Ar Rass 2 PV
Kingdom of Saudi Arabia

ESIA Addendum

October 2023

Document Information

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List of Abbreviations

Abbreviation	Meaning
5 Capitals	5 Capitals Environmental and Management Company
CCPI	Climate Change Performance Index
CCRA	Climate Change Risk Assessment
CIA	Cumulative Impacts Assessment
CRI	Climate Risk Index
E&S	Environmental & Social
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EPFI	Equator Principles Financial Institutions
EPs	Equator Principles
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management Systems
GBVH	Gender Based Violence and Harassment
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GWh	Gigawatt Hours
HR	Human Resource
HRGPs	Guiding Principles on Business and Human Rights
HRIA	Human Rights Impact Assessment
ICCPR	International Covenant on Civil and Political Rights
ICESCR	International Covenant on Economic, Social and Cultural Rights
IFC	International Finance Corporation
ILO	International Labour Organization
IRENA	International Renewable Energy Agency
KSA	Kingdom of Saudi Arabia
KWh	Kilowatt Hours
MEWA	Ministry of Environment, Water and Agriculture
MHRSD	Ministry of Human Resources and Social Development
MoE	Ministry of Energy
MoL	Ministry of Labour
MoMRAH	Ministry of Municipal, Rural Affairs & Housing
NCCHT	National Committee to Combat Human Trafficking
NCEC	National Center of Environmental Compliance
NGO	Non-Governmental Organization
NREP	National Renewable Energy Programme
NSHR	National Society for Human Rights

ODS	Ozone Depleting Substances
OHS	Occupational Health and Safety
OHTL	Overhead Transmission Line
PIF	Public Investment Fund
PPE	Personal Protective Equipment
PS	Performance Standard
REPDO	Renewable Energy Project Development Office
SEA	Sexual Exploitation and Abuse
SEC	Saudi Electricity Company
SGI	Saudi Green Initiative
SH	Sexual Harassment
SSP	Shared Socioeconomic Pathways
TCFD	Task Force on Climate-related Financial Disclosures
UAE	United Arab Emirates
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
VEC	Vulnerable Environmental Components
WBG	World Bank Group
WPS	Wage Protection System

1 INTRODUCTION

The Ar Rass 2 PV Project (the Project), located in Saudi Arabia is being developed by ACWA Power under tender from the Saudi Power Procurement Company (SPPC) and Ministry of Energy (MoE).

The Project is one of three solar PV projects that are being developed by ACWA Power and PIF in KSA as part of PIF's commitment to develop 70% of Saudi Arabia's renewable energy by 2030, in line with the country's National Renewable Energy Program.

An Environmental and Social Impact Assessment (ESIA) Report for the "Ar Rass Solar PV Park" was completed in November 2019 by Worley. The Project's lenders and their technical advisors identified certain gaps in the Worley ESIA and the need for additional studies and impact assessment.

As a result, 5 Capitals Environmental and Management Consultancy (5 Capitals) has been engaged by ACWA Power to prepare this ESIA Addendum with a focus on the following areas:

- Land Use and Social Impacts;
- Human Rights;
- Climate Change; and
- Cumulative Impacts.

To address the scope of the ESIA Addendum, this Report is structured in the following format:

- **Chapter 1 Introduction** (this chapter): provides a brief introduction of the Project, its location, and the purpose of the Report;
- **Chapter 2 Land Use and Social Impacts**: assesses the impact on land use and social aspects;
- **Chapter 3 Human Rights Impacts Assessment**: provides the human rights risk assessment for the Project;
- **Chapter 4 Climate Change Risk Assessment**: provides the climate change impact and vulnerability assessment;
- **Chapter 5 Cumulative Impacts Assessment**: outlines the potential cumulative impacts of the Project; and
- **Chapter 6 References**: Provides the list of references used to inform and prepare this report.

1.1 Project Description

Note: *the description below is brief and for the purpose of context in this ESIA Addendum.*

The Project is a planned 2000MW$_{ac}$ solar PV project that will connect to the main grid through a gantry. The Project will be designed to withstand normal operation and conditions under a 35-year Power Purchase Agreement (PPA).

1.1.1 Associated Facilities

The Project will be connected to adjacent Saudi Electricity Company (SEC) substations and overhead transmission line (OHTL). The development and operation of these substations and OHTL are not within the scope of this Project, or financed under this Project, therefore are considered as associated facilities.

1.2 Project Location

The Project is located in the southeast side of Al Qassim Province in KSA, approximately 24 km south-east of the city of Ar Rass, and 22 km north of the smaller city of Duhknah. The area of the Project will be approximately 57.6 km^2, with around 32.6 km^2 of that being for the solar field.

There is an existing Ar Rass 1 project to the northwest of the Project that is undergoing construction, along with the substation that the Project will connect to. The Project site is accessed via both roads that are adjacent to the Project, the Highway 411 to the west and the road 7399 to the east. The location is shown in the following figures.

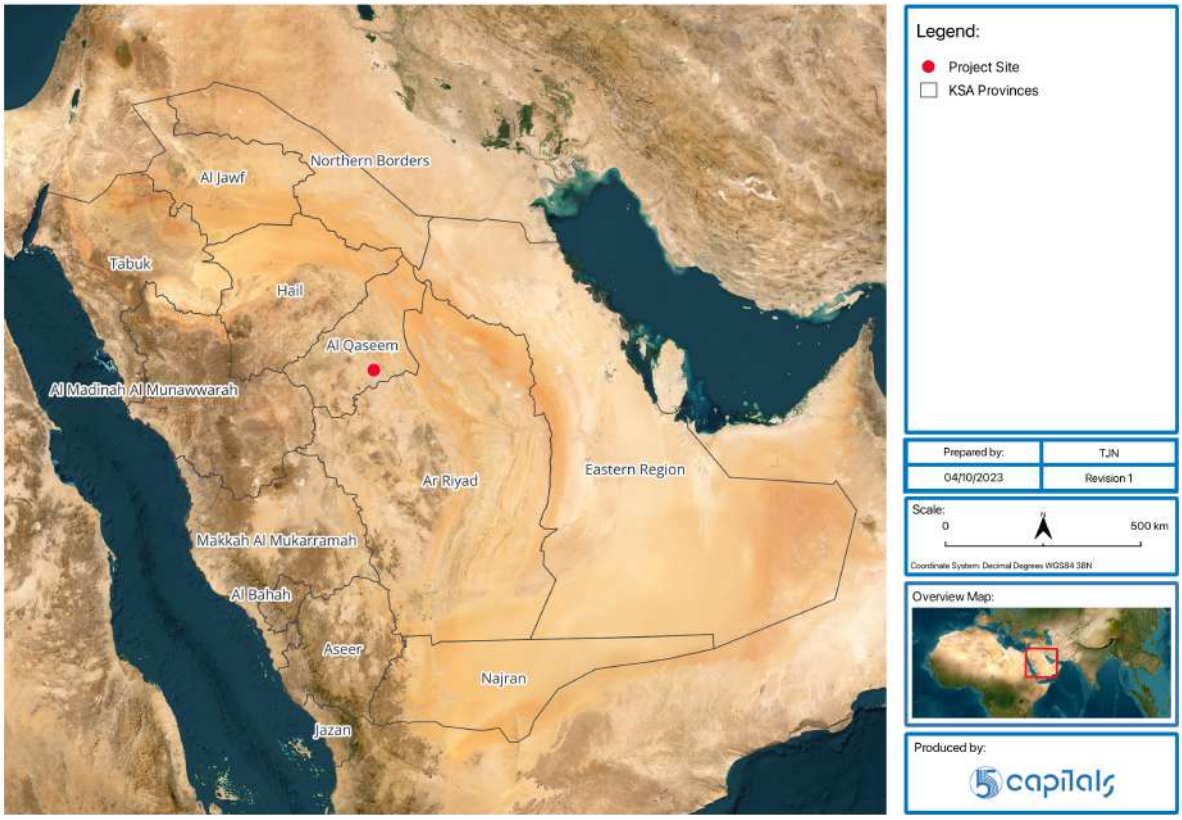

Figure 1-1 Project Location - National Context

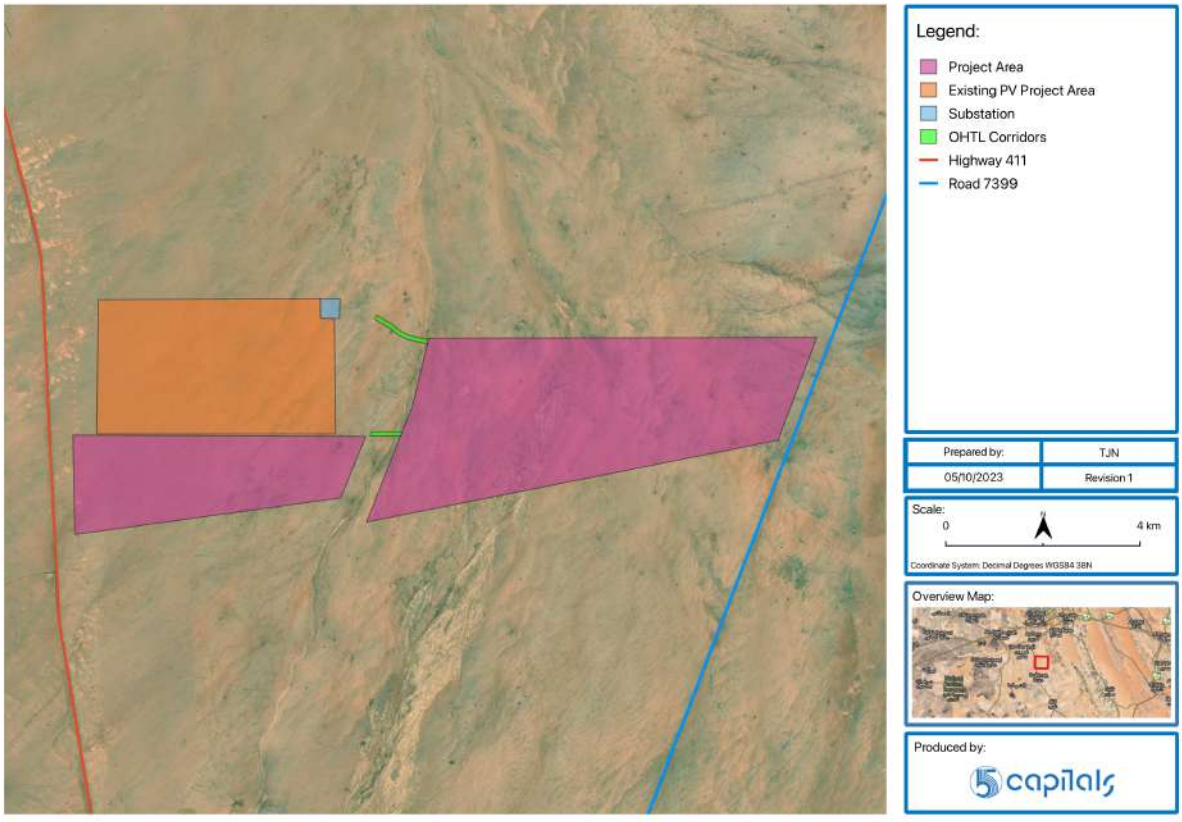

Figure 1-2 Project Location - Local Context

1.3 Project Workforce

1.3.1 Construction Phase

WORKFORCE NUMBERS

There are estimated to be up to 600 workers on-site at the peak of construction.

WORKFORCE ACCOMMODATION

The construction workforce will be accommodated in the nearby city of Ar Rass, as far as is practical, and they will be transported to site by bus each day. It is unlikely that Ar Rass will be able to accommodate all of the peak workforce, therefore it is expected that on-site (or nearby) accommodation may be required. The location of the onsite accommodation is not known at the time of writing, however, it is understood that it will be located within the allocated Project area.

1.3.2 Operation Phase

During the operation phase, it is expected that there will be 20-30 staff.

2 LAND USE AND SOCIAL IMPACTS

2.1 Standards and Regulations

2.1.1 National Context and Regulations

There are no statutory requirements in Saudi Arabia's legal system for land acquisition and resettlement related to informal land users. Processes are in place for legal title holders only.

2.1.2 Lenders Requirements

IFC PERFORMANCE STANDARD 5-LAND ACQUISITION AND INVOLUNTARY RESETTLEMENT

This standard recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) because of project-related land acquisition and/or restrictions on land use. Where involuntary resettlement is unavoidable, it should be minimised, and appropriate measures to mitigate adverse impacts on displaced persons and host communities should be carefully planned and implemented.

2.2 Baseline

2.2.1 Land Ownership

The land is government owned, and it is understood to be headleased to SPPC. SPPC has entered a separate headlease with The Ministry of Municipal, Rural Affairs and Housing providing them the rights to build the Project on the land, therefore no land acquisition will be required for the Project.

2.2.2 Land Use at the Project Site

The Project is located in the southeast side of Al Qassim Province in KSA, approximately 24 km south-east of the city of Ar Rass, and 22 km north of the smaller city of Duhknah. There are no permanent settlements within the Project site.

Highway 411 runs approximately 400 m to the west of the Project site, and the road 7399 approximately 250 m to the east. During the site visit in September 2023 the site was observed for signs of settlements, herders, or other land use.

The land is mostly a barren, sandy landscape with areas of gravel. It is sparsely scattered with small, shrubby vegetation. The vegetation is mostly congregated in lower-lying areas, such as the water run off areas. The typical landscape of the site can be seen in the figure below.

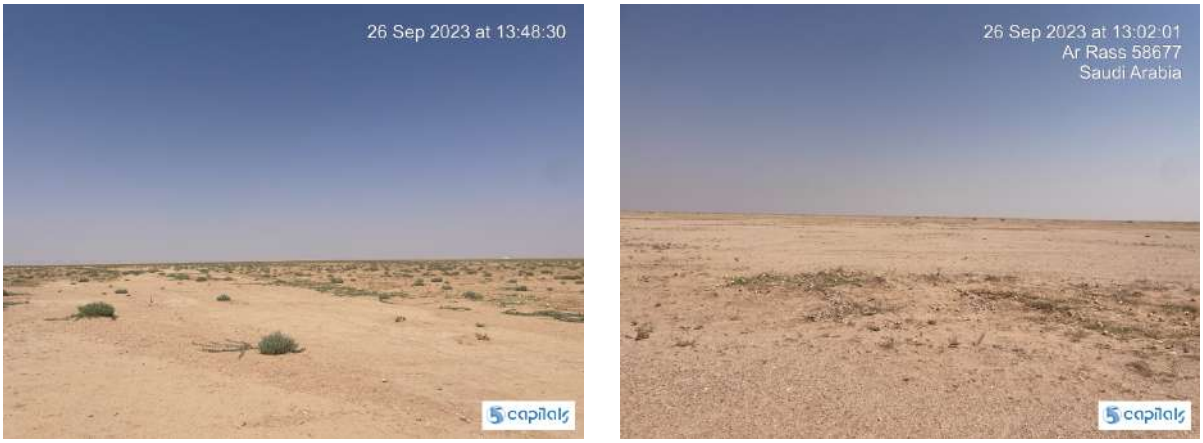

Figure 2-1 Typical Land Use at the Project Site

The runoff areas, as described in the ESIA, have very different characteristics. The western area is deeper, more defined, but narrow, and it runs between the two Project site areas. The eastern area flows through the east Project site and is wider, but very shallow, and can barely be noticed from the ground. Their locations can be seen in the figure below, and images in Figure 2-3. According to the ESIA study, these channels flow northwards to Wadi Ar Rummah.

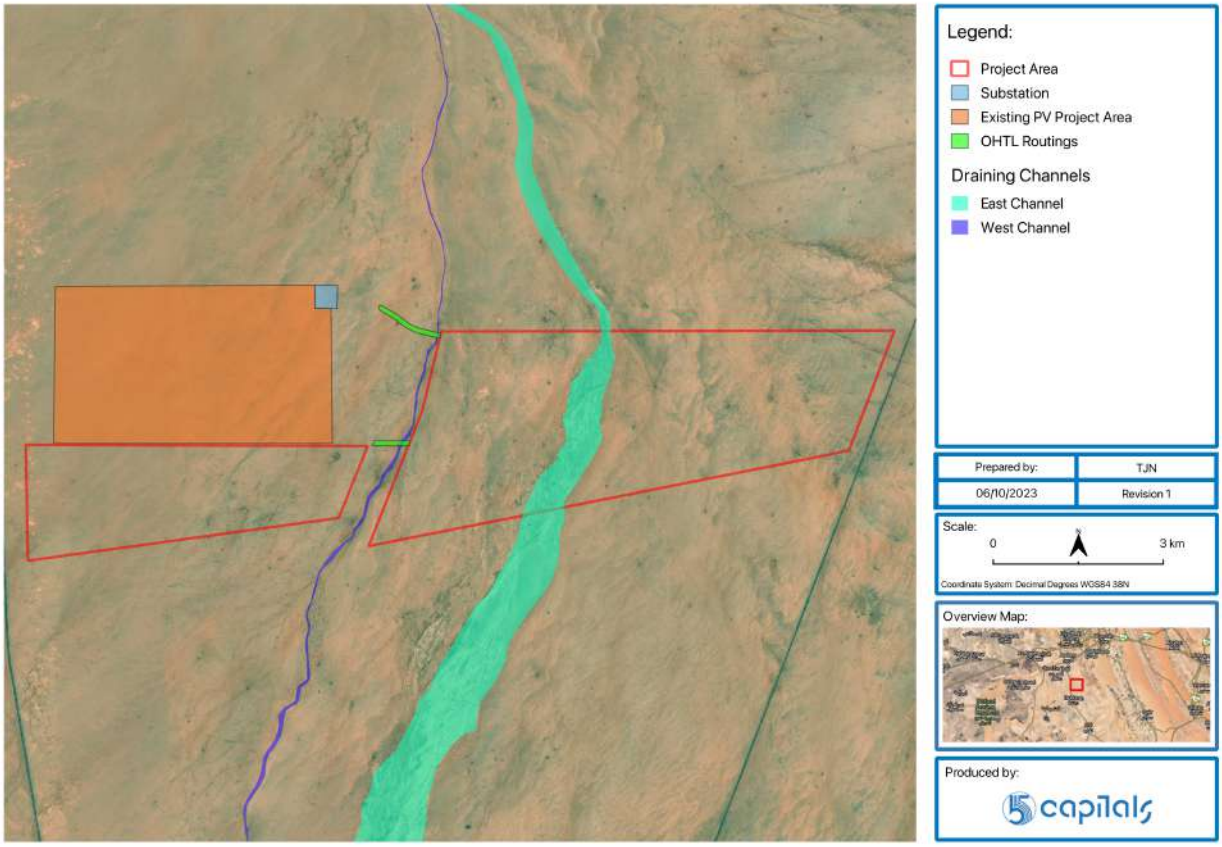

Figure 2-2 Drainage Channel Locations

Figure 2-3 Water run off areas in the west (left) and east (right)

On-going construction works at the Ar Rass 1 PV plant and substation were observed during the site visit.

Figure 2-4 Existing Construction Work near the Project Site

2.2.3 Site Visit and Consultation

A site visit was conducted in September 2023 by 5 Capitals, ACWA Power's Project Company, and the EPC Contractor. Prior to the site visit, 5 Capitals prepared a consultation questionnaire (with guidelines) for the Project Company to engage with people observed on or adjacent to the Project site (if any). It was important to consider the cultural context in Saudi Arabia when preparing the questionnaire and hence, the extent and type of questions was tailored to suit this.

The primary purpose of the questionnaire was to gain an overview of the baseline situation of such people at the site and to understand their land uses, livelihoods, and access to ecosystem services. Hence, to consequently determine what potential effects the Project might have, if any. The responses to the questionnaires are presented in Appendix A.

No herders were identified on-site, although it is understood based on the consultation responses presented in Appendix A that portions of the Project site and surrounding areas are used by herders for informal grazing of camel, although it was evident from the visit that the camels' diet

(at the time of the visit at the end of the summer) was being supplemented by the herders. It is noted that these herders do not have land use rights or other agreements and are unaware of the land ownership. They are largely nomadic and move about the open land in the region to find suitable grazing land.

At the time of the consultation, one nomadic herder (with caravan and animal pens) was located around 800 m southwest of the site (off-site). Their current location with respect to the Project boundaries at the time of the consultations is shown in Figure 2-6 and images are supplied in Figure 2-5.

Figure 2-5 Camel Herd (Off-Site)

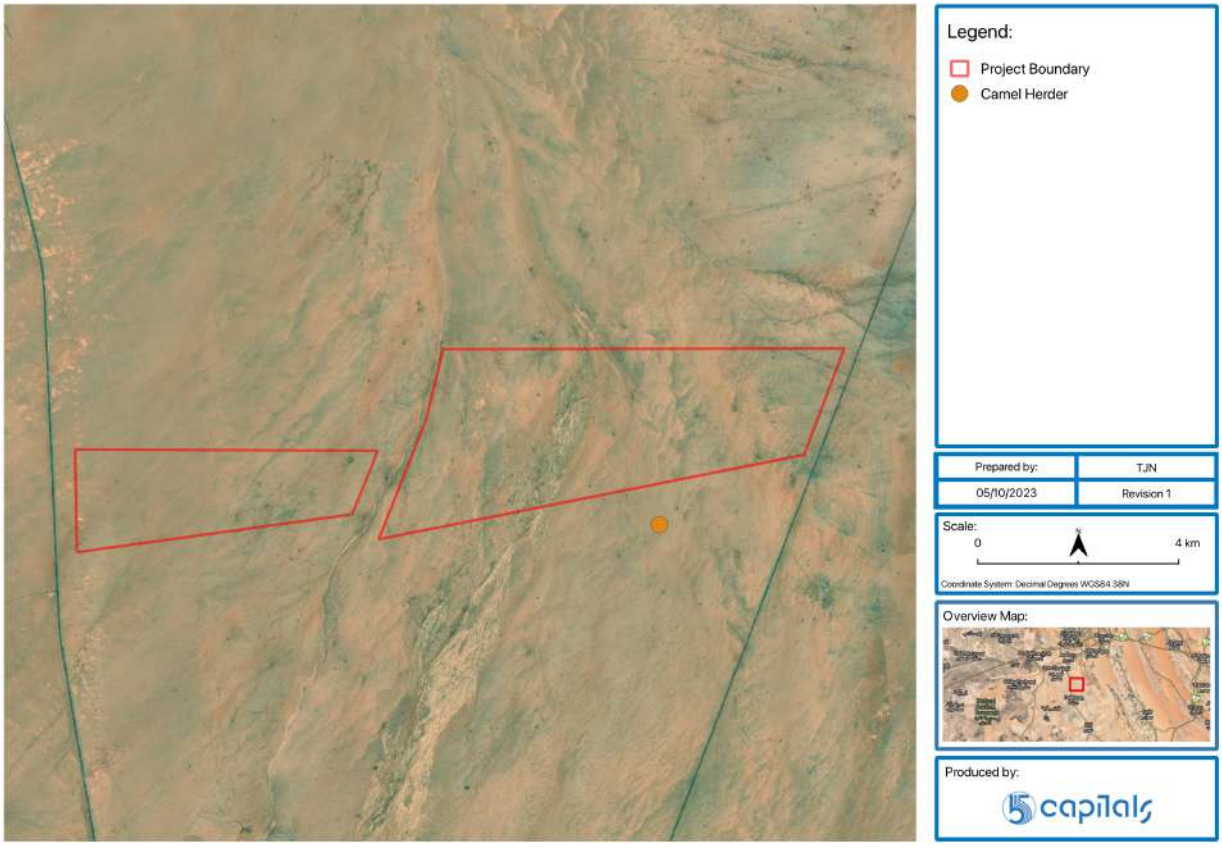

Figure 2-6 Camel Herder Location

Based on the engagement with the herder, it was understood that they are employed to herd camels in the region, likely by Saudi families. This is common in the GCC, where there are many expatriates who are engaged for such practices.

The herder stated that he had been using the site itself and surrounding areas for approximately three months, and tended to use it seasonally, during winter and summer. He said that ACWA Power notified him of the Project and that he is planning to move his herd 2 km to the south side during those seasons he uses the area. The Project is said to have no impact on his livelihood of herding as he will be able to move to a new location. In general, this is considered to be accurate given that this is a common occurrence for such herders to move with their camels and vehicles.

2.3 Potential Project Impacts

2.3.1 Land Use Change

It is initially noted that at the time of the site visit in September 2023, no herders were observed on the site.

Based on the engagement responses it is understood that certain areas of the Project site have been used for grazing of camels. Due to the Project development, the site will be fenced and Project structures (i.e., the solar field) will be constructed. Consequently, the site will no longer be accessible to the herders for the purpose of grazing.

The area being used for grazing is understood to be limited as most of the Project site is an open sand and gravel plain habitat, sparse with vegetation. The clusters of vegetation on-site are primarily located in lower lying areas (i.e., where water may drain during rainfall).

Given the abundance of open available land outside of the site and expected grazing areas available for use by herders, the loss of land due to the Project for grazing activities is expected to be minimal.

Furthermore, based on consultation with the herder located off-site, it is clear that there is abundant, open, and accessible land to the south and east of the Project area that he and other potential herders are easily able to access if needed. He also mentioned that the Project is not affecting his livelihood and there are no permanent structures that require relocation. This means that IFC PS5 is not specifically triggered by the Project.

2.3.2 Access

In response to the questionnaire, it is understood that this herder, and potentially others occasionally use the site area for access as a transportation route. Given that the site will be fenced and developed, these routes will no longer be accessible and hence an alternative slightly longer route will be used by the herders. It is understood that the use of this track is with vehicles and the slightly longer travel duration will not present significant impacts.

2.4 Ecosystem Services

Ecosystems provide services that result in beneficial human impacts. A decline or loss of any of these services and their benefits can result in socio-economic impacts that extend beyond environmental damages (World Resources Institute, 2013).

Ecosystems services are divided into four categories (World Resources Institute, 2013 and also consistent with the four types outlined in IFC PS6):

- "***Provisioning services*** *are the goods or products obtained from ecosystems, such as food, timber, fiber, and freshwater.*
- ***Regulating services*** *are the contributions to human well-being arising from an ecosystem's control of natural processes, such as climate regulation, disease control, erosion prevention, water flow regulation, and protection from natural hazards.*
- ***Cultural services*** *are the nonmaterial contributions of ecosystems to human well-being, such as recreation, spiritual values, and aesthetic enjoyment.*
- ***Supporting services*** *are the natural processes, such as nutrient cycling and primary production, that maintain the other services."*

IFC PS6 outlines that ecosystem services valued by humans are often underpinned by biodiversity, and hence impacts to biodiversity can adversely affect the delivery of ecosystem services.

The ecosystem services available to (and in use by) humans at the Project site are limited, primarily due to the lack of land users, lack of extensive vegetation, or other ecological features that are commonly used to derive benefits. The consultation questionnaire (ref. Appendix A) included a question (#2) that was targeted towards identifying provision and benefits of ecosystem services to people on or close to the site. The responses provided specified that there are not specific derived benefits from the site to these herders.

Based on the site observations and details provided in sections above, the habitat is considered to be of little grazing importance due to the lack of substantial vegetation. The herder (based off-site) was consulted and stated that he is already planning to move further afield areas for grazing, approximately 2 km south.

As seen in the figures above, there were no observed trees on site, producing a lack of firewood provisions. The habitat is representative of typical large regional arid ecosystems within KSA, and the loss in ecosystem services are envisaged to be minimal.

Based on the baseline sections, the ecosystem services provided by the Project site are expected to be limited to the following.

Table 2-1 Ecosystem Services Provided by the Project Site

Ecosystem Service	Type of Service	Beneficiary	Category	Description
Provisioning service	Type I	Local herders	Food-Livestock	The wider Project area is utilised by herders with livestock. One (1) herder was observed off-site to the south who stated that the site land is occasionally used for grazing, however they are planning to move 2 km further south. At the time of the site visit this service appeared to be limited with herders providing feed for the penned camels diets. Grazing may be more apparent in winter, spring, and early summer where perennial vegetation may establish in lower lying drainage/water collection areas. Consultation response #1 (ref. Appendix A), indicated that the herders were primarily using the land in the summer and winter seasons.
Regulating services	Type I	Local communities and the global population	Regulating air quality and climate change	There is very limited existing vegetation and shrubs on site, which nonetheless will provide a service to trap air pollutants and GHGs and accordingly help reduce impacts on air quality and climate change. Such benefits are expected to be very limited due to the limited vegetation and biomass on the site, which is primarily sparse, tussocky vegetation as observed during the site visit.
	Type I	Local communities and surrounding land users	Regulating water flows	The Project site is an area of flat topography. A wadi channel splits the site and there is not planned to be construction in this area. A lower-lying area that appears to be subject to drainage and water flows (based on soil pattern observations from satellite imagery review) is present through the eastern Project segment. This area appears to have the highest density of vegetation and is considered likely to provide an element of water flow regulation and collection (ref. Section 2.2.2). According to the ESIA, these water channels flow into Wadi Ar Rummah, north of the Project. There may be some flow of water (and water collection) from this drainage/runoff area to areas off-site at times of rainfall. The amount of flow off-site from this area is likely to be negligible compared with the existing deeper wadi channel separating the western and eastern project segments. Impacts due to the removal of vegetation (and possibly some soil compaction due to works) in this area by the project may have limited potential to increase flows and flow speeds, which may result in a slight increase in flow volumes and the timing of peak flow off the site vs. a baseline situation. This, however,

Ecosystem Service	Type of Service	Beneficiary	Category	Description
				is unlikely to result in significant impacts to areas off-site.

2.5 Mitigation

2.5.1 Herders

During the consultation, the Project Company has offered its full support to assist the herder in case of any issues. The contact details of the Project Company have been provided in case of any assistance that may be required.

2.5.2 Access to the Grievance Mechanism

Further the herders will need to remain as stakeholders in the Project SEP for the implementation of the Project and will have access to the Grievance Mechanism should any issues need to be raised. Issues will be dealt with on a case-by-case basis.

2.5.3 Ecosystem Services

- There shall be no removal of vegetation in areas outside of the Project footprint and access roads.
- The movement of construction and operational vehicles on any site access roads shall be limited (where practical) to gravel plain habitats, so as to caused least disturbance to vegetation that may be suitable for grazing.
- Where there is landscaping on-site, this should include native species. Invasive alien species shall not be introduced and if they are identified, a plan to remove them shall be prepared and implemented.
- Implementation of common good management practices for waste (as per ESIA mitigation) to minimise environmental exposure of pollutants and avoid pest attraction to the area.

2.6 Monitoring

Table 2-2 Land Use and Social Monitoring Requirements – Construction and Operation

Monitoring	Parameter	Frequency & Durations
External Party Grievances	Issues concerning socioeconomic factors or land use/ownership	On-going

3 HUMAN RIGHTS IMPACTS ASSESSMENT

3.1 Overview

With new requirements under EP IV, an increased attention is being given to the accountability of businesses for their impact on human rights and it now necessitates the inclusion of a 'Human Rights Impact Assessment' as part of the ESIA for projects financed by Equator Principles Financial Institutions (EPFIs). Accordingly, a Human Rights Impact Assessment has been conducted to evaluate:

- The rights of the local community and herders who live and work in the surrounding area to a healthy, safe, and secure environment;
- The rights of the labourers to adequate healthy and safe living conditions; and
- The rights of the labourers healthy, safe, and fair working environment and conditions.

3.2 Standards and Regulations

3.2.1 National Context and Regulations

Saudi labour law is governed by Royal Decree No. M/51 (23 Sha'ban 1426 / 27th September 2005). The labour law includes terms and conditions of employment in Saudi Arabia required by employers and includes details of worker rights.

The Ministry of Labour (MOL) approved amendments to the Labour Law on 5th April 2015 (Resolution No. 258) which was first published in the official gazette on 24th April 2015.

The Ministry of Labour and Social Development was later merged with Ministry of Civil Service to establish the Ministry of Human Resources and Social Development in 2019, which is the governing Ministry in Saudi Arabia responsible for providing development, support, and protection for the community.

Section 26 of the Basic Law of Governance states the Government is responsible for protecting human rights in accordance with the Shari'a Law that governs the country. Human Rights treaties ratified by the Kingdom include (Treaty Body Database, 2020):

- Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment (23 September 1997);
- Convention on the Elimination of All Forms of Discrimination against Women (7 September 2000);
- International Convention on the Elimination of All Forms of Racial Discrimination (23 September 1997);
- Convention on the Rights of the Child (26 January 1996);

- Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict (10 June 2011):
- Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography (18 August 2010);
- Convention on the Rights of Persons with Disabilities (24 June 2008);
- The Arab Charter of Human Rights; and
- Geneva Convention (18 May 1963).

In addition, Saudi Arabia is an International Labour Organisation (ILO) member state and has ratified 16 ILO Conventions out of which 6 are part of the IFC Performance Standard 2.

3.2.2 Lender Requirements

IFC PERFORMANCE STANDARD 4-COMMUNITY HEALTH, SAFETY AND SECURITY

This standard establishes requirements for the safeguard of the local community from potential risks associated with the project including impacts associated with the introduction of communicable disease, loss of ecosystem function, site access and operation, material use etc. It requires the Client (and Project) to avoid or minimise the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups.

IFC PERFORMANCE STANDARD 2-LABOUR AND WORKING CONDITION

IFC PS2 recognises that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. This includes rights for direct, contracted, and supply chain workers (as applicable for key primary supply chains).

PS2 is in part guided by several ILO conventions, as follows:

- ILO Convention 87 on Freedom of Association and Protection of the Right to Organize;
- ILO Convention 98 on the Right to Organize and Collective Bargaining;
- ILO Convention 29 on Forced Labour (ratified by KSA);
- ILO Convention 100 on Equal Remuneration (ratified by KSA);
- ILO Convention 105 on the Abolition of Forced Labour (ratified by KSA);
- ILO Convention 111 on Discrimination (Employment and Occupation) (ratified by KSA);
- ILO Convention 138 on Minimum Age (of Employment) (ratified by KSA);
- ILO Convention 182 on the Worst Forms of Child Labour (ratified by KSA);
- UN Convention on the Rights of the Child, Article 32.1; and
- UN Convention on the Protection of the Rights of all Migrant Workers and Members of their Families.

In addition to this, PS2 outlines certain requirements for projects linked to Human Resource (HR) policies, management, working conditions, and terms of employment (other elements not linked to the ILO conventions above) as well as key processes for occupational health and safety (OHS) management, and grievance redress.

UNITED NATIONS HUMAN RIGHTS GUIDING PRINCIPLES (HRGPS)

HRGP II on "The corporate responsibility to respect human rights" recognises that it is the responsibility of businesses and corporations to respect human rights. It is a global standard of expected conduct for all business enterprises wherever they operate. It exists independently of a States' ability and/or willingness to fulfil their human rights obligations and does not diminish those obligations. The Foundational principles to take into consideration are:

- Principle 11: Business enterprises should avoid infringing on the human rights of others and should address adverse human rights impacts with which they are involved;
- Principle 12: The responsibility of business enterprises to respect human rights refers to internationally recognized human rights – understood, at a minimum, as those expressed in the International Bill of Human Rights and the principles concerning fundamental rights set out in the International Labour Organization's Declaration on Fundamental Principles and Rights at Work;
- Principle 13: The responsibility to respect human rights requires that business enterprises avoid causing or contributing to adverse human rights impacts through their activities and address such impacts when they occur;
- Principle 14: The responsibility of business enterprises to respect human rights applies to all enterprises regardless of their size, sector, operational context, ownership, and structure. Nevertheless, the scale and complexity of the means through which enterprises meet that responsibility may vary according to these factors and with the severity of the enterprise's adverse human rights impacts;
- Principle 15: Business enterprises should have policies and processes appropriate to their size and circumstances in place.
- Principle 16: Policy commitment
- Principle 17 to 21: Human rights due diligence
- Principle 22: Remediation

IFC GUIDANCE ON GENDER BASED VIOLENCE AND HARASSMENT (GBVH) IN THE CONSTRUCTION SECTOR

The assessment, prevention, monitoring, and response measures with regards to GBVH should be underpinned by the following principles:

- Survivor Centred: The rights of GBVH survivors need to be consistently prioritised and used as the starting point for all decisions on efforts to assess, prevent, monitor, and respond to GBVH.
- Safe: Survivors, witnesses, and those who report and seek to address GBVH can be at risk of retaliation, including threatening and violent behaviour, often from those who do not

like their position of power being challenged. Companies should prioritise the safety of those who have experienced, witnessed, and reported GBVH.

- Context specific: All measures need to be rooted in a thorough understanding of the local context. Investors and companies should understand the legal and social context, and identify the support mechanisms that are in place.
- Collaborative: Companies should seek inputs from a range of internal and external stakeholders to increase the likelihood of broader buy-in and make GBVH prevention more effective.
- Inclusive: Companies should recognise the heightened risks of GBVH faced by certain groups who are subject to discrimination and marginalisation. High risk groups often include people with disabilities, single parents, migrants and ethnic minorities, and sexual and gender minorities. The system should also account for illiterate or non-literate people who may not be able to access written information on GBVH reporting mechanisms.
- Integrated: Processes and efforts to assess, prevent, monitor, and respond to GBVH need to be integrated as much as possible into existing processes and management systems, such as occupational health safety, security management systems, environmental and social management systems (ESMS), and human resources (HR) policies and procedures.
- Non-discriminatory: All survivors need to be listened to and treated equally whilst promoting diversity in the workplace.
- Well-informed: Companies should draw on relevant expertise when developing prevention and response measures. The grievance mechanism and investigation procedures should be set up to ensure they are appropriate, relevant, and safe in the local context.

According to the guidance, the benefits of addressing GBVH include:

- Improves workers' physical and emotional wellbeing and strengthens occupational health and safety.
- Avoids reputational damage, financial risks, and legal liabilities for companies, investors, and construction contractors.
- Builds relationships and social license to operate in communities. This can result from regular dialogue to understand and track project GBVH risks as well as the effective use of measures to prevent and respond to GBVH.
- Broadens the pool of potential workers that companies can draw upon, including women workers from nearby communities because of lower perceived risk of GBVH.

3.3 Project Affected People

3.3.1 Local Communities and Herders

The Project is located in the southeast side of Al Qassim Province in KSA, approximately 24 km south-east of the city of Ar Rass, and 22 km north of the smaller city of Duhknah. The Highway 411 is approximately 400 m to the west of the Project site, and the road 7399 approximately 250 m to

the east. The Project activities can potentially result in direct or indirect impacts to users of the adjacent roads, as well as the communities of Ar Rass and Duhknah.

During a site visit in September 2023 by 5 Capitals, it was observed that there are no permanent settlements within the Project site. A mobile camel herder that visits areas near the site every 3 months during summer and winter was observed around 800 m off the southwest of the site.

Other than the seasonal herder and ongoing construction, no activities are observed to be undertaken on the Project site.

Note: *Refer to Land Use and Social Impacts chapter above for further information.*

3.3.2 Project Workers

As per the ESIA, it is estimated that the Project's construction phase will employ approximately 600 people at its peak. During the operation phase, it is expected that 20-30 workers will be required.

Certain parties may also engage contract staff (e.g., from agencies) where additional manpower is required. There will also be suppliers and/or service providers for deliveries, waste management etc., who will have access to the site and will be exposed to certain risks.

Accordingly, Project related activities, management processes, living conditions, and work environments can result in potential adverse impacts to employees and workers listed above.

3.4 Potential Project Impacts on Human Rights

3.4.1 Construction

COMMUNITY SAFETY AND SECURITY

All construction projects have potential risks to public safety associated with the use of high-powered equipment, heavy construction equipment, excavation activities, transportation, fire incidents, and pollution releases, as well as non-authorised parties (including the public) accessing the construction site.

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, however, this rarely occurs. Such impacts are possible due to the location of the Project being close to herders and other local receptors.

It is noted that a Grievance Mechanism has been established for the Project, to allow third parties to raise concerns or complaints against the Project without cost, retribution, or fear of negative consequences.

The Project will ensure that the right of local communities to a clean and safe environment is safeguarded through the implementation of mitigation and management measures detailed in the ESIA and this ESIA Addendum.

OCCUPATIONAL HEALTH AND SAFETY

Common activities undertaken during construction such as the movement of heavy machinery, excavation, handling of chemicals, and works undertaken at height, in confined space or with electrical hazards etc. can introduce risk to the health and safety for the workforce. Risks are more likely to be apparent for those who are not familiar, applicably qualified, or otherwise well trained with the type of works undertaken and/or the associated hazards.

The type of hazards attributable to a construction site will vary significantly depending on the construction methods employed and the degree of control implemented by the contractor. HSE personnel will be on site during the day and night. These personnel will be dedicated Health, Safety, and Environment professionals to ensure the EPC workers and affiliated sub-contractors demonstrate consideration of health and safety risks as part of their chosen construction methods and that these risks are appropriately mitigated during the construction phase.

COMMUNICABLE DISEASES

The peak construction phase of the Project will require approximately 4,000 employees and workers including PC, EPC Contactor and Subcontractors as well as suitable accommodation areas.

Impacts on Workforce

The risk associated with the spread of communicable diseases within workforces is prominent in construction working environments that require the sharing of equipment, accommodation, canteens, and transportation between workers. Such a high number of workers working in such proximity or confined spaces also increases the risk of infection.

Impacts on Surrounding Community

The location of employees' accommodation may also have a possible impact on community health where integration with local communities takes place, should either party become infected with a communicable disease.

WORKING CONDITIONS, WELFARE & ACCOMMODATION

Inequality of income, education, and opportunities among the workforce is resulting in opportunistic immoral practices with labourers and site staff who consequently suffer.

The quality of living accommodation, living areas, the number of workers per room, facilities and amenities available to workers, maintenance accommodation areas, and provisions of associated services (e.g., catering, waste management etc.) can significantly impact the lives of

Project workers. This can include a lack of welfare provisions on-site such as clean drinking water, hygienic and ample toilet facilities, hand basins (with soaps/hand wash), temperate rest areas, food, and other amenities necessary to the works and the environment.

WORKER / WORKFORCE EXPLOITATION

The Project will have several parties contributing as part of the construction phase, of which there will likely be varying internal processes and protocols for each concerning HR, labour/workforce employment, and other related elements.

However, labour exploitation on construction sites, unfortunately, has become a reality in some parts of the world. Examples from other projects within the region have shown that there can be instances of forced labour (including bonded labour), labour with poor contracting conditions, or lacking processes in place to manage such elements. Therefore, potential risks exist regarding the above and are expected to be more prevalent at lower ends of the Project hierarchy, particularly for sub-contractors and agency/contract manpower that may need to be engaged.

GENDER INEQUALITY & DISCRIMINATION

Saudi Arabia has eliminated restrictions on women's employment in industrial sectors including construction, however, the construction industry remains lacking in gender diversity, being dominated by men. Women are generally more likely to face discrimination in terms of employment or wages, even when they engage in the same tasks as men.

In addition, income earning opportunities for women through direct employment during the construction phase or through indirect employment has the potential to increase household tensions and expose women to cultural pressure, or harassment and violence in their homes or communities, considering them 'home makers' who should not be engaged in construction work.

The Project should guarantee the right of all Project workers including women to just and favourable work conditions, free of discrimination.

GENDER BASED VIOLENCE AND HARASSMENT, SEXUAL EXPLOITATION & ABUSE, AND SEXUAL HARASSMENT

Members of the workforce or the neighbouring communities can potentially face harassment in the workplace or at home in forms of Gender Based Violence and Harassment (GBVH), Sexual Exploitation & Abuse (SEA), and Sexual Harassment (SH). The influx of workers from outside of the Project region will increase the likelihood of Gender Based Violence (GBV). The constructions workers are likely to be predominantly young males coming from other regions and outside of the country. These workers will be away from their families and removed from their normal social spheres. This could potentially result in peer pressure and involvement in unlawful behaviour. Such behaviour can lead to unwanted aggressive advances and harassment.

During the construction phase, workers will also be vulnerable to various forms of harassment, exploitation, and abuse, which could be aggravated by the traditional male working environment.

3.4.2 Operations

COMMUNITY SAFETY AND SECURITY

Although they are expected to be minimal for a Solar PV project, the Project will carry certain risks that could result in impacts to public/external party safety where such impacts are transferred or received outside of the Project boundaries. Such impacts are unlikely to occur but may relate to fire, Volatile Organic Compound (VOC) fumes, explosions, spills of back-up generator fuels, and un-warranted or accidental releases of sanitary wastewater.

The extent of such impacts may range outside of the boundaries of the Project and require the involvement of external agencies to help manage and abate such impacts (e.g., Civil Defence, Police and Army).

Potential risks can arise from non-authorised parties (including the public) accessing the Project. Several measures are considered to reduce those risks including fencing the site, installing monitored gates, and hiring security guards either through a 3rd party or direct employees of the Company to prevent the public from trespassing to the site and any malicious intrusion during operation.

A grievance mechanism has been established for the Project, and it includes:

- Verbal complaints/concerns received in person or through phone calls.
- Written complaints/concerns received through emails or grievance boxes located:
  - At the main gate
  - At the gate of the temporary site facilities
  - Around the site

The grievance mechanism should allow third parties to raise concerns or complaints against the Project without cost, retribution, or fear of negative consequences.

OCCUPATIONAL HEALTH AND SAFETY

The risks associated with the operational phase of the project are anticipated to be less than during the construction phase due to reduced site activity and requirements for heavy plant and machinery. However, there will remain occupational health and safety risks attributable to the operational phase associated with maintenance and inspection requirements.

The severity and likelihood of risks during the operational phase will also depend on the frequency and requirements for planned and unplanned maintenance. The O&M team should develop and implement a robust plan to appropriately manage these risks.

A grievance mechanism has been established for the Project and will be implemented to allow employees to express their concerns or complaints without cost, retribution, or fear of negative consequences.

COMMUNICABLE DISEASES

Even though the required number of workers is limited during operation, there is potential for the spread of diseases among workers, or within the local community and vice-versa to the workforce.

WORKERS CONDITIONS

The number of staff required during operation is limited, however, the lack of welfare provisions on-site such as clean drinking water, hygienic and ample toilet facilities, hand basins (with soaps/hand wash), temperate rest areas, food, and other amenities necessary to the works and the environment can impact the lives of Project workers.

GENDER BASED VIOLENCE AND HARASSMENT

As majority of the staff will be direct employees of the Project Company, the potential risks associated with violence and harassment are anticipated to be limited due to consistent processes in place as part of the respective HR management systems, assuming they are appropriately designed and resources.

3.5 Recommended Mitigation Measures

3.5.1 Construction

To reduce the impacts on health and safety of the community and site personnel, and to ensure the provision of the required human rights during the construction phase, appropriate measures should be implemented. The table below presents the relevant mitigation measures.

Table 3-1 Human Rights Mitigation & Management Measures – Construction

POTENTIAL IMPACT	MITIGATION AND MANAGEMENT MEASURES
Public/Community Safety	• Risks to public safety will be appropriately addressed and prepared for in an 'Emergency Preparedness and Response Plan'. • Site personnel should be trained in emergency procedures and plans, and the potentially affected receptors should be notified of procedures to follow via relevant communication channels. • Employees shall undergo a Code of Conduct training to ensure smooth coordination with the neighbouring community. • Project induction training will include a section on code of conduct when engaging with local community members. This will include an overview of culturally appropriate measures and etiquette to bear in mind. • The plan will include the appropriate procedure to respond to any such incidents, as well as site-specific contact details and details of external agencies who may be required.

Potential Impact	Mitigation and Management Measures
	• All high-risk areas including fuel storage areas will be secured with internal fencing and will be patrolled by security throughout the day. • Appropriate mechanisms for emergency control (e.g., firefighting equipment) will be placed at suitable positions around the site. • The implementation of a robust Grievance Mechanism will be ensured.
Public/Community Security	• The EPC Contractor shall prepare a Security Plan consistent with its Security Risk Assessment. • The Project will employ its security staff to provide 24/7 security control across the Project site and dedicated security staff at gatehouses. • All vehicles entering the site will require pre-approved clearance and will need to be registered. • The Project site will be guarded during the enabling work's stage and security will manage visitors as per the Security Management Plan. • Project security will record all instances of incoming vehicles. • CCTV will be installed at key locations around the site and gatehouses. • Appropriate lighting will be provided at gatehouses for security personnel to prevent unauthorised access. • Project personnel will only be provided access to the construction site with valid ID cards and permits to work in line with Health Safety and Environment (HSE) requirements. • People trying to gain unauthorized access to the site without appropriate permits and PPE will not be permitted or will be removed from site if identified and an investigation carried out on how they were able to access the site and corrective action taken. • The security personnel will be regularly trained on GBVH code of conduct including how to handle grievances related to GBVH from the community.

Occupational Health and Safety	• The EPC Contractor will provide all workers with a safe and healthy work environment, considering inherent risks and specific classes of hazards associated with the Project.
	• The EPC Contractor shall implement and maintain an OHS management system considering specific risks associated with the Project, legal requirements, and duty of care.
	• The EPC Contractor shall be responsible for ensuring that all affiliated sub-contractors comply with the OHS management system. The OHS management system shall be in-line with recognised international best practice and as a minimum, this plan shall include:
	  ○ Means of identifying and minimising, so far as reasonably practicable, the causes of potential H&S hazards to workers.
	  ○ Provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances.
	  ○ Provision of appropriate protective equipment to minimise risks, and the requirement and enforcement of its use.
	  ○ Training of workers, and the provision of appropriate incentives for them to use and comply with OHS procedures and protective equipment.
	  ○ Documentation and reporting of occupational accidents, diseases, and incidents.
	  ○ Emergency prevention, preparedness, and response arrangements.

Potential Impact	Mitigation and Management Measures
Staff/Community exposure to communicable diseases	• Staff and workers shall have access to medical insurance, health professionals and suitable medical facilities, which will aim to prevent the spread of diseases internally and externally. • Any reportable disease shall be diagnosed by the authorised medical centre doctors. Diagnosis includes identifying any new symptoms or any significant worsening of existing symptoms. • The potential for exposure to water-borne, water-based, vector-borne diseases and communicable diseases as a result of Project activities will be avoided or minimized. • Any external and internal spreading of diseases shall be diagnosed and the precautions as per the instructions from the national or local medical authority shall be implemented. • The Health and Safety Team on site should provide advice during training or inductions on exposure to diseases, including national and project requirements for any infectious disease that may be present. • Provide a 24hr emergency hotline. • Isolate/care for sick and potentially infected staff and workers. • Identify any vulnerable groups (i.e., those with pre-existing conditions) working in the Project site (for the EPC and sub-contractors) and take precautionary measures in accordance with the national and WHO guidelines. • Provide testing for staff as required at no cost to them. • Ensure that social distancing measures are put in place i.e., allow some of the office staff to work from home, working in shifts etc. • Promote personal hygiene among the workers and provide training and posters to remind workers to wash their hands regularly, clean their work areas and equipment, sanitize properly etc. • Ensure social distancing, proper ventilation, hygiene within workers accommodation. • Coordinate and regulate transportation of workers and access to the site i.e., through reduced bus occupancy, and temperature and PPE checks etc. • Provide a flexible working regime for employees who may prefer to work from home due to health issues, childcare, home schooling etc. without fear of victimisation. • Address mental health issues where workers are not able to travel back to their families due to travel restrictions, and provide information on how to seek help from local experts. • Reporting of illness and self-isolation will be encouraged and there will be zero tolerance for discrimination against sick workers. • Regularly review and update information/requirements in the ever-evolving situations.
Worker Welfare (site)	• Ensure that welfare provisions are available on-site, including but not limited to: o Hygienic and regularly cleaned toilets (commensurate to applicable requirements or good practices for the quantity required on-site, or in areas of the site); o Basins and running clean water, with hand-wash/soap for hand cleaning; o Rest areas (with air conditioning, chairs, and tables); and o Clean drinking water available in working areas (at a suitable temperature).

Potential Impact	Mitigation and Management Measures
	• If applicable, suitable and hygienic areas for eating and storing food (including refrigerators, heating devices [ovens/microwaves] etc.)
Worker Accommodation	• Provide accommodation that complies with the IFC & EBRD Workers Accommodation: Processes and Standards (2009)
Workers Conditions - Terms of Employment, Non-discrimination and equal opportunities, Working Relationships	• Project parties will establish HR Policies and processes to ensure working conditions and terms of employment are compliant with the requirements of National Labour Law, IFC PS 2 and associated ILO conventions. • Project employment relationships shall be on the principle of equal opportunity and fair treatment, and will not discriminate concerning any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, promotion, termination of employment, retirement, and discipline. • Project parties will not make employment decisions based on personal characteristics, such as gender, race, nationality, ethnic origin, religion or belief, disability, age, or sexual orientation, unrelated to inherent job requirements. • Project parties will document and communicate to all workers their working conditions and terms of employment including their entitlement to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity/paternity, or holiday). *Special measures of protection or assistance to promote local employment opportunities or selection for a particular job based on the inherent requirements of the job, which are per national law, will not be deemed discrimination.*
Workers Conditions-Forced Labour	• Project parties will not employ forced labour, which consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labour, such as indentured labour, bonded labour, or similar labour-contracting arrangements. • Such requirements are also applicable in the hiring of agency/other contracted manpower, for which processes should be in place by the Project party to undertake due diligence on the agency providing the manpower. Where potential risks of forced labour are identified other suppliers with reputable processes and controls should be sought. • HR policies and procedures will be adapted appropriately to the size of the workforce required for the Project. Policies and procedures must be prepared to demonstrate consistency with the requirements of national legislation and IFC PS 2.
Workers Conditions-Child Labour	• Project parties will comply with all relevant national laws and provisions related to the employment of minors. • In any event, Project parties will not employ children in a manner that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. • Young people below the age of 18 years will not be employed in hazardous work and all work of persons under the age of 18 shall be subject to an appropriate risk assessment. • Such requirements are also applicable in the hiring of agency/other contracted manpower, for which processes should be in place by the Project party to undertake due diligence on the agency providing the

Potential Impact	Mitigation and Management Measures
	manpower. Where potential risks of child labour are identified other suppliers with reputable processes and controls should be sought.
Workers Conditions-Wages, benefits, conditions of work and retrenchment	• HR policies and procedures will be adapted appropriately to the size of the workforce required for the Project. Policies and procedures must be prepared to demonstrate consistency with the requirements of national legislation and IFC PS 2 and include a code of conduct on GBVH. • Wages, benefits, and conditions of work offered should be overall comparable to those offered by equivalent employers in the relevant region of that country/region and sector concerned. • If Project parties anticipate collective dismissals associated with the proposed Project, the parties shall develop a plan to mitigate the adverse impacts of retrenchment in line with national law and good industry practice, and based on the principles of non-discrimination and consultation. Without prejudice to more stringent provisions in national law, such consultation will involve reasonable notice of employment changes to the workers' representatives and, where appropriate, relevant public authorities so that the retrenchment plan may be examined jointly to mitigate adverse effects of job losses on the workers concerned. The outcome of the consultations will be reflected in the final retrenchment plan.
Workers Conditions-Key Supply Chain (i.e., PV module suppliers)	• Project parties shall devise and implement applicable controls to ensure the measures herein are implemented by any sub-contractors and the requirements for workers conditions are included in the pre-qualifications criteria for selection of key contractors and suppliers. • Project parties will take reasonable steps to inquire about the use of child labour and forced labour in their supply chains and try to exert influence where possible or identify other suppliers.
Grievance Mechanism	• A grievance mechanism for workers will be provided to raise reasonable workplace concerns. • Workers will be informed of the grievance mechanism at the time of hiring and make it easily accessible to them. • The mechanism will involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides feedback to those concerned, without any retribution. • The mechanism will not impede access to other judicial or administrative remedies that might be available under law or through existing arbitration procedures, or a substitute for grievance mechanisms provided through collective agreements. • The grievance mechanism should be used to monitor worker morale, understand how workers are affected and what their concerns are in relation to communicable diseases, and address pressing matters promptly. • The grievance mechanism shall be provided for confidential reporting and a support system for any workers reporting issues relating to GBVH. It will also allow for reporting through word of mouth for those who cannot write. • A grievance mechanism for community members will be provided to raise concerns or complaints. • Community members will be informed of the grievance mechanism through stakeholders' engagement, and it will be made easily accessible to them.

Potential Impact	Mitigation and Management Measures
	• Complaints will be acknowledged, addressed, and closed out in a timely manner.
Violence and Harassment	• The Project parties will conduct a GBVH risk assessment in consultation with relevant stakeholders including women leaders and those working with young adolescent girls and boys. This will also include the identification of potential interventions and risk mitigation measures. • Awareness training will be mandatory for all Project workers regarding the GBVH risks and the workers responsibilities and the legal consequences of being a perpetrator. • Information will be provided on how to report any cases of violence or harassment and the services that will be made available to offer support to any of the survivors. • Approach towards GBVH prevention, mitigation and response will be survivor centred and ensure confidentiality, dignity, and respect to them. • The Project staff will be trained on how to preserve the safety of the women, girls, and boys when interviewing them and collecting information about their experiences on GBVH. • The Project will provide essential services for survivors such as access to counselling services, support groups, legal support etc. at no cost to them. • All determined cases of GBVH will be referred to relevant legal entities in the Project area for further investigation and prosecution. • The Project grievance mechanism will be made available to project workers and community members and will ensure that survivors' information is confidential and kept anonymous. • All cases relating to GBVH shall be documented and closed.

3.5.2 Operation

To reduce the impacts on health and safety of the community and site personnel and to ensure the provision of the required human rights during the operation phase, appropriate measures should be implemented. The following table presents the relevant mitigation measures.

Table 3-2 Human Rights Mitigation & Management Measures – Operation

Potential Impact	Mitigation and Management Measures
Public/Community Safety	• Risks to public safety will be appropriately addressed and prepared for in the operational phase 'Emergency Preparedness and Response Plan' and training. • The plan will include the appropriate procedure to respond to any such incidents, as well as site-specific contact details and details of external agencies who may be required. • All high-risk areas including fuel storage areas (such as at the Emergency Generator) will be secured. • Appropriate mechanisms for emergency control (e.g., firefighting equipment) will be placed at suitable positions around the site. • The employees during the operational phase shall undergo a Code of Conduct training to ensure smooth coordination with the neighboring community. • Grievance Redressal Mechanism shall be made accessible to the community to ensure that community members raise grievances to the Project leadership.

Potential Impact	Mitigation and Management Measures
Public/Community Security	• The Project will employ its security staff who will provide 24/7 security control across the Project site and dedicated security staff at gatehouses. • The security personnel will be regularly trained on GBVH code of conduct including how to handle grievances related to GBVH from the community. • All vehicles entering the site will require pre-approved clearance and will need to be registered. Project security will record all instances of incoming vehicles. • CCTV will be installed at key locations around the site and gatehouses. • Appropriate lighting will be provided at gatehouses for security personnel to prevent unauthorised access. • Project personnel will only be provided access to the construction site with valid ID cards and permits to work in line with HSE requirements. • Security arrangements will be in line with the KSA National Standards. In addition to this, security personnel will receive internal training aligned to the UN requirements on the control of force by law enforcement officials. Additional training will be provided to access gate staff regarding grievances, reporting such grievances and dialogue with any members of the local community.

Occupational Health and Safety	• The Project Company will provide the workers with a safe and healthy work environment, considering inherent risks and specific classes of hazards associated with the Project.
	• The Project Company shall implement and maintain an OHS management system considering specific risks associated with the Project, legal requirements, and duty of care.
	• The Project Company shall be responsible for ensuring that all affiliated sub-contractors comply with the OHS management system. The OHS management system shall be in-line with recognised international best practice and as a minimum, this plan shall include:
	  ○ Means of identifying and minimising, so far as reasonably practicable, the causes of potential H&S hazards to workers.
	  ○ Provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances.
	  ○ Provision of appropriate equipment to minimise risks, and requirement and enforcement of its use.
	  ○ Training of workers, and the provision of appropriate incentives for them to use and comply with H&S procedures and protective equipment.
	  ○ Documentation and reporting of occupational accidents, diseases, and incidents.
	  ○ Emergency prevention, preparedness, and response arrangements

Staff/Community exposure to communicable diseases and associated risks	• Staff and workers shall have access to medical insurance, health professionals and suitable medical facilities, which will aim to prevent the spread of diseases internally and externally. • Any reportable disease shall be diagnosed by the authorised medical centre doctors. Diagnosis includes identifying any new symptoms or any significant worsening of existing symptoms. • The potential for exposure to water-borne, water-based, vector-borne diseases and communicable diseases as a result of project activities will be avoided or minimized.

Potential Impact	Mitigation and Management Measures
	• Any external and internal spreading diseases shall be diagnosed and the precautions as per the instructions from the national/local medical authority shall be implemented. • Provide a 24hr emergency hotline. • Isolate/care for sick and potentially infected staff and workers. • Identify any vulnerable groups (i.e., those with pre-existing conditions) working in the Project site and take precautionary measures in accordance with the national and WHO guidelines. • Provide testing for staff at no extra cost to them. • Ensure that social distancing measures are put in place i.e., allowing some of the office staff to work from home, working in shifts etc. • Promote personal hygiene among the workers and provide training, posters to remind workers to wash their hands regularly, clean their work areas and equipment, and sanitize properly etc. • The transportation of workers and access to the site shall be coordinated and regulated i.e., through reduced bus occupancy, temperature, and PPE checks etc. • Provide a flexible working regime for those workers who may prefer and are able to work from home due to health issues, childcare, home schooling etc. without fear of victimisation. • Address mental health issues during induction and provide information on how to seek help from local experts.
Worker Welfare (site)	• Project parties will ensure that welfare provisions are available on-site, including but not limited to: o Hygienic and regularly cleaned toilets (commensurate to applicable requirements or good practices for the quantity required on-site, or in areas of the site), o Basins and running clean water, with hand, wash for hand cleaning, o Rest areas (with air conditioning, chairs, and tables), o Clean drinking water available in working areas (at a suitable temperature) o If applicable suitable and hygienic areas for eating and storing food (including refrigerators, heating devices [ovens/microwaves] etc).
Workers Conditions-Terms of Employment, Non-discrimination and equal opportunities, Working Relationships	• Project parties will establish HR Policies and processes consistent with the requirements of National Labour Law, IFC PS 2 and associated ILO conventions. • Project parties will provide a plan detailing how working conditions and terms of employment are compliant with national labour, social security and occupational health and safety laws. • Employment relationships shall be on the principle of equal opportunity and fair treatment, and will not discriminate concerning any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, promotion, termination of employment or retirement, and discipline. • Project parties will not make employment decisions based on personal characteristics, such as gender, race, nationality, ethnic origin, religion or belief, disability, age, or sexual orientation, unrelated to inherent job requirements. • Project parties will document and communicate to all workers their working conditions and terms of employment including their entitlement

Potential Impact	Mitigation and Management Measures
	to wages, hours of work, overtime arrangements and overtime compensation, and any benefits (such as leave for illness, maternity/paternity, or holiday). *Special measures of protection or assistance to promote local employment opportunities or selection for a particular job based on the inherent requirements of the job, which are following national law, will not be deemed discrimination.*
Workers Conditions-Forced Labour	• Project parties will not employ forced labour, which consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labour, such as indentured labour, bonded labour, or similar labour-contracting arrangements. • HR policies and procedures will be adapted appropriately to the size of the workforce required for the Project. Policies and procedures must be prepared to demonstrate consistency with the requirements of national legislation and IFC PS 2 and include a code of conduct on GBVH. • Such requirements are also applicable in the hiring of agency/other contracted manpower, for which processes should be in place by the Project party to undertake due diligence on the agency providing the manpower. Where potential risks of forced labour are identified other suppliers with reputable processes and controls should be sought.
Workers Conditions-Child Labour	• Project parties will comply with all relevant national laws and provisions related to the employment of minors. • In any event, Project parties will not employ children in a manner that is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. • Young people below the age of 18 years will not be employed in hazardous work and all work of persons under the age of 18 shall be subject to an appropriate risk assessment. • Such requirements are also applicable in the hiring of agency/other contracted manpower, for which processes should be in place by the Project party to undertake due diligence on the agency providing the manpower. Where potential risks of child labour are identified other suppliers with reputable processes and controls should be sought.
Workers Conditions-Wages, benefits, conditions of work and retrenchment	• Wages, benefits, and conditions of work offered should, overall, be comparable to those offered by equivalent employers in the relevant region of that country/region and sector concerned. • If Project parties anticipate collective dismissals associated with the proposed Project, the parties shall develop a plan to mitigate the adverse impacts of retrenchment, in line with national law and good industry practice and based on the principles of non-discrimination and consultation. Without prejudice to more stringent provisions in national law, such consultation will involve reasonable notice of employment changes to the workers' representatives and, where appropriate, relevant public authorities so that the retrenchment plan may be examined jointly to mitigate adverse effects of job losses on the workers concerned. The outcome of the consultations will be reflected in the final retrenchment plan. • The workers/representatives shall be involved on any labour reduction measures.

Potential Impact	Mitigation and Management Measures
Workers Conditions-Key Supply Chain (if any)	• Project Company shall devise and implement applicable controls to ensure the measures herein are implemented by any sub-contractors and are internally checked/audited. • Project Company shall take reasonable steps to inquire about the use of child labour and forced labour in their supply chains and try to exert influence where possible or identify other suppliers.
Grievance Mechanism	• A grievance mechanism for workers will be provided to raise reasonable workplace concerns. • Workers will be informed of the grievance mechanism at the time of hiring and make it easily accessible to them. • The mechanism will involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides feedback to those concerned, without any retribution. • The mechanism will not impede access to other judicial or administrative remedies that might be available under law or through existing arbitration procedures, or a substitute for grievance mechanisms provided through collective agreements. • A grievance mechanism for community members will be provided to raise concerns or complaints. • Community members will be informed of the grievance mechanism through stakeholders' engagement and make it easily accessible to them. • Complaints will be acknowledged, addressed, and closed out in a timely manner.
Violence and Harassment	• The Project parties will conduct a GBVH risk assessment in consultation with relevant stakeholders including women leaders and those working with young adolescent girls and boys. This will also include the identification of potential interventions and risk mitigation measures. • Awareness training will be mandatory for all Project workers regarding the GBVH risks and the workers responsibilities and the legal consequences of being a perpetrator. • Information will be provided on how to report any cases of violence or harassment and the services that will be made available to offer support to any of the survivors. • Approach towards GBVH prevention, mitigation and response will be survivor centred and ensure confidentiality, dignity, and respect to them. • The Project staff will be trained on how to preserve the safety of the women, girls, boys when interviewing them and collecting information about their experiences on GBVH. • The Project will provide essential services for survivors such as access to counselling services, support groups, legal support etc. at no cost to them. • All determined cases of GBVH will be referred to relevant legal entities in the Project area for further investigation and prosecution. • The Project grievance mechanism will be made available to project workers and community members and will ensure that survivors' information is confidential and kept anonymous. • All cases relating to GBVH shall be documented and closed.

3.6 Monitoring

The protection of human rights is an on-going process, and this should be reflected in the Project's internal management policies.

The EPC Contractor (for construction) and the O&M Company (for operations) are expected to be the primary parties for ensuring that mitigation measures are internally audited, and processes are in place to protect labourers, subcontractors, suppliers, as well as the surrounding community. Monitoring required is provided in the Table below.

Table 3-3 Key Monitoring Indicators during Construction and Operation

Monitoring	Parameter	Frequency & Duration	Monitoring Locations
Worker Contracts & HR	Records of contracts, payments, receipt of benefits, leave entitlements, retrenchment etc.	On-going	For all Project workers (direct staff) and oversight of sub-contractor staff dedicated to the project
Women employed in the Project	Number of women employed in the Project including their rank and renumeration compared to men occupying the same positions.	On-going	For all female Project personnel including those employed by the sub-contractors.
Worker Welfare	Quality, appropriate numbers and suitable locations of Sanitation Facilities, Office Spaces, Welfare and Rest Areas	On-going	At all such facilities on-site
Quality of Accommodation	Inspection/internal audit of worker accommodation facilities vs. IFC & EBRD standards	Monthly	All accommodation facilities provided to direct and full time sub-contracted labour.
OH&S Near Misses (involving external parties)	Any classified near miss	On-going	n/a
OH&S Emergency Situations and Incidents	Any classified emergency situation or incident	On-going	n/a
Grievances and disputes including those relating to gender-based violence and harassment, sexual exploitation & abuse, and sexual harassment	Grievances received	On-going	Project site and any other grievances received from communities in reference to Project workforce including suppliers.
Health of the workers	Records of the illnesses the workers are suffering from and an analysis of top diseases.	On-going	Project site clinic or first aid facility
Human rights complaints/violations as reported by Project workers including workers hired through third-parties or in the supply chain	Grievances received	On-going	As defined in the Stakeholder Engagement Plan (SEP)
Emergency Situations and Incidents	Any classified emergency situation or incident	On-going	n/a

4 CLIMATE CHANGE IMPACT ASSESSMENT

4.1 Overview

ACWA Power is seeking finance for the Project from international and lenders who are understood to be signatories of the Equator Principles, hence are Equator Principles Financial Institutions (EPFIs), which necessitates compliance with the Equator Principles (EPs). This chapter has been prepared in compliance with the Equator Principles volume IV which requires the inclusion of a 'Climate Change Risk Assessment' as part of the ESIA studies for projects financed by EPFIs.

4.1.1 Objectives of the CCRA

The objectives of the Climate Change Risk Assessment (CCRA) are to:

- Review and outline the KSA national regulations and standards, and lenders requirements;
- Review the climate change context and trends of KSA, highlighting the main issues;
- Identify and describe the potential vulnerabilities of the Project to climatic risks;
- Identify and describe the potential impacts of the Project or its activities on the climate;
- Propose project alternatives for potential lesser climatic impacts; and
- Propose actionable recommendations and mitigations to reduce the risks of adverse impacts.

4.1.2 Scope of the CCRA

The CCRA focuses on the climatic risks and impacts to the Project, associated facilities, and workforce during the Construction and Operational phases of the Project.

It considers potential impacts of the Project on the climate also.

4.1.3 Methodology

To address the scope of the CCRA, the following methodology was followed:

- Data collection & baseline development;
  - Desktop background research of national regulations and standards
  - Collation of lenders' requirements for CCRA's
  - Desktop background research of climate risks in KSA, current climatic situations, and future trends
- Scoping of climate risks identified in lenders' requirements for relevance against national desktop background research information to identify potential hazards;
- Analysis of the Project specific level of risk of each identified national hazard;

- Outline the potential Project alternatives; and
- Proposal of mitigation measures to limit the effects of these potential climatic hazards on the Project and methods of monitoring.

4.2 Standards and Regulations

4.2.1 National Context and Regulations

The Paris Agreement came into force on 4th November 2016. The KSA signed and ratified the Agreement on 3rd November 2016 (UNTC, 2023). To date, the Kingdom of Saudi Arabia has not released a national climate action plan, however, the country has established several initiatives to address climate change issues, including:

- Establishing a Renewable Energy Project Development Office (REPDO) by the Ministry of Energy in 2017 which outlined plans for the kingdom to develop 58.7GW of renewable energy capacity by 2030, in line with Saudi's Vision 2030. In 2019 they also increased the 2023 clean energy target almost threefold to 27.3GW, from the previous target of 9.5GW (MEED, 2019);
- Launched the Saudi Green Initiative (SGI) in 2021 which "*aims to combat climate change, improve quality of life and protect the planet for future generations*", overseen by The Energy and Climate Change Committee and The Environment Committee (Saudi and Middle East Green Initiatives, 2022);
- Establishing a National Committee for the Clean Development Mechanism and Designated National Authority in 2009, which oversees the development process of Clean Development Mechanism projects;
- Establishing a Saudi Energy Efficiency Program launched by Saudi Energy Efficiency Centre, which aims at designing and implanting energy efficiency initiatives for the country; and
- Oil and Gas Climate Initiative lead by Saudi Aramco to help member companies support the Paris Agreement and its aims
  - (https://oilandgasclimateinitiative.com/about-us/#guidingprinciples).

4.2.2 Lenders Requirements

Equator Principles volume IV establishes that impacts on the climate should be avoided where possible, and in support of the 2015 Paris Agreement recognises that EPFIs have a role to play in improving the availability of climate-related information, such as the recommendation by the Task Force on Climate-related Financial Disclosures (TCFD).

More specifically, Principle 1 states that factors such as climate change are required for the project categorisation based on the International Finance Corporation's (IFC) environmental and social categorisation process.

Principle 2 outlines the need for a climate change risk assessment, stating a requirement to "*include assessments of potential adverse […] climate change risks as part of the ESIA or other Assessment*". It further states that "*The Climate Change Risk Assessment should be aligned with the Climate Physical Risk and Climate Transition Risk categories of the TCFD*". These are (TCFD, 2017):

- ***Physical Risk***: Risks related to the physical impacts of climate change; and
  - Acute Physical Risk: those that are event-driven, including increased severity of extreme weather events, such as cyclones, hurricanes, or floods etc; and
  - Chronic Physical Risk: longer-term shifts in climate patterns (e.g., sustained higher temperatures) that may cause sea level rise or chronic heat waves.
- ***Transition Risk***: Risks related with a transition to a lower-carbon economy.

EP 2 delineates emissions into two scopes:

- ***Scope 1 Emissions***: direct emissions from the project owned facilities, or facilities controlled within the physical project boundary; and
- ***Scope 2 Emissions***: indirect emissions associated with the off-site production of energy used by the project, such as connection to the grid.

For projects with combined scope 1 & 2 Greenhouse Gas (GHG) emissions of over 100,000 tonnes $CO_{2\text{-eq}}$ per annum, Principle 2 states requirements for analysis of alternatives which evaluates low GHG intense alternatives, and Principle 10 states that projects should report their GHG emissions annually.

International Finance Corporation (IFC) PSs underpin EP 2. PS 1 states that the clients "*risks and impacts identification process will consider the emissions of greenhouse gases, the relevant risks associated with a changing climate and the adaptation opportunities, and potential transboundary effects*."

PS 3 continues that clients should "*consider alternatives and implement technically and financially feasible and cost-effective options to reduce Project-related GHG emissions during the design and operation of the Project*". For projects producing in excess of 25,000 tonnes $CO_{2\text{-eq}}$ per annum, PS3 states a requirement for the client to quantify scope 1 and 2 emissions.

4.3 Baseline Data

4.3.1 National Climate Change Context

The mean global temperature has increased by an estimated 1.09 °C since the pre-industrial era. Climate observation and analysis in recent decades indicate that the globe is warming up at an average rate of 0.2°C per year (IPCC, 2021). Regarding long-term projections, the IPCC estimates a global mean surface temperature increase of 3.3 to 5.7°C in the period 2080-2100. The warming effect of progressive GHG emissions on the global climate has caused an upturn in the frequency

and intensity of extreme weather events. Indirectly, these effects have also induced the occurrence of climate-sensitive natural hazards such as droughts, floods, sea-level rise, and landslides.

By the end of 2021, KSA was reported to have a population of 35.46 million people and Gross Domestic Product (GDP) totalling 833.5 billion US Dollars. While the oil and gas industry accounts for 50% of the country's GDP, the country's economy is also significantly reliant on climate sensitive sectors such as agriculture (OPEC, 2023).

For 2023, KSA scored a Climate Change Performance Index (CCPI) score of 22.41%, rating them as 'very low' and ranking 62nd of 63 countries evaluated (Germanwatch, 2023). KSA also scored a Climate Risk Index (CRI) index of 73, ranking 57th in terms of average fatalities, and 51st in terms of economic losses in relation to extreme weather events (Germanwatch, 2022).

With a growing urban population, increasing temperatures, dwindling groundwater resources, rising sea levels, and recurrent flood events, KSA is faced with growing biophysical and socioeconomic vulnerabilities to climate change. In response to the climate urgency, the country launched a coordinated move towards decarbonisation with its entry into the Paris Climate Accords in 2015, and they also part of the United Nations Framework Convention on Climate Change (UNFCCC) since 1996.

In a movement towards a greener environment, KSA launched the Saudi Green Initiative (SGI) in 2021 which "*aims to combat climate change, improve quality of life and protect the planet for future generations*". To date, it is reported (Arab News, 2023) that this initiative has led to:

- 150,000 homes powered by renewable energy;
- 18 million trees planted in 2022 in KSA;
- 62 sites approved for tree planting;
- 60,000 hectares of land rehabilitated in 2022;
- 250,000 cultivated shrubs in AlUla nurseries;

4.3.2 National Climate

Standing amongst the world's hottest and most arid countries, Saudi Arabia is characterised by a desert climate. In terms of climatic zones defined by the Köppen climate classification system, most of the country falls within the hot, arid desert zone. There are remote patches of cold, arid steepe, and hot, arid steppe, and also areas of cold, arid desert climates, much of which represent mountainous pockets in the country's western reaches.

Figure 4-1 Köppen Geiger climate classification for Saudi Arabia

Source: Beck, H.E. et al. (2018)

The climate mostly consists of high daytime temperatures, inversely low night-time temperatures, and little, irregular precipitation. With climatological influences from both tropical and extra-tropical weather systems, the country experiences the four seasons of winter (December-February), spring (March-May), summer (June-August) and fall (September-November) (Odnoletkova and Patztek, 2021), with a wet season in March and April.

4.3.3 Natural Hazards

Climatic hazards can be divided into natural climatic hazards, and induced climatic hazards.

- **Climatic natural hazards** are those hazards that are directly related to the changing climate, such as temperature or rainfall. The climatic changes that are causing the hazards to occur are being directly caused by climate change.
- **Climate-induced hazards** are those that can be indirectly related to the changing climate, such as floods and forest fires. The hazards are being caused by other climatic changes, such as sea level rise being induced by increasing temperatures that are the result of climate change.

CLIMATIC NATURAL HAZARDS

Temperature

Baseline and Historic Trends

Summers in the central region are extremely hot and dry, ranging from 27°C to 43°C in the inland areas and 27°C to 38°C in coastal areas. In winter, the temperature ranges between 8°C to 20°C

in the interior parts while higher temperatures of 19°C - 29°C have been recorded in the coastal areas of Red Sea (Climate Change Knowledge Portal, 2021). A graph illustrating the variation in mean annual temperature levels in the period 1991 to 2020 is shown below.

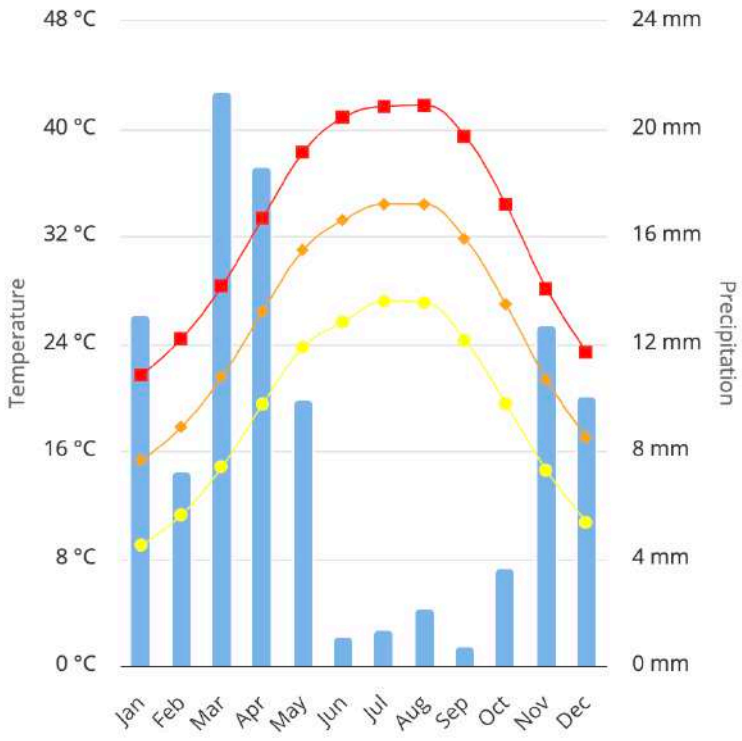

Figure 4-2 Observed Monthly Average Temperatures (High – red; mean – orange, low – yellow), and rainfall (blue) in Saudi Arabia 1991-2020

Source: Climate Change Knowledge Portal (2021)

Projections

Below are projected temperatures for KSA using a range of Shared Socioeconomic Pathways (SSP). Modelling for the most severe SSP5-8.5 scenario predicts that maximum surface temperatures will rise by 16.8% from 2023 – 2100 to an average of 38.66 °C, and to at least 33.88 °C under SSP1-2.6

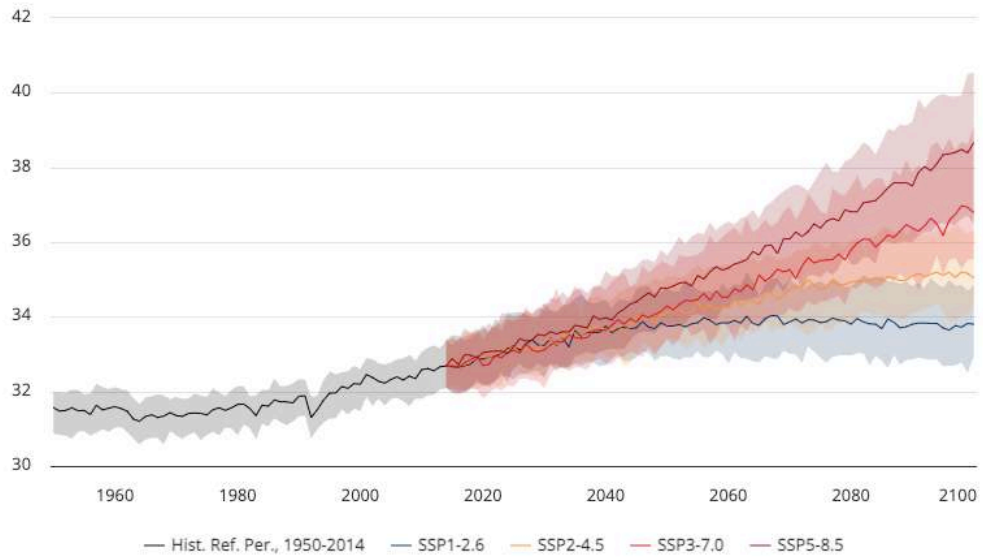

Figure 4-3 Projected Average Maximum Surface Air Temperature, Saudi Arabia

Source: Climate Change Knowledge Portal (2021)

Precipitation

Baseline and Historic Trends

KSA has a rainy season of March and April, as seen in Figure 3-2. The average annual rainfall in most parts of the country is below 150 mm throughout the year, except in the southwest part where the rainfall occurs between 400 – 600 mm annually (Climate Change Knowledge Portal, 2021). The annual average precipitation for 2010 – 2021 can be seen below, as well as monthly variations above in Figure 4-2.

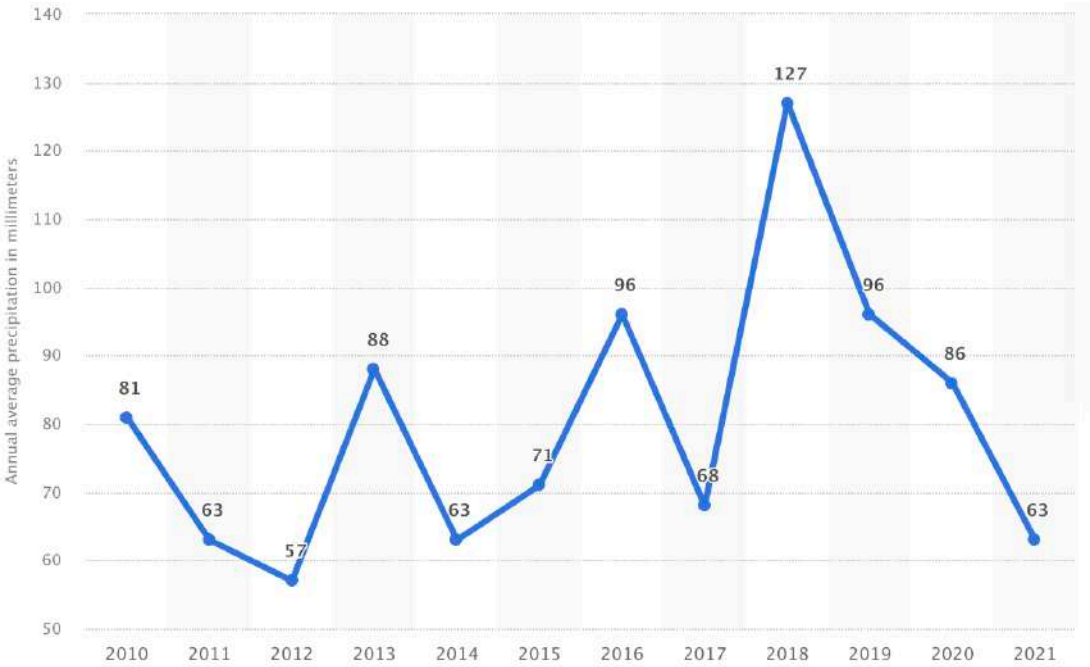

Figure 4-4 Annual Average Precipitation in KSA 2010 – 2021

Source: Statistica (2023).

Projections

Using the SSP5-8.5 model, precipitation is estimates to rise by approximately 12 mm per annum, although there appears to be much variation in the estimations, as seen in the Figure below.

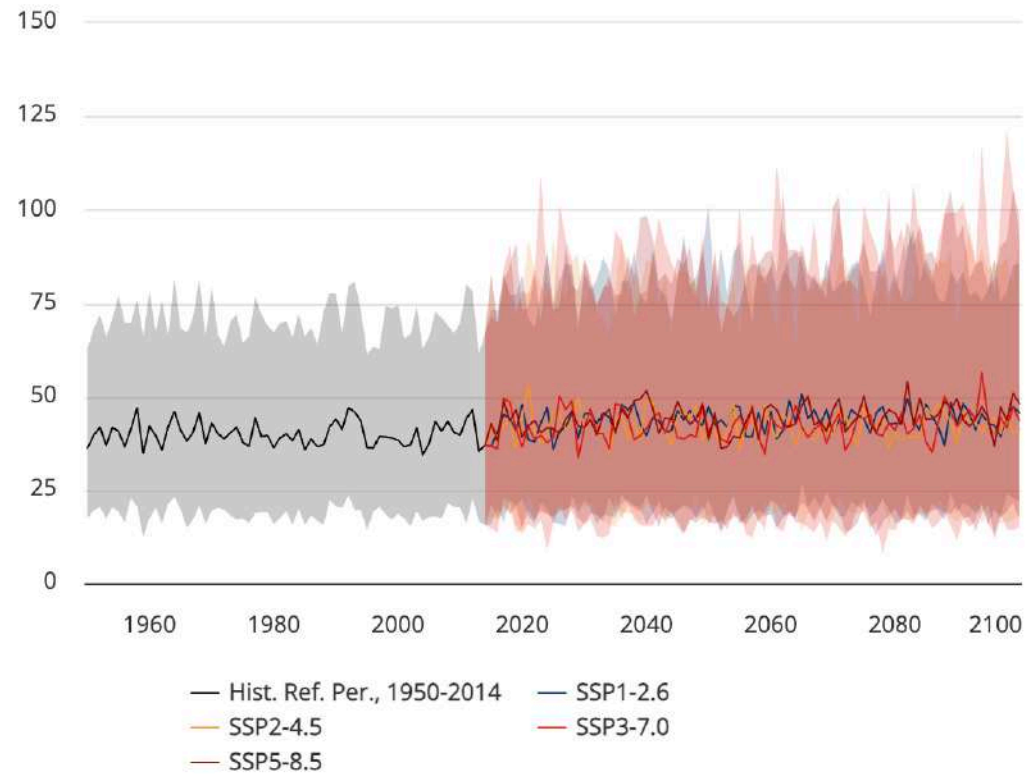

Figure 4-5 Project Precipitation in KSA

Source: Climate Change Knowledge Portal (2023).

The frequency of intense rainfall events is increasing for the majority of Saudi Arabia, while the frequency of weak events is decreasing. The contribution of extreme events (daily rainfall of ≥ 26 mm) to the total rainfall amount varies, but in one case was found to be up to 56%, and this is expected to increase, causing more large scale, intense rainfall events (Almazroui, 2020).

CLIMATE-INDUCED HAZARDS

Flooding

Flash floods are caused by slow-moving weather patterns (convective systems) that generate intense rainfall over a poorly-drained area in a short space of time (less than six hours). As outlined above, KSA is observing a trend of more intense rainfall which leads to more extreme flooding.

In August of 2023, the Mecca neighbourhood of al-Kakiyyah recorded 45 millimetres of rain within 24 hours, causing large scale flooding (Al Jazeera, 2023). A total of 11 extensive flash floods have occurred in KSA since 1985.

In Tabuk in particular, rapid population growth, urbanization, the transformation of vast areas of sandy desert into impervious, paved landscapes, alongside the lack of adequate drainage systems have exacerbated the city's vulnerability to flash-floods (Alsubeai and Burckhard, 2021).

Floods are observed to be the most significant key natural hazard for the period of 1980 – 2020.

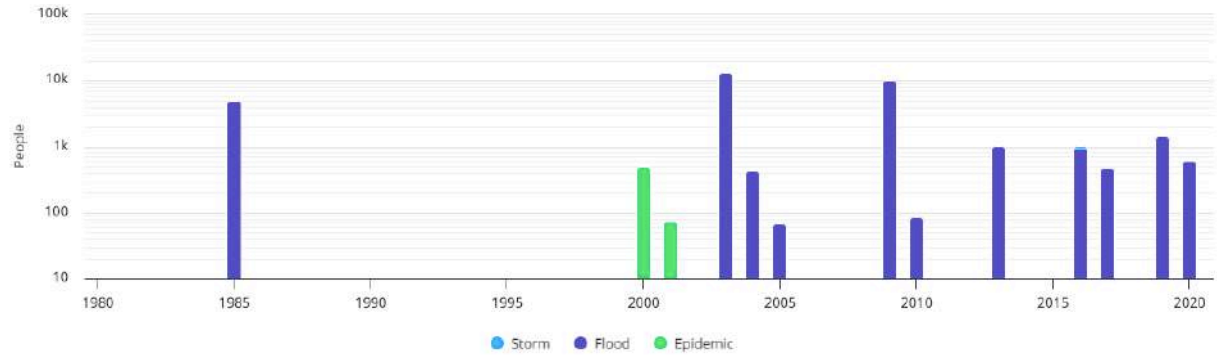

Figure 4-6 Number of People Affected by Key Natural Hazards in KSA 1980 – 2020

Source: Climate Change Knowledge Portal (2023).

Sea Level Rise

Saudi Arabia has 2,320 km of coastline. Rising sea levels, coastal erosion, and changing storm patterns could see 210,000 people in KSA exposed to devastating floods by 2050 if it follows a high carbon pathway (G20 Climate Risk, 2021). Along the western side of KSA, projections indicate that up to 187.1m of land retreat might be seen due to the rising Red Sea, and in the eastern side, up to 148.6 m might be lost to the Arabian Gulf (Luijendijk et al., 2022). Following a low carbon pathway and investing in climate-resilient coastal infrastructure will help Saudi Arabia avoid the worst coastal impacts (G20 Climate Risk, 2021).

The Project site is over 555 km from the nearest coastline therefore will not be affected by sea level rise.

Landslide

Think Hazard (2023) have classified the risk of landslides in KSA as 'Medium'. KSA's rainy season of March and April increases the risks of landslides throughout the country. Landslides are one of the biggest environmental risks to the northwest of KSA (Kahal et al., 2021), and are common in the west and southwest (Youssef et al., 2022).

Heat Waves and Drought

Over the past four decades, the mean annual temperature in Saudi Arabia has risen at a rate that is 50% higher than that of the remaining landmass of the Northern Hemisphere. KSA's mean temperature increased by 2.18°C between 1979 and 2019, which is threefold the global average. This trend has been paralleled by an increase in humidity.

The total duration of heat waves in a year (prolonged periods of maximum temperature records) is growing exponentially in most of the big cities in Saudi Arabia (Odnoletkova & Patzek, 2021). Such heatwaves are the most significant weather-related cause of mortality in the world (Gronlund et al., 2018).

The increase in temperatures will also cause an increase in distribution of vector organisms such as malarial mosquitoes, and therefore the transmission of numerous vector-borne diseases like malaria and dengue fever (McMichael et al. 2003).

Alongside heat waves, the rising temperatures are inducing more drought periods. KSA lies in a region of great water stress, and "*is highly vulnerable to recurring droughts*" (Syed et al., 2022). Eight drought years (1990, 2003, 2007, 2008, 2009, 2011, 2012 and 2017) are identified by Syed et al. (2002), the most extreme being 2007, and the longest period being from 2007 to 2012 when approximately 70% of KSA land area was under drought conditions (ibid.)

It is predicted that in KSA climate change will cause decreased regular national rainfall patterns and increased evaporation rates. More extensive dry periods are expected that will result in further depletion of groundwater reserves, and the worsening of water scarcity (Dargin, 2023).

Water Scarcity

Water scarcity is a key challenge in KSA which depends heavily on desalinated water. According to the US - Saudi Business Council (2021), KSA is the largest country in the world without running surface water, but if has the third-highest per capita freshwater consumption in the world (2022), at over 8 million m^3/day, forecast to reach 12.3 million m^3/day by 2040.

As per the World Future Energy Summit, the Ministry of Environment, Water and Agriculture (MEWA) announced the launch of the Qatrah program in 2019 to rationalise water consumption and address the overuse and waste of water resources (WaterWorld, 2019). The mission of the program is to reduce 24% of the country's daily per capita consumption rate by 2022 and 43% by 2030.

Dust Storms

Dust storms refer to extensive dust dispersion events caused by strong winds that raise dust and sand from deserts and surrounding areas and carry it over large distances. KSA is situated on the Arabian Peninsula, the world's largest source of dust. Together with North Africa, these two regions account for 70% of global dust emissions (Ginoux et al., 2012). Most dust storms are found in the east of KSA, which experiences between 10 and 60 per annum (Albugami et al., 2019).

The increasing temperatures and prolonged dry periods can increase the severity or frequency of dusty days and hence the risk of dust storms. This may include increased wind velocity over current speeds.

Forest Fires

With warmer temperatures and drier climates, the risk of forest fires is increasing throughout KSA, particularly in the southern regions with more vegetation, where the risk is rated as 'high' by Think Hazard (2023). The Project site contains no forested areas, therefore forest fires are not a Project concern.

Erosion and Desertification

It is believed that between 70 and 90 percent of the Arabian Peninsula is under threat of desertification. This desertification is leading to greater levels of erosion in KSA due to the dry, windy conditions, resulting in reduced land productivity and increased unwanted sedimentation (Ejaz et al., 2023).

4.4 Project Vulnerability

In line with EP 2 and IFC PS 2, this CCRA will assess the potentially adverse impacts of climate change risks to the Project, specifically. The potential impacts have been categorised according to the 'Climate Physical Risk and Climate Transition Risk' categories of the TCFD, as required by IFC PS 2.

The acute and chronic climate-related hazards are defined following the major hazard groups as defined in EU Taxonomy[1]. The Equator Principles Guidance Note on Climate Change Risk Assessment[2] states that these hazards should "*be taken into account as a minimum in the climate risk and vulnerability assessment*". These hazards have been scoped for national risk (See Appendix C) based to the desktop review of baseline data in Section 4.3, but not explicitly for the Project itself. The risks that are found to be relevant to KSA are assessed for Project relevance and vulnerability, and are discussed below. Additional risks to those from the EU Taxonomy have been added to the Project vulnerability assessment below based on the findings of the national baseline study.

4.4.1 Climate Physical Risk

ACUTE PHYSICAL RISK

Extreme Heat Events

The Project province of Al Qassim is rated as medium risk of extreme heat events (Think Hazard, 2023). If these events occur, Project workers' health and safety may be at risk, particularly if safety

[1] https://finance.ec.europa.eu/system/files/2020-03/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf
[2] https://equator-principles.com/app/uploads/Guidance-CCRA_May-2023.pdf

measures are not integrated for their protection when working outdoor in heat. The Project site is open, with no natural shade, so extreme heat events could have severe effects.

It is reported that solar panel efficiency is reduced during high heats by 0.3% to 0.5% for every degree above 25 °C (Ecoflow, 2023), so extreme heat events will impair the electricity generation capacity of the Project.

Extreme Precipitation Events

The Project is located inland in an area of the country that experiences relatively stable weather patterns. The province of Al Qassim which the Project is located in receives moderate levels of rainfall at 185 mm average per annum between 1991 and 2020 (Climate Change Knowledge Portal, 2021). Extreme precipitation events are not expected to affect the Project.

Drought and Water Scarcity

No water sources are available onsite, hence all water will be provided from a low salinity water source such as water trucks by local suppliers, and stored in large tanks onsite. The Ministry of Environment, Water, and Agriculture (MEWA) licenses the abstraction of groundwater.

During construction, water will be used for construction activity purposes as well as for consumption. During operation, water will be for consumption, and potentially for cleaning of the PV panels. The daily potable water consumption for the construction workers is estimated to be 393 m^3/d, and approximately 22.50 m^3/d for the operational workers. Operational cleaning water is estimated (for standard cleaning technologies) to be 105,000 m^3 of water per annum.

Considering the above, and from 5 Capitals' experience of working in KSA, drought and water scarcity impacts are not anticipated to pose a significant risk to the Project.

Flooding

The Project is located inland in an area of the country that experiences relatively stable weather patterns. The province of Al Qassim which the Project is located in receives moderate levels of rainfall. There are no permanent surface water bodies within the area. There are two water drainage channels on or near the site (See Section 2.2.2). They are both tributaries of the Wadi Al-Rummah (Al-Rimmah) which crosses the Al Qassim region from south-west to north-east.

One tributary passes north-south through the eastern section of the Project site, and is wide and very shallow. The other runs north-south between the two Project segments and is much narrower and is deeper. The Project site has been split specifically to avoid interaction with this wadi channel.

The hydrology study conducted for the ESIA states that Project site has a low hazard rating for flooding and the site is generally only subject to low depth and velocity expansive flooding. Therefore, it is expected that such infrequent extreme precipitation events are unlikely to affect the Project.

Over the timescale of the Project, the changing climatic patterns will not significantly change the level of the risk to flooding, therefore the current low risks are accepted throughout the Project.

Extreme Mass Movement

Although landslides and other mass movements have occurred within KSA, the Project site is mostly flat and stable. There is a 0.3 km^2 area of mounds in the south of the Project area, but this is not expected to cause any mass movement hazards and will likely be removed before the Project is built. Combined with the minimal risk of rapid water accumulation and minimal undulation across the site, there is believed to be little to no risk of mass movement events.

Wildfires

During the baseline studies it was found that wildfires do occur within KSA, and that KSA had launched a project aimed to prevent them. In the context of the Project site however, there is no risk of large-scale wildfires as there is minimal vegetation or flammable natural material on the site, which is predominantly sand and gravel.

Dust and Sandstorms

In the event of warmer temperatures and any prolonged dry periods (i.e., during the summer), this could potentially result in the increase in the severity or frequency of dusty days, and dust or sandstorms. Severe dust or sandstorms can affect the workers' health if mitigation measures are not put into place. Furthermore, the PV panels may require more regular cleaning, and depending on the method used for cleaning, this may require an increase in water consumption.

CHRONIC PHYSICAL RISK

Mean Temperature Change

Temperature rise is a national issue for KSA, suggesting that average temperatures could rise by as much as another 16% by 2100. The Project could have 600 workers at the peak construction period, the majority of which are expected will have to work outdoors. During the operation phase, it is expected there will be between 20 & 30 workers, some of which will also be working outdoors. Working outdoors in high temperatures for extended periods is dangerous to the health and wellbeing of the workers. It is expected that the number of these staff working outdoors will be limited where possible and the Project will incorporate resting periods during peak seasons.

The increase in temperature due to climate change will not be observed during the timescale of the Project, therefore the current risks are accepted throughout the Project.

Sea Level Rise

Although sea level rise is a risk to the coastal communities of KSA, the Project it situated over 555 km from the nearest coastline, therefore no impacts will occur to the Project.

Erosion

The Project is in a predominantly flat, dry, sandy area. Although extreme wind events are not expected, it is expected that every day winds will frequently move material around, off, or on to the Project site. Material might be removed in sections, exposing sub material, or it may gather up against the PV installation footings.

4.4.2 Climate Transitional Risk

As the Project is a Solar PV project and is aligned with wider strategies for a transition to a lower carbon economy (such as those in line with Saudi Vision 2030), there are not expected to be any climate transitional risks related to future low carbon economies (policy, regulations etc.), or future public perceptions of the Project that are considered risks at this stage.

4.5 Project Effects

4.5.1 Construction Phase

EMISSION GENERATION

For projects producing in excess of 25,000 tonnes $CO_{2\text{-eq}}$ per annum, PS3 states a requirement for the client to quantify scope 1 and 2 emissions. PS 1 further states that the clients "*risks and impacts identification process will consider the emissions of greenhouse gases*".

The stationary combustion sources used during the construction phase of the Project will primarily relate to temporary diesel generators, which will be located around the site in the EPC Contractor and sub-contractors administration & office areas.

Based on a factor of the Project size in comparison to the Shuaibah PV Project that is also under development by ACWA Power, it is estimated that diesel generators will consume approximately 7,890 L of diesel per month.

Using the GHG Protocol calculation tool for GHG Emissions from Stationary Combustion (World Resources Institute, 2015), the GHG emissions during construction were calculated and are summarised in the table below.

Table 4-1 Generators-GHG Emissions During Construction of the Project

Fuel Type	Volume of Fuel (L/ Month)	GHG Emissions (tonnes/month)			Total GHG (tonnes $CO_{2\text{-eq}}$ /year) *
		CO_2	CH_4	N_2O	
Liquid Fossil (Diesel)	7,890	21.133	8.55776e-4	1.711552e-4	21.134
Total GHG emissions from fossil fuels (tonnes $CO_{2\text{-eq}}$)					**21.134**
*If/when the generators are operational					

Mobile Source - Fuel Combustion

The construction phase of the Project will necessitate an amount of mobile equipment/plant and vehicles to facilitate works. Equipment such as excavators, rollers, cranes, pneumatic compressors, and other vehicles will be ample on the site, and are expected to be used in most construction processes. Such equipment will be fuelled by either diesel or unleaded petrol. Given the early stages of the Project's development, the expected quantity of fuel to be consumed during construction by the appointed EPC has not yet been confirmed. The expected fuel quantity will depend on the number of mobile equipment, hours of operation, and efficiency of machinery. Therefore, the potential GHGs have not been calculated for the mobile equipment/plant and vehicles.

Loss of Carbon Sinks

The Project is located in an open area with limited vegetative ground cover and a lack of voluminous biomass that would present stores for carbon. The construction phase may result in the removal of ground cover vegetation but due to the limited volumes, this is not expected to result in significant loses of carbon storage.

4.5.2 Operational Phase

GHG Abatement

As a renewable energy project, there is essentially a neutral operational impact on GHGs when the project is generating, as the Project will not combust fossil fuels, other than for the potential running of generators for required operational functionality tests. A key benefit of the Project is the resulting lowering of the carbon intensity of the grid produced electricity in KSA.

It is possible to make a comparison of GHGs mitigated against a grid factor for GHG emissions in KSA. The GHG emissions avoided over the operational phase have been calculated below.

The table below shows estimated $CO_{2\text{-eq}}$ that will be avoided per year for Ar Rass 2, compared with typical grid generation emissions. This is based on the KSA default grid factor of 650 gCO_2/KWh from the International Financial Institution Dataset for Intermittent renewable energy sources, i.e., solar and wind (International Financial Institution, 2019).

Table 4-2 Estimated CO_2 Emissions Mitigated in Tonnes per Year for Ar Rass 2

YEAR	PROJECT ELECTRICAL GENERATION (MWH)	RELATIVE NET EMISSIONS SAVING ($tCO_{2\text{-}EQ}$ /YEAR)
1	5,592,508	3,635,130.20
2	5,580,592	3,627,384.80
3	5,568,528	3,619,543.20
4	5,556,316	3,611,605.40
5	5,543,963	3,603,575.95
6	5,531,469	3,595,454.85
7	5,518,816	3,587,230.40
8	5,506,028	3,578,918.20
9	5,493,114	3,570,524.10
10	5,480,060	3,562,039.00
11	5,466,901	3,553,485.65
12	5,453,611	3,544,847.15
13	5,440,232	3,536,150.80
14	5,426,779	3,527,406.35
15	5,413,247	3,518,610.55
16	5,399,671	3,509,786.15
17	5,386,035	3,500,922.75
18	5,372,347	3,492,025.55
19	5,358,652	3,483,123.80
20	5,344,934	3,474,207.10
21	5,331,201	3,465,280.65
22	5,317,457	3,456,347.05
23	5,303,703	3,447,406.95
24	5,289,939	3,438,460.35
25	5,276,155	3,429,500.75
26	5,262,358	3,420,532.70
27	5,248,555	3,411,560.75
28	5,234,740	3,402,581.00
29	5,220,194	3,393,126.10
30	5,199,300	3,379,545.00
31	5,184,638	3,370,014.70
32	5,170,798	3,361,018.70
33	5,156,957	3,352,022.05
34	5,143,112	3,343,022.80
35	5,129,264	3,334,021.60

Based on assessment of available data, it is estimated that the PV plant will result in an average reduction of around 3.49 million tonnes of CO_2 equivalent per annum when compared to conventional grid energy source.

GHG Emission - Grid Electricity Usage

Although being a renewable energy project, the generation of solar power is intermittent and restricted to daylight hours only. As such the Project will draw power from the grid during the night to provide electricity for lighting, security purposes, (e.g., security systems, CCTV etc.) and any site office, workshop or other requirements being undertaken at night.

Given that it is only expected that security staff will be present at night and there are no operational processes that will require large quantities of power to be drawn from the KSA grid, the amount of power usage is expected to be 13,530 KWh/month. This value is based on a factor of the Project size in comparison to the Shuaibah PV Project that is also under development by ACWA Power.

According to Climate Transparency (2020), the energy sector in KSA generates 703 gCO2/kWh. Based on an estimated 13,530 KWh monthly electricity consumption, a total of 114.13 tons of $CO_{2\text{-}eq}$ are expected to be generated annually.

Emergency Diesel Generator - Fuel Combustion

The Project has emergency diesel generators that will be located on-site. These generators are not expected to be used except during grid blackout conditions where the generator would provide an amount of power load to enable the safe operation of the plant in such circumstances. It is estimated that each generator is to be used for a maximum of 36 hours per contract year.

Based on a factor of the Project size in comparison to the Shuaibah PV Project that is also under development by ACWA Power, it is estimated that 3,000 L of fuel will be required annually (which includes regular functionality testing) for each generator. Using the Greenhouse Gas Protocol calculation tool for GHG Emissions from Stationary Combustion (Greenhouse Gas Protocol, 2015), the GHG emissions during operation were calculated and are summarised in the table below.

Table 4-3 Generator-GHG Emissions During Operation of the Project – Per Generator

Fuel Type	Volume of Fuel (L/year)	GHG Emissions (tonnes/year)			Total GHG (tonnes $CO_{2\text{-}eq}$ /year)
		CO_2	CH_4	N_2O	
Liquid Fossil (Diesel)	3,000	8.051	3.259168e-4	3.472736e-5	8.051
Total GHG emissions from fossil fuels (tonnes $CO_{2\text{-}eq}$)					**8.051**

Mobile Source - Fuel Combustion

Mobile source GHG emissions during operations will only relate to the few vehicles being used on-site for O&M purposes and for the commuting of the small number of staff who will be required to operate the Project. The Project does not require key supply chains during operation (i.e., regular deliveries or removals) and is not expected to require significant maintenance. As the Project size

is similar to the Shuaibah PV Project that is also under development by ACWA Power, it is estimated that four vehicles would also be required, using 600 L/year. Using the Greenhouse Gas Protocol calculation tool for GHG Emissions from Mobile Combustion (Greenhouse Gas Protocol, 2015), the GHG emissions from vehicles during operation were estimated at 1.363 tonnes $CO_{2\text{-eq}}$/year.

USE OF OZONE DEPLETING SUBSTANCES (ODS)

Sulphur hexafluoride (SF_6) is to be used in high voltage electrical equipment as the insulating gas, as part of the gas insulated switchgear, and associated facility of the main PV project. There may be some leakage from the gas insulated switchgear, or where mishandled. Under normal operational conditions leakage should not occur.

REFRIGERANTS

Trace amounts of refrigerants will be used in chiller packages were needed on-site for air conditioning, refrigerators etc. Where applicable, the requirements of the Montreal Protocol are applicable concerning applicable ODS. Any leakage of refrigerants would be negligible.

4.5.3 Decommissioning Phase

WASTE

End-of-life management requirements for PV panels still largely falls under the general waste classification rather than dedicated to PV. Resource Media (2023) have estimated that solar panel waste is set to increase by more than 4000 per cent in the next decade. The International Renewable Energy Agency (IRENA) (2022) have further estimated that cumulative waste from PV plant decommissioning will increase from 0.2 Mt (megatonnes[3]) in 2021 to 4 Mt by 2030, 50 Mt by 2040, and more than 200 Mt by 2050 (See figure below).

[3] Millions of tonnes

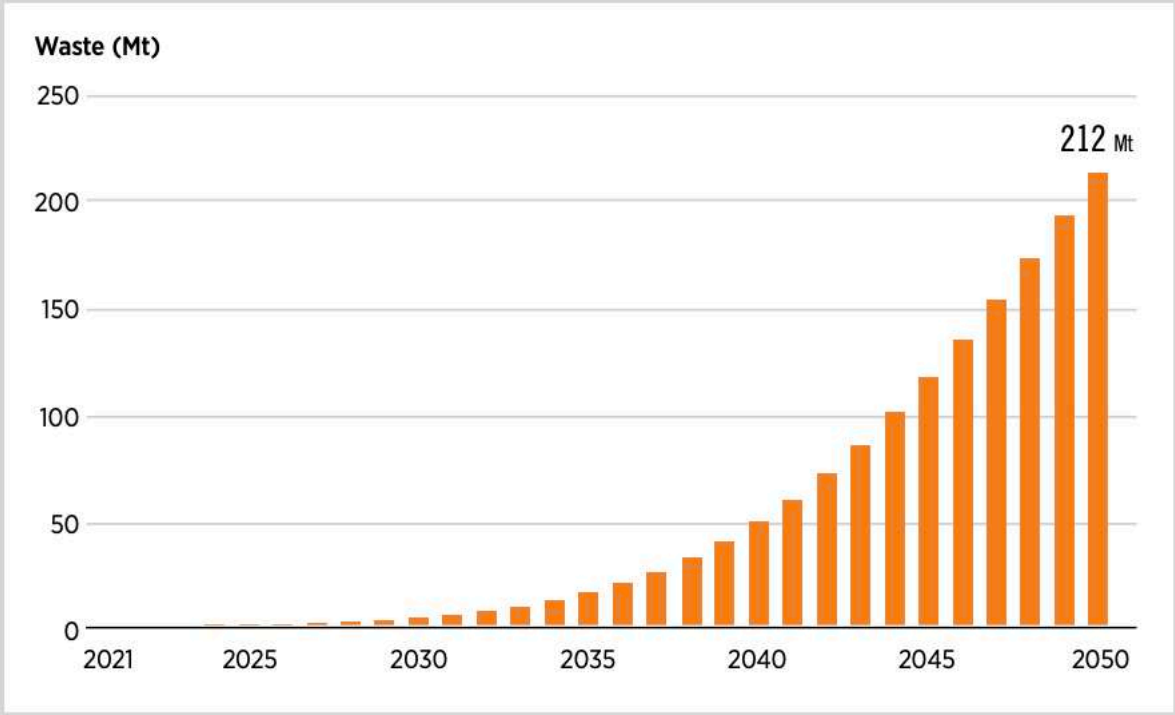

Figure 4-7 Projected Cumulative Waste from Solar Photovoltaic Projects

Source: IRENA (2022).

A country specific breakdown was presented by IRENA and IEA (2016), which specifies that even without 'early loss' waste, Saudi Arabia will have 450,000 tonnes of solar PV waste by 2050.

Table 4-4 Modelled results of cumulative waste volumes of end-of-life PV panels for KSA, in tonnes (IRENA & IEA, 2016)

YEAR	2020	2030	2040	2050
End-of-life waste PV panels in tonnes (no early losses)	300	3,500	70,000	450,000

IRENA (2022) believes that by unlocking the full potential of a circular economy, solar PV panel waste can be restored, reused, and recycled, saving more than 17.7 Mt of raw materials from waste by 2050, generating a value of 8.8 billion US dollars.

The Project will be using polycrystalline solar panels, which contain approximately 0.5 kg of silicon (Sah et al., 2023). Silicon wafer manufacturing is energy intensive, and producing 1 kg of wafer requires up to approximately 440 kWh of power. The Project is estimated to incorporate 9,088,974 solar modules, resulting in a totally energy consumption of nearly 2 billion kWh for the production of the silicon alone.

It should be noted that over the lifespan of solar panels, the green energy produced does outweigh the energy consumption used for their manufacturing, when sourced responsibly. The PPA term of this Project is 35 years.

At the end of this time the site will be decommissioned, and the materials will need to be removed. These materials, if not restored, reused, or recycled, will add to the cumulative waste issue, and

not aid in deterring the generation of more solar PV panels, which is energy intensive and adds to the effects of global warming.

4.6 Transboundary Effects

PS 1 states that the clients "*risks and impacts identification process will consider […] potential transboundary effects.*"

Transboundary climate risks are those risks induced by climate change that cross national borders. These effects are not relevant to the Project so have not been assessed for their risk.

Further, this Project is part of a renewable energy program that is going to provide green energy, therefore diminishing cumulative transboundary effects.

4.7 Lower GHG Alternatives

For projects with combined scope 1 & 2 GHG emissions of over 100,000 tonnes $CO_{2\text{-eq}}$ per annum, Principle 2 states requirements for analysis of alternatives which evaluates low GHG intense alternatives. Based on the above information, this Project is not going to exceed this value per annum. However, for information purposes only, lower GHG alternatives have been mentioned below.

4.7.1 No-Project Alternative

This alternative option is not feasible, as it would lead to loss of investment and expected employment, as well as green power generation.

It is part of a National Renewable Energy Program in KSA that will generate approximately 7,006 GWh per year, and the environmental benefits outweigh the negative impacts.

Hence, carrying out the proposed Project can importantly have high positive impacts to the country. The "no-project" alternative means the loss of opportunity for development, and opportunity to focus power resources in Saudi Arabia.

4.7.2 Mounting System

A principal piece of the infrastructure of the Project is the mounting system for the PV panels. There are two options for the mounting system; a fixed tilt mounted system that does not tilt but is fitted at an optimal angle, and a single-axis tracking system that is aligned north-south and tilts on an axis between ±60° to follow the sun. For the same rated capacity, the annual generation of the single-axis tracking system is said to generate 20% more electricity on average. For the above reasons, the single-axis mounted system has been chosen for the Project.

4.7.3 Panel Cleaning System

As discussed previously, the Project area environment is dry, sandy, and dusty. The dust will become accumulated on the panels' facings, blocking the incident light from the sun, and consequently reducing the panel's electricity generating capacity.

Two main systems for cleaning these panels of the dust have been considered. The first is a fully-automated cleaning rig which has a very low consumption of water and requires minimal labour input. The second is a semi-automated option that will consist of a truck or tractor configuration and will combine high-pressure water and spinning brushes. The fully-automated, more resource efficient system would be recommended for this project. The option to be used will be determined prior to the initiation of the Project.

4.7.4 Solar Panel Type

There were different types of solar panels for Project selection, namely silicon based (Polycrystalline), and thin film. Thin film panels are the cheapest but have the lowest efficiency rating. Polycrystalline panels are more expensive, however are more durable, and have a 20% efficiency compared to thin film panels' 10%, therefore the life of the Project will be more environmentally friendly. For the proposed Project, polycrystalline solar panels are selected.

4.8 Mitigation Measures

4.8.1 Resource Efficiency

The following measures can be implemented in subsequent stages of project planning to minimise GHG emissions over the course of the Project's lifetime:

The Project should implement comprehensive resource efficiency measures to reduce scope 1 and scope 2 GHG emissions during the Project's construction and operational phases. These measures generally include, but are not limited to the following:

- The procurement of equipment for the Project's construction and operational phases that give priority consideration to power efficiency, durability, and water conservation;
- During construction and operation, energy conservation measures for electricity-powered equipment should be promoted, and power consumption should be monitored. Economical use of fuel-powered equipment should be encouraged and monitored on the same basis; and
- During construction, resource efficiency in relation to construction materials should be promoted and monitored in the same manner.

4.8.2 Extreme Heat

The following mitigation measures shall be implemented to mitigate against heat-related medical conditions, for operational labour:

- Workers assigned to operations outside of the buildings and shaded areas will be provided with appropriate PPE (e.g., sun hats and cooling vests).
- Shaded resting areas (ideally with air conditioning) and adequate access to potable water will be provided for workers stationed outside of the Plant's buildings (e.g., guard houses).
- Work locations (and duration, to the extent possible) will be restricted during periods of extreme heat to lessen the risk of heat-related health effects. Maintenance work within high-temperature units will be avoided during days with inordinately high temperatures.
- Staff rooms on the plant's premises will be equipped with HVAC or fans to enable operations at workstations during periods of extreme heat.

4.8.3 Dust

To effectively manage dust-related issues in the context of climate change, it's recommended to maintain diligent visual and secondary monitoring (i.e., weather station reports or other publicly available sources) of dust levels, and ensure outdoor staff are not exposed to hazardous dust levels.

4.8.4 Water Availability

Although not identified as a significant risk to this Project, to reduce impacts on water resources, a water management plan/programme could be implemented to include the following:

- Installing smart water management systems (faucets with sensors, water meters, leakage detection systems etc.);
- Monitoring water consumption;
- Conducting regular maintenance of faucets, plumbing, water tanks etc.; and
- Raising awareness on water conservation among workers.

5 CUMULATIVE IMPACTS ASSESSMENT

Cumulative impacts are defined as those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. For any given project, a Cumulative Impact Assessment (CIA) serves to identify resultant environmental and social impacts that can synergize with equivalent impacts of proximate developments, and with natural stressors, such as climate change.

As such, the CIA process primarily consists of the following two aspects:

- Identification and characterisation of potential impacts that can be expected to ensue from the project activities, other developments, and environmental drivers within the temporal and special boundaries of the project in focus; and
- Development of actionable measures for effective prevention, mitigation, and alleviation of negative cumulative impacts and risks, and enhancement initiatives for any positive cumulative impacts.

5.1 Objectives of the Cumulative Impact Assessment

The objectives and outcomes of the CIA study for the Project are as follows:

- Identification of Project components, coincident developments, and natural/ unplanned dynamics that bare mutual E&S impacts, which may arise and/or intensify within the Project's lifetime and influence areas;
- Identification of Vulnerable Environmental Components (VECs) that are subject to E&S impacts brought on by the Project in synergy with external drivers;
- Overview of the current state of the VECs identified, with a focus on baseline attributes of particular relevance to the Project;
- A description and assessment of cumulative E&S impacts foreseen to affect established VECs, relative to baseline conditions, legal requirements, and internationally recognised benchmarks;
- Recommendation of effective mitigation measures to prevent, abate, and/or alleviate negative E&S impacts, alongside enhancement actions to reinforce anticipated Project benefits; and
- Development of a management and monitoring plan with a specific focus on the Project's E&S impacts, which should set out the timing, monitoring indicators, and responsible implementing parties for consistent impact management and performance evaluation in relation to established indicators and targets.

5.2 Identification of Concurrent Developments and Environmental Drivers

For the purpose of this CIA, and considering a worst-case scenario, it has been assumed that the construction phase of the Ar Rass 2 Project and the below mentioned activities occur concurrently. However, as the Ar Rass 1 Project is currently under construction, the impacts from the Ar Rass 1 PV Project during its construction phase will partially overlap with the construction phase of the Ar Rass 2 PV Project.

Table 5-1 Activities and Developments Included in CIA

Projects/ Environmental Stressors	Description	Status
Ar Rass 1 PV Project	This project is located adjacent to the Ar Rass 2 PV Project on the northwest side of the project.	Under Construction
Ar Rass 2 PV Project	Planned Project	Design Phase
SEC Sub-station (Associated Facilities)	The Ar Rass 2 PV Project will be connected to adjacent SEC substation.	Under Construction
Overhead transmission line (OHTL) (Associated Facilities)	380 kV overhead transmission line from the SS to the existing 380 kV lines	Existing

5.3 Identification of Valued Environmental Components

The impacts on the main VECs that have been considered for the purpose of this CIA during construction and operation are:

- **Air Quality** – due to the arid nature of the site and surrounding areas there are potential cumulative air quality impacts (particularly with regards to particulate matter) should the construction phases of the projects overlap;
- **Noise** – concurrent construction activities have the potential to result in elevated noise levels across the wider area. Noise levels will be elevated because of construction activities and construction vehicles;
- **Ecology** – Cumulative land take for PV projects resulting in habitat loss and fragmentation. Further, the erection and presence of numerous transmission lines has the potential to result in cumulative impacts to ecology, primarily avifauna, who are at risk of electrocution and collision with transmission lines;
- **Grazing Land** - Cumulative land take for PV projects resulting in loss of grazing land;
- **Landscape/Visual Amenity** – Largescale cumulative impacts on landscape character from the PV projects;
- **Waste Utilities** – Additional pressure on available waste services and utilities due to the large-scale construction projects;

- **Socio-economics** – Employment and other business benefits and opportunities; and
- **Traffic and Road Infrastructure** – Cumulative impacts during construction of multiple projects in the same area.

5.4 Assessment of Cumulative Impacts on VECs

Project activities set for the construction and operational phases were overlaid with respect to the biophysical and socioeconomic context within the Project area to identify interfaces and potential impacts that could grow in magnitude as a result of commonalities amongst the Project components and other local developments (identified above). Potential cumulative impacts derived from this analysis are itemised in correspondence to their respective VECs for the Project's construction and operation phases, in the following table.

Table 5-2 Assessment of Cumulative Impacts on VECs

Valued Environmental Components	Impact-Generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
Air Quality	1. Ar Rass 1 PV Project (under construction) 2. Ar Rass 2 PV Project (the Project) (planned) 3. SEC Sub-station (under construction)	As a worst-case scenario it has been assumed that the construction periods of all the developments will coincide to an extent. Local ambient air quality will be potentially affected by increased dust during site clearance, and earthworks as well as by gaseous emissions from the exhaust of construction vehicles, equipment, and temporary power generators. With the adoption of typical and common management practices (mitigation measures) outlined in the ESIA Report, the cumulative impacts are anticipated to have only minor significance. This is mainly attributed to the remote location of the site, which has limited external sensitive receptors.	None expected
Noise	1. Ar Rass 1 PV Project (under construction) 2. Ar Rass 2 PV Project (the Project) (planned) 3. SEC Sub-station (under construction)	As a worst-case scenario it has been assumed that the construction periods of all the developments will coincide to an extent. Construction activities will result in temporary and short duration increases in the noise and vibration levels emanating from construction site noise and construction vehicle noise. With coinciding construction activities there is the potential for cumulative noise impacts.	None expected

Valued Environmental Components	Impact-Generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
		With the adoption of typical and common management practices (mitigation measures) outlined in the ESIA Report, the cumulative impacts are anticipated to have only minor significance. This is mainly attributed to the remote location of the site, which has limited external sensitive receptors.	
Ecology	1. Ar Rass 1 PV Project (Currently under construction phase) 2. Ar Rass 2 PV Project (the Project) (planned) 3. SEC Sub-station 4. OHTL (existing)	Project land take is gradually reducing the available land in the Project area. This notably includes the on-going Ar Rass 1 PV construction. Assuming habitats were the same at the Ar Rass 1 site as for Ar Rass 2, there is limited vegetation volume loss over the area. There will however be a loss of vegetation from these areas. Areas of gravel plain that comprise the majority of the sites would be largely unaffected as limited construction works will be required that affect the morphology and topography of such habitats.	The erection and presence of transmission lines has the potential to result in cumulative impacts to ecology, primarily to avifauna which are at risk of collision and electrocution impacts. It is however noted that both site visit to the Project area conducted in January 2019 for ESIA, and the 2023 ESIA Addendum site visit did not observe abundant or diverse avifauna at the site. With GIIP for OHTL mitigation (e.g., design to reduce bird electrocution and collisions) it is expected that potential cumulative impacts will be further reduced.
Grazing Land	1. Ar Rass 1 PV Project (under construction) 2. Ar Rass 2 PV Project (the Project) (planned) 3. SEC Sub-station (under construction)	Project land take is gradually reducing the available land in the Project area. This notably includes the on-going Ar Rass 1 PV construction, as well as Ar Rass 2 PV. There are potentially herders locally who use land for grazing of camels. Although the quality of grazing land is limited, on-going development is further reducing available land in this area, which would require the herders to move to other areas. Overall, the availability of land is ample, and the consultation with the local herder identified areas that would be suitable for herders to move to.	

Valued Environmental Components	Impact-Generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
Landscape/visual amenity	1. Ar Rass 1 PV Project (Currently under construction phase) 2. Ar Rass 2 PV Project (the Project) (planned) 3. SEC Sub-station 4. OHTL (existing)	Through construction and sustained during operations, the land in the project area will change from a barren desert landscape to one of a more industrialized character. In particular the extensive installation of dark colored PV modules for Ar Rass PV 1 & 2 projects will make a significant change to the visual amenity (especially if viewed from above), due to the change in surface coloration. There are few receptors locally that will be affected by visual amenity, however, due to the projects listed, views across the largely flat land will be reduced due to the installation of fences, and tracker foundations, PV modules, and other structures. Lighting from the projects, although expected to be limited to certain areas (e.g., security entrances and control buildings) will likely be evident at distance, although this is not expected to result in light spill outside of the project areas. The new OHTL also presents a vertical intrusion to a landscape that did not include this previously.	
Waste utilities	1. Ar Rass 1 PV Project (Currently under construction phase) 2. Ar Rass 2 PV Project (the Project) (planned) 3. SEC Sub-station 4. OHTL (existing)	The construction phase of the project will overlap with the concurrent construction of the Ar Rass 1 PV Project and SEC substation, which is located adjacent to the project site. The generation of liquid, solid, and hazardous waste by the project could potentially impose additional demands on the existing waste management facilities in the Ar Rass region.	None expected
Socio-economics	1. Ar Rass 1 PV Project (Currently under construction phase) 2. Ar Rass 2 PV Project (the Project) (planned) 3. SEC Sub-station 4. OHTL (existing)	The outset and progress of construction on the Ar Rass PV Project will create income-generating opportunities for skilled labour, and semi-skilled labour and various enterprises in Ar Rass Region. Employed locals will also benefit from capacity enhancement and transferable skills, which will boost employability. In the absence of proper management, the influx of workers for Ar Rass PV projects may potentially result in adverse impacts. These	The main socio-economic advantage of the Project (including the Ar Rass PV 1, substation and OHTL) is the benefit of grid stability for economic purposes. The Projects will also create some (but limited) new employment opportunities in the operations phase.

Valued Environmental Components	Impact-Generating Projects	Cumulative Impacts	
		Construction Phase	Operation Phase
		impacts are associated with the risk of social conflict due to different cultures, increased demand and pressure on public infrastructures, facilities and recourses, increased risk of communicable diseases or local inflation of prices.	
Traffic and road infrastructure	1. Ar Rass 1 PV Project (Currently under construction phase) 2. Ar Rass 2 PV Project (the Project) (planned) 3. SEC Sub-station 4. OHTL (existing)	It is anticipated that there will be a period when construction activities for the Ar Rass PV Projects will overlap, and shared routes may be used for transporting construction personnel, materials, and equipment. Given the collective magnitude of these construction operations, an increase in transportation activity can be expected. During periods of significant construction-related traffic, there is the potential for road congestion in specific areas or placing physical stress on the existing road infrastructure.	None expected

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APPENDIX A – QUESTIONNAIRE RESPONSES

QUESTIONNAIRE RESPONSE 1

AR RASS-02 PV IPPs, KSA
HERDERS STANKEHOLDER ENGAGEMENT

On September 26th, 2023, 5Capital representative along with PC & EPC HSSE team conducted site survey of AR Rass-2 project areas. During site visit, we observed one herder (Muhammad) which was present outside of project boundary (near South-East corner). Introduction of the project was given to him, and timeline of the project were explained along with the positive impact of the project. Kindly refer below table for his response.

Annex - Targeted Consultation Questions

ID	QUESTION
Targeted Stakeholder Group	**Herders and community leaders**
1.	Have you used the land at the Project site in the past and what purpose did you use the land for? (Grazing, camping, transportation route, watermelon cultivation etc.) **Herder response: Herding and transportation route**
2.	Do you obtain any services from the Project site (such as firewood, water, crops, or any cultural or spiritual benefits?) **Herder response: No**
3.	How long did you/the community use the project site? **Herder response: Three months**
4.	Was the land at the project site used seasonal or all year round? If it was seasonal, which months was the land used? **Herder response: winter & summer season**
5.	Did you have any formal or informal agreement/contract to access or use the project site? If so, who was this agreement with? **Herder response: We don't have any agreement with anyone**
6.	If the land was grazed, what type of herds and approximately how many livestock did you graze on the project site? - Camels - Goats - Sheep - Other etc **Herder response: Around 25 camels**
7.	Do you own the livestock or are you employed to graze them? If owned, do you employ any workers to assist you and are they on a formal working contracts? **Herder response: I am employed to graze them**
8.	If the person is employed to graze the herds, please specify - Who owns the livestock you graze? **Herder response: My owner** - How much do you receive for grazing cattle? **Herder response: Did not disclose** - Do you have an agreement with your employer? **Herder response: I am on Qafeel sponsorship.**
9.	How and when were you notified about the project development and that you could no longer use the site? **Herder response: same day 26-Sep-2023, we will shift our temporary shelter 02 kilo meter away from project boundary south side.**
10.	Who informed you? **Herder response: Project Company employee**
11.	Do you have access to alternative land for grazing in the area close to your communities? **Herder response: Yes, South and east site of the same area**

AR RASS-02 Herder consultation report 1

12.	Did you own any camps/structures on the project site? If yes, were you able to relocate them to a new site? **Herder response: No, we don't have any camps**
13.	Who owns this land and what are the terms of use (formal or informal agreements)? **Herder response: I don't have any idea**
14.	Were you provided with any support to move from the project site? If yes, what type of support was provided? **Herder response: We can ask if need. As we are outside of project boundary and will move more toward south side.**
15.	What is your main source of income? **Herder response: Herding**
16.	What has the impact been on your livelihood as a result of relocating from the project site? **Herder response: No impact**
17.	What are your perceived impacts of the project? **Herder response: Production of electricity**

AR RASS-02 PV IPPs, KSA
HERDERS STANKEHOLDER ENGAGEMENT

شركة نوار للطاقة المتجددة
NAWWAR RENEWABLE ENERGY COMPANY

AR RASS-02 Herder consultation report 3

APPENDIX B – STAKEHOLDER ENGAGEMENT GUIDELINE

PV IPPS, KSA

STAKEHOLDER ENGAGEMENT

GUIDELINE FOR PROJECT COMPANY HSSE TEAM

STAKEHOLDER ENGAGEMENT - OVERVIEW

Stakeholder engagement can be described as the systematic method to understand and involve stakeholders and their concerns in project activities and decision-making processes. It identifies the appropriate approach to be used for consultation and information disclosure. Stakeholders include persons or groups that may be directly or indirectly affected by the project, as well as those that may have interest in the project and/or those that may influence the projects outcome either positively or negatively.

OVERARCHING REQUIREMENTS

In order to meet Equator Principles IV (Principle 5 & 6) and IFC Performance Standard (PS 1) requirements, the Project is required to conduct stakeholder engagement.

GUIDELINES

The table below provides a guideline on how the consultation process should be undertaken by the PV IPP Project Company – HSSE Team.

It is recommended that bi-lateral meetings are arranged and held with identified stakeholders. This will avoid open public events/gatherings. It can be explained that the key purpose of the consultations are:

- To share an overview of project information,
- To seek feedback on the project itself.
- To gather specific information on targeted issues.
- To seek advice on any issues in the area (or at the land) that may be of concern or that may have been overlooked.
- To advise on the availability of a third-party grievance mechanism (and how to access it).

ELEMENT	GUIDELINE
Meeting/Consultation Agenda	
Project information	Advise the stakeholder on the following: • Overarching requirement and context of the project – (i.e. in line with REPDOs targets under Vision 2030, Saudi Green Initiative, other strategy etc). • The project parties (including ACWA Power, the PC, EPC, O&M, Sub-Contractors, other relevant 3rd parties). • Project location (include maps showing the geographic location of the site, total area and project boundaries) • Summary of project components/facilities • Details and location of associated facilities (where available), such as access roads, sub-stations and locations of these. Also advise who is responsible for these works.
General overview of the project Construction	• Nature and scale of construction works, any phasing that is planned. • Expected numbers of workforce during construction and operational phases. • Location of project construction facilities such as temporary construction laydown areas, accommodation facilities etc. Timeline and schedule of construction works. • Any expectation on traffic/vehicle flows. • Any specific facilities that may only be necessary for construction (e.g. temporary access roads, batching plants etc.)
General overview of the project Operation	• General overview of day-to-day operations (such as SCADA operations, typical maintenance, cleaning etc.) • Number of O&M staff
Project Impacts	<u>Positive Impacts</u> • Example of positive impacts include employment opportunities, diversification of existing skill base, contribution to KSA renewable energy targets, and reduction on reliance on fossil fuels, benefits towards KSA international targets and commitments linked to the Paris Climate Agreement. etc. <u>Negative Impacts</u> • Example of negative impacts include i.e., dust, noise & traffic during construction, landscape change, community health & safety risks etc. • To include a summary of key mitigation and management measures the project will put in place in order to minimise the negative impacts i.e., ***Note:*** *the positive & negative impacts should match those identified in the ESIA and ESIA Addendum.*
Discussions	During the consultations, stakeholders will be given time to ask for clarifications, additional project information or raise their concerns, or give their general feedback. Where available any requested information should be provided immediately, or where not possible the PC shall revert to them at a later agreed time.
Targeted Questions and Information Gathering	
Guidance Note: *For this important part of the consultation process, please refer to the specific questions in the Annex.*	
Grievance Mechanism	

<table>
<tr><th>Element</th><th>Guideline</th></tr>
<tr><td>Implementation of the Grievance Mechanism</td><td>An important part of the engagement process is to advise that there is a third-party grievance mechanism in place and how it can be accessed.
The Project specific Stakeholder Engagement Plan (SEP) should include details of the grievance mechanism for the Project.
In order to implement it, please ensure that the SEP is completed by including the following details:
<table>
<tr><th>Company</th><th>Details</th></tr>
<tr><td>ACWA Power or Project Company
Name of contact person</td><td>Email: XX
Work: XX
Mob: XX</td></tr>
<tr><td>EPC Contractor
Name of contact person</td><td>Email: XX
Work: XX
Mob: XX</td></tr>
</table>
The grievance mechanism will need to be publicised and available at the project entrance, Project website (if any) & during the consultation meetings.
It is suggested that a handout on this is provided to the stakeholders so there is firmer evidence that this has been communicated.</td></tr>
<tr><td>Grievance Mechanism</td><td>Advise the stakeholders that the purpose of the grievance mechanism is to evaluate and address stakeholders' problems and concerns regarding project activities and impacts. During the stakeholder consultation process, the participants will be made aware of the following:
That the grievance mechanism is available to all third parties (with a separate process for all staff to also raise grievances).
How to access the grievance mechanism (i.e., name of project personnel in charge, contact details including email, phone, office location (if applicable)
Where stakeholders can file their complaints in person or anonymously (through a suggestion box outside the project entrance)
What type of response the complainants can expect to receive.
Duration of time it will take to receive a response (this should be aligned with the SEP).</td></tr>
<tr><td colspan="2">Record of Meetings/Consultations</td></tr>
<tr><td>Minutes of Meetings</td><td>Please document the proceedings of all meetings held with the different stakeholders and provide a list of participants including a signed attendance sheet where it is possible.
All feedback, queries (and the responses provided to these) must be documented.
Consultations through the phone, telecommunication channels such as Zoom, Microsoft Teams or messaging apps should also be documented.
A summary of informal consultations and general /side discussions should also be documented (in the event that formal meetings cannot be arranged).</td></tr>
<tr><td>Photographs</td><td>If permitted by the stakeholder, timestamped photographs of the meeting should be taken – as evidence of the consultation undertaken.</td></tr>
</table>

TARGETED CONSULTATION QUESTIONS

ID	QUESTION
Targeted Stakeholder Group	**Herders and community leaders**
1.	Have you used the land at the Project site in the past and what purpose did you use the land for? (Grazing, camping, transportation route, watermelon cultivation etc.)
2.	Do you obtain any services from the Project site (such as firewood, water, crops, or any cultural or spiritual benefits?)
3.	How long did you/the community use the project site?
4.	Was the land at the project site used seasonal or all year round? If it was seasonal, which months was the land used?
5.	Did you have any formal or informal agreement/contract to access or use the project site? If so, who was this agreement with?
6.	If the land was grazed, what type of herds and approximately how many livestock did you graze on the project site? - Camels - Goats - Sheep - Other etc
7.	Do you own the livestock or are you employed to graze them? If owned, do you employ any workers to assist you and are they on a formal working contracts?
8.	If the person is employed to graze the herds, please specify - Who owns the livestock you graze? - How much do you receive for grazing cattle? - Do you have an agreement with your employer?
9.	How and when were you notified about the project development and that you could no longer use the site?
10.	Who informed you?
11.	Do you have access to alternative land for grazing in the area close to your communities?
12.	Did you own any camps/structures on the project site? If yes, were you able to relocate them to a new site?
13.	Who owns this land and what are the terms of use (formal or informal agreements)?
14.	Were you provided with any support to move from the project site? If yes, what type of support was provided?
15.	What is your main source of income?
16.	What has the impact been on your livelihood as a result of relocating from the project site?
17.	What are your perceived impacts of the project?

APPENDIX C – CLIMATE CHANGE RISK SCREENING

CATEGORY		HAZARD	APPLICABILITY TO THE PROJECT	REASONS
Acute	Temperature Related	Extreme Heat Event	**Applicable**	• Extreme heat events found found to be common in KSA. • ThinkHazard (2023) classes KSA at high risk of extreme heat.
	Water Related	Extreme Precipitation Events	**Not Applicable**	• Extreme precipitation events are not common within KSA. • Future projections vary in the possibilities of the worsening or bettering of these events, but changes are seen to be limited.
		Drought	**Applicable**	• Droughts are very common within KSA. • Droughts are causing greater water scarcity in KSA, which could affect the project and its workers.
		Flood	**Applicable**	• Floods are seen to be very common within KSA from the baseline study. • Coastal flooding is classed as high risk by Think Hazard (2023).
	Wind Related	Extreme Wind Events	**Not Applicable**	• The baseline study found no evidence of extreme wind events that occur regularly, or any evidence of future trends to suggest this might occur.
	Solid Mass Related	Extreme Mass Movement	**Applicable**	• Landslides have occurred within KSA. • ThinkHazard (2023) classes KSA at moderate risk of landslides.
	Wildfires	Change In Fire Condition	**Applicable**	• Saudi Arabia has launched a project aimed at preventing forest fires in the kingdom's southern and southwestern regions. • ThinkHazard (2023) classes KSA at high risk of wildfires.
Chronic	Temperature Related	Mean Temperature Change	**Applicable**	• Temperatures are currently very high throughout KSA, and the projections suggest this could rise by as much as another 16% by 2100.
	Water Related	Mean Precipitation Change	**Not Applicable**	• Projections for KSA show no signs of the changes in precipitation levels.
		Sea Level Rise	**Applicable**	• Think Hazard (2023) classifies KSA as at high risk to coastal flooding. • Baseline desk study suggests that areas in KSA are at risk of sea level rise.

Category		Hazard	Applicability to the Project	Reasons
	Wind Related	Mean Wind Change	**Not Applicable**	• Not significant trends in wind speed changes were found during the baseline study.
	Solid Mass Related	Erosion	**Applicable**	• Coastal erosion was found to be an issue in KSA during the baseline study. • Desertification is also leading to greater inland erosion.