

# Dzhankeldy 500MW Wind Farm

## Republic of Uzbekistan



Environmental and Social  
Impact Assessment (ESIA)  
Volume 1 - Non-Technical  
Summary

Prepared for:



October 2022

## DOCUMENT INFORMATION

PROJECT NAME	Dzhankeldy 500MW Wind Farm
5Cs PROJECT NUMBER	1305/001/102
DOCUMENT TITLE	Environmental and Social Impact Assessment (ESIA) Report: Volume 1 – Non- Technical Summary
CLIENT	ACWA Power
5Cs PROJECT MANAGER	Eva Muthoni Oberholzer
5Cs PROJECT DIRECTOR	Ken Wade

## DOCUMENT CONTROL

VERSION	DATE	DESCRIPTION	AUTHOR	REVIEWER	APPROVER
1.0	17/12/2021	ESIA-NTS	EFO	MKB/KRW	KRW
1.1	11/01/2022	Updates Based on ACWA Power's comments	EFO	MKB	KRW
1.2	27/04/2022	Update based on comments received from EBRD/RINA & ADB	SB/EFO/EMO	MKB	KRW
1.3	16/05/2022	Update based on comments received from EBRD	EFO/EMO	MKB/KRW	KRW
1.4	04/10/2022	Update based on comments received from ADB	EFO/EMO	KRW/MKB	KRW



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## LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
ADB	Asian Development Bank
CESMP	Construction Environmental & Social Management Plan
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
ESIA	Environmental & Social Impact Assessment
GBVH	Gender Based Violence & Harassment
IFC	International Finance Corporation
NEGU	National Grid of Uzbekistan
OESMP	Operational Environmental & Social Management Plan
OHTL	Overhead Transmission Line
PCFM	Post Construction Fatality Monitoring Plan
RAP	Resettlement Action Plan
SEP	Stakeholder Engagement Plan
5 Capitals	5 Capitals Environmental and Management Consultancy

# 1 INTRODUCTION

## 1.1 The Project

The government of the Republic of Uzbekistan through the Ministry of Energy aims to increase the electricity production in the country from 12.9GW in 2019 to 29.3GW in 2030 in order to foster economic growth as part of the Uzbekistan 2030 Energy Strategy. One of the objectives of the Energy Strategy include the development and expansion of renewables use and their integration into the unified power system. In regard to the development of wind farms the Energy Strategy states the following as priority:

*“Creation of large-scale wind farms with single site capacities ranging from 100MW to 500MW mostly concentrated in North-Western region (Republic of Karakalpakstan and Navoi region) shall be the main priority of wind power development”*

The Dzhankeldy 500MW Wind Farm aligns with the above statement and the 2030 Energy Strategy. The 500MW Wind Farm in Dzhankeldy (herein after referred to as 'the Project') will be developed on two adjacent plots of land in Peshku District by ACWA Power through a Project Company 'FE ACWA Power Dzhankeldy Wind LLC' registered in the Republic of Uzbekistan with registration number 839766. The Project will also include the development of a 128.5km single circuit 500kV Overhead Transmission Line (OHTL).

ACWA Power Dzhankeldy Wind LLC has entered into a 25-year Power Purchase Agreement (PPA) with JSC 'National Electric Grids of Uzbekistan.

ACWA Power has appointed 5 Capitals Environmental and Management Consulting (5 Capitals) as the lead E&S Consultant to undertake the independent Environmental Impact Assessment (EIA) and Environmental and Social Impact Assessment (ESIA) processes, to attain the relevant National regulatory permits and approval from the international banks required for the project finance.

This Non-Technical Summary (NTS) of the ESIA provides a description of the Project and the anticipated impacts (both positive and negative) associated with its construction, commissioning, operation and decommissioning phases. It also describes the design process taken to prevent impacts and the mitigation and management measures identified to minimise or manage negative impacts and where possible to enhance beneficial impacts.

The NTS has been prepared for the potential financing of the Project by the European Bank for Reconstruction and Development (EBRD), the Asian Development Bank (ADB) and Multilateral Investment Guarantee Agency (MIGA). The Project will comply with the environmental and social policies and safeguards of these banks including EBRD's specific Performance

Requirements, ADB's Environmental & Social Safeguards and IFC's Performance Standards, the latter being applied by ACWA Power on all their projects. Such requirements comprise the disclosure of the Project's environmental and social documentation for consultation with relevant stakeholders and those people that might be affected by the project. The public disclosure period for ADB commenced March 2022 and will extend for 120 days while the disclosure for EBRD is 60 days commencing May 2022.

## 1.2 Background and Rationale

### 1.2.1 National EIA

5 Capitals appointed a local consultant, 'Juru Energy' (based in Tashkent, Uzbekistan) to undertake baseline surveys, consultations, and preparation of the project specific Stage I EIA Preliminary Statement of Environmental Impact for submission to the local regulator.

The Stage I EIA was submitted to the State Committee on Ecology and Environmental Protection (SCEEP) of the Republic of Uzbekistan on 5<sup>th</sup> July 2021 by Juru Energy. This was reviewed by SCEEP and comments were received on 2nd August 2021 to update this report to include preliminary Biodiversity Conservation Plan and Biodiversity Monitoring Programme and a tree report summarizing the qualitative & quantitative survey of trees and shrubs conducted by the Bukhara Regional Department of Ecology & Environmental Protection.

The updated National EIA (Stage I) was resubmitted to the State Committee on 7<sup>th</sup> September 2021 and approved on 30<sup>th</sup> September 2021 allowing for project construction works to commence without the need to prepare a Stage II "Statement for Environmental Impact". However, a Stage III 'Statement on Environmental Consequence' is required to be submitted, and approved, prior to commencement of project operations.

### 1.2.2 Lenders' ESIA

An *Environmental and Social Scoping Report* was completed on 11<sup>th</sup> March 2021, which identified the likely risks and impacts of the project, and provided the terms of reference for the ESIA, including consultations and the scope and methods for baseline surveys, laboratory analyses and modelling that will be used to determine the impacts and establish the required mitigation measures. The ESIA was undertaken in line with lender requirements<sup>1</sup> (as well as

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<sup>1</sup> 'Lender Requirements' includes: EBRD Environmental & Social Policy (2019); ADB SPS (2009) and Safeguard Requirements, Equator Principles IV (2020); IFC Performance Standards 2012; IFC & EBRD Worker's Accommodation, Processes and Standards (2009); and ILO Conventions.



Uzbekistan requirements). Since ACWA Power implements the E&S requirements of IFC as a minimum on all its projects, the ESIA has also been prepared in accordance with the IFC Performance Standards and IFC Environment, Health and Safety Guidelines.

The key objectives of the ESIA include the following:

- To provide an overview of the Project design, identification of sensitive receptors in the Project's area of influence and assessment of Project alternatives;
- Assessment of baseline conditions prior to the development of the Project through review of available data and conducting surveys;
- Assessment of the project's environmental & social impacts for the construction and operational phases;
- To review compliance obligations, including applicable Uzbekistan regulations and international regulations & standards as well as international lender requirements;
- To engage with key stakeholders and project affected people to disclose Project information, study outcomes, gain lay knowledge about the local environmental & social context, seek feedback on proposal and to understand & map any resettlement requirements.
- Determination of applicable mitigation and management measures including monitoring requirements to be implemented in order to avoid or minimise potential impacts and maximise potential environmental and social gains;
- Consideration of design alternatives that can reduce impacts and/or provide greater social and environmental gains.
- To prepare an Environmental & Social Framework from which the construction phase and operational phase respective environmental & social management systems and plans can be developed and implemented.

The ESIA has been divided into several volumes as follows:

- **Volume 1:** ESIA Non-Technical Summary;
- **Volume 2:** ESIA Main Text, Tables, Figures and Plates;
- **Volume 3:** ESIA Framework for Environmental & Social Management; and
- **Volume 4:** ESIA Technical Appendices

### 1.3 Related Project Environmental & Social Documents

The Project's Environmental & Social documentation also includes the following:

- Stakeholder Engagement Plan (SEP), Including Grievance Mechanism; and
- Resettlement Action Plan (RAP).

## 1.4 Key Project Information

**Table 1-1 Key Project Information**

<b>PROJECT TITLE</b>	Dzhankeldy 500MW Wind Farm
<b>PROJECT DEVELOPER</b>	ACWA Power
<b>PROJECT COMPANY</b>	FE "ACWA Power Dzhankeldy Wind" LLC
<b>OFFTAKER</b>	JSC National Electric Grid of Uzbekistan
<b>EPC CONTRACTOR</b>	China Energy International Group Co (CEEC)
<b>O&amp;M COMPANY</b>	First National Operation and Maintenance Co. Ltd (NOMAC)
<b>ENVIRONMENTAL CONSULTANT</b>	5 Capitals Environmental and Management Consulting (5 Capitals) PO Box 119899, Dubai, UAE Tel: +971 (0) 4 343 5955, Fax: +971 (0) 4 343 9366 www.5capitals.com
	Juru Energy Consulting LLC Chust Str. 10, 100077, Tashkent, Uzbekistan Tel: +998 71 202 0440, Fax: +998 71 2020440
<b>POINT OF CONTACT</b>	Ken Wade (Director), Ken.wade@5capitals.com

# 2 PROJECT SUMMARY

## 2.1 Project Location

### 2.1.1 Wind Farm

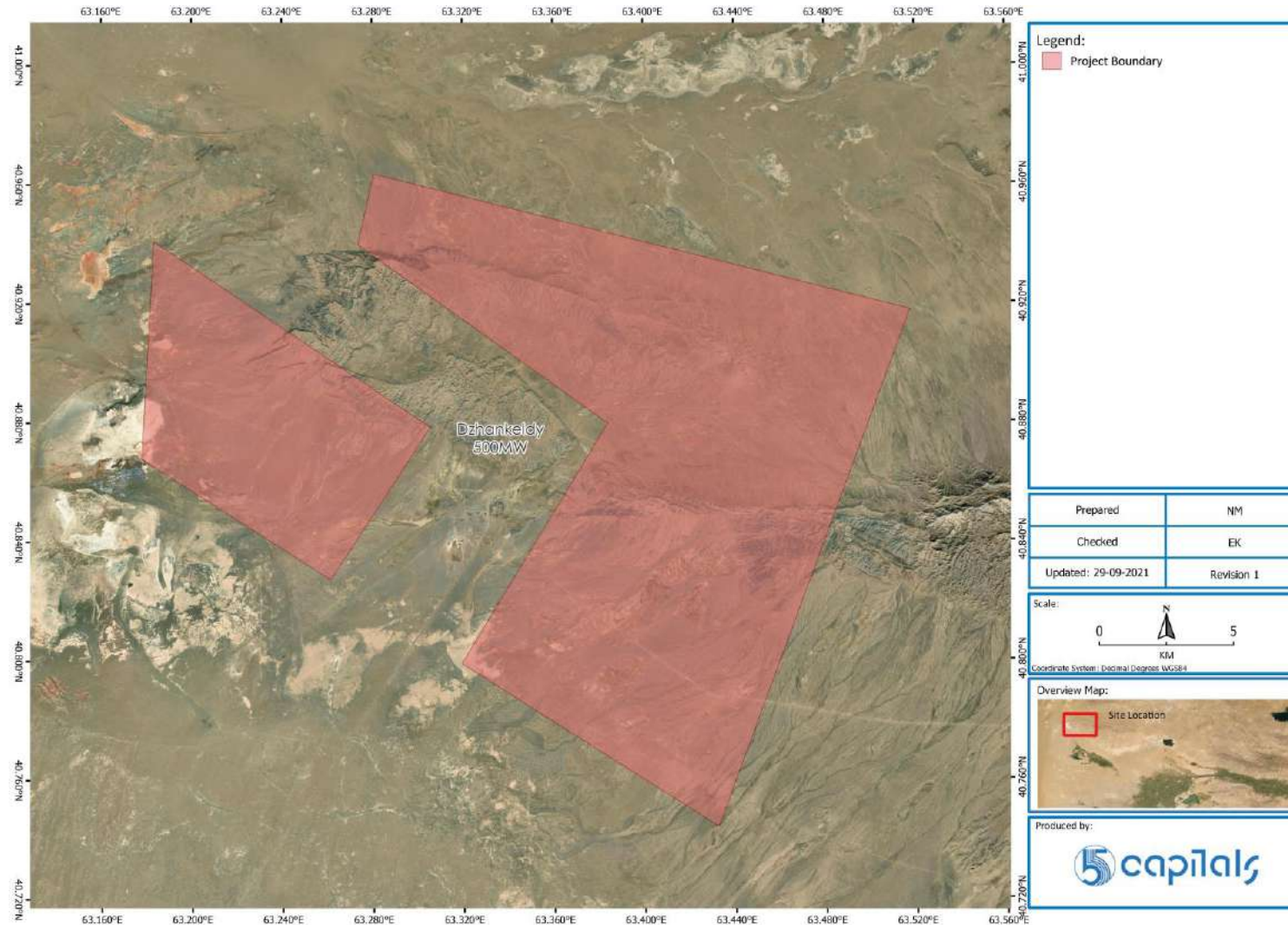
The Dzhankeldy 500MW Wind Farm Project will be located on two plots of land as follows:

- The south eastern part of the Kyzylum desert on the territory of the Kuldzhuktau mountain range, Peshku district of the Bukhara region; and
- The western plot of the wind farm is located approximately 2.5km east of Dzhankeldy village and directly adjacent to the Kalaata village. The eastern plot of the wind farm will be located approximately 1.4km west of Dzhankeldy, 27km west of Ayakguzhumdy and approximately 92km west of Bukhara town.

Both the western & eastern plot are approximately 47km north of Highway A380. The proposed Project location is provided in the figure below.

The wind turbines will be sited within the allocated land where the wind resource is most reliable but the siting has also taken account of environmental and social issues which are described in this NTS, to ensure that impacts are prevented, minimised or mitigated in accordance with Uzbekistan laws and environmental standards and the E&S policies and safeguards of the international banks funding the project.

Figure 2-1 Project Location – Local Context



### 2.1.2 Overhead Transmission Line

A 128.5km single circuit 500kV OHTL will run from the Dzhankeldy Wind Farm site to the Bash Wind Farm site located approximately 94km east of the Dzhankeldy Wind Farm site. The OHTL will be developed as part of the Project by the FE “ACWA Power Dzhankeldy Wind” LLC and the alignment is presented in the figure below.

**Figure 2-2 Alignment of 128.5km OHTL from the Dzhankeldy Wind Farm to Bash Site**



From the Bash site, power will be transferred to the Qurako'l substation via another 500kV OHTL that will be developed as part of the Bash Project (which is assessed in a separate ESIA).

## 2.2 Project Description Summary

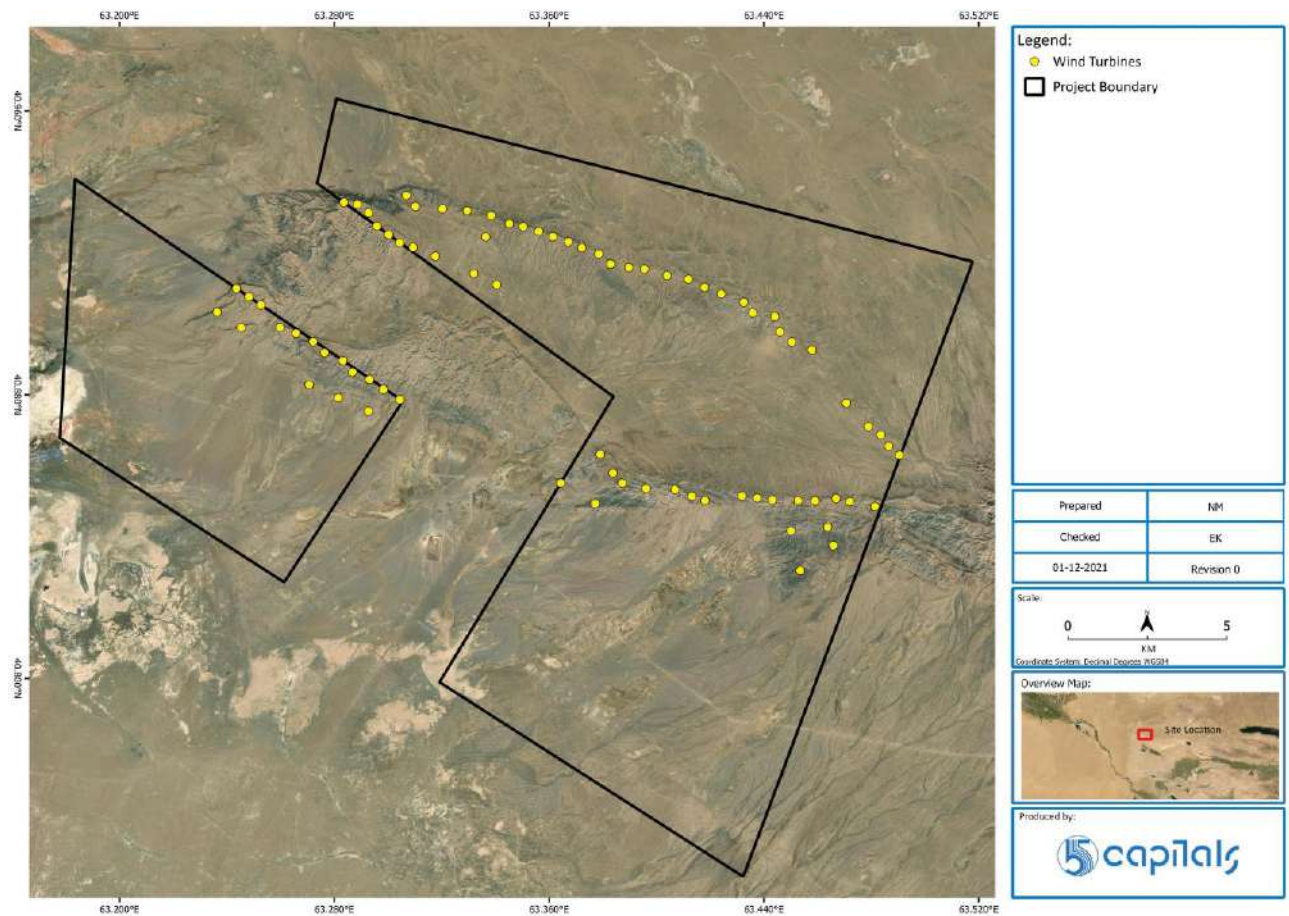
### 2.2.1 Wind Farm

The Dzhankeldy Wind Farm final configuration will comprise of 79 Wind Turbines Generators (WTGs) which will be 6.5MW each, based on Envision “EN 171” specification. The WTG configuration shown in the figure below (November 2021) previously comprised 125 WTGs and this was reduced by 46 units during the design review to reduce environmental and social impacts particularly on sensitive habitat.

The proposed location of the WTGs within the Project site are presented in the figure below.



**Figure 2-3 Proposed Location of the WTGs within the Project Site (November, 2021)**



The wind turbine chosen for the Project will have a hub height of 100m and a rotor diameter of 171m and adopts variable speed control, variable pitch control and advanced control strategies. The variable speed control is adopted when the wind speed is below the rated value, variable-pitch control is adopted when the wind speed is above the rated value, and advanced control strategies are adopted to reduce WTG load and increase power generation. This flexible and advanced control mechanisms also allow for short term temporary stopping of the wind turbine rotation when birds such as the Egyptian Vulture are approaching the danger zone and can be quickly restarted when the birds are at a safe distance.

Compared with existing direct drive wind turbines in the current international market, the direct drive chosen for this wind farm has a higher generator efficiency and wide speed (7.1rpm to 9.94rpm). The pitch system adopts the inner ring HVSM gear pitch scheme which has high control accuracy and high bearing capacity. The pitch system also pitch system employs brushless AC motor and uses ultra-capacitor as standby power supply, achieving a longer service life and less maintenance.

The main Wind Farm components and facilities will include:

- Turbine blades, generator, generator rotor, generator stator, nacelle, brake system, yaw system, tower, converter system, transformer for grid connection.
- Ancillary/support facilities: security building, administration building, offices and amenities, warehouse and stores, lighting, security, central control room, etc.
- Internal access roads between turbines: To enable easy access and transportation of project components within the site
- 33kV OHTL: to enable connection of the western wind farm to the 33kV substation to be located at the eastern plot
- 33/500kV sub-station: To be developed at the eastern plot with an approximate area of 39,900m<sup>2</sup>. From this substation, power will be transferred to a 500kV single circuit OHTL.
- External access road: To enable access to the Project site from Highway A380 south of the Wind Farm.
- Electrical connection facilities comprising a 33kV substation and 500kV switchyard that will enable connection of the Wind Power Plant to the single circuit 500kV OHTL (see details below).

### 2.2.2 OHTL

In order to enable connection of the Dzhankeldy Wind Farm to the grid, the Project will connect to a 128.5km single circuit 500kV OHTL that will run from the Project site to Bash Project site approximately 94km east of the site. The 500kV single circuit OHTL from Dzhankeldy to Bash will connect to the Bash 500kV pooling switch sub-station which is shared between the Dzhankeldy Wind Farm and Bash Wind Farm (subject to a separate ESIA). The switchyard will be designed to accommodate planned interconnections from Navoi-Muruntau LILO and the line from Sarymay to Dzhankeldy.

The design of the OHTL will include bird protection features, most notably anti-electrocution design features to avoid mortality of raptors resting on the lines and towers.

Power generated by the wind farms will be exported to the National Electric Grid Uzbekistan (NEGU) via the plant electrical interconnection facilities/500kV Air Insulated Substation (AIS).

It is understood from ACWA Power that the Bash 500kV pooling switch sub-station will be operated by both the FE "ACWA Power Dzhankeldy Wind" LLC and FE "ACWA Power Bash Wind" LLC, which will allow independent operation of the two wind farms.

Associated Facilities<sup>2</sup> of the OHTL include:

- A 500kV single circuit OHTL from Dzhankeldy to Sarymay: This OHTL will be approximately 120km and will also include the expansion of the existing 500kV Sarymay substation
- 500kV LILO to Navoi – Murantau: The LILO will be up to 2X5km, connecting to:
  - 500kV single circuit 108km OHTL to Murantau 500kV sub-station and
  - 500kV single circuit 80km OHTL to Navoi 500kV TPP switchyard
- The expansion of the existing Qurako'l 500kV sub-station

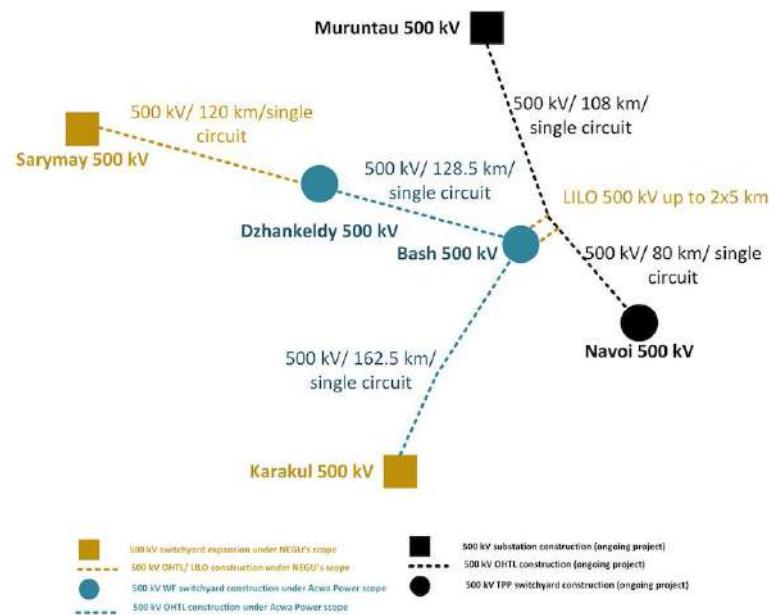
NEGU will be responsible for the construction and operation of the OHTL associated facilities. During a meeting held between the Ministry of Environment, NEGU, ACWA Power & Juru Energy, NEGU stated they will follow official procedure with banks such as EBRD for securing funds and ensuring timely implementation of Sarymay – Dzhankeldy 500kV OHTL and Sarymay 500kV switchyard commissioning in line with planned Dzhankeldy WF Early Commercial Operation Date (ECOD). It is noted that NEGU also stated that they have started discussions with EBRD on the financing of this alignment.

The figure below shows the Grid Interconnection Option to accommodate planned interconnections from Navoi-Murantau LILO and the line from Sarymay to Dzhankeldy.

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<sup>2</sup> Associated Facilities (in this case the OHTLs and substations) are necessary for the Bash Wind Farm to operate and transmit the generated power to the National Grid of Uzbekistan for required distribution.

**Figure 2-4 Grid Interconnection Option for 1GW ACWA Power Wind Farms (Dzhankeldy & Bash)**



Source: Selection of Interconnection Option

**Note:** The length of the OHTLs shown in the figure above have since been revised. The figure is included to illustrate the interconnectedness between the Dzhankeldy and Bash Projects and their associated facilities.

## 2.3 Project Construction

Construction works will include transportation of wind farm components to the site, site preparation, construction of temporary laydown facilities, land clearance at tower footprint & OHTL rights of way, transportation of OHTL components and construction of platforms for pylons/tower, etc.

A concrete batching plant will be located to the west of the eastern plot at a distance of over 500m from the on-site worker accommodation camps and from nearby local communities in order to mitigate against potential impacts.

All temporary construction working areas and facilities will be located within the Project footprint including the EPC accommodation facilities. Any temporary construction laydown area established along the OHTL rights of way will be for the storage of OHTL materials such as pre-assembled tower sub-structures, for the further assembly of these sub-structures into final tower structures, for storage of foundation reinforcement steel or steel tower metal bars, tools & equipment to be used by the Engineering Procurement and Construction (EPC) contractor as well as sub-contractors responsible for OHTL construction.



It is expected that the EPC Contractor will engage several sub-contractors and there will be a peak workforce of about 700-1000 personnel for the construction of the wind farm and OHTL. Out of these 700-1000 personnel, about 350 - 500 will be employed from within Uzbekistan while approximately 60% of the workers will likely be recruited from China, Turkey, India and Europe.

## 2.4 Project Operations

The duration of the Power Purchase Agreement (PPA) is 25 years from the Project's Commercial Operation Date. The operations and maintenance activities of the Wind Farm will be undertaken by The First National Operations and Maintenance Company Ltd. (NOMAC), a wholly owned subsidiary of ACWA Power. The operational workforce is expected to include approximately 35-40 personnel for the wind farm, excluding local personnel employed by NOMAC to undertake monitoring of birds activities during operations ensuring that the WTGs are stopped when there is a risk to endangered species such as the Egyptian Vulture.

The OHTL will be operated and maintained by NEGU. Dedicated/full-time personnel are not required for this purpose, however, both preventive & corrective maintenance will be undertaken at the OHTL.

## 2.5 Project Milestones

Based on the details provided by ACWA Power, the milestone for the wind farm and the OHTL are provided below

**Table 2-1 Key Project Milestone/Timeline Dates**

MIILESTONES	DATE
Signing Project Agreements (PPA; Investment Agreement)	24 <sup>th</sup> January 2021
Presidential Decrees	23 <sup>rd</sup> February 2021 as amended on 8 <sup>th</sup> July 2022
Land Allotment Orders	19 & 23 March 2021
Limited Notice to Proceed (LNTP)	July 2022
Site Mobilisation	September 2022
Full Notice to Proceed (FNTP)	October 2022
Obtain Permits for Road Modification Works to Allow for Transportation	October 2022
Substation Construction Commencement	Jan 2023
OHTL Design Approval	April 2023
Transmission Line Construction	August 2023
Commencement of WTG Reliability Tests	June 2024
Grid Available for synchronization & full production (Earliest connection date)	February 2024
Wind Farm Substation Commissioning Tests Completion	June 2024

MILESTONES	DATE
Interconnection and synchronization at wind farm and grid-level substation are completed (Communication is established & ready for evacuation)	June 2024
Early Commercial Operation Date (>10WTG for each site)	July 2024
Project Commercial Operation Date	December 2024
Project Taking Over	December 2024

## 2.6 Project Decommissioning

Potential impacts relating to decommissioning will be similar to those encountered during the construction phase. There are likely to be few decommissioning related risks to wind turbines such as minor quantities of hazardous components. Due to the small footprint of the project WTG, all structures and infrastructure could feasibly be dismantled for material recovery.

Given that the decommissioning phase is not expected for at least 25 years from COD, there are no specific requirements for decommissioning at this time, since future environmental and social regulations have yet to be developed. As such, it is not considered practical to speculate on future environmental and social conditions including the sensitivity of current or future receptors at this time.

It is proposed that the decommissioning process will be managed via an updated ESIA and ESMS to identify measures for the prevention, avoidance or minimisation of impacts. This will also require a specific Decommissioning Plan. The studies should be undertaken at least 12 months prior to the time of decommissioning to reflect changes in regulations and standards, and requirements for compliance with the expected "circular economy" that is likely to be a condition at that time. This will require maximising the re-use, recovery and recycling of components and materials to provide resource for future use.

It is anticipated that a specific requirement of decommissioning will be to restore habitats lost by the WTG footprints and this will be assessed in the future ESIA and Restoration Plans to identify the critical habitats and rare, endemic or endangered species that will benefit most from the newly restored habitats.

## 2.7 Project Alternatives

### 2.7.1 No Project Option

The government of the Republic of Uzbekistan through the Ministry of Energy aims to increase the electricity production in the country to foster economic growth, develop and expand use of renewables and develop public-private partnership in the country's energy sector. The

Dzhankeldy Wind Farm project forms part of the Ministry of Energy's plan to develop and expand renewable use and increase electricity production in the country to 29.3GW by 2030.

The generating capacity of the Project will be 500MW and this will contribute to the 3GW estimated wind power contribution to the total renewable power generating capacity (wind and solar) of 8GW by 2030. Given the national strategy for additional renewable energy contribution to the total power generating capacity, a 'No Project' option has not been considered further, as considering this option would delay and possibly prevent the Government of Uzbekistan from meeting its 2030 renewable energy target.

## 2.7.2 Alternative Project Sites

The process of site selection commenced in 2019 by the Ministry of Energy, State Geology Committee of the Republic of Uzbekistan and ACWA Power. The Ministry of Energy proposed specific area within the country where the wind farm can be developed. According to the State Geology Committee of the Republic of Uzbekistan, this area/territory was selected due to the area having less availability of minerals (precious and non-ferrous metals) than other areas/territories within the country. In March 2020, ACWA Power considered four (4) potential sites for the development of wind power projects in the Country as follows:

- Dzhankeldy: 7km west of Ayakguzhumdy;
- Bash: 30km west of Kokcha;
- Kanimekh 1: 20km northwest of Nurmakhan; and
- Kanimekh 2: 50km north east of Aznek

ACWA Power selected the Dzhankeldy site based on its high wind potential after reviewing the vortex data, wind campaign measurements, geological factors, existing infrastructure, and interconnection to the grid. Besides the above, the site was also selected due to presence of existing road infrastructure in the project area and the location of the site away from protected areas, Important Bird Areas (IBAs) or Key Bird & Biodiversity Areas (KBAs). It should be noted that the Bash, Kanimekh 1 and Kanimekh 2 sites are located approximately 0.5km, 65km and 78km to the nearest IBA - Ayakagitma lake respectively while the Dzhankeldy project site is approximately 86km from this IBA.

On 27<sup>th</sup> October 2021 the Ministry of Energy provided the key steps of the site identification/selection process and a summary of this is outlined below.

ID	KEY STEP	DATE
1	Participation of ACWA Power in the International Conference on the development of oil and gas in Uzbekistan followed by the meeting in the Ministry of Energy of the Republic of Uzbekistan	Q2 2019
2	The delegation consisting of the specialist from the Ministry of Energy and NEGU visited ACWA Power's facilities in UAE and Saudi Arabia	Q2 2019

ID	KEY STEP	DATE
3	Proposal from ACWA to do a wind farm in Nurota mountains	July 2019
4	After the State Geology Committee of the Republic of Uzbekistan rejected giving the land in Nurota district and proposed land by SGC as not accepted by ACWA Power, Ministry of Energy proposed that ACWA comes up with new site in Bukhara and Navoiy regions	Q3 - Q4 2019
5	Based on the analyses of ACWA Power on Bukhara and Navoiy regions, the negotiations on Head of Terms started	July 2019
6	Head of Terms signed on the 20 <sup>th</sup> September 2020 which includes the site coordinates for various wind power plants in Uzbekistan	September 2019
7	List of potential wind sites provided by Ministry of Energy based on satellite wind atlas, proximity to the national grid network	Q4 2019 – Q1 2020
8	Implementation Agreement signed on 5 <sup>th</sup> March 2020 between ACWA Power and Ministry of Energy which includes a shortlist of 5 wind sites (including Dzhankeldy & Bash sites)	March 2020
9	Final Selection of the 2 sites (Dzhankeldy & Bash) following the final discussion with: <ul style="list-style-type: none"> <li>• State Geology Committee (specifically in consideration of existing and future mining activities);</li> <li>• National Electric Grid of Uzbekistan (specifically in consideration of the length of the evacuation and future grid expansion plan); and</li> <li>• Environmental &amp; Social experts (in consideration of minimizing the potential environmental &amp; social negative impact).</li> </ul>	June 2020
10	Project Agreements (PPA & IA) signed on 24 <sup>th</sup> January 2021 which includes the site coordinates for Dzhankeldy & Bash	January 2021

### 2.7.3 Project Technology

Different turbines considered for the Project would have required 125 WTGs for the site, but this was reduced to 79 Envision EN 171 6.5MW model resulting in a much smaller footprint than was originally proposed, reducing the impact on critically important habitat for critically endangered, endangered and vulnerable species. The chosen technology finally selected also achieved the following:

- Technology allowing flexible use and maximising energy generation during high and low wind conditions;
- Ability to quickly slow and stop the rotating blades, called "shut down on demand" (SDOD) to prevent impacts with critically endangered birds of prey such as Egyptian Vulture and then restart quickly after the bird(s) are at a safe distance. This flexibility significantly reduces energy losses and risk of bird mortality;
- Least Cost of Energy (LCOE) which results in highest generation at lowest cost;
- Site Suitability of the chosen WTG Model and least footprint on natural and critical habitats and species; and
- The Project Schedule agreed with the Ministry of Energy,

## 2.7.4 Wind Farm Project Layout

Several changes were made to the location of the WTG locations based on the wind measurement campaign, due to potential environmental impacts (including ecological impacts) and due to potential social impacts to current land users, existing houses and settlements.

### ECOLOGICAL CONSIDERATIONS

A number of design changes were undertaken over a period of 9 months to optimise the Wind Farm layout and reduce the overall Project footprint. This included reducing the 125 WTGs initially proposed in March 2021 to the current 79 WTGs as shown in the table below.

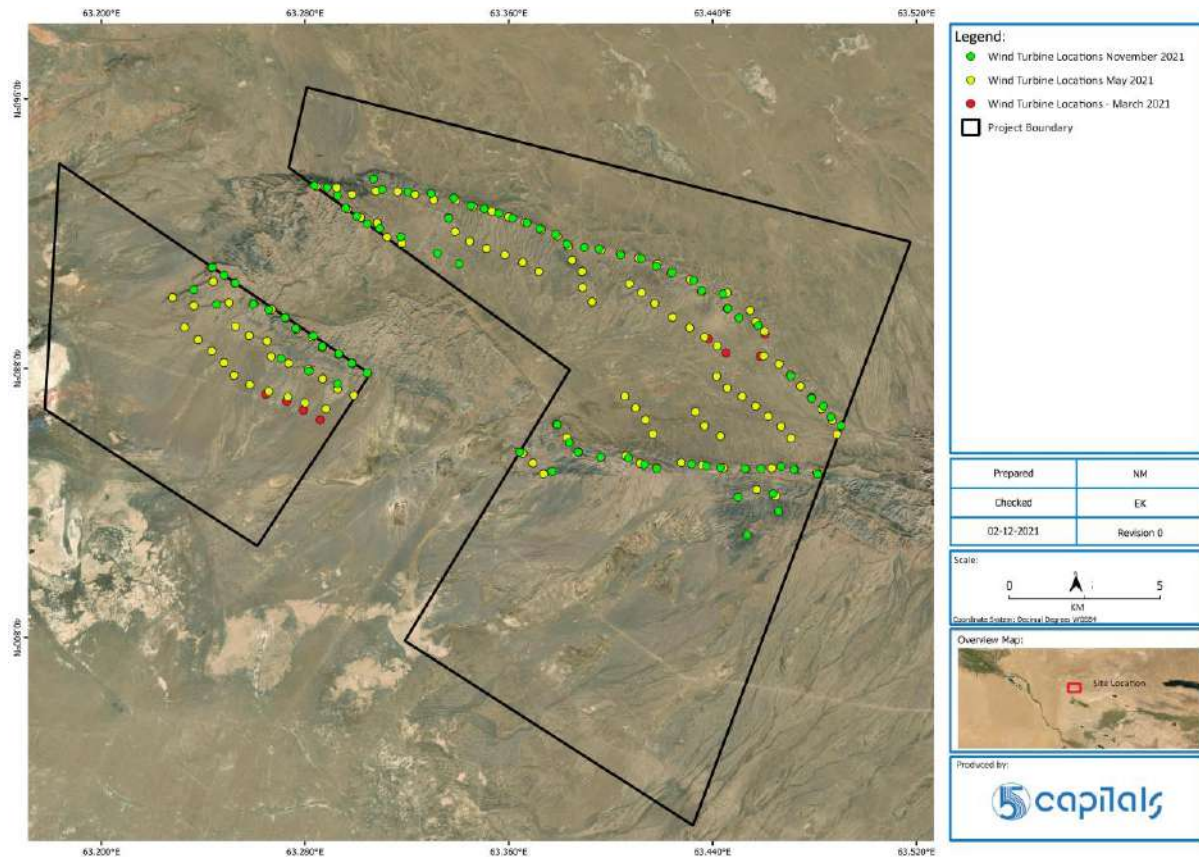
**Table 2-2 Optimisation of WTGs for the Dzhankeldy WF**

MONTH	NUMBER OF WTGs
March 2021	125
May 2021	125
August 2021	125
November 2021	79

The changes to the layout were not only undertaken to optimise the wind potential but they were also based on the following ecological considerations:

- Due to the identification of a critical habitat for the Southern-Even Fingered Gecko within the Southern part of the Wind Farm, approximately 10 WTGs and access roads were removed from the gecko habitat while the substation was relocated further north to avoid impact on critical habitat.
  - In addition, ACWA Power in consultations with SCEEP has identified a gecko reserve south of the Project site where no construction activities will be allowed and where the geckos within construction areas will be relocated to.
- Location of WTGs at least 750m from known active Tier 1 species nests apart from one WTG where ACWA Power has committed to upfront SDOD. This WTG (DZH-01) is within 640m of an active Golden Eagle Nest

**Figure 2-5 Overlay of WTG Siting Considered in March, May and November 2021 Showing Difference in WTG Location**



## HUMAN SETTLEMENTS & LAND USE CONSIDERATIONS

The wind farm boundary is located approximately 1.4km from Dzhankeldy village and 35m from Kalaata village. It is noted that the nearest WTG to Kalaata village is located approximately 5km away. This layout and siting of the WTGs ensures that the Project is in line with the required noise health protection zone.

The windfarm is used for grazing by 13 herders (8 from Dzhankeldy, 3 from Kalaata villages and 2 from Bukhara city). In order to minimize the impact on grazing land, only the BoP area will be permanently impacted and this accounts for 106.3ha of the 280ha allocated to the Project through a Presidential Decree. To mitigate against construction and operational phase impacts on livelihoods, alternative land outside of the Project boundary has been identified for the herders and grazing can still continue within the gecko reserve (to the south of the project boundary) where no construction activities are permitted. Additional information is provided in the Project specific Resettlement Action Plan (RAP).

### 2.7.5 33/500kV Substation Location

The 33/500kV substation was proposed to be located within the eastern plot. However, during ecological survey within the site, it was identified that the substation is located within the



Southern-Even Fingered Gecko habitat; a critically endangered and endemic species vulnerable to habitat loss. Based on an Environmental & Social Constraints study conducted by 5 Capitals in August 2021, it was recommended that the substation be moved to the north or south of the proposed location as there is flat terrain available in those areas and this would take the substation out of identified gecko habitat.

Technical studies were undertaken by Juru Energy as part of the OHTL Pre-Feasibility study on behalf of ACWA Power and a new substation location was proposed in September 2021 taking into consideration the environmental recommendations from the E&S Constraint study.

The location of the 33/500kV substation in June 2021 and the final proposed location (September 2021) are presented in the figure below

**Figure 2-6 The 33/500kV Substation Considered in June 2021 (ref. white polygon) & September 2021 (ref. orange polygon)**



## 2.7.6 OHTL Route

In March 2021, two (2) OHTL options were considered for the routing of the proposed OHTL as presented below:

- **Option A:** 60km OHTL from the Project site with a rating of either 220kV double-circuit or 500kV single-circuit that will connect to a newly construction substation.
- **Option B:** 250km OHTL (from Dzhankeldy Project site to Bash Project site to an existing substation at Karakul) with a rating of 500kV single circuit

Option B was selected and increased to 290.5km. Approximately 128.5km of the OHTL runs from Dzhankeldy project site to Bash project site and approximately 162km runs from Bash site to an existing substation in Karakul. This Option was also revised in May 2021 to change its routing due to the following reasons:

- To avoid proximity of the OHTL to two Important Bird Areas; the Karakyr lake also called the Karakyr State Nature Sanctuary approximately 20km south of the eastern plot and the Ayakagytna lake; an IBA drainage lake approximately 85km east of the eastern plot;
- To avoid the Kuldjuktai mountain cliffs along the Dzhankeldy to Bash route which are used by nesting birds of prey and for roosting and breeding bats;
- To avoid proximity of the OHTL to agricultural zones/ farmlands, water bodies (lakes, ponds, canals, irrigation channels, etc.);
- To avoid human settlements and to avoid the need for any physical displacement & resettlement;
- To avoid proximity to bird migratory flyways;
- To select areas for the routing that is close to existing roads and railway; and
- To select areas for the routing that is close to the existing EBRD approved 500kV Navoi- Muruntau transmission line.

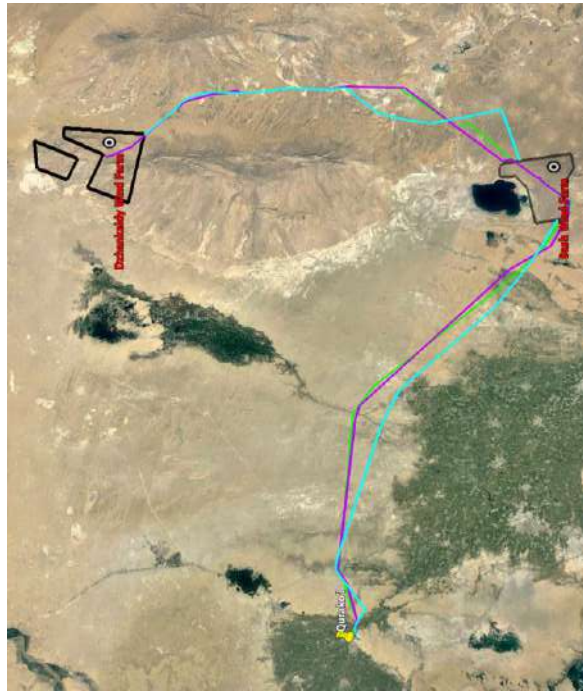
**Figure 2-7 Revised Option B OHTL Alignment & Substation – May 2021**



By mid-May 2021, technical studies (OHTL pre-feasibility studies) were being undertaken by Juru Energy on behalf of ACWA Power along three (3) OHTL alignments as shown below.



Figure 2-8 The three (3) OHTL Alignment Options – May 2021



**Note:**

- **Green Line:** OHTL 500kV Line 1
- **Violet Line:** OHTL 500kV Line 2
- **Cyan Blue Line:** OHTL 500kV Line 3

Studies along the Cyan Blue Route - Line 3 were discontinued along the Bash to Karakul substation and a new route considered for the Dzhankeldy to Bash OHTL due to the environmental and social constraints identified along the proposed alignment.

The figure below shows the new alignment options considered in August 2021.

Figure 2-9 The Three (3) OHTL Alignment Options - August 2021



**Key to OHTL Alternatives:**

- **Green Line:** OHTL 500kV Line 1
- **Violet Line:** OHTL 500kV Line 2
- **Dark Blue Line:** OHTL 500kV Line 3

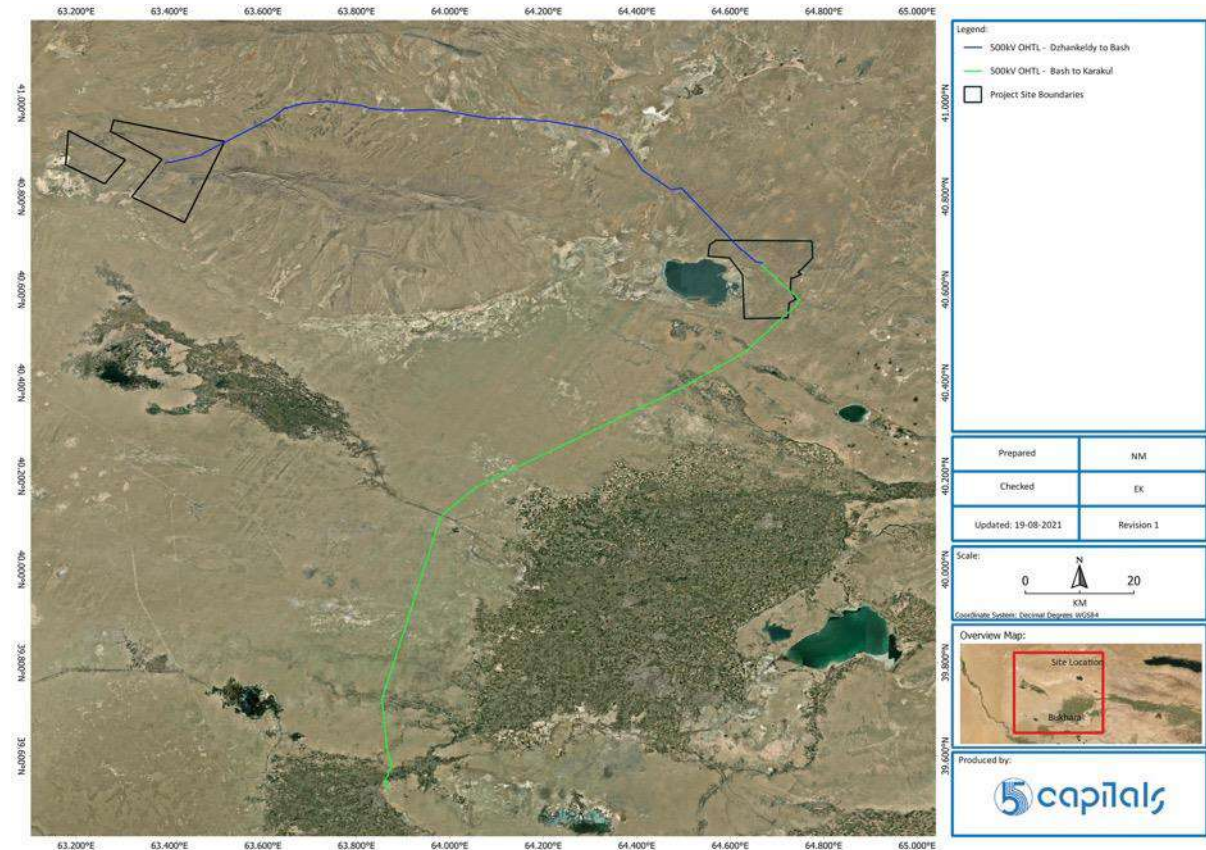
Based on the findings from site visits, ecological surveys undertaken along the route and E&S Constraint analysis conducted by 5 Capitals, the pre-feasibility study recommended that Line 3 (dark blue) is the best alignment for the Dzhankeldy to Bash 500kV OHTL as the alignment runs parallel to the highway, existing transmission line and access road. The highway and access road will provide easy access during the construction phase and maintenance work during the operational phase.

Line 3 is also located as close as possible (approximately 100-140m) of the existing highway where the gecko habitat overlaps with the highway, and is more aligned with the existing railway and existing 220kV OHTL corridor. This allows for minimal additional habitat loss of the gecko, and minimizes the amount of ground disturbed by construction vehicles and machinery.

For the Bash to Karakul route, the pre-feasibility study recommended that Line 1 (green line) is the best alignment between Bash to Karakul due to the limited number of crossings. In August 2021, this OHTL Line 1 was slightly revised to avoid small farmlands along the route as far as practicable and to ensure the line connects to the available spare bay at Karakul substation.

The proposed Dzhankeldy – Bash – Kurakul OHTL alignment was submitted to NEGU by ACWA Power in August 2021 and this was approved by NEGU in November 2021 following their review of the OHTL pre-feasibility study and consideration of environmental & social impacts of other OHTL alignment options (see the figure below).

**Figure 2-10 Proposed OHTL Alignment – August 2021**



## 3 OVERVIEW OF LOCAL ENVIRONMENT & SOCIAL CONTEXT

### 3.1 Land Ownership

#### 3.1.1 Wind Farm

The Resolution of the President of the Republic of Uzbekistan dated February 2021 PQ-5001 included a requirement for the Khokimiyat of Bukhara region together with the Ministry of Agriculture, within a month, in the prescribed manner, sign an agreement on the transfer of land to the Project Company on the terms of the Investment Agreement and the Agreement on the purchase of electricity with the allocation of the plot of land for the period of implementation of the Investment Agreement.

In addition, the Land Allotment Order issued for the Project on 23<sup>rd</sup> March 2021 stated that *“the Deputy Mayor and Department of State Cadastre of Peshku district should allocate 280.0ha land from state reserve in Peshku district to “ACWA Power Dzhankeldy Wind” LLC for construction of wind power plant with a capacity of 300-500 MW”*

These directives have now been superseded by the issuance of the Presidential Decree of the Republic of Uzbekistan No 314 dated 8<sup>th</sup> July 2022 which includes the following key changes:

- The Khokimiyat of the Bukhara region, by July 30<sup>th</sup> 2022, to ensure the allocation to the Ministry of Energy of a land plot on the right of permanent use, as well as the land area necessary for the construction of a wind power plant, substation and overhead power lines based on the coordinates of the land occupied by the supporting structures corresponding to the conditions specified in the Investment Agreement and the Agreement about the purchase of electric energy.
- The Ministry of Energy (MoE), for state and public needs, shall ensure the transfer of the lease to the:
  - Project Company a land plot allocated for the construction of a Wind Farm and a substation for a period equal to the period of implementation of the Investment Project.
  - National Electric Grid of Uzbekistan, JSC, a land plot allocated for the construction of the overhead power lines.
- At the same time, the decree includes an exemption for the Project Company and NEGU from compensation for losses in agricultural production (compensation payments) when using agricultural land as part of the implementation of the Investment of the Project.
- Agree with the proposal of the Ministry of Investments and Foreign Trade, the Ministry of Agriculture, the Ministry of Water Resources, the Khokimiyat of Bukhara and Navoi region on the transfer of lands allocated for the investment project with



an area of 154.2ha in Peshku and Gijduvan districts of Bukhara region from the category of agricultural land to the category of industrial land in accordance with the annexes of the Resolution.

Based on this, the land will be allotted to the Ministry of Energy who will sign a Land lease Agreement (LLA) with the Project Company for the Project site as well as the Purchase Electric Facilities (PEF). The signing of the LLA is expected to be undertaken by October 2022. According to the Presidential Decree, the wind farm have been allocated 152.3ha based on the final project layouts submitted by ACWA Power to the government on 30<sup>th</sup> June 2022.

### 3.1.2 OHTL

Based on consultation with the Committee for the Development of Sericulture and Wool Industry confirmed that the section of the OHTL within the wind farm is under the supervision and management of the Committee. The OHTL runs through three (3) different districts the and these are Peshku District, Gijduvon District and Konimekh District in Navoi region.

#### **GIJDUVON DISTRICT**

The Dzhankeldy-Bash OHTL alignment within their district is located on land that belongs to the Committee for the Development of Sericulture and Wool Industry.

#### **PESHKU DISTRICT**

The part of land in Peshku district where Dzhankeldy-Bash OHTL is planned has been allocated to "ACWA Power Dzhankeldy Wind" LLC for the construction of WF.

#### **KONIMEKH DISTRICT**

The Dzhankeldy-Bash OHTL alignment within their district is within the territory of Forestry Fund. A section of this land belongs to the Qaraqo'ta LLC (see blue line in figure below) who leases the land from the Committee for the Development of Sericulture and Wool Industry.

**Figure 3-1 Dzhankeldy-Bash OHTL Alignment Within Konimekh District (Ref. Blue Line for Section Leased by Qaraqo'ta LLC)**



## 3.2 Land Lease and Land Use

### 3.2.1 Wind Farm

The wind farm is used by Dzhankeldy Livestock and Sericulture LLC who are a cluster under the Committee for the Development of Sericulture and Wool Industry. Consultations with Dzhankeldy LLC have revealed that they have been allocated 756,121ha of grazing land under their management which includes the land within the Project site and in the wider Project area.

Based on the Presidential Decree, the permanent land impact based on the land lease issued for the lifetime of the Project will only impact approximately 0.017% of the total grazing land owned by the LLC while the temporary impact accounts for approximately 0.0011%. Based on this, it is expected that the Project will have limited impact on Dzhankeldy LLC (and its herders) activities and operations. These impacts are addressed in the Project specific RAP.

In addition, a copy of a letter between the Committee for the Development of Sericulture and Wool Industry and the Bukhara regional municipality regarding the land ownership dated 31<sup>st</sup> December 2020 was provided to Juru Energy. Of importance to the project, the letter stated *"In order to implement the 4<sup>th</sup> part of the Presidential Decree No. 4422 dated 22.08.2021 for development of alternative energy, the request by Bukhara region municipality for 1100ha of land in Peshku and Gijduvon districts will be allocated to the Projects only if it is not interrupting Karakul farming activities"*.

## **SIGNING OF THE LAND LEASE**

On 20<sup>th</sup> September 2021, ACWA Power sent a letter to the Bukhara Region Khokimiyat seeking clarification on whom the land lease agreement should be concluded with. The Bukhara Region Khokimiyat provided ACWA Power with a letter from Peshku District Municipality Mayor dated 20<sup>th</sup> January 2020 which states that *"278 ha of land in Dzhankeldy massive (district) examined by representatives of Ministry of Energy has been taken into state reserve fund for construction of wind farm with total capacity of 500 MW by ACWA Power (Saudi Arabia) based on public-private partnership"*.

On 30<sup>th</sup> September 2021, Bukhara Region Khokimiyat provided ACWA Power with a response to the letter ACWA Power sent on 20<sup>th</sup> September 2021. This letter states that *"As per paragraph 8 of Presidential Decree-5001 on 23.03.2021 "On construction of wind power plant with a capacity of 300-500 MW in Peshku district of Bukhara region", local authorities are obliged to allocate required land plots to Investing company for realisation of these projects. Based on the instructions given in PD-5001 on 23.02.2021 "ACWA Power Dzhankeldy Wind" LLC as well as in signing investment agreement and PPA, Dzhankeldy municipality has allocated required 280ha of land under the Mayor order on 23<sup>rd</sup> March 2021. Considering the above mentioned, we inform you that land lease agreement should be signed with relevant district municipality as per land allotment orders"*.

As such, the land lease agreement (LLA) will be signed with Peshku municipality as per land allotment orders. It is understood from the Client that, that SWID have been informed of this decision by the Bukhara Region Khokimiyat.

Based on the Presidential Decree issued on 8<sup>th</sup> July 2022, the Khokimiyat of the Bukhara region will allocate land to the Ministry of Energy who will sign the LLA with the Project Company. As such, ACWA Power/Project company cannot sign the LLA with the municipality or Committee.

### **3.2.2 OHTL**

#### **Land Lease**

ACWA Power will transfer the operation of the OHTL to NEGU after completion of the construction phase. As such and in accordance with the Presidential Decree, ACWA Power will only be granted land usage rights during the construction phase of the OHTL and the required land will be allocated to NEGU on a permanent basis by MoE. The land allocated to the OHTL tower footprint based on the Presidential Decree is 17.94ha.

#### **Land Use**

The 128.5km OHTL route is located in the central part of the Kyzylkum desert and lies on the flat part of the northern foothills of the Kuljuktai Range. From the Project site, this proposed OHTL route runs along/parallel to a local asphalt road (called Zarafshan-Navoi road) that connects

the village of Dzhankeldy to the former Chontabay village, the village of Chengeldy, Karakata and Baloakarak approximately 140m, 3.7km, 6.1km and 10km north of the OHTL respectively.

Where the local asphalt road ends, the proposed OHTL route runs further across the hills from the Darbaza to the Kafirtepa Hill after which it crosses and runs parallel to an existing 220kV high voltage transmission line that runs through the Bash site from north to south east. The proposed OHTL also crosses the Navoi-Uchkuduk railway that runs through the Bash site.

### 3.3 Local Receptors

#### 3.3.1 Wind Farm & OHTL

The ESIA identifies the main sensitive receptors within 5km radius of the Wind Farm and 1km of the OHT and along the access road. The receptors within the defined Area of Influence (Aoi) include residential, agricultural, structural, infrastructure, cultural, commercial and industrial receptors. In addition there are two accommodation structures located within the Wind Farm and used by local herders. The nearest communities to the Wind Farm are Dzhankeldy village (2.5km east of the western plot) and Kalaata village (35m west of the western plot). Few receptors are found along the OHTL Aoi with Chantabay village located approximately 160m to the north.

Details of the identified receptors, and potential impacts including mitigation measures are provided in ESIA Vol 2. A summary of these impacts and the key mitigations is provided below in Chapter 4.



## 4 SUMMARY OF MAIN ENVIRONMENTAL & SOCIAL IMPACTS

### 4.1 Terrestrial Ecology

#### 4.1.1 Wind Farm

##### **BASELINE CONDITIONS**

Biodiversity baseline studies were undertaken to understand the existing biodiversity and ecosystem services in the area that may be affected by the project. Survey boundaries were determined by understanding both the potential area of influence (Aoi) of the proposed project as well as the Ecologically Appropriate Area for Analysis (EAAA) for various species

##### Flora

Habitat mapping and botany transect surveys were undertaken to understand land use and land cover and to identify biodiversity including rare and endemic floral species. The Dzhankeldy wind project is situated in south-western part of the Kyzylkum, desert in the Bukhara Province of Uzbekistan. The dominant habitat type in the survey area is Weakly inclined piedmont plains of relic low mountains followed by foothills of relic mountains. A largely untouched landscape, only 0.02 km<sup>2</sup> of the project area is taken up by anthropogenic settlements and wastelands.

The vascular plants recorded within the project site during the field survey in April and June includes 49 species of which one species is nationally red-listed; *Tulipa leihmanniana* and three species are endemic to Uzbekistan; *Acanthophyllum cyrtostegium*, *Calligonum zakirovii*, *Eremurus korolkowii* and *Ferula kyzylkumica*. White Saxaul and Black Saxaul, which are nationally protected trees were also recorded during the survey. National red listed and endemic range restricted species were noted as species of concern for which potential impacts of the wind farm were assessed.

##### Birds

The project site is located within the convergence of two major migratory flyways; the Central Asian Flyway and the West Asian/East African Flyway. In order to analyse the potential impacts on migrating birds, the spatial context around the project site was assessed including Important Bird Areas (IBAs). A number of Important Bird Areas were highlighted that exist in the immediate area of the wind project as well as several in the larger region; Karakyr Lakes, Buzaubay,, Ayakagytm lake and Gorelde all lie within 30-85 km of the project site.

Based on the location of various lake and river deltas, and the mountain landforms to the north and east of the project site, the predicted migratory flight paths analysis anticipate relatively low levels of migratory flight activity occurring in the project site airspace.

Given the potential for threatened species and the sensitivity of birds to wind farm developments, vantage point and transect surveying were undertaken utilising the Scottish Natural Heritage (SNH) guideline methods to provide adequate data for the development of Collision Risk Models (CRM). With specialised nest searching studies also conducted, the wind farm area and associated OHTL alignment route was comprehensively surveyed year-round to ensure that seasonal changes (Spring, Summer, Autumn and Winter) in avifauna abundance and diversity due to migration and breeding were captured.

During the initial desktop review, a number of vulnerable (VU), endangered (EN) and critically endangered (CR) birds of prey (raptors), ground birds and waterbird species on the Global IUCN Red List as well as endemic, range restricted, and migratory species were anticipated to occur in the project area.

Among the IUCN endangered species, the Steppe eagle and Egyptian Vulture were recorded during the survey. Egyptian Vultures and Steppe Eagles are a breeding species; Egyptian Vultures' breeding season occurs during summer months (June, July and August) and Steppe Eagles' (Critical species) breeding season lasts from January to May. Other threatened and sensitive species of note include the Eastern imperial eagle (VU), Cinerous Vulture (NT) and Eurasian Griffon Vulture (NT).

Specialised surveys were undertaken to assess the presence of the "vulnerable" Houbara Bustard during the peak mating season, when this cryptic species can be easily observed. Stakeholder engagement exercises indicated that the wind farm area lies within both prime breeding ground as well as a migratory corridor of this species.

Nest search surveys of the wind farm area in 2020 recorded nests of two raptor species; Egyptian Vulture and Lesser kestrel. In Spring of 2021, six nests were located during a wider search of the area. Five nests were empty, and one was occupied by a long-legged buzzard incubating three eggs. During the 2022 Spring nesting survey, active nests of the Golden Eagle and Common Kestrel were observed.

### Bats

The EAAA was surveyed with passive and active acoustic detectors to capture bat echolocation data over time. Bat calls parameters known for European bat populations and bat species from neighbouring countries of Uzbekistan were used for identification and analysis. Specialized bat roost searches were undertaken within the project boundaries to identify residential bats roots, wintering roosts, maternity colonies and mating colonies.

A total of 6 species of bats were identified during the surveys. No globally threatened species were registered during the survey. With a low bat population density, bat activity within the project area was determined to be relatively low. Relative high activities were recorded during warmer nights, post showers with low wind speeds. Bursts of high activity was registered during the survey, attributed to migration pass-through or alternatively foraging activity.

Bat roost searches of the wind farm area found a high number of suitable roosting locations, both anthropogenic and natural; two species were recorded during roost searches, Bhokara horseshoe bat *Rhinolophus bocharicus* and Ognev's serotine bat *Eptesicus ognevi*.

#### Mammals (Non-Volant)

Surveying for non-volant mammals was undertaken in the spring and summer seasons, the periods of most activity. Using a combination of diurnal and nocturnal transect surveying a total of 10 mammalian species have been recorded in the Dzhankeldy wind farm project area. Among these were one IUCN listed VU species, the Goitered Gazelle and one national Red List Near Threatened (NT) species, Brandt's Hedgehog. The survey finding indicated that these species do not occur in large number in the project area. Historical and stakeholder accounts confirm the presence of the Caracal, Sand Cat and Marbled Pole Cat (VU) in the project area. The baseline surveys also noted a number of mammal carcasses along the existing road in the survey area as victims of vehicular collision, including jerboa, Tolai hare, and Brandt's hedgehog.

#### Reptiles and Amphibians (Herptiles)

Diurnal and nocturnal transect surveying were conducted to assess the herptile species abundance and diversity within the WF project area. Surveying was undertaken in late Spring and mid-Summer, as these represent the seasons of highest reptile activity. Of the 12 species recorded, three species are threatened on the IUCN Red List. Of greatest concern is the critically endangered Southern Even-fingered Gecko. This species is a particularly sensitive ecological receptor. Recent DNA analysis shows that this gecko population distinct from its conspecifics in the area and likely to be classified as a new locally endemic species within Central Uzbekistan. Given its unique nature, this species is ranked #54 on the Top 100 reptile species Edge of Extinction list. Among other species of note were that Russian Tortoise (VU) and the Desert Sand Boa (NT). Commonly occurring non threatened species within the project area include the Aralo-Caspian racerunner, Steppe Agama and Reticulated toad-headed agama.

#### Insects (Entomofauna/Invertebrates)

Invertebrate surveying was undertaken in Spring 2021, which is the optimal time as invertebrate populations are at a peak due to the increase in available vegetation. A series of transects

were carried out where sweep netting and manual collection techniques were used to identify the species present and provide an indication of relative abundance and population density.

With 13 species, the order Hymenoptera was the most abundant among the 8 orders recorded. The entomofauna was typical for this area. No species listed in the Red Book of Uzbekistan or IUCN Red List were found among the 26 insect species.

### Critical and Priority Species

The findings of the biodiversity baseline studies confirmed that the project area has a diverse and abundant distribution of flora and fauna species. A number of these biodiversity elements have been identified as elements of conservation concern. The EBRD PR6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources requires that baseline studies conclude with a Critical Habitat Assessment (CHA) to determine if any features in the project area qualify as priority biodiversity features or critical habitat.

A CHA was undertaken for the project, which identified species of concern which have the potential to trigger criticality for the project's area of influence. It was found that the project area has a relatively low risk of triggering criticality for the majority of identified potential species of concern. The review indicated that Critical Habitat (CH) thresholds has been triggered in reference to two species: the Critically Endangered Southern Even-fingered Gecko and the Vulnerable Houbara Bustard. Other identified species of concern, including nationally listed bird, mammal, and reptile species, as well as range-restricted and endemic flora species, were classified as Priority Biodiversity Features (PBFs) based on EBRD PR6.

All species of concern were integrated into the biodiversity assessment to identify potential impacts arising from the construction and operation of the wind farm project and associated facilities. Recommendations for management, mitigation and monitoring in line with EBRD, IFC and lender requirements and international best practice were proposed to alleviate and reduce the significance of impact to all biodiversity elements of concern within the project area.

### **IMPACT ASSESSMENT**

A comprehensive Biodiversity Impact Assessment was undertaken. Sensitive ecological receptors anticipated to occur within the area of influence were identified and evaluated against potential impacts arising from different phases of the project.

The construction phase of the project was initially predicted to have major to moderate impacts within the AoI including potential habitat loss, biodiversity loss, biodiversity displacement, and deterioration of environmental quality. However, with the implementation of both general control measures as well as species-specific mitigation measures, residual impacts of the construction phase are predicted to be minimal.

Habitat and biodiversity loss is anticipated to occur through clearing, excavation and earth works. The Southern Even-fingered Gecko (CR) and the Russian Tortoise (VU) are both burrowing species considered as Critical and Priority Biodiversity Features (PBFs) respectively; both are particularly vulnerable to excavation and earth works. Post-construction restoration of areas to suitable habitat conditions via seeding, re-planting, and landscaping with native, high-value flora species will further serve to reduce the impact of habitat loss.

Biodiversity loss is likely to be augmented by vehicular collisions, poaching, littering and general disturbance. With the influx of personnel and a degree of urban influence, shyer species may be displaced away from the project area and proliferation of pest species and other urban-adapted species may occur. However, the surrounding areas of the landscape support similar habitat types and are not constrained by large-scale urban or industrial developments. Therefore, it is not anticipated that displaced individuals will have a significant impact on adjacent ecosystems.

In order to mitigate against biodiversity loss during the construction phase, preconstruction surveys were carried during the active period of early spring and summer to identify suitable release sites and relocate threatened reptiles; Southern even-fingered Gecko and the Russian Tortoise within the construction footprint. Subsequent efforts will be undertaken during the active season throughout the construction phase of the project. The Reptile Relocation Plan provides detailed instruction on the surveying and relocation methodology required to mitigate construction impacts on these two reptile species of concern.

A Breeding Bird Protection Plan was prepared to guide the implementation of impact mitigation that will be undertaken for the protection of breeding bird species that may be impacted from the project construction. Pre-construction nest search surveys were undertaken to identify nest location and implement species specific construction buffer. During subsequent years, the nesting survey will be repeated during Spring in order to monitor the status of nesting as well as identify the location of any new nests.

In order to mitigate the risk of vehicular collision strict speed controls will be implemented and driving and operation of heavy machinery will be restricted to daylight hours. Protocols will also be in place for the removal of any road-kill carcasses to at least 10 meters away from access roads during the construction phase to reduce the risk of vehicle collision to scavenging, slow moving and small species.

Besides the biodiversity impacts of the construction phase environmental quality and the quality of the environment may also decline due to light and noise pollution, and soil compaction/erosion. These impacts are expected to be minimal with the appropriate control measures outlined in the Construction Environmental & Social Management Plan in place.

Pre-construction flora surveys were conducted for the purposes of seed collection, demarcation of areas to be protected, and translocation of whole as per the Flora

Conservation Action Plan which provides a guide to the species-specific impact mitigation that will be undertaken for the protection of sensitive flora species that may be impacted from the project construction. The Restoration Action Plan has been prepared to guide post-construction restoration of areas to suitable habitat conditions via seeding with seeds collected prior to the construction phase, re-planting, and landscaping with sensitive flora species will further serve to reduce the impact of habitat loss.

Operation of the wind farm project poses a unique threat to birds and bats due to the potential for collision with moving turbines. This could potentially have a major impact on resident and migratory bird and bat populations and cause significant loss to biodiversity.

With respect to bird turbine collision, the magnitude of risk and significance of the potential impact is highly dependent upon the location of the wind farm and landscape context, spatial layout, height and length of turbines, and the types and numbers of birds present. Quantitative assessment was undertaken by utilizing a Collision Risk Model (CRM) developed as per SNH Guidelines.

CRM analysis indicated that no threatened bird species are predicted to experience collisions more frequently than one fatality per year. Among non-threatened, albeit at risk bird species, only the Eurasian Kestrel, a widespread and abundant species that does not have elevated conservation status at the national or international levels, was predicted to experience more than one collision per year under the realistic collision avoidance scenarios modelled (16.2 collisions per year). For non-threatened bird species, the CRM analysis predicts collision rates are up to 1.05 collisions per year.

Mitigation measures will be implemented during the project design and operation phases of the wind farm project to reduce the impacts of bird collision with wind turbines. Collision mitigation measures through project design that have been implemented to date include change in wind turbine layout and decrease in the number of turbines.

During the operation phase of the project fatality monitoring will be undertaken as per the Post-Construction Fatality Monitoring Plan (PCFM) which details the intensive carcass searches that will take place throughout the wind farm. The PCFM will be continued for 5 years until the risk to birds is considered 'negligible' in consultation with the lenders.

A Potential Biological Removal (PBR) analysis was undertaken to determine the thresholds for acceptable levels of annual losses. A Collision Risk Management Plan (CRMP) has been prepared to mitigate the bird turbine collision. The plan provides details of the camera-based automated Shut Down on Demand System (SDOD), Identiflight, that will be implemented for Egyptian Vulture, Cinereous Vulture and Golden Eagle within 1km of nesting locations. Should the PCFM prove that thresholds for any other species are reached, this will trigger an upscaling of mitigation as provided in the Collision Risk Management Plan (CRMP).

In order to further reduce the risk of collision to scavenging birds, a Livestock Management Plan has been prepared to ensure the management and safe disposal of livestock carcasses so as to reduce food availability to scavengers within the project footprint especially near the wind turbines.

Predicted fatality levels for bat species may have potential to impact regional populations of these species, and therefore warrants special consideration in the biodiversity management planning for the project. The impact of bat turbine collision is expected to be minimised for all species with the implementation mitigatory measures in the design and operation phases of the project. In particular, project design mitigation measures include applying wind turbine generator designs that do not support roosting bats and implementing lighting systems that are least attractive to insects.

Bat fatality monitoring will be undertaken as per the Post-Construction Fatality Monitoring Plan (PCFM). The PCFM Program will be continued for 5 years until the risk to bats is considered 'negligible' in consultation with the lenders.

A Potential Biological Removal (PBR) analysis was undertaken to determine the thresholds for acceptable levels of annual losses. Should the PCFM prove that thresholds for any bat species are reached, this will trigger the adaptive Cut-in Speed Curtailment program detailed in the Collision Risk Management Plan (CRMP).

Though there are two mining facilities as well as the proposed Bash Wind Farm in development in the vicinity of the Dzhankeldy wind farm, no cumulative impacts of significance on biodiversity receptors are anticipated to occur during the construction stage due to its small BUA, temporary construction works and unfenced project boundaries preventing habitat fragmentation. The presence of multiple wind farms in the same migratory corridor may produce cumulative collision impacts.

The predicted cumulative collision risk for the Houbara Bustard, a CH species, is 1.22 collisions per year. Though the predicted collision risk for this species is based on hypothetical scenarios where a single individual is observed flying within the rotor swept zone, this collision rate cannot be ruled out. The anticipated collision risk for all other threatened bird species indicates cumulative collisions of less than 1 per year. Two species of the non threatened birds are anticipated to experience a cumulative collision risk greater than one per year. These species are abundant, widespread species with very large global populations, and are not classified with an elevated conservation status at either the national or international levels.

The CHA indicates that the project area is a Critical Habitat for Southern Even-fingered Gecko and Asian Houbara. A further 36 species are designated as Priority Biodiversity Features (PBFs). As per the requirements of EBRD PR6 and IFC PS6, additional conservation outcomes are required to achieve Net Gains (NG) and No Net Loss (NNL) for the populations of CH species and PBF species respectively, in the project area. The Biodiversity Action Plan (BAP) illustrates



the pathway to>NNL for PBFs and, with the Compensation Offset Plan, provides the strategy designed to achieved NG for CH species.

#### 4.1.2 OHTL

##### **BASELINE CONDITIONS**

###### Flora

Habitat mapping and botany transect surveys were undertaken to understand land use and land cover and to identify rare and endemic floral species. The associated OHTL corridor was surveyed with approximately a 100m buffer in width along the planned route. The dominant habitat type of the OHTL alignment is described as "*Weakly inclined piedmont plains of relic low mountains*" interspersed with ecotones of "*Fixed and semi-fixed sands*", "*Sandy and sand-loamy desert plains*" and "*Outcrops of variegated beds and Saline lands*". Two endemic species were recorded; *Acanthophyllum cyrtostegium* and *Calligonum zakirovii*

###### Birds

Surveys along the associated OHTL alignment registered three threatened species; the Egyptian Vulture (EN), the Houbara Bustard (VU) and the Steppe Eagle (EN) . The nationally red listed Short-toed Eagle was also observed along the OHTL alignment. Existing transmission lines in the vicinity of the project area were also surveyed to assess bird mortality from operating OHTLs. The majority of the carcasses observed belonged to passerines and only one belonged to a raptor species, Long-legged buzzard. This species is widespread in the Kyzylkum desert and is listed under IUCN as "Least Concern" (LC). The presumed cause of death was collision with OHTL cables.

###### Bats

Roost searches of the OHTL alignment identified colonies of Ognev's serotine bat (*Eptesicus ognevi*) and Common Pipistrelle Bat (*Pipistrellus pipistrellus*), both of which are classed as Least Concern (LC) globally and nationally.

###### Mammals excluding Bats (Non-Volant)

Mammal surveying was undertaken along the proposed OHTL alignment corridor Using a combination of diurnal and nocturnal transect surveying. Incidental sightings and records (visual and audible) as well as indirect records of tracks, burrows, droppings, and shelters were used to assess species abundance and diversity. Burrow entrance counts were carried out to establish abundance of rodent species. A total of 13 mammalian species were recorded of which one species, the Goitered gazelle is listed as VU on the IUCN Red List. Survey findings indicated that occurrence of this species in the project area is rare.



### Reptiles and Amphibians Herptiles

Diurnal and nocturnal transect surveying were conducted in June to assess the herptile species abundance and diversity along the OHTL alignment of the wind farm. 7 species were recorded among which Southern Even-fingered Gecko, Russian Tortoise, Rapid Lizard and Caspian Monitor were recorded.

### Insects (Entomofauna Invertebrates)

Invertebrate surveying was undertaken by visual and netting surveys covering various transects throughout the OHTL corridor. invertebrate community present within the corridor is typical of the region and no representatives of threatened species were documented. *Lycosa sp.* and *Anacanthotermes turkestanicus* were the most abundant species recorded along the OHTL.

### Critical and Priority Species

The findings of the biodiversity baseline studies confirmed that the project area has a diverse and abundant distribution of flora and fauna species.

A CHA was undertaken for the project, which identified species of concern which have the potential to trigger criticality for the project's area of influence. It was found that the project area has a relatively low risk of triggering criticality for the majority of identified potential species of concern. The review indicated that Critical Habitat thresholds has been triggered in reference to two species: the Critically Endangered Southern Even-fingered Gecko and the Vulnerable Houbara Bustard. The CHA classified 36 species as Priority Biodiversity Features (PBF) among which are nationally listed bird, mammal, and reptile species, as well as range-restricted and endemic flora species, were classified as Priority Biodiversity Features (PBFs).

All species of concern were integrated into the biodiversity assessment to identify potential impacts arising from the construction and operation of the wind farm project and associated facilities. Recommendations for management, mitigation and monitoring in line with EBRD, IFC and lender requirements and international best practice were proposed to alleviate and reduce the significance of impact to all biodiversity elements of concern within the project area.

## **IMPACT ASSESSMENT**

For many threatened raptor species worldwide, electrocution by powerlines is considered to be the number one conservation threat contributing to population decline. In particular, larger-bodied birds which tend to prefer perching at high altitudes have the highest risk for electrocution. As there are a number of susceptible species including the critical Steppe Eagle, the significance of unmitigated bird OHTL electrocution impact was found to be major.

However, OHTL design interventions are proposed including the use of appropriate insulators as well as adequate spacing of the live components. These are highly effective mitigation measures; thus, the residual significance is negligible to minor.

Thin, dark wires used in overhead transmission lines are visually difficult to detect. Particularly at risk are birds migrating between 20-50m altitude, birds flying at night, birds flying in flocks, and / or large and heavy birds of limited manoeuvrability. Unmitigated OHTL collision risk of various bird species was predicted to be of major to moderate impact significance.

A Potential Biological Removal (PBR) Analysis was undertaken to determine the thresholds for acceptable levels of annual losses due to the project. A Post-Construction Fatality Monitoring (PCFM) Plan will also include carcass searches along the OHTL route and mortality rate calculations for the OHTL.

Houbara Bustards are known to be susceptible to OHTL collision. The Biodiversity Action Plan (BAP) provides the strategy for No Net Loss (NNL) for PBF species and Net Gain (NG) for the CH species, Asian Houbara. The Compensation Offset Plan details the offset measures that will be implemented for the Asian Houbara if the PCFM exceeds the PBR thresholds.

Given the implementation of mitigation measures such as inclusion of bird visual diverters, the residual significance is down listed to minor.

Sensitive bird receptors may be cumulatively affected by the presence of multiple regional wind farms operating simultaneously. As appropriate design essentially eliminates electrocution risk and reduces collision risk significantly, the residual project specific cumulative effects given appropriate design would be negligible.

## 4.2 Air Quality

### 4.2.1 Wind Farm & OHTL

Temporary activities may result to dust generation and gaseous emissions on local receptors near the Wind Farm, OHTL and associated access roads. Such impacts are expected to range from negligible to minor in significance and will be managed through the implementation of the Project specific CESMP.

The operation of the project is not expected to result in impacts to air quality as there will be no permanent fuel combustion requirements except for the use of vehicles for operation and maintenance works at the Wind Farm and along the OHTL. Emission from vehicles during operation will be minor and unlikely to result in a discernible impact at receptor locations.

Potential impacts relating to decommissioning of the wind farm will be managed through the implementation of a Decommissioning Management Plan, with specific relevance to working methods and regulations that may be applicable at this time

## 4.3 Noise and Vibration

### 4.3.1 Wind Farm & OHTL

#### Construction Phase

Temporary construction noise & vibration are expected to arise from the construction at the site and OHTL route and the use of access roads. These impacts are expected to be in the range of receptors along the access road, Dzhankeldy and Kalaata villages and herder shelters near the Wind Farm and the herders along the OHTL. However, the impacts on these receptors have been assessed as negligible to minor and will be managed through the implementation of the CESMP.

#### Operational Phase (Wind Farm)

The Project's primary noise impact are expected to relate to the operation of the wind turbine as noise will be generated from a number of different mechanisms grouped into mechanical and aerodynamic sources. Operational noise impacts have been assessed using modelling suite IMMI2020 in order to evaluate noise emissions from the wind farm at the nearest noise sensitive receptors. The modelling study was undertaken in accordance with WBG/IFC EHS Guidelines on Wind Energy where preliminary noise modelling was initially undertaken with respect to Project noise (without baseline). The outcome of the preliminary noise model identified two (2) receptors (the active settlement within the project site (R6) and the Dzhankeldy village (R12)) that exceeded the 35dB  $L_{A90}$  noise threshold established within the guidelines, hence requiring detailed modelling.

After an appropriate amount of background noise data had been collected, a regression analysis was conducted and following the regression analysis, the derived noise levels were calculated in accordance with the Institute of Acoustics guideline. The derived noise level was compared with the predicted noise levels from wind turbines at 10m/s at the receptor locations and the result showed that noise contributed from the WTGs is significantly higher (49.8dB(A)) than the night-time background noise (43 dB(A)) at the active settlement which is used by three (3) herders and their families all year round. Given the high sensitivity of this receptor, the settlement will be relocated in accordance with the Project's RAP.

### Operational Phase (OHTL)

No significant noise impact is expected to receptors during the operational phase of the OHTL and potential noise related to Corona effect is expected to be decrease with distance. Based on this, corona effect is not anticipated to be discernible to land users along the OHTL.

Potential impacts relating to decommissioning of the OHTL will be similar to those encountered during the construction phase and these will be managed through the implementation of the Decommissioning Management Plan.

## **4.4 Soil, Geology, Groundwater and Surface Water**

### **4.4.1 Wind Farm & OHTL**

During construction, impacts on soil and groundwater could arise from a number of activities. These include excavation and soil compaction, accidental spills or leaks, disposal of wastewater and inadequate management of waste. Since groundwater was not encountered at the Project site, it is not expected that any contamination will reach groundwater.

Specific project impacts to soil, groundwater and geology are not expected during the operational phase of the Wind Farm and the OHTL. Potential risks of concern during the operational phase are expected to be limited to the management and storage of the very small quantities of materials/wastes/wastewater, chemicals and fuels. With the provision of the mitigation measures recommended in the ESIA and associated Waste Management Plans, no significant environmental impacts are envisioned for the Wind Farm or the OHTL.

Potential soil & groundwater impacts relating to decommissioning of the wind farm will be similar to those encountered during the construction and operational phase and will be managed through the implementation of a Decommissioning Plan.

## **4.5 Electro Magnetic Field**

### **4.5.1 OHTL**

The operation of the 500kV OHTL will be a source of electric and magnetic fields (EMF) which are invisible lines of force that surround any electrical device such as power lines. The impact on receptors is anticipated to be negligible given that human settlements are located well away from the OHTL route and outside of the legally required Health Protection Zone (HPZ) of 30m.

The only potential risk of exposure relates to herders grazing directly under the HPZ including operational phase maintenance workers. It is noted that impacts to the OHTL maintenance workers will be managed through the preparation and implementation of an EMF safety program.

**Note:** No EMF impacts are expected during the construction and decommissioning phase of the OHTL because there will be no transmission of power.

## 4.6 Traffic and Transportation

### 4.6.1 Wind Farm & OHTL

Wind turbines and OHTL components will be manufactured abroad and transported to the Project site by road from either Dulata, Khorgos or Alanshankhou borders in China and from either of these borders to custom points at Nur Zholy/ Kolzhat in Kazakhstan and thereafter to the site. As such, appropriate roads are needed for site and OHTL access and the hauling of equipment turbines and OHTL components. If improperly planned and managed, the trailers hauling the heavy Project components can potentially damage the existing highways, bridges, overpasses, roads, utilities, local access roads and other structures.

Construction activities will also result in an increase of the numbers of movements of HGVs and other vehicles for the delivery of heavy plant, equipment, materials, and transportation of Project staff. Close coordination will be required with the road transport authorities to manage the transport of materials for the Project, which will be detailed in a Traffic and Transportation Management Plan. In addition, a road safety campaign will be implemented in local schools and communities near the Wind Farm and access roads in order to raise awareness on the safety risks involved with increased traffic.

The number of vehicles during the operational phase are likely to be low, with access required for maintenance and servicing. It is expected that the majority of these vehicles will be light vehicles with HGVs only required in instances where WTG, OHTL components need to be replaced.

## 4.7 Infrastructure and Utilities

### 4.7.1 OHTL

There are existing infrastructure & utilities along the OHTL which include OHTL, railway line and access road. The construction phase of the OHTL may lead to potential damage of this infrastructure thus resulting to disruption of services. In order to mitigate against this, the EPC Contractor will be required to conduct a risk assessment, adhere to all relevant construction

buffer zones, obtain necessary permits and ensure on-going stakeholder consultations with the relevant agencies operating the infrastructure

## 4.8 Archaeology and Cultural Heritage

### 4.8.1 Wind Farm & OHTL

There are known archaeological sites within the Wind Farm based on surveys undertaken by the Institute of Archaeology between 5<sup>th</sup> to 26<sup>th</sup> July 2021. As a result, and in compliance with the Agency of Conservation of Cultural Heritage, buffer zones between archaeological sites have been established which include 100m for complex relief areas and 50m for flat relief. It is noted that there are no known archaeological sites along the OHTL alignment.

In addition to the known archaeological sites, there remains potential to uncover previously buried archaeology (chance finds) within the Wind Farm and OHTL footprint during the construction phase. As such, a full-time archaeologist will be present at the Wind Farm and along the OHTL including the implementation of a Cultural Management Plan and a Chance Find Procedure.

Impacts to intangible cultural elements for communities living near the Wind Farm and OHTL are expected to be minor and will be managed through the implementation of a Worker's Code of Conduct which will include measures relating to respect of local beliefs, customs, rituals and their general way of life.

During the operational phase of the wind farm, there will be no further excavations at the Project site and as such, there is no risk of uncovering an item of archaeological importance at this stage. However, a Cultural Management Plan will be developed as part of the operational ESMS to include procedures to be implemented in ensuring protection of the archaeological sites.

Any impacts on archaeological sites and cultural heritage during the decommissioning phase will be managed through the implementation of a Decommissioning Management Plan and in consultation with the with the Institute of Archaeology and the National Centre of Archaeology.



## 4.9 Landscape and Visual Amenities

### 4.9.1 Wind Farm

#### LANDSCAPE

The development of the wind farm will include levelling, grading, construction of administrative buildings, erection of WTGs and many more activities which will transform the landscape in the area into a 'Desert with Wind Turbines' landscape character as large vertical rotating features will be added into the landscape. The installation of towers, turbines, and the shape or colour will result in visual intrusion at receptor location in proximity to WTG areas.

In addition, the use of lighting across the site in an environment classified as 'Rural/suburban transition site' during construction phase will introduce light spill & glare and result in a night time light haze likely to be visible for several kilometres from the project area. However, this impact will be temporary. Any impacts from lighting are anticipated to be minimised by limiting works being undertaken during the night and by the implementation of specific controls detailed in the CESMP on-site.

#### VISUAL

The continuous movement of the wind turbine rotors will result in changes to the visual envelope of receptors overlooking the Project site as there would be loss of static landscape view; particularly residents of the settlements within the site and residents of Kalaata & Dzhankeldy village.

### 4.9.2 OHTL

Given that majority of the OHTL route is mostly flat gravel plain, excavation, levelling, grading and other site preparation activities may result in limited land use changes. The subsequent erection of pylons/ towers will result in large anthropogenic intrusions into the landscape transforming the landscape of the OHTL route. Such intrusions of large scale vertical structures will likely result in minor but noticeable landscape character impacts.

Impacts to the visual envelope of surrounding receptors will also occur at night where the addition of lighting during construction will illuminate the OHTL construction area that has previously been free of any light sources. Similar to the wind farm, any impacts from lighting are anticipated to be minimised by limiting works being undertaken during the night and by the implementation of specific controls detailed in the CESMP on-site.

## 4.10 Shadow Flicker

### 4.10.1 Wind Farm

Shadow flicker is the effect of the sun shining through the rotating blades of a wind turbine and casting a shadow on the window of neighbouring properties under certain wind & light conditions. In order to assess the effect of shadow flicker on nearby sensitive receptors during operation of the Wind Farm, Shadow flicker modelling was undertaken for the Wind Farm

The modelling considered the 79 Envision EN171 (6.5MW capacity) turbines proposed for the Project, the turbine locations & dimension, the sun's path with respect to every turbine location during every minute over a complete year, receptor location, size of windows on each receptor & the direction that the windows face and the topography model of the site. The modelling study considered two (2) scenarios; a conservative worst-case approach based on the requirements outlined in IFC EHS Guideline for Wind Energy and a more realistic approach to consider actual site conditions.

The modelling predicted that under worst-case scenario & realistic scenario the active settlement within the Project site (R6) will experience shadow flicker for 66 hours 16 minutes and for 45 hours 19 minute in a year respectively. This exceeds the IFC recommended limit of 30 hours per year. However, it should be noted that the worst-case scenario provides an over estimation of the duration of shadow flicker occurrence at the receptor location. Also, the realistic scenario has not considered screening. Other receptors will not experience shadow flicker that exceed the limit of 30 hours per year established by IFC EHS Guideline for Wind Energy both in the worst case & real case scenarios.

Based on the results obtained from the shadow flicker assessment (and other impacts relating to land use), the herders within the Wind Farm boundary will be resettled to an alternative land in accordance with the Project specific RAP.

## 4.11 Socio-Economics

### 4.11.1 Wind Farm & OHTL

#### STAKEHOLDER ENGAGEMENT

A number of stakeholder engagement activities have been undertaken as part of the ESIA process. The outcome of stakeholder consultations has been considered in the development of the ESIA and the Project specific Stakeholder Engagement Plan (SEP).

The draft ESIA was disclosed to local communities on 22<sup>nd</sup> to 25<sup>th</sup> February 2022 and the meetings were attended by local leaders, men and women (separate meetings were held for

the women) and herders. Disclosure materials used included Power Point, brochures and leaflets which included the Project information and details of the grievance mechanism.

Based on the consultations and surveys undertaken, the main impacts anticipated by local communities include:

- Creation of job opportunities;
- Expectation that ACWA Power will invest in community projects including offering support to poor families;
- Improvement in the power supply and reduction in the cost of electricity;
- Concerns on the reduction of grazing land within the Wind Farm; and
- Impacts relating to noise and dust generation and damage to existing infrastructure such as local access roads.

At the end of 60 days EBRD disclosure period and 120 days ADB disclosure period, a public consultation and disclosure report will be developed based on additional consultation and feedback undertaken during the disclosure period.

Additional consultations have also been undertaken (and are on-going) with land users (herders) using the Wind Farm and along the OHTL (herders) as part of the RAP processes. The implementation of the RAP will mitigate against physical and economic displacement which is expected as a result of the Project and OHTL implementation.

### **SOCIAL ECONOMIC IMPACTS**

The construction and operation of the Wind Farm and OHTL is expected to positively influence the local, regional and national economy i.e., through employment, direct procurement and supply of materials, increased power supply and contribute towards a low carbon economy.

Negative impacts relating to the construction phase will include labour risks such as poor working and living conditions, forced labour etc. There will also be potential risks associated with the supply chain relating to forced labour, child labour, health & safety etc.

#### **Supply Chain Risk**

A supply chain risk assessment for the Project was undertaken by SGS for Envision (Tier 1 – turbine OEM Manufacturer) and its suppliers and the assessment outlined that:

- All suppliers meet the requirements of National laws & regulations;
- There is no evidence of “Zero Tolerance” such as child labour and forced labour for all suppliers
- The management and executive levels of the suppliers have an adequate understanding of the basic requirements of labour and working conditions according to national legislations.

- Majority of the suppliers have established related rules and policies, which defined some of the requirements of protecting employees and providing safe working conditions.
- The suppliers have carried out various training activities, to improve the awareness and ability of relevant personnel on protecting workers.

Although, the assessment identified Zero Tolerance to forced and child labour issues in Envision and its supply chain, a number of major non-compliance points which largely relate to inconsistencies in policies against the requirements and implementation practices, overtime issues, gaps in HSE processes, disciplinary and grievance mechanism or employee record-keeping systems were identified. Given the number of major non-compliances, the social risk related to supply chain is anticipated to be Moderate.

Supply chain risks will be managed through the implementation of a Supply Chain Management Plan

## 4.12 Solid Waste and Wastewater Management

The construction of the Wind Farm and OHTL will result in the generation of waste due to excavations, packaging waste and small quantities of hazardous waste. This will also include sanitary wastewater which will be contained in septic tanks prior to removal by a licensed wastewater contractor. During the operational phase, there will be relatively few waste streams, although maintenance waste may be generated in small quantities on a continued basis. The ESIA outlines the mitigation and management measures and the implementation of a Waste Management Plan.

During decommissioning of the wind farm, there is a potential for inert demolition waste and materials such as steel reinforced bars, broken concrete, cabling, transformer oils etc. to contaminate soils. The decommissioning of the wind farm provides significant opportunity for resource efficiency and material re-use/recycling. As such, a Decommissioning Plan will be developed to include detailed methods for re-use, recycling and disposal of decommissioning wastes.

## 4.13 Community, Health, Safety and Security

Public risks during the construction have the potential to result in isolated incidents, which could be of a devastating magnitude to a person or group of people in the wrong place at the wrong time. The potential risks to communities will include safety, health and security risks, Gender Based Violence & Harassment (GBVH), Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH). These risks will be managed through the implementation of the mitigation measures in the ESIA and of appropriate plans, procedures and policies such as the Emergency Preparedness and Response Plan, Influx Management Plan, GBVH policy etc.

The operational phase of the Wind Farm will include various risks that could result in impacts to public safety. With regards to blade & ice throw from the wind turbine, the Project has set a minimum distance of 200m from the local communities to the nearest wind turbine in accordance with the Agency for Sanitary and Epidemiology Welfare Health Protection Zone requirement 'to maintain a distance of 200m from wind turbines to limit any activities and people's presence during possible emergency periods under adverse weather conditions'. In addition, all of the WTGs are over 2km from the nearest local community and the local communities are not within the setback distance of approximately 278m & 407m for blade throw & ice throw respectively. As such, the likelihood/risk of blade & ice throw is anticipated to be negligible.

Other operational phase impacts relating to safety risks to children and young people trying to explore the WTGs or substation, OHTL and/or vandalising Project equipment/structures etc will be addressed through on-going awareness campaigns in local schools and communities.

Erection of WTGs can present a physical obstruction to aircrafts and also cause radar and other navigational aid interference where the blades appear as 'clutter' on radar screens and can be mistaken for aircraft. The nearest airport to the Dzhankeldy site is the airport in Zarafshan which is 98km north of the site. As such the Project is required to continue with consultations with the Civil Aviation Authority and obtain a permit for the Project.

#### 4.14 Labour & Working Conditions

Construction activities will generate a variety of occupational health and risk to the workforce. These will include physical risks such as traffic on site, working at height, movement of heavy machinery, excavations, scaffolding etc. other risks may include handling of fuels, chemicals, paints and solvents, noise and emissions from machinery and generators etc. These will be managed through the implementation of an Occupational Health and Safety Management Plan (OHSMP) which will be prepared at the start of the construction phase.

In addition, there will be potential working condition and labour risks such as child labour, forced labour, poor accommodation facilities, restrictions for workers to join trade unions, GBVH, wage discrimination based on gender etc. To address these issues, a number of measures will be implemented to mitigate against these impacts such as the implementation of Human Resources Policies & Procedures, Human Rights Policy, GBVH Policy, Worker Code of Conduct and provision of a Worker Grievance Mechanism.

#### 4.15 Influx Impact

In addition to the influx of workers in the area, the development of the wind farm and OHTL may result in the in-migration of other people seeking direct or indirect opportunities from the

Project such as opportunistic in-migrants seeking jobs from the Project, opportunistic traders aiming to take advantage of business opportunities encouraged by the Project and by the increased income of the local community and other migrants seeking to take advantage of the economic and development opportunities created in the area.

This may result to social conflict, increased competition on public services, health risks (relating to spread of communicable diseases and sexually transmitted diseases), GBVH, disruption of local culture, increase in crime, local inflation etc.

However, due to the location of workers accommodation facilities within the Project site, it is expected that workers and community interaction will be minimal and other impacts will be managed through the implementation of an Influx Management Plan, a Code of Conduct, Local Content Plan, Cultural Sensitization Training to guide staff on appropriate behaviour & interaction with local communities and purchase of goods & services.

#### 4.16 Climate Affairs

Fuel combustion during the construction phase for diesel generators and mobile plant will result in GHG emissions, however, the primary operation of the Project will lower the carbon intensity of Uzbekistan's grid electricity and result in avoidance of CO<sub>2</sub> emissions. This will be in line with the Uzbekistan 2030 Energy Strategy to reduce reliance on fossil fuels.

The potential climate physical risk for the project will include increase in temperature and increased flooding. However, the WTGs have been designed to operate in a wide range of temperature and it is not expected this will be a transition risk. In addition, the Wind Farm is also located in a very low risk flood area and flooding is not anticipated.

#### 4.17 Cumulative Impacts

The ESIA has assessed cumulative impacts of several environmental parameters where applicable (e.g., biodiversity impacts), which has considered the measured baseline conditions in combination with the predicted project contributions. A specific chapter has been prepared in the ESIA in accordance with the IFC guidelines on cumulative impacts assessment and assess potential future impacts of the project in combination with other known and/future Projects in the Project's area of influence.

The key cumulative impacts assessed include:

- Cumulative dust generation and gaseous emissions is anticipated when construction activities are undertaken simultaneously with mining works at the mining areas;



- Cumulative noise and vibration impacts at receptor location is anticipated when construction activities is being undertaken at the same time as extraction processes at some mining facilities;
- Employment creation and dissemination of skills during construction phase will result in a significant beneficial cumulative impact and;
- The influx of workers and interaction of workers with residents of nearby villages during construction phase could lead to outbreak of diseases and illnesses, strain the public social services and even result in conflict with local communities due to differing ideals, behaviour and cultural practices.

## 5 ENVIRONMENTAL & SOCIAL MANAGEMENT & MONITORING

Both the construction and operational phase of ESMS will need to incorporate mitigation and monitoring requirements established within Volume 2 of the ESIA as well as requirements set out by the State Committee on Ecology and Environmental Protection and the Lenders.

Volume 3 of the ESIA provides a framework for the development of the Environmental and Social Management System (ESMS) for the construction and operational phases of the Project. The framework has been developed to ensure that all Environmental & Social impacts identified for both construction and operational phases are appropriately identified and controlled through the development of a robust construction and operational phase ESMS. ACWA Power has developed an ESMS Implementation Manual for the Project Companies to ensure there is sufficient oversight of contractors and operators and ensure compliance, risk and opportunity management including monitoring.

In addition, there will be dedicated competent Project teams put in place by the EPC Contractor and the O&M Company overseen by the Project Company to ensure the implementation of the E&S mitigation measures.

The primary documents guiding the environmental and social management of the construction and operational phases will be the Environmental and Social Management Plans (ESMP) respective to construction and operational risks, impacts and compliance requirements.

### 5.1 Independent Auditing and Monitoring

The Project will be subject to periodic independent monitoring in accordance with the requirements of the lenders Environmental and Social Action Plan (ESAP) and an Equator Principle Action Plan (EPAP) if the Project is financed by institutions signatory to the Equator Principles. The scope of the independent audits will include the implementation of the project ESMS and will evaluate on-site activities and documented controls and monitoring efforts, with respect to the Project's compliance obligations.

## APPENDIX A – PROJECT CONTACT INFORMATION

**Table A-1 Project Contact Information**

NAME	ASPECT	CONTACT DETAILS
Mr. Sherzod K. Onarkulov	Uzbek local address and contact details	International Business Center Block-A, 13th Floor 107-B, Amir Temur Avenue Tashkent, 100084, Uzbekistan
		T + 998 71 238 9960 M + 998 90 003 9960
Mr. Rohit Gokhale	General public enquiries	<a href="mailto:rgokhale@acwapower.com">rgokhale@acwapower.com</a>
Mr. Sachin Abhyankar		SAbhyankar@acwapower.com Tel: +971 (0) 58 634 6493
Mr. Sachin Abhyankar	Public enquiries related to environmental & social issues	SAbhyankar@acwapower.com Tel: +971 (0) 58 634 6493
Mr. Sherzod K. Onarkulov		<a href="mailto:Sonarkulov@acwapower.com">Sonarkulov@acwapower.com</a> M + 998 90 003 9960