BACKGROUND INFORMATION DOCUMENT

Environmental Impact Assessment for the Proposed Construction and Operation of a Seawater Desalination Plant and its Associated Infrastructure to Support the Production of Green Hydrogen and Green Ammonia on Portion 7 of Farm 58, Walvis Bay, Erongo Region

For: Elof Hansson Hydrogen Namibia (Pty) Ltd

ECT
ENVIRONAM CONSULTANTS TRADING

TABLE OF CONTENTS

List of Figure

List of Tables

1 INTRODUCTION

1.1 Purpose of this Document

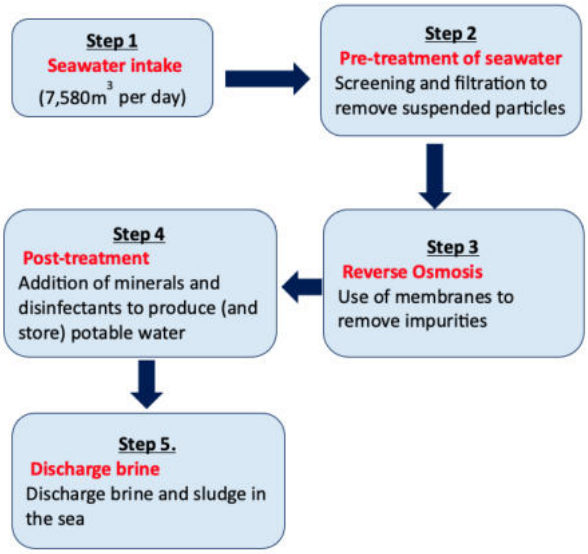
The purpose of this Background Information Document (BID) is to provide a brief description of the proposed project and the Environmental Impact Assessment (EIA) process to be undertaken. The BID also provides an opportunity for all Interested and Affected Parties (I&Aps) to register for the EIA process and to submit any initial comments or concerns regarding the proposed project. The comments and concerns received will be evaluated during the assessment and included in the reports that will be submitted to the Department of Environmental Affairs (DEA) of the Ministry of Environment, Forestry and Tourism (MEFT) for consideration.

1.2 The Proponent

Elof Hansson Hydrogen Namibia (Pty) Ltd in collaboration with leading German technology suppliers, intends to be amongst the first green hydrogen manufacturers in Namibia. The company is incorporated in Namibia with strategic international partnerships that are well-vested in the industry.

1.3 Project Description

Seawater desalination is the process of water treatment whereby salts are removed from the saline water to produce fresh water. The project will construct a state-of-the-art desalination plant. The proposed desalination plant will use reverse osmosis technology to convert saline seawater into pure water. The diagram below outlines the process of seawater desalination.



Pure water from the desalinated plant will be used to produce Green Hydrogen through the Alkaline Electrolysis process. Figure 1 below provides an overview of the plant concept for the entire Green Hydrogen and Green Ammonia production project components.

1.3.1 Seawater requirement

The project aims to establish a desalination plant to produce fresh water. It is estimated that 7,580 cubic meters of seawater will be abstracted to produce 2,160 cubic meters of distilled water daily.

1.3.2 Electricity

The desalination plant will be powered by clean energy from a 2.1GW photovoltaic solar farm dedicated to powering all components of the green hydrogen and Green Ammonia production.

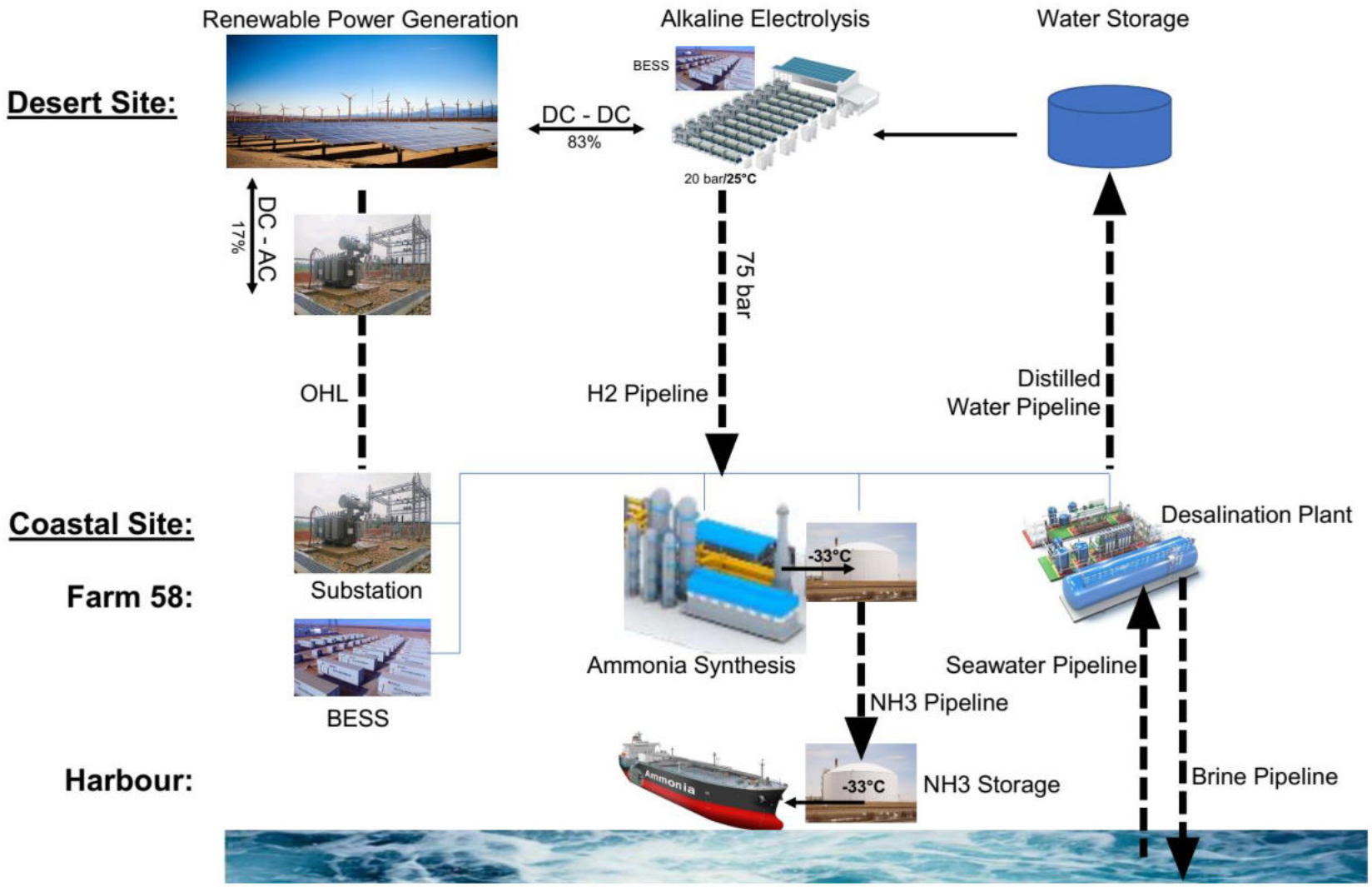


Figure 1: Overall Green Hydrogen and Green Ammonia Production Plant Concept

1.3.3 Pipeline and water storage infrastructure

Seawater will be abstracted and transported via a 15km pipeline to the desalination plant. The same servitude will host a brine pipeline that will pump the brine back to sea. The distilled water from the desalination plant will be pumped via a 70km pipeline to a storage reservoir situated 70km east of the desalination plant.

1.4 Project Location

1.4.1 Desalination plant

The desalination plant is proposed to be located on Portion 7 of Farm 58, Walvis Bay Constituency in the Erongo Region. The site is situated west of the Walvis Bay International Airport and east of the landmark, Dune 7 at coordinates 22.945214°S; 14.613832°E (see Figure 2 below).

Figure 2: Locality Map of Portion 7 of Farm 58

1.4.2 Storage facility for distilled water

The distilled water storage facility is located on desert land at Remainder of Farm Geluk No.116, about 70km east of Farm 58. Farm Geluk will host the alkaline electrolysis plant and the PV solar farm.

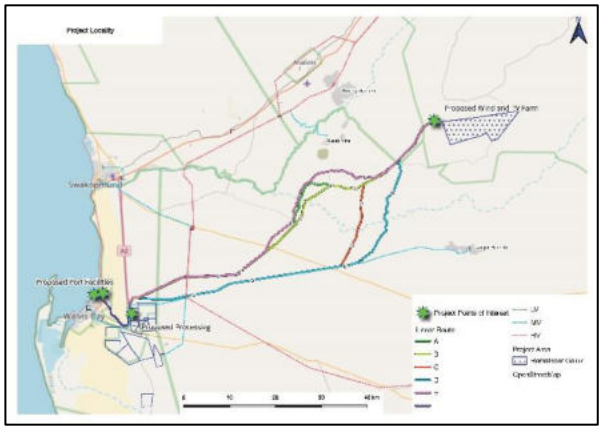


Figure 3. Map indicating Farm 58 and Farm Geluk

2 STATUTORY REQUIREMENTS

The protection of the Namibian environment is enshrined in the Namibian constitution under article 95(l)[1]. This constitutional provision provided for the enactment of the Environmental Management Act 2007 (Act No. 7 of 2007) (EMA) and its Environmental Impact Assessment Regulation, Government Gazette 6 February 2012 No. 4878.

The EMA promotes the sustainable management of the environment and the use of natural resources by establishing principles

[1]The Constitution of Namibia Article 95(l) *"The State shall actively promote and maintain the welfare of the people by adopting policies aimed at … The maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future".*

for decision making on matters affecting the environment. These principles must be applied by Government instututions, private persons, companies, institutions and organisations when planning for activities that may have significant impacts on the environment. The EMA provides for a process of assessment and control of activities which may have significant effects on the environment; and to provide for incidental matters.

Section 27(2)(b) of EMA provides a list of activities that may not be undertaken without and Environmental Clearance Certificate (ECC). Seawater desalination is a listed activity that may not be undertaken without an ECC as indicated in Table 1 below.

Table 1: Namibian regulatory requirement applicable to the proposed project

Environmental Impact Assessment Regulation 2012 GRN Gazette No. 4878	
Activity	**Applicability to the project**
8.1 The abstraction of ground or surface water for industrial or commercial purposes	The abstraction of seawater for desalination is aimed for industrial / commercial use
8.6 Construction of industrial and domestic wastewater treatment plants and related pipeline systems.	The project will construct a pipeline carrying brine, a waste product from seawater desalination
8.12 The release of brine back into the ocean by desalination plants	Brine from the desalination plant will be pumped back into the sea
9.2 Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste.	The project will release brine into the sea which requires a permit from the Ministry of Agriculture Water and Land Reform
The construction of 10.1 (a) oil, water, gas and petrochemical and other bulk supply pipelines	The desalination project will construct two pipelines; the seawater inlet and brine discharge.
10.1 (e) any structure below the high-water mark of the sea;	The seawater inlet and brine pipelines will be constructed below the high-water mark of the sea

Overall, the environmental impact assessment process will be done in accordance with local and international regulatory frameworks and best practises.

It should be noted that desalination is amongst the supporting components for the production of green hydrogen and green ammonia. Other regulatory requirement in relation to power generation, alkaline electrolysis and ammonia synthesis are outlined in seperate BIDs of the specific project components.

3 OVERVIEW OF THE AFFECTED ENVIRONMENT

3.1 Terrestrial

Farm 58 is part of the Walvis Bay townlands in an industrial development area. The area is a desert of barren land with no vegetation. Small desert animals such as geckos and desert-dwelling insects are however likely to frequent the area.

The pipeline servitude from Farm 58 to the sea traverses through an area generally known as a breeding area for the Damara terns, which are near-endemic to Namibia and near-threatened. Damara Terns are found in concentrated numbers along the coastline stretching north from the south of Walvis Bay to the Ugab River. They nest on gravel plains within 3–5 km of the shore where they forage over the shallow Bay water, over reefs, or in salt ponds (NACOMA, 2010).

This servitude follows the railway line however it will require to be formally defined and registered with relevant authorities.

From farm 58 eastwards, the distilled water pipeline traverses through the Namib Naukluft Park. The preliminary route was carefully studied to avoid desert-sensitive areas, such as the Welwitschia mirabilis fields and tourism sites.

Farm Geluk is located near Uranium mines and various other mining activities. The Strategic Environmental Assessment (SEA) for central Namib indicates that the area is designated for mining and other industrial activities.

3.2 Marine Environment

Namibia has one of the most productive fishing grounds in the world's oceans. The productivity is driven by the cold Benguela Current that enhances primary production which forms the basis of most of the world's ocean's food web (Shannon *et al* 2004). The current extends from South Africa up to Angola. It is however sub-divided into three parts; the cold Benguela which originate from Lüderitz, and the two warm water currents on the South African and Angolan coastlines (Shannon *et al* 2004, Wolfgang Fennel 1999). The cold Benguela current found along the Namibian coast is sandwiched between the two warm currents. The most productive ground is found in the area of Lüderitz. There are approximately 20 fish species in the Namibian waters (EEZ 200nm). The most important commercial fishery includes; Hake (*Merluccius capensis*

and *M. paradoxus)*, Horse mackerel (*Trachurus capensis*, Monk *Lophius vomerinus),* Red Crab Rock Lobster, Orange Roughy Pilchard (*Sardinops ocellatus).* Fishing activities in Namibia are predominantly industrialised and very little artisanal fishing.

Several aquaculture farms are found along the coastal areas, some are based in the sea (e.g oyster farming) and others are on the coastal edge (e.g. abalone farms). Both species (oysters and abalones) are exotic species in Namibia. Abalone is imported from neighbouring South Africa while the oysters are imported from Chile.

4 DESALINATION IN NAMIBIA

The coastal environment of Namibia is arid and seldom receives rainfall. Freshwater is supplied through borehole schemes. The Uranium 'Rush' in the central Namib desert necessitated the development of Namibia's first desalination plant, which was developed by Areva Mining Company to supply the Trekkopje Uranium Mine. This desalination plant, located North of Swakopmund, now called Erongo Desalination Plant (EDP) has an annual seawater feed capacity of 48Mm^3 (131,506.85m^3/day) which produces 30Mm^3 of brine and 20Mm^3 of freshwater (Orano Group, 2023). The plant is powered with electricity from the grid. The proposed desalination plant will be 17 times smaller than the EDP.

5 POTENTIAL SOCIAL AND ENVIRONMENTAL IMPACTS

5.1 Terrestrial Environment

5.1.1 Socio-Economic Impacts

The construction and operation phases of the desalination plant and its associated infrastructures will create significant direct and indirect employment opportunities for locals. The purchase of goods and services for the construction and operation of the plant will contribute to state revenues through direct taxes. Employment created will contribute to capacity building and skills development of the workforce. The income generated will further contribute to poverty alleviation and improved standards of living of local communities. Additional opportunities include the development of temporary increases in business and tourism opportunities associated with the construction and operation phases.

Construction projects are generally associated with increased rural-urban migration and associated risk of the increase in social ills such as petty crimes, increased alcohol abuse, and social disturbances to family structures.

5.1.2 Bio-Physical Impacts

The construction of the desalination plant at Farm 58 is not expected to have significant adverse impacts on the environment because

the proposed site is already zoned as an industrial area. The proposed project area is in desert land, which is mostly free of vegetation. The impact of the project on biodiversity and the natural environment is therefore not anticipated to be detrimental. The construction of pipelines will however change the aesthetic view of the area. If inevitable, affected vegetation (mostly *Welwitschia Mirabilis*) will be transplanted.

5.1.3 Waste Generation

During the construction phase, it is envisaged that domestic waste and construction waste will be generated. The project will be required to put in place a solid and liquid waste management plan. The project will be required to provide adequate ablution facilities and waste drums for solid waste.

5.1.4 Land Degradation

Uncoordinated movement of heavy vehicles and other vehicles in undesignated areas may cause land degradation and alter the landscape.

5.1.5 Heritage and Archaeological Materials

The National Heritage Council Act 27 of 2004 provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Register; and to provide for incidental matters. There are currently no known heritage sites of special importance in the proposed area and hence, no negative impacts to any sites of heritage significance are expected.

Project construction may however unearth heritage or archaeological material. A comprehensive heritage resource study will be undertaken.

5.1.6 Wild Animal Routes

The Namibia desert is home to various wild animals. The construction of pipelines may impede the movement. The construction will consider the area of wildlife crossing, as will be informed by the Avifauna study.

5.2 Marine Environment

Desalination plants pose various potential threats to the environment depending on their scale or level of seawater abstraction and brine production and discharge. The following impacts are expected.

5.2.1 Seabed construction

The construction and installation of seawater intake and discharge pipelines disrupt the seabed and result in the increased suspension of sediments and pollutants in the water column. This may increase turbidity to levels that may prevent sunlight penetration into the water column. This may affect processes such as photosynthesis and provide a favourable environment for harmful algal blooms. Furthermore, predators that depend on light and visibility for their prey may be

affected by increased turbidity. The pipes would be buried into the ground until at points where they cross the lowest tide zone. This impact is however localized and short-term.

5.2.2 Brine

The discharge of brine and associated sludge back to sea may result in increased localized salinity. Salinity influences water density which plays a vital role in floating planktonic organisms. A high concentration of brine reduces the amount of dissolved oxygen in the water which affects the productivity of the marine ecosystem.

5.2.3 Chlorine Concentration

In general, the intake water for the Reverse Osmosis (RO) plant is dosed with Chlorine and dechlorinated again with sodium bisulfite before entering the RO unit to prevent damage to the filtration membranes.

The dose of intake water with Chlorine gets concentrated in the effluent (brine) which is discharged back to sea. This may affect water and sediment quality and consequently affect the ecological system in the long term.

5.2.4 Entrainment and Impingement

Generally, without well designed screening and filtration systems on the inlet pipe, fish and other marine organisms will enter the inlet pipe into storage tanks. Entraintment occurs when marine organisms pass through a water intake due to inadequate screens around the water intake. Entraintment affects smaller organisms such as algae, plankton and bacteria. Impingement occurs when large marine organisms (e.g. fish, crabs etc) get in physical contact with screening barrier, often resulting in injuries and mortality. Enstrainment and Impingement effect marine ecology and the plant operation due to scaling / bio-fouling that may reduce the flow intake or damage the RO membranes.

5.2.5 Shipping routes

Shipping routes may be affected depending on how further offshore the pipe extend.

6 THE EIA PROCESS

The Namibia EIA process is explained in the EIA regulation 2012, GRN Gazette No. 4878. The EIA process to be undertaken is summarised in **Figure 4** below.

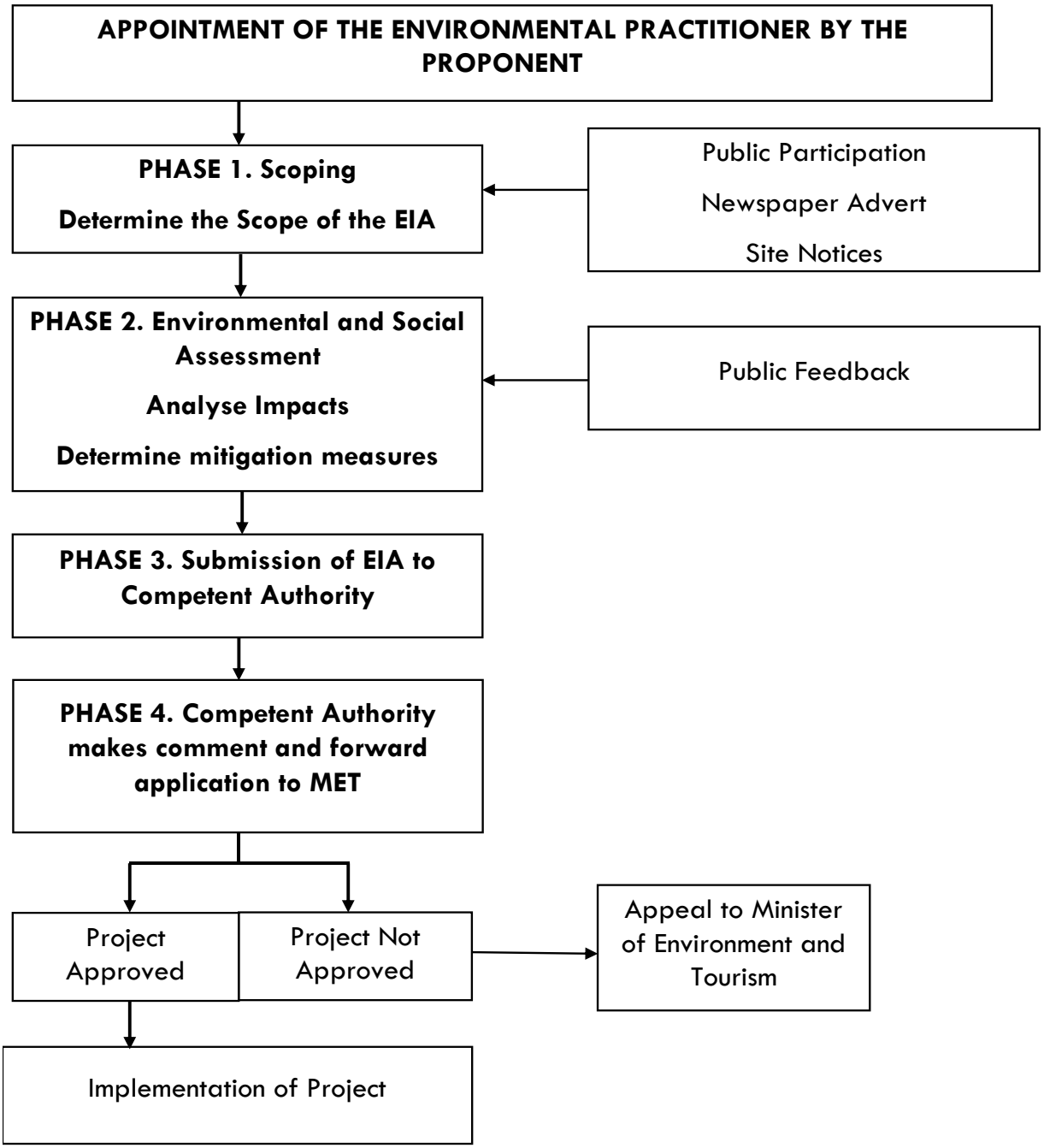


Figure 4. The EIA process in Namibia

7 TERMS OF REFERENCE FOR UNDERTAKING THE EIA

The scope of the EIA is guided by the Terms of References as provided for by the EIA Regulation 2012, Section 9 (a-b) but, is not limited to the following;

- Provide a comprehensive description of the proposed Project;
- Identify relevant legislation and guidelines for the project;
- Identify potential environmental (physical, biological and social) conditions of the project location and conduct risk assessment;
- Inform Interested and Affected Parties (I&APs) and relevant authorities about the proposed project to enable their participation and contribution;
- Develop an Environmental Management (EMP) that would be a legal guideline for the environmental protection by the project

8 PUBLIC CONSULTATION

Section 21 of the EIA Regulation requires the undertaking of an Environmental Impact Assessment (EIA) to follow a robust and comprehensive public consultation. This is an important process because it gives members of the public, especially the Interested and Affected Parties the opportunity to comment or raise concerns that may affect their socio-economic or general environment because of the project. Furthermore, it solicits crucial local knowledge that the Environmental Assessment Practitioner may not have. The process will be undertaken as follows;

I. **Notice board:** In accordance with Section 21 (a) a notice board will be placed at the project site and other public places to inform and create public awareness about the project and the application of ECC.
II. **Written notice**: In accordance with Section 21 (b) written notices will be given to the public, particularly in the surrounding areas to inform them and create awareness about the project and the application of ECC.
III. **Newspaper advertisement:** In accordance with Section 21 (c), the project must be advertised once a week for two consecutive weeks in two newspapers that are widely circulated in Namibia.
IV. **Public Meeting:** In accordance with Section 21 (5,6) a public meeting will be undertaken in Walvis Bay on Wednesday **13 December 2023** at the Walvis Bay Side Hall at 14:00.

9 REGISTRATION AS AN INTERESTED AND AFFECTED PARTY

The public, individuals, scholars, community leaders and organizations are urged to register as Interested and Affected Parties (I&AP) and provide comments and input using the comment form in Annex 1 at the following address;

Name of Consultant:	Colin P Namene
Email Address:	colin@environam.com/ spike@environam.com
Postal Address:	P.O. Box 24213 Windhoek
Cell phone:	+264 81 458 4297/ +264 81 240 5365
Deadline for submission of comment:	20th December 2023

10 ANNEX 1. COMMENT FORM

Environmental Impact Assessment for the Proposed Construction and Operation of a Seawater Desalination Plant and its Associated Infrastructure to Support the Production of Green Hydrogen and Green Ammonia at Portion 7 of Farm 58 Walvis Bay, Erongo Region

Date		**Time**	
Particulars of I&APs			
Surname		**Initials**	
First Name (s)		**Tel/Cell**	
Organisation		**Postal Address**	
Email		**Postal Code**	
Town			

What is your area of interest in the Project?

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Kindly write your comment, Concerns, Recommendations and or Questions below.

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Thank you for your comments ☺