basins and collectors transverse to the lane. The spacing between catch basins will be smaller in the sections where there are more obstacles to water flow. To avoid erosive processes and uncontrolled settling in the downstream part of the collectors, head breakers will be projected				
Flood	During the course of the work, the contractor must respect the natural drainage of the environment and take all appropriate measures to allow the normal flow of surface water. Strict prohibition of spoil deposits in runoff areas; spoil must be either recycled or accumulated on site in suitable environments subject to validation by the Foundation. Re-establish natural flows with properly sized structures	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Limit the risk of scouring and soil erosion. Provide stormwater retention ponds to accommodate surface water runoff and limit the size of stormwater facilities.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor

6.1.1.5 Biodiversity

Table 6: Synthesis of project impacts on biodiversity and mitigation and / or compensation measures

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Général	Préparation d'un plan de gestion de la biodiversité	EPC et sous-traitants	Avant la phase de démantèlement.	Before the dismantling phase.	Minor

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Habitat destruction and disturbance of fauna (including chiropterans)	The contractor will take care not to impinge on nearby, adjacent land to construction site. Site facilities and construction infrastructure will be located within the project site and will be removed as soon as possible after the start of operation immediately following the withdrawal of any delivery-related reservations).	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	During the construction phase, vehicles will travel on designated roads to avoid encroaching on land without good reason, which will protect natural resources and reduce dust emissions.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Avoid mobilization of LD9 south of A2 Ridge for the work area to the extent possible. If necessary, reduce the right-of-way to avoid destruction of identified critical habitat. Any extension of the existing platforms at the level of the A2 ridge must be followed by an action of regeneration of the environment, in particular on the new slopes created, using the 2 dominant heritage species, Stachys fontqueri and Ulex parviflorus subsp africanus. These actions can be carried out by direct sowing of locally collected seeds, with the setting of a fence. These actions can be supervised by researchers from the Faculty of Sciences of Tetouan.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	In case of destruction of natural/critical habitat an adequate compensation will have to be put in place.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Provide for revegetation at existing dismantled wind turbine pads. The revegetation must be done with the species present in the vicinity of the platform concerned.	EPC and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Restoration of species habitats (plantations, refuge areas for reptiles, etc.) on the areas used during the work phase;	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Give priority to natural recolonisation and decompact the soil at the end of the work to encourage the germination of the seeds contained in the soil.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Carry out a campaign to raise workers' awareness on the ecological and utility values of wild flora and fauna.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	The personnel will be sensitized, so that, during the works, the individuals of fauna discovered and thus threatened are collected and transported to several hundreds of meters of the building site, outside the right-of-way, and in natural environment	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Sensitize (and follow-up) workers on the protection and respect of local wildlife and the monitoring of the premises against poaching.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	The machinery used must be in good condition and comply with the statutory noise levels; it shall cease to operate at night.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Storage and work areas must be clearly demarcated in order to reduce the footprint on the natural environment as much as possible;	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Considering the implementation of measures to ensure that wildlife leaves the site before it is destroyed, by planning the work according to the seasons (do not clear land during the breeding season - April to July), and by allowing wildlife to escape	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Conservation of top soil layers during earthmoving activities in order to preserve them and potentially reuse them to vegetate the area	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Limiting the use of external backfill in order to eliminate the risk of introducing exogenous invasive species.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Clean machinery and equipment to limit the spread of exotic and invasive plant species.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Manage construction site activities as described in the relevant sections of the IFC's General EHS Guidelines	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Ensure reclamation of work areas upon completion of the work, including flattening and revegetation activities. Revegetation must be done with the species present in the vicinity of the work areas.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
Risk of pollution of natural	Preventive maintenance of equipment and machinery (tightness of tanks and fuel, lubricant and hydraulic fluid circuits);	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
environments and flora and fauna	Absence of oil changes on the site; Reduced storage of hydrocarbons; On-board refueling of equipment using a tanker equipped with nozzles and non-return valves; Use of absorbent tarpaulin under the tank during refueling Etc. In the event of an accidental leak of the polluting products identified above, the operator must have the means to quickly contain the pollution generated through the use of absorbents (sand) and/or anti-pollution kits fitted to all equipment. The measures listed here are not exhaustive and it will be up to the operator to determine the exact details				
Destruction of individuals/nests and disturbance of breeding birds	Carry out the work, as far as possible, outside the nesting and rearing season for the young; which essentially covers the months of April to July in this region of Morocco.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Watering the areas set aside for construction work and the tracks on which the machinery travels in order to reduce dust build-up, which can alter ecological habitats and affect their role as feeding and nesting sites.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
Fauna mortality	Establish procedures for dealing with all species present on the construction site, including reporting, identification and potential relocation procedures.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	A speed limit of 30km/h shall be imposed on the site to avoid direct mortality of fauna. Speed limits are to be respected on external access routes.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
Poaching / hunting / trade	Hunting, falconry and trade will be strictly prohibited and subject to sanctions. Information notes will be posted.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
Human activities	Wherever possible, night work will be avoided in order to avoid excessive human disturbance of fauna. Measures against light pollution, as described in the chapter on landscape, and noise, as described in the relevant chapter, will minimise human disturbance.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
Fire risks	Site personnel should be trained in fire risk: the activities that can cause fires, how to avoid fires and how to behave in the event of a fire. It will therefore be	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	necessary to introduce a total ban on fire on the site, and to program high-risk activities (bush-clearing activities, etc.) outside the dry seasons.				

6.1.1.6 Management of waste, hazardous and non-hazardous materials

Table 7: Synthesis of project impacts on Management of waste, hazardous and non-hazardous materials and mitigation and / or compensation measures

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Dismantling existing turbines	Prepare a dismantling management plan including waste management for the dismantling equipment for the mast, nacelle and the rotor. This waste management plan will have to comply with Moroccan standards and to be in line with the IFC EHS Guidelines. It will be approved by MASEN-EDF Renewables at least 30 days prior to the contract signing.	EPC and sub-contractors	Prior to the start of dismantling activities	Included in the EPC costs	Minor
Volumes / Quantities of solid waste	The physical and chemical composition of the waste and the identification of hazard characteristics will be established for the mast, the nacelle and the rotor.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	The foundations of the platforms will be leveled just below ground level, the metal parts will be leveled and the area will be covered with topsoil.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	The recycling of scrap metal will be favoured according to existing recycling channels. Recycling and/or revalorisation of the material of the existing turbines will be favoured. The process have to be identified and controlled.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Prepare a site-specific waste management plan, including hazardous and non-hazardous waste. The plan will include staff training. This waste management plan will meet Moroccan standards and be approved by MASEN-EDR renewbales.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	The physical and chemical composition of the waste and the identification of hazard characteristics will be established	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Cleaning	Separate waste streams to facilitate recycling. All storage areas should be well organized and waste properly managed: hazardous and non-hazardous waste should be segregated. Waste in each category will be further separated by type (paper, plastic, metal, masonry) and whether or not the material is recyclable. A waste register will be kept on site and will contain, as a minimum, information on quantities, types of management solutions (according to the waste management hierarchy described in the "Baseline Conditions" section), operators, disposal/final destination, etc.).	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Install adequate storage facilities for non-hazardous waste in designated areas to prevent it from being dispersed throughout the site.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	At the beginning of employee training, include modules so as to increase their knowledge on waste management protocols, including proper waste handling and storage, response and contingency plans.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
Waste Storage	Food waste will be stored in an airtight metal or plastic bin or container with a self-closing lid to prevent access by birds/vermine/parasites.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Light waste such as paper, cardboard, plastics will be stored in a watertight container with a tarpaulin or a secure lattice sufficient to prevent their dispersal.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Heavy waste may be contained in an open bin, provided that it is segregated effectively enough to remove any light material that may be carried away.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Different bins/garbage/containers for each distinct category of garbage (food or household waste) should be placed in areas where construction workers and staff consume food on a daily basis. These will be regularly collected and taken to the main waste storage area. Separate portable waste bins will also be placed in areas where work will be undertaken.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	No underground waste containers will be set up.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	Waste containers will be clearly identified with appropriate labels accurately describing their contents and containing detailed safety instructions. The labels will be water-resistant and securely attached. Wherever possible, chemicals will be kept in their original containers.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Waste generated during construction will only be transported off-site for disposal by an duly approved supplier. This service provider shall comply with appropriate protocols to ensure that all waste handling and disposal from the site is carried out in accordance with accepted environmental regulations. A register of all waste streams shall be kept on site.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Regular training of site personnel on waste management and correct chemical handling procedures will be provided at regular intervals.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	The burial of waste (rotor, blade, nacelle, etc…) will not be allowed.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Incineration/combustion of waste will not be allowed on site.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
Hazardous Substances	Installation of adequate secondary containment for fuel tanks, and for the storage of various fluids (lubricating oils and hydraulic fluids).	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	During the decommissioning phase, assessment of the content of hazardous materials and petroleum-based products in building systems (e.g., PCB-containing electrical equipment, asbestos-containing construction materials) and process equipment; disposal of these materials and products prior to decommissioning activities; and management of their treatment and disposal in accordance with IFC and IBP recommendations and applicable waste disposal regulations.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Implementation of best practice procedures and regulations regarding proper handling, establishment of secure temporary storage areas, and disposal of waste by licensed companies.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Hazardous waste will be disposed of in an environmentally sound manner and by authorized hazardous waste operator(s).	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	Materials will be segregated according to whether they are combustible or not, and all flammable substances will be kept away from all sources of ignition.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	No underground hazardous material containers will be set up. Hazardous material storage will be located in a dedicated fenced area with a separate, covered rainwater drainage system to prevent rainwater from entering the area. This hazardous material storage area will be located taking into account potential risks (e.g. traffic accidents/crashes, falling objects, drainage system, etc.).	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Installation of retention bins for the storage of hazardous materials. Retention areas will have the capacity to hold 110% of the total volume of materials stored and will be protected from vehicle traffic and other risks. This area shall be located away from all sources of ignition. Retention bins for fuel storage tanks will be tested regularly with recycled water or treated wastewater (e.g. non-hazardous water already used for an activity that is not likely to be contaminated or treated wastewater). Storage areas shall be sealed at the base (if necessary, this requires covering a large area so as to avoid soil contamination e.g. refuelling areas shall include an impermeable base that protects the ground where vehicles are parked), shall be covered and equipped with spill kits.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Containers of hazardous materials shall be clearly identified with appropriate warning labels accurately describing their contents, detailed technical specifications and safety instructions. The labels shall be water repellent and securely attached. Wherever possible, hazardous materials will be kept in their original containers.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Hazardous materials will only be transported to and from the site by a duly authorized operator. This service provider will follow appropriate protocols to ensure that all hazardous materials are transported and transferred in accordance with applicable environmental regulations. A register of all hazardous materials will be kept on site.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	Only qualified personnel are authorized to handle hazardous materials/substances. Training of workers on proper fuel and chemical transfer and handling techniques and spill response.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Put in place the necessary human resources to ensure periodic and daily monitoring and follow-up activities related to the management of hazardous and non-hazardous waste.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	All chemicals will be handled in accordance with relevant instructions (MSDS).	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
Waste management facilities	Only duly licensed waste management facilities shall be used for the disposal of hazardous and non-hazardous waste, respectively.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
Recycling and Recovery	Evaluation of waste generation processes and identification of potentially recyclable materials by identifying wastes that can be reused in the construction process of the new wind farm.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Landfill is prohibited, all the components of the wind farm should be recycled	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Examination of external markets for recycling through other industrial treatment companies located near or in the region of the facility.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
Transportation of waste and hazardous materials	On- and off-site transportation of waste shall be conducted in a manner that prevents or minimizes spills, discharges and exposure of employees and the public.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	All waste containers designated for off-site transportation must be securely labelled with the contents and inherent hazards, properly loaded onto transport vehicles prior to departure from the site, and accompanied by shipping documents (e.g., waybill) that describe the loading and associated hazards.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

6.1.1.7 Waste water management

Table 8: Synthesis of project impacts on wastewater Management and mitigation and / or compensation measures

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
General	Develop a waste water management plan.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
sanitary waste water	Chemical toilets will be available at various locations on the site in sufficient numbers to accommodate the expected number of employees (at least one for every 20 workers) and will be emptied regularly whenever they are filled.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	These chemical toilets should be checked regularly for any leaks.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Temporary biological treatment systems can be set up for the treatment of sanitary water (showers, canteens, etc.).	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	No domestic waste water will be discharged outside the toilets to avoid the discharge of waste water into the soil, in the wadis, ground water and the rainwater drainage system.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Waste water from chemical toilets will be collected by duly authorised operators. All chemical toilets will generally be collected and emptied before their contents have reached 80% of their capacity. The required permits and contracts must be obtained by the developer before construction begins.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Chemical toilets must be completely emptied prior to demobilisation to avoid contamination of the site area. The demobilisation procedure will ensure that tanks are not destroyed or damaged during the removal process.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
liquid effluents from cleaning	Cleaning, refuelling, cleaning of vehicles and machinery and maintenance operations will be carried out on watertight platforms with water recovery, passing through an oil separator before being sent to a storage tank or into the natural environment. The platform can be arranged as follows:	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	• Waterproof floor (by means of a concrete floor covering, a layer of clay or other means); • Effluent evacuation and collection system; • Adequate tank or sump for the storage of the generated effluents.				
	Storage areas for hazardous materials: Storage areas for hazardous and/or contaminating materials must also be properly conditioned using: • Adequate impermeable flooring (by means of a concrete floor covering, a layer of clay or other means); • Cover to avoid toxic and/or dangerous contact with rain and/or other meteorological agents; • Spill containment system possible.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
liquid effluents from waste storage areas.	Temporary waste storage areas : Waste storage areas must also be properly conditioned by means of : • Adequate impermeable flooring (by means of a concrete floor covering, a layer of clay or other means); • A cover to avoid toxic and/or dangerous contact with rain and/or other meteorological agents; • A containment system of the possible spills.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Temporary waste storage areas must be duly conditioned by : • Waste containers adapted to each specific type of residue generated. • Containers must always be closed to prevent contact with rainwater and must be in good working order, free of dents and leaks.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	The effluents generated must be taken to an authorised manager for appropriate treatment.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
Effluent from construction	Concrete mixer washing water shall in no event be discharged into the oueds and solid waste must be disposed of with construction waste	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

6.1.1.8 Traffic and transportation

Table 9: Synthesis of project impacts on traffic and transportation and mitigation and / or compensation measures

Impact/Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Congestion on the roads serving the project by exceptional convoys	All vehicles of exceptional nature due to their size or mass must have exceptional transport authorisations in accordance with the provisions of articles 98 and 99 of decree n° 2.10.420 of 20 Choual 1431 (September 29, 2010) fixing the methods of application of the provisions of law n° 52.05 relating to road traffic rules.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
Increase in traffic on roads serving the project	Develop a transport and traffic management plan for dismantling activities.	EPC and sub-contractors	Before construction starting	Included in the EPC costs	Minor
	Ensure that the bearing capacity of the tracks is adapted to the volume of traffic (number and load). If necessary carry out consildation works especially for bridge and pipes before starting construction.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Determine the designated access roads for the removal of equipment, road capacity, entry/exit points of the site, etc.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Determine requirements for regular vehicle maintenance (currently being implemented) and the use of manufacturer-approved parts.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Use dust suppression techniques, such as spraying water or non-toxic chemicals to minimize dust from vehicle traffic.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
Accident risks and road safety	Working with local communities and relevant authorities to improve road signs, visibility and overall pavement safety, especially near schools and other places where children may be present.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Adoption of traffic regulation measures, including the provision of traffic signs and the employment of persons responsible for signalling the presence of dangerous situations.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Ensuring the planning and separation of areas for vehicular traffic, machinery use and pedestrian crossings, and the regulation of one-way traffic,	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

Impact/Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Limit the speed of traffic on site and employ traffic control personnel wearing vests or high visibility clothing.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Use inspected and well maintained lifting devices appropriate for the to-be-lifted load.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

6.1.1.9 Archeology and cultural heritage

An archeological survey (**APPENDIX 1 – Archaelogical survey**) has been conducted in the Project location where specific measures to preserve any findings have been identified.

Table 10: Synthesis of project impacts on archeology and cultural heritage and mitigation and / or compensation measures

Impact/Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Artefact discovery and preservation	Prepare an archeology and cultural heritage management plan (Chance find procedure)	EPC and sub-contractors	Before starting construction	Included in the EPC costs	Minor
	Carry out a follow-up of the excavation work by an archaeologist in order to identify potential vestiges	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Attention should be given in order to avoid damaging the vestiges of the contemporary era[12].	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	The discovery of remains will be signalled to the competent authorities with the implementation of the appropriate procedure: works suspension on the identified area and within a protection perimeter, investigations implemented by the Ministry of Culture.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor
	Training and awareness programs will be provided to ensure that construction staff and workers are aware of the procedures relating to	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

[12] Please refer to APPENDIX 1 – Archaelogical survey

Impact/Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	the Archaeological Watching Brief if any artefacts or anthropogenic finds are uncovered				
	In the unlikely event of any artefacts being found/uncovered, the construction works would be ceased immediately and the Minister of Culture, via the"Institut National des Sciences de L'Archéologie et du Patrimoine (INSAP)" will be contacted by the EPC Site Manager. The INSAP will be in charge of any archaeological investigations.	EPC and sub-contractors	Dismantling activities	Included in the EPC costs	Minor

6.1.1.10 Landscape and visual impact

Table 11: Landscape and visual aspects - Mitigation measures in the dismantling phase

Impact / Source	Reduction measures	Responsibility	Schedule	Cost	Residual impact
Modification of landscape features having an impact on the field of vision (release of dust, installation of fences, etc.)	• Ensure good management of backfill / cuttings • Mark the access roads so as not to encroach on a larger surface where the impacts have not been assessed • Prepare a restoration plan to restore pre-existing conditions, where possible, and minimize visual impact. • For the release of dust see the measures proposed for air quality • Install platforms and power lines above existing vegetation to avoid clearing land	EPC and subcontractor	Dismantling activities	Included in the EPC costs	Minor
Light pollution	All floodlights needed during night construction activities will be directed at the site, with a maximum position angle of 30 ° to the vertical, therefore this will reduce leakage and potential light impact during the night.	EPC and subcontractor	Dismantling activities	Included in the EPC costs	Minor

6.1.1.11 Socio-economics and community health and security

Table 12: Synthesis of project impacts on socio-économics and community health and security and mitigation and / or compensation measures

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Employment	The project will aim to employ local workers where possible and appropriate to the phase of the project, when they are both available and competent to perform the tasks to be performed.All non-specialized employment opportunities will be offered to local residents prior to employment of employees from other regions where possible. Employment of women and vulnerable groups will be specifically targeted where possible	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	In order to ensure transparency in the recruitment mechanism, all job offers/requests will go through ANAPEC (Tangier or M'diq-Fnideq) Information will be communicated to the different partners to inform them of this recruitment mechanism.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	The EPC must provide workers with information, supported by clear easily understood documents, about their rights under national labour and employment law, including their rights regarding working, hours, salaries, overtime, remuneration and social allowances, at the beginning of the working relation and whenever significant changes are made	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	The EPC shall base the working relations on equal opportunities and treatment, and shall not discriminate against any social groups (including women)	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
Staff conflict	The initial training of foreign employees will include information on the cultural background of the closest inhabitants.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
Interference with existing economic activities and infrastructure	Limit the speed of the construction site machinery on the RP4703 (30 km/h) and on the tracks, especially on Souk days.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	Limit the site area and avoid depositing materials outside this limit in order to preserve the passage of livestock as much as possible.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	The telecommunication infrastructure nearby the site construction won't be damaged by any construction activity.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Health and safety of the local community	Ensure that the site of dismantling activities won't be accessible to prevent any exposure or accident to the various risks on the site (falling materials, inhalation of chemicals, burns, etc.). Put in place clear signage indicating the ban to the public.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	Persons not engaged in the work should not be allowed to enter the work site unless they are accompanied or authorized by a competent person and are provided with appropriate protective equipment.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	Implement a traffic safety plan to avoid road accidents.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	In the event of an emergency, where the local population is at risk, means of communication and notification should be put in place to warn the local population.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	Reducing the off-site impacts of spills through measures designed to: contain explosions and fires; alert the public; provide for the evacuation of surrounding areas; establish safety zones around the site; and provide emergency medical services to the public.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	The local communities must be informed about the risks related to the work site. The various works phases and corresponding constraints must be explained to them.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	Inform the local population of the existence of a grievance management mechanism (dismantling phase) where PAPs can express their grievances related to the nuisances generated by the work Inform the population affected by the project of the existence of a grievance management mechanism and explain to them the different ways in which grievances can be lodged and the timescale for processing them. Provide support for vulnerable people (illiterate, elderly, disabled, etc.) who wish to express their grievances	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
Health and safety of the local	The site/construction premises shall be designed to prevent fire outbreaks through the implementation of applicable construction fire codes; Implement essential fire prevention measures, such as:	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
community/Fire risks	Equip facilities with fire detectors, alarm systems, and firefighting equipment. Equipment must be maintained in good working order and be readily accessible. It must be appropriate to the size and use of the premises, the equipment installed, the physical and chemical properties of the substances present and the maximum number of people present. Provision of easily accessible and simple to use manual fire-fighting equipment				
	Portable hand-operated fire extinguishers will be installed on each truck and machine and the employees trained to use them	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	Inform the local population of the existence of a grievance management mechanism (dismantling phase) where PAPs can express their grievances related to the nuisance caused by the works	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
Health and safety of the local community/ Violence and sexual harassment	Sensitivity of workers to the cultural context of the region and how they should interact with local communities. Raise workers' awareness of the SGBV aspects.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
Spread of diseases	Disease prevention (including STDs and COVID 19 if applicable) will be included in the training programs through toolkit conferences or separate training sessions.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	Cooperate with the local rescue and care services to make sure first aid services are available if there is an accident	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
Security employees	Security personnel will undergo a specific training program that will include, as a minimum, information on how to practice GIIP (United Nations Voluntary Principles on Security and Human Rights) practices. Develop and implement a security policy and Code of Conduct for security personnel.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
	Informal or clandestine settlements will be monitored by security personnel on site and reported to the relevant authorities.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Proliferation of informal settlements and Encroachment	Local public security forces will be required to deal with illegal immigrants who settle according to national requirements.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor
Security forces and human rights	The security provider and its staff will adhere to international best practices regarding the use of security forces: - Train/educate staff on the United Nations Voluntary Principles on Security and Human Rights, where possible. - Link security to community relations; - Provide security with respect for human rights; - The use of force should be defensive and preventive only; - Take into account women's unique experiences and perspectives; - Coordinate community relations and establish grievance mechanisms. The security provider should also encourage public security personnel to behave in a manner consistent with the principles outlined for private security personnel in Performance Standard 4. Construction companies and their subcontractors will comply with the IFC sustainability framework and security issues, primarily covered in Performance Standard 4: Community Health, Safety and Security.	EPC and Sub-Contractor	Dismantling activities	Included in the EPC costs	Minor

6.1.1.12 Occupational Health and Safety

Table 13: Synthesis of project impacts on occupational health and safety and mitigation and / or compensation measures

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
General	Prepare an occupational health and safety management plan included an emergency rescue plan compliant with Moroccan regulations, ILO conventions and the EHS IFC general guidelines and wind energy guidelines.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Physical (risk of falling, handling, ...), chemical and electrocution risks	Supply and control of the wearing of personal protective equipment, such as helmets, safety shoes, protective gloves, safety harnesses, etc.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	- Security personnel will undergo a specific training program that will include, at a minimum, information on how to practice the GIIP (United Nations Voluntary Principles on Security and Human Rights); - Develop and implement a security policy and code of conduct for security personnel	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Set up an equipped Nursery; First aid personnel should be clearly designated, trained and competent.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Set up an ambulance equipped with medical personnel along the construction period.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Appropriate precautions, such as the installation of barriers or lookouts, should be taken to protect workers from falling materials, tools or equipment during lifting operations; Guards and skirting boards in accordance with national legislation should be installed to prevent workers from falling from a certain height.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Avoid carrying out installation work in bad weather conditions, especially when there is a risk of lightning.stron winds.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Where the noise level exceeds 85dB (A) as a weighted average over 8 hours per day without hearing protection against noise, devices must be provided for site personnel. No unprotected ear should be exposed to a peak (instantaneous) sound pressure level of more than 140 dB (C).	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	Put in place a fall protection system that must be adapted to the structure of the mast and the movements required, including ascent, descent and movement from one point to another. Use seat belts made of nylon lined at least millimetres (5/8 inch) or other material of equivalent strength. Rope seat belts should be replaced before showing signs of ageing or fibre wear. Provide for a second (spare) safety strap to be worn by workers who handle power tools at height.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Working conditions	• Adopt a human resources policy that describes its approach to managing workers in accordance with the requirements of Performance Standard 2; • Document and communicate all terms and conditions of work and employment to all workers; • Comply with all collective bargaining agreements with a workers' organization and provide reasonable working conditions and terms of employment in accordance with national legislation; • Recognize the right of workers to form or join workers' organizations, regardless of the recognition of this right by national law; • To base employment decisions on the principle of equal opportunity and fair treatment; • To ensure fair treatment, non-discrimination and equal opportunity; • Ensuring a good relationship between workers and management; • Compliance with national laws on employment and labor, especially in the development of employment contracts; • Protection of workers, especially those belonging to vulnerable categories; • Promote safety and health; • Not using forced or child labor; • Establish a grievance handling mechanism for workers; • The accommodation of workers will be in hygienic and sanitary conditions; • Undertake inspection, audit and review activities to ensure that the contractor's health, safety, security and welfare and environmental objectives are met.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
Spread of diseases and lack of hygiene	• Disease prevention (including STDs and COVID 19 if appropriate) will be part of training programs and appropriate personal hygiene measures; • During summer work outdoors, it is essential to develop regular hydration habits.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor
	• Changing rooms and washrooms should facilitate personal hygiene practices, be easy to maintain, be designed to explicitly isolate specific areas and be adapted to the number of employees.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	• Separate toilet facilities for men and women; • Temporary or permanent living quarters within the structures forming part of the permanent works isn't allowed. • Workers' accommodation must meet/contain at least the following spaces and equipment: ○ water supply; ○ adequate sewage and waste disposal services; ○ appropriate protection against heat, cold, humidity, noise, fire and disease-carrying animals; ○ adequate sanitary and hygiene facilities; ○ ventilation, kitchen and storage facilities; ○ natural and artificial lighting; • Putting up hygiene awareness signs and posters on the site. • The accommodation facilities will be compliant with IFC/EBRD Worker Accommodation Guidelines.				
Workers' safety	• Obligation to fence off the building site, with the presence of a permanent security guard. • Persons not engaged in the works should not be allowed to enter the construction site unless they are accompanied or authorized by a competent person and are provided with appropriate protective equipment. • Train all employees to be aware of their own responsibilities with regard to relevant health and safety issues, and ensure that they participate in the prevention of accidents and cooperate in measures taken to prevent occupational diseases. • - Put in place an HSE manager to assist in the implementation and maintenance of the hygiene, health and safety of workers and the environment. • - Make all employees aware of the rules regarding drinking and driving, speed limits, wearing seatbelts, using the telephone, etc. • - Implementing a prevention policy that applies to four major inseparable areas: travel, vehicles, communications and skills. • - Ensure the maintenance and safety of the vehicles used and develop means for the protection and safety of workers and road users; • - Ensuring the monitoring of the speed of users on work sites	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Redundancy / downsizing	• Construction companies and their subcontractors will find the best way to plan for and manage significant job losses/reductions in accordance with the CWS. These firms should: • Analyze all alternatives to avoid or minimize layoffs ; • Develop and implement a plan to mitigate the negative impact of retrenchment if they anticipate a large number of layoffs; • Prepare tools and procedures to effect the retrenchment, including an appeal or grievance mechanism; • The plan will incorporate principles of non-discrimination and include input from workers, their organizations and, where appropriate, the government; • Companies can take a range of steps beyond severance payments and compliance with basic legal requirements to demonstrate their social responsibility in dismissals: ○ Training ○ Career and financial counseling ○ Promotion of local economic development ○ Opportunities ○ Outsourcing • Assistance in finding a new job.	EPCs and subcontractors	Dismantling activities	Included in the EPC costs	Minor

6.1.2 Wind farm construction

6.1.2.1 Air quality

Table 14: Synthesis of project impacts on air quality and mitigation and / or compensation measures (Windfarm and powerline construction)

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
Dust production due to earthworks	Large sand piles should be avoided where possible. Otherwise wind barriers, or covers for small piles should be utilized, particularly during periods where the wind speed exceeds 15km/h.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
and site activities and vehicle dust	Stockpiles of dusty materials will only be located on site and away from the site boundaries.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	Powdery materials will be covered as much as possible.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	Where sand and other dusty materials are transported to the site, trucks will not be overloaded and will be appropriately covered to avoid any loss while moving forward.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	Water spraying on roads from a tancker truck to minimise the dust generated from the vehicles and trucks	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	Dusty materials (e.g. cements) will be stored and transported in sealed containers.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	Powdery materials (e.g. cements) will be stored and transported in sealed containers.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	No burning of waste or other materials will be allowed on site during the construction phase.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	Undertake daily visual assessment of dust levels and take actions (dust suppression) to reduce emissions, when they are identified as excessive.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	Transport of uncovered powdered loads (materials and waste) is strictly forbidden.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
Gaseous and particulate emissions from vehicles	On-site / off-site speed limits (30 km/h) are included in the Road safety and traffic section. In addition to road safety, these limits will help reduce exhaust emissions resulting from traffic movements.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	Efficiently manage deliveries of equipment/installation to the site, to reduce the number of trips.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
	Minimise exhaust fumes and particles emitted from trucks and vehicles by ensuring the use of vehicles in good condition. Vehicles entering the site for the first time will be inspected for their integrity and where necessary will not be permitted to enter the site. Vehicles will be turned off while waiting (more than 15 minutes and during loading and unloading) on site to minimise gas emissions	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
VOCs and other fugitive emissions	Hazardous materials stored and used on site with potential gas emissions (e.g. Volatile organic compounds) will be located in well-ventilated, secured and low-risk areas	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
	Fires and material burning is prohibited on the project's site.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor
General	Personal Protection Equipment will be provided to all employees. Special attention will be given during site preparation and other activities likely to cause significant levels of dust. Special attention will be given during site preparation and other activities that may result in significant dust levels. Informing the local population as well as the various other sensitive receptors of the work schedule.	EPC and Subcontractors	Construction phase	Included in the EPC costs	Minor

6.1.2.2 Noise and vibrations

Table 15: Synthesis of project impacts on Noise and vibrations and mitigation and / or compensation measures (Windfarm and powerline construction

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
Construction noise and vibration	Diesel compression equipment or generators will be equipped with effective silencers when necessary	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Electrically powered equipment will be preferred, where possible, to mechanically powered alternatives. The motorised mechanical	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
	equipment will be equipped with appropriate silencerswhen necessary				
	On site's facility units operating intermittently will be shut down during the intervening periods between uses	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Construction employees will, at all times, carry out all works in such a manner as to keep any disturbance from noise and vibration to a minimum within the industrial best practices limits Operators of vibrating hand held machinery will be provided with appropriate PPE (Protective gloves) and be given suitable breaks form using such equipment to reduce the impacts of vibration	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	When the noise level exceeds 85dB (A) weighted average over 8 hours per day without hearing protection against noise, devices must be provided for site personnel (PPE Noise earphones ...). No unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB (C)	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	All vehicles will be properly maintained to minimize noise emissions, Engines should not be running when vehicles are stopped	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Informing the local population as well as the various other sensitive receptors of the work schedule (including the dismantling of the existing park)	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
Vehicle noise	Vehicles will be equipped with effective mufflers where necessary	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Heavy vehicle traffic during the night will be reduced	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Deliveries of fuel , and materials and equipments as well as removals of waste must be carried out during daylight hours when possible	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	All vehicles will be adequately maintained in order to minimise sound emissions	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact/Source	Mitigation measures	Responsibility	Schedule	Cost	Residual impact
	Onsite/offsite speed limits are included in the Traffic and road safety section of this ESIA. These limits will be included in the traffic management plan that will be prepared by the EPC before starting construction works	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

6.1.2.3 Soil and groundwater

Table 16: Synthesis of project impacts on soil and ground water and mitigation and / or compensation measures (Wind farm)

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Soil Erosion	From the design phase, a geotechnical study must be carried out prior to the start of the works in order to best adapt the foundations of the wind turbines and identify sensitive areas as slip zone and karst areas. Risk management measures in sensitive areas if appropriate.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	From the conception phase, a geotechnical study must be carried out before the beginning of the works in order to adapt the foundations of the wind turbines as well as possible.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The data from the wind speed measurements will also be used to dimension the foundations according to the type of machines and the associated load drops.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Wind speed measurement data will also be used to allow the sizing of the foundations according to the type of machines and the associated load drop.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Existing roads will be used in priority; their renovation and widening according to the needs of the project are preferred to the creation of new roads.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	A detailed earth movement plan shall be prepared so as to ensure that all impacts are identified, assessed and addressed accordingly. This plan shall comply with the requirements applicable in the field at the time of preparation and with the applicable legal requirements.	EPC and subcontractors	Before starting construction phase	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Earth movements will be reduced as much as possible. In cases where these are unavoidable, the different soil layers will be stored separately. When the soil layers are restored to their initial state, the order of the layers before stripping must be respected, in particular topsoil will be brought back to the surface to increase the possibilities of regeneration of habitats and recolonisation of vegetation once the worksite is completed.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	As far as possible (i.e. if their characteristics allow them to be reused on site) the excavated materials will be crushed and reused on site, particularly for foundation backfill or runway development work. Any rubble disposal sites will have to be developed in order to reduce environmental impacts. The rubble must be regularly compacted, the slopes of the embankments adapted to rainwater runoff and revegetated to mitigate erosion.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Excavation work will be interrupted when the soil is extremely wet or saturated.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Special care will be taken to limit as much as possible the trees cut off on other ridges.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Trails shall preferably be delineated parallel to the maximum slope of the ridges in order to avoid the transverse interception of the rainwater runoff that would not be drained by the terrain.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Keep the length and gradient of the slopes as low as possible to avoid erosive action.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	A drainage network along the edge of the tracks will be put in place as part of the recalibration of existing tracks and the creation of new tracks. It must include small riprap weirs to reduce the flow rate and must be stable to prevent the formation of gullying.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Re-vegetation with seeding is recommended for the rehabilitation of the dismantled wind turbine platforms on the A2 ridge, as waiting for natural vegetation may lead to erosion on bare earth.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	If particularly eroded areas appear, stone-made retaining walls will be built on the location of the maximum slope and/or geotextile and hydroseeded shrub and herbaceous attachments will be put in place.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	The stability of the crane platforms must be ensured.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The extracted and non-reused materials will be evacuated as waste.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Special care will be taken to minimize tree cutting on other ridges;	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Excavated material will be kept in the reserve for as short a period as possible and, once an area has been backfilled with soil material, that material will be compacted within a short period of time.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The height of embankments and slopes will be reduced.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Steep slopes will be avoided on lands susceptible to landslides.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Concrete gabions and barriers will be built for containment, wire mesh and nets, drains and gutters will be used in slopes for ground stability.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Work segment by segment, i.e. finish uprooting trees, and conduct all the widening, stabilising and drainage works on one segment before starting on the next segment.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Borrowing areas must be authorized in accordance with applicable law.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The company will have to identify areas where excavated material can be deposited without causing any harm to the environment; Borrowing areas will have to be authorized according to the local applicable laws.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	The material borrowing sites will have to be identified by the EPC, validated by the Koudia SPV. These sites must have all the required authorizations including environmental authorizations.	EPC and subcontractors	Before starting construction	Included in the EPC costs	Minor
	A detailed land movement plan will be prepared to ensure that all impacts are identified, assessed and addressed. This plan will comply with the requirements applicable in the field at the time of preparation and the requirements of applicable legislation.	EPC and subcontractors	Before starting construction	Included in the EPC costs	Minor
Reclamation work at the end of works	At the end of the work, the company will restore all the non usefull work sites (crane platform, materials storage platform, etc.). If necessary, the temporary access roads will be rehabilitated. The areas will be covered with topsoil in order to promote revegetation and limit erosion.	EPC and subcontractors	End of construction phase	Included in the EPC costs	Minor
Soil and ground water pollution	The materials used to stabilize or create the tracks should be inert and (allow for) draining, and similar to those existing on the site.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Metal structures (including painting and protections) will be designed/selected to resist corrosion due to local environment conditions. All outdoor structural steel shall be hot-dipped galvanized in accordance with Technical Specification.	EPC and subcontractors	Design phase	Included in the EPC costs	Minor
	At the beginning of the construction site, a pre-development of the land will be carried out in order to materialize the traffic lanes or tracks.	EPC and subcontractors	Before construction phase	Included in the EPC costs	Minor
	Ensure good vehicle maintenance to limit any accidents. Vehicle maintenance areas will be equipped in such a way that there is no spill to the outside: protective measures, sealed areas with runoff water recovery system	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Maintenance and cleaning operations should be prohibited outside the machinery storage area	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Define the site's right-of-way with a boundary marker in order to reduce any impact on the environment.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Heavy and light vehicles will have to have a recent technical inspection.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Access to the construction site and to the site in general will be forbidden to the public.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Chemicals products will not be released into the natural environment and will be reprocessed through appropriate channels in accordance with regulations.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The storage of potentially polluting products (fuels and motor/engine oil(s)) will be strictly limited on the site. The discharge of these substances into the natural environment will be prohibited. They must be collected and disposed of in accordance with local regulations. In addition, the room or space for storing polluting products shall be locked to prevent any intrusion or malicious act.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	As far as possible storage of potentially polluting products will be prohibited on karst areas especially on the southest zone of ridge A2.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Chemicals, fuels, lubricants and paints will be stored in dedicated locations on impermeable surfaces to prevent leakage into the ground and will be contained inside a secondary containment (110% of the largest container). Additional mitigation measures are presented in the non-hazardous waste and hazardous materials section.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The design and location of permanent/temporary storage areas will consider the potential ground contamination risks. Storm waterrunoff will not be able to enter areas where hazardous materials are stored, handled or transferred. If storm water runoff can enter potentially contaminated areas, there will be an oiler separator and then storage tank.. The tanks will be waterproof and potential leaks would be monitored.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Develop and implement an Emergency preparedness and Response Plan, to take immediate action in the affected area in the event of a spill or leakage of chemicals, fuels, paints, and any hazardous material	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	All chemicals will be handled in accordance with relevant instructions (MSDS).	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	To prevent tank overflow: (i) level gauges must be installed on tanks (ii) tanker pipe connections must be fully watertight; (iii) automatic shut-off valves must be installed;	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	(iv) pipe connections must be equipped with overflow protection; (v) vent holes and safety valves must be fitted to prevent over-filling and over-pressure so that the excess overflows into a collecting receptacle				
	Regularly check the content of tanks and inspect all visible parts of tanks and pipes in search of leaks.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Collectors and grease/hydrocarbon traps must be installed in supplies facilities, workshops, parking areas, fuel tanks and containment areas	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The company shall put in place – and be able to prove – the necessary means to limit sludge soiling outside the worksite (possible cleaning of wheels with water before leaving the site).	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	In the event of accidental dispersion (discharge or hose rupture), the site will have large watertight absorbent covers for hydrocarbons.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Training will have to be given to operators in the field of spill prevention and response thereto.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The soiled soil will then be immediately collected by the available equipment and stored in the sealed area until it is treated in a suitable unit. All site personnel must be informed of the procedure to be followed in the event of a spill of polluting products or hydrocarbons on the soil/ground.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The production of waste will be limited as much as possible at the source, in particular by the use of recyclable elements.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The EPC and subcontractors are responsible for the collection, sorting and routing to the channels of recovery and/or treatment of the waste it generates, including packaging waste.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Site sanitation facilities must not generate any discharge into the natural environment. The toilets will be chemical toilet type and the sanitary water will be collected in a watertight tank for appropriate treatment through ad-hoc units. An approved operator will remove used wastewater.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

6.1.2.4 Storm water management

Table 17: Synthesis of project impacts on storm water management and mitigation and / or compensation measures (Windfarm)

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Modification of the rainwater drainage regime	Carrying out a hydrological study in order to ensure flexibility in the drainage of rainwater at the right of crossings with wadis, rivers and ravines if necessary.	EPC and subcontractors	Design phase	Included in the EPC costs	Minor
	Installation of rainwater collection systems for roads and platforms; in this case, special attention should be paid to water drainage.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Thus, the water drainage system must respect natural drainage as much as possible and any rainwater discharge point must be approved by the client and the competent authorities.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Drainage channels must be constructed with a maximum flow velocity of 0.8 m/s.	EPC and subcontractors	Design phase	Included in the EPC costs	Minor
	Whenever possible, collect run-off water through a low-slope system to direct it to neighbouring plantations. However, it is necessary to make sure that these waters have not carried away oils or other substances..	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	In general, the drainage network must allow rainwater to be collected in accordance with best practice, current regulations, design assumptions, technical and natural constraints and environmental requirements.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Maintain the channels and ditches in good working order all along the construction phase.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
Surface water pollution	Measures against water pollution will be the same than those for soil protection. In addition, other measures need to be adopted: • On the one hand, de-oiling basins will have to be installed at the level of the platform for washing and for the maintenance of the machines;	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	• On the other hand, runoff and rainwater will run over the delivery stations and foundations and infiltrate directly into the ground. In addition, a drainage network will be put in place. This drainage system consisting of ditches will complement the existing system already in place. These ditches will be located on either side of the tracks in order to channel run-off water. Once the water has been channelled, it could be channelled to the lower part of the slope via catch basins and collectors that are transverse to the tracks. The spacing between catch basins will be smaller in sections where there are more obstacles to the flow of water. In order to avoid erosive processes and uncontrolled settling in the downstream part of the collectors, load breakers will be projected. • For example, a separate rainwater/wastewater network should be provided to limit pollution.				
Flood	During the works, the contractor shall comply with the natural drainage of the environment and take all appropriate measures to allow the normal flow of surface water.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The deposit of excavated material in run-off areas shall be strictly prohibited; the excavated material shall either be recycled or accumulated on site in suitable environments.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Reduce or prevent the transport of sediments from the site.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Restoring natural flows with well-dimensioned structures.	EPC and subcontractors	Design phase	Included in the EPC costs	Minor
	Limit the risk of scouring and soil erosion.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Provide rainwater retention basins to accommodate surface water runoff and limit the size of rainwater structures.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	The contractor shall construct drainage channels to protect the structures and buildings under construction from rainwater.	EPC and subcontractors	Design phase	Included in the EPC costs	Minor

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	The collection network must prevent the accumulation of water at all points and must be dimensioned for a minimum return period of 10 years.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	If necessary installation of a pumping system to evacuate any accumulation of natural or artificial water.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor

Table 18: Synthesis of project impacts on storm water management and mitigation and / or compensation measures (powerline)

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Modification of the rainwater drainage regime	Adaptation of the layout of power lines in relation to the crossing of wadis, rivers and ravines; Installation of well-dimensioned drainage works respecting natural drainage as much as possible.	EPC and subcontractors	Design phase	Included in the EPC costs	Minor
Surface water pollution / Flood	The measures against water pollution and flood will be identical to those adopted for the wind farm.	EPC and subcontractors	Design phase	Included in the EPC costs	Minor

6.1.2.5 Biodiversity

Table 19: Synthesis of project impacts on biodiversity and mitigation and / or compensation measures (Windfarm)

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
General	Preparation of a biodiversity management plan	EPC and subcontractors	Before the dismantling phase.	Included in the EPC costs	Minor
Destruction of habitat and disturbance of	In case of clearing, the areas will have to be identified by the company (location and delimitation). A biodiversity expert will have to be mobilized to make a	EPC/Koudia SPV	Construction phase	cost of compensation (agreement	Moderate

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
fauna (including Chiroptera)	reconnaissance on these areas by focusing only on the habitats and the patrimonial species.			with the administration of Waters and Forests)	
	The contractor will take care not to impinge on nearby, adjacent land to construction site. Site facilities and construction infrastructure will be located within the project site and will be removed as soon as possible after the start of operation immediately following the withdrawal of any delivery-related reservations).	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Vehicles will travel on designated roads to avoid encroaching on land without good reason, which will protect natural resources and reduce dust emissions.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Reduce the footprint of the LDA9 works area at the A2 ridge to avoid destruction of the identified critical habitat. A2 must be followed by an action of regeneration of the environment, in particular on the new slopes created, using the 2 dominant heritage species, Stachys fontqueri and Ulex parviflorus subsp africanus. These actions can be carried out by direct sowing of locally collected seeds, with the setting of a fence. These actions can be supervised by researchers from the Faculty of Sciences of Tetouan.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	In case of destruction of natural/critical habitats, adequate compensation must be provided.	EPC and subcontractors	Construction phase	Included in the EPC costs	Minor
	Provide for revegetation at existing dismantled wind turbine pads. The revegetation must be done with the species present in the vicinity of the platform concerned.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Restoration of species habitats (plantations, refuge areas for reptiles, etc.) on the areas used during the work phase;	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Give priority to natural recolonisation and decompact the soil at the end of the work to encourage the germination of the seeds contained in the soil.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Carry out a campaign to raise workers' awareness on the ecological and utility values of wild flora and fauna.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
	Sensitize (and follow-up) workers on the protection and respect of local wildlife and the monitoring of the premises against poaching.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	The machinery used must be in good condition and comply with the statutory noise levels; it shall cease to operate at night.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Storage and work areas must be clearly demarcated in order to reduce the footprint on the natural environment as much as possible;	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Considering the implementation of measures to ensure that wildlife leaves the site before it is destroyed, by planning the work according to the seasons (do not clear land during the breeding season - April to July), and by allowing wildlife to escape	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Conservation of top soil layers during earthmoving activities in order to preserve them and potentially reuse them to vegetate the area	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Limiting the use of external backfill in order to eliminate the risk of introducing exogenous invasive species.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Clean machinery and equipment to limit the spread of exotic and invasive plant species.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Manage construction site activities as described in the relevant sections of the IFC's General EHS Guidelines	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Ensure reclamation of work areas upon completion of the work, including flattening and revegetation activities. Revegetation must be done with the species present in the vicinity of the work areas.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Risk of pollution of natural environments and flora and fauna	Preventive maintenance of equipment and machinery (tightness of tanks and fuel, lubricant and hydraulic fluid circuits); Absence of oil changes on the site; Reduced storage of hydrocarbons; On-board refuelling of machinery using a tanker equipped with nozzles and non-return valves;	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
	Use of an absorbent tarpaulin under the tank during refuelling, etc.				
	In the event of an accidental leak of the pollutants identified above, the operator must have the means to quickly contain the pollution generated through the use of absorbents (sand) and/or anti-pollution kits fitted to all equipment. The measures listed here are not exhaustive and it will be up to the operator to determine the exact details.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Destruction of individuals/nests and disturbance of breeding birds	Carry out the work, as far as possible, outside the nesting and rearing season for the young; which essentially covers the months of April to July in this region of Morocco.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Watering the areas set aside for construction work and the tracks on which the machinery travels in order to reduce dust build-up, which can alter ecological habitats and affect their role as feeding and nesting sites.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Fauna mortality	Establish procedures for dealing with all species present on the construction site, including reporting, identification and potential relocation procedures.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	A speed limit of 30km/h shall be imposed on the site to avoid direct mortality of fauna. Speed limits are to be respected on external access routes.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Poaching / hunting / trade	Hunting, falconry and trade will be strictly prohibited and subject to sanctions. Information notes will be posted.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Human activities	Wherever possible, night work will be avoided in order to avoid excessive human disturbance of fauna. Measures against light pollution, as described in the chapter on landscape, and noise, as described in the relevant chapter, will minimise human disturbance.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Fire risks	Site personnel should be trained in fire risk: the activities that can cause fires, how to avoid fires and how to behave in the event of a fire. It will therefore be necessary to introduce a total ban on fire on the site, and to program high-risk activities (bush-clearing activities, etc.) outside the dry seasons.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor

Table 20: Synthesis of project impacts on biodiversity and mitigation and / or compensation measures (specifics for powerline)

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
Destruction of natural habitat and disturbance of fauna	The route of the power line will have to pass through areas where the vegetation is less dense.	EPC	Design phase	Included in the EPC costs	Minor
	Carry out a campaign to make workers aware of the ecological and utility values of wild flora and fauna.	EPC and subcontractor	Design phase	Included in the EPC costs	Minor
	Locate transmission and distribution right-of-way, access roads, lines, towers and substations so as to avoid critical habitats, using existing rights-of-way and utilities already established for the transmission and distribution of electricity, and using existing roads and tracks as access routes wherever possible.	Design phase	Design phase	Included in the EPC costs	Minor
	Limit clearing along access roads and temporary occupation zones to the strict minimum. If forest areas cannot be avoided, tree pruning should be kept to a minimum, taking into account the safety distances to be respected (prune only branches or cut down trees that may fall on the power line, etc.). In case the pruning of trees is necessary, it must receive the approval of the water and forests administration and compensation must be made in accordance with the water and forests administration.	EPC and subcontractor	Construction phase	Included in the EPC costs	Minor
	Adjust the height of some pylons to save a large part of the existing tree stratum where the cables are lowest (halfway between two pylons).	EPC and subcontractor	Design phase	Included in the EPC costs	Minor
	As far as possible keep low shrub and tree vegetation in the corridors of the line to allow some ecosystem connectivity and avoid exposing soils that could suffer from significant erosion mechanisms.	EPC and subcontractor	Construction phase	Included in the EPC costs	Minor
	It is recommended that all areas of temporary use (roadsides, areas around pylons, etc.) and embankments created in areas where vegetation removal has been necessary should be revegetated with species native to the area in question.	EPC and subcontractor	Construction phase	Included in the EPC costs	Minor
	For revegetation, invasive species other than endemic species are prohibited.	EPC and subcontractor	Construction phase	Included in the EPC costs	Minor

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
	Do not undertake construction activities during breeding periods or other sensitive seasons and times of day.	EPC and subcontractor	Construction phase	Included in the EPC costs	Minor
	Replanting in disturbed areas of native species	EPC and subcontractor	Construction phase	Included in the EPC costs	Minor
	Manage construction site activities as described in the relevant sections of the IFC's General EHS Guidelines.	EPC and subcontractor	Construction phase	Included in the EPC costs	Minor
	The organic material produced during the clearing of vegetation will be stored on piles of no more than 2 m in height.	EPC and subcontractor	Construction phase	Included in the EPC costs	Minor
Destruction of individuals/nests and disturbance of breeding birds	Carry out the works, as far as possible, outside the nesting and rearing season for the young individuals; which essentially covers the months of April to July for this region of Morocco.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Watering the areas set aside for construction work and the tracks on which the machinery travels in order to reduce dust build-up that could alter ecological habitats and thus affect their role as feeding and nesting sites.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Human activities	Wherever possible, night work will be avoided in order to avoid excessive human disturbance of wildlife. Measures against light pollution, as described in the chapter on landscape, and noise, as described in the relevant chapter, will minimise human disturbance.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor

6.1.2.6 Management of waste, dangerous and non dangerous materials

Table 21: Synthesis of project impacts on waste, dangerous and non-dangerous materials management and mitigation and/or compensation measures.

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Volumes / Quantities of solid waste for turbine dismantlingVolumes	Prepare a site-specific waste management plan, including hazardous and non-hazardous waste. The plan will include staff training. This waste management plan will have to comply with Moroccan standards and to be in line with the IFC EHS Guidelines. It will be approved by MASEN-EDF Renewables.	EPC and sub-contractors	Before construction starting	Included in the EPC costs	Minor
	The physical and chemical composition of the waste and the identification of hazard characteristics will be established.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Masonry deriving waste will be reused in road construction and basic filling. Reasonable levels of use would be between 50-80%.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	The recycling of scrap metal will be favoured according to existing recycling channels. Recycling and/or revalorisation of the material of the existing turbines will be favoured. The process have to be identified and controlled.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Ordering materials with reusable, recyclable and/or bulk packaging can reduce the waste generated. These practices will be favoured whenever possible.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Ask suppliers to use minimal packaging.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Chemicals should be ordered in reusable drums (plastic and/or metal).	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Reusable containers will be used, if possible, for the collection of solid and liquid waste.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Cleaning	Separate waste streams to facilitate recycling. All storage areas should be well organized and waste properly managed: hazardous and non-hazardous waste should be segregated. Waste in each category will be further separated by type (paper, plastic, metal, masonry) and whether or not the material is recyclable. A waste register will be kept on site and will contain, as a minimum, information on quantities, types of management solutions (according to the waste management hierarchy described in the "Baseline Conditions" section), operators, disposal/final destination, etc.).	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Install adequate storage facilities for non-hazardous waste in designated areas to prevent it from being dispersed throughout the site.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	At the beginning of employee training, include modules so as to increase their knowledge on waste management protocols, including proper waste handling and storage, response and contingency plans.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
Waste Storage	Food waste will be stored in an airtight metal or plastic bin or container with a self-closing lid to prevent access by birds/vermine/parasites.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Light waste such as paper, cardboard, plastics will be stored in a watertight container with a tarpaulin or a secure lattice sufficient to prevent their dispersal.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Heavy waste may be contained in an open bin, provided that it is segregated effectively enough to remove any light material that may be carried away.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Different bins/garbage/containers for each distinct category of garbage (food or household waste) should be placed in areas where construction workers and staff consume food on a daily basis. These will be regularly collected and taken to the main waste storage area. Separate portable waste bins will also be placed in areas where work will be undertaken.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	No underground waste containers will be set up.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	Waste containers will be clearly identified with appropriate labels accurately describing their contents and containing detailed safety instructions. The labels will be water-resistant and securely attached. Wherever possible, chemicals will be kept in their original containers.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Waste generated during construction will only be transported off-site for disposal by an duly approved supplier. This service provider shall comply with appropriate protocols to ensure that all waste handling and disposal from the site is carried out in accordance with accepted environmental regulations. A register of all waste streams shall be kept on site.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Regular training of site personnel on waste management and correct chemical handling procedures will be provided at regular intervals.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Incineration/combustion of waste will not be allowed on site.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
Hazardous Substances	Installation of adequate secondary containment for fuel tanks, and for the storage of various fluids (lubricating oils and hydraulic fluids).	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	During the decommissioning phase, assessment of the content of hazardous materials and petroleum-based products in building systems (e.g., PCB-containing electrical equipment, asbestos-containing construction materials) and process equipment; disposal of these materials and products prior to decommissioning activities; and management of their treatment and disposal in accordance with IFC and IBP recommendations and applicable waste disposal regulations.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Implementation of best practice procedures and regulations regarding proper handling, establishment of secure temporary storage areas, and disposal of waste by licensed companies.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Hazardous waste will be disposed of in an environmentally sound manner and by authorized hazardous waste operator(s).	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	Materials will be segregated according to whether they are combustible or not, and all flammable substances will be kept away from all sources of ignition.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	No underground hazardous material containers will be set up. Hazardous material storage will be located in a dedicated fenced area with a separate, covered rainwater drainage system to prevent rainwater from entering the area. This hazardous material storage area will be located taking into account potential risks (e.g. traffic accidents/crashes, falling objects, drainage system, etc.).	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Installation of retention bins for the storage of hazardous materials. Retention areas will have the capacity to hold 110% of the total volume of materials stored and will be protected from vehicle traffic and other risks. This area shall be located away from all sources of ignition. Retention bins for fuel storage tanks will be tested regularly with recycled water or treated wastewater (e.g. non-hazardous water already used for an activity that is not likely to be contaminated or treated wastewater). Storage areas shall be sealed at the base (if necessary, this requires covering a large area so as to avoid soil contamination e.g. refuelling areas shall include an impermeable base that protects the ground where vehicles are parked), shall be covered and equipped with spill kits.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Containers of hazardous materials shall be clearly identified with appropriate warning labels accurately describing their contents, detailed technical specifications and safety instructions. The labels shall be water repellent and securely attached. Wherever possible, hazardous materials will be kept in their original containers.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Hazardous materials will only be transported to and from the site by a duly authorized operator. This service provider will follow appropriate protocols to ensure that all hazardous materials are transported and transferred in accordance with applicable environmental regulations. A register of all hazardous materials will be kept on site.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor

Impact/Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
	Only qualified personnel are authorized to handle hazardous materials/substances. Training of workers on proper fuel and chemical transfer and handling techniques and spill response.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Put in place the necessary human resources to ensure periodic and daily monitoring and follow-up activities related to the management of hazardous and non-hazardous waste.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	All chemicals will be handled in accordance with relevant instructions (MSDS).	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
Waste management facilities	Only duly licensed waste management facilities shall be used for the disposal of hazardous and non-hazardous waste, respectively.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
Recycling and Recovery	Evaluation of waste generation processes and identification of potentially recyclable materials by identifying wastes that can be reused in the construction process of the new wind farm.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Examination of external markets for recycling through other industrial treatment companies located near or in the region of the facility.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
Transportation of waste and hazardous materials	On- and off-site transportation of waste shall be conducted in a manner that prevents or minimizes spills, discharges and exposure of employees and the public.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	All waste containers designated for off-site transportation must be securely labelled with the contents and inherent hazards, properly loaded onto transport vehicles prior to departure from the site, and accompanied by shipping documents (e.g., waybill) that describe the loading and associated hazards.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor

6.1.2.7 Waste water management

Table 22: Synthesis of project impacts on wastewater Management and mitigation and / or compensation measures

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
General	Develop a waste water management plan.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
Sanitary waste water	Chemical toilets will be available at various locations on the site in sufficient numbers to accommodate the expected number of employees (at least one for every 20 workers) and will be emptied regularly whenever they are filled.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	These chemical toilets should be checked regularly for any leaks.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Temporary biological treatment systems can be set up for the treatment of sanitary water (showers, canteens, etc.).	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	No domestic waste water will be discharged outside the toilets to avoid the discharge of waste water into the soil, in the wadis, ground water and the rainwater drainage system.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Waste water from chemical toilets will be collected by duly authorised operators. All chemical toilets will generally be collected and emptied before their contents have reached 80% of their capacity. The required permits and contracts must be obtained by the developer before construction begins.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Chemical toilets must be completely emptied prior to demobilisation to avoid contamination of the site area. The demobilisation procedure will ensure that tanks are not destroyed or damaged during the removal process.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
Liquid effluents from cleaning	Cleaning, refuelling, cleaning of vehicles and machinery and maintenance operations will be carried out on watertight platforms with water recovery, passing through an oil separator before being sent to a storage tank or into the natural environment. The platform can be arranged as follows:	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	• Waterproof floor (by means of a concrete floor covering, a layer of clay or other means); • Effluent evacuation and collection system; • Adequate tank or sump for the storage of the generated effluents.				
	Storage areas for hazardous materials: Storage areas for hazardous and/or contaminating materials must also be properly conditioned using: • Adequate impermeable flooring (by means of a concrete floor covering, a layer of clay or other means); • Cover to avoid toxic and/or dangerous contact with rain and/or other meteorological agents; • Spill containment system possible.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
Pollution by liquid effluents from waste storage areas.	Temporary waste storage areas : Waste storage areas must also be properly conditioned by means of : • Adequate impermeable flooring (by means of a concrete floor covering, a layer of clay or other means); • A cover to avoid toxic and/or dangerous contact with rain and/or other meteorological agents; • A containment system of the possible spills.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	Temporary waste storage areas must be duly conditioned by : • Waste containers adapted to each specific type of residue generated. • Containers must always be closed to prevent contact with rainwater and must be in good working order, free of dents and leaks.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
	The effluents generated must be taken to an authorised manager for appropriate treatment.	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor
Effluent from construction	Concrete mixer washing water shall in no event be discharged into the oueds and solid waste must be disposed of with construction waste	EPC and sub-contractors	Construction phase	Included in the EPC costs	Minor

6.1.2.8 Traffic and transportation

Table 23: Synthesis of project impacts on traffic and transportation and mitigation and / or compensation measures

Impact/Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Congestion on the roads serving the project by exceptional convoys	All vehicles of exceptional nature due to their size or mass must have exceptional transport authorisations in accordance with the provisions of articles 98 and 99 of decree n° 2.10.420 of 20 Choual 1431 (September 29, 2010) fixing the methods of application of the provisions of law n° 52.05 relating to road traffic rules.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
Increase in traffic on roads serving the project	Develop a transport and traffic management plan	EPC and sub-contractors	Before construction starting	Included in the EPC costs	Minor
	Ensure that the bearing capacity of the tracks is adapted to the volume of traffic (number and load). If necessary carry out consildation works especially for bridge and pipes before starting construction.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	Determine the designated access roads for the delivery of equipment, road capacity, entry/exit points of the site, etc.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	Determine requirements for regular vehicle maintenance (currently being implemented) and the use of manufacturer-approved parts.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	Use of local materials wherever possible to minimise transport distances	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	Use dust suppression techniques, such as spraying water or non-toxic chemicals to minimize dust from vehicle traffic.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
Accident risks and road safety	Working with local communities and relevant authorities to improve road signs, visibility and overall pavement safety, especially near schools and other places where children may be present.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	Adoption of traffic regulation measures, including the provision of traffic signs and the employment of persons responsible for signalling the presence of dangerous situations.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor

Impact/Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Ensuring the planning and separation of areas for vehicular traffic, machinery use and pedestrian crossings, and the regulation of one-way traffic,	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	Limit the speed of traffic on site and employ traffic control personnel wearing vests or high visibility clothing.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	Use inspected and well maintained lifting devices appropriate for the to-be-lifted load.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
Widening work on the RP 4703	• Informing the local population, particularly users of roads that will be impacted by the nuisance resulting from the construction activities, of the work schedule. • Establish alternative access roads • Provide appropriate signage. • Ensure access to properties and business premises. • Control the speed of traffic, particularly when crossing houses. • The works companies must ensure: ○ The temporary stoppage of work in times of exceptional bad weather which could significantly increase the extent of the damage; ○ The cleaning of the site by removing debris and residues of all kinds; ○ o The restoration of fences, hedges and paths at the end of the work.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor

6.1.2.9 Archeology and cultural heritage

Table 24: Synthesis of project impacts on archeology and cultural heritage and mitigation and / or compensation measures

Impact/Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Artefact discovery and preservation	Prepare an archeology and cultural heritage management plan (Chance find procedure)	EPC and sub-contractors	Before starting construction	Included in the EPC costs	Minor
	Carry out a follow-up of the excavation work by an archaeologist in order to identify potential vestiges	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor

Impact/Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Attention should be given in order to avoid damaging the vestiges of the contemporary era.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	The discovery of remains will be signalled to the competent authorities with the implementation of the appropriate procedure: works suspension on the identified area and within a protection perimeter, investigations implemented by the Ministry of Culture.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	Training and awareness programs will be provided to ensure that construction staff and workers are aware of the procedures relating to the Archaeological Watching Brief if any artefacts or anthropogenic finds are uncovered	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor
	In the unlikely event of any artefacts being found/uncovered, the construction works would be ceased immediately and the Minister of Culture, via the“Institut National des Sciences de L’Archéologie et du Patrimoine (INSAP)” will be contacted by the EPC Site Manager. The INSAP will be in charge of any archaeological investigations.	EPC and sub-contractors	Construction Phase	Included in the EPC costs	Minor

6.1.2.10 Landscape and visual impact

Table 25: Synthesis of project impacts on landscape and visual impact and mitigation and / or compensation measures

Impact / Source	Mitigation measure	Responsibility	Schedule	Cost	Residual impact
Modification of landscape features having an impact on the field of vision (co-visibility)	The reclaimed areas should be replenished with "topsoil", ideally with the topsoil from earthworks on the site. This operation should allow a spontaneous recolonization of the natural vegetation.	Masen & EDF	Desing phase	Included in the EPC costs	Minor
	Examine the visual impacts of wind turbines from all angles of view before choosing their final installation site	Masen & EDF	Desing phase	Included in the EPC costs	Minor

	Ensure uniformity of size and design of wind turbines (direction of rotation, type of wind turbine and mast, height)	Masen & EDF	Desing phase	Included in the EPC costs	Minor
	Paint all the wind turbines the same color, choosing a shade close to the color of the sky (pale gray or pale blue),	Masen & EDF	Desing phase	Included in the EPC costs	Minor
	Avoid affixing letters, logos, advertisements or other graphic motifs on wind turbines.	Masen & EDF	ESMP operational phase	Included in the EPC costs	Minor
Light pollution	The supply of lighting should not be excessive or unnecessary - The lights in the control panel will only be on when strictly necessary	EPC and Sub-Contractor	Operating ESMP -	Included in the EPC costs	Minor

Table 26: Synthesis of project impacts on landscape and visual impact and mitigation and / or compensation measures(Electric lines)

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Modification of landscape characteristics that have an impact on the visual field (co-visibility)	Organize large-scale public consultations when choosing the location of power lines and their right-of-way	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Install power lines and design substations taking into account the landscape, environmental features and characteristics of the local population.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Évaluer avec précision l'impact sur la valeur des propriétés en raison de la proximité des lignes électriques.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor

	Avoid the most populated areas as much as possible.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor

6.1.2.11 Socio-economics and community health and security

Table 27: Synthesis of project impacts on socio-économics and community health and security and mitigation and / or compensation measures

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Employment	The project will aim, as far as possible and according to the phases thereof to employ local workers when they are both available and competent to carry out the tasks to be carried out. All unskilled employment opportunities will be offered to local residents prior to the hiring of employees from other regions where possible. The employment of women and vulnerable groups will be specifically targeted where possible.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	A downsizing plan will be prepared for the transition from the construction to the operation phase.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	The EPC must provide workers with information, supported by clear easily understood documents, about their rights under national labour and employment law, including their rights regarding working, hours, salaries, overtime, remuneration and social allowances, at the beginning of the working relation and whenever significant changes are made	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	The EPC shall base the working relations on equal opportunities and treatment, and shall not discriminate against any social groups (including women)	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
Dissemination of skills	Identification of a Skills Development Plan for all stakeholders involved in environmental and social management.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	EPC will only engage with reputable suppliers who do not use force or child labour.	EPC and Sub-Contractor	Construction phase	Included in the	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Local economic dynamics (purchase of goods / services)				EPC costs	
	The purchase of goods and services for construction labour and materials will be done where possible at the local/regional level.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
Staff conflict	The initial training of foreign employees will include information on the cultural background of the closest inhabitants.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
Interference with existing economic activities and infrastructure	Limit the speed of the construction site machinery on the RP4703 and on the tracks, especially on Souk days.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Limit the site area and avoid depositing materials outside this limit in order to preserve the passage of livestock as much as possible.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	The telecommunication infrastructure nearby the site construction won't be damaged by any construction activity.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
Crop loss and damage	Compensation for crop damage through appropriate compensation to farmers according to the types and yields of crops affected; Orient the choice of pylons so as to avoid cultivated land as much as possible; Transplantation of trees affected by the works to the landowners' land if possible; Restoration of the site after completion of the work; Limiting the work area to reduce the impact on neighbouring plots.	MASEN/EPC and Sub-Contractor	Construction phase	Included in the PAT and EPC costs	Minor
Population displacement	Limit the displacement of the population as much as possible; Ensure that compensation is paid to those entitled to it in accordance with the regulations in force,	Koudia SPV	Desing phase	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Ensure that the physically displaced have a secure livelihood. Mitigation measures to enable the local population to sustain their livelihoods should be developed to ensure that vulnerable groups can access and benefit from them without discrimination, and specific measures are included in the PEPP and the Land Acquisition Plan (LAP) to ensure that women and other vulnerable groups are consulted about these proposed livelihood recovery measures;				
	Establish a grievance management mechanism to resolve disputes (related to displacement or other issues) Inform the population affected by the project of the existence of a grievance management mechanism and explain to them the different ways in which grievances can be filed and the timeframe for processing them. Provide support for vulnerable people (illiterate, elderly, disabled, etc.) who wish to express their grievances	Koudia SPV	Construction phase	Included in the EPC costs	Minor
Health and safety of the local community	Ensure that the site enclosure construction is fenced off to prevent public access and exposure to the various risks on the site (falling materials, inhalation of chemicals, burns, etc.). Put in place clear signage indicating the ban to the public.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Persons not engaged in the work should not be allowed to enter the work site unless they are accompanied or authorized by a competent person and are provided with appropriate protective equipment.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Implement a traffic safety plan to avoid road accidents.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Implementing a Local Community Health and Safety Plan	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	The Moroccan authorities must be informed about the transport of the wind turbines; they will communicate the route the trucks will be taking to the work site to the gendarmerie	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	In the event of an emergency, where the local population is at risk, means of communication and notification should be put in place to warn the local population.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Reducing the off-site impacts of spills through measures designed to: contain explosions and fires; alert the public; provide for the evacuation of surrounding areas; establish safety zones around the site; and provide emergency medical services to the public.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	The local communities must be informed about the risks related to the work site. The various works phases and corresponding constraints must be explained to them.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Inform the local population of the existence of a grievance management mechanism (work phase) where PAPs can express their grievances related to the nuisances generated by the work	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
Health and safety of the local community/Fire risks	Employees must be trained concerning fire risks especially related to cigarettes.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Portable hand-operated fire extinguishers will be installed on each truck and machine and the employees trained to use them	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
Health and safety of the local community/	Sensitivity of workers to the cultural context of the region and how they should interact with local communities. Raise workers' awareness of the SGBV aspects.	EPC and Sub-Contractor	Construction phase	Included in the	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Violence and sexual harassment				EPC costs	
Spread of diseases	Disease prevention (including STDs and COVID 19 if applicable) will be included in the training programs through toolkit conferences or separate training sessions.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
Security employees	Security personnel will undergo a specific training program that will include, as a minimum, information on how to practice GIIP (United Nations Voluntary Principles on Security and Human Rights) practices. Develop and implement a security policy and Code of Conduct for security personnel.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
Proliferation of informal settlements and Encroachment	Informal or clandestine settlements will be monitored by security personnel on site and reported to the relevant authorities.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
	Local public security forces will be required to deal with illegal immigrants who settle according to national requirements.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	Minor
Security forces and human rights	The security provider and its staff will adhere to international best practices regarding the use of security forces: - Train/educate staff on the United Nations Voluntary Principles on Security and Human Rights, where possible. - Link security to community relations; - Provide security with respect for human rights; - The use of force should be defensive and preventive only; - Take into account women's unique experiences and perspectives; - Coordinate community relations and establish grievance mechanisms.	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	EPC and Sub-Contractor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	The security provider should also encourage public security personnel to behave in a manner consistent with the principles outlined for private security personnel in Performance Standard 4. Construction companies and their subcontractors will comply with the IFC sustainability framework and security issues, primarily covered in Performance Standard 4: Community Health, Safety and Security.				
Influx of workers	- Provide adequate transportation management systems to preserve workers' rights and freedom of movement; - Putting in place appropriate signage; - Provide for the rehabilitation of infrastructure, particularly transportation infrastructure, to ensure maximum safety and security for workers and communities	EPC and Sub-Contractor	Construction phase	Included in the EPC costs	EPC and Sub-Contractor

6.1.2.12 Occupational Health and Safety

Table 28: Synthesis of project impacts on occupational health and safety and mitigation and / or compensation measures

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
General	Prepare an occupational health and safety management plan included an emergency rescue plan compliant with Moroccan regulations, ILO conventions and the EHS IFC general guidelines and wind energy guidelines.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Physical risks (risk of falling, handling, ...), chemical and electrocution risks	Supply and control of the wearing of personal protective equipment, such as helmets, safety shoes, protective gloves, safety harnesses, etc.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Set up an ambulance equipped with medical personnel along the construction period. Establish an equipped infirmary. First aid personnel should be clearly designated, trained and competent;	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Appropriate precautions, such as the installation of barriers or lookouts, should be taken to protect workers from falling materials, tools or equipment during lifting operations; Guards and skirting boards in accordance with national legislation should be installed to prevent workers from falling from a certain height.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Security personnel will undergo a specific training programme which will include, as a minimum, information on how to practice the GIIP (United Nations Voluntary Principles on Security and Human Rights); Develop and implement a security policy and code of conduct for security personnel.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Where the noise level exceeds 85dB (A) as a weighted average over 8 hours per day without hearing protection against noise, devices must be provided for site personnel. No unprotected ear should be exposed to a peak (instantaneous) sound pressure level of more than 140 dB (C).	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Put in place a fall protection system that must be adapted to the structure of the mast and the movements required, including ascent, descent and movement from one point to another. Use seat belts made of nylon lined at least millimetres (5/8 inch) or other material of equivalent strength. Rope seat belts should be replaced before showing signs of ageing or fibre wear. Provide for a second (spare) safety strap to be worn by workers who handle power tools at height.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Lifting operation	Ensure all relevant information is known about the load, e.g., the size, weight, method of slinging, and attachment points.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Ensure all lifting equipment (including load attachment points) is suitable, capable of supporting the load, in good condition, and in receipt of any statutory inspections required.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Ensure all supervisors, equipment operators, and slingers are trained and competent in the lifting equipment and intended lifting techniques.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Where possible, exclusion zones are to be established and maintained in order to prevent any unauthorized access to lifting areas.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	When lifting large loads, ensure weather conditions are favorable for the task.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Electric and magnetic fields	exposure limits for occupational exposure to electric and magnetic fields	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Working conditions	○ To base employment decisions on the principle of equal opportunity and fair treatment; ○ To ensure fair treatment, non-discrimination and equal opportunity; ○ Ensuring a good relationship between workers and management approach to managing workers in accordance with the requirements of Performance Standard 2; ○ Document and communicate all working and employment conditions to all workers; ○ Comply with all collective bargaining agreements with a workers' organization and provide reasonable working and employment conditions in accordance with national legislation; ○ To recognize the right of workers to form or join workers' organizations, regardless of the recognition of this right by national legislation; ○ To base employment decisions on the principle of equal opportunity and fair treatment; ○ To ensure fair treatment, non-discrimination and equal opportunity; ○ Ensuring a good relationship between workers and management; ○ Compliance with national laws on employment and labor, especially in the development of employment contracts; ○ Protection of workers, especially those belonging to vulnerable categories; ○ Promote safety and health; ○ Not using forced or child labor; ○ Establish a grievance handling mechanism for workers; ○ The accommodation of workers will be in hygienic and sanitary conditions; ○ Undertake inspection, audit and review activities to ensure that the contractor's health, safety, security and welfare and environmental objectives are met	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
	Set up an HSSE manager to provide assistance in implementing and maintaining the process of hygiene, health and safety for workers and the environment.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Spread of diseases and	Disease prevention (including STDs and COVID 19 if appropriate) will be part of training programs and appropriate personal hygiene measures; During summer work outdoors, it is essential to develop regular hydration habits.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
lack of hygiene	Changing rooms and washrooms should facilitate personal hygiene practices, be easy to maintain, be designed to explicitly isolate specific areas and be adapted to the number of employees. Separate toilet facilities for men and women; Temporary or permanent living quarters within the structures forming part of the permanent works isn't allowed. Workers' accommodation must meet/contain at least the following spaces and equipment: - water supply; - adequate sewage and waste disposal services; - appropriate protection against heat, cold, humidity, noise, fire and disease-carrying animals; - adequate sanitary and hygiene facilities; - ventilation, kitchen and storage facilities; - natural and artificial lighting; Putting up hygiene awareness signs and posters on the site. The accommodation facilities will be compliant with IFC/EBRD Worker Accommodation Guidelines.	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Workers' safety	Obligation to fence off the building site, with the presence of a permanent security guard. Persons not engaged in the works should not be allowed to enter the construction site unless they are accompanied or authorized by a competent person and are provided with appropriate protective equipment. Train all employees to be aware of their own responsibilities with regard to relevant health and safety issues, and ensure that they participate in the prevention of accidents and cooperate in measures taken to prevent occupational diseases. - Put in place an HSE manager to assist in the implementation and maintenance of the hygiene, health and safety of workers and the environment. - Make all employees aware of the rules regarding drinking and driving, speed limits, wearing seatbelts, using the telephone, etc. - Implementing a prevention policy that applies to four major inseparable areas: travel, vehicles, communications and skills. - Ensure the maintenance and safety of the vehicles used and develop means for the protection and safety of workers and road users; - To ensure the monitoring of the speed of users on work sites..	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor
Retrenchment	The construction companies and their subcontractors will find the best way to plan and manage significant job losses in accordance with PS requirements. These companies should:	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Analyse all alternatives to avoid or minimize retrenchment; Develop and implement a plan to mitigate the adverse impact of retrenchment if they anticipate a large number of layoffs; Prepare the tools and procedures to effect the retrenchment, including an appeal or grievance mechanism; The plan will incorporate non-discrimination principles and include the input of workers, their organizations and, where appropriate, the government. Companies may take a range of steps that go beyond severance payments and compliance with basic legal requirements to demonstrate corporate social responsibility in relation to retrenchment: • Training • Career and financial counselling • Promotion of local economic development • Opportunities • Outsourcing • Assistance with finding new employment.				
Gender-specific measures	- Provide specific toilets, changing rooms and showers for women; - Putting up easily accessible and visible information panels containing information on gender equality; - Organize training and awareness-raising workshops for managers and workers covering the GIS theme,	EPCs and subcontractors	Construction phase	Included in the EPC costs	Minor

6.2 Operation phase

6.2.1 Air quality

Table 29: Air Quality - Mitigation Measures - Operations Phase

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Air emissions from vehicles **Very low intensity**	• Compliance with vehicle exhaust emission standards; • Reduce the number of vehicles to a minimum.	O&M Company	Operation	included in the O&M Costs	Insignificant
Generation of dust	• Minimize the number of vehicles; • Controlling the speed of vehicle traffic; • Light watering of the tracks to limit dusting.	O&M Company	Operation phase	included in the O&M Costs	Insignificant

6.2.2 Noise and vibrations

Table 30: Synthesis of project impacts on Noise and vibrations and mitigation measures and / or compensation measures (Windfarm)

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Wind turbines	Relocate the 7 houses located within the 600 metre perimeter for which the impacts are proven, and put in place a land acquisition plan	MASEN	Pre-construction	Included in the LAP costs	Moderate
	The level of emergence of ambient noise must not exceed 3dB at sensitive receptors (living area closest to wind turbines). Provide a modeling of the sound environment taking into account the locations of wind turbines	EPC	Operation phase	Included in the EPC costs	Minor

	Limit turbine operations above the wind speed at which turbine noise becomes unacceptable in the project-specific circumstances. Ensure monitoring of noise levels appropriate to operating conditions.	Koudia SPV	Operation phase	Included in operation costs	Minor

Table 31: Synthesis of project impacts on Noise and vibrations and mitigation and / or compensation measures (powerlines)

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Powerline/Corona effect	The route of the powerlines must be far enough from homes (at least 20 meters)	EPC	Operation phase		Insignificant

6.2.3 Soil and ground water

Table 32: Synthesis of project impacts on soil and ground water and mitigation and / or compensation measures

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Soil erosion	As there is no impact on the soil during the operation phase under normal conditions, no compensatory measures are planned. However, runway maintenance work must be carried out in order to limit any risk of degradation due to erosion. The rainwater drainage structures must be well maintained to ensure that they play their role at all times. The service roads must be regularly maintained to ensure stability and to repair drop and washout effects. Maintenance includes gabion monitoring, planting vegetation in bare parts, filling in new gullies with riprap, cleaning pipes and concrete pipe inlets, etc.	O&M Company	Operation	included in the O&M Costs	Insignificant
Soil and ground water pollution	During major maintenance operations requiring the use of construction machinery, specific measures to protect the quality of soil and ground water during the construction phase must be applied. To this end, a permanent watertight parking area will be maintained throughout the operation of the wind farm. This parking area will be sized to accommodate the site machinery required for maintenance operations.	O&M Company	Operation	included in the contract	Insignificant

Table 32 : Synthesis of project impacts on soil contamination and mitigation and / or compensation measures (Powerline)

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Spillage & leaks	Use Sulfur Hexafluoride (SF6) as dielectric gas, PCB is not allowed	EPC	Design phase	included in the contract	Insignificant
	Equipment with a low leakage- rate (<99 percent) should be used.	EPC	Design phase	included in the contract	Insignificant
	The oil transformers will be placed on retentions.	EPC	Design phase	included in the contract	Insignificant
	MSDS will be provided for all chemicals.	O&M Company	Operation	included in the contract	Insignificant

6.2.4 Storm water management

Table 33: Synthesis of project impacts on storm water management and mitigation and / or compensation measures

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Surface water pollution	In the absence of a significant impact on the hydrographic network, no specific accompanying measures have been put in place. Vegetation will grow back around the wind turbines and access roads, which will limit the risk of erosion, in order to facilitate water infiltration at site level. However, in the event of major maintenance operations, the measures taken to protect surface water against accidental pollution will be identical to those planned for soil protection during the work phase. Provide a separate wastewater/rainwater network so as not to contaminate rainwater;	O&M company	Operation	included in the O&M Costs	Insignificant

	Provide watertight septic tanks or mobile collection systems to evacuate domestic wastewater for the services building; Regularly check machinery and equipment and replace any parts that could cause an accidental spill.				
Flood	In the absence of a significant impact, there are no specific accompanying measures to be put in place. All roads and platforms must be regularly maintained, especially during the rainy season. Connection of the buildings to the water and sewerage networks of the wind farm.	O&M company	Operation	included in the O&M Costs	Insignificant

6.2.5 Biodiversity

Table 34: Synthesis of project impacts on biodiversity and mitigation measures and / or compensation measures (Windfarm)

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
Chiropteran mortality	The area where the wind turbines are located is not very sensitive. Nevertheless, we propose first a monitoring, then, according to the results, a stop of the operation of the wind turbines (bridging). A priori the periods of stop of operation meet the following standards: - During the period of intense chiropteran activity, from April to October - During the first 4 hours of the night, period of maximum activity of chiropterans - During non-rainy nights - If the wind speed is less than 8 m/s The first 2 criteria (period of important activity, seasonal and beginning of night), correspond to 9.1% of the total annual duration. As there are no measurements in the moderately sensitive area, it is not yet possible to estimate the loss of productivity due to a flange during reduced winds (i.e. less than 8 m/s) and non-rainy nights. An estimate could be made from measurements available in the existing wind farm, which is probably more exposed to wind than the moderately sensitive area.	O&M company	Operation phase	included in the O&M Costs	according bats monitoring results

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
	This reduction in activity results in minimal loss of productivity, and greatly mitigates chiropteran mortality				
Mortality of migratory birds	Do not install wind turbines in the Ain Jir sector (valley north of the study site), Respect a minimum distance of 1 km on either side of the pass identified between the ridges A1 and A2-F forming the main ridge, A charnel house is being set up at Jbel Moussa to attract vultures in order to keep them away from the site where the reinforcement of the wind farm of Al Koudia Al Baida is planned (Appendix 1 - Photo 1). This consists of a fenced platform (to keep out dogs and other carnivores) but large enough to allow the arrival and departure of vultures without accidents (an enclosure of about 100 meters in diameter. Maintenance of the mass grave could be assigned to the northern regional unit of a national NGO (GREPOM-BirdLife) with support from the wind farm project developer. The maintenance consists in searching in the region (notably with breeders or in local souks) for animal carcasses and bringing them to the mass grave, at a rate of twice a month. The cost of this operation could be estimated at 60,000 to 80,000 dirhams per year. If necessary and if confirmed by the spring surevy, the Owner will proceed, during the Operation phase of the Wind Farm and before the first migration season after commissioning to the implementation of a shut down protocol. The eventual shutdown protocol and necessary mitigation actions will be defined by the Owner according to the final results of the bird collision study, and will be adjusted based on the specific results of the post-construction observations if necessary. - support the nearby vulture rehabilitation center to encourage vultures to avoid the wind farm area.	O&M company	Operation phase	included in the O&M Costs	According to bats and birds monitoring results
Mortality of Chiroptera and	Configure wind turbines to avoid bird mortality (e.g. by grouping turbines together instead of spacing them apart or orienting them so that they are aligned parallel to the direction of bird movement).	EPC	Design phase	Included in the EPC costs	Monitoring

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
migratory birds	Take appropriate rainwater management measures to avoid the formation of small pools of water at the foot of the wind turbines that could attract birds and bats, which could then come to feed or nest near the wind farm.	O&M company	Operation phase	Included in the O&M costs	Monitoring
	Maintain a sufficient distance between the rotor blades and the surface to prevent the blades from hitting the water and disturbing birds flying near the surface	Project company	Operation phase	Included in the O&M costs	Monitoring
Poaching / hunting / trade	Hunting, falconry and trade will are strictly prohibited and shall be sanctioned. Information notes are to be posted.	O&M company	Operation phase	Included in the O&M costs	Monitoring
Herbicides and pesticides	An integrated pest management program will be put in place so as to avoid the use of pesticides and herbicides. If weeding is necessary, it will be carried out manually and/or mechanically. The use of pesticides shall comply with the AfDB's OS-4 requirements. Only low-toxicity pesticides that do not pose a threat to human health or the environment, and that will not affect the natural enemies of pests. The management and disposal of pesticides shall be in line with good international industry practice, such as the Food and Agriculture Organisation's (FAO) International Code of Conduct on the Distribution and Use of Pesticides. All chemicals, including ozone-depleting substances and persistent organic pollutants, pesticides classified as Class Ia (extremely hazardous), Ib (very hazardous) or II (moderately hazardous) are banned.	O&M company	Operation phase	Included in the O&M costs	Insignificant
Fire risks	The maintenance personnel of the lines and wind turbines will have to be trained on fire risks: the activities that can cause fires, the behaviour to follow to avoid fires, and the behaviour to adopt when faced with a fire. It shall therefore be necessary to introduce a total ban on fire igniting on the site, and to program high-risk activities (bush-clearing activities, etc.) outside the dry seasons.	O&M company	Operation phase	Included in the O&M costs	Minor

Table 35: Synthesis of project impacts on biodiversity and mitigation and / or compensation measures (Powerlines)

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
Collision and electrocution of birds and bats	Draw transport corridors to avoid critical habitats (e.g. nesting sites, heronries, rookeries, feeding and migration corridors for bats).	EPC	Design phase	Included in the EPC costs	Minor
	Maintain a 1.5 m (60 inch) gap between live parts and grounding equipment or, where such a gap cannot be provided, cover live parts and equipment.	EPC	Design phase	Included in the EPC costs	Minor
	Install objects that improve visibility, such as marker balls and other devices to keep birds away.	EPC	Design phase	Included in the EPC costs	Minor
	Suitable bird hunters will be installed above unsuspended insulators to prevent possible death of birds by electrocution.	O&M company	Operation phase	included in the O&M Costs	Minor
	Cables will be clearly visible with appropriate markers/bird flight diverter. Examples of diverters / flight markers	O&M company	Operation phase	included in the O&M Costs	Minor
	The markers will be installed to generate a visual effect of a diverter every 10 m. The markers will be installed on an alternative model. This arrangement can reduce collision accidents by 50-85%.	O&M company	Operation phase	included in the O&M Costs	Minor
Direct mortality of birds by electrocution with an electric line	The technical requirements established by MASEN/EDF Renouvelables for the construction of the power lines will take into account the guidelines on how to avoid or mitigate the impact of power lines on migratory birds in the African-Eurasian region, established by AEWA-CMS (Agreement on the Conservation of African Waterbirds – Eurasian Migratory Birds) and the Convention on Migration of Species (Bonn Convention) for the engineering design of power lines. This design will also be in line with the recommendations of the "Bern Convention Expert Group on Bird Conservation" and "Birds and Power Lines in the Rift Valley / Red Sea Flyway". These recommendations will be part of the technical requirements for the construction of the lines by the EPC and its subcontractors.MASEN/EDF Renewables will ensure via its internal environmental and social monitoring system that these requirements are met during the conception and construction phase.	MASEN/EDF Renouvelables and EPC and subcontractors	Construction phase	included in the construction costs	Minor

Impact	Mitigation	Responsibility	Schedule	Cost	Residual impact
Natural habitat and vegetation	Implement integrated vegetation management. The usual approach to managing vegetation in transmission line rights-of-way is to selectively remove large trees and encourage the establishment of low-growing grasses and shrubs. The choice of alternative techniques should take into account the specific characteristics of the environment and site, including potential effects on non-target, threatened and endangered species.	O&M company	Operation phase	included in the O&M Costs	Minor
	Eliminate invasive plant species, as far as possible, by cultivating native plant species	O&M company	Operation phase	included in the O&M Costs	Minor
	Monitor the state of vegetation in the right-of-way in relation to fire risks.	O&M company	Operation phase	included in the O&M Costs	Minor
	Schedule thinning, brush cutting and other maintenance activities to avoid seasons that are prone to forest fires.	O&M company	Operation phase	included in the O&M Costs	Minor
Fire risks	Implementation of a fire-fighting system at the transformer station in compliance with regulatory requirements	EPC	Operation phase	Included in the EPC costs	Minor

6.2.7 Management of waste, hazardous and non-hazardous materials

Table 36: Synthesis of project impacts on Management of waste, hazardous and non-hazardous materials and mitigation and / or compensation measures

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Volumes / Quantités de déchets solides	Prepare a site-specific waste management plan, including hazardous and non-hazardous waste. The plan will include staff training. This plan will include staff training. The waste management plan should comply with Moroccan standards and the IFC EHS guidelines. It will be approved by MASEN-EDF Renewables.	O&M company	Operation phase	included in the O&M Costs	Minor
	The physical and chemical composition of the waste and the identification of hazard characteristics will be established.	O&M company	Operation phase	included in the O&M Costs	Minor
	Recycling of scrap metal will be encouraged through existing recycling channels. The recycling and/or revalorisation of materials from existing turbines will be encouraged. The processes must be identified and controlled	O&M company	Operation phase	included in the O&M Costs	Minor
	Ordering materials with reusable, recyclable and/or bulk packaging can reduce waste generation. These practices will be preferred where possible.	O&M company	Operation phase	included in the O&M Costs	Minor
	Request that suppliers use minimal packaging.	O&M company	Operation phase	included in the O&M Costs	Minor
	Chemicals should be ordered in reusable drums.	O&M company	Operation phase	included in the O&M Costs	Minor
	Buy-back agreements should be established with major suppliers so that excess chemicals or materials can be returned.	O&M company	Operation phase	included in the O&M Costs	Minor
Cleaning	Separate waste streams to facilitate recycling. All storage areas must be well organized and waste managed appropriately through the separation of hazardous and non-hazardous waste. Waste in each category will be further segregated by type (paper, plastic, metal) and whether the material is recyclable or not. A waste log will be maintained on site and will contain, at a minimum, information on quantities, types	O&M company	Operation phase	included in the O&M Costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	of management solutions (according to the waste management hierarchy described in the reference section), operators, disposal/final destination, etc.).				
	Install adequate storage facilities for non-hazardous waste in designated areas to prevent it from being dispersed throughout the site.	O&M company	Operation phase	included in the O&M Costs	Minor
	Include sections at the beginning of employee training to increase knowledge of waste management protocols, including proper waste handling and storage, response and emergency plans.	O&M company	Operation phase	included in the O&M Costs	Minor
Storage of Waste	Food waste should be stored in a dumpster or trash can with a metal or plastic lid to prevent access by vermin/parasites.	O&M company	Operation phase	included in the O&M Costs	Minor
	Light waste such as paper, cardboard, plastics should be stored in a dumpster with a secure tarp or mesh sufficient to prevent dispersal.	O&M company	Operation phase	included in the O&M Costs	Minor
	For garbage (food or household waste), trash cans for separate categories will be placed throughout the site in areas where construction workers and staff consume food. These will be regularly collected and taken to the main waste storage area.	O&M company	Operation phase	included in the O&M Costs	Minor
	Waste containers will be clearly marked with appropriate warning labels accurately describing their contents and detailed safety instructions. Labels will be waterproof and securely attached. Whenever possible, chemicals will be kept in their original containers.	O&M company	Operation phase	included in the O&M Costs	Minor
	Waste generated during construction will only be transported off-site for disposal by an appropriately licensed provider. This service provider will follow appropriate protocols to ensure that all handling and disposal of waste from the site is done in accordance with applicable environmental regulations. A record of all waste streams generated and collected will be maintained on site.	O&M company	Operation phase	included in the O&M Costs	Minor
	Regular training of site personnel on waste management and proper chemical handling procedures will be conducted at regular intervals.	O&M company	Operation phase	included in the O&M Costs	Minor
	Incineration/combustion of waste on site will not be permitted.	O&M company	Operation phase	included in the O&M Costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Dangerous materials	Implementation of best practice procedures and regulations regarding proper handling, establishment of secure temporary storage areas, and disposal of waste by licensed companies.	O&M company	Operation phase	included in the O&M Costs	Minor
	Hazardous waste is disposed of in an environmentally sound manner and by the licensed hazardous waste operator.	O&M company	Operation phase	included in the O&M Costs	Minor
	Materials will be segregated as to whether they are combustible or noncombustible, and all flammable substances will be kept away from any source of ignition.	O&M company	Operation phase	included in the O&M Costs	Minor
	No underground hazardous materials containers will be placed.	O&M company	Operation phase	included in the O&M Costs	Minor
	Hazardous materials storage will be located in a dedicated fenced area with a separate drainage system and covered to prevent contact with rainwater. This hazardous materials storage area will be located with consideration for potential hazards (e.g., traffic accidents/collisions, falling objects, drainage system, etc.).	O&M company	Operation phase	included in the O&M Costs	Minor
	Mise en place de bacs de rétention pour l'entreposage de matières dangereuses. Les zones de rétention auront la capacité de contenir 110 % du volume total des matières entreposées et seront protégées de la circulation des véhicules et des autres risques. Cette zone doit être placée à l'écart de toute source d'inflammation. Les zones de stockages seront imperméabilisées à la base (cela nécessite au besoin de couvrir une large zone pour éviter la contamination des sols par exemple les zones de ravitaillement devront inclure une base imperméable qui protégé le sol où les véhicules sont stationnés), devront être couvertes et équipée de kits- de déversement.	O&M company	Operation phase	included in the O&M Costs	Minor
	Ret Hazardous material containers will be clearly marked with appropriate warning labels accurately describing their contents, detailed technical specifications and safety instructions. Labels will be waterproof and securely attached. Wherever possible, hazardous materials will be kept in their original containers.ention areas will have the capacity to hold 110% of the total volume of stored materials and	O&M company	Operation phase	included in the O&M Costs	Minor

Impact / Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	will be protected from vehicle traffic and other hazards. This area must be located away from any source of ignition.				
	Les matières dangereuses ne seront transportées vers le site, hors de celui-ci, que par un opérateur agréé approprié. Ce fournisseur de services suivra les protocoles appropriés pour veiller à ce que toutes les matières dangereuses soient transportées et transférées conformément aux réglementations environnementales en vigueur. Un registre de toutes les matières dangereuses sera conservé sur place.	O&M company	Operation phase	included in the O&M Costs	Minor
Waste management facilities	Only waste management facilities approved by the authorities should be used for the disposal of hazardous and non-hazardous waste, respectively.	O&M company	Operation phase	included in the O&M Costs	Minor
Soil and ground water pollution from waste issued from maintenance turbines	The wind farm won't product waste except during maintenance activities (defective parts, used oils, etc…). Prepare a site-specific waste management plan, including hazardous and non-hazardous waste. Implementation of best practice procedures and regulations regarding proper handling, the establishment of secure temporary storage areas, and the disposal of waste by licensed companies.	O&M Company	Operation	included in the O&M Costs	Insignificant
Solid waste from building services	Incineration/combustion of waste on site will not be allowed.	O&M Company	Operation	included in the O&M Costs	Insignificant
	Waste should be stored in a dumpster or bin with a metal or plastic lid to prevent access by vermin/parasites	O&M Company	Operation	included in the O&M Costs	Insignificant
	Collect the waste and send them to the nearest authorized landfill	O&M Company	Operation	included in the O&M Costs	Insignificant

6.2.8 Waste water management

Table 37: Synthesis of project impacts on wastewater Management and mitigation and / or compensation measures

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Pollution of soil and surface and ground water by liquid effluents from maintenance drains and leaks	A specific reaction procedure in the event of a spill or leak of a polluting product must be put in place; Training will be provided to all employees upon arrival and practical exercises are to be carried out; Absorbent material must be made available at intervals near transformers and storage areas for oils or other hazardous products; In the event of a leak or spill, the soiled products will be collected and evacuated by specialised channels; The oil transformers will be placed on retentions; Ensuring a high-performance maintenance system to guarantee optimal operation of transformers.	O&M Company	Operation	included in the O&M Costs	Insignificant
Pollution of soil, surface and ground water by the discharge of waste water	The waste water sewer system of the building services must be connected to a septic tank; This tank will be emptied as required by trucks and the recovered effluent will be sent to the nearest waste water treatment plant; Regular inspection of septic tanks; Documentary follow-up of the emptying.	O&M Company	Operation	included in the O&M Costs	Insignificant
Soil and Groundwater Pollution / for power lines	The operation of the power lines does not generate any discharge of contaminated water or pollutants into the soil or subsoil and will therefore have no impact on groundwater during the operation phase. There are no specific accompanying measures in place. On the other hand, in case of important maintenance operations, the measures taken for the protection of water against accidental pollution are identical to those foreseen for the protection of soils during the construction phase.	O&M Company	Operation	included in the O&M Costs	Insignificant

6.2.9 Traffic and transportation

Table 38: Traffic - Some operational mitigation measures

Impact/ Source	Mesures d'atténuation	Responsabilité	Programme	Coût	Impact résiduel
Vehicle traffic along the RP4703 access road to the site and the access roads through the douars.	Develop a transportation management plan	O&M Company	Operation phase	included in the O&M Costs	Insignificant
	Determine designated access routes for collection and delivery, site entry points and parking areas, etc.	O&M Company	Operation phase	included in the O&M Costs	Insignificant
	Determine regular vehicle maintenance requirements in accordance with national and GIIP requirements	O&M Company	Operation phase	included in the O&M Costs	Insignificant
	Specific parking areas will be designated in appropriate locations	O&M Company	Operation phase	included in the O&M Costs	Insignificant
	Vehicle movement along the access road will be minimized to essential operational and maintenance activities.	O&M Company	Operation phase	included in the O&M Costs	Insignificant

6.2.10 Archeology and cultural heritage

There will be no significant impacts on the historic and religious heritage during the operation phase, so there are no measures identified.

6.2.11 Landscape and visual impact

Table 39: Synthesis of project impacts on landscape and visual impact and mitigation and / or compensation measures

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Modification of landscape	Examine the visual impacts of the wind turbines from all angles before selecting the final site for their installation.	EPC	Operation phase	Included in the EPC costs	Moderate

characteristics affecting the visual field (co-visibility)	Ensure uniformity in turbine size and design (direction of rotation, type of turbine and mast, height).	EPC	Operation phase	Included in the EPC costs	Moderate
	Paint all turbines with the same colour, choosing a shade close to the colour of the sky (light grey or light blue).	EPC	Operation phase	Included in the EPC costs	Moderate
	Avoid using letters, logos, advertisements or other graphic designs on wind turbines.	O&M Company	Operation phase	No cost	Moderate
Light pollution	The supply of lighting must not be excessive or unnecessary - The lights of the plant will be turned on only when strictly necessary	O&M Company	Operation phase	No cost	Moderate

Table 40: Synthesis of project impacts on landscape and visual impact and mitigation and / or compensation measures (Powerlines)

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Modification of landscape characteristics that have an impact on the visual field (co-visibility)	Organize large-scale public consultations when choosing the location of power lines and their right-of-way	EPC	Operation phase	Included in the EPC costs	Moderate
	Install power lines and design substations taking into account the landscape, environmental features and the characteristics of the local population.	EPC	Operation phase	Included in the EPC costs	Moderate
	Accurately assess the impact on property values due to the proximity of power lines	EPC	Operation phase	Included in the EPC costs	Moderate
	Avoid the most populated areas as much as possible.	EPC	Operation phase	Included in the EPC costs	Moderate

6.2.12 Socio-economics and community health and security

Table 41: Synthesis of project impacts on socio-economics and community health and security and mitigation and / or compensation measures (Windfarm)

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Employment	The project will aim to employ local workers where they are ready with particular and appropriate skills. All unskilled jobs are likely to be offered to local residents as a priority before hiring employees from other regions Employment of women and vulnerable groups will be specifically targeted and monitored where possible. .	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Establish and implement a recruitment policy and ensure that the necessary measures to mitigate the negative effects related to working conditions and employment are implemented (e.g. child and forced labour, exploitation, excessive overtime, insufficient wages, harassment, hazardous living and working conditions /.). Working conditions will be brought in line with EBRD/IFC standards	O&M company	Operation phase	included in the O&M Costs	Insignificant
Achats/approvisionnement	O&M will only engage with reputable suppliers who do not use forced or child labour. Local/regional procurement of goods and services by labor and building materials will be prioritized	O&M company	Operation phase	included in the O&M Costs	Insignificant
Dissemination of Skills	Local employees will receive training in SE and HST to enhance skill development. A certificate describing the content of the training and signed by plant management will be provided	O&M company	Operation phase	included in the O&M Costs	Insignificant
Conflicts Mgmt – Workforce / Local residents	Initial training will include information on the cultural background of the population. The security company and its staff will adhere to international best practices regarding the use of security forces: - Linking security to community relations; - Provide security with respect for human rights; - Use of force should be defensive and preventive only;	O&M company	Operation phase	included in the O&M Costs	Insignificant

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	- Take into account women's unique experiences and perspectives; - Coordinate community relations and establish grievance mechanisms. The security company should also encourage public security personnel to behave in a manner consistent with the principles outlined for private security personnel in Performance Standard 4				
Spread of diseases	Disease prevention (including STDs and COVID 19 if appropriate) will be part of the training programes.	O&M company	Operation phase	included in the O&M Costs	Insignificant
Health and safety of the local community / public access	The prevention and control measures aimed at managing public access to the wind farm facilities consist of : • Installing barriers on the access roads to the site ; • closing off access to the ladders to the masts; • Installing information panels on the risks involved and on the services to contact in case of emergency	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Inform the local population of the existence of a grievance management mechanism (operation phase) where the PAPs can express their grievances related to the nuisances generated by the operation of the park (noise, stroboscopic effect, ...)	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Measures related to noise impacts on population displacement are included in Chapter 8.	O&M company	Operation phase	included in the O&M Costs	Insignificant
Aircraft navigation safety	Consult with the relevant aviation authorities before installation, in accordance with air traffic safety regulations. Mark the turbines and install anti-collision markings on the masts and blades	Project Sponsors	Design phase	no cost	Insignificant
	Inform the civil aviation authorities of the windfarm commissioning.	O&M company	Operation phase	included in the O&M Costs	Insignificant
Blade/Ice Throw	Establish setback distances between turbines and populated locations. The minimum setback distance is 1.5 x turbine height (tower + rotor radius).	EPC	Design phase	no cost	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Equip wind turbines with vibration sensors that can react to any imbalance in the rotor blades and shut down the turbine if necessary.	EPC	Design phase	no cost	Minor
	Ensure regularly maintenance of the wind turbines	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Install warning signs to warn the public of the risk of falling	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Assess ice formation risk and consider the risk in turbines choice	EPC	Design phase	no cost	Minor
	In the event of falling ice, the following measures should be implemented - idle the turbines during periods of ice formation; - Install warning signs at least 150 meters from the turbines in all directions; - Equip turbines with heaters and ice sensors; - Use cold-resistant steels for the wind turbine mast; - Use synthetic lubricants suitable for low temperatures; - Use black fluoroethane-coated blades; heat the entire blade surface if possible or, failing that use a tip heating system at least 30 cm wide.	O&M company	Operation phase	included in the O&M Costs	Insignificant
Electromagnetic interference and radiation	Prefer wind equipment with components designed to minimize interference with radar signals (e.g., nacelle shape and materials) and use radar-absorbing materials (e.g., blades made of epoxy or glass fiber reinforced polyester) to avoid electrical interference The potential exposure of the local population to electromagnetic fields should be assessed and ensured that it does not exceed the EU and WHO limit values of 100 µT or 5000 V/m. A minimum distance between the power line and dwellings of 20 metres is recommendedIncorporate power lines into urban planning documents to avoid future construction within a 60-meter corridor on either side of the lines.	EPC	Operation phase	no cost	Minor
	If interference is detected during operation : - install better quality aerials or directional aerials; - point the aerial towards another television transmitter;	O&M company	Operation phase	included in the O&M Costs	Insignificant

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	- install amplifiers; - move the aerials; - if the disturbances exist in an enlarged area, contemplate building a new relay station., install higher-quality or directional antenna.				
Shadowflicker effects	The grievance mechanism will collect any complaint from residents so that they can be examined.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	- Redefine the orientation of wind turbines to avoid residential areas in the narrow bands that typically extend southwest and southeast of the turbines, where the frequency of sun glare on the blades is higher;	O&M company	Operation phase	included in the O&M Costs	Insignificant
	In the event of complaints at sensitive receptors, and after verification that the grievance is due to the Project's shadow flicker effect are exceeded at the sensitive receptors, implementation of appropriate mitigation measures.	O&M company	Operation phase	included in the O&M Costs	Minor
	- Wind turbines that have a shadow flicker impact will be programmed to stop when shading limits are exceeded. The stroboscopic studies conducted for the Koudia El baida project have identified the turbines concerced by flicker curtailment and the duration of shutdown (see table below)	O&M company	Operation phase	included in the O&M Costs	Minor

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact

Koudia Al Baida Repowering W.F. – Flicker curtailment

WTG	Stopped due to flicker curtailment [h/year]
T01	
T02	68:32:00
T03	58:46:00
T04	64:01:00
T05	
T06	
T07	32:36:00
T08	96:19:00
T09	19:25
T10	14:55
T11	
T12	
T13	
T14	
T16	70:27:00
T17	
T18	
T19	187:54:00
T28	
T29	

Table 42: Synthesis of project impacts on socio-economics and community health and security and mitigation and / or compensation measures (Powerline and substation)

Impact / Source	Mitigation Measure	Responsibility	Schedule	Cost	Residual impact
Electric and Magnetic Fields	The potential exposure of the local population to electromagnetic fields should be assessed and ensure that it does not exceed the limit values set by the EU and WHO at 100 µT or 5,000 V/m. A minimal distance between the powerline and the dwellings of 20 meters is recommended.	EPC	Design phase	Included in the EPC contract	Insignificant

6.2.13 Occupational health and safety

Table 43: Synthesis of project impacts on occupational health and safety and mitigation and / or compensation measures

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
General	Prepare an occupational health and safety management plan included an emergency rescue plan compliant with Moroccan regulations, ILO conventions and the EHS IFC general guidelines and wind energy guidelines.	O&M company	Operation phase	included in the O&M Costs	Insignificant
Working at height	- Test the integrity of the structure before starting work; - Implement a fall protection programme that includes training in climbing techniques and the application of fall protection measures; inspection, maintenance and replacement of fall protection equipment; and rescue of workers whose fall has been interrupted; - The fall protection system must be suitable for the structure of the mast and the movements required, including ascending, descending and moving from one point to another; - Provide level access to the base of the turbine by positioning the entrance door at the same level as the working area in front of the turbine; - Install fixed attachments to mast elements to facilitate the use of fall protection systems	O&M company	Operation phase	included in the O&M Costs	Insignificant

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	- Provide a good system of positioning devices for workers. The connectors of the positioning systems should be compatible with the mast elements to which they are attached; - Install a fixed ladder allowing access to all landings (from the lowest level to the basket). It must be fitted with a safety net and a belaying device allowing the use of personal protective equipment against falls from a height; - Use safety belts made of at least millimetre (5/8 inch) lined nylon or other material of equivalent strength. Rope seat belts should be replaced before they show signs of age or fibre wear; - Provide a second (backup) safety belt for workers who operate power tools at height; - Remove signs and other obstructions from poles or structures before starting work; - Use an approved tool bag to raise or lower tools or equipment used by workers working on structures at height; - Avoid carrying out installation and maintenance work in adverse weather conditions, particularly where there is a risk of lightning - Anchor points should be provided to ensure access to the interior of the mast and to allow operators to use fall protection equipment. The location of the anchorage points must be defined by the turbine operator, taking into account their function (restraint, work holding, fall arrest). They should be positioned as high as possible in order to reduce the fall factor and the risk linked to the air draft. - Recommend remote monitoring devices to limit the number of interventions at the top of the nacelle.				
Lifting operation	- All load information must be known and recorded (size, weight, sling method and attachment points) - All lifting equipment (including load attachment points) is suitable, capable of supporting the load, in good condition and has undergone all required regulatory inspections. - All supervisors, equipment operators and slingers are trained and competent in lifting equipment and intended lifting techniques. - Where possible, exclusion zones should be established and maintained to prevent unauthorized access to lifting areas.	O&M company	Operation phase	included in the O&M Costs	Insignificant

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	- When lifting heavy loads, ensure that weather conditions are favorable for the task. Heavy lifting equipment generally has safe operating parameters included in its operating manual and these parameters should not be exceeded at any time.				
Isolated work / remote locations	Reduce as far as possible the number of isolated work situations by setting up remote monitoring and control devices (data collection, fault identification system, etc.).	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Set up an appropriate communication system in order to keep in touch with the workers (fixed telephone line/landline in wind turbines, radios,...).	EPC	Operation phase	Included in the contract	Insignificant
	Set up a local emergency plan.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Training workers in first aid.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Ensuring good coverage by the mobile telephone network will facilitate communication conditions and the intervention of rescue services in case of need.	O&M company	Operation phase	included in the O&M Costs	Insignificant
Electrical risks	Authorize only trained and certified workers to install, maintain or repair electrical equipment.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Put warning signs on all electrical devices and cables.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Apply double insulation / ground all electrical equipment used in wet or potentially wet environments; use equipment with GFI protected circuits.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Apply warning labels to technical rooms containing high-voltage equipment ("electrical hazards") to which access is controlled or prohibited.	O&M company	Operation phase	included in the O&M Costs	Insignificant

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Establish "no approach" zones around and u nder high-voltage lines, in accordance with IFC EHS guidelines. Define in a health and safety plan the required training, safety measures, personal safety equipment, and other precautions necessary when maintenance and operation must be performed at less than the minimum safe distance,	O&M company	Operation phase	included in the O&M Costs	Insignificant
Working conditions	Adopt a human resources policy that describes its approach to managing workers in accordance with the requirements of Performance Standard 2; - Document and communicate all terms and conditions of employment to all workers; - Comply with all collective bargaining agreements with a workers' organization and provide reasonable working and employment conditions in accordance with national legislation. - Recognize the right of workers to form or join workers' organizations, regardless of the recognition of this right under national law. - Base employment decisions on the principle of equal opportunity and fair treatment; - Ensure fair treatment, non-discrimination, equal opportunity	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Ensure a good relationship between workers and management.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Comply with national employment and labour laws, particularly in the drafting of employment contracts.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Protect workers, especially those belonging to vulnerable categories.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Promote health and safety.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	No resort to forced or child labour.	O&M company	Operation phase	included in the O&M Costs	Insignificant

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
	Undertake inspection, audit and review activities to ensure that the contractor's health, safety, security, welfare and environmental objectives are met.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Set up an HSE manager to provide assistance in implementing and maintaining the process of hygiene, health and safety for workers and the environment.	O&M company	Operation phase	included in the O&M Costs	Insignificant
Risks related to the working environment	To avoid ground-level risks the following measures should be taken into consideration from the design phase onwards: • Provide sufficient space at the foot of the wind turbines • Avoid unnecessary obstacles and steps • Provide collective protection (guardrails) around work areas where possible • Choose a floor covering adapted to the climatic conditions Provide sufficient lighting (around 75 lux) in the traffic area	O&M company	Operation phase	included in the O&M Costs	Insignificant
	No employee shall be exposed to a noise level greater than 85 dB(A) for a period of more than 8 hours per day without wearing earmuffs. In addition, unprotected ears must not be exposed to a peak (instantaneous) sound pressure level of more than 140 dB(C).	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Machine operators must be trained and they shall undergo periodic medical check-ups.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Machinery used on site must be well maintained and equipped with back-up warning devices.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Facilitate access to appropriate hydration systems, such as drinking water or electrolyte drinks, or preventing the consumption of alcoholic beverages. Set up an equipped infirmary with the presence of an occupational physician.	O&M company	Operation phase	included in the O&M Costs	Insignificant
	Train all employees to be aware of their own responsibilities with regard to relevant health and safety issues, and ensure that they participate in the prevention of accidents and cooperate in measures taken to prevent occupational diseases.	O&M company	Operation phase	included in the O&M Costs	Insignificant

Table 44: Worker Health and Safety - Mitigation Measures - for Power Line Operations

Impact/ Source	Mitigation Measures	Responsibility	Schedule	Cost	Residual impact
Working at height	All of the above measures are applicable to power lines.	O&M company/ ONEE	Operation phase	inclus dans les coûts d'O&M	Insignifiant
Electromagnetic fields	Implementing a safety program, which includes : • Determining potential occupational exposure levels, including survey-based assessment of exposure levels in new projects and the use of personal measurement devices during work activities; • Training or - Implementing a safety program, which includes: • Determining potential exposure levels in the workplace, including survey-based assessment of exposure levels in new projects and the use of personal measuring devices during work activities; • Train workers to determine the levels and risks of occupational exposure to electromagnetic fields; • Establish and identify safety zones to distinguish areas where the level of exposure to electromagnetic fields is acceptable to the general population/general public from work areas where the risk is high and, therefore, limit access to these risk areas to trained workers; • Establish and identify safety zones to distinguish areas where the level of exposure to electromagnetic fields is acceptable to the general population/general public from work areas where the risk is high and, therefore, limit access to these risk areas to trained workers.	O&M company / ONEE	Operation phase	inclus dans les coûts d'O&M	Insignifiant
Exposure to chemicals	• - Train personnel in pesticide application and ensure that they receive the necessary certification or equivalent training; • -Respecting the safety period after each treatment to avoid exposure to crops with residues of pesticides when resuming activities; • - Ensuring hygienic measures are followed (in accordance with FAO guidelines and the pest management plan) to avoid exposure of operators' families to pesticide residues	O&M company/ ONEE	Operation phase	inclus dans les coûts d'O&M	Insignifiant

6.3 Decommissioning phase

The synthesis of project impacts and mitigation measures for dismantling wind farm of Kouida El baida are detailed in the tables below.

Table 45: Synthesis of project impacts on occupational health and safety and mitigation and / or compensation measures

Impact / Source	Mitigation measure	Responsibility	Program
Dismantling of the future wind farm (general order)	Carry out a site rehabilitation study, based on a new ecological diagnosis and which takes into account the prospective condition of the site and the new technologies that can be used for the dismantling of the project and the rehabilitation of the site.	MASEN- EDF renewable	ESMP - dismantling
	The dismantling plan must take into account the presence of critical habitat near the site and take steps with the competent services to take charge of the protection of these environments.	MASEN- EDF renewable	ESMP - dismantling
Soil erosion	Plan dismantling work outside the rainy season, which lasts between November and March. Avoid a complete decompaction of the tracks which could generate a new erosion process.	MASEN- EDF renewable	ESMP - dismantling
Waste management (solid and liquid)	Design and implement a solid waste and wastewater management system generated during the decommissioning phase; this plan can be a continuation of the one adopted during the operation of the project.	MASEN- EDF renewable	ESMP - dismantling
	At the end of the dismantling, the site should contain no dangerous liquids and no metallic or electrical elements, visible or buried, which could interfere with the usual activities of forestry, grazing, etc.	MASEN- EDF renewable	ESMP - dismantling
Natural environment	The rights-of-way of the dismantling works of each component of the project should be rehabilitated: decompact surfaces trampled by excavation and transport machinery. The surface part of the wind turbine fixing platforms will be fragmented so as to allow passive colonization by riparian vegetation. In order to avoid the reuse of the connecting tracks between the wind turbines (and an occupation of the site by human habitat), their coating will be decompressed so as to facilitate their rapid occupation by vegetation.	MASEN- EDF renewable	ESMP - dismantling

	Include in the awareness campaign against the disturbance of animal species, the ecological and economic effects of eliminating animals. Carry out (in the study recommended as a general measure) a study of the risks of mortality and disturbance of wildlife, based on an updated diagnosis.	MASEN- EDF renewable	ESMP - dismantling
Fire hazards	Allowing the use of fire extinguishing equipment (extinguishers, tanks equipped to extinguish the fire) acquired during the operational phase is sufficient in principle. Raise awareness among dismantling workers about the causes of forest fires.	MASEN- EDF renewable	ESMP - dismantling
Pressure on existing infrastructure	At the end of the dismantling phase, the project leader will rehabilitate the sections of road that it will have damaged.	MASEN- EDF renewable	ESMP - dismantling

6.4 Cumulative impact assesment

A Cumulative impact Assessment (CIA) process was undertaken to understand the impacts of the wind farm project and power line development alongside the development of other commercial, industrial infrastructure in the area.

Spatial boundaries for identifying cumulative impacts were set within a radius of 20 km from the approximate center of the Koudia El Baida wind project.

Within this 20 km radius circle, the following developments have been identified:

- 2 existing wind farms: Khelladi wind farm and El Houma wind farm)
- Power lines
- Two posts
- Four quarries in operation;

The two existing parks are relatively parallel to the migration corridors. The repowering of Koudia Al Baida takes into account the main migration corridor at the level of the main ridge A2. The position of the Khelladi and Haouma wind farms in parallel with the migration corridors and the consideration of the constraints of the migratory corridors for the Koudia Al Baida repowering project greatly limits the cumulative impact of the Koudia Al Baida repowering project.

A cumulative effect can be induced by the proximity of an electric line constituting a second obstacle to the movements of birds. However, this line also remains parallel to the migration corridors, therefore the cumulative impacts are low to insignificant.

The repowering project being implemented on an existing park, the loss of habitat and destruction of flora is insignificant. We can even consider a positive impact because the footprints of the platforms will be less important taking into account the lower number of wind turbines.

As for existing quarries, the cumulative impact mainly concerns:

- The increase in dust during the construction phase
- Pressure on the use of water during the works (watering of the tracks)
- Congestion of the RP 4703 by the heavy goods vehicle which increases the probability of accident risks.

The operators of existing quarries must be sufficiently informed of the cumulative impacts that may occur following the implementation of the project, particularly during the works phase. It is recommended that MASEN / EDF RENOUVELABLES initiate dialogue with quarry operators in order to pool efforts to reduce the cumulative impacts that may occur on the areas or resources used or the safety of road users.

In return, the cumulative impacts of the two projects can be positive on the project area with not only the increase in the number of employees of the local population but also by creating an economic dynamic at the level of the municipality of Tlat Taghramt by creating income-generating activities around the two projects (catering areas, rental of real estate, transport, etc.).

However, it is recommended to get in touch with other developers of wind farms located in the same geographic area to implement a coordinated approach to surveys and monitoring that will serve to assess cumulative impact while throughout the project.

The potential cumulative impact due to Koudia El Baida windfarm project will be assessed more precisely once monitoring data of the surrounding windfarms will be avalaible.

7. Public consultation process

In order to comply with the guidelines of the donors, public information meetings must be conducted.

7.1 Consultations during the house acquisition phase

During this phase, MASEN held several meetings with the authorities (in particular the governor) in order to present the project to him and inform him of MASEN's desire to acquire the houses near the T29 wind turbine in order to minimize the noise impact on these houses given their proximity to the said wind turbine (between 200m and 500m).

As part of the acquisition process of houses impacted by the project, the meetings that are held are presented in the table below:

Table 46: Meetings held in connection with the acquisition[13]

Purpose of the meeting	Dated	Targeted stakeholders	Means of communication
Presentation of the results of the plot survey and discuss the modalities of mobilization and compensation of the houses affected by the displacement.	Week of July 06, 2020	Governor of the province of Fahs Anjra and members of the commission.	Fax sent 03/07/2020
Meeting of administrative review committee to define the sale price of the goods	07/17/2020	Secretary General of the Province The president of the municipality of Taghramt MASEN Representing the various departments that make up the commission.	Minutes of the meeting of 07/17/2020
Information meeting for owners concerned by the acquisition and their support for the development of deeds of engagement where the owners confirm and undertake to leave the houses following the amicable sale process to MASEN.	06/16/2021	Owners of the houses affected by the acquisition.	See the residents' commitments in appendix 4

[13] Established on the basis of information from the PAT and its annexes communicated by MASEN

7.2 Consultations during the realization of the baseline

Carrying out the various baseline studies provided an opportunity to directly consult the various stakeholders interested in the project during field investigation missions and data collection missions from administrations.

7.3 Consultation during the ESIA process

As required by Law 49-17 on environmental assessment, stakeholder consultation will be carried out as follows:

- Provision of the various documents relating to the environmental impact study to the local population and the competent authorities (filing at the IRC platform);
- Following the provisions of the governorial decree of the Governor of the province of Fahs Anjra and the Governor of the prefecture of M'diq-Fnideq, a public inquiry will have to take place at the level of the municipalities concerned by the project for a period of 20 days. The purpose of this survey is to enable the population concerned to learn about the possible impacts of the project on the environment and to collect their observations and related proposals which will be entered in a register filed at the level of the municipalities.

During the investigation, the chairman of the commission takes all the necessary measures allowing the population concerned to consult the investigation file, at the headquarters of the districts concerned by the project.

At the end of this investigation, the commission draws up the report of the public inquiry on the basis of the observations contained in the registers. This report must summarize the observations and proposals made by the population concerned about the project.

The project will then be examined by the unified regional investment committee. This committee is made up of several ministerial departments.

7.4 Public consultation meeting

Two public consultation meetings (at the level of the three municipalities concerned by the project) according to IFC and EBRD standards should be carried out in order to inform the local population and the various stakeholders. The purpose of these consultations is to collect the stakeholders' point of view on the various environmental and social issues raised by the project and to collect their various comments and proposals.

These public consultations will also aim to present the mechanism for managing grievances that will be put in place as part of the Koudia El Baida wind farm project, in accordance with IFC and EBRD guidelines.

7.5 Grievance mechanism

A system for recording and monitoring grievances will be implemented by Koudia SPV, EPC and the O&M company.

Complaints will be collected weekly and processed within a period of one month.

8. Environmental monitoring plan

8.1 Environmental monitoring plan in construction phase

8.1.1 Objectif

Environmental monitoring is to ensure that the commitments and recommendations for environmental issues included in this ESIA will be applied. At first, this monitoring includes the integration of mitigation and other environmental considerations measures in the plans and specifications and their implementation during construction.

The Koudia SPV will approve the main CESMP and the related procedures and plans 30 days prior to the start of construction both with the detailed studies submitted by contractors assessing the mitigation measures that companies should integrate.

Thus, the CESMP and the related procedures and plans should be submitted to the Koudia SPV for review at least 3 months prior to the start of construction.

8.1.2 Monitoring plan content in construction phase

Environmental monitoring consists of ensuring that mitigation and compensation measures have been taken into account in both design and construction phases.

The environmental monitoring plan will involve the following aspects during the work:

Table 47 : Monitoring plan in construction phase

What (Wich parameter to be monitored?)	**Where** (Place / monitoring point ?)	**How** (is the parameter to be monitored?)	**When** (Define the frequency / Period)	**Why** (is the parameter to be monitored?)	**Cost**	**Who** (Is responsible for the contrôle?)
Air quality - Dust (PM 2.5 & PM 10)	Boundaries of site construction (road access, windturbines platforms) Out door Facilities areas (with employees presence)	measuring by portable equipment for total MP, MP2.5 & PM 10.	Weekly. Daily in case of dust generating activities or in windy conditions> 15 km/h	Dust generated by machinery and vehicles used for earthworks	Integrated into the project budget	EPC
Air quality – Exhausts	Vehicles / exhausts of equipment and machinery	Visual inspection of smoke (monitoring and control of equipment and machinery before / during use)	Daily	Sending equipment and machinery for maintenance, maintenance or replacement, in case of significant or visible smoke development	Cost borne by the contractor	EPC
Noise	Surrounding sensitive receptors	Noise monitoring standards	Weekly frequency	Increased noise by construction work (earthworks, excavations, etc.)	Cost borne by the contractor (as an indication, the cost of a sound level meter: 2000 - 5000 Dh)	EPC
Waste water – (level, leaks)	Chemical toilets	Monitor the good working condition and the emptying needs	Weekly	Wastewater in the natural environment	Integrated in the cost of the work	EPC
Waste management	All over the site construction	Presence of not collected solid waste	Daily	Compliant with law 28-00 and CESMP and IFC's Standards	Integrated in the cost of the work	EPC
Waste management	On dedicated solid waste storage areas	Identify the quality of waste to classify them	control	To prevent anu contamination and to be manage disposal and recycle channels	Integrated in the cost of the work	EPC

What (Wich parameter to be monitored?)	**Where** (Place / monitoring point ?)	**How** (is the parameter to be monitored?)	**When** (Define the frequency / Period)	**Why** (is the parameter to be monitored?)	**Cost**	**Who** (Is responsible for the contrôle?)
		Waste management plan (approved by Koudia SPV)		To be compliant with Moroccan regulations and IFC's standards		
Waste management	-	Recording quantities and various flux Waste management plan (approved by Koudia SPV)	Whenever waste is identified off-site or recycled on-site	Process control of waste recycling and off-site disposal by approved subcontractors. To be compliant with Moroccan regulations and IFC's standards.	To be agreed and validated between contractor and evacuation and on-site waste management company	EPC
Avifauna	Project area	Field survey	Pre-construction and construction phase (Migration seasons)	To get additional data for migratory birds and nesting birds	To be identified	EPC or Project Company
Herpotofauna	Project area	Field survey	Pre-construction (Spring 2022)	To get additional data for herpetofauna	To be identified	EPC or Project Company
Insects	Project area	Field survey	Pre-construction	To get additional data on the sensitive insect specie identified (*Nimbus anyerae*)	To be identified	EPC or Project Company
Bats	Project area	Field survey	Pre-construction (Spring 2022)	To get additional data on bats	To be identified	EPC or Project Company
Habitats	Project area	Delimitation of senstive habitats	Pre-construction and construction phase, prior to vegetation clearance	To protect sensitive habitats	To be identified	EPC or Project Company
Archeology	Earthworks for road access and turbines platforms	Visual inspection	during construction phase	To identify any artefact	Cost of an archeologist	EPC

What (Wich parameter to be monitored?)	**Where** (Place / monitoring point ?)	**How** (is the parameter to be monitored?)	**When** (Define the frequency / Period)	**Why** (is the parameter to be monitored?)	**Cost**	**Who** (Is responsible for the contrôle?)
Job offer	Not applicable	Local Labor Report	Whenever there is a need for recruitment	Provide jobs for local people	Integrated in the cost of work	EPC
Register of grievances	To be defined	Record complaints and how they are handled	Whenever there is a complaint	Registration of the complaint, its care and follow-up	Integrated in the cost of work	EPC
Emergency supervision	Not applicable	Register the emergency case and follow-up of its support	Whenever there is an emergency	Register the emergency case and follow-up of its support	Integrated in the cost of work	EPC
Independent Audits of the Environment - Documentation	-	The auditors review the environmental documentation kept at the plant, verify the proper implementation of the environmental procedures in place in the ESMP (CEMP) and the application of the mitigation and monitoring measures cited in ESIA, including results of monitoring	Quarterly frequency	Independent environmental audits provide assurance of compliance with the measures proposed in ESIA and the ESMP. Audit reports can be provided to the funder	Cost of an independent environmental expert	Project Company
Independent Environmental Audits - Site Inspection	-	Auditors visit the plant site to ensure that environmental procedures are properly applied	Annual frequency	Independent environmental audits provide assurance of compliance with the measures proposed in ESIA and the ESMP. Audit reports can be provided to the funder	Cost of an independent environmental expert	Project Company
Independent environmental audits – Surveillance	-	The auditors will have their own samples and the measurements of the monitoring elements	Annual frequency	Independent environmental audits provide assurance of compliance with the measures proposed in ESIA and the ESMP.	Cost of an independent environmental expert	Project Company

What (Wich parameter to be monitored?)	**Where** (Place / monitoring point ?)	**How** (is the parameter to be monitored?)	**When** (Define the frequency / Period)	**Why** (is the parameter to be monitored?)	**Cost**	**Who** (Is responsible for the contrôle?)
		described above for the works and operation phases, if deemed necessary to confirm the validity of the results provided by the contractor or developer		Audit reports can be provided to the funder		

8.2 Environmental monitoring plan in operation phase

8.2.1 Objectives and implementation

Environmental monitoring concerns the operational phase and pursues two objectives within the framework of the project:

- Evaluate the adequacy of environmental assessment and, as needed, adjust the impact assessment and propose mitigating measures allowing the minimization of unforeseen repercussions on the project's insertion environment;
- Evaluate the performance of mitigation measures and, if necessary, make improvements,

The Koudia SPV will approve the main OESMP and the related procedures and plans 30 days prior to the start of operation.Thus, the OESMP and the related procedures and plans should be submitted to the Koudia SPV for review at least 3 months prior to the start of operation.

Environmental monitoring of the operation of the Koudia Al Baida windfarm repowering project will be placed under the responsibility of Koudia SPV which must designate a person responsible for the environment in the operational phase. The O&M company for the project will ensure for his part the environmental monitoring suited for this windfarm and powerlines and will designate a person responsible for the environment in the operational phase.

The principal functions of environmental monitoring will be the following:

- Establish an exhaustive list of the measures in, the ESIA;
- Establish a detailed schedule of activities to be carried out in order to meet the commitments and the implementation of the proposed measures;
- Document actions taken (letters, written reports, photographs, etc.);
- Prepare six-month reports of activities carried out within the framework of environmental monitoring ;
- Announce the results of the monitoring to the concerned administrations, ministries involved with the management and protection of the environment, international moneylenders, and to the local population.

In addition, a six-month report on environmental monitoring will be prepared. Nevertheless, in the event of an incident or an activity likely to have significant impact on the environment during operation, an immediate report will be produced in order to put in place, as rapidly as possible, the appropriate corrective measures.

The six-month report and eventual immediate reports in case of an incident will be addressed to the money lenders. Practical formatting for reporting will be specified at a later time.

The six-month report during the construction phase may contain the following elements:

- Principal phases of work accomplished (i.e.: purification of rain-water, placement of civil engineering elements, etc…);
- Environmental issues related to these steps (soils, natural environment, etc…);
- Measures implemented by the company;
- Possible impacts and measures taken;
- Elements of synthesis of possible complaints.

The six-month report in the operational phase may contain the following elements:

- Status of electrical production;
- Possible incidents observed;
- Elements of synthesis of possible complaints.

8.2.2 Monitoring plan

The following table is a proposal for an environmental monitoring plan.

Table 48 : Monitoring plan in operation phase (Windfarm)

What (Wich parameter to be monitored?)	**Where** (Place / monitoring point ?)	**How** (is the parameter to be monitored?)	**When** (Define the frequency / Period)	**Why** (is the parameter to be monitored?)	**Cost**	**Who** (Is responsible for the contrôle?)
Noise	sensitive receptors for windfarm	Measures at sensitive receptor (identified in the baseline conditions to compare the ambient noise with the residual noise)	One year after commissioning Measures in line with international standards (IFC guidelines for wind energy)	To asses the level of noise with the windfarm	To be identified	O&M Co
Shadow flicker	sensitive receptor in case of complaint	Measures	If complaint	Assess the effect	To be identified	O&M Co
Bats monitoring activity	at least 4 recorders on wind turbines in moderately sensitive areas.	Recorder in wind Turbines	for a period of one year	Ensure presence or absence of bats at height	To be identified	O&M Co
Bats monitoring mortality	Windfarm	Visual observation	Period of bats activity	Assess the mortality	To be identified	O&M Co
Ecological status of vegetalisation areas	Windfarm	Visual observation	To be defined	Assess the development of the vegetation	To be identified	O&M Co
Avifauna (nesting and migratory) activity and mortality	Windfarm	Visual observation	To be defined	Assess the impact	To be identified	O&M Co
Job offer	Not applicable	Local Labor Report	Whenever there is a need for recruitment	Reduce the use of foreign labor as much as possible	Not defined	O&M Co

What (Wich parameter to be monitored?)	**Where** (Place / monitoring point ?)	**How** (is the parameter to be monitored?)	**When** (Define the frequency / Period)	**Why** (is the parameter to be monitored?)	**Cost**	**Who** (Is responsible for the contrôle?)
Register of grievances	To be defined	Register complaintsand how they are handled	Weekly and treatment within one month	Registration, address and complaint tracking	Integrated with the operating cost	O&M Co
Emergency supervision	Not applicable	Register the emergency case and follow-up of its support	Whenever there is an emergency	Register the emergency case and follow-up of its support	Integrated with the operating cost	O&M Co
Independent Audits of the Environment -Documentation	-	The auditors review the environmental documentation kept at the plant, verify the proper implementation of the environmental procedures in place in the ESMP (OESMP) and the application of the mitigation and monitoring measures cited in ESIA, including results of monitoring	Quarterly frequency	Independent environmental audits provide assurance of compliance with the measures proposed in ESIA and the ESMP. Audit reports can be provided to the funder	Cost of an independent environmental expert	Project Company
Independent Environmental Audits - Site Inspection	-	Auditors visit the plant site to ensure that environmental procedures are properly applied	Annual frequency	Independent environmental audits provide assurance of compliance with the measures proposed in ESIA and the ESMP. Audit reports can be provided to the funder	Cost of an independent environmental expert	Project Company
Independent environmental audits – Surveillance	-	The auditors will have their own samples and the measurements of the monitoring	Annual frequency	Independent environmental audits provide assurance of	Cost of an independent environmental expert	Project company

What (Wich parameter to be monitored?)	Where (Place / monitoring point ?)	How (is the parameter to be monitored?)	When (Define the frequency / Period)	Why (is the parameter to be monitored?)	Cost	Who (Is responsible for the contrôle?)
		elements described above for the works and operation phases, if deemed necessary to confirm the validity of the results provided by the contractor or developer		compliance with the measures proposed in ESIA and the ESMP. Audit reports can be provided to the funder		

Table 49 : Monitoring plan in operation phase (Powerlines and substation)

What (Wich parameter to be monitored?)	Where (Place / monitoring point ?)	How (is the parameter to be monitored?)	When (Define the frequency / Period)	Why (is the parameter to be monitored?)	Cost	Who (Is responsible for the contrôle?)
Avifauna (migratory) activity and mortality	Powerlines	Visual observation	To be defined	Assess the impact	To be identified	ONEE
Register of grievances	To be defined	Register complaints and how they are handled	Weekly and treatment within one month	Registration, address and complaint tracking	Integrated with the operating cost	ONEE for the powerlines SPV Koudia /O&M Co for the substation
Emergency supervision	Not applicable	Register the emergency case and follow-up of its support	Whenever there is an emergency	Register the emergency case and follow-up of its support	Integrated with the operating cost	ONEE for the powerlines SPV Koudia/O&M Co for the substation

What (Wich parameter to be monitored?)	**Where** (Place / monitoring point ?)	**How** (is the parameter to be monitored?)	**When** (Define the frequency / Period)	**Why** (is the parameter to be monitored?)	**Cost**	**Who** (Is responsible for the contrôle?)
Independent Audits of the Environment -Documentation	-	The auditors review the environmental documentation kept at the plant, verify the proper implementation of the environmental procedures in place in the ESMP (OESMP) and the application of the mitigation and monitoring measures cited in ESIA, including results of monitoring	Quarterly frequency	Independent environmental audits provide assurance of compliance with the measures proposed in ESIA and the ESMP. Audit reports can be provided to the funder	Cost of an independent environmental expert	Project Company
Independent Environmental Audits - Site Inspection	-	Auditors visit the plant site to ensure that environmental procedures are properly applied	Annual frequency	Independent environmental audits provide assurance of compliance with the measures proposed in ESIA and the ESMP. Audit reports can be provided to the funder	Cost of an independent environmental expert	Project Company
Independent environmental audits – Surveillance	-	The auditors will have their own samples and the measurements of the monitoring elements described above for the works and operation phases, if deemed necessary to confirm the validity of the results provided by the contractor or developer	Annual frequency	Independent environmental audits provide assurance of compliance with the measures proposed in ESIA and the ESMP. Audit reports can be provided to the funder	Cost of an independent environmental expert	Project company

9. Risk assessment and management

The content of this chapter will be used as a basic requirement of risk assessment during construction and operation phase of the Koudia Al Baida wind farm repowering project.

The risk assessment addresses the impacts to the environment that could occur as a result of mishaps or failures during the construction and operation phases of the project. These could be failure of equipment or material or processes. Examples of mishaps are;

- Spills;
- Leaks;
- Fires; and
- Explosions.

To account for, control and avoid such potential hazards, this section provides for;

- Identify the hazards;
- Assess and prioritize risks and hazards;
- Decide on control measures;
- Implement the control measures; and
- Monitor and Review.

9.1 Hazards identification

The first Risk Assessment Process step is to systematically identify the potential health, safety, and environmental hazards and effects of activities and operations. Hazards and effects need to be identified as early as possible and tracked through the life cycle of each activity. It is imperative that sensitive environmental components and conditions are identified and priority protection areas delineated.

Hazards can be identified and assessed in a number of ways:

- Using checklists;
- By referring to codes and standards;
- By undertaking more structured review techniques;
- Previous experience in the area, including that of third parties;
- General observation and HSSE awareness;
- Audits;
- Accident / incident investigations;
- Drills and exercises; and
- EHS/Environmental meetings.

Action to be taken by individuals on identifying a hazard include –

- Eliminating or controlling the hazard immediately;
- Isolating the hazard to prevent an accident; and
- Reporting the hazard using the standard form.

It must be noted that all hazards are to be reported, including those eliminated or controlled immediately. Any situation where an Equipment Incident could cause injury or other significant loss under different circumstances will first be reported.

9.2 Analysis of Risk

Every reported hazard is analyzed to decide how serious it is, and this is done by using the risk matrix, based on the knowledge and experience of the person(s) conducting the analysis.

The risk matrix is used to analyze the probability of occurrence (frequency) and severity of consequence or potential consequence, producing a rating as a code. The code is then classified into four (4) risk groups: low, moderate, high, and extreme risk. The level of risk is indicative of how much effort and urgency must be put in to controlling the problem.

Table 50 : Potential EHS Impact and Potential Incidence Consequences Rating

Area impacted (a)	Insignificant consequences (Score = 1)	Minor consequences (Score = 2)	Moderate consequences (Score = 3)	Major consequences (Score = 4)	Catastrophic consequences (Score = 5)
Atmosphere /Waste/Other	Temporary nuisance from noise, dust, odor, other air emissions, greenhouse gases, vibration, visual impact. Results in the generation of significant quantities of non-hazardous wastes.	Minor environmental impact due to contained release of pollutant (including odor, noise and dust) fire of explosion with no lasting detrimental effects. No outside assistance required. Significant use of water, fuels, and energy and other natural resources.	Creation of noise, odor, dust, other controlled/uncontrolled air emissions, greenhouse gases, vibration, and visual impact at significant nuisance level. Results in the generation of significant quantities of hazardous wastes.	Major environmental impact due to uncontained release, fire, or explosion with detrimental effects. Outside assistance required.	Catastrophic environmental impact due to uncontained release, fire or explosion with detrimental effects. Outside assistance required. Extensive chronic discharge of persistent hazardous pollutant. Results in the generation of significant quantities of intractable wastes.
Human health and safety	Minor injuries, which may require self-administered first-aid. Injured personnel can continue to perform normal duties.	Injuries requiring on-site treatment by medical practitioner. Personnel unable to continue to perform normal duties	Serious injuries requiring off-site treatment by a medical practitioner or immediate evacuation to hospital. Potential long term or permanent disabling effects.	Single fatality	Multiple fatalities

The Risk Assessment Matrix helps to focus attention on the risks that matter by considering the following two questions:

- What is the probability of that incident occurring?
- What is the likely consequence of that occurrence?

Use of the Risk Assessment Matrix will:

- Enhance appreciation of HSSE risk and achieve “As Low As Reasonably Practicable” ALARP at all levels in all PP operations,
- Assist in setting clear risk based strategic objectives,
- Provide the basis for implementation of a risk based EHS Management System,
- Provide a consistency in evaluating risk across all PP activities.

9.3 Deciding on Control Measures

A 'control' is anything used to manage risks e.g. procedures, work permits, Personal Protective Equipment (PPE), training, and on-site supervision.

Once the hazards of activities have been identified and assessed, controls must be put in place to manage the risks. It is also important to put steps in place to be able to recover from an unplanned hazard and return to normal operating conditions.

Information on hazards, effects, and the risks connected to these and requirements to limit ('control') them such as limits of safe operation are prepared and recorded by Management.

Table 51 : Hazard Controlling Measures

Control	Use	Description and example
Preventive measures	To reduce the likelihood of hazards or to prevent or avoid the release of a hazards	a. Examples include guards or shields (coatings, inhibitors, shutdowns), separation (time and space), reduction in inventory, control of energy release (lower speeds, safety valves, different fuel sources) and administrative (procedures, warning, training, drills).
Improvement measures	To reduce or limit the consequences arising from a hazardous event or effect	**Active systems:** **b.** Intended to detect and abate incidents, for example, gas, fire and smoke alarms, shutdowns, deluge **Passive systems:** c. Intended to guarantee the primary functions, for example, fire and blast walls, isolation, separation, protective devices, drain systems **Operational (non physical) systems:** d. Intended for emergency management, for example contingency plans, procedures, training, drills

Control	Use	Description and example
Recovery Measures	Includes top events	All technical, operational and organizational measures which can : e. Reduce the likelihood that the first hazardous event or 'top event' will develop into further consequences. f. Provide life saving capabilities will the 'top event' develop further.

Any hazard and its associated risk are controlled by either reducing probability of occurrence or by reducing the effects. This may be achieved by one or more of the following steps shown in the figures below:

Note that these measures are listed from most effective to least effective. Efforts will be made to use the most effective possible measures to achieve results and several measures may be for each situation.

Once the control measures have been designed, the hazard can be re-analyzed on the risk matrix to ensure that risk has been reduced to acceptable levels.

9.4 Implementing the Control Measures

- The developer shall inform all relevant personnel about the control measures being implemented;
- The developer shall provide adequate supervision to ensure that the new control measures are being implemented and used correctly;
- Any maintenance in relation to the control measures shall be defined in the Work Procedures;

To reduce the risk in a maximum way, consideration shall be given to;

- Legal requirements;
- International standards/guidelines;
- Availability of resources;
- Costs and benefits; and
- The status of scientific and technical knowledge.

The purpose of the implementation plan is to document how the chosen options will be implemented. These plans shall include;

- Proposed actions;
- Resource requirements;
- Responsibilities;
- Timing;
- Performance measures; and
- Reporting and monitoring requirements.

9.5 Monitor and Review

Monitoring and review is an on-going process and will not be considered as a one-off activity.

- Ongoing review is essential to ensure that everything planned is implemented. It is imperative that the Risk Management be considered a continuous process since the environment is always changing, e.g. the consequences of an event could change over time and/or the suitability or cost of mitigating the event;
- Monitoring and review also involves learning lessons from the Risk Management Process; and
- To compare the plans with the actual implementation provides a good performance measurement. Such results shall be incorporated into Performance Management, Measurement and Reporting System.

9.6 Record the Risk Management process

Procedures will be established and maintained to document the process and results of risk assessment and management. The recording shall include the following:

- Statutory requirements and codes applicable to the HSSE aspects relevant to operations, products, and services;
- Identified hazards and effects in relation to HSSE, Production, Services, Properties, and company reputation;
- Established risk criteria;
- Risks of consequence severity and likelihood of identified hazards; and
- Risk reduction measures.

10. Sectorial management plan

Sectorial management plans will be part of the ESMP in order to implement and manage mitigations measures.

These management plans will have to be prepared by the EPC and O& M as part of the CESMP and OESMP. The ESMP (construction and operation) with their associated plans and procedures will be subject to Koudia SPV approval 30 days prior to the start of any of the phases (construction/operation).

Thus, the ESMPs and their associated procedures and plans should be submitted to the Koudia SPV for review at least 3 months prior to the start of any of the phases (construction/operation).

The following is an exhaustive but not limited list of the specific plans and procedures associated with Environmental and Social Management Plans (ESMP construction & ESMP operational) to be carried out:

- Audit procedure
- Birds ands bats Monitoring Plan
- Birds and bats Mortality Plan
- Chance find procedure
- Communication plan
- Dismantling existing turbines management plan
- Demobilization plan
- Earth movement plan
- Emergency response plan
- Environmental emergency preparedness plan
- Environmental monitoring plan
- Grievance mechanism
- Hazardous materials handling plan
- HSSE plan and its associated procedures
- Leak and fire contingency plan
- Legislation procedure
- Monitoring program
- Noise management plan
- Labour management plan
- Social management plan
- Spill response plan
- Traffic management plan
- Training procedure
- Vehicule maintenance plan
- Waste management plan
- Wastewater management plan

10.1 Safety and security plan

Leak and fire contingency plan is included in the safety and security plan. This plan will include at least :

- Introduction
- Legal and IFC requirements
- Safety and security organization
- Roles and responsibilities
- Practices and procedures
- Safety requirements for project operation (work permits, safety training, safety meetings, activity hazards analysis, etc.)
- Fire management plan
- Security system report (suitable security systems description, car and truck parking area description, guard house description, perimeter security fence characteristics, siren system characteristics and the protection for the dust, etc.)
- Hazardous area classification report
- Preliminary thermal storage safety plan
- VOC health risk analysis report

10.2 OHS plan

The OHS management plan will include at least :

- Introduction
- OHS regulation and IFC requirements
- Roles and Responsibilities
- Training
- OHS Risk Assessment
- Right of Entry
- General OHS information
  - Emergency Procedures
  - Hazard/Injury/Incident Reporting
  - Reporting of Notifiable Incidents
  - First Aid
  - OHS Training and Induction
  - Risk Management and the Risk Register
  - Workplace Hazard Inspections
  - Purchasing
  - OHS Record Keeping
  - Documents to be displayed
  - Important Contact Numbers
- OHS requirements

  This part will identify the various situation and requirements to manage them. We can identify at least :
  - Dangerous Goods and Hazardous Substances

- Electrical Safety
- Confined Spaces
- Falls from height
- Manual Handling
- Personal Protective Equipment
- Slips, trips and falls
- Vehicles

10.3 Labour management plan

Training procedure plan, grievance mechanism, recruitment plan and demobilization plan are included in the Labour Management Plan

This plan must be prepared by the EPC. This plan ensures local workforce management will comply with all regulations and international good practices.

It will include at least :

- Introduction
- Description of construction activities and manpowerneeds
- Legal and IFC requirements
- Organisation, roles and responsibilities
- Hiring and Recruitment Procedure
- Training activities and training procedure plan
- Provisions for Drinking Water, Cooking Arrangements
- Medical Facilities
- Transportation organization
- Initial training of foreign employees will include information on the cultural background of local residents
- Skill management plan in wind energy technologies
- Labour grievance mechanism
- Demobilization plan
- Monitoring and reporting

10.4 Hazardous Materials Management Plan

The hazardous materials management plan will be prepare for the construction phase and will include at least :

- Introduction
- Legal and IFC requirements
- Hazardous materials identification
- Procedures, rules and training for :
  - handling and storage
  - spill response protocols
  - contingency plans

10.5 Earth movement Plan

The earth movement plan will prepared before construction phase and will include at least :

- Introduction
- Applicable Legislation
- Topographic study
- Site construction identification
- Evaluation of cuttings
- Borrowing sites identification
- Deposit site identification (temporay and permanent)
- Capacity, layout of each deposit site, stockpile layout, storage mode
- Stormwater management
- Erosion management
- Revegetation program
- Planning

10.6 General Waste Management Plan

(which comprises the necessary measures to fully apply the waste hierarchy described in the baseline section);

This plan must be prepared by the EPC. This plan ensures the waste management will comply with all regulations and international good practices.

The waste management plan will include hazardous and non-hazardous waste. The plan will include staff training.

This waste management plan will include :

- The process for identification and classification of solid waste
- The measures to ensure, the minimization of waste (agreement with providers, recycling on site, etc..)
- The measures to sort, store the waste
- The description of the requirements of waste storage areas
- The identification of waste disposal routes for each waste stream
- The agreement with licensed waste collector for waste elimination

10.7 Dismantling existing turbines management plan

The dismantling plan will be prepared before EPC contracting. It will include at least :

- Dismantling procedure and activities
- Lifting plans for crane Works;
- Drawings describing the location and configuration for storage of Existing Equipment once disassembled;
- Transportation Plan
- Waste Management Plan
- Hazard identification

- Pollution prevention plan.

10.8 Emergency Preparedness and Response Plan.

It ensures that the project complies with IFC Guideline n°3.7, Emergency preparedness and response.

The plan must include the following:

- Administration (policy, purpose, distribution, definitions, etc.)
- Organisation of intervention zones (command centres, medical units, etc.) and list of sensitive elements in the immediate surroundings of the work site and potential hazards;
- Roles and responsibilities: line responsibilities must be clearly determined;
- Disclosure: at the beginning of works, the Main Contractor must post the plan so that all the employees can see it; the public must also be informed if public health is likely to be affected;
- Emergency procedures and equipment;
- Emergency resources: list and contact details of everyone to be contacted in an emergency and sequence of action. It is also necessary to plan financing for rescue/relief activities. Fire risk (facilities, farmers' fields, olive groves) and local and contractors' fire prevention resources must be assessed;
- Training and recycling: the employees must be trained so that they are familiar with the procedures for spills, fire, evacuation and any other emergency involving the workers and the local inhabitants. The plan must be revised and kept up to date with all changes in equipment, personnel and facilities;
- Check-lists (lists of roles and measures; equipment check-list);
- Sustaining the various activities and emergency plans: finding the space and additional equipment necessary for the contractor to continue the works activities after an emergency. For example, this often includes seeking alternative sources of water, electricity and fuel;
- Hydrocarbon spills are the main risk of emergency.

The Contractor must also have an emergency kit ready in the event of accidental pollutant spills. It must contain equipment that is suitable for use in the work place(s) concerned.

For example, an emergency kit for spills should usually contain the following:

- 1 drum or box containing emergency equipment for spills;
- 10 polypropylene pillows - size 430 cm3;
- 200 absorbent polypropylene pads;
- 10 absorbent polypropylene socks;
- 5 10 litre peat fibre bags for oil spills;
- 10 polyethylene 6mm thick 205 litre disposal bags for soiled absorbent equipment.

The Contractor will immediately warn the Project Manager's officially appointed representative in the event of contaminant spills whatever the size of the spill.

In the event of pollutant spills, the Contractor must immediately proceed as follows, at his own expense:

- Bring the leak under control;
- Check the extent of the spill;
- Start off the emergency procedure;
- Confine and collect the pollutant;
- Excavate and replace contaminated soil, if any;

- Handle contaminated waste accordingly depending on the degree of contamination;
- Write a report on the spill.

10.9 Traffic and transportation management plan

The traffic and transport management plan examines the routes of the parts and machinery and assesses the actions necessary to bring them to their destination.

- The first stage consists of planning transport requirements:
  - the number of trucks necessary for the blades, towers, living quarters and equipment;
  - the human resources necessary;
  - the number of vehicles and trucks using the roads;
  - analysis of rail transport capacities;
  - approval of routes by the authorities.
- • Route planning
  - study of alternative routes and fuel consumption;
  - number of return journeys planned;
  - analysis of route-related constraints: weak points in the road system, improvements considering bend radius, maximum load, maximum headroom;
  - study of traffic and the most favourable periods for transport;
  - identification of owners and negotiations to lease land likely to be necessary for the transport and storage of the wind turbines.
- Permits and authorization planning
  - applications for permits for trucks and large convoys will be necessary;
  - Gendarmerie escorts may also be necessary in certain urban areas.

10.10 Waste water management plan

This plan must be prepared by the EPC. This plan ensures the wastewater management will comply with all regulations and international good practices.

The wastewater management plan will include domestic wastewater, effluents from cleaning operation, and effluents from cleaning concrete.

This plan will identify:

- Potential quality and quantity of the effluent
- Way to reduce wastewater
- Treatment equipment and storage
- Monitoring and report

10.11 Emergency response plan

Emergency Response Plans (ERP) plans are general action plans to tackle emergencies that may occur within a construction site. This will enable lives to be protected and damage to be kept to a minimum in an emergency at the construction site. Contingency plans also serve as a guide to the workers at the construction site to respond to emergencies in an orderly and effective manner.

The most common environmental emergency in construction site is the oil and chemical spill, which is a potential cause for soil contamination, groundwater and water pollution. Spills of hazardous materials may include:

- Gasoline;
- Diesel;
- Adhesives;
- Hydraulic oil;
- Lubricating oil and grease;
- Cleaning solvents;
- Paint and paint thinners; and
- Concrete from release agents.

The ERP must be prepared to cover any potential risks of accidents or spills and will be made known and available to all workers within the construction site. Key personnel will know and understand their responsibilities as well as coordinate their response actions with their subordinates.

This plan serve as a guideline to organize a prompt and effective response to oil spills affecting or likely to affect the area of the site and to ensure preparedness, response and reporting following an oil and chemical pollution incident.

For this purpose the following specific actions are listed:

- Preparedness;
- Response; and
- Reporting.

10.11.1 Preparedness

Each individual will be introduced to their prospective Supervisor and Environment Coordinator within their introduction and training. Emergency services shall be notified as necessary by the Supervisor or Environment Coordinator.

A variety of equipment and personal protective equipment may be needed to support a chemical or oil spill incident response. A list of equipment is detailed below:

- Sand;
- Sand bags;
- Buckets and shovels;
- Storage containers; and
- Spill kit.

Sand stocks will be dry and buckets and shovels readily available. Mechanical loading shovels, excavators and dump trucks may also available for sand distribution and clean up.

Storage containers for contaminated materials and earth will be bonded, located in the waste storage area, and labeled and treated as hazardous waste.

All equipment will be stored in a safe location on site in close proximity to the storage and waste areas. This material is to be used to contain and clean up pollution/spills, care will be taken to dispose of any absorbent materials properly. The Supervisor and Environment Coordinator will keep stocks well maintained and replenished.

10.11.2 Response

In the event of a chemical or oil spill the following measures will be employed:

- Notify Supervisor or Environment Coordinator;

- Only attempt containment and cleanup operations of spilt substances when it can be performed safely;
- If spilled material is flammable, eliminate sources of ignition near spill area;
- Evacuate personnel and neighbors if they are at risk; and
- Secure the area and establish perimeter control at a safe distance from the spill.

Oil Spill Response Options

Remedial action to collect and remove all materials contaminated by the oil spillage or leakage event is to be taken immediately. The following actions are required:

- Any oil remaining on the ground is to be collected using oil spill kit. The spill is to be surrounded by the kit and then the area of the spill is to be slowly reduced by enclosing the absorbent. The absorbent pads will be used to absorb the oil. Once all of the oil on the ground surface has been collected, the absorbent agents themselves are to be appropriately stored and disposed;
- All contaminated materials are to be handled as hazardous waste. The contaminated material shall be collected and appropriately stored. A hazardous waste vendor will collect this;
- Contaminated materials will be stored in plastic barrels with tightly closing lids. These barrels are to be stored in a concrete lined bund if available. In absence of such a bund at the site as a short-term storage alternative, a double plastic lined bund will be used. Barrels will be placed on plastic or wooden pallets in the temporary double plastic lined bund and not directly on the plastic; and
- Conventional metal barrels will not be used, however if there are no alternatives the materials may be stored in them providing they are covered with plastic sheet tightly fastened to prevent Aeolian distribution and again are stored in an appropriate waterproof platform to prevent leakage.

All contaminated materials that cannot be collected and disposed are to be cleaned in-situ. This cleaning is to be undertaken by an approved service providers.

Chemical Spill Response Options

The following actions are to be taken in case of a chemical spill;

- Only attempt containment and cleanup operations of spilt substances when it can be performed safely;
- If spilled material is flammable, eliminate sources of ignition near spill area;
- Liquid spills – If the spill is liquid its path will be blocked or diverted and then soaked up using an absorbent material such as sand;
- Gaseous spills/leaks – A gaseous leak must be stopped at the source as soon as possible and will then disperse in the air;
- No spills will be rinsed away;
- Contaminated soils and clean-up materials from spills will be handled properly using personal protective equipment, stored in a suitable container that is then labeled and stored in the appropriate location for subsequent disposal;
- Any stockpiles of remnant contaminated materials will be covered;
- Contaminated materials will be stored in plastic barrels with tightly closing lids. These barrels are to be stored in a concrete lined bund if available. In absence of such a bund at the site as a short-term storage alternative, a double plastic lined bund will be used;
- Barrels will be placed on plastic or wooden pallets in the temporary double plastic lined bund and not directly on the plastic; and
- Conventional metal barrels will not be used, however if there are no alternatives the materials may be stored in them providing they are covered with plastic sheet tightly fastened to prevent

Aeolian distribution and again are stored in an appropriate waterproof platform to prevent leakage.

All contaminated materials that cannot be collected and disposed are to be cleaned in-situ. This cleaning is to be undertaken by an approved service providers.

10.11.3 Reporting

Any person involved in construction works that witnesses an incident must be able to report the incident to the responsible supervisor. The Environmental Coordinator shall be responsible for ensuring a report is filed describing the cause of the incident, action taken, the incident and recommended actions for ensuring the incident will not reoccur.

10.12 Physical cultural resource management plan (chance find procedure)

This plan must be prepared by the EPC. This plan ensures heritage cultural resources management will comply with all regulations and international good practices.

This plan will include:

- Archeologist missions on site
- Awareness of the workers for the importance of cultural heritage respect
- Process in case of chance discovery: interruption of work, decision chain, security area implementation, etc.
- Workers training for process in case of chance discovery

10.13 Biodiversity management plan

This plan will include actions before construction, construction and operation phase. It will include at least :

- Introduction
- Stakeholders for biodiversity (expert identification)
- Mitigation measures in construction phase and operation phase for flora, flauna including bats and avifauna
- Key indicators identification
- Training activities for employees
- Monitoring plan with methodology associated
- Procedures identification in case of bird/bat carcass discovery
- Report
- Biodiversity management plan

10.14 Legislation procedure

This plan aims to idenfity all Moroccan legislation applicable to the project. It will base on legislation identified in the ESIA.

It aims to identify :

- all permits required before construction but also through out construction and operation phase.
- Permit process

- Permit schedule
- Regulatory monitoring process
- Reporting

10.15 Vehicle maintenance plan

The vehicle maintenance objectives is to provide safe, comfortable, and reliable transportation for passengers, and efficient operation for all the equipement to avoid work stoppages.

It will include at least :

- Roles and responsibilities
- Applicable regulation
- Vehicles and equipment inventory and process to update it regularly
- Preventive maintenance and repair activities
- Vehiclescleaning
- Vehicles and equipment maintenance to promote cost-efficiency
- Vehicle operations, repairs, and cleaning in compliance with applicable regulation
- Key indicators
- Monitoring and report.

10.16 Decommissioning Plan at the end of the wind farm life

The plan must be prepared by the Owner.

The wind turbines must be dismantled at the end of their life. There are two possibilities for the wind farm: either the wind turbines are replaced by new, more efficient ones, or the site is disused.

The decommissioning plan must address several points:

- Estimated cost of decommissioning, including the cost of restoring the site and post-dismantling monitoring;
  - description of the stages of dismounting and site restoration:
  - identification of the facilities to be removed and those to be left on the spot;
  - Identification of the depth below which the equipment will be left in place (cables between wind turbines, etc.);
  - dismounting the overhead electric transmission lines and towers and the delivery substation;
  - classification of decommissioning waste and identification of treatment processes: landfill; recycling of iron, copper and aluminium; treatment of some kinds of hazardous waste, etc.;
  - identification of the works necessary to dismantle them if the service roads built during the works phase have not been appropriately maintained;
  - restoration of the soils after dismounting the facilities for use as cultivable land again;
  - adjustment of the logistics and transport management plan to cover the dismounting activities;
  - introduction of a communication system for the safety of the local inhabitants (to avoid collisions);
- Description of a post-dismantling monitoring program assessing the conditions in which the site is recovered (agriculture, erosion, etc.).

APPENDIX 1 – Archaelogical survey

MASEN - FUTUREN

Province de Fahs Anjra- Préfecture de Fnideq

Etude d'impact environnemental et social du projet de Repowering du parc éolien de Koudia Al Baida – Etude archéologique

Réf : C 399 / R455-01
YB/HAS/CL
Septembre 2020

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MASEN – FUTUREN

Province de Fahs Anjra- Préfecture de FnideqFahs Anjra- Préfecture de Fnideq

Etude d'impact environnemental et social du projet de Repowering du parc éolien de Koudia Al Baida – Etude archéologique I

Ce rapport a été rédigé avec la collaboration de :

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			Nom	Signature	Nom	Signature	Nom	Signature
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1. Introduction

L'étude archéologique du projet Koudia Al Baida permettra d'identifier le potentiel archéologique et patrimonial de la zone d'étude afin d'évaluer efficacement les impacts potentiels sur les ressources culturelles matérielles, et plus spécifiquement les vestiges archéologiques qui pourraient être présents sur l'aire d'étude et proposer des mesures d'atténuation pour minimiser ou prévenir les risques potentiels menaçant le patrimoine culturel et l'archéologique durant les différentes phases de réalisations du projet (travaux, exploitation, démantèlement).

Cette étude sera conforme à la législation locale et internationale, aux règlements et aux normes en vigueur.

2. Méthodologie

Une mission de terrain et de travail de recherches documentaires a été réalisée durant le courant du mois de juillet 2020.

La recherche documentaire a concerné les institutions suivantes :

- Direction Régionale de Tanger –El Hoceima du Ministère de la Culture
- Division de l'Inventaire du Patrimoine Culturel, (Direction de Patrimoine Culturel – Ministère de le Culture).
- Bibliothèque de l'Institut National des Sciences de l'Archéologie et du Patrimoine (INSAP-Rabat).

Une mission de prospection de terrain pédestre de trois jours par un expert archéologique s'est déroulée du 3 au 5 juillet 2020.

Ces recherches se sont avérées fructueuses, puisqu'elles ont permis de consulter des articles et ouvrages publiés par une équipe archéologique espagnole : Université de Cadis (Espagne), dont l'objet est le résultat de prospections archéologiques réalisées au sein de la zone du projet entre 2008 et 2012.

3. Etat de référence

3.1 Etendue régionale

La région de Tanger Tétouane est connue par ses sites archéologiques qui représentent les différentes époques qui ont marqué l'histoire de cette partie du Royaume, à savoir la préhistoire, l'antiquité et l'époque islamique. Cette diversité permet d'apprécier l'importance de la contrée Nord-Ouest du pays. De par leur situation dans des zones périurbaines, balnéaires et rurales, ces sites confèrent une originalité architecturale, historique et paysagère à la région tout entière.

Les sites les plus connus dans la zone sont situés en dehors de la zone d'étude. Il s'agit de :

◗ Le site de Belyounech à 15km au nord du site du projet

Le Site archéologique de Belyounech est situé à 7 Km à l'Ouest de la ville de Ceuta, sur les versants de Jbel Moussa. Il correspond aux vestiges d'une occupation sub-urbaine liée à la ville médiévale de Sebta/Ceuta et au XIIème siècle elle formait un lieu de plaisance pour les habitants de Ceuta. Son corpus archéologique se compose de vestiges de maisons, Hammams, mosquées, bastions et d'une al-munya mérinide, unique en son genre au Maroc, forme d'architecture palatine et de plaisance, très connu en Andalousie.

Le site de Kser Sghir situé à 10 Km au nord-ouest du projet

La ville de Ksar Sghir fait partie du «cercle du détroit du Gibraltar», à mi-chemin entre Tanger et Sebta. L'archéologie confirme son importance depuis l'antiquité. Une occupation fut attestée dans la zone du site dès le 1er siècle avant J.-C. et, pendant la période romaine, une usine de salaison y fut construite. En 708-709, une forteresse portant le nom de Ksar Mesmouda existait à l'emplacement actuel du site.

Sous les Idrissides, l'établissement faisait partie de la principauté d'al-Kacem Ibn Idriss II. En 971, les Omeyyades de Cordoue tentèrent de s'en emparer après une expédition ordonnée par le Calife al-Hakam al-Moustansir.

Ksar al-Majaz est l'une des appellations ultérieures attribuées au site. Elle évoque sa fonction de port de traversée vers l'Andalousie aux temps des Almoravides (Yousouf Ibn Tachfin en 1088), des Almohades (Abu Yousouf Yaakub en 1184, al-Nasir en 1211 et al-Adil en 1225).

Sous le règne des Mérinides, Ksar Sghir se transforma en une ville-forteresse dotée d'importantes structures urbaines : enceinte circulaire, portes monumentales (Bab al Bahr, Bab Sebta, Bab Fas), mosquée, hammam, ruelles, maisons et puits. A partir de la deuxième moitié du XVème siècle, les Portugais y débarquèrent et s'emparèrent de la place fortifiée. Au début du XVIIème siècle, le site servit de port pour le débarquement des Morisques refoulés d'Andalousie. Actuellement, la ville de Ksar Sghir se compose de deux unités monumentales et urbaines : la ville marocaine et la forteresse portugaise.

3.2 Zone locale

La zone du projet et la zone d'étude n'abrite aucun site classé au patrimoine culturel du Maroc.

Lors de la prospection archéologique pédestre réalisée en juillet 2020, aucun site d'intérêt patrimonial ou archéologique n'a été identifié.

Des campagnes pédestres d'investigation archéologiques ont été réalisées entre 2008 et 2012 par des équipes mixtes sur une grande partie de la zone du Nord du Maroc couvrant notamment la zone du projet. Ces investigations ont abouti à la production d'une carte archéologique du Maroc recensant des gisements archéologiques datant de la préhistoire, du paléolithique au néolithique.

Les études d'investigation ayant permis d'élaborer ces cartes archéologiques ont aussi identifié des sites datant de l'occupation espagnole.

La carte ci-après localise les sites identifiés par rapport à la zone d'implantation du projet sur les différentes crêtes.

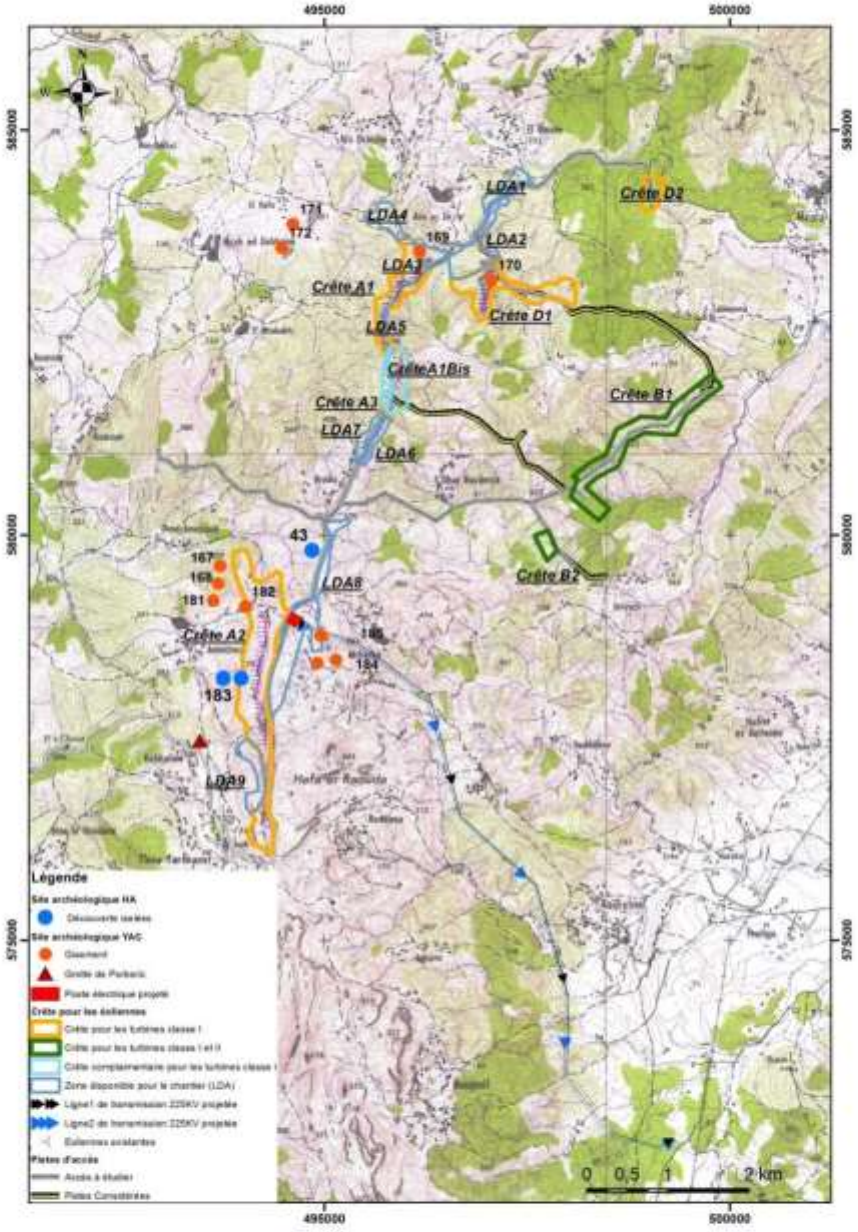

Figure 1 : Carte de situation des sites archéologiques par rapport à la zone du projet[1]

Les caractéristiques de ces différents sites sont présentés dans ci-après[2].

[1] Source : Carta arqueologica del Norte de Marruecos

[2] Source : Informe de la campaña del año 2011 del proyecto de investigación «Carta Arqueológica del norte de Marruecos» . Universidad de Cádiz, Universidad Abdelmalek Essaadi de Tetouan et INSAP de Rabat.

Site archéologique 167. Amezzouk I

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: Depuis la route Tletla Taghramt avant d'atteindre la centrale électrique, une voie en direction ouest.

Cadre géologique: Il est situé sur le palier d'un gisement quaternaire de montagne, en unités calcaires-dolomitiques du Haouz Externe.

Situation géographique: Il est situé en zone montagneuse, dans l'environnement Amezzouk, dans un espace ouvert qui rappelle un poljé près des premiers escarpements, à 417 m au-dessus du niveau de la mer.

Chronologie relative: néolithique 6000 à 3000 ans avant Jésus Christ.

Site archéologique n°168: Amezzouk II

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: Il est similaire au précédent, depuis la route Tletla Taghramt avant d'atteindre la station électrique, une voie direction ouest.

Contexte géologique: Comme le gisement précédent, il se trouve dans les calcaires et les dolomites du Haouz Externe.

Situation géographique: Il est situé dans une zone d'atterrissage en montagne, aux alentours d'Amezzouk, un peu plus au sud du gisement Amezzouk I. Il est situé à 422 m d'altitude.

Chronologie relative: Paléolithique / Atérien : 100.000 à 20.000 ans avant Jésus Christ.

Site archéologique n°169. Tour de la Croix I

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: avant d'atteindre la jonction vers Tletla Taghramt, par une piste en direction sud menant au sommet d'une colline.

Cadre géologique: Sur sol schisteux.

Situation géographique: dans une zone bien positionnée en hauteur.

Chronologie relative: contemporaine : époque coloniale.

Site archéologique n°170. Tour de la Croix II

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: à côté de la jonction vers Tletla Taghramt, le long d'une piste au sud qui mène à la partie supérieure de quelques collines.

Contexte géologique: substrat de schiste avec peu couverture édaphique.

Chronologie relative: contemporaine : époque coloniale.

Site archéologique n°171. El Hafa I

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: Depuis les maisons situées à l'est d'L Hafa, le long à certaines sources, à travers une gorge au sud. Aussi accessible par la route de la carrière vers l'ouest.

Cadre géologique: il se trouve dans des unités de calcaire et Dolomitique du Haouz externe (Trias supérieur).

Situation géographique: sur le versant nord-ouest de la colline situé au-dessus d'El Hafa, sur un petit palier situé à 412 m au dessus du niveau de la mer (figure 312). Dans les environs d'un chêne, met en évidence un petit profil stratigraphique avec abondance de produits lithiques et céramiques.

Chronologie relative: Néolithique 6000 à 3000 ans avant Jésus Christ.

◗ Site archéologique n°172. El Hafa II

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: Il est similaire au gisement n°171 à proximité, bien qu'il est également accessible par la route qui borde l'ouest de la carrière.

Cadre géologique: calcaires et dolomites du Haouz Externe.

Situation géographique: Il est situé dans le colline d'El Hafa, à environ 400 m au sud du gisement. Il correspond à une petite cavité avec une entrée d'environ 1,10 m, et certains dimensions de 2,90 m (nord-sud) × 7,30 m (est-ouest) et une hauteur maximale à ce moment-là de 1,95 m qui est réduit dans les zones proches de la limite calcaire. Il est situé à 398 m au dessus du niveau de la mer.

Chronologie relative: préhistoire récente 3000 à 2000 ans avant Jésus Christ.

◗ Site.181. Amezzouk III

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: De la route de Tagharamt en direction du sud avant d'atteindre la station électrique. L'accès est le même que le gisement 168, mais se déplaçant vers l'est.

Cadre géologique: Il est situé à côté de gisements de calcaire et de dolomites du Haouz Externe.

Situation géographique: Elle est située au pied de la montagne, à proximité du village d'Amezzouk, à 407 m d'altitude.

Chronologie relative: Paléolithique inférieur et Néolithique 500.000 à 300.000 et 6.000 à 3.000 avant Jésus Christ.

◗ Site 182. Amezzouk IV

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: De la route de Tagharamt en direction sud avant d'atteindre la centrale électrique. L'accès est le même que celui du site181, mais en avançant vers l'est.

Cadre géologique: il est situé à côté de gisements de Calcaires et dolomites du Haouz externe.

Localisation géographique: elle est documentée sur un palier montagne, dans la région du Haouz extérieur, à côté des sources d'eau, à 439 m au-dessus du niveau de la mer.

Chronologie relative: Paléolithique 300.000 à 100.000 ans avant Jésus Christ.

◗ Yac.183. Mrharba I

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: De la route qui mène à Tagharamt , il faut prendre une piste à l'est, à la hauteur de la centrale électrique.

Cadre géologique: comme les gisements précédents, il est situé à côté de gisements de calcaire et de dolomite Haouz externe. Il existe également des gisements récents de l'Holocène avec du sable brun où se trouvent les produits archéologique.

Situation géographique: Elle est située sur un palier de montagne, près d'une source, au sud du village d'Amezzouk, à 435 m au-dessus du niveau de la mer. Dans un profil stratigraphique, au niveau des argiles brunes, sous-sol édaphique, de nombreux fragments de poterie à la main.

Chronologie relative: Néolithique final / Chalcolithique 4000 à 2000 ans avant Jésus Christ.

◗ Site .184. Mrharba II

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: De la route qui mène à Tagharamt, prendre une piste à l'est à la hauteur de l'usine électrique. Situé à environ 200 m au sud-est du site Mrharba I (site. 183).

Cadre géologique: comme les gisements précédents, il est situé à côté de gisements de calcaire et de dolomite Haouz externe. Il existe également des dépôts du Pléistocène avec sables rouges et Holocènes récents avec sables pardas, où se trouvent des produits archéologiques.

Situation géographique: Comme le site précédent, il est situé sur un palier de montagne, près d'une source, au sud du village d'Amezzouk, à 431 m d'altitude.

Chronologie relative: Paléolithique inférieur et Néolithique. 500.000 à 300.000 et 6000 à 3000 avant Jésus Christ.

Site185. Mrharba III

Situation en cartographie: Carte du Maroc-1: 50 000. Sebta. Feuille NI-30-XIX-4c.

Accès: Comme les gisements .183 et 184, depuis la route qui mène à Tagharamt, il faut emprunter une piste à l'est à la hauteur de la centrale; Environ 100 m avant d'atteindre le gisement 183, une plate-forme a été vue détruite par des machines.

Contexte géologique: Comme les gisements précédents, il est situé à côté des dépôts calcaires et des dolomites du Haouz externe. De même, il existe des gisements du Pléistocène avec des sables rouges où se trouvent des produits archéologiques.

Chronologie relative: Paléolithique inférieur 500.000 à 300.000 ans avant Jésus Christ.

Deux vestiges contemporains datant de l'époque coloniale ont été identifiés à proximité des éoliennes existantes (au nord de la crête A1). Deux gisements archéologiques sont situés en limite de la zone d'étude à plus de 300 mètres de la crête sur la crête A2. Des découvertes isolées ont été identifiées à proximité de la LD8.

4. Sensibilité du milieu et enjeux

Aucun site ne fait actuellement l'objet d'un classement ou d'une procédure de classement. Les investigations réalisées durant les campagnes de 2008 à 2012 montrent un potentiel faible à moyen concernant la présence potentielle d'artéfacts archéologiques.

5. Recommandations

La réalisation des travaux de mise en place du parc éolien ne va pas toucher directement les sites et gisements identifiés.

Cependant d'autres vestiges archéologiques peuvent être enterrés au droit des implantations des plateformes qui pourraient être endommagés lors des travaux de terrassement.

La présence d'employés peut engendrer des dégradations au niveau des gisements existants.

Pour limiter ces impacts il est vivement recommandé de :

- Réaliser un suivi des travaux de terrassements par un archéologue afin de pouvoir identifier les vestiges potentiels
- Former les employés du chantier à la découverte d'objets préhistoriques et à leur sensibilisation sur la protection de ses objets.
- Veillez à ne pas dégrader les vestiges de l'époque contemporaine.

APPENDIX 2 – Environmental and social policy of EDF Renewables

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ENVIRONMENTAL AND SOCIAL POLICY

Scope of application	This policy and its provisions are intended to apply to all legal entities within the scope of the EDF Renouvelables Group, without prejudice to compliance with locally applicable laws and regulations. They are mandatory for all entities of which EDF Renouvelables is the sole owner, and must be also presented to potential partners prior to any joint venture investment (in particular in case of control or co-control by EDF Renouvelables Group but also even in case of a minority interest), so that all or part of their provisions, or similar principles, are implemented in those partnerships. In the event of significant deviations, these are to be identified and approved prior to the investment or partnership decision.
Related references	ERGR-SD-PO01(EN): Environmental and Social Policy
Author / Department	Clotilde NICOLAS / Alessandro FRANGI – Strategy and Sustainability Division
Signature date	d25/m03/y21

Approvers
Signature

Carlotta GENTILE LATINO Head of Strategy and Sustainability	Bruno FYOT COO	Bruno BENSASSON CEO

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Rules for dissemination of the document

The Author is responsible of the classification and dissemination of the document in accordance with the Company's classification policy.

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☒ Internal (C=1)	The information is intended to be processed within the scope of EDF Renewables and its subsidiaries. It may, however, be shared with external parties if access to it is necessary in the context of their relationship with the Group. Each footer must be completed with the mention: "Name of the entity - internal accessibility".
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History of the evolution of the document

Revision index	Date	Reason for and location of changes
00	2018	Environmental Policy - creation of the document
01	2021	Renamed as Environmental and Social Policy - update of the environmental items and inclusion of social aspects

ENVIRONMENTAL AND SOCIAL POLICY

EDF Renewables, as a leading player in renewable energy, aspires to develop economically, socially and environmentally sustainable activities worldwide, contributing to build a Net-Zero future.

EDF Renewables activities are consistent with EDF Groupe *Raison d'Etre "to build a net zero energy future with electricity and innovative solutions and services, to help save the planet and drive wellbeing and economic development"* and with the underlying 16 Corporate Social Responsibility commitments.

Our commitments

EDF Renewables actions in the environmental and social fields are guided by principles of **proportionality** and **subsidiarity** in order to ensure an appropriate answer to the context in which we operate.

EDF Renewables is committed to **adopting the best practices and technologies available, all along the life cycle of our activities, in a perspective of best reasonable effort**. Our environmental and social practices are periodically evaluated and we strive to **continuously improve our environmental and social performance**.

We focus our efforts notably in the following areas:

- Fighting **climate change** with **efficient, low carbon renewable energy**
- Respect of **biodiversity** and sustainable management of **natural resources**
- **Dialogue and consultation** with relevant stakeholders
- Respect and promotion of **Human Rights** and the **rights of local communities**
- Assessment and mitigation of environmental and social risks in our **supply chain**
- Management of the **end of life of our equipment and assets**
- **Local** economic, social and environmental **value creation**

Our expectations

- All entities of the EDF Renewables group commit to implement this policy or similar principles locally, under the responsibility of local management, the corporate sustainability management and the executive management, and to do so in compliance with locally applicable laws and regulations, as well as International Labor Organization fundamental Conventions.
- The implementation of this Policy is supported by an environmental and social management system and underpinned by the implementation of a mitigation hierarchy approach.
- Employees will be trained to comply with the requirements of our environmental and social policy, and will play a key role in these continuous improvement actions.
- Our partners, services providers and suppliers will all be associated to our ambition and will contribute in achieving our objectives.

Paris La Défense, March 2021

Bruno BENSASSON
CEO

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