

# Hyphen Hydrogen Energy: Establishing Namibia's renewable hydrogen and ammonia industry

WEBINAR



**Toni Beukes**

Head of Environment,  
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Chief Operating Officer



**AMMONIA ENERGY**  
ASSOCIATION

Thursday, October 24, 2024  
3-4 PM CET (9-10 AM EDT)

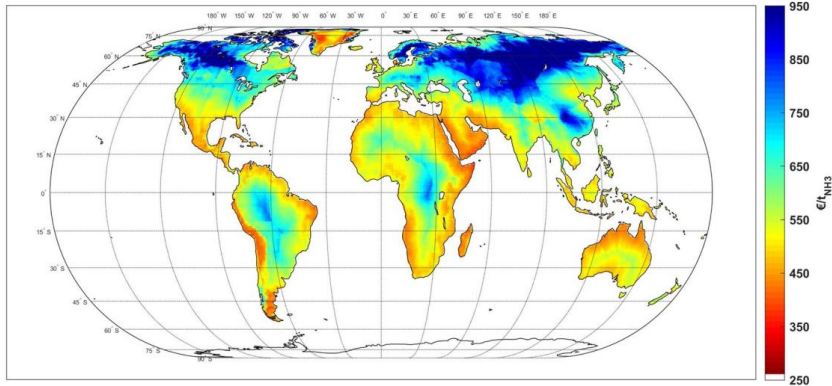
# House rules



- Any questions for the speakers can be asked in the Q&A section. The questions will be answered by text by the speakers, or will be discussed in the panel.
- The webinar recording of this webinar will be shared with all registrants after the webinar.
- An article about the webinar will be posted on [AmmoniaEnergy.org](https://AmmoniaEnergy.org)



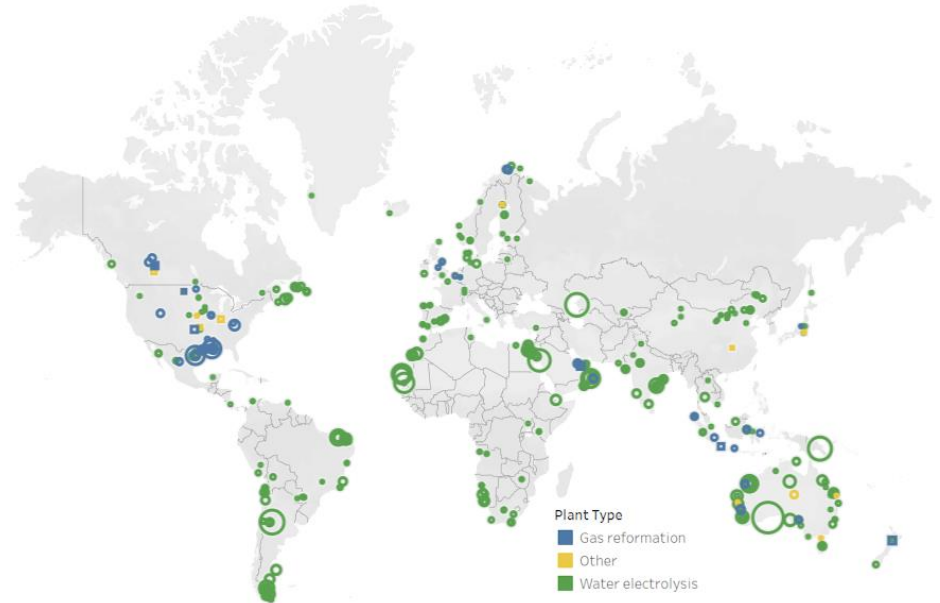
# Renewable ammonia production



*Levelized cost of renewable ammonia in 2030*

Fasihi et al. 2021

<https://www.sciencedirect.com/science/article/pii/S0306261920315750>



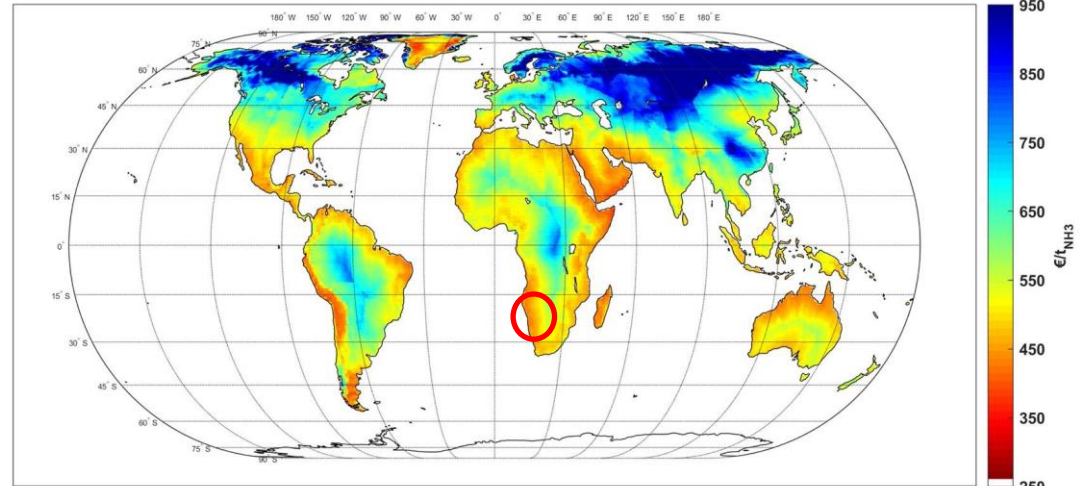
*Global Project List: Low-Emission Ammonia Plants*

Ammonia Energy Association (August 2024)

[ammoniaenergy.org](https://ammoniaenergy.org)

# Renewable ammonia production in Namibia

- Namibia has some of the best combined solar and wind resources globally, technically allowing for renewable ammonia production
- Namibia is a stable democracy, allowing for long-term investments
- Renewables for local industry and relative proximity to international offtake markets (Europe and East Asia)



*Levelized cost of renewable ammonia in 2030*

Fasihi et al. 2021

<https://www.sciencedirect.com/science/article/pii/S0306261920315750>

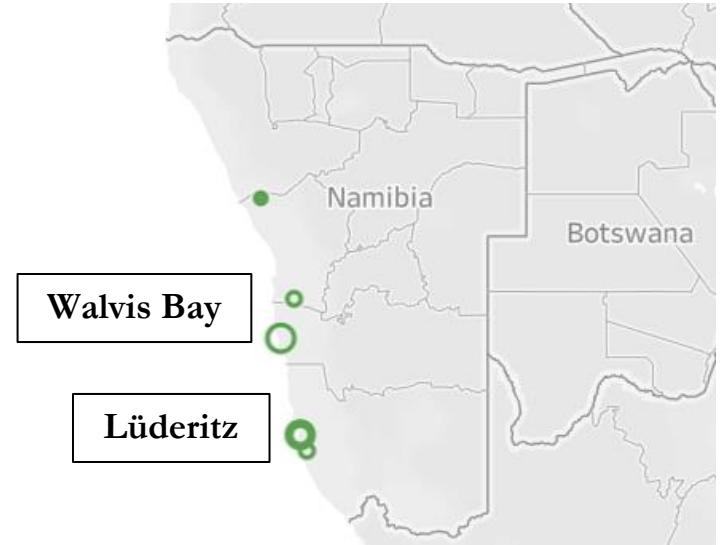
# Renewable ammonia production in Namibia



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Numerous renewable ammonia projects are under development. The main hubs are (1) Lüderitz / Angra Point and (2) Walvis Bay.

Hyphen Hydrogen Energy is also developing its renewable ammonia project in the Lüderitz area.



*Global Project List: Low-Emission Ammonia Plants*  
Ammonia Energy Association (October 2024)  
[ammoniaenergy.org](https://ammoniaenergy.org)



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# MadoquaPower2X: Renewable hydrogen and ammonia for Iberian, European and global markets

WEBINAR



**Rogaciano Rebelo**  
CEO, MadoquaPower2X



**Alberto Litta Modignani**  
VP Hydrogen, NextChem



**AMMONIA ENERGY**  
ASSOCIATION

Tuesday, November 26  
3-4 PM CET (9-10 AM EDT)





HYDROGEN  
ENERGY

**HYPHEN**

**Hyphen Green Hydrogen Project  
SCDI, Namibia:**

**Hyphen Project Overview  
Ammonia Webinar**

**24 October 2024**



Quiver Trees – Konkerboom Woud, Keetmanshoop Namibia  
*(Andreas Glockner)*



## Item Topic

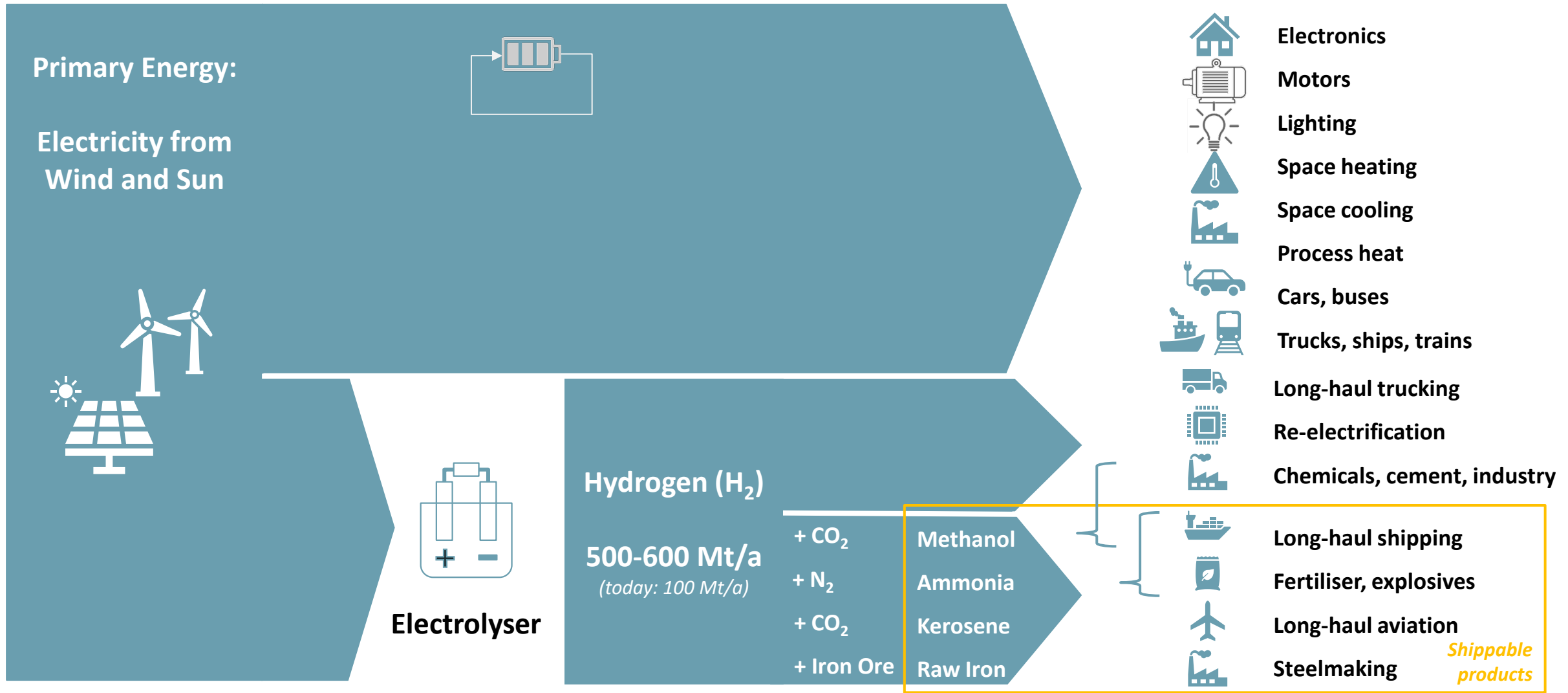
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1. The Case for Green Hydrogen and Why Namibia
2. Who is Hyphen
3. Technical Project and Location
4. Environmental De-risking
5. Socio-Economic Development

1

# The case for Green Hydrogen and why Namibia?

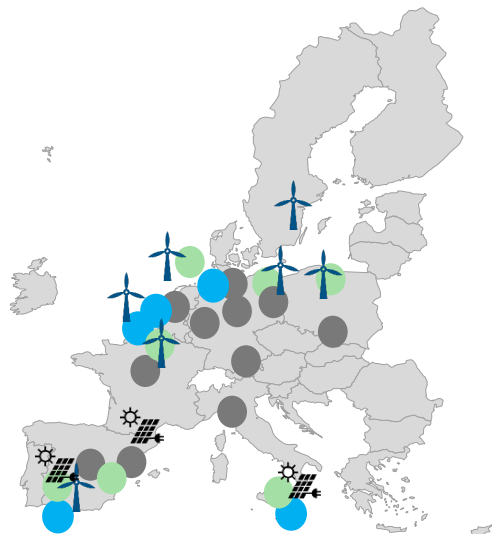
# Sun + Wind + Hydron = Global Energy System in 20xx



# Namibia as a key supply hub for green-hydrogen products

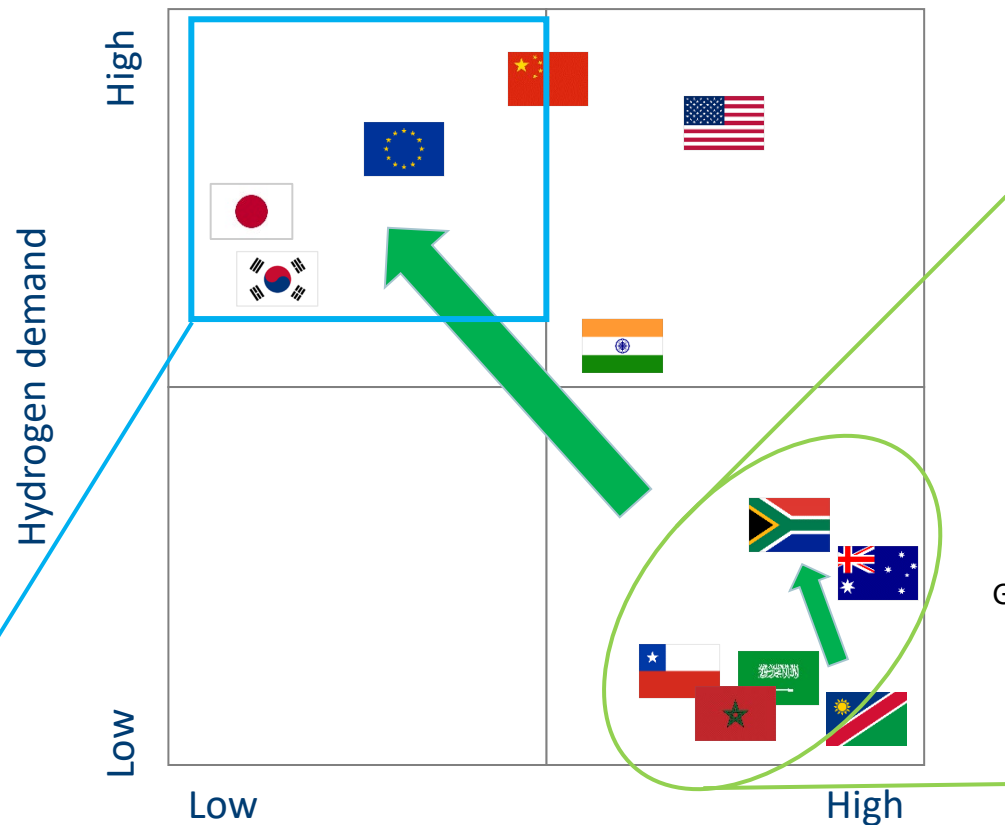


Import hubs in the EU

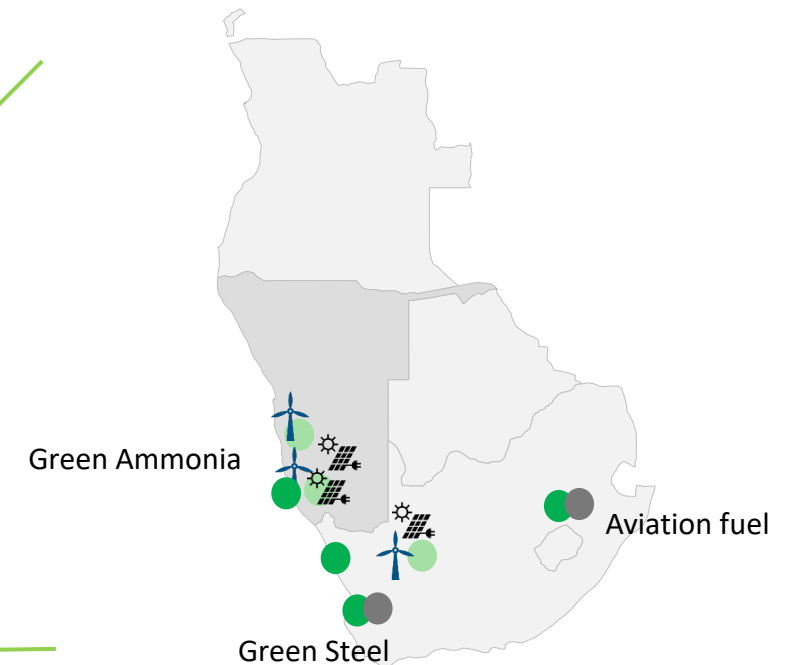


- Import hub
- Major off-taker
- Major production area

Illustrative figure



Export hubs in Southern Africa



- Export hub
- Major off-taker
- Major production area



2

# Who is Hyphen?

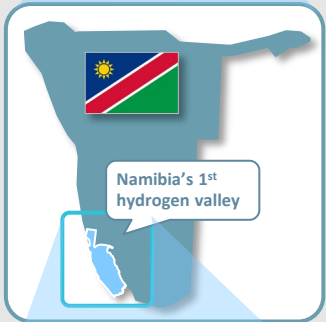
# Project Hyphen: The first step in Namibia's GH<sub>2</sub> industrialisation



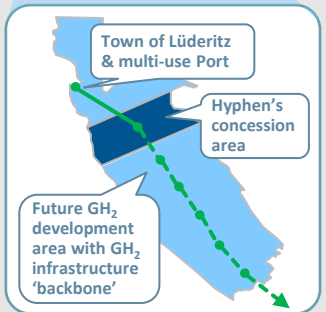
## Namibia: one of the worlds best GH<sub>2</sub> production areas



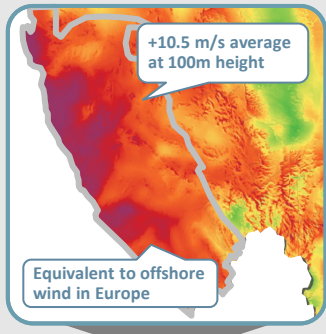
Namibia's position in Africa



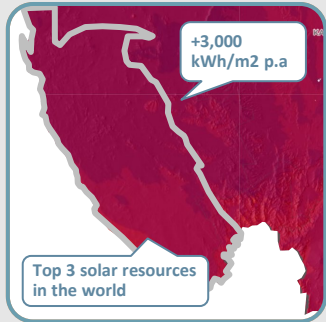
Location 1<sup>st</sup> hydrogen valley



GH<sub>2</sub> development area



1<sup>st</sup> hydrogen valley wind

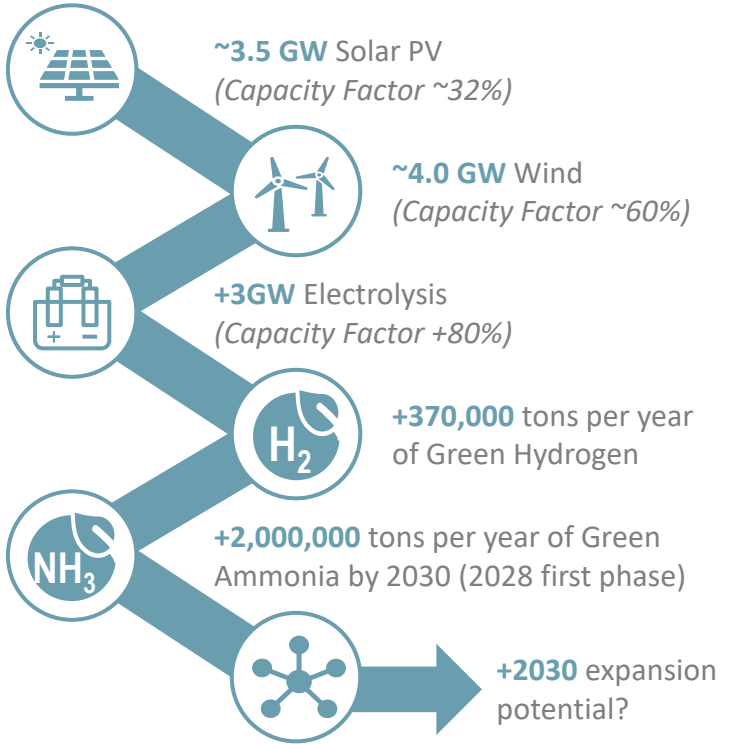


1<sup>st</sup> hydrogen valley Solar

Regionally integrated 'Common Use Infrastructure' designed to enable scale up to 2-3Mtpa H<sub>2</sub>

~20,000 km<sup>2</sup> has been designated for GH<sub>2</sub> development, the first 4,000 km<sup>2</sup> awarded to Hyphen

## Hyphen: fully integrated & one of the world's lowest cost

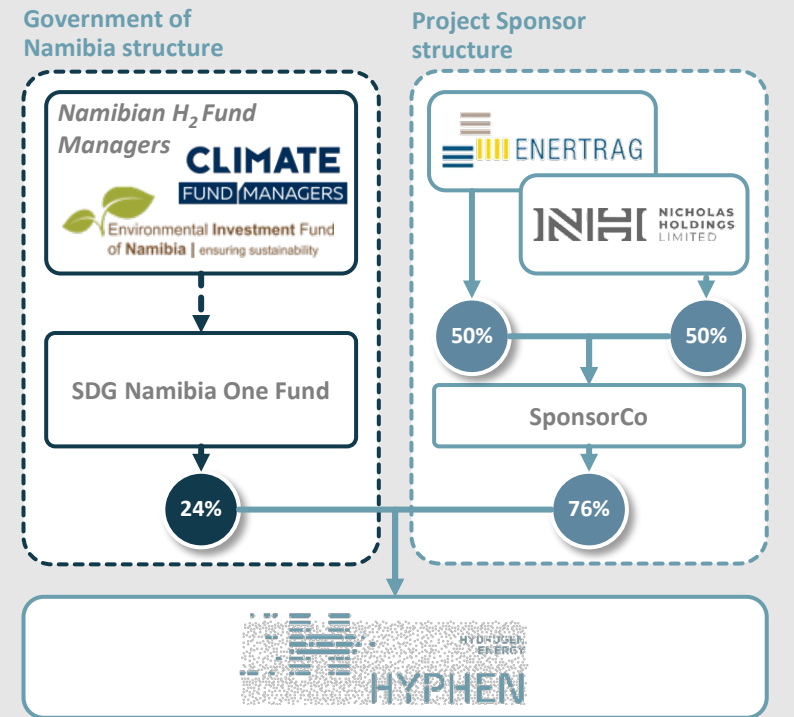


~15,000 employed during construction

~3,000 employed in operations

30% local content in supply chain

## Ownership: a broad based equitable & sustainable model



**Advantages of structure**

- Close alignment between Government and Project Sponsors
- Increased geopolitical positioning of the Project

**Value for Namibia**

**Government non-equity flows:** taxes, royalties and land rentals

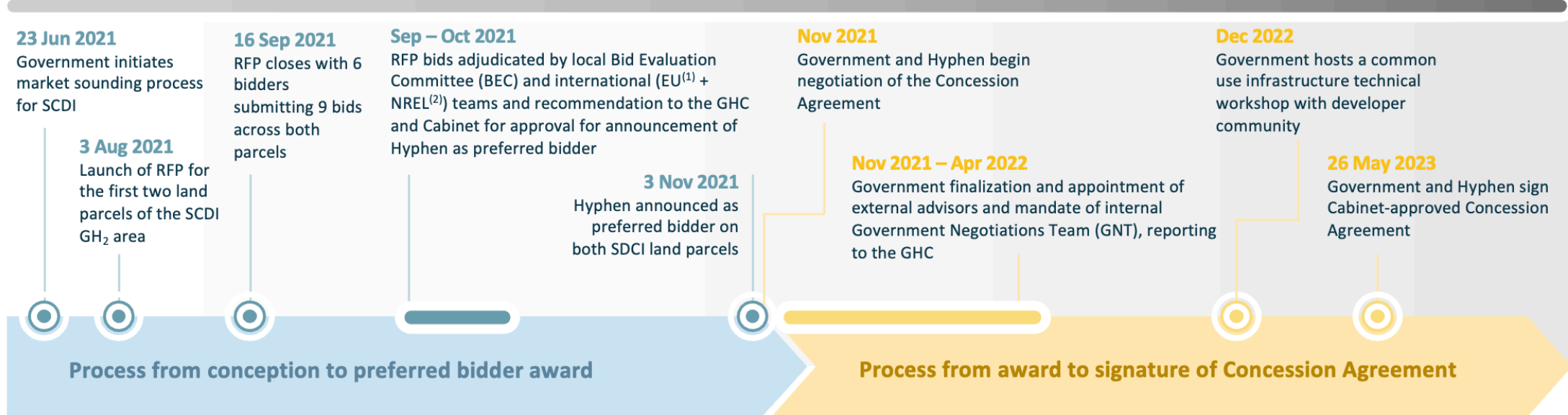
**Government equity flows:** dividends

# Hyphen won competitive tender to develop the project



## Government utilized international experts throughout the process

**May 2021 – May 2023** - Detailed tender, negotiations and market sounding process to conclude Concession Agreement



### Bidders

6 bidders submitting 9 bids across the two land parcels

- SASOL – (x2)
- Fortescue – (x2)
- HYPHEN – (x2)
- CRPG JV Broskies – (x1)
- Tumoneni (CWP) – (x1)
- NeoGreen Hydrogen – (x1)

### Tender Process

The Government BEC was supported in its evaluation of bids by external advisors from the EU and USA:

**European Union Global Technical Assistance Facility on Sustainable Energy**

### Concession Agreement process

The GHC and GNT were supported in the development and negotiations of the Concession Agreement by a team of local and international advisors

<b>Legal</b> CLIFFORD CHANCE ESI Dr S Akweenda	<b>Strateg</b> McKinsey & Company	<b>Technical and Advisory</b> SYSTEMIO HInicio
<b>Financial</b> Cranmore Partners	<b>Project Management</b> SYSTEMIO Performance Delivery Unit	

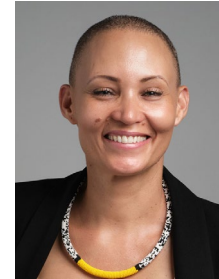
### Namibia's Green Hydrogen Traction Document

Scan to follow link

# Proudly Namibian team of >25 people across 2 offices



## Windhoek office



## Lüderitz office





3

# Technical project overview and location

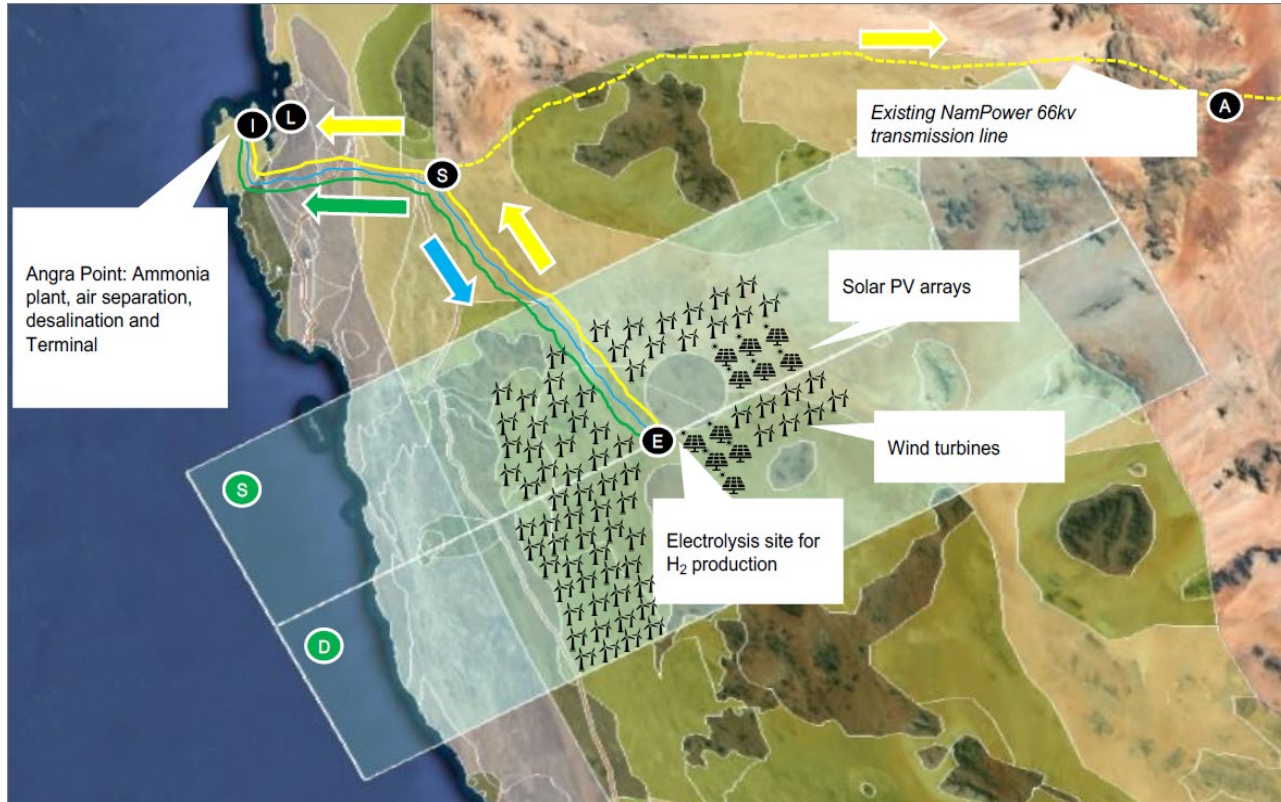
# Hyphen project layout and SCIDI

Conservative estimates<sup>1</sup>

## Hyphen Hydrogen is targeting a promising market: green ammonia

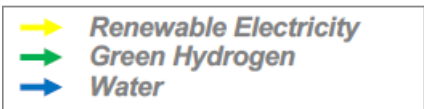


- Hyphen will produce green ammonia for export from the port of Lüderitz primarily to Europe, and possibly to other markets (Asia)
- As an illustration, this represents c. 50% of the current German ammonia production, which is currently made with Russian gas
- Hyphen will thus have a key role in ensuring security of supply for the EU

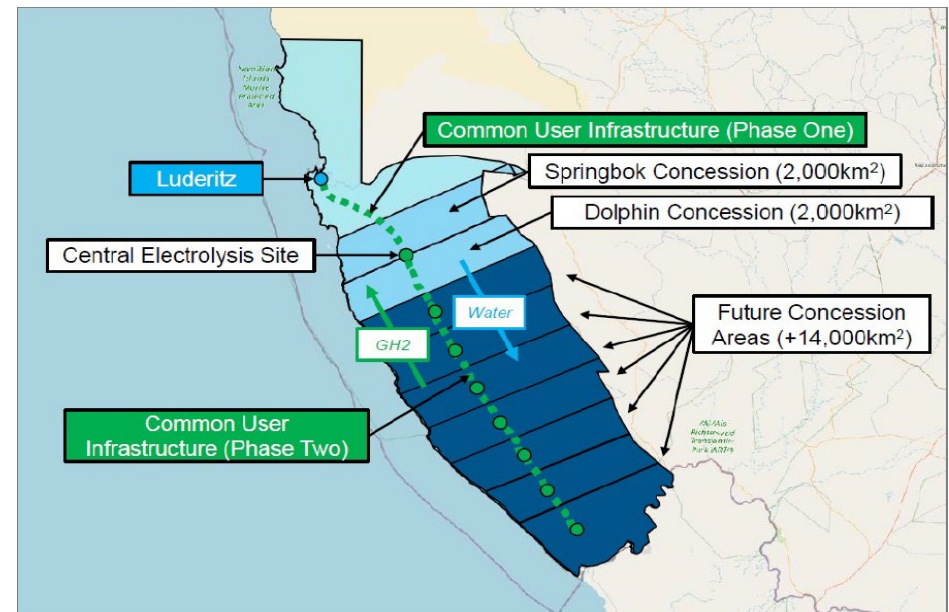


- S** Springbok land parcel (2000 km<sup>2</sup>)
- D** Dolphin land parcel (2000 km<sup>2</sup>)

- I** Angra Point Industrial Facility
- L** Lüderitz town
- S** Substation connecting to Nampower grid
- E** Electrolyser Site
- A** Town of Aus



Note: (1) Engineering studies under way  
HYPHEN

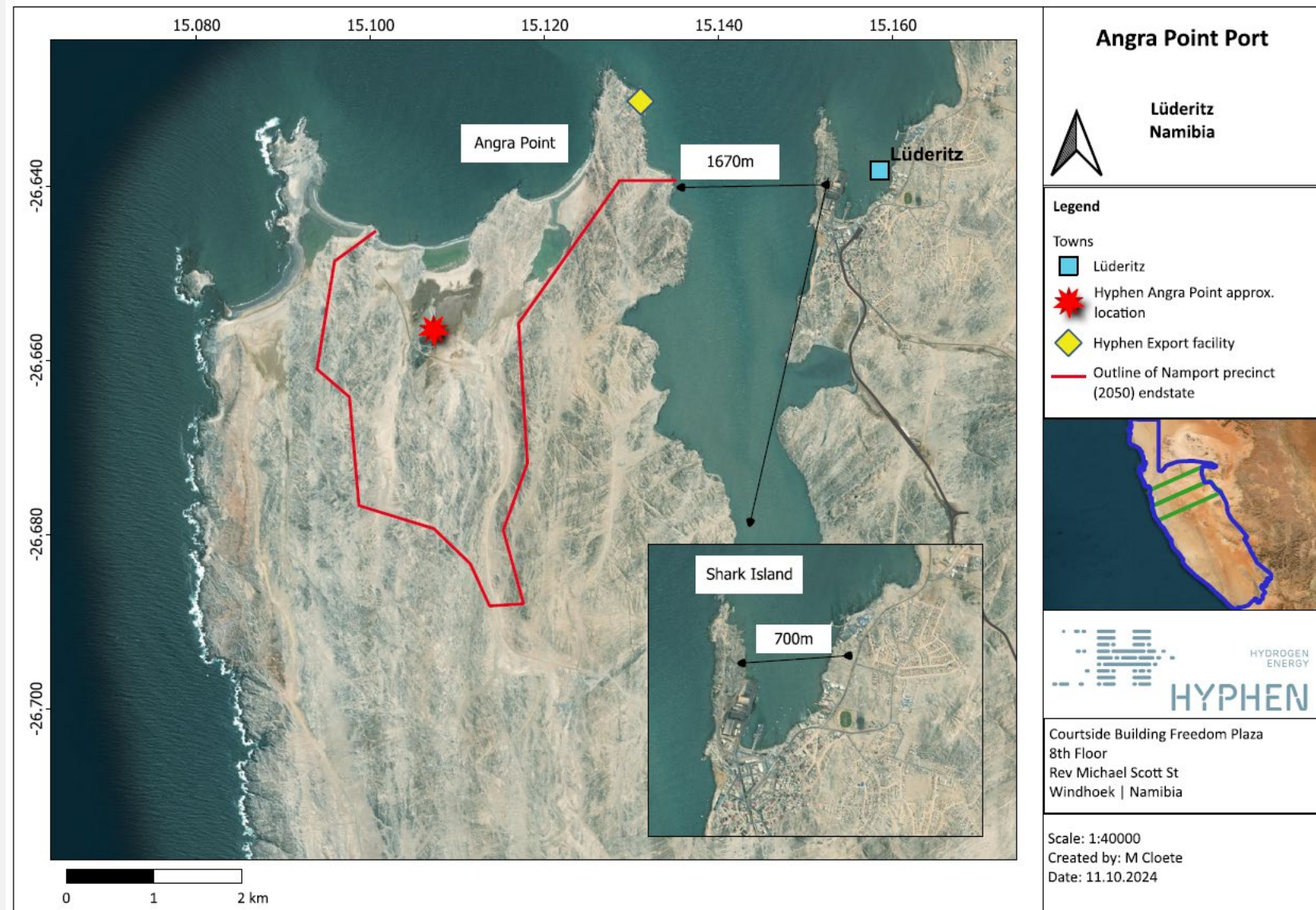




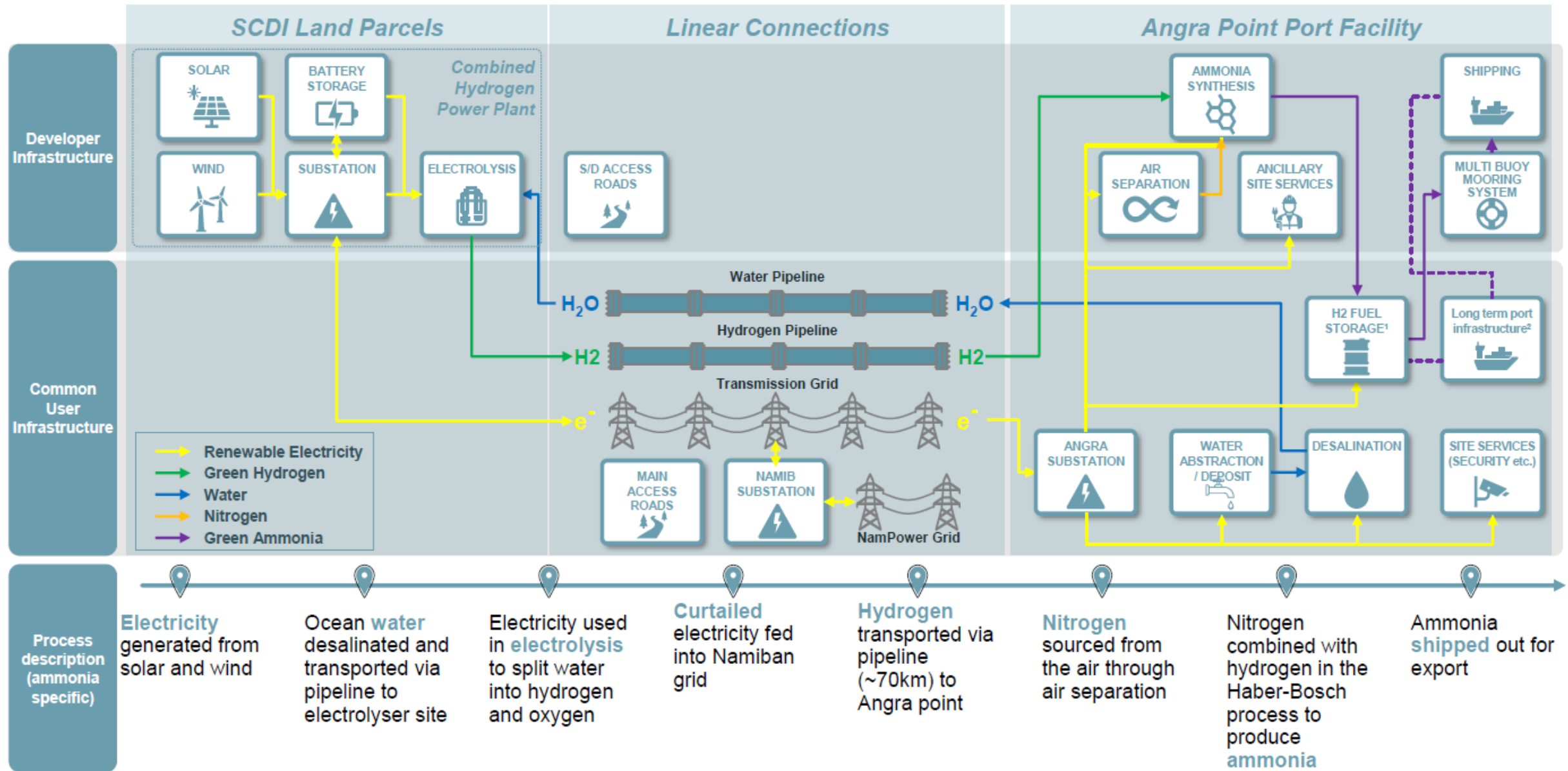
# Angra Point location for new port development

- Proposed location for the new port infrastructure for the importation of project cargo for the construction of the project and the location for the export of ammonia

- The location for the chemical and port industrial complex site (location of water desalination, ammonia production and storage and other cargos being targeted for export)



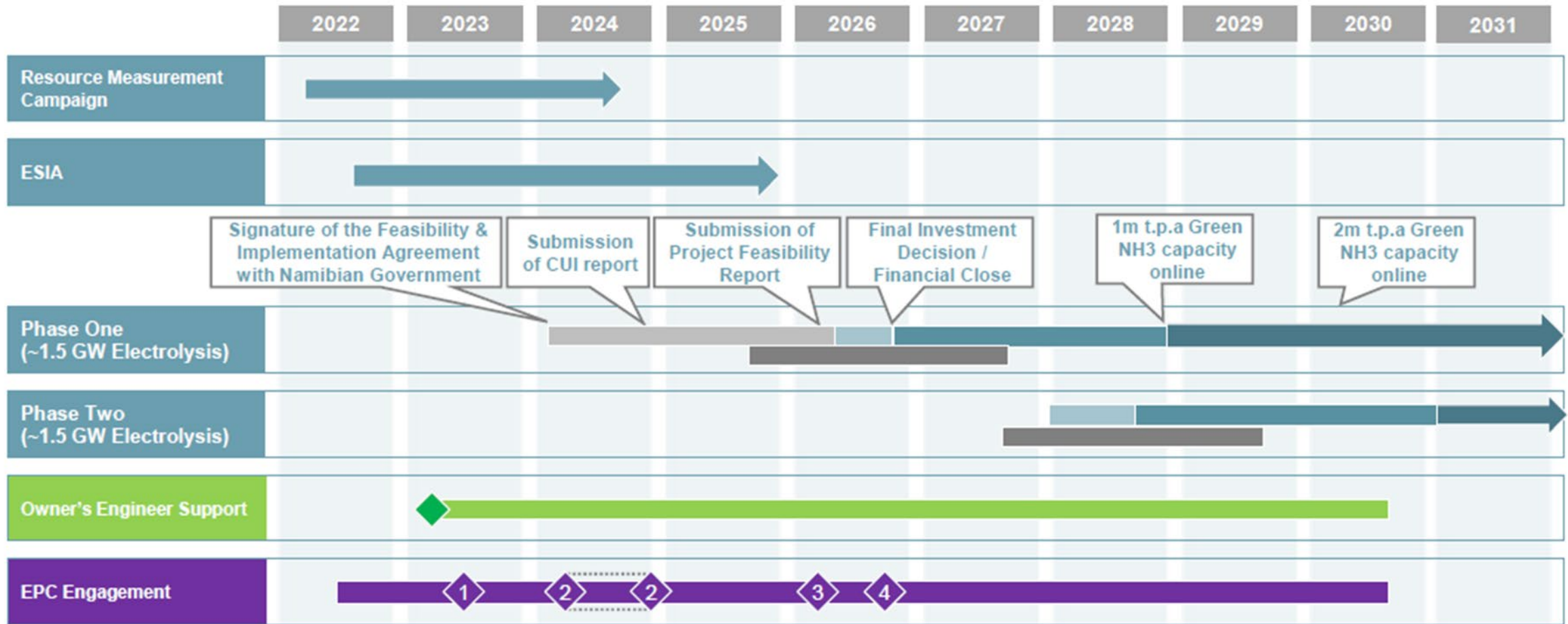
# 'Common User Infrastructure' will enable low-cost future projects



1. Could also store other synthetic fuels. The product stored as part of the first project is ammonia 2. Long term physical port infrastructure to be build in the future, with exact ownership and operating structure to be determined



# Hyphen Timelines (High-Level)



Signature of the Feasibility & Implementation Agreement with Namibian Government

Submission of CUI report

Submission of Project Feasibility Report

Final Investment Decision / Financial Close

1m t.p.a Green NH3 capacity online

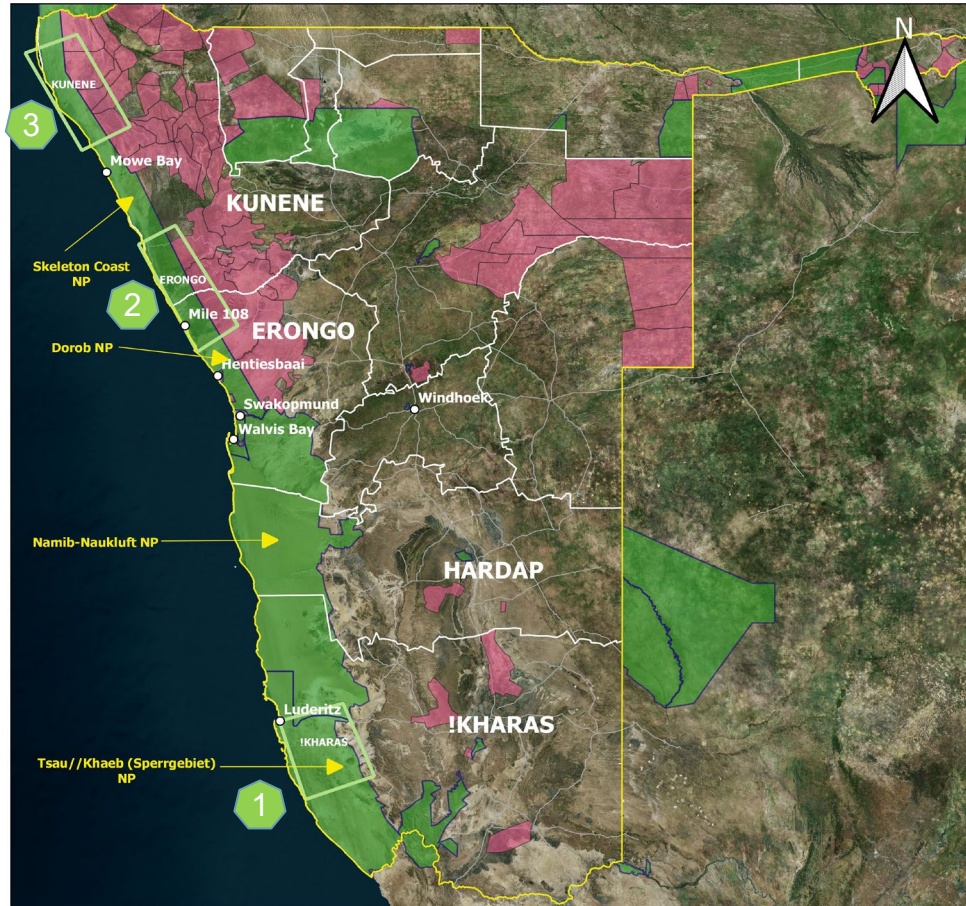
2m t.p.a Green NH3 capacity online

- ◆ Appointment OE
  - FEED
  - Detailed Design
  - Mobilisation
  - Construction
  - Operations
- 1 RFI to EPCs
  - 2 Selection of EPCs
  - 3 FEL3 Design
  - 4 Contract Award

4

# Environmental de-risking

# Environmental constraints unavoidable as ~42% of Namibia's landmass under conservation mgmt; National Parks extend entire length of coast



## Legend

- Key Places
- ▭ Namibia Border Boundary
- ▭ Potential Renewable Energy Locations
- ▭ Regional Boundaries
- ▭ National Parks
- ▭ Communal Conservancies
- Roads

0 100 200 300 400 km

Scale: 1 : 5 192 909 @ A3  
Projection: Pseudo Mercator WGS84



Both Hyphen and the Namibian Green Hydrogen Council (GHC) **understand the complexities of biodiversity** in the Tsau //Khaeb National Park (TKNP)

Hyphen has prioritised the **Mitigation Hierarchy** to limit as far as possible the negative impacts on biodiversity

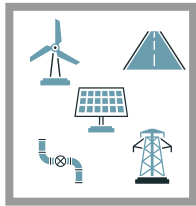
Hyphen with SLR and local specialists conducted site **alternative assessment**. The findings were shared with the stakeholder as part of the initial Stakeholder Engagement

All **first mover** alternative sites fall within **Protected Areas**

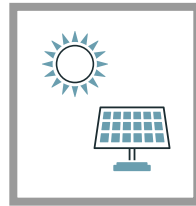
GHC has recognised that the **TKNP** holds significant potential to contribute to the development of the **green hydrogen industry in Namibia**, and is an extremely favourable location for a first mover in Namibia

# Infrastructure design optimised to ensure smallest footprint

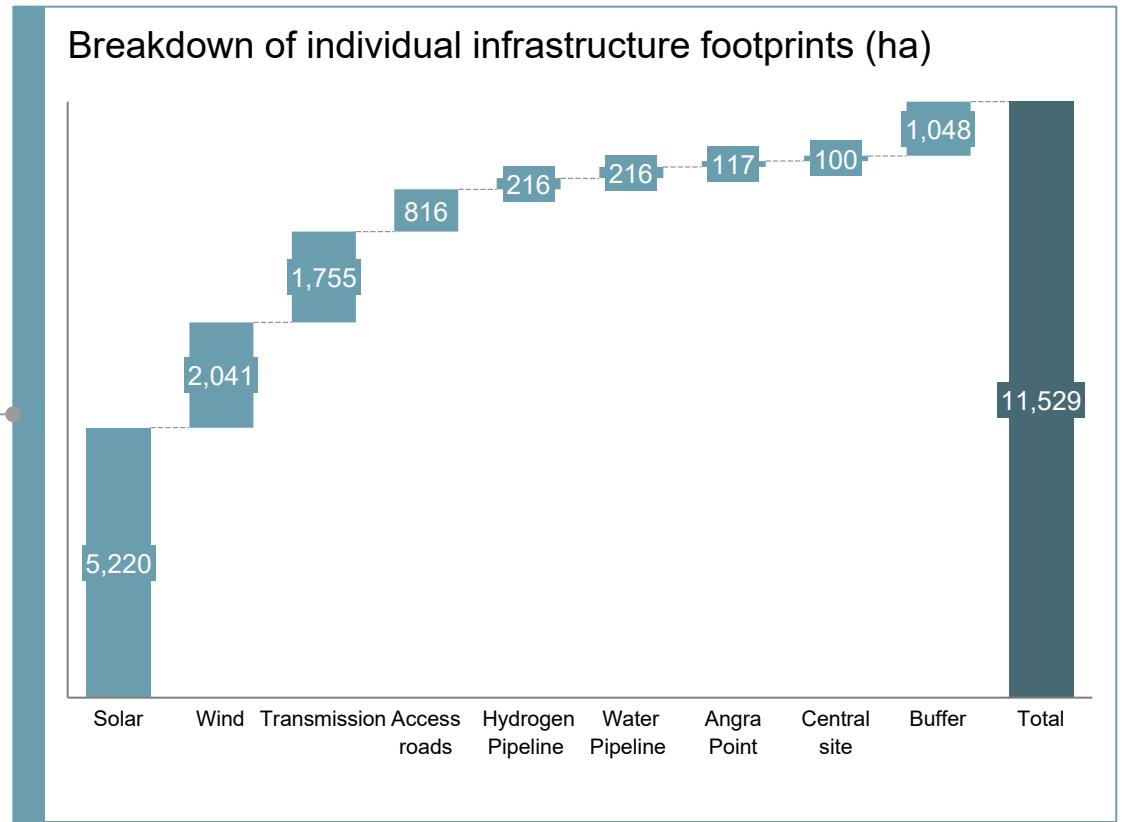
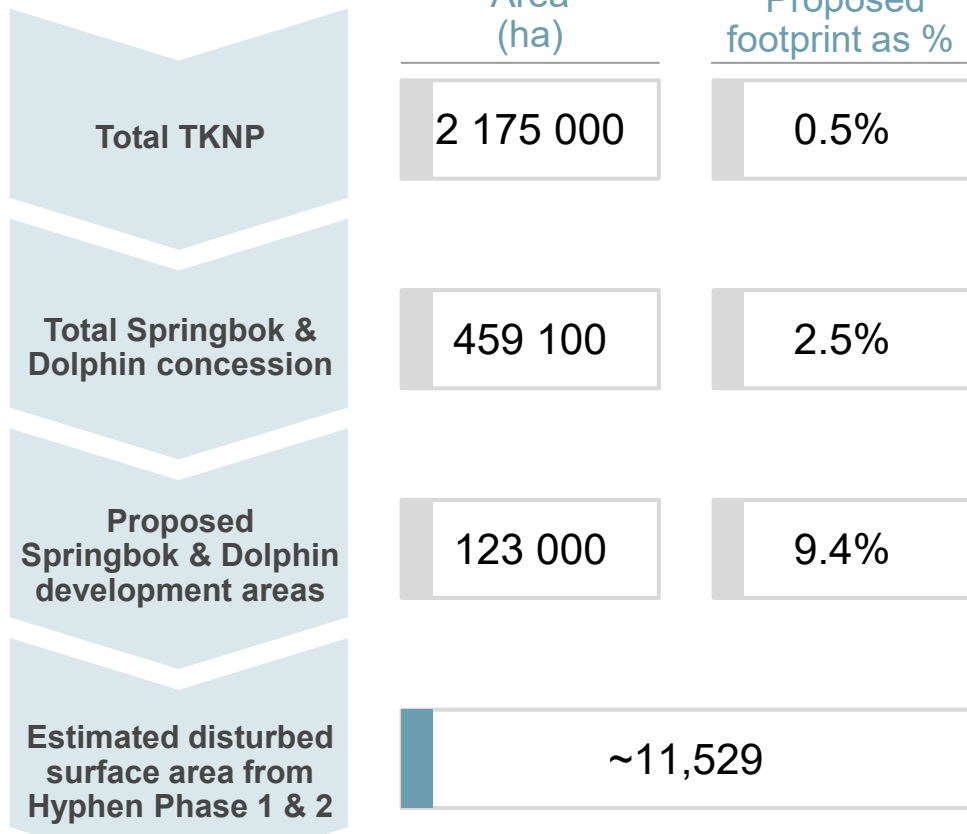
Preliminary



**Worst case** <3% of concession areas will be disturbed through **surface infrastructure footprint**



Solar infra accounts for **~1/2 of the total disturbed area**, and has therefore been located in the least environmentally sensitive zone of the TKNP



Note: Central site consists of BESS, Buildings, Electrolyser, Control Systems; Angra point consists of Desalination, N2 plant, Ammonia plant, Ammonia storage; Buffer of 10% added to ensure estimate is conservative  
HYPHEN

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# Socio-Economic Development



# Socio-Economic Development Framework Overview

Hyphen is central to Namibia's economic recovery plan and is aligned to Harambee Prosperity Plan II (HPP2) which aims to complement and accelerate the long-term goals for prosperity under Vision2030 and the NDPs

The project will bring unprecedented developmental impact and important co-benefits for Namibia (through taxes, royalties, land rentals, employment, local content, infrastructure, etc.)



Hyphen and Government have agreed a SED framework under the Concession Agreement

Guiding Principles that define Hyphen and Government's approach throughout the development and implementation of the SED framework

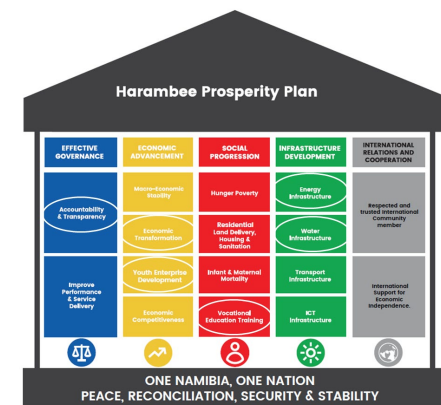
- Maximize uptake of Namibian Citizens and Youth for employment in the Project
- Maximize number of Local Entities that can participate through procurement opportunities in the Project during construction and operations



**1** The SED Framework incorporates mechanisms that will enable Government to provide meaningful input, exercise oversight and monitor compliance with the principles and objectives contained in the SED Framework

**2** The SED Framework supports Government's national social progression imperatives without compromising Project delivery

**3** The SED Framework will be evolved into a comprehensive SED Strategy and Plan




## SED Elements

Hyphen and GRN have gone beyond legal requirements to design an SED framework that covers seven elements and ensures that the benefits and opportunities under this pioneering green hydrogen project are enjoyed by all Namibians throughout the country:



Employment and Local Procurement were the only elements included by GRN in its RFP

Procurement Initial Employment and Procurement numbers were *good faith estimates*, and are subject to further verification during Feasibility Period

 <h3>Employment</h3> <p>Refers to the estimated number of people to be employed by Hyphen</p> <ul style="list-style-type: none"> <li>• Construction phase: 15,000</li> <li>• Operational phase: 3,000</li> <li>• Estimated 90% Namibian and 20% youth employment</li> </ul>	 <h3>Skills Development</h3> <p>Refers to education, training and capacity building initiatives by Hyphen and GRN that are necessary to support the employment of Namibians and youth under the project</p>	 <h3>Local Procurement</h3> <p>Refers to the proportion of goods, services and/or materials procured locally by Hyphen, favouring local entities that are Namibian-owned</p>
 <h3>Enterprise and Supplier Development</h3> <p>Refers to initiatives by Hyphen and GRN necessary to support enterprises to accelerate the development of Namibian business to capture opportunities arising from the project</p>	 <h3>Supplementary Infrastructure Requirements</h3> <p>Refers to the development by GRN of key public infrastructure such as roads and utility supply infrastructure in Luderitz and Aus necessary to address the expected growth in population as a result of the project, as well as the provision of housing by Hyphen for its employees</p>	 <h3>Corporate Social Investment</h3> <p>Refers to charitable and philanthropic investments to be made by Hyphen for the benefit of local communities</p>

**SED outcomes are intended to be impactful, transformative, sustainable and inclusive.**

# Transitioning SED Framework to IFC compliant SED Strategy & Plan

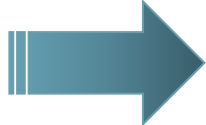
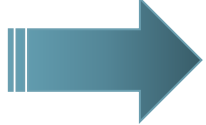


The SED Framework will be evolved into a **comprehensive SED Strategy and Plan** within 18 months of the FIA becoming effective



## SED Framework

- 1 Employment
- 2 Local Procurement
- 3 Skills Development
- 4 Enterprise and Supplier Development
- 5 Supplementary Infrastructure
- 6 Corporate Social Investment (CSI)
- 7 Reporting, Monitoring & Evaluation



## SED Strategy & Plan

- 1 Hiring Policy & Procedure
- 2 Local Content Plan
- 3 Skills Development Plan
- 4 Enterprise and Supplier Development Plan
- 5 Project Housing Strategy
- 6 Corporate Social Investment Plan
- 7 Reporting, Monitoring & Evaluation Protocols

