HYIRON GREEN TECHNOLOGIES (PTY) LTD

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED OSHIVELA GREEN IRON PILOT PROJECT ON PORTION 4 OF FARM BLOEMENHOF 109, ERONGO REGION

BACKGROUND INFORMATION DOCUMENT

1. INTRODUCTION

HyIron Green Technologies (Pty) Ltd (HyIron) intends to develop the Oshivela Green Iron Pilot Project, on Portion 4 of Farm Bloemenhof 109. HyIron owns the farm, which is located ~75 km north-east of Swakopmund, in the Erongo Region (refer to Figure 1). HyIron is a Namibian registered company who is the "Net Zero Iron Production Technology" owner with their sister companies, Co2Grab GmbH and Hyiron GmbH based in Germany. HyIron proposes to produce "green" iron, i.e. without any CO_2 emissions, by using renewable energy only and applying its proprietary technology.

It is the aim of HyIron to lay a cornerstone and to establish a 'lighthouse project' to prove that climate neutral technologies in heavy industries are available and economically competitive. So far in the heavy industries very little has been done towards decarbonisation. Therefore, it is likely that already in the proposed pilot production phase (i.e. comparably small), the Oshivela Project would be the biggest production of climate neutral iron in the world.

The proposed pilot production phase is planned in the north-western section of Farm Tevrede – See Figure 1) and includes the following:

- Production of 5 tons raw iron per hour (~ 3 000 hours per year), using hydrogen as a reduction agent during the product beneficiation, in a specialised industrial (airtight) furnace.
- Hydrogen will be produced by means of electrolysis (i.e. splitting water in H_2 and oxygen (O)).
- Renewable energy supply (i.e. 25 MWp) in the form of Photovoltaic (PV) power to supply energy for the above mentioned electrolysis process. The PV power plant will cover an area of ~ 30 hectares (ha).

2. ENVIRONMENTAL CLEARANCE APPLICATION

Prior to commencement of the proposed Oshivela Green Iron Pilot Project, an application will be submitted to the Ministry of Mines and Energy (MME), as the competent authority and the Ministry of Environment, Forestry and Tourism (MEFT) in terms of the Environmental Management Act, No. 7 of 2007 and associated EIA Regulations (January 2012). An EIA process will be conducted in terms of the above-mentioned Act and Regulations. Namisun Environmental Projects & Development (Namisun) has been appointed by HyIron as the independent Environmental Assessment Practitioner to undertake the EIA process for the proposed Pilot Project.

3. PURPOSE OF THIS DOCUMENT

This document has been prepared by Namisun to inform you about:

- The proposed Oshivela Pilot Project (Sections 1 and 5).
- The EIA process (Section 6).
- Key environmental issues (i.e. aspects and potential impacts) (Section 7).
- How you can register as an interested and / or affected party (I&AP) (Sections 4 and 8).

4. PARTICIPATION IN THE EIA PROCESS

Public participation is an essential part of the EIA process. If you want to register as an I&AP and have input into the EIA process, please refer to the box below. All comments / questions / concerns will be recorded and addressed in the EIA process.

HOW TO REGISTER AS AN I&AP AND COMMENT

Please register as an I&AP and submit any questions or comments through communication with Namisun.

Attention: Werner Petrick
E-mail address: wpetrick@namisun.com
Cell number: +264 (0)81 739 4591

If you would like your comments to be addressed in the report, please submit them by **3 November 2023**.
All comments received will be recorded and responded to in the EIA Scoping Report.

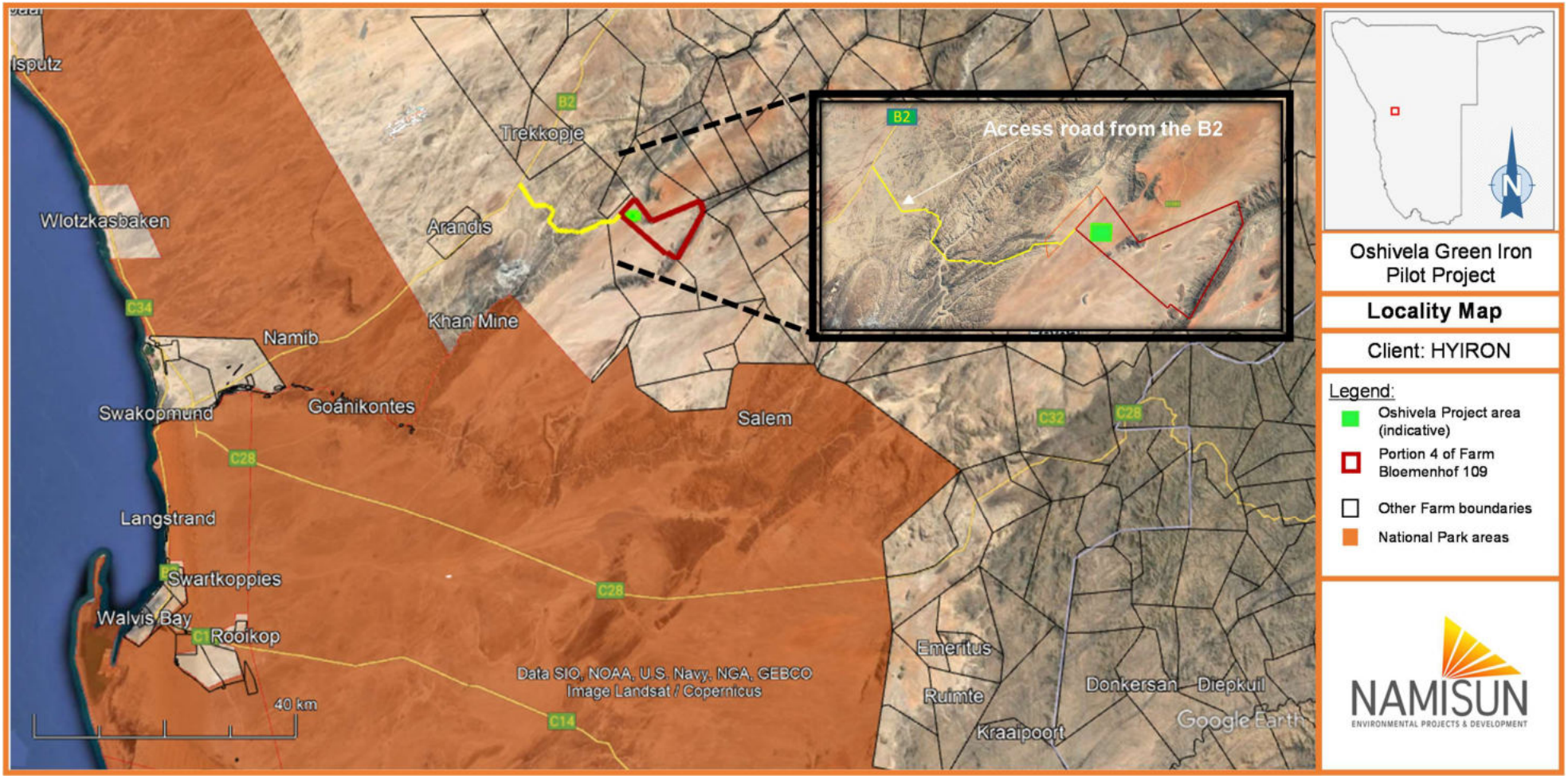

Figure 1: Location of the proposed Oshivela Pilot Project area on Farm Tevrede (ref. Google Earth)

5. PROPOSED PROJECT ACTIVITIES

HyIron ultimately considers upscaling to a production of 40 tons per hour of sponge iron (with the final product being between 90 and 99% purity), generated with net zero CO_2 emissions.

Their proposed Pilot Project will, however, first be implemented to prove various concepts and the feasibility of the bigger project. Furthermore, ongoing monitoring of relevant environmental aspects will be undertaken during the Pilot Project stage.

The following sections provide a description of the proposed Oshivela Green Iron Pilot Project and associated infrastructure & activities.

5.1 IRON ORE CONCENTRATE BROUGHT TO SITE

HyIron plans to obtain iron ore concentrate from various sources / suppliers. The details of these still need to be confirmed.

During the pilot phase, 27 000 tons of iron ore concentrate will be required per annum. The ore concentrate will be stockpiled (maximum ~ 3 000 m^3) on site, near the furnace. HyIron estimates that ~ 2.5 truck trips (on average) will be required on a daily basis to transport the iron ore concentrate to the Project site. The trucks will follow an existing access road (i.e. Valencia mine access road) from the B2 Road as indicted on Figure 1. Other options for access to the Project site are also being considered by HyIron.

5.2 PROCESSING / BENEFICIATION

The iron ore concentrate will be transported from the stockpile area to a specialised industrial furnace, together with hydrogen produced on site (see below). In this airtight furnace, the Hydrogen (H_2) reacts with the Oxygen contained in the Iron Oxide (Iron ore concentrate). As a result an Iron product (i.e. “sponge iron”) of between 90 and 99 % purity is produced (see Figure 2).

This sponge-iron (i.e. “green iron”) is produced in the furnace, generating net zero CO_2 emissions. A by-product from the furnace would be water, which would be recycled for hydrogen production. (See Figure 2 and Figure 3).

The shaft furnace for Iron reduction and the hydrogen processing (see section 5.3) as well as the briquetting will be covered in a steel structure with shade netting.

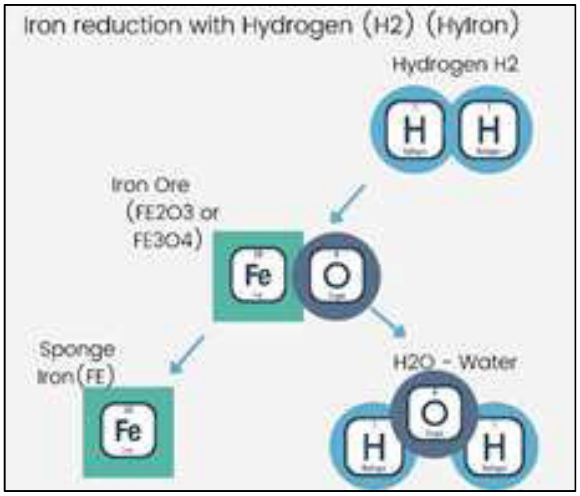

Figure 2: Processing Sponge Iron

5.3 OVERALL PRODUCTION OUTLINE

Currently the technology for Iron reduction is being implemented by HyIron in cooperation with the companies BENTELER and RWE as part of the "GEiSt - Green iron for steel production" project in a prototype plant in Lingen, Germany. This is a prototype for process optimization with a production volume of up to 1 000 kg per hour.

During the Pilot phase of the Oshivela Project, 5 tons per hour will be produced, solely in daytime (i.e. 9 hours) at around 3 000 hours per year.

The prohibited CO_2 emissions per year will be close to 1% of the yearly CO_2 emissions of Namibia.

The required staff during operations will be at a maximum ~ 20 people at a time. Also, during construction there will not be more than ~80 people on site at a time.

The final material (Sponge Iron) has 30% less weight, than the Iron ore.

The final product will be transported to Walvis Bay for export. Approximately 2 truck trips would be required from site to Walvis Bay on a daily basis.

5.3 HYDROGEN PRODUCTION AND WATER USE & WATER RECYCLING

Renewable energy will be produced onsite. This energy will be used to split water into hydrogen and oxygen by means of electrolysis. During electrolysis water is split into H_2 and O, and in the reaction of the H_2 with the O of the iron ore concentrate (i.e. Fe_2O_3 or Fe304), water is again produced. (See Figure 3).

Even though in the electrolysis, water is split into hydrogen and oxygen, there is no water use in the HyIron process, since in the reaction of the Hydrogen with the Oxygen of the Iron Ore, water is produced. Therefore, in the HyIron

process the water is recycled. A water tank with a size of 40 m³ would be required. (See Figure 3 for the water cycle).

In addition to the water formed during reduction, only small volumes of water will be required to make up process losses and for domestic use.

A maximum of ~40 m³ water would be required on average per week during the Pilot Project phase. Water will either be supplied by boreholes (i.e. groundwater) or trucked in.

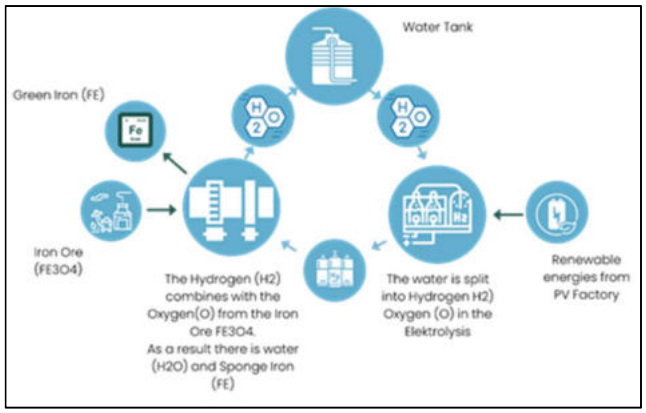

Figure 3: Proposed water cycle

5.5 MINERALISED WASTE FACILITIES

There is no mineralized waste expected.

5.6 POWER SUPPLY AND ELECTROLYSIS

No grid power would be required on site and therefore no transmission lines would be installed.

Photovoltaics is a method of generating electrical power by converting solar radiation into direct current electricity. This is done by using semiconductors that exhibit the photovoltaic effect. The photovoltaic effect is the generation of voltage and electric current in a material upon exposure to light. Photovoltaic power generation uses solar panels composed of several solar cells connected in series containing a photovoltaic material (see Figure 4 for an illustration of a typical solar PV plant).

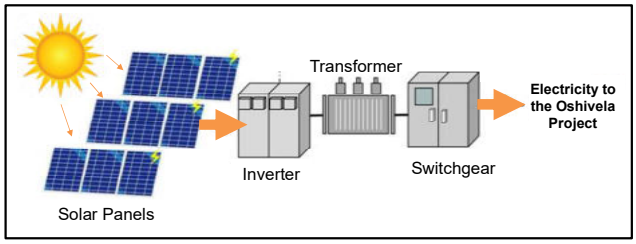

Figure 4: Illustration of a typical solar PV Power Plant

HyIron proposes to install 25 MWp of Solar power. The PV panels are planned to be built in a north-facing alignment at a tilt of 25° and will need a maximum of 30 Ha of space. The electrolysis will be installed in a 1000 m² building.

The panels will each be ± 2.3 m high and 1 m wide.

All cabling will be underground or on the ground and electric installations will be bundled in the "production" area.

5.7 ADDITIONAL SUPPORT SITE INFRASTRUCTURE

Within the proposed Project area internal roads, internal power lines, pumps, pipes, water storage and other associated infrastructure and services, process and non-process plant buildings, product handling & loading areas, fuel storage facilities, general waste handling and storage facilities, etc. would need to be constructed.

5.8 HYIRON PROCESS IN COMPARISON TO TRADITIONAL STEEL MAKING

In traditional reduction process coal is the most used reduction agent and causes average CO_2 emissions of 1.8 Tons CO_2 per ton of Iron produced. Coals are burned at very high temperatures and the main component of the coals, Carbon (C) reacts to become Carbon Monoxide (CO) to then draw the Oxygen (O) from the Iron ore (FE_xO_y). Theses traditional processes accounts for ± 9% of the global CO_2 emissions.

For the proposed Oshivela Project, hydrogen will be used as a reduction agent. The hydrogen will be produced on site and directly used in the furnace, without being pressurized, so that it does not mean any hazard. As result of the reaction, the only waste product is Water.

6. EIA PROCESS

The main objectives of this EIA process are to:

- Provide information on the proposed project activities and facilities / infrastructure.
- Describe the current environment in which it will be situated.
- Identify, in consultation with I&APs, the potential negative and positive environmental aspects.
- Assess the associated potential impacts of the proposed project.
- Report on measures required to avoid impacts or mitigate such impacts to acceptable levels.

The likely process steps and timeframes are provided in Table 1.

Table 1: EIA Process

STEPS IN THE EIA PROCESS
PHASE I: Project initiation and internal screening (September – October 2023)
• EIA project initiation. • Identify environmental aspects. • Site visit and identify environmental issues. • Prepare Application Form. • Identify key stakeholders.
PHASE II –Scoping & Assessment Phase and EMP (October 2023 – January 2024)
• Notify regulatory authorities and I&APs of the proposed project (via newspaper advertisements, this document, emails, site notices and telephone calls). • Conduct focus group meetings with key Stakeholders. • Carry out relevant specialist investigations. • Assess the potential impacts of the proposed Oshivela Green Iron Pilot Project activities and compile an EIA Scoping (including Impact Assessment) Report and Environmental Management Plan (EMP). • Distribute the EIA reports for review and comment by regulatory authorities and I&APs. • Consider comments received and compile the final reports. • Submit the final reports to MEFT for their review and decision-making.

A draft EIA Scoping (including Impact Assessment) Report (including an EMP) for the Oshivela Green Iron Pilot Project will be made available for a public review and comment period. Registered I&APs will be notified via e-mail of the review period and the availability of the draft Report. The final EIA Report, along with all IA&P comments, will be submitted to the MEFT (Environmental Commissioner) for review and a final decision.

7. KEY ISSUES RELATED TO THE PROPOSED OSHIVELA PROJECT TO BE CONSIDERED

Key potential environmental issues (i.e. aspects / potential impacts), that need to be assessed as part of the EIA process, associated with the proposed Project, include:

- Biodiversity – potential destruction and loss of species, habitats and ecological functioning. Specifically the PV Power plant infrastructure would contribute to a relatively big overall project footprint.
- Avifauna – potential impacts to birds associated with the proposed solar PV infrastructure.
- Visual impact – change to the visual landscape and impact on sense of place, specifically relating to the PV Power plant infrastructure.
- Surface and groundwater impacts – groundwater abstraction impacts to other users; alteration of drainage patterns and pollution of groundwater and surface water.
- Archaeology – destruction and damage to archaeological sites and landscapes specifically relating to areas to be disturbed by the project activities and infrastructure / facilities.
- Waste management – general waste generated from construction activities and packaging as well as broken panels.
- Socio-economic – Positive impacts associated with employment, income, and expenditure. Potential negative impacts due to change of land use; traffic related impacts; and social ills relating to more people on the farm.

8. INVITATION TO REGISTER AND COMMENT

If you would like to register as an I&AP to the proposed project and EIA application process, or if you have any questions / comments, please contact Namisun.

For comments to be included in the Scoping (including Impact Assessment) Report they must reach Namisun by no later than **3 November 2023**.