

Area 1 Wind Farm Project  
Absheron Region  
Azerbaijan



Environmental and Social  
Impact Assessment (ESIA)  
Report –  
Non-Technical Summary (NTS)

Prepared for:



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## LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
AoI	Area of Influence
Azerenergi	Azerenergi Open Joint Stock Company
BOO	Build Own Operate
BOP	Balance of Plant
CRM	Collision Risk Model
EBRD	European Bank for Reconstruction and Development
EAAA	Ecologically Appropriate Area for Analysis
ESC	Environmental and Social Considerations
FDI	Foreign Direct Investment
GHG	Greenhouse Gas
IRENA	International Renewable Energy Agency
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
MENR	Ministry of Ecology and Natural Resources
MoE	Ministry of Energy
NDC	Nationally Determined Contribution
OHTL	Overhead Transmission Line
OFID	OPEC Fund for International Development
PBF	Priority Biodiversity Features
PIC	Public Information Centre
PPA	Power Purchase Agreement
SDOD	Shut Down On Demand
SNH	Scottish Natural Heritage
SS	Substation
WBG	World Bank Group
WTG	Wind Turbine Generators

# 1 OVERVIEW OF THE PROJECT

The developer ACWA Power signed an implementation agreement with the Ministry of Energy (MoE) in Azerbaijan for developing, building and operating a 240 MW wind power project. The wind project is expected to operate for 20 years on a Build Own Operate (BOO) basis according to the Power Purchase Agreement (PPA). The 240.5 MW wind project will be split and built on two (2) locations as follows:

- Khizi 3: Capacity up to 162.5 MW and will be generated using 25 x 6.5 MW Wind Turbine Generators (WTG), located in Khizi region; and
- Area 1: Capacity up to 78 MW and will be generated using 12 x 6.5 MW WTGs, located at Absheron region.

This document is the Environmental and Social Impact Assessment (ESIA) Non-Technical Summary (NTS) for the Area 1 Wind Farm Project (the Project).

ACWA Power appointed 5 Capitals Environmental & Management Consultancy (5 Capitals) to prepare the ESIA for the Project and they have appointed a local consultant Ecoenergy Ltd to undertake baseline surveys and consultations with the authorities and local communities.

The ESIA report has been prepared in accordance with Azerbaijan national environmental and social regulations and standards and the European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (2019) and Performance Requirements and applicable European Union (EU) Directives and environmental standards. Other potential Lenders include Japan International Cooperation Agency (JICA) and OPEC Fund for International Development (OFID). Environmental & Sustainability requirements from these institutions where available, have been considered in the ESIA, together with World Bank/IFC (International Finance Corporation) Policy, guidelines and Performance Standards.

## KEY PROJECT INFORMATION

<b>PROJECT TITLE</b>	Area 1 Wind Project
<b>LOCATION</b>	Absheron Region - Azerbaijan
<b>PROJECT DEVELOPER</b>	ACWA Power
<b>PROJECT COMPANY</b>	ACWA POWER AZERBAIJAN RENEWABLE ENERGY
<b>OFF-TAKER</b>	AzerEenergi
<b>EPC CONTRACTOR</b>	To Be Confirmed (TBC)
<b>O&amp;M COMPANY</b>	First National Operation and Maintenance Co. Ltd (NOMAC)
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## GOALS & OBJECTIVES

This Project will contribute towards Azerbaijan's carbon reduction commitments in reducing its Greenhouse Gas (GHG) emissions 35% by 2030, measured from the 1990 base year set in its Nationally Determined Contribution (NDC) under the Paris Agreement (IRENA, 2019). In addition, there will be:

- Environmental benefits: The operation of the WF is a proactive measure towards a low carbon transition for Azerbaijan's economy harnessing the abundant wind resource in the country. This project will reduce the country's dependency on fossil fuel generated power and will reduce atmospheric pollution, in comparison to other power generation technologies in the current energy mix of Azerbaijan.
- Social benefits: The project is expected to create employment opportunities during the construction and operational phases; and
- Economic benefits: Due to the reduction in GDP growth and substantial drop in oil prices in recent years, the country is planning to diversify its economy and move towards a modernised energy system, which includes renewable energy projects. Non-oil sector foreign direct investment (FDI) is set to increase from 1.5% to 4% by 2025 and an increase in the share of non-oil sector exports from USD 200 per capita in 2016 to USD 450 by 2025 and USD 1,200 by 2035, as set by the Strategic Roadmap on National Economic Perspectives (approved by Presidential Decree on 6<sup>th</sup> December 2016) (IRENA, 2019). Khizi 3 and Area 1 WFs will contribute to the diversification and development of renewable energy.

The principal objectives of this 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;
- To assess baseline conditions (existing conditions) prior to the development of the project through review of available data and conducting site specific surveys;
- To assess the project's environmental and social impacts during construction and operational phases and future decommissioning;
- To assess E&S compliance obligations, including applicable national regulations and international regulations and standards and lender requirements;
- To engage with key stakeholders and project affected people to disclose Project information, study outcomes, gain local knowledge about the local environmental and social context and seek feedback on the project;
- To determine applicable mitigation and management measures to be implemented in order to prevent, avoid or minimise potential impacts; and
- To prepare an Environmental and Social Management and Monitoring Framework (ESMMF) from which the construction and operational phases of the E&S Management Systems and Supplementary Plans can be developed and implemented.

## ALTERNATIVES

The following project alternatives were considered:

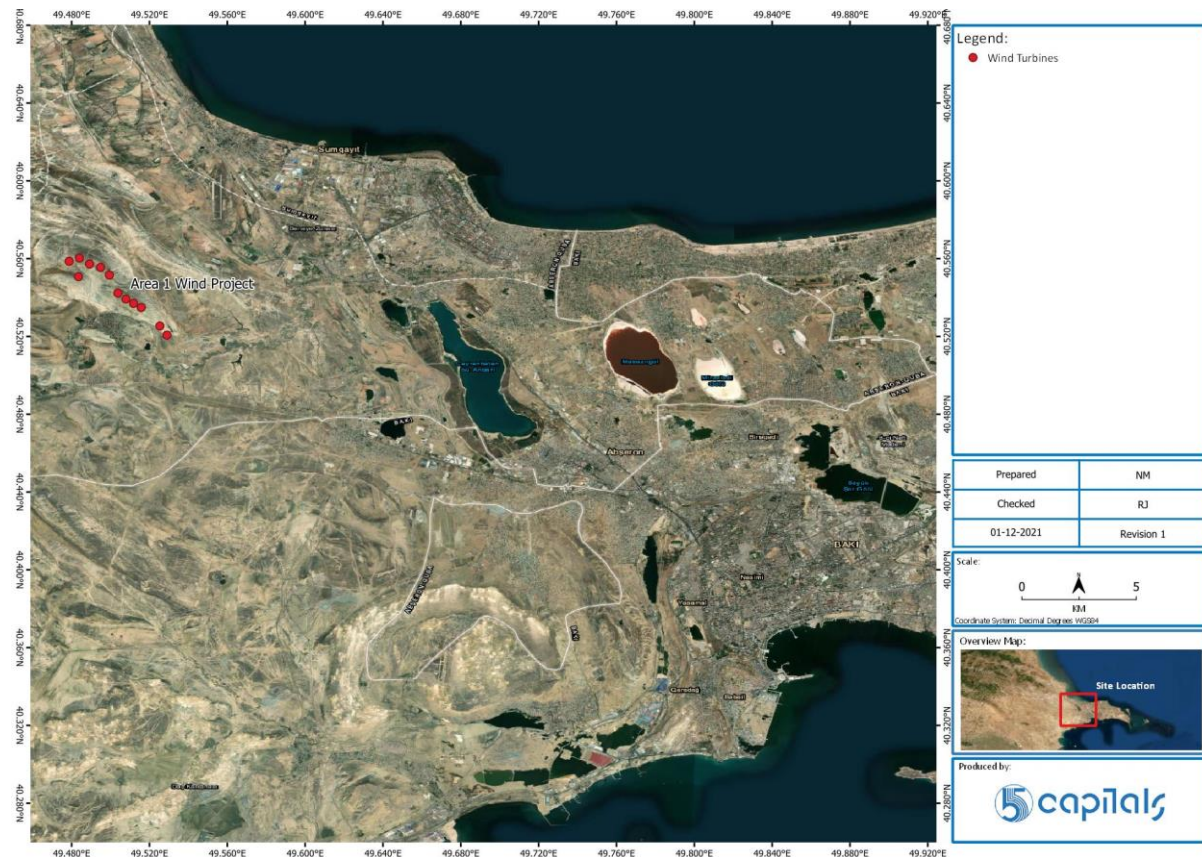
- No Project Alternative: Should the "Do Nothing" scenario be applied, then the anticipated negative impacts discussed in the ESIA would not occur. However, as assessed in this report, the impacts which are most likely to happen during the construction phase, are not expected to pose significant risks and can be adequately controlled through the implementation of the ESMMF (ref. Volume 3 of the ESIA). The potential for significant impacts during operations on migrating birds will be mitigated through a range of adaptive measures. If the project were not to go ahead, the positive benefits that will result from this clean Renewable Energy including cutting carbon emissions, reducing the reliance on fossil fuel power sources, socio-economic benefits and promoting alternative energy sources would not be achieved. Therefore, the implementation of the WF will have a positive impact in its contribution towards meeting the country's commitments to transition towards clean renewable energy and the "No Project Scenario" would adversely impact the governments initiatives in achieving this national goal;
- Site Selection: In January 2020, three (3) sites were considered for the 240 MW Wind Projects in Azerbaijan (Khizi 3, Area 1 and Area 7). Out of the three (3) sites, Khizi 3 and Area 1 were selected due to the wind potential at these project areas and possible construction and operations synergies and the close proximity of the two selected sites compared to the distance to third site (Area 7 site).
- Technology (Turbine) Alternatives; Four (4) turbine models were considered for the Project including Siemens Gamesa - SG 6.0-155, Goldwind GW136-4.8, Goldwind GW165-5.2 and Envision EN171 6.5. The Envision EN171-6.5 model was selected for the current layout and was based on Least Cost of Energy (LCOE) which results in highest generation at lowest cost, site suitability of the chosen WTG model and project schedule;
- WTG Layout: The layout and number of WTGs has been progressively refined since the commencement of the ESIA study (March 2020) based on avoiding or minimising E&S issues. The layout and number of WTGs has been finalised and the selection of the WTG Layout is based on wind resource assessment, distance from identified human, ecological and archaeological receptors and the outcome of the Collision Risk Modelling (CRM) for birds and Noise and Shadow Flicker Modelling. The studies have minimized potential impacts on birds, bats, existing houses and settlements and as well as other environmental and social impacts, arising from underground cables, access roads, constructability and operability.
- OHTL Route: A review of the preliminary OHTL route and surrounding areas was carried out by 5 Capitals using satellite imagery and the initial environmental and social risks have been identified along the route. Based on the initial/ desk study review, Azerenergi revised the OHTL to avoid E&S risks where possible. This was following a site reconnaissance in May 2021 along the OHTL route and immediate surroundings which also identified key environmental and social receptors along the route. Based on the outcome of the survey, Azerenergi further refined the route to avoid, farms and any other identified human and ecological receptors where possible. The OHTL will also be informed by the outcome of baseline surveys undertaken as part of this ESIA scope.

## 2 PROJECT DESCRIPTION

### LOCATION

The Project is located in an area within the Absheron region of Azerbaijan. The site is located approximately 28 - 45 km northwest of Baku.

**Figure 2-1 Project Location**



### SITE CONDITIONS

The project area is largely open with little vegetation, besides grass, small shrubs and a few trees. The land starts at a relatively high altitude (>200m above sea level at peaks) and tends to reduce in altitude towards the south.

### SURROUNDING AREAS

The land is primarily greenfield apart from a few isolated structures and unpaved tracks, and it is likely that there have been few anthropogenic influences in this area.

South east of the Project area is surrounded by settlements, agriculture and other commercial establishments and has more anthropogenic influences than the northern section as the area is more accessible than the north section. There are lakes to the east of the Project area which



appear to have been engineered to collect rainwater, likely for irrigation provision to this land or surrounding land users.

To the east and south east is Sumgayitchay river which is on one of the largest rivers that flows into the into the Caspian Sea. Throughout warm periods, the river dries up completely downstream.

Also, to the south and east are agriculture farms (including greenhouses). Industrial facilities identified surrounding the project area include:

- Military area with helipads located approximately 142 to 600 m southwest of WF;
- Radioactive Waste facility "Izotop" special treatment plant" located approximately 4.2km south of project area (i.e. the nearest WTG);
- Hazardous waste facility site located approximately 2km east of WTG G9 (shown in Figure below);
- Airforce base (Baku Kala Air Base) located approximately 5.5km to the north of this area which includes a military airport; and
- Solar park located approximately 6.5 km east/south east of the project area.

The Baku Radioactive Waste Disposal Facility was built in the 1980s and was operating under the former Soviet Union standards. In 2001, the facility was upgraded to meet the European Commission standards under an allocated by the European Commission Emergency Assistance Program. The construction of the new facility was completed in 2006. The upgraded facility is designed to store solid and liquid radioactive waste as well as low and medium active radioactive sources. The facility receives, processes (cutting, compaction and cementation), buries and stored radioactive waste,

Pirakashkul (Cayli) village is located approximately 1km west of WTG G9. Other villages/settlements within the vicinity of the Project area are listed in the table below.

**Table 2-1 Villages within Vicinity of Project Area**

VILLAGE	LOCATION (FROM CLOSEST POINT TO WTG/SST/LAYDOWN AREA)
<b>Pirakashkul (shown as Cayli in Map below)</b>	Located approximately 1km to the west of closest WTG (G10)
<b>Gobustan</b>	Located approximately 3 km south west of closest WTG (G11)
<b>Military Accommodation Settlement</b>	Located approximately 6.5 km north west of closest WTG G4. It consists of 80% military officers and 20% Internally Displaced People (IDPs).

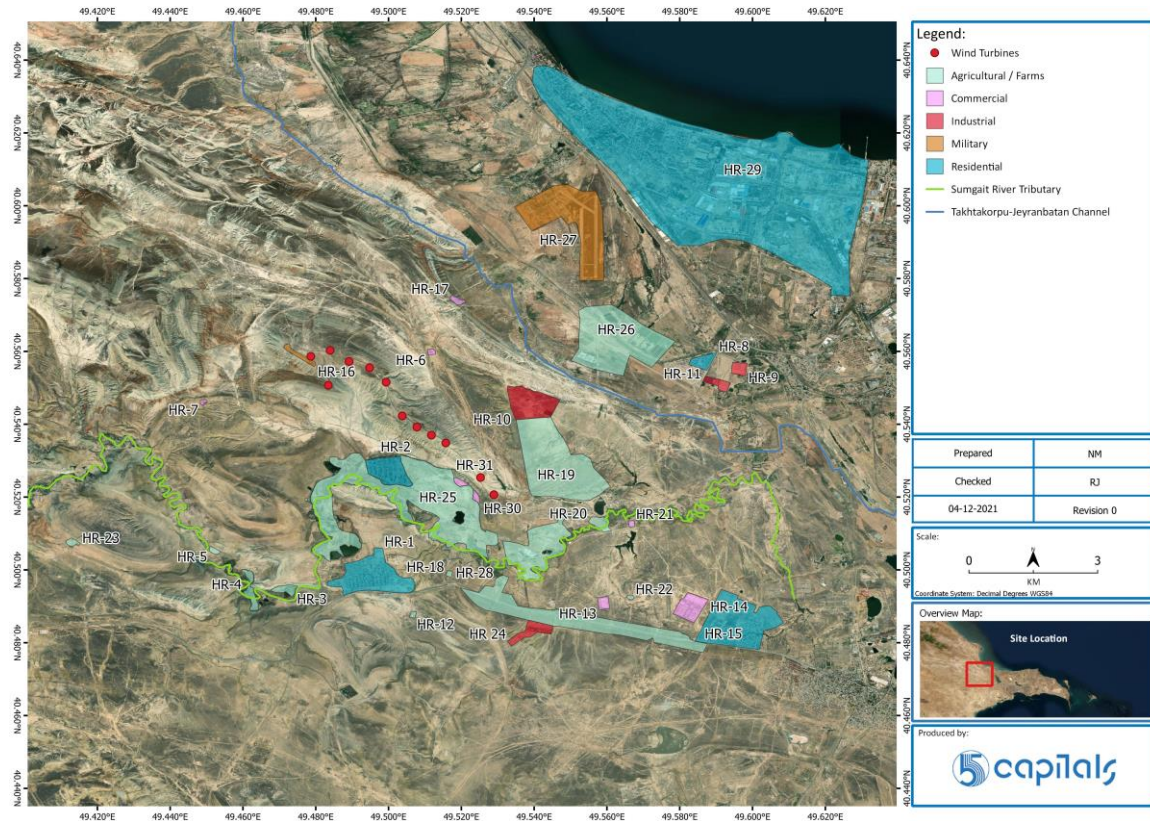
A dog shelter has been identified and is located approximately 350m south west of WTG G11.

The land uses/ activities identified within the Project and surrounding areas based on the revised WTG Layout are presented in the Table and Figure below.

**Table 2-2 Land Use**

ID	NAME	LAND USE/ CATEGORY	DISTANCE (m)	NEAREST WTG
1	HR-1	Gobustan Village - Residential	3111	G11
2	HR-2	Cayli Village - Residential	987	G8
3	HR-3	Agricultural / Farms	5445	G11
4	HR-4	Agricultural / Farms	5938	G7
5	HR-5	Agricultural / Farms	5715	G1
6	HR-6	Commercial	1305	G5
7	HR-7	Commercial	2803	G12
8	HR-8	Residential	6041	G10
9	HR-9	Solar Park	6747	G10
10	HR-10	Hazardous Waste Facility - Industrial	1799	G9
11	HR-11	Agricultural / Farms	6036	G10
12	HR-12	Poultry Farm	4068	G11
13	HR-13	Poultry farm	4025	G11
14	HR-14	Military Unit	5478	G11
15	HR-15	Residential	6129	G11
16	HR-16	Military	83	G12
17	HR-17	Commercial	2842	G4
18	HR-18	Agricultural / Farms	2571	G11
19	HR-19	Agricultural / Farms	851	G11
20	HR-20	Agricultural / Farms	2385	G11
21	HR-21	Commercial	3283	G11
22	HR-22	Agricultural / Farms	4437	G11
23	HR-23	Agricultural / Farms	7650	G1
24	HR 24	Industrial – Radioactive Waste Facility	3970	G11
25	HR-25	Agricultural / Farms	358	G10
26	HR-27	Military - Baku Kala Air Base	5550	G5
27	HR-28	Agricultural / Farms	2500	G11
28	HR-26	Agricultural / Farms	3907	G9
29	HR-29	Residential - Sumqayit Town	7990	G5
30	HR-30	Commercial - Motordrome	350	G11
31	HR-31	Commercial - Dog Shelter	358	G10

Figure 2-2 Land Use Map



**PROJECT COMPONENTS**

WF

The project will include a maximum of 12 WTGs. The proposed WTG for the Area 1 WF is the Envision Energy EN-171/6.5 Wind Turbine model. ‘The EN-171/6.5 WTG has a rated power of 6.5 MW, 171m rotor diameter, and three (3) blades, horizontal axis, upwind direction, variable speed and pitch control’ (Envision Energy Co., Ltd, n.d.).

Auxiliary facilities for the Project will include site entrance and security building; administration building, offices and amenities; central control room, warehouse and stores, security, lighting; other mobile plant and vehicles; access roads; and electrical connections (underground) and substation.

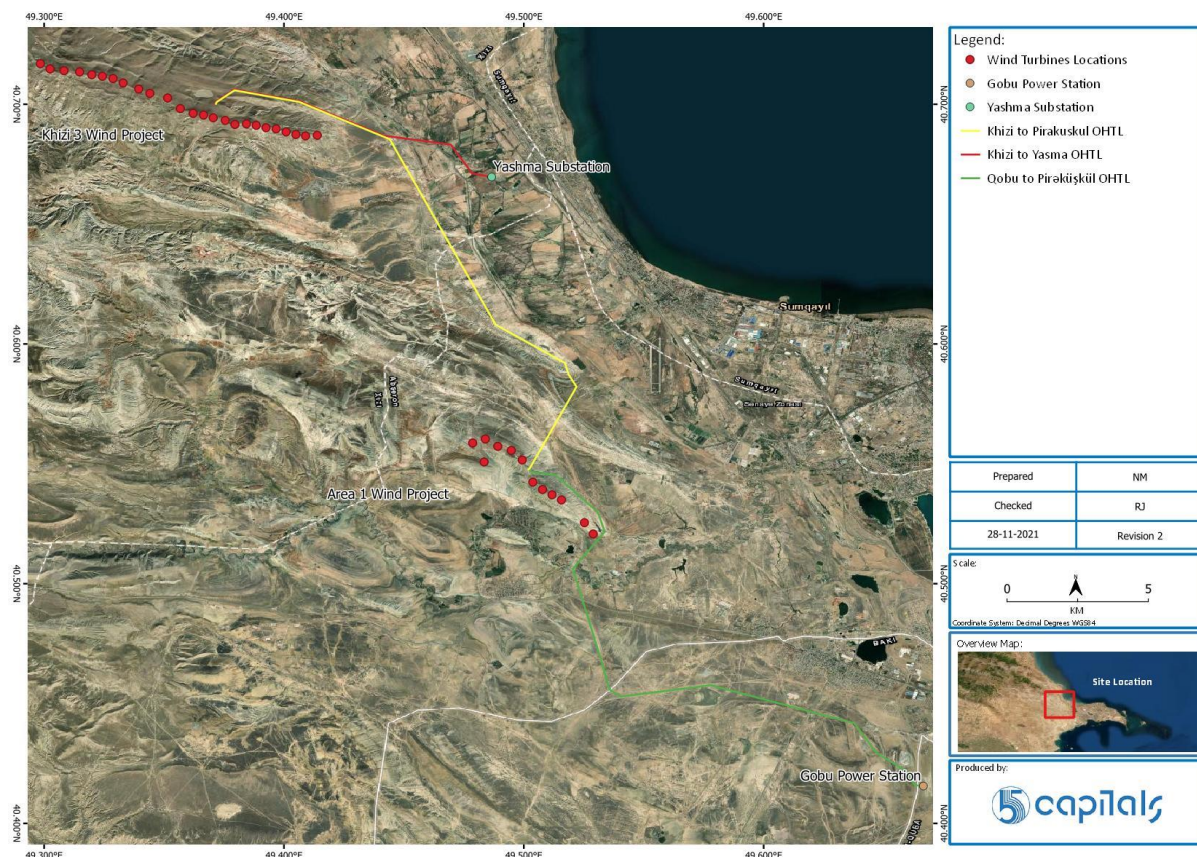
Overhead Transmission Line (OHTL) - Associated Facility

An OHTL will connect both Wind Farms (Khizi 3 and Area 1 WFs) together and to the national grid. The responsibility for developing the OHTL lies with Azerenergi Open Joint Stock Company (Azerenergi), the Project off-taker and as such, the OHTL is considered an ‘Associated Facility’ to the Project; as it is not being directly funded under the loan agreement with lenders.

The OHTL is divided into three (3) lines as follows:

- 220 kv Khizi 3 - Yashma OHTL: This OHTL will connect the Khizi 3 WF substation (SS) to the existing Yashma SS and is approximately 20 km long – assessed as part of Khizi 3 ESIA report;
- 220 kv Khizi – Pirakashkul OHTL: The OHTL line that will connect Khizi 3 and Area 1 WFs SS and is approximately 30 km long - assessed as part of Khizi 3 and Area 1 ESIA report; and
- 220 kv Pirakashkul – Gobu OHTL: The OHTL line that will connect the Area 1 WF SS to the existing Gobu Power Station and is approximately 30 km long - assessed as part of Area 1 ESIA report.

**Figure 2-3 OHTL Routes**



### 3 REGULATORY FRAMEWORK

The ESIA report has been prepared in accordance with the Azerbaijan national environmental regulations and standards and the expected E&S requirements of prospective Lenders, particularly EBRD. In addition, ACWA Power policy is to implement IFC E&S requirements on all its projects, which will include the Azerbaijan 240 MW Wind Project. The key international E&S requirements will include the following:

- European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (2019) and Performance Requirements;

- European Union (EU) Directives (as relevant);
- JICA Guidelines for Environmental and Social Considerations (ESC);
- IFC Performance Standards (2012);
- IFC Wind farm Guidelines (2015);
- IFC EHS General Guidelines (2007); and
- Equator Principles IV (2020).

The regulatory body within the Cabinet of Azerbaijan responsible for the regulation of the activities within the country that relate to ecology, environmental protection and use of natural resources is the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan (MENR). The legal, economic and social framework for environmental protection in Azerbaijan is governed by the Environmental Protection Law of 1999 (No. 678-IQ) and its amending Laws (Law No. 1032-IVQD, 932-IVQD, 590-VQD and 553-IVQD).

A new Law on Environmental Impact Assessment was introduced in Azerbaijan on 14<sup>th</sup> July 2018, which sets out the mandatory EIA requirements within Azerbaijan. The purpose of this Law is to give effect to Article 54.2 of the Law on the Protection of the Environment in Azerbaijan, establishing the legal, economic and organisational framework for assessment of impacts on natural environment and human health associated with economic activities proposed by public and private developers. Annex 1 of the Law lists the types of projects/activities that require an EIA. According to the list of projects provide in the Annex, this proposed wind project will require an EIA "Design of wind power stations with a capacity of more than 1 megawatt (wind generator parks)".

Also, based on the local requirements by the MENR, the environmental regulator in Azerbaijan, and the national Law on Environmental Impact Assessment (2018), an EIA is required for transmission lines of 220 kilovolts more than 15 km in length (Annex 1 of the EIA Regulation). Therefore, under local requirements, an EIA must be carried out for the OHTL.

It was agreed with EBRD on 28<sup>th</sup> June 2021 that a high-level assessment of potential OHTL impacts will be included as part of the ESIA study, therefore, 5 Capitals carried out the necessary environmental and social baseline surveys required of this Associate Facility to establish any risks associated with the development of the OHTL as part of the EISA studies and a preliminary assessment has been included in the ESIA Report.

MENR, the environmental regulator in Azerbaijan, does not require a Scoping Report and scoping can be carried out in a form of a meeting instead. Therefore, a virtual meeting was held with the State Environmental Expertise Department of the MENR on 8<sup>th</sup> September 2021 to introduce the project and ESIA study scope. The ESIA report will be submitted to MENR, EBRD and other potential Lenders.

## 4 BASELINE CONDITIONS

### AIR QUALITY

The area has a temperate-hot semi-desert and dry desert climate. The Project site is located in a remote area and based on site visits and review of satellite imagery, there are no anthropogenic air quality influences in the Project area. Continuous monitoring was undertaken at three (3) locations using a mobile monitoring station. The majority of the measured parameters were found to have average ambient air values within Azerbaijan, WHO and EU standards, however, occasional exceedances of WHO PM standards were recorded. PM exceedances can likely be attributed to nearby construction works and the semi-arid nature of the site and surrounding area.

### NOISE

The undeveloped and remote nature of the Project site means that there are very limited sources in the project footprint likely to result in major anthropogenic sources of noise or vibration. A baseline noise survey was undertaken at five (5) locations. Exceedances of the national limit were recorded at four of the five monitoring locations during the daytime monitoring, while the majority of nighttime levels were within the limit. Local noise sources were noted to be distant traffic, insects and wind, with noise from wind likely the primary source of noise.

### ECOLOGY

#### FLORA

Azerbaijan lies at a crossroads where the flora and fauna of at least three biogeographic provinces converge, resulting in high levels of biodiversity; representatives include species typical of Europe, Central Asia, and Asia Minor.

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.

Habitat mapping exercises and botany surveys were undertaken to understand land use and land cover and to identify rare and endemic floral species. The habitats that the WF, BOP and Laydown footprints encompass are lowland steppe, highland mountains and salt ponds/depressions. The associated OHTL corridors passes through modified agricultural habitat.

Botany field studies found a total of 222 species in the wind farm area and 86 species along the OHTL alignment, of which 15 are considered threatened plant species. A total of 9 species

are endemic to Azerbaijan. *Iris acutiloba* and *Astragalus albanicus* were the only IUCN listed endangered and regionally endemic species recorded in the survey area. Nonetheless VU, nationally CR, EN and endemic range restricted species were noted as Priority Biodiversity Features (PBF) and therefore were considered as species of concern.

## BIRDS

The project area lies within important migratory flyways; the Black Sea/Mediterranean Flyway and West Asian-East African Flyway. There are three important bird area (IBAs) within 15-25 km of the project site; Yashma Island, Alty Agach area and Mount Kargabazar and Mount Gush-gaya.

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 numerical collision risk modelling CRM. With nest searches also conducted, the wind farm area was comprehensively surveyed year-round to ensure that seasonal changes in avifauna abundance and diversity due to migration and breeding were captured.

During the initial desktop review, a number of sensitive raptors, ground birds and waterbird species listed as CR, EN and VU on the Global IUCN Red List as well as endemic, range restricted, and migratory species were anticipated to occur in the project area. Surveying over a period of one year did not confirm the presence of the critically endangered Sociable Lapwing and White-headed Duck within the project footprint.

Among the endangered bird species the Steppe eagle, Egyptian Vulture and Saker Falcon were observed. Egyptian Vultures' are resident breeding species, with the breeding season occurring during summer months (June, July and August).

Other threatened and sensitive species of note include the Eastern Imperial Eagle and the Greater Spotted Eagle. Species recorded were also assessed based their status on the EU Habitat Directive, EU Bird Directive, Bern Convention and Edge of Extinction species lists.

Breeding bird surveying, including nest searches comprised breeding bird walkover mapping survey to quantify bird flight activity. Surveying during Summer 2020 and Summer 2021 included nest searches and transects focused on identifying breeding birds. Two nesting locations were found within the wind farm belonging to Chough and Lesser Kestrel. A confirmed Egyptian Vulture nest and Lesser Kestrel colony were recorded over 4km away from the nearest WTG to the south.

## BATS

The proposed wind farm site is located within a broad route known to be used by migratory bat species. The EAAA was surveyed using passive and active acoustic monitoring, and mist

netting techniques to determine potential swarming and migration movements. Roost searches were undertaken to identify colonies and roosting locations in the wind farm area.

A total of 15 species of bats were identified during the surveys. No globally threatened species were registered during the survey. General bat activity within the project area was determined to be relatively low. Late spring (May) and early autumn (September) saw the relative highest amount of activity which were attributed to migration pass-through or alternatively breeding activity. Three migratory species were recorded; Nathusius's Pipistrelle, Noctule and the Particoloured Bat were recorded. A number of roosts belonging to Kuhl's Pipistrelle and Serotine Bats were found at three locations, of which two were within the wind farm area, approximately 500m away from a proposed WTG location.

### **MAMMALS (NON-VOLANT)**

Some 106 species of mammals have been recorded in Azerbaijan, three of which are introduced species. Using a combination of diurnal and nocturnal surveying, a total of 13 mammals were recorded in the survey area. 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. Two threatened species of note, the Goitered Gazelle and the Marbled Polecat both listed as Vulnerable on the global IUCN Red List were recorded at the WF area. Survey findings indicated that occurrence of both species is rare in the project area.

### **HERPTILES**

There are 52 species of reptiles and ten species of amphibians found in Azerbaijan. Most reptile species are found in semi-desert areas whereas amphibian species live in a variety of landscapes, depending on their ability to adapt to harsh environments, and their different nutrient needs. A total of 13 herptile species were registered in the survey area. The majority of species are listed as LC on the IUCN Red List as well as the Azerbaijan Red Data Book. The exceptions are two species; European Pond Turtle *Emys orbicularis* recorded as NT, and Mediterranean Spur-thighed Tortoise *Testudo graeca* recorded as VU on the IUCN Red list. The Mediterranean Tortoise (VU) and European Pond Turtle are a burrowing species that hibernate during the winter. The latter breeds during the summer season however, the Mediterranean tortoise undergoes an additional dormant period during the hotter months of summer that usually continues into winter dormancy. It is usually most active during the spring.

### **ENTOMOFAUNA**

Entomofauna survey finding of the wind farm area reflected the diverse and rich entomofauna of Azerbaijan. A series of transects and quadrats were undertaken where sweep netting and manual collection techniques were used to identify the species present and provide an indication of relative abundance and population density.



Among the 24 insect species recorded in the Area 1 project site, two are rare and have been listed in the Azerbaijan Red Data Book; *Saga ephippigera* and *Bubopsis Andromache*. *Saga ephippigera* hatches from eggs laid in soil in May, and lays eggs in soil 4 weeks after.

### **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 has 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 thresholds has been triggered in reference to four species: the Endangered Steppe Eagle, the Endangered Egyptian Vulture, the Endangered Saker Falcon and the Vulnerable Greater Spotted Eagle. 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).

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 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.

### **SOIL, GEOLOGY AND GROUNDWATER**

Soil analysis surveys were undertaken for the WTG site, laydown area, BOP and OHTL route. The soil analysis concluded that the area has a slightly alkaline pH. The majority of parameters were well within national, however, nickel and zinc samples often exceeded the national standard but are well within the Dutch Intervention Values and are typical of the region.

Groundwater was not encountered at any level during drilling works at the Project site.

### **DRAINAGE AND WATER**

There are no permanent surface water features within the Project site. Surface water in the vicinity of the Project area includes natural lakes that fill during rainfall events with the nearest lake located 300m from the closest WTG and the Sumgait River tributary, located 1.6km from the closest WTG of the project area to the west.

Water samples were taken from four (4) locations within the WF and BOP area and the surrounding area and two (2) locations along the OHTL.

Water samples taken from the river and pond east of WF showed high levels of turbidity and suspended solids. Conductivity levels ranged from 2,492 to 5,798 uS/cm. The sewage indicator *E. coli* was detected in all samples, including those along the OHTL.

In terms of flooding, the entire region has unstable flow patterns with dry riverbeds in summer and seasonal streams in spring and autumn with potential for local flood events.

### **WASTE AND WASTEWATER**

At the local level, the waste management services including proper waste collection, transportation and disposal are non-existent. There is an existing landfill located near Sumgait City, in the Haji Zeynalabdin settlement, around 10 km east of the Project area, however, in consultations with the local consultant it was advised that this facility is not suitable to handle the Project waste. Villagers of Cayli and Gobustan as well as the settlements in the Project area, manage waste by burying it in the lands around their homes, burning, or dumping it outside the village.

In addition, the wastewater management services in the area are also non-existent, and it is not clear whether there are any plans to develop a sewage network and a treatment facility for the area in the future. Cayli and Gobustan villages do not have a wastewater network and therefore, sewage is discharged into excavated pits where wastewater slowly seeps into the ground. This has been confirmed in additional consultation letters received from the Azersu Open Joint Stock Company, received on 8th October 2021, who confirmed that there are no plants in Cayli but there are two sewage pumping stations and one wastewater treatment plant in the territory of the Khizi district.

### **ARCHAEOLOGY**

Based on the archaeological survey conducted, three (3) archaeological sites were found within and surrounding the Project area. The majority of the findings were found to be of post-medieval pottery and possible indications of potential late Bronze Age mounds found on the surface.

Based on the Final Letter received from Academy of Science on 21<sup>st</sup> October 2021 and completion of all surveys, the Academy of Science concluded that there are 'no remarkable archaeological monuments discovered in the project area and its vicinity and construction works in the area doesn't pose any archaeological risk'. However, the Academy requested their officers to undertake monitoring during the excavation and construction works.

In addition, no significant archaeological finds were discovered along the OHTL.

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## LANDSCAPE CHARACTER, VISUAL AMENITY AND LIGHTING

Within the study area there are three distinct landscape character areas, ranging from 'Medium' to 'Low' sensitivity.

There are no receptors that are considered to be 'critical visual receptors' There are also no national historic sites locally, where the visitors could be considered critical receptors nor are there any tourist sites or recreational destinations nearby where the views of the project area are valued either locally, nationally or internationally.

Generally, the site is intrinsically dark. A lack of light sources was noted across the site and surrounding areas, with the only sources of light being internal residential illumination and headlights from the M4 highway.

## CLIMATE AFFAIRS

There has been an increase in temperatures across Azerbaijan of 1.3 °C in 2010, relative to the normal average annual temperatures observed in the period 1961 – 1990. Temperatures during the summer months of June, July and August 2010 for the Capital city Baku were 2.9 – 3.2 °C higher than the 1961 – 1990 baseline.

Trends in precipitation in Azerbaijan are variable with a degree of uncertainty. The amount of precipitation, seasonal and annual is determined by the interaction of air masses with the landscape and the Caspian Sea. Azerbaijan has also seen an increase in extreme events such as floods and droughts in recent years.

## 5 IMPACT ASSESSMENT

### AIR QUALITY

Temporary construction activities may result in increased dust generation and gaseous emissions on local military, agricultural and commercial receptors. Such impacts are expected to be minor in significance and able to be well managed through the implementation of the CESMP. The operation of the project is not expected to result in any impacts to air quality.

### NOISE

Temporary construction noise and vibration impacts are expected to arise from construction activities at the site and OHTL route and the use of access roads. Impacts are expected on a range of receptors including Cayli village, however, after implementation of mitigation measures, impacts are expected to be negligible to minor.

### OPERATIONAL NOISE

A noise assessment has been undertaken in accordance with the World Bank Group/International Finance Corporation's guidelines for Wind Energy as well as that permitted under national legislation of the Republic of Azerbaijan.

All but two (2) receptors (SR-6 & SR-2) comply with the either the day/night-time criteria set out by WBG/IFC General Guidelines, or the criteria derived from the background noise levels. Therefore, mitigation measures are required for receptors SR-6 and SR-2.

Following discussions with ACWA Power (the developer), turbines G10 & G11 have been modelled with serrated rotor edges (lower sound power levels) to ensure that receptor SR-6 is compliant with the derived background noise-based criteria. After mitigation, all of receptors comply with the either the day/night-time criteria set out by WBG/IFC General Guidelines, or the criteria derived from the background noise levels and therefore further mitigation measures are not required.

### ECOLOGY

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, biosecurity risks and deterioration of environmental quality. Habitat and biodiversity loss is anticipated to occur through clearing, excavation and earth works. Biodiversity loss is likely to be augmented by vehicular collisions, poaching, littering and general disturbance.

Soil imports, intentional or via previously used excavation and earthworks equipment, may contain pathogens that put native vegetation and fauna that do not have natural defence mechanisms at biosecurity risk. In addition to the impact of the construction phase air, water and soil quality, environment quality may also decline due to light and noise pollution, vibration and soil compaction/erosion.

However, the implementation of both general control measures as well as species-specific mitigation measures, residual impacts of the construction phase are predicted to be minor to moderate. Preconstruction surveys will be carried during the active period of early spring and summer to relocate Vulnerable testudines; Mediterranean/Greek tortoise and European Pont Turtles. These surveys will also demarcate nesting sites of endangered breeding birds and avoid works during the breeding season. In addition to removal of any road-kill carcasses, strict speed controls and restriction of driving and machinery operation to daylight hours will be implemented to reduce the risk of vehicle collision to scavenging, slow moving and small species. 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.

Operation of the wind farm project poses a unique threat to birds and bats due to the potential for collision with moving turbines. 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.

Significance of bird and bat turbine collision impact were found to range from minor to major, dependent upon effected species. Mitigatory measures that serve to reduce impact as well as compensatory measures to offset any net loss will minimise the impact to minor to moderate for all species. In particular, adaptive management programs are proposed for long-term monitoring of avian turbine collision mortality, along with shut-down on demand (SDOD) programs for peak migration period in select areas of the wind farm. Cut—in curtailment is proposed to reduce bat collision risk, which will be tailored and site-specific based on seasonal and meteorological conditions.

For many endangered 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. Given the implementation of mitigation measures such as inclusion of bird visual diverters as well as habitat modification to reduce flying through the risk zone, the residual significance is down listed to minor.

Khizi 3 WF is a sister wind farm located near Cayli. Further, an existing wind farm, Yashma Wind Farm, is located near Khizi 3 WF. Three windfarms in the same region may have cumulative biodiversity impact. The potential cumulative effects of the operational wind farms are mainly on avifauna. The cumulative impact from sister windfarms Khizi and Area 1 remains minor, due to the implementation of anti-collision and anti-electrocution design and management mitigation.

However, when assessing the cumulative impact inclusive of Yashma Wind Farm, a precautionary approach has been taken due to the lack of data regarding bird and bat mortalities, and/or management programs at the existing wind farm. The cumulative potential impact of all three wind farms due to bird and bat turbine collisions is calculated to be of moderate significance. It can also be mentioned that application of SDOD and cut-in curtailment programmes at the Yashma Wind Farm if not already in place would undoubtedly reduce cumulative impacts to negligible.

### **SOIL, GEOLOGY AND GROUNDWATER**

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. 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, no significant environmental impacts are envisaged.

### **DRAINAGE AND WATER**

During construction, the water environment has the potential to be impacted directly and indirectly by the construction activities. However accidental spillage of fuels, chemicals, and wastewater which might contaminate nearby water sources (water harvesting feature, lake, etc) used by herds and native fauna as a source of water is unlikely, as they will be contained within bunded structures with 110% storage volume as a minimum. Any impacts however

unlikely would be temporary and limited to the construction phase and be generally within the Project area.

The construction activities may result in changes in the direction or natural flow of surface water from the site and associated facilities which can potentially divert water flows away from vegetated areas or result in flooding having a direct impact upon nearby communities and land. Therefore, the EPC will provide an Erosion and Sediment Control Plan to establish the management controls to prevent sediment runoff and flooding prior to clearance of the site.

During operation, limited impacts are expected from the management and storage of hazardous materials, wastes, wastewater and during operation. These include accidental leaks and spillage, inadequate temporary storage and handling of sanitary wastewater prior to being removed for disposal. Such instances are considered most unlikely as all such chemicals, wastewater etc. will be stored inside bunded structures and buildings with impermeable base and where appropriate with secondary containment. Potential risks may occur from improper stormwater management which can result in significant negative impacts. With the provision of the mitigation measures and adhering to the recommendations in the Hydrology Study undertaken for the project and in the ESIA, no significant environmental impacts are envisaged.

#### **WASTE AND WASTEWATER**

Construction of the project will result in the generation of waste due to excavations, packaging wastes, and very small quantities of hazardous wastes (such as used fuel containers, spent paint cans, lubricant cans and oil cans, vehicle/plant maintenance wastes). During operations, there will be relatively few waste streams, although maintenance wastes may be generated in small quantities on a continued basis. Wastes will be minimal and varied but may contain small quantities of hazardous components. The ESIA outlines appropriate mitigation and management measures that can be implemented to suitably manage waste during both project phases.

#### **ARCHAEOLOGY**

There are several archaeological features on the site and construction activities have the potential to damage or impact these archaeological sites. To prevent any damage during construction, these will be clearly marked and/or fenced off (temporarily) by EPC Contractor, to ensure equipment and construction activities do not encroach onto the known archaeological sites. As required by the Ministry of Culture and Tourism, a number of archaeologists will be on site to monitor construction in these sensitive areas. The archaeologists conducting the observation and monitoring will also regularly inform construction workers about the archaeological procedure and conduct induction sessions. An archaeological 'Chance Find Procedure' will be developed prior to any access road earthworks, site survey, preparations or early construction.

The operational phase will not result in further impacts to archaeology, as the site will be static and further excavations are unlikely to be required. During maintenance works there is a very low risk of damage to archaeological sites due to a vehicle accident in the event of “off-roading” and not using the service road.

A Cultural Management Plan will be developed for the construction and operational ESMS to include locations and procedures to ensure protection of all known archaeological sites.

#### **LANDSCAPE CHARACTER, VISUAL AMENITY AND LIGHTING**

The development of the Project will lead changes in landscape character and visual amenity impacts, however, it is noted that there are no critical visual receptors or listed heritage sites and the landscape character has capacity to manage the change. Lighting of the WTGs will be limited to the red lights required for aviation safety.

The wider region already has existing wind farms, including the Yashma Wind Farm, and therefore the installation of turbines will not be setting a new precedent for the region..

#### **SHADOW FLICKER**

Turbine shadow flicker was modelled using ‘WindPRO’ (v3.4), an industry-leading software package for the design and planning of wind energy projects. Receptors SR-6, SR-15, SR-20 and SR-7-3 exceed the IFC criteria (30 hours per year or less than 30 mins per day, worst-case). However, receptors SR-15, SR-20 and SR-7-3 are all within the IFC criteria for the realistic case. Therefore, only SR-6 would potentially require some form of mitigation.

However, it is noted that, following a site visit, the residential dwellings of SR-6 do not have windows facing directly at any of the turbines of concern (windows facing the NW or SW) and therefore mitigation measures are not required for receptor SR-6.

#### **TRAFFIC AND TRANSPORT**

Wind turbines are manufactured abroad and transported to the country then transferred to the Project site for assembly and installation. The transport method will be carried out using a combination of road and sea transport. The Project will require an estimated number of 9 shipments for transporting the components. Appropriate roads are needed for site access and the hauling of equipment and turbines. Given the number of turbines expected for the Project, this will entail a total of 144 trips from the port to Project site. If improperly planned and managed, the trailers hauling the heavy Project components can potentially damage the existing highways, bridges, overpasses, roads, utilities, 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 maritime and road transport authorities to manage the transport of materials for the Project, which will be detailed in a Traffic Management Plan.



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## COMMUNITY HEALTH, SAFETY AND SECURITY

All construction projects have potential risks relating to public safety that could arise, particularly in regard to the use of high-powered equipment, heavy construction plant, excavations, transportation amongst others, including fire and pollution releases. Public risks during 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. Risks that could be experienced include worker influx and disease (such as COVID-19, Sexually Transmitted Illnesses (STIs) and skin infections), Gender Based Violence and Harassment (GBVH), Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH). The Project will develop a Worker Influx Management Plan to manage the potential risks associated with worker influx in the Project area. Other risks will be appropriately assessed and prepared in the construction phase 'Emergency Preparedness and Response Plan' and training. Furthermore, security staff will be onsite during both the operation and construction phase.

The operational phase of the Wind Farm will include various risks that could result in impacts to public safety. With regards to blade throw, the minimum set back is set to 273 m for the project. This is based on IFC EHS for Wind Energy setback requirement, which is 1.5 x turbine height (tower + rotor radius).

For ice throw, the maximum falling distance of ice for the Envision EN 171/6.5 is calculated to be 406.5 m. This is based on the International Energy Agency on Wind Energy Projects in Cold Climates and referenced in the IFC EHS Guideline on Wind Energy 1.5 x (rotor diameter + hub height).

This could result in safety risk to nearby receptors (military area and dog shelter) and users (including seasonal herders and road users) where some turbines are located, however, the likelihood of such events occurring are considered very low especially the WTGs most likely will have built in control in reducing this from happening.

## LABOUR AND WORKING CONDITIONS

The risks associated with the construction and operational phase of the project are anticipated to be related to occupational health and working conditions risks. The impacts during operation are expected to be significantly less than during the construction phase due to reduced site activity and requirements for heavy plant and machinery. These risks will be managed through effective risk assessment, development and implementation of an Occupational Health & Safety (OH&S) Plan.

## CLIMATE AFFAIRS

Fuel combustion during the construction phase for diesel generations and mobile plant will result in GHG emissions, however, the primary operation of the Project will lower the carbon intensity of Azerbaijan's grid electricity and result in avoidance of CO<sub>2</sub> emissions. Fuel

combustion from the use of operation vehicles and emergency diesel generators will be negligible.

Although climate change will result in increased temperatures, droughts and flood risks, these are not expected to pose a significant risk to the Project. As a renewable project, climate transition risks are also not anticipated.

## 6 ENVIRONMENTAL & SOCIAL MANAGEMENT & MONITORING

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 and 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.

Both the construction and operational phase of the ESMS will incorporate mitigation and monitoring requirements established within Volume 2 of the ESIA as well as requirements set out by the Ministry of Ecology and Natural Resources (MENR) (national Environmental Regulator) and the Lenders.

The primary documents guiding the environmental and social management of the construction and operational phases will be the Construction Environmental and Social Management Plan (CESMP) and Operational Environmental & Social Management Plan (OESMP) respectively. These will be supported by Supplementary Management and Monitoring Plans.

## 7 PUBLIC CONSULTATIONS

Stakeholder engagement and consultation commenced during the scoping stage of the Project and progressed through to the ESIA. A systematic approach was used to identify the project impacted stakeholders and those who may have interest in the project. Public consultation and meetings were held with directly affected communities, local government authorities and land users including member of Cayli and Gobustan villages, local municipality and herders using the Project site. Where community members or land users were not able to attend due to COVID-19 restrictions, the local consultant team distributed Project brochures which included Project information and grievance mechanism. Interest based stakeholders such as national, regional, local authorities and experts were engaged via letters, emails, virtual meetings, telephone calls and telegram.

A Public Information Centre (PIC) was established by ACWA Power at Cayli Village on 15<sup>th</sup> June 2021 to provide information on the Project to the members of the community, receive

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grievances and facilitate local recruitment for the Project. A Stakeholder Engagement Plan (SEP) has also been developed for the Project which outlines the proposed methodology for stakeholder engagement throughout the lifecycle of the Project. The grievance mechanism for the Project during the construction and operation of the project is also outlined in the SEP.

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## 8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

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 and social impacts are appropriately identified and controlled through the development of a robust ESMS and associated Management Plans.

The construction and operational phases of ESMS will incorporate mitigation and monitoring requirements established within Volume 2 of the ESIA as well as requirements set out by the Lenders. The primary documents guiding the environmental and social management of the construction and operational phases will be the Construction Environmental & Social Management Plan (CESMP) and the Operational Environmental & Social Management Plan (OESMP) respectively.