

ENVIRONMENTAL IMPACT ASSESSMENT FOR THREE 10 MEGAWATT PHOTOVOLTAIC FACILITIES AT MARIENTAL, OMARURU AND OKAHANDJA, NAMIBIA



Non-technical summary of the Draft Scoping Report

This non-technical summary aims to provide Interested and Affected Parties (I&APs) access to non-technical information and to facilitate active public participation in the Environmental Impact Assessment (EIA) process. This non-technical summary includes the following sections:

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1. INTRODUCTION

Namibia Power Corporation (Pty) Ltd (NamPower) propose to purchase power from three Independent Power Producer (IPP) run photovoltaic (PV) solar energy facilities to reduce their high reliance on power imports as part of Namibia's security of power supply plan. The power would be generated from three individual PV facilities at three separate locations in Namibia namely; Mariental, Omaruru and Okahandja. The proposed facilities would each generate 10 megawatts (MW) and cover approximately 35 hectares (ha) at each location, dependent on final design. The selected IPP would build, own and operate each facility on sites owned by the State.

NamPower appointed Aurecon Namibia (Pty) Ltd (Aurecon) to undertake the EIA study to investigate the potential biophysical and socio-economic environmental impacts. The findings of the Scoping Report will inform the Ministry of Environment and Tourism: Department of Environmental Affairs (MET: DEA) decision-making and, if approved, it would inform the design and operation of the three proposed PV facilities.

How does a typical EIA work?

An EIA is a process that evaluates the environmental and socio-economic characteristics of a proposed project, its site and surrounds and then assesses the potential consequences that the project might have. Where negative impacts are likely, measures are recommended to avoid or lessen these impacts. Similarly, measures are also recommended to increase positive impacts. The process provides I&APs with an opportunity to have input and comment on the project. The project I&APs will also be kept informed about the EIA process. The various stages of the process are shown in the Figure 1.

This is a non-technical summary of the Draft Scoping Report and does not replace the comprehensive Report. It is recommended that if any person has significant interest or queries that they refer to the complete Draft Scoping Report for detailed information.

2. WHAT IS PROPOSED AND WHERE?

NamPower identified three existing substations where each of the proposed PV facilities could connect with to feed electricity to the National Grid. The three sites identified were:

- The Hardap PV site adjacent to the Hardap substation, south of the M29 gravel road (35 ha of Koichas Farm (Farm Number 89) close to Mariental, Hardap Region).
- The Omburu PV site adjacent to the Omaruru substation, on the southeast corner of the Omaruru Townlands east of the C36 gravel road (35 ha of the Omaruru Townlands (Portion B of Farm Number 2215) close to Omaruru, Erongo Region).
- The Osona PV site adjacent to the Osona substation, 3 km from Gross Barmen Hot Springs and approximately 19 km from Okahandja, south of the tarred M87 road (35 ha of Farm Gross Barmen (Portion C of Farm Number 7) near Okahandja, Otjozondjupa Region).

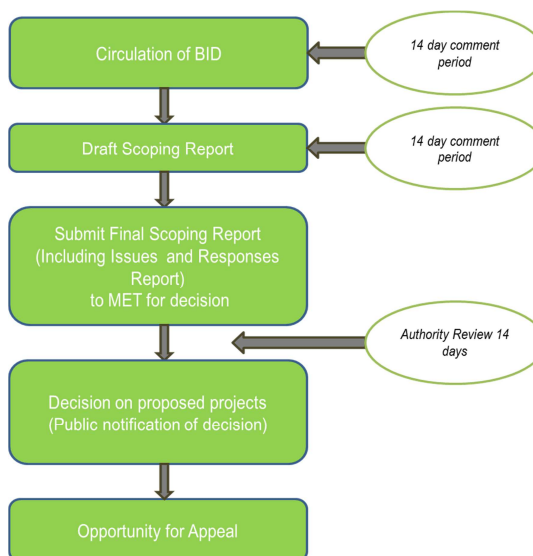


Figure 1 | Current EIA process

The proposed 35 ha sites have taken cognisance of environmentally sensitive areas as indicated in Figure 3, Figure 4 and Figure 5.

Each of the proposed 10 MW PV facilities will be similar in design and layout and would consist of the following:

- **Photovoltaic component:** numerous rows of PV panels and associated support infrastructure to generate electricity.
- **Transmission corridor:** one overhead 66 kilovolt transmission line located within a transmission corridor to connect the proposed onsite substation to the existing main substation.
- **Onsite substation:** the onsite substation to collect the electricity produced onsite and step it up to the correct voltage to transfer via the transmission line to the existing main central substation.
- **Access road corridor:** a corridor to accommodate the access road for constructing, servicing and maintaining the facility.
- **Buildings:** operation and maintenance buildings to house equipment and a guard cabin for security.



Figure 2 | Example of a PV facility

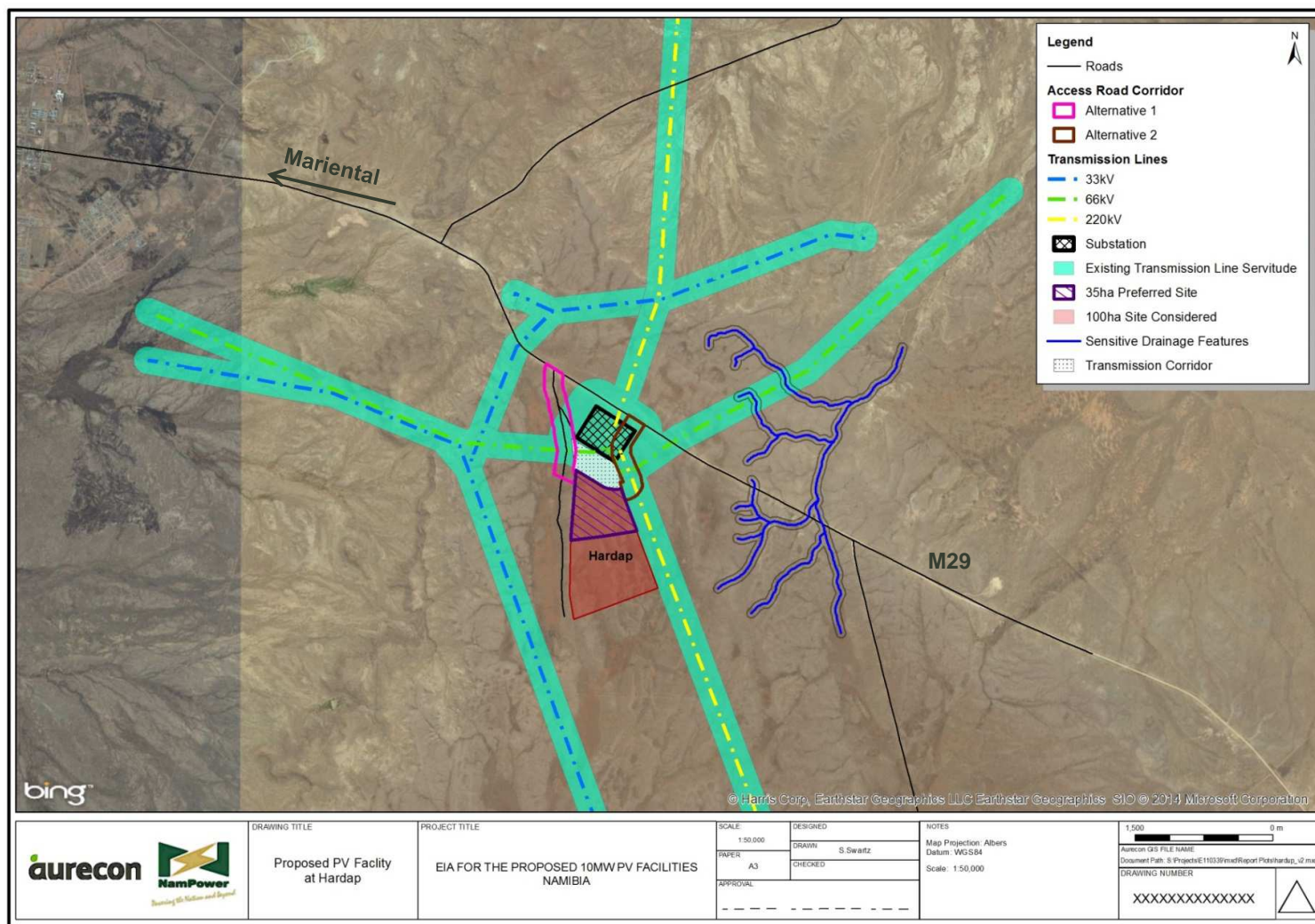


Figure 3 | Locality map of Hardap PV facility

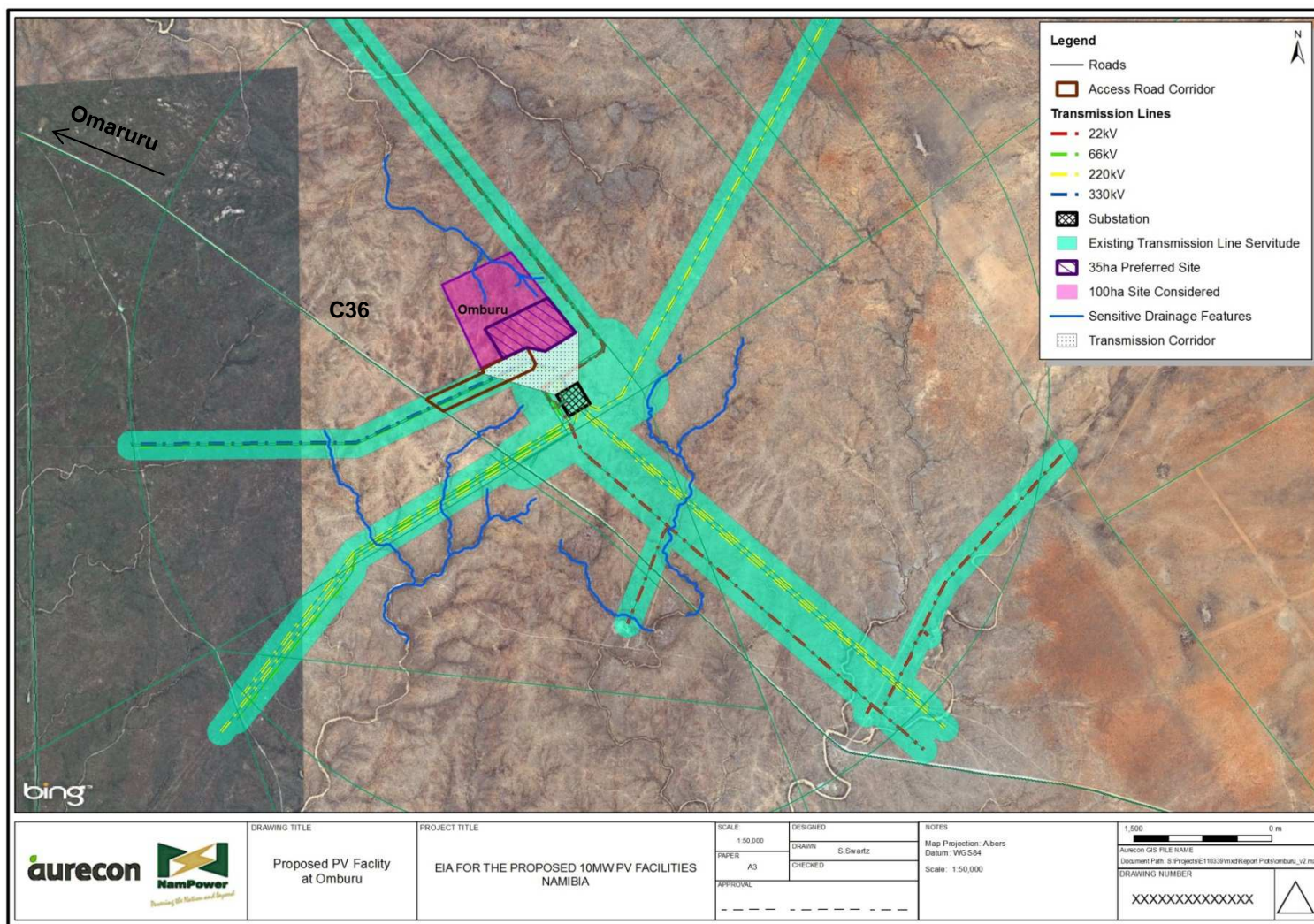


Figure 4 | Locality map of Omburu PV facility

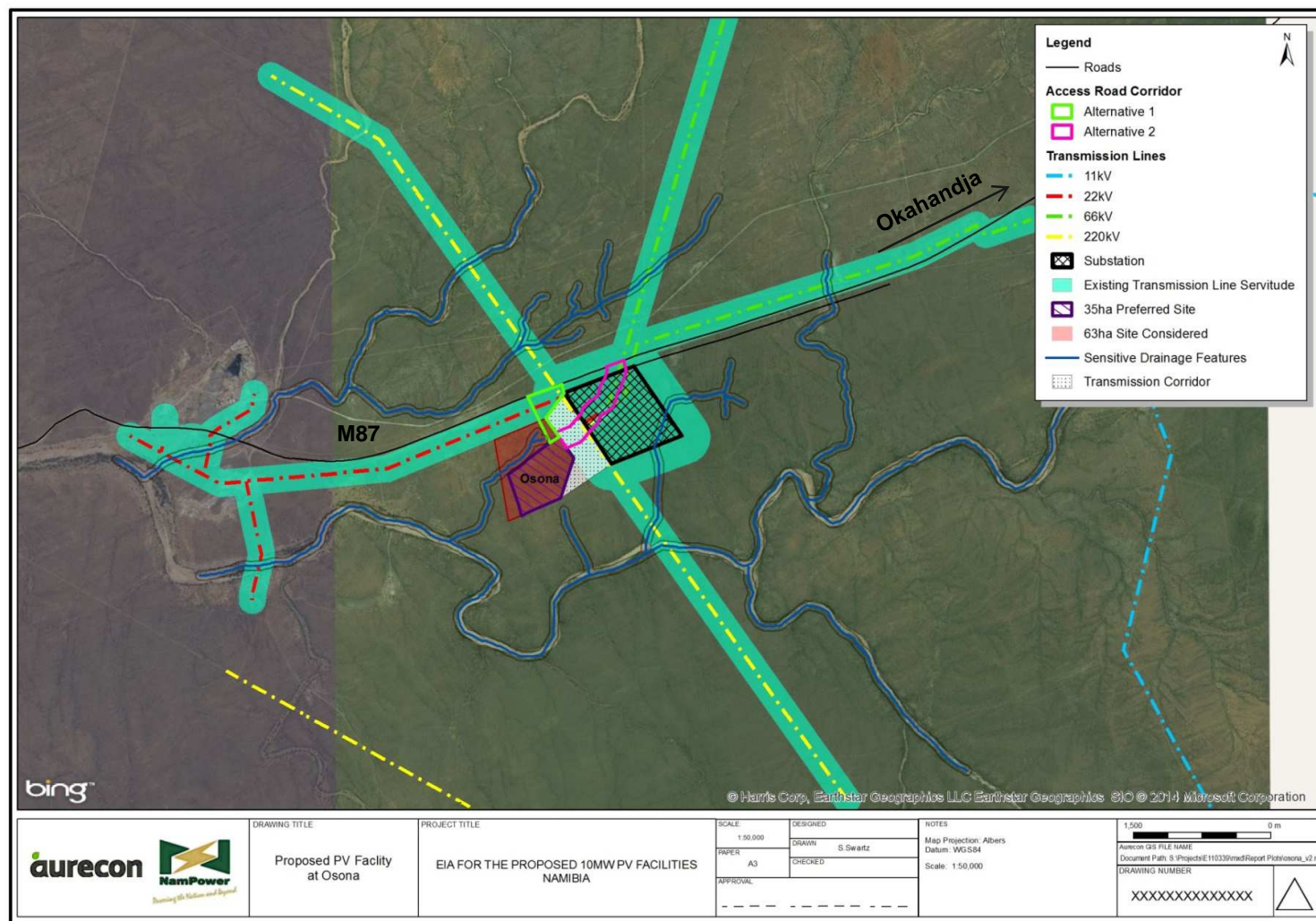


Figure 5 | Locality map of Osona PV facility

Additional infrastructure: a boundary fence for health, safety and security reasons; water supply infrastructure for groundwater abstraction and stormwater infrastructure, if required.

3. WHAT ALTERNATIVES ARE BEING CONSIDERED?

A Multi-Criteria Decision Making process was undertaken as a high level screening of alternative sites for the three PV facilities. This open, transparent and interactive process was used for optimal site selection based on the major issues that influence the viability and suitability of the proposed PV facilities. The process strongly favoured the three sites indicated in Figure 3, Figure 4 and Figure 5 and these were considered in the Scoping Report. However, an important part of an EIA process is to consider not only location alternatives but also other viable alternatives such as technology. The reasonable and feasible alternatives that were identified are given in Table 1.

Table 1 | Alternatives considered per PV facility

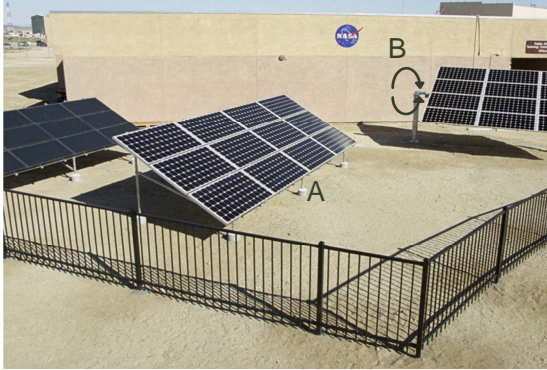
Hardap PV facility	<ul style="list-style-type: none"> Location alternative: Hardap1 Technology alternatives: <ul style="list-style-type: none"> Fixed tilt: typically a rack mounted system of panel arrays on frames and installed at a fixed angle (see Figure 6a). Single-Axis Tracking PV: The panels are fixed on a single axis that follows the sun movement to ensure maximum exposure to sunlight as indicated by (B) in Figure 6. Layout alternatives: Hardap Road 1; Hardap Road 2 No-Go alternative 	
Omburu PV facility	<ul style="list-style-type: none"> Location alternative: Omburu3 Technology alternatives: Fixed tilt PV and Single-axis tracking Layout alternative: one access road alternative, Omburu Road 1 No-Go alternative 	
Osona PV facility	<ul style="list-style-type: none"> Location alternative: Osona1 Technology alternatives: Fixed tilt PV and Single-axis tracking Layout alternatives: Osona Road 1 and Osona Road 2 No-Go alternative 	

Figure 6 | Fixed tilt (A) and single axis tracking (B)

4. WHAT ARE THE EXPECTED IMPACTS?

Potential impacts could arise during the construction, operation and decommissioning of the proposed development, as listed in Table 2. These potential impacts on the biophysical and socio-economic environment were assessed, in terms of the Aurecon methodology, and relevant mitigation measures have been proposed to reduce and/ or avoid negative impacts and enhance positive impacts.

Table 2 | Anticipated impacts assessed in the Scoping Report

Potential impacts	Assessments undertaken
Disturbance of flora, fauna and avifauna	Ecology Impact Assessment by Environment and Wildlife Consulting considering fauna, flora and

Potential impacts	Assessments undertaken
	avifauna.
Impact on agricultural resources	Assessment by Aurecon EIA team.
Impacts on surface water resources including sedimentation and erosion	Assessment by Aurecon EIA team and Ecology Impact Assessment.
Impact on groundwater	Assessment by Aurecon EIA team.
Impacts on heritage resources	Heritage Impact Assessment by Quaternary Research Services.
Visual impacts	Visual Impact Assessment by Visual Resource Management Africa.
Social impacts	Social Impact Assessment by Digby Wells.
Noise and dust pollution	Assessment by Aurecon EIA team.
Impact on energy production	Assessment by Aurecon EIA team.
Increased traffic	Desktop Assessment by Aurecon Transport Engineers.
Storage of hazardous substances onsite	Assessment by Aurecon EIA team.
Impact of waste	Assessment by Aurecon EIA team.
Impact on Climate change	Assessment by Aurecon EIA team.
Cumulative impacts	Assessment by Aurecon EIA team.

Impact ratings are provided in Table 3, Table 4 and Table 5 and a summary of the highest rated impacts is provided below.

Construction phase impacts

The most significant negative (-) construction phase impact associated with the Hardap PV facility, without mitigation, was impact on birds due to an increase in transmission line pylon collisions. This was rated as high (-) significance but would reduce to medium (-) with the implementation of the proposed mitigation measures, such as requiring the installation of bird flappers on all new transmission lines longer than 100 m to make the lines more visible to birds. This is considered to be acceptable as the length of the new transmission line would be relatively short in relation to the existing transmission lines and should therefore not result in critical issues.

The most significant negative construction phase impacts associated with Omburu PV and Osona PV facilities would be the increase in pylon collisions by birds and the visual impact associated with the 15 m high single axis tracking system. In order to construct the single axis tracking system a 20 m high crane would be required and this would be visible to nearby people during the construction phase. These impacts were rated as high (-) and medium (-), respectively. With the implementation of the mitigation measures, the impact significance of visual would be remain medium (-) and avifauna impact would reduce to medium (-). By limiting the height of the single axis tracking to 8 m at Omburu and 7 m at Osona, it could further reduce the visual impact significance to low (-).

The other potential construction phase impacts were mostly considered to be low (-) or very low (-).

For all three PV facilities potential positive ((+)) socio-economic impacts, such as employment creation and energy production, would result during construction and would be between medium (+) and low (+) significance, without and with mitigation measures.

Table 3 | Summary of significance of the potential impacts associated with the proposed Hardap PV facility

IMPACTS- HARDAP		Construction		Operation		Decommissioning	
		No Mitigation	With Mitigation	No Mitigation	With Mitigation	No Mitigation	With Mitigation
Impact on ecology (flora and fauna)	Destruction of vertebrate fauna (e.g. road kills; fence and pylon mortalities)	Low (-)	Very low (-)	Medium (-)	Low (-)	-	-
	Loss of unique flora and special habitats as a result of access road alternatives and transmission corridors	Low (-)	Very low (-)			-	-
	Provide ideal habitat for alien vegetation to establish	-	-	-	-	Very low (-)	Very low (-)
	Access road alternatives and transmission corridor	-	-	-	-	Low (-)	Very low (-)
	Avifauna Impacts	High (-)	Medium (-)	High (-)	Medium (-)	High (-)	Medium (-)
	'No-go'	Neutral		Neutral		Neutral	
Impact on agriculture	Hardap PV site	Low (-)	Very low (-)	-	-	Very low (-)	Very low (-)
	'No-go'	Neutral		Neutral		Neutral	
Impact on surface water	Hardap PV site	Very low (-)	Very low (-)	Very low (-)	Very low (-)	Low (-)	Very low (-)
	'No-go'	Neutral		Neutral		Neutral	
Groundwater impacts	Hardap PV site	Low to medium (-)	Very low (-)	Low (-)	Very low (-)	-	-
	'No-go'	Neutral		Neutral		Neutral	
Impact on archaeology	Hardap PV site	Medium (-)	Low (-)	Medium (-)	Low (-)	-	-
	'No-go'	Neutral		Neutral		Neutral	
Visual impacts	Alternative 1: Conventional PV 5m	Very low (-)	Very low (-)	Low (-)	Low (-)	Very low (-)	Very low (-)
	Alternative 2: Tracking PV 15m	Low (-)	Low (-)	Medium (-)	Medium (-)	Low (-)	Low (-)
	Road Access 1	Low (-)	Very low (-)	Low (-)	Very Low (-)	Low (-)	Low (-)
	Road Access 2	Very Low (-)	Very Low (-)	Very Low (-)	Very Low (-)	Very low (-)	Very low (-)
	'No-go'	Neutral		Neutral		Neutral	
Socio-economic	Employment creation during construction	Low (+)	Medium (+)	Medium (+)	Medium (+)	Medium (-)	Low (-)
	Presence of construction workers	Medium (-)	Low (-)	-	-	-	-

IMPACTS- HARDAP		Construction		Operation		Decommissioning	
		No Mitigation	With Mitigation	No Mitigation	With Mitigation	No Mitigation	With Mitigation
	Displacement of land uses	Medium (-)	Medium (-)	-	-	Low (+)	Low (+)
	Physical intrusion impacts	Low (-)	Very low (-)	-	-	-	-
	'No-go'						
Noise impact	Hardap PV site	Low (-)	Very low (-)	Very low (-)	Very low (-)	Low (-)	Very low (-)
	'No-go'	Neutral		Neutral		Neutral	
Dust impacts	Air Emissions	Low (-)	Low (-)	Very Low (-)	Very low (-)	Very low (-)	Very low (-)
	'No-go'	Neutral		Neutral		Neutral	
Hazardous substances	Spillage of hazardous substances	Medium (-)	Negligible	Medium (-)	Negligible	Medium (-)	Negligible

Table 4 | Summary of significance of the potential impacts associated with the proposed Omburu PV facility

IMPACTS- OMBURU		Construction		Operation		Decommissioning	
		No Mitigation	With Mitigation	No Mitigation	With Mitigation	No Mitigation	With Mitigation
Impact on ecology (flora and fauna)	Destruction of vertebrate fauna (e.g. road kills; fence and pylon mortalities)	Low (-)	Very low (-)	Medium (-)	Low (-)	-	-
	Loss of unique flora and special habitats as a result of access road alternatives and transmission corridors	Low (-)	Very low (-)			-	-
	Provide ideal habitat for alien vegetation to establish	-	-	-	-	Very low (-)	Very low (-)
	Access road alternatives and transmission corridor	-	-	-	-	Low (-)	Very low (-)
	Avifauna Impacts	High (-)	Medium (-)	High (-)	Medium (-)	High (-)	Medium (-)
	'No-go'	Neutral		Neutral		Neutral	
Impact on Agriculture	Omburu PV site	Low (-)	Very low (-)	-	-	Very low (-)	Very low (-)
	'No-go'						
Impact on Surface Water	Omburu PV site	Very low (-)	Very low (-)	Very low (-)	Very low (-)	Low (-)	Very low (-)
	'No-go'						

IMPACTS- OMBURU		Construction		Operation		Decommissioning	
		No Mitigation	With Mitigation	No Mitigation	With Mitigation	No Mitigation	With Mitigation
Groundwater impacts	Omburu PV site	Low to medium (-)	Very low (-)	Low (-)	Very low (-)	-	-
	'No-go'						
Impact on archaeology	Omburu PV site	Medium (-)	Low (-)	Medium (-)	Low (-)	-	-
	'No-go'	Neutral		Neutral		Neutral	
Visual impacts	Alternative 1: Conventional PV 5m	Very low (-)	Very low (-)	Low (-)	Very low (-)	Very low (-)	Very low (-)
	Alternative 2: Tracking PV 15m	Medium (-)	Medium (-) or Low (-) ¹	High (-)	Medium (-) or Low (-) ²	Very low (-)	Very low (-)
	Road Access	Very low (-)	Very low (-)	Low (-)	Low (-)	Very low (-)	Very low (-)
	'No-go'	Neutral		Neutral		Neutral	
Socio-economic	Employment creation during construction	Low (+)	Medium (+)	Medium (+)	Medium (+)	Medium (-)	Low (-)
	Presence of construction workers	Medium (-)	Low (-)	-	-	-	-
	Displacement of land uses	Medium (-)	Medium (-)	-	-	Low (+)	Low (+)
	Physical intrusion impacts	Low (-)	Very low (-)	-	-	-	-
	'No-go'						
Noise impact	Omburu PV site	Low (-)	Very low (-)	Very low (-)	Very low (-)	Low (-)	Very low (-)
	'No-go'	Neutral		Neutral		Neutral	
Dust impacts	Air Emissions	Low (-)	Low (-)	Very low (-)	Very low (-)	Very low (-)	Very low (-)
		Neutral		Neutral		Neutral	
Hazardous substances	Spillage of hazardous substances	Medium (-)	Negligible	Medium (-)	Negligible	Medium (-)	Negligible

Table 5| Summary of significance of the potential impacts associated with the proposed Osona PV facility

IMPACTS- OSONA		Construction		Operation		Decommissioning	
		No Mitigation	With Mitigation	No Mitigation	With Mitigation	No Mitigation	With Mitigation

IMPACTS- OSONA		Construction		Operation		Decommissioning	
		No Mitigation	With Mitigation	No Mitigation	With Mitigation	No Mitigation	With Mitigation
Impact on ecology (flora and fauna)	Destruction of vertebrate fauna (e.g. road kills; fence and pylon mortalities)	Low (-)	Very low (-)	Medium (-)	Low (-)	-	-
	Loss of unique flora and special habitats as a result of access road alternatives and transmission corridors	Low (-)	Very low (-)			-	-
	Provide ideal habitat for alien vegetation to establish	-		-		Very low (-)	Very low (-)
	Access road alternatives and transmission corridor	-		-		Low (-)	Very low (-)
	Avifauna Impacts	High (-)	Medium (-)	High (-)	Medium (-)	High (-)	Medium (-)
	'No-go'	Neutral		Neutral		Neutral	
Impact on Agriculture	Osana PV site	Low (-)	Very low (-)	-	-	Very low (-)	Very low (-)
	'No-go'						
Impact on Surface Water	Osana PV site	Very low (-)	Very low (-)	Very low (-)	Very Low (-)	Low (-)	Very low (-)
	'No-go'						
Groundwater impacts	Osana PV site	Low to medium (-)	Very low (-)	Low (-)	Very low (-)	-	-
	'No-go'						
Impact on archaeology	Osana PV site	Medium (-)	Low (-)	Medium (-)	Low (-)	-	-
	'No-go'	Neutral		Neutral		Neutral	
Visual impacts	Alternative 1: Conventional PV 5m	Very low (-)	Very low (-)	Low (-)	Very low (-)	Very low (-)	Very low (-)
	Alternative 2: Tracking PV 15m	Medium (-)	Medium (-) or Low (-) ³	High (-)	Medium (-) or Low (-) ⁴	Very low (-)	Very low (-)
	Road Access 1	Low (-)	Very low (-)	Medium (-)	Very low (-)	Low (-)	Very low (-)
	Road Access 2	Very low (-)	Very low (-)	Very low (-)	Very low (-)	Low (-)	Very low (-)
	'No-go'	Neutral		Neutral		Neutral	
Socio-economic	Employment creation during construction	Low (+)	Medium (+)	Medium (+)	Medium (+)	Medium (-)	Low (-)
	Presence of construction workers	Medium (-)	Low (-)	-	-	-	-

³ With the implementation of a 7 m height limit.⁴ With the implementation of a 7 m height limit.

IMPACTS- OSONA		Construction		Operation		Decommissioning	
		No Mitigation	With Mitigation	No Mitigation	With Mitigation	No Mitigation	With Mitigation
	Displacement of land uses	Medium (-)	Medium (-)	-	-	Low (+)	Low (+)
	Physical intrusion impacts	Low (-)	Very low (-)	-	-	-	-
	'No-go'						
Noise impact	Osana PV site	Low (-)	Very low (-)	Very low (-)	Very low (-)	Low (-)	Very low (-)
	'No-go'	Neutral		Neutral		Neutral	
Dust impacts	Air Emissions	Low (-)	Low (-)	Very low (-)	Very low (-)	Very low (-)	Very low (-)
		Neutral		Neutral		Neutral	
Hazardous substances	Spillage of hazardous substances	Medium (-)	Negligible	Medium (-)	Negligible	Medium (-)	Negligible

Key:

M-H	Medium to High Significance
M	Medium Significance
L-M	Low to Medium Significance
L	Low Significance
VL-L	Very Low to Low Significance

N	Neutral Significance
L-M+	Medium positive significance
L+	Low positive significance

Operational phase impacts

For all three PV facilities the most significant negative operational phase impact (avifaunal impacts) was rated as high (-) without mitigation. With the implementation of the proposed mitigation measures, the significance would be reduced to medium (-).

Omburu and Osona PV facility had a second impact that was considered to be high (-) as a result of the visual impact of the single axis tracking PV. With the implementation of the proposed mitigation measures, the impact significance would be reduced to medium (-) for both these impacts. With the implementation of height restrictions (8 m for Omburu and 7 m for Osona) the visual impact would further reduce low (-).

For all three PV facilities the most significant positive operational phase impacts were the creation of employment, impact on climate change and energy production and these impacts were considered to be medium (+), with and without mitigation.

5. WHAT ARE THE PREFERRED ALTERNATIVES?

The Ecological Impact Assessment concluded that the Hardap Site, Osona Site and Omburu Site along with the transmission corridors are suitable for development purposes. However, Hardap access road 1 and Osona access road 2 were slightly preferred as it follows the existing roads. The Visual Impact Assessment concluded that either of the PV type alternatives (fixed tilt or single axis tracking photovoltaic) were suitable for the Hardap PV site. However, due to the visibility of the 15 m high single axis tracking system at the Omburu and Osona sites, this technology is least preferred. The other assessments did not indicate a preference for any of the alternatives. Based on these findings the preferred alternatives are as follows:

Hardap PV facility

- Location alternative: Hardap1.
- Technology alternative: Fixed tilt PV or Single axis tracking.
- Layout alternative: Hardap Road 2, following the existing farm road.

Omburu PV facility

- Location alternative: Omburu3.
- Technology alternative: Fixed tilt PV or Single axis tracking PV with an 8 m height restriction.
- Layout alternative: Omburu Road 1, following the existing transmission service road.

Osona PV facility

Location alternative: Osona1.

- Technology alternative: Fixed tilt PV or Single axis tracking PV with a 7 m height restriction.
- Layout alternative: Osona Road 2, following the existing substation access road.

6. WHAT IS PUBLIC PARTICIPATION AND HOW DO YOU GET INVOLVED?

Public participation is an important part of the EIA process, as it allows the public to obtain information about the proposed project and to provide input and voice any concerns. To date the following public participation has taken place:

- Adverts were placed in *The Namibian* and *Die Republikein* for two consecutive weeks advertising the proposed project and inviting I&APs to register and raise comments.
- An I&AP database was developed for the project. The database includes the landowners, adjacent landowners, local municipal officials, relevant national and regional government officials, and organisations in the area. Registered I&APs were sent a Background Information Document (BID) obtaining information about the proposed project and inviting I&APs to comment on the project. All comments received on the BID were collated into a Comments and Responses Report Version 1 (CRR1), along with responses from NamPower and Aurecon and this has been included in the Draft Scoping Report.
- Registered I&APs were notified of the availability of the Draft Scoping Report and sent a copy of this non-technical summary. The Draft Scoping Report was made available at the respective local municipalities (Mariental, Omaruru and Okahandja) and on the Aurecon (www.aurecongroup.com) and NamPower websites (www.nampower.com.na).

7. WAY FORWARD

Comments on the Draft Scoping Report can be submitted to Ilze Rautenbach of Aurecon from 18 June 2014 until 8 July 2014.

Contact details	Ilze Rautenbach
Tel	+264 61 297 7000 / 11
Fax	+264 61 297 7007
Email	Ilze.rautenbach@aurecongroup.com
Postal address	PO Box 5353 Ausspannplatz, Windhoek

I&APs have been invited to attend public open houses where more information on the projects will be available in the form of posters and the Aurecon project team will be available to answer any questions. Note that as no formal presentation will be provided I&APs are invited to attend the open house at any time between the hours indicated below:

Location, date and time	Venue and address
Okahandja: Monday, 23 June 2014, 12h00-14h00	Venue: JG van der Wath Secondary School Address: Kahimemwa Street, Okahandja
Omaruru: Tuesday 24 June 2014, 9h00-11h00	Venue: Omaruru Municipal Community Hall Address: Wilhelm Zeraua Street, Omaruru Namibia
Mariental: Wednesday, 25 June 2014, 11h00-13h00	Venue: Mariental Municipal Hall Address: Dr Hendrik Witbooi Ave Mariental Namibia

Cognisance will be taken of all comments in compiling the final report, and the comments, together with the project team and NamPower responses thereto, will be included in the Final Scoping Report. Where appropriate, the report will be updated.

The Final Scoping Report will be submitted to the MET:DEA for consideration and decision-making. The MET: DEA has 30 working days to review the report and issue a decision. Following this, all interested and affected parties will be notified of the decision and an appeal period will follow.

8. ABBREVIATIONS USED IN THIS DOCUMENT

Abbreviations used in this document:	
Aurecon	Aurecon Namibia (Pty) Ltd
BID	Background Information Document
CRR1	Comments and Responses Report Version 1
EIA	Environmental Impact Assessment
Ha	Hectares
IPP	Independent Power Producer
I&APs	Interested and Affected Parties
MW	Megawatts
MET: DEA	Ministry of Environment and Tourism: Department of Environmental Affairs
NamPower	Namibia Power Corporation (Pty) Ltd
(-)	Negative
PV	Photovoltaic
(+)	Positive