

NON-TECHNICAL SUMMARY

Environmental and Social Impact Assessment

Marsa Solar PV Project | Haima, Al Wusta Governorate, Oman

Prepared by: HMR Environmental Engineering Consultants

On behalf of: OQ Alternative Energy (OQAE) & TotalEnergies

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1. Project at a Glance

Project Name	Marsa Solar PV Project
Project Proponents	OQ Alternative Energy (OQAE) & TotalEnergies
Technical Consultant	Integrated Engineering & Technology (IET)
ESIA Consultant	HMR Environmental Engineering Consultants
Location	Near Haima, Al Wusta Governorate, Sultanate of Oman (~85 km SW of Duqm)
Project Capacity	280 MWac (grid-connected solar photovoltaic)
Project Area	Approximately 1,290 hectares of flat, arid desert terrain
Technology	Bifacial monocrystalline PV modules on single-axis trackers
Cleaning System	Dry robotic cleaning (no water use for panel maintenance)
Purpose	Supply renewable electricity to the Marsa LNG plant for carbon neutrality
Project Phases	Construction, Operation , Decommissioning
ESIA Standards	IFC Performance Standards PS1–PS6, World Bank EHS Guidelines, MD 187/2001

2. Project Background and Purpose

OQ Alternative Energy (OQAE) is part of OQ, a state-owned integrated energy group, serving as the cornerstone of OQ's energy transition efforts and a catalyst to achieve the national objectives for carbon neutrality by 2050. This is aligned with Oman's Vision 2040. OQ AE is committed to placing decarbonization at the heart of its strategy, focusing on the decarbonization of OQ assets and, ultimately, the decarbonization of Oman and such has been designated by the government as "The National Champion for Renewable Energy". OQ AE aims to drive sustainable economic growth in Oman's energy value chain and enable the energy transition through successful partnerships while developing a robust clean energy portfolio for the nation.

TotalEnergies is a global multi-energy company that produces and markets energies: oil and biofuels, natural gas and green gases, renewables and electricity. Active in more than 120 countries, TotalEnergies puts sustainable development in all its dimensions at the heart of its projects and operations to contribute to the well-being of people.

Marsa Solar PV Project (hereafter “the Project”) is a solar power plant with a capacity of 280 MWac, to be developed by TotalEnergies (TTE) and OQ Alternative Energy (OQAE). It is intended to supply the required electricity demand of the Marsa Liquefied Natural Gas (Marsa LNG) plant located in Sohar Port, which is developed and operated by a consortium of TotalEnergies and OQ Exploration and Production (OQEP). The electricity generated by the solar power plant will be supplied to the

grid which Marsa LNG will import its electricity from, while retaining the renewable energy certificates generated by the solar plant, thus achieving its objective of carbon neutrality.

3. Project Description

The Marsa Solar PV Project is a large-scale renewable energy development that aims to generate clean electricity to support the Marsa LNG plant and contribute to Oman's transition toward a low-carbon economy. The project is being developed by OQ Alternative Energy in partnership with TotalEnergies, aligning with national strategies such as Oman Vision 2040 and the country's target for carbon neutrality.

The project is located near Haima in the Al Wusta Governorate, approximately 85 km southwest of Duqm. The selected site lies within a designated renewable energy zone and consists of flat, arid desert land with low environmental sensitivity. This location was identified as suitable for solar energy generation due to its high solar irradiance and distance from major population centers.

The development involves the construction of a solar photovoltaic power plant with a generation capacity of 280 MWac, covering an area of approximately 1,290 hectares. The electricity produced will be supplied to the Marsa LNG facility and connected to the national grid, supporting the country's growing demand for sustainable energy.

In addition to the solar generation facility, the project will include supporting infrastructure such as access roads, operational facilities, and grid connection components necessary for efficient operation. The project has been designed to minimize environmental impacts while ensuring reliable and efficient energy production.

A location of the project site is presented in the figure below, illustrating its position within Al Wusta Governorate and its proximity to key reference points.

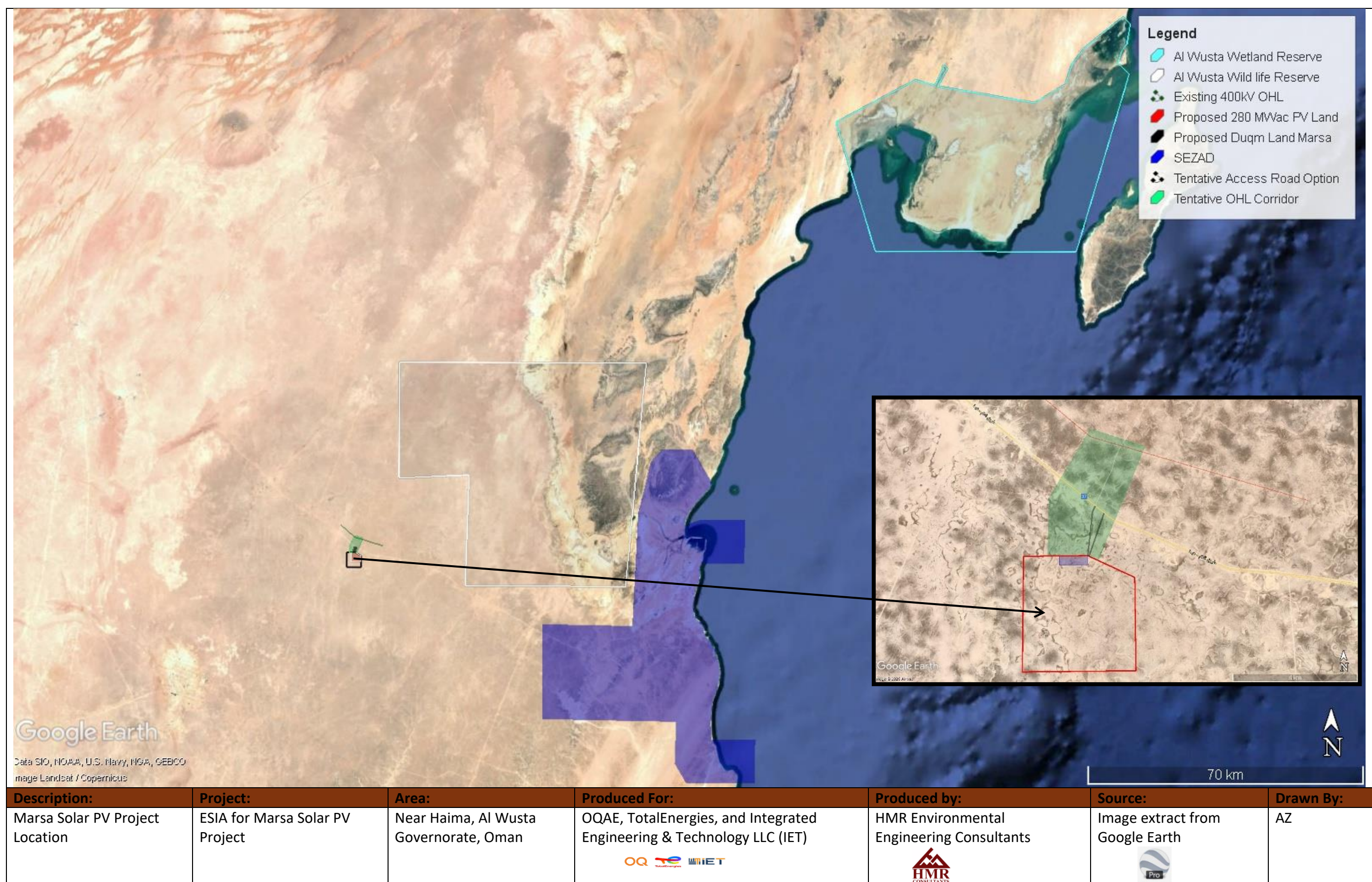


Figure 1 Marsa Solar PV Project Location

4. Legal and Regulatory Framework

The Marsa Solar PV Project is designed and assessed in full compliance with Omani legislation and international standards, including:

- Royal Decree 114/2001 and subsequent Ministerial Decisions establishing the Environmental Authority and environmental permitting requirements.
- Ministerial Decision (MD) 187/2001 on environmental permitting for industrial and infrastructure projects.
- Ministerial Decision (MD) 48/2017 on hazardous waste management.
- Ministerial Decision (MD) 41/2017 on ambient air quality standards.
- Ministerial Decision (MD) 296/2024 on noise standards.
- IFC Performance Standards (2012), PS1 through PS6, covering environmental and social assessment, labour, resource efficiency, community health and safety, land acquisition, biodiversity, and cultural heritage.
- World Bank Group Environmental, Health, and Safety (EHS) Guidelines for solar energy facilities.
- Equator Principles (EP4) and OECD Common Approaches for due diligence.

5. Alternatives Considered

Multiple alternatives were evaluated during the project planning stage, including:

- No-Project Alternative: Rejected as it would result in continued fossil fuel dependence, loss of renewable energy capacity, and missed opportunities for carbon reduction and local job creation.
- Technology Alternatives: Fixed-tilt systems were assessed against single-axis trackers. Single-axis trackers were selected for their greater daily solar capture, higher energy yield, and compact land footprint.
- Site Location Alternatives: Several sites were evaluated. The Haima site was selected for its high solar irradiance, flat topography, proximity to grid connection infrastructure, location within a designated renewable energy zone, and low ecological and social sensitivity.
- Cleaning System: Wet cleaning was compared to dry robotic cleaning. Dry robotic cleaning was selected to eliminate water consumption and operational wastewater in the arid desert environment.
- Grid Connection: The LILO (loop-in/loop-out) grid connection was chosen for its operational efficiency and reduced environmental footprint during installation.

6. Environmental and Social Baseline

The Environmental and Social Impact Assessment (ESIA) for the Marsa Solar PV Project was conducted to evaluate potential environmental and social impacts and to ensure compliance with applicable Omani regulations and international standards. The assessment followed a structured process, combining desk-based studies with field investigations and stakeholder engagement.

A total of four site visits were undertaken as part of the ESIA process. These included an initial visit during the scoping stage to identify key environmental and social sensitivities, followed by seasonal baseline surveys conducted during summer (July 2025) and winter (October 2025) to capture

representative conditions. An additional site visit was carried out to support vegetation assessment and tree counting at the project boundary.

The ESIA process included several key stages:

- Screening and Scoping: Identification of key environmental and social issues and definition of the assessment scope.
- No Objection Certificates (NoCs): Initiation of approvals with relevant authorities as part of the regulatory process.
- Baseline Studies: Detailed environmental and social surveys and technical assessments.
- Impact Assessment and Mitigation: Evaluation of potential impacts and development of mitigation measures under the ESMP.
- Stakeholder Engagement and Disclosure: Consultation with stakeholders and sharing of ESIA findings.
- Permitting: Submission of the final ESIA report to obtain the environmental permit.

Extensive fieldwork was conducted to establish baseline conditions within the project area. Surveys undertaken in both summer and winter ensured seasonal variations were captured, supported by technical studies and modelling.

Physical Environment

- Climate: Hot arid desert climate with high solar irradiance, very low annual rainfall, and high temperatures. Prevailing winds are northeasterly.
- Air Quality: Baseline air quality measurements confirmed all pollutant levels (PM10, PM2.5, SO2, NO2, CO, O3) are within permissible limits defined by MD 41/2017 and IFC standards.
- Noise: Ambient noise levels at all five monitoring receptors are within the limits of MD 296/2024 and IFC standards, reflecting the site's remote and undeveloped nature.
- Geology and Soils: Flat, arid terrain underlain by consolidated sedimentary rock. Soil investigations conducted over 40% of the project footprint confirm limited contamination risk.
- Hydrology: The potential for flooding was evaluated by analysing how water moves across the land during rainfall from seven catchments. Mitigation measures including raised infrastructure design have been incorporated to manage flood risk.
- Groundwater: Salinity mapping confirms limited groundwater potential in the area; the site is not overlying a sensitive aquifer.

Ecological Environment

- Protected Areas: The project site is approximately 25 km from the Al Wusta Wildlife Reserve, with no direct impact anticipated on the reserve.
- Flora and Fauna: Surveys confirmed sparse desert vegetation with no protected or critically endangered plant or animal species within the project footprint.
- Avifauna: No migratory bird routes cross the site. No protected or endangered bird species were identified.
- Invasive Alien Species: No invasive alien species were identified during field surveys.

Social Environment

- Population: No permanent settlements exist within 5 km of the project boundary. The nearest village is Al Ajayez, beyond this radius.

- **Land Use:** The area is used seasonally by Bedouin herders for livestock grazing (ezab). These seasonal enclosures are temporary and mobile by nature, relocating according to seasonal patterns. The land is state-owned and officially designated for renewable energy development.
- **Livelihoods:** Approximately 60-70% of the local population in the Haima area relies on livestock rearing and grazing, while others are employed as drivers and guards.
- **Cultural Heritage:** No archaeological features or cultural heritage sites were identified within or near the project area.

7. Stakeholder Engagement

A formal stakeholder consultation meeting was held on 9 September 2025 at the Wali's office in Haima, attended by representatives from OQAE, TotalEnergies, and HMR Environmental Engineering Consultants. Key stakeholders consulted included:

- Wali of Haima
- Haima Municipality representatives
- Shura Council members
- Omani Women's Association representatives
- Other key local community representatives

Key themes raised and responded to during the consultation:

Topic Raised	Concern/Request	Response/Commitment
Seasonal Grazing & Ezba	Potential disruption to seasonal livestock herding within the project area	Confirmed land is state-designated, Mitigation in ESMP
Fencing Design	Risk to camels from barbed wire or chain-link fencing	Fencing design will be determined based on the outcomes of discussions with the Royal Oman Police (ROP).
Local Employment	Prioritize local Omanis; training for graduates	Hiring will be based on multiple factors, including competency and individual commitment, with skills development supported under the ICV strategy.
Community Infrastructure	Solar lighting along Haima-Duqm road; fodder for Ezba community	Community support initiatives to be explored under ICV framework

Following completion of the ESIA, the findings were disclosed to stakeholders to ensure transparency and allow for feedback. The final ESIA report incorporates stakeholder input and has been submitted to the Environmental Authority for review and approval, leading to the issuance of the environmental permit.

Overall, the baseline conditions and ESIA process confirm that the project is located in an area of low environmental and social sensitivity and has been assessed through a comprehensive and transparent process aligned with regulatory requirements.

8. Summary of Environmental and Social Impacts

The ESIA assessed potential impacts across all project phases. The table below summarises the key impacts and their residual significance after mitigation:

Aspect	Impact	Before Mitigation	After Mitigation	Change
CONSTRUCTION PHASE				
Air Quality	Dust from earthworks and vehicle movement	Minor	Negligible	↓
	Diesel emissions from construction equipment	Minor	Negligible	↓
Noise	Elevated noise from machinery and vehicles	Minor	Negligible	↓
Soil & GW	Accidental fuel/chemical spills	Minor	Minor	—
Biodiversity	Vegetation clearance within footprint	Minor	Negligible	↓
	Avifauna disturbance from construction	Minor	Negligible	↓
Social	Temporary employment creation	Positive	Positive	—
	Traffic and road safety risks	Minor	Negligible	↓
	Seasonal grazing disruption (Ezab)	Minor	Negligible	↓
OPERATION PHASE				
Climate	Renewable electricity generation / avoided GHG	Positive	Positive	—
Air Quality	Dust from wind/sandstorms (natural)	Minor	Minor	—
Noise	Inverter and transformer hum (within boundary)	Negligible	Negligible	—
Biodiversity	Bird collision risk (minor; no migratory routes)	Minor	Negligible	↓
Social	Long-term local employment and skills development	Positive	Positive	—
	Local procurement and business opportunities	Positive	Positive	—
DECOMMISSIONING PHASE				
Air Quality	Dust and emissions from dismantling activities	Minor	Negligible	↓
Waste	PV module and metal recycling/recovery	Positive	Positive	—
Social	Temporary employment during decommissioning	Positive	Positive	—

9. Environmental and Social Management Plan (ESMP)

An Environmental and Social Management Plan (ESMP) has been developed to guide the implementation, monitoring, and reporting of all mitigation measures throughout the project lifecycle. The ESMP is aligned with applicable Omani regulations and international standards and

provides a structured framework to ensure that environmental and social risks are effectively managed during construction, operation, and decommissioning phases.

The ESMP is based on the internationally recognised mitigation hierarchy approach, which prioritises:

- Avoidance of impacts wherever feasible through appropriate site selection, design optimisation, and planning measures.
- Reduction (Minimisation) of impacts that cannot be avoided through the implementation of engineering controls, management procedures, and best practices.
- Restoration and Offset of residual impacts, where necessary, through rehabilitation measures or compensatory actions to achieve no net loss, where applicable.

This approach ensures that potential impacts are addressed systematically, with preference given to preventing impacts at source before applying corrective or compensatory measures.

Avoidance measures have been incorporated into the project design from an early stage. These include the selection of a site with low environmental and social sensitivity, avoidance of protected areas and critical habitats, and minimisation of interaction with local communities and existing land uses. Design considerations, such as layout optimisation and infrastructure positioning, have also been applied to reduce potential disturbance.

Where impacts cannot be fully avoided, reduction measures are implemented through a range of management plans and operational controls. These include dust suppression and noise control during construction, proper waste handling and disposal, traffic management to ensure community safety, and biodiversity protection measures such as controlled vegetation clearance and invasive species management. Workforce management procedures are also in place to minimise social impacts and ensure appropriate conduct.

For any residual impacts, restoration and offset measures are applied as necessary. These include site rehabilitation following construction activities, recontouring and revegetation where applicable, and restoration of temporarily disturbed areas. At the end of the project life, a comprehensive decommissioning plan will ensure the safe removal of infrastructure and the restoration of the site to acceptable conditions.

The ESMP encompasses the following key plans to support the implementation of the mitigation hierarchy:

- Construction Environmental Management Plan (CEMP): Measure to control construction related impacts, dust suppression, noise control, waste management, spill prevention, and workforce.
- Waste Management Plan (WMP): Segregation, handling, storage, and disposal of all waste streams including hazardous materials, solid waste, and wastewater.
- Traffic and Transport Management Plan (TMP): Routes, scheduling, speed limits, and community safety during construction and operation.
- Biodiversity and Vegetation Management Plan: Restrictions on vegetation clearance, tree compensation measures, invasive species control, and bird-safe design elements.
- Stakeholder Engagement Plan (SEP): Ongoing community consultation, grievance mechanism, and disclosure protocols throughout the project lifecycle.
- Grievance Mechanism (GM): A formal, accessible, and culturally appropriate process for affected communities to raise concerns and receive timely responses.
- Worker Management Plan: Labour standards, health and safety, code of conduct, and community interaction guidelines for all project workforce.

- Decommissioning Plan: Procedures for safe dismantling, material recycling, site rehabilitation, and ecological restoration at end of project life.

Through the implementation of the ESMP and its associated plans, the project will ensure that environmental and social impacts are effectively managed in accordance with the mitigation hierarchy, achieving outcomes that are environmentally sustainable and socially responsible.

10. Overall Assessment and Conclusions

Based on the comprehensive environmental and social assessment conducted, the following conclusions are drawn:

- The Marsa Solar PV Project is located on state-owned, governmentally designated renewable energy land with no permanent settlements and no protected ecological habitats within the project boundary.
- Following the application of all proposed mitigation measures outlined in the ESMP, the majority of potential environmental impacts are reduced to Negligible or Minor significance. No high or irreversible negative impacts are anticipated.
- The project will generate substantial positive impacts, including significant long-term reduction in greenhouse gas emissions, contribution to Oman's renewable energy and carbon neutrality targets, and local socioeconomic benefits including employment, skills development, and business opportunities.
- The project complies fully with applicable Omani regulations and international standards (IFC Performance Standards, World Bank EHS Guidelines, Equator Principles EP4).
- Stakeholder engagement with the Wali of Haima and local community representatives confirmed broad support for the project, with specific socioeconomic requests to be addressed through the ICV strategy and SEP.
- A project-level grievance mechanism will be established to allow stakeholders and community members to raise concerns or complaints, ensuring that all issues are recorded, addressed, and resolved in a timely and transparent manner.
- The overall environmental and social footprint of the project will remain As Low As Reasonably Practicable (ALARP), ensuring sustainable development in harmony with its surrounding environment and communities.

11. Contact Information

Project Proponent	ESIA Consultant
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This Non-Technical Summary is intended to present the key findings of the full ESIA Report (HMR #5553, Final Rev E, April 2026) in accessible language for community members, local authorities, and other interested parties. It is not a substitute for the full ESIA report.