

192248.R.004

B2

Masdar

Zarafshan Wind Farm

Environmental & Social Impact Assessment

15 July 2021

Non-Technical Summary



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Report Classification:	Confidential

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Date of issue:	15 July 2021		

Amendment Record

Revision Number	Date	Summary of Amendments	Purpose of Revision
A1	08/07/2021	n/a	First draft
A2	08/07/2021	Minor amendments following review	Internal authorisation
B1	09/07/2021	Minor amendments following authorisation	Client issue
B2	15/07/2021	Minor amendments following Lender comments.	Client issue.

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1 Introduction

1.1 Project Location and Description

Masdar is proposing to construct and operate a wind farm project located in the Tamdy District of Uzbekistan, approximately 7 km east of Zarafshan City (the Project). The Project, once operational, will generate 500-megawatt (MW) of renewable energy. The Project location is shown on Figure 1-1.

The Project is proposed to include 111 wind turbines as well as a substation, compound area, tracks to access each turbine, underground cabling from the turbines to the substation and two short overhead transmission lines, connecting to two existing transmission lines that cross the Project site. There will be one access point from the A379 road to the site.

It is expected that construction will take place from late 2021 to late 2024 and, once operational, will supply power to the national grid.

1.2 Preliminary Environmental and Social Impact Assessment

A Preliminary Environmental and Social Impact Assessment (ESIA) has been prepared by Wood to identify and assess potential environmental and social impacts of the wind farm and all infrastructure associated with it. Measures are then identified to reduce and manage potential environmental and social impacts.

The purpose of this non-technical summary (NTS) is to present the key findings of the Preliminary ESIA in a manner which is accessible to everyone that may be interested in the Project.

A Final ESIA will be produced at a later stage once further Project information, including a detailed layout and construction details, are available. This NTS will be updated once the Final ESIA has been prepared.

1.3 Importance of the Project

The Uzbek Government has ambitious energy transformation plans and the development of renewable energy is of key importance. Uzbekistan has a rich renewable energy potential, particularly for wind, solar PV and hydroelectric development. The Project is important as it will assist with the Uzbek Government's aim to increase the renewable energy sector and reduce reliance on non-renewable sources.

1.4 Alternative Options

A number of realistic alternatives were considered throughout the Project's development in terms of different options relating to:

- Site selection.
- Technological alternatives.
- Grid connection.
- Site layout.

Wind power was determined as the optimal technology for the Project location. The proposed wind farm layout and grid connection have been modified and refined, taking account of environmental and social factors, with the aim of minimising conflicts with existing roads, residential areas and on-site constraints.

1.5 Wind Power

Wind power is energy obtained from the wind. To be able to produce electricity from wind, a wind turbine is used. The turbines will have a tower and three blades with a total height to the tip of the blade of 172.5 m. Typical wind turbines are illustrated in the photograph below.



Figure 1-2: Typical Wind Turbines

1.6 Project Site

The main Project area is located within the Tamdy district, in the central part of the Kyzylkum desert occupying around 9,600 hectares in size. The area is largely used for rough grazing of sheep and to a lesser extent, goats and horses, with a number of access tracks crossing the site. All land within the Project area is owned by the government and managed by Tamdy District on behalf of central government. Certain parts of the Project are leased to farmers for agricultural activities in the form of animal keeping.

The photograph below provides an illustration of the Project site.



Figure 1-3: Core Project Site Area

2 Environmental and Social Baseline, Potential Impacts and Mitigation

The Preliminary ESIA identifies the potential impact of the wind farm on the existing environmental and social conditions of the Project site and surrounding area.

The environmental and social baseline was collected through site survey and consultation exercises. The proposed Project site and turbine locations were identified to avoid the areas of highest sensitivity.

A summary of key impacts that have been identified by the Preliminary ESIA process during the construction and operational phases of the wind farm are outlined below. Decommissioning impacts are typically similar to construction phase impacts and have not been summarised. Key mitigation measures are also outlined within the sections below.

2.1 Birds

The site is situated approximately 3.5 km from the Mount Aktau Important Bird and Biodiversity Area which supports breeding and resident populations of raptors which are of international and national conservation status.

Potential impacts on birds arising during construction comprise:

- Direct loss of vegetation and habitat (including food sources).

- Indirect damage to habitats and disturbance of birds from presence of people, machinery, traffic, and noise, both within and outside of the Project area. This indirect impact could affect species of global and regional conservation concern.
- Indirect impacts associated with pollution.

The predicted impacts of construction are low and not significant based on survey information obtained so far, however mitigation during construction will include timing work to remove suitable nesting habitat to avoid the most sensitive times of year for ground nesting species.

The key potential impact during operation is the potential collision of birds with wind turbines, particularly species of conservation concern present at the Project site including the Cinerous Vulture, Eurasian Griffon Vulture, Egyptian Vulture and Steppe Eagle. The assessment identified the potential for significant impacts on these four species during operation.



Figure 2-1: Steppe Eagle¹

Mitigation to avoid impacts to these sensitive bird species will be implemented by the Project. This will include (amongst others) using coloured wind turbine blades (as per standard aviation markings) to increase turbine visibility, shutting down turbines if sensitive bird species fly too close to turbines, removal of animal carcasses from the site and education of the local community in the importance of conserving key bird species.

¹ https://ebird.org/species/steeg1?siteLanguage=en_GB

2.2 Terrestrial Ecology

The proposed Project site is situated within areas of low species diversity. Potential impacts on flora (plants) and fauna (animals) arising during construction comprise:

- Direct loss of vegetation and habitat (including food sources).
- Direct loss of fauna during construction activities.
- Damage to habitats and disturbance of fauna from presence of people, machinery, traffic, and noise, both within and outside of the Project area. This indirect impact could affect species of global and national conservation concern.
- Indirect impacts associated with pollution.

Potential impacts during operation of the Project are as follows:

- Disturbance of fauna from turbine noise, shadow flicker, people, and traffic.
- Displacement from immediate surrounds of turbines and wind farm area resulting in loss of feeding resources.
- Loss of fauna from collision with turbines (bats).

The impacts on flora and fauna on, or within the vicinity of, the proposed Project site have been assessed as low generally, with some impacts anticipated at local levels. Mitigation is proposed to ensure the overall effect of the Project will not be significant in the long-term.

The construction timetable will be designed so that activities such as breaking ground in un-prepared areas will be timed to avoid the most sensitive times (for example mid-October to March when vulnerable species of reptile, such as Russian Tortoise may be hibernating below ground). Pre-construction surveys will identify sensitive areas and species immediately before work commences so that they can be captured and moved to safe areas of the site.

A number of other mitigation measures will be implemented to include pollution prevention measures, management and restoration of habitat and protection of excavations to prevent sensitive species such as Russian Tortoise, Caspian Monitor or hedgehog species falling into excavations and becoming trapped/injured.

Ongoing bat activity surveys will determine appropriate levels of operational mitigation.

2.3 Social

2.3.1 Engagement

A number of stakeholder engagement activities were completed with local stakeholders during preparation of the Preliminary ESIA. All stakeholder and public comments received to date have been considered when developing the Preliminary ESIA and included within the Project Stakeholder Engagement Plan (SEP).

Stakeholders' opinions towards the Project typically reflect the following:

- A clear expectation of local employment opportunities and improved electricity supply, which is expected to result in follow-on industrial developments, bringing even more employment and improved economic opportunities in the future.
- The expectation for Project employment opportunities to benefit men more than women.
- Community investment projects that are funded by the developer to address challenges such as inadequate teaching materials, water supply problems, and the living standards and future opportunities for young and disabled people.
- The opportunity for young people to learn about this type of renewable energy which is new to both the region, and country as a whole.

During the stakeholder engagement activities, there were no specific concerns associated with the Project reported. The consultation and disclosure carried out to date will be continued, with the disclosure of the findings of the ESIA to be undertaken prior to the start of construction. A community grievance mechanism template is included within the SEP.

2.3.2 Impact Assessment

A number of positive impacts are anticipated to arise from the Project. The Project will positively influence the local, regional and national economy during construction, from the direct procurement and supply of materials and services, and during operation contributing towards the ongoing development of the country using a low-carbon, renewable source. The Project will also result in local employment opportunities both during construction and operation.

During construction and operations, Masdar will design and implement a Community Development Plan (CDP) that aims to provide a range of benefits to people in local communities in the vicinity of the Project. The CDP is an entirely voluntary initiative. The CDP will have the following objectives:

- To establish procedures for responding to community needs, working with the community and other partners including local government, planning and implementing community Projects, and managing financial arrangements.
- To describe the way in which information associated with community development is to be disclosed and shared in a culturally appropriate manner.
- To ensure that the needs of women and vulnerable groups are taken into consideration during the selection of community development Projects.
- To define clear roles and responsibilities between the various stakeholder groups involved; and
- To define monitoring and reporting procedures that can be used to track implementation over time.

The social assessment also determined negative impacts associated with the Project. Key impacts are described below.

The use of a supply chain introduces the potential for labour violations to occur. This includes, for example, poor working conditions, a lack of written worker contracts being used, low-levels of occupational health and safety, child labour, forced labour and other forms of labour-related exploitation.

During construction there is a potential for people from outside the Tamdy District to turn up without invitation, seeking employment and other types of economic opportunities from the Project. This may result in a spread of communicable diseases, increased tensions between local people and newcomers, and may result in an increase in the local incidence of crime.

The use of a workforce and construction activities generates a variety of occupational health and safety risks to the workforce and to local people. In addition, the use of road vehicles to transport materials and personnel to/from the site introduces significant community health and safety risks.

There is also the potential for impacts to land-based livelihoods as a result of the Project. Farmers that currently use the Project area will no longer have access to areas of relatively small amounts of land used for grazing livestock. However, none of the informal herder shelters shall be impacted by land-use change arising from the Project.

A number of mitigation measures will be implemented to ensure impacts are minimised. These will include engagement with land users prior to construction commencing, development of a Workforce Health and Safety Plan, an Influx Management Plan and a Supply Chain Management Plan.

The Project will prepare a Livelihood Restoration Plan (LRP) to address involuntary economic displacement prior to construction.

2.4 Transport and Access

The wind turbine components need to be transported to the Project site using oversized vehicles, larger than typical heavy goods vehicles (HGVs). HGVs will also be required to transport other Project components. This will result in increased traffic on the transportation route and local roads surrounding the Project site.

It is assumed at this stage that turbine components will be transported from the port of Aktau to site (1,358 km distance). The Project site will then be accessed from the south via one access point off the A739 road. The logistics study is underway considering route options including a route from mainland China to Horgos, Almaty, Tashkent and Zarafshan. The final route option will be assessed in the Final ESIA.

During the construction phase potential impacts include:

- Traffic generation during construction period with potential for increased accidents, severance, driver delay and pedestrian delay.
- Damage to road edges and surfaces.

During operation the number of vehicles is likely to be low, with access required only for maintenance and servicing. The majority of these will be light vehicles with HGVs only required if turbine components need replacing.

Mitigation is proposed to include the development of a construction transport management plan to manage potential impacts on the road network and its users. With mitigation measures implemented impacts are predicted to be minor.

2.5 Landscape and Visual

An assessment of landscape and visual impacts has been undertaken. Seven viewpoints have been identified within the 35 km study area for the visual assessment. The Project is located within the Kyzulkum desert and is considered to largely be within a Rocky Deserts landscape character type (LCT). The photo below, illustrates the Project site area and landscape type.



Figure 2-2: Project Area – Rocky Deserts LCT

Landscape

During construction new machinery and equipment will be introduced into the landscape, including a crane, trucks, excavators, bulldozers, and other heavy equipment. In addition, there will be temporary storage areas and temporary workers' accommodation. Due to the temporary nature of the works and the surrounding topography that will provide screening of the works, no significant landscape impacts are predicted during construction.

During operation, there is the potential for significant landscape impacts within 5 km of the Project however further afield, as the desert landscape is vast there is the capacity to absorb the Project within the landscape.

Visual

During construction, the greatest visual impacts will be during the wind turbine erection process. Impacts during construction at viewpoints are not considered to be significant.

During operation of the Project, significant impacts are predicted to occur at two viewpoint locations due to the number of turbines visible.

Mitigation measures will be implemented, to include the reinstatement of construction areas and the implementation of a community benefits package, to ensure that any visual impacts experienced by the local population are offset by an appropriate level of community benefit.

2.6 Archaeology and Cultural Heritage

The potential impacts of the Project and associated works on cultural heritage assets in the surrounding area has been assessed.

There are no known archaeological or cultural heritage sites within the Project area, however, the area has not been well studied with respect to archaeology. A religious site is located just south of the Project, adjacent to the Golden Key Tourist Resort.

As there are no identified sites within the Project area, the Project is not deemed to directly impact on any international or nationally recognised heritage. There remains the potential to uncover previously buried archaeology (chance finds) during construction works therefore an observation and investigation exercise (an archaeological chance finds procedure) will be implemented during initial construction works to identify any uncovered archaeological features.

2.7 Noise

Noise sensitive receptors were identified during the baseline collection phase of the Project. These represent a mix of temporary farm dwellings, tourism area, settlements (including mining area settlement for workers). The closest is located just under 1 km from the closest wind turbine.

Construction noise is short term and typically managed through standard measures. A Noise Management Plan will be developed for the construction phase. The plan will set out how permitted working hours will be adhered to, mitigation to ensure construction noise limits are met and community consultation details and grievance mechanism process in the event of any noise-related complaints.

Wind turbines emit noise during their operation. Noise from the turbines must meet fixed lower limits for day-time and night-time. The following operational noise limits from local regulations and international guidelines have been applied to the Project for the noise assessment:

- Day-time – limit of 55 dB(A).
- Night-time – limit of 45 dB(A).

- For industrial areas, the day and night LAeq values are relaxed to 70 dB(A).

A detailed noise modelling exercise has been carried out to ensure that the turbines do not exceed the specified limits. The operational noise impact assessment concluded that the predicted levels for total operational wind farm noise meet the limits at all noise sensitive receptors close to the Project and therefore no significant impacts are predicted.

2.8 Shadow Flicker

Shadow flicker occurs during the operational phase of a wind farm when the sun passes behind the turbines and casts a shadow. As the blades rotate, shadows pass over the same point causing an effect termed shadow flicker. Shadow flicker may become a problem when potentially sensitive receptors (residential properties, workplaces, learning spaces and health care settings are all potentially sensitive to shadow flicker) are located near, or have a specific orientation to, the wind farm.

Modelling of shadow flicker duration was undertaken for ten identified sensitive receptors within the area predicted to be impacted by shadow flicker. The limit of 30 minutes per day and 30 hour per year is predicted to be breached at two receptors. Mitigation is therefore proposed and will include the installation of shadow flicker modules on the identified wind turbines (34, 37 and 39) to shut down the turbines at specific dates and times of the year when shadow flicker is an issue. This will ensure there are no significant impacts relating to shadow flicker.

If any complaints are raised by the local community (through the grievance mechanism or other channels) relating to shadow flicker from the Project, the Project operator shall investigate and, where found to be necessary, instigate appropriate further measures to mitigate the shadow flicker effects.

2.9 Hydrology and Hydrogeology

Potential impacts resulting from the construction, operation and decommissioning of the Project on the water environment including surface water and groundwater conditions, have been examined.

There are no permanent waterbodies on or adjacent to the Project site. A number of seasonal drainage channels were observed across the site. The temporary channels are active during the Spring period and during heavy rains and snow melt.

Potential impacts on water resources include:

- Water consumption, potentially affecting local water resources.

- Alteration of surface and groundwater flow.
- Water discharge and pollution.

Water required during construction will likely be delivered to the Project site via tankers. This will be determined following appointment of the Engineering, Procurement and Construction (EPC) Contractor with further information provided within the Final ESIA document.

Standard mitigation measures are proposed during construction and operation to prevent pollution and contamination of surface and groundwater, and to reduce the potential of erosion particularly during spring months when drainage channels are utilised.

2.10 Geology and Soils

The main impacts on soils and geology are likely to arise during the various site preparation and construction activities associated with the Project and its access roads.

Soils in the Project area are identified as vulnerable to erosion and desertification. In particular, soil erosion can be caused by vehicles on unimproved tracks, and water erosion may occur during winter. During operation, the main impacts on soils would be from continued vehicle traffic.

Standard mitigation measures are proposed during construction and operation to control erosion, prevent pollution and contamination of soils, and to reduce soil damage.

2.11 Aviation and Radar

Turbines can present as physical obstruction to aircraft. Turbines can also cause radar and other navigational aid interference whereby the blades appear as 'clutter' on radar screens and can be mistaken for aircraft.

The closest airport to the Project is Zarafshan at a distance of around 5.8 km west-north-west of the western edge of the Project site. Consultation will therefore need to take place with the Civil Aviation Authority to provide the information required to obtain a permit for the Project. This will be undertaken once the final Project layout has been determined.

2.12 Climate Change

A climate change risk assessment has been carried out for the Project to ascertain on-going and expected changes in climatic patterns and an evaluation of the climate-related physical risks which included implications for the Project associated with increasing air temperatures and a high number of high heat days. There is also the potential for ice being thrown from turbine blades to increase with climate change however this is not considered a significant issue for the Project as there is sufficient distance to residential receptors.

A greenhouse gas (GHG) emissions calculation has also been undertaken. Benefits are envisaged through carbon emission reductions each year by reducing reliance on fossil fuels for electricity generation. The Project will contribute to Uzbekistan's target to reduce annual GHG emissions per unit of gross domestic product by 10% by 2030 (relative to 2010), thereby providing a minor overall benefit.

3 Environmental and Social Management System

The mitigation, monitoring and performance improvement measures identified within the Preliminary ESIA and the Final ESIA document will be incorporated into the Project Environmental and Social Management System (ESMS) developed by Masdar. The measures and actions to address identified impacts and risks will favour the avoidance and prevention of impacts over minimisation, mitigation or compensation wherever technically and financially feasible. Where risks and impacts cannot be avoided or prevented, mitigation measures and actions are identified so that the Project can operate in compliance with applicable laws and regulations in addition to meeting international standards.

The scope of the ESMS for the Project will include:

- The operational standards to be applied to the Project.
- Masdar's policy for environmental management, occupational health and safety, labour and community health, safety and security.
- Organisational chart for environmental, social, health and safety (ESHS) elements, roles and responsibilities and Contractor management.
- ESHS reporting – both of routine and incidents / accidents.
- Audit, review and management of non-conformances.
- Community grievance mechanism (alongside the Stakeholder Engagement Plan).
- Workers' grievance mechanism.

A number of management plans (sub-plans) will be produced in support of the ESMS. The construction Environmental and Social Management Plan (CESMP) will constitute the overarching document referring to a number of sub-plans required for the Project and implemented by the Project engineering contractor.

Management plans consist of a combination of operational policies, procedures and practises. These plans will provide a system against which to monitor and audit environmental and social performance. In addition, they will detail the practical methods required to ensure work is completed in accordance with current best practice, the mitigation measures in the ESIA and legislative and regulatory requirements.

A programme of Environmental and Social Monitoring will be undertaken in order to verify the effectiveness of the proposed mitigation and management measures.

4 Contact Details

Any queries regarding the Project or the Preliminary ESIA can be raised directly with Masdar by contacting:

Name: TO BE CONFIRMED.

Address:

E-mail:

Telephone:

