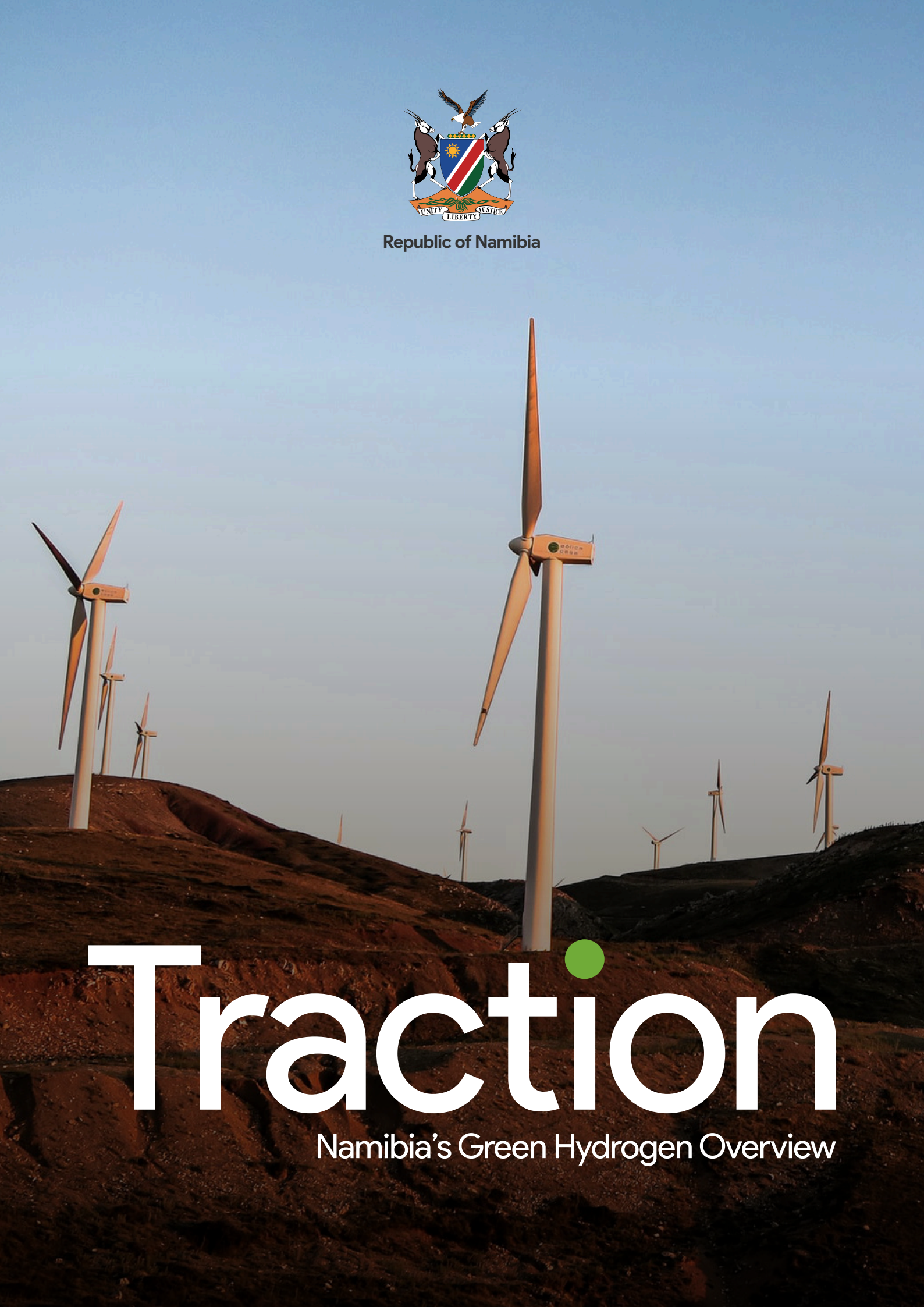
Republic of Namibia



Traction

Namibia's Green Hydrogen Overview

> With its abundant, world-class renewable energy resources and increasing demand for green hydrogen worldwide, Namibia could be an early entrant in this new market.
>
> Harambee Prosperity Plan II

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Learn more on:
www.gh2namibia.com

HARAMBEE PROSPERITY PLAN II
2021 - 2025

GreenHydrogen | Namibia

Harambee Prosperity Plan II
Performance Delivery Unit

Foreword

Namibia is resolutely committed to the Paris Agreement, and to taking practical and ambitious action to reduce emissions and ensure a climate-resilient economy. In order to achieve the targets therein an increased uptake of green hydrogen in hard to abate, energy intensive sectors is critical.

The commitment to the Paris Climate Accords and ambitions of the 17 Sustainable Development Goals require resolute policy commitment and expedited project execution. Given our world-class renewable resources, proximity to the ocean and peaceful operating environment, Namibia is well placed to become a sub-Saharan clean energy powerhouse with dynamic green and blue economies. To this end, Namibia has identified 4 potential Hydrogen valleys across the country and has commenced with the development of the first: The Southern Corridor Development Initiative (SCDI). The SCDI is a portfolio of complementary projects and infrastructure in the !Karas region of Namibia that seeks to optimize the production of affordable Green Hydrogen and Ammonia for the country. Green hydrogen in turn, offers a unique opportunity to deploy renewable energy at scale, leading to Namibia's energy independence, whilst also unlocking an opportunity to industrialize Namibia by attracting energy intensive sectors that would benefit from cheap and clean energy. This development of complementary engines of growth through the accumulation of new productive capacities and know-how, in strategic sectors, is a vital component of our economic recovery plan which aspires to grow the complexity and diversity of Namibia's economic structure.

We have captured and articulated our Hydrogen ambitions in the 2nd Harambee Prosperity Plan under the Economic Advancement Pillar and have actively pursued its respective goals and targets, since its launch in March 2021. This Report takes account of our progress and begins to share our story with the World.

Hydrogen is already in widespread use but today more than 95% of hydrogen is produced from natural gas and coal and is thus incompatible with a long-term sustainable energy ecosystem. While green hydrogen has received increased attention from governments and industry alike, significant investment is required to reduce the levelized cost of hydrogen over time. This is necessary to ensure that green hydrogen and its derivatives become an indisputable mainstay of the global energy mix. In Davos this year, Namibia will thus be announcing its efforts to court concessionary capital using a blended financing platform we have termed SDG Namibia ONE, to facilitate the effective deployment of the systemic capital needed to meet this challenge.

The Namibian Government has set ambitious targets to support the regional and global decarbonization agenda and has made significant strides over the past 12 month since the launch of the Harambee Prosperity Plan II. We remain a friend to all and an enemy to none and are willing to open up our borders to facilitate the effective construction of an industry that will lead to the economic emancipation of our people and the preservation of the pristine majesty of our planet for our loved ones. Let us all hold hands and deliver on the commitments of the Paris Agreement with utmost allegiance and enthusiasm.

Dr. Hage G. Geingob
PRESIDENT OF THE REPUBLIC OF NAMIBIA

Chairmans Report

Green Hydrogen Council

April 2021 - March 2022

Executive Summary

The accelerated deployment of clean energy has set in motion a global energy transformation with far-reaching geopolitical implications. Less than a year ago His Excellency Dr Hage G. Geingob launched the 2nd Harambee Prosperity Plan as a targeted Action Plan of the Namibian Government towards Economic Recovery and Inclusive Growth.

As the world economy works to transition to net zero emissions, Namibia's vast renewable resources offer a once in a generation opportunity to jump start Namibia's industrialization, achieve energy security and increased prosperity for its citizens as envisioned under HPPII and Vision 2030, while making a crucial contribution to solving global climate challenges through the provision of affordable clean energy to the global economy and meeting Namibia's pledges to the Glasgow Breakthrough agenda.

Renewable energy deployment is labor intensive and well documented employment multipliers range from 5 jobs per MW to 7 per MW during construction and just under 1 per MW during operations. Given the strategic importance and alignment of this 'Strategic Bet', the Namibian Government has aggressively made progress in developing our Hydrogen Economy. This report is an account of the events of the past 12 months and the progress achieved by the Green Hydrogen Council, a body His Excellency constituted to expedite the incubation of a synthetic fuel industry in Namibia.

The report reflects on the key milestones reached and takes a look into the near future and shares upcoming goals and objectives and our desire to collaborate with like-minded partners to deliver on said ambitions. It further highlights some of the partnerships that were signed over the past 12 months and profiles the Tsau //Khaeb (Hyphen) project as the 1st of many such projects to come. The first phase of this project, which is expected to enter production in 2026, will see the creation of 2 gigawatts of renewable electricity generation capacity to produce green hydrogen for conversion into green ammonia, at an estimated capital cost of US$4.4 billion.

Further expansion phases in the late 2020s will expand combined renewable generation capacity to 5 gigawatts and 3 gigawatts of electrolyser capacity, increasing the combined total investment to US$9.4 billion and green hydrogen production to 300,000 tons. Through the strategic deployment of R&D, targeted stimulative investment and pilot projects, 3 other hydrogen valleys may emerge over time. These will be the subject of the Namibian Synthetic Fuels Strategy to be developed by our Ministry of Mines and Energy.

Namibia plans to contribute to regional cohesion by reducing the Southern Africa's emissions profile and alleviate the strain on Eskom and the Southern African Power Pool (SAPP) to supply power to its neighbors. Green hydrogen is a game changer for Namibia and has the potential to become a significant enabler of Namibia's Vision 2030.

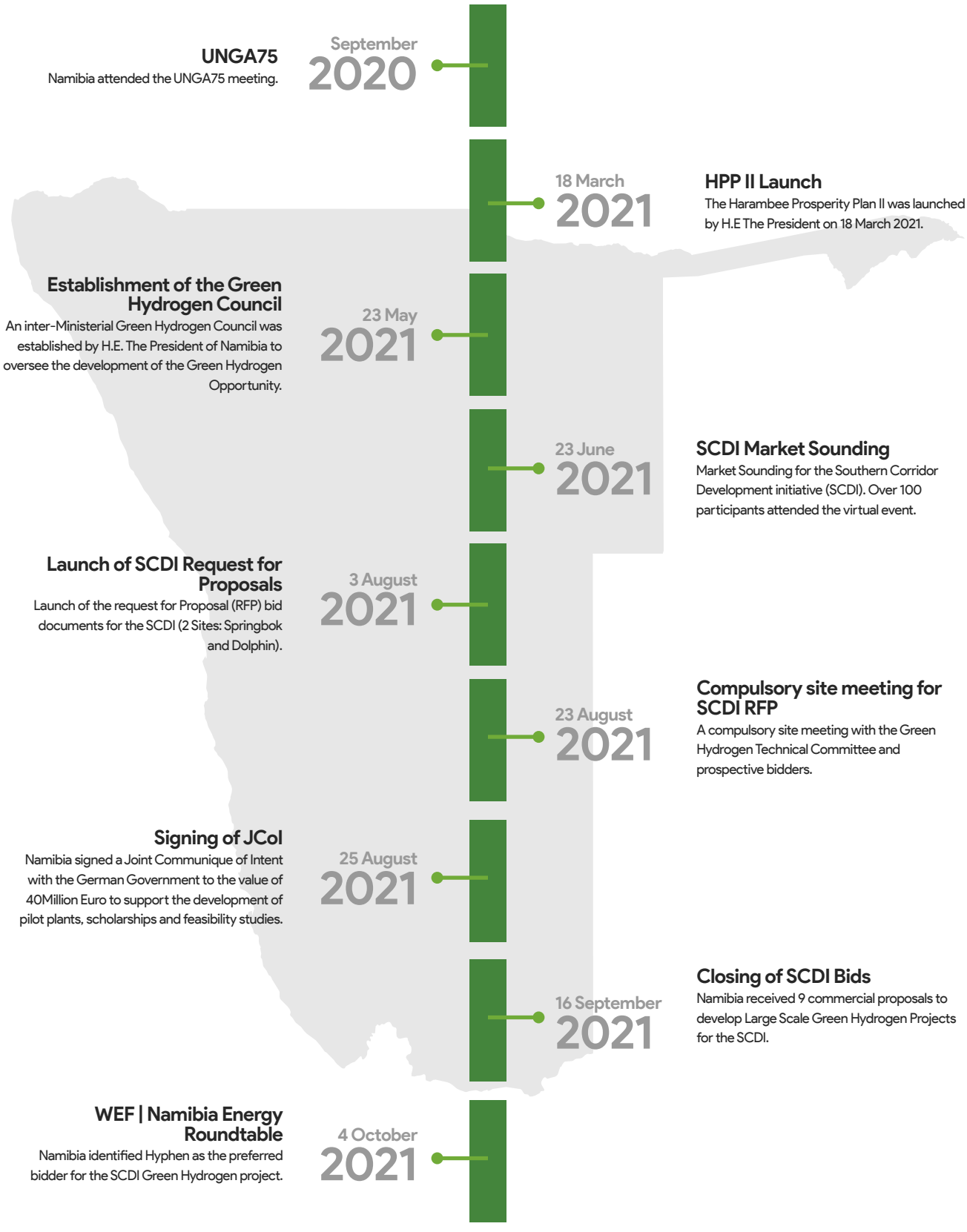
Namibia recognizes the important role critical raw minerals will play in enabling a just energy transition. Early assessments of rare earths deposits around the country indicate that Namibia may have some of the largest deposits of rare earths outside of China. When combined with our synthetic fuels potential, Namibia posseses a truly unique opportunity to meaningfully contribute to the global decarbonization agenda!

Honourable Obeth M Kandjoze
Green Hydrogen Council Chairperson

The Last 12 Months

The Namibian Green Hydrogen Milestones

Namibia's Green Hydrogen Milestones



UNGA75
Namibia attended the UNGA75 meeting.

September 2020

18 March 2021

HPP II Launch
The Harambee Prosperity Plan II was launched by H.E The President on 18 March 2021.

Establishment of the Green Hydrogen Council
An inter-Ministerial Green Hydrogen Council was established by H.E. The President of Namibia to oversee the development of the Green Hydrogen Opportunity.

23 May 2021

23 June 2021

SCDI Market Sounding
Market Sounding for the Southern Corridor Development initiative (SCDI). Over 100 participants attended the virtual event.

Launch of SCDI Request for Proposals
Launch of the request for Proposal (RFP) bid documents for the SCDI (2 Sites: Springbok and Dolphin).

3 August 2021

23 August 2021

Compulsory site meeting for SCDI RFP
A compulsory site meeting with the Green Hydrogen Technical Committee and prospective bidders.

Signing of JCoI
Namibia signed a Joint Communique of Intent with the German Government to the value of 40Million Euro to support the development of pilot plants, scholarships and feasibility studies.

25 August 2021

16 September 2021

Closing of SCDI Bids
Namibia received 9 commercial proposals to develop Large Scale Green Hydrogen Projects for the SCDI.

WEF | Namibia Energy Roundtable
Namibia identified Hyphen as the preferred bidder for the SCDI Green Hydrogen project.

4 October 2021

Agreement with Port of Rotterdam

2 November 2021

The Namibian Ports Authority (NAMPORT) signed a memorandum of understanding with the Port of Rotterdam (PoR), readying itself to become the Green Hydrogen Export Hub for Europe and the rest of the world.

Selection of Preferred Bidder at COP26

2 November 2021

Namibia identified Hyphen as the preferred bidder for the SCDI Green Hydrogen project.

Namibia - Belgium Agreement

4 November 2021

Namibia and Belgium have sealed a deal to promote and develop cooperation in the field of Green Hydrogen.

Signed agreement with Economic Affairs and Climate Action Ministry - Germany

11 April 2022

The Joint Declaration of Intent (JCoI) was signed by Robert Habeck, the German Chancellor and Minister of Economic Affairs and Climate Action, and Thomas K Alweendo, the Namibian Minister of Mines and Energy.

Establish Namibia Negotiating Team

11 April 2022

The Green Hydrogen Council appointed a 21 member negotiating team to support negotiations with Hyphen.

Launch of JCoI bid documents

12 April 2022

Namibia launched 3 bids as part of the JCoI Program to develop Green Hydrogen Pilot Plants, Scholarships for 200 Namibians and developing a Green Hydrogen Strategy for Namibia.

Closing of JCoI Bids

May 2022

31 Bids received to develop pilot plants across Namibia and 3 Bids received to develop the National Green Hydrogen Strategy.

The Green Hydrogen Council

On the 23rd of May 2021, The President of The Republic of Namibia established an Inter-Ministerial Green Hydrogen Council (GHC) as outlined in the Harambee Prosperity plan II (Economic Advancement Pillar – Goal 3, Activity 2a). Below is a summary of the Council Members and their respective Portfolios:

Honourable Obeth M Kandjoze

- Green Hydrogen Council Chair
- Director General of the National Planning Commission
- Former Minister of Mines and Energy.

Mr James Mnyupe

- Green Hydrogen Commissioner
- Economic Advisor to the Namibian President
- Former Allan Gray Namibia Managing Director and a 2022 WEF Young Leader.

Honourable Iipumbu W Shiimi

- Green Hydrogen Council Member
- Minister of Finance
- Former Governor of the Bank of Namibia from 2010 until 2020.

Honourable Thomas K Alweendo

- Green Hydrogen Council Member
- Minister of Mines and Energy
- In 2003, he became the first Namibian Governor of the Bank of Namibia.

Honourable Pohamba P Shifeta

- Green Hydrogen Council Member
- Minister of Environment, Forestry and Tourism
- Pohamba Penomwenyo Shifeta is a Namibian politician who has served as Minister of Environment and Tourism in the Cabinet of Namibia since his appointment by president Hage Geingob in March 2015.

Honourable Carl-Hermann G Schlettwein

- Green Hydrogen Council Member
- Minister of Agriculture, Water and Land Reform
- Former Minister of Finance.

Mr Johannes !Gawaxab

- Green Hydrogen Council Member
- Central Bank Governor
- Former Head of Old Mutual Africa and Chair of EOS Capital.

Mrs Nangula N Uaandja

- Green Hydrogen Council Member
- CEO : NIPDB
- Former Country Partner of Price Waterhouse Coopers in Namibia.

The SCDI

The Southern Corridor Development initiative

The Southern Corridor Development initiative

SCDI Market Sounding

To ensure policy alignment and market demands & expectations, on the 10th of June 2021, the Namibian Government launched the Green Hydrogen Market Sounding Document. The purpose of the market sounding process was to validate the proposed procurement modalities for the Southern Corridor Development (SCDI)and collect & infuse market know-how and requirement. The Market Sounding Documents were uploaded on the gh2namibia.com and NIPDB website.

A Virtual Market Sounding session was conducted on the 23rd of June 2021 between 10h00 and 12h00. The zoom session was attended by over 100 participants from various parts of the world representing several companies, organizations, and consortiums.

Below is a summary of the Market Sounding Outcome

10
Structured Questions

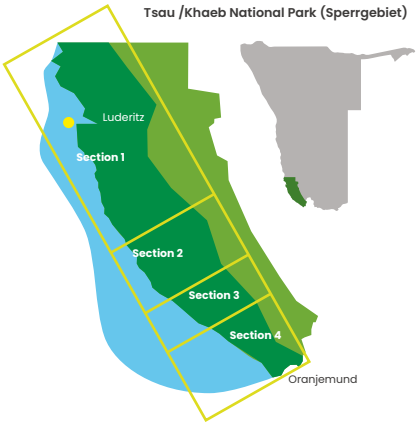
118
Participants

4
Presentations

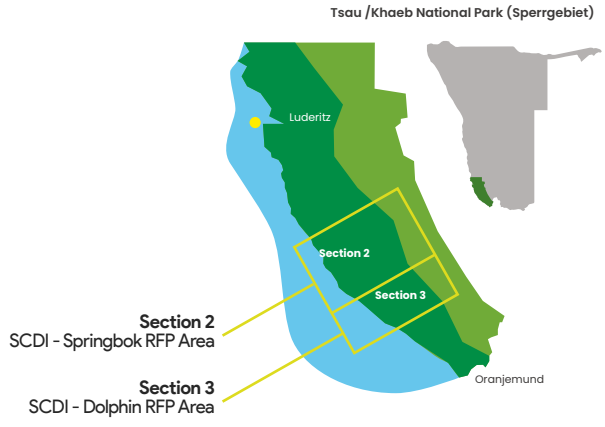
8
Formal Responses

The outcome from the market sounding sessions provided valuable inputs on what would attract potential developers to participate in the Namibia Project, potential risks that developers identify in the project and Government's initial plans, recommendations on concession fees and key proposals on project structuring (i.e. inclusion of the port as part of the project).

Below is a key summary of the key outcomes from the market sounding:



Above: Pre- Market sounding SCDI Layout



Above: Post- Market sounding SCDI Layout

The Southern Corridor Development initiative

SCDI Request for Proposals

Following an engaging Market Sounding process in June 2021, The Namibian Government further developed the Request for Proposals for the first 2 sites (Dolphin and Springbok) in the SCDI Project. Given the nature of the SCDI Green Hydrogen Project and its location, the Request for Proposal (RFP) bid was based on the MEFT legal framework that governs the long-term lease and development of climate combating projects in the National Parks.

The consolidated RFP documents were developed by the Green Hydrogen Technical Committee in consultation with MEFT, validated by the Attorney General, endorsed by the Green Hydrogen Council and Approved by Cabinet for release. Encompassed in the RFP was the evaluation criteria (see the evaluation criteria below). An All of Government support agreement to be signed by the successful developers and various supporting documents such as associated feasibilities, kmz files and key project information.

Evaluation Component	Weight
1. Business Case	30.00
2. Development and Usage Plan Environmental Impact	10.00
3. Social Impact	25.00
4. Financial Evaluation	35.00

Bidding Documents for the SCDI RFP were launched on the 3rd of August 2021 by HE. The President of Namibia at State house. Bids were sold at a cost for N$ 50 000.00 (USD 3,333.33) per site. A total of 23 documents were sold on the 16th of September 2021, 9 bids were received in response to the RFPs from 6 different bidders.

Bidder name	Springbok Site	Dolphin Site
1. Sasol	Yes	Yes
2. Hyphen	Yes	Yes
3. Fortescue Future Industries (FFI)	Yes	Yes
4. CRPG JV BroskiesT	N/A	Yes
5. Tumoneni	N/A	Yes
6. Neo Green	Yes	N/A

The Bid Evaluation Process

9 Bid Received

1. Bid Evaluation Committee (BEC) : Local experts evaluate the received bids.
2. National Renewable Energy Laboratory & European Union Global Technical Assistance Facility on Sustainable Energy supported the BEC in assessing the submitted bids.
3. Green Hydrogen Council: Validate and approve the recommendations from the BEC
4. No objection from the Ministry of Environment, Forestry and Tourism
5. Cabinet Approval to issue Notice to Award after negotiations

1 Preferred Bidder

The Southern Corridor Development initiative

Tsau //Khaeb National Park (Hyphen SCDI) Project

Namibia is one of the top-five locations globally that is blessed with collocated wind and solar resources, near to sea and land export routes. The development of green hydrogen has therefore been identified as an essential industry to drive economic growth and assist Namibia and the world in achieving global decarbonisation goals.

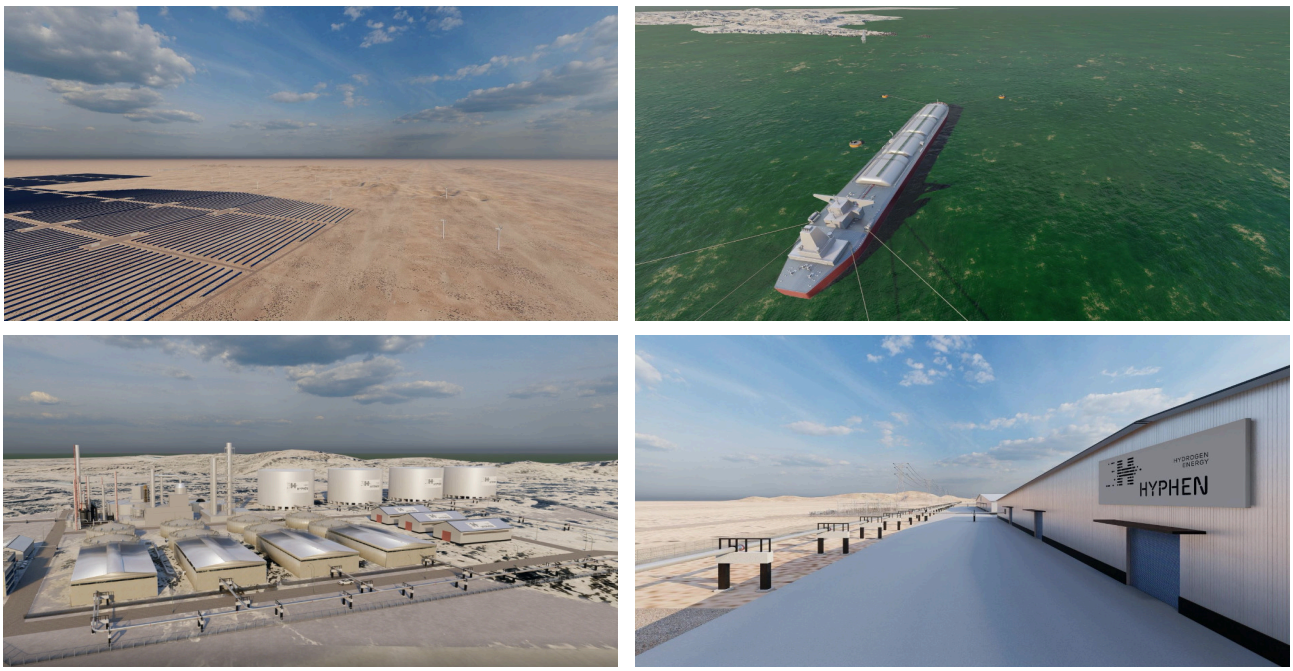
This strategy was adopted in Namibia's national growth and economic plan, the Harambee Prosperity Plan II, and the Southern Corridor Development Initiative (SCDI) was conceived by Government for Namibia's first gigawatt scale fully vertically integrated green hydrogen project.

Under a competitive tender process, ~4,000mk2 of land in the Tsau//Khaeb National Park was allocated for the first projects, attracting bids from international and regional developers. The SCDI, comprising of ~26,000mk2, has the potential to produce up to 3 million tons per annum of green hydrogen. Namibia was assisted in the adjudication of bids to develop the first project by NREL, a national laboratory of the U.S. Department of Energy and two experts appointed by the European Union Global Technical Assistance Facility on Sustainable Energy. Following the adjudication process and ratification by the Green Hydrogen Council and Cabinet, Hyphen Hydrogen Energy (Hyphen) was selected as the preferred bidder for the first project in November 2021.

The Hyphen project, with an estimated investment of US$9.4 billion, which will be entirely financed by Hyphen, will at full scale produce ~300 000 tons of green hydrogen for regional and global markets before the end of the decade, with first production in 2026. This first project will act as a catalyst for the rapid scale up of green hydrogen production in the SCDI by establishing the legal and regulatory framework for the industry and the master plan to realise the SCDI's production potential, with Hyphen building out the first components of the common use infrastructure to be used by subsequent projects.

Below are some of the Key Project components and phases:

	Renewable Energy	Water Supply & Electrolysis	Ammonia Synthesis	Export & End uses
Value Chain	Solar Wind	Water Desalination Hydrogen Electrolysis	Nitrogen DAC Ammonia Synthesis	SADC NH3 Industrial Chemicals Export NH3 Agricultural Chemicals
Process		$2H_2O \rightarrow 2H_2 + O_2$	$N_2 + 3H_2 \rightarrow 2NH_3$	$NH_2 + HNO_3 \rightarrow NH_4NO_3$ $NH_3 + CO_2 + H_2O \rightarrow NH_4HCO_3$ $2NH_3 + CO_2 + H_2O \rightarrow CH_4H_2O$
Phase One	Wind = 1,200MW Solar = 800 MW Transmission = ~80KMs	Water = ~1,4m t/p.a. Electrolysis = 840 MW *(120,000 tons H2 p.a.)*	Ammonia = 700,000 t/p.a.	Domestic (SADC) = (TBC) International = (TBC)
Phase Two	Wind = 1,800 MW Solar = 1,200 MW *(SGW RE cumulative)*	Water = ~3,4m t/p.a. Electrolysis = 1,200 MW *(300,000 tons H2 p.a. cumulative)*	Ammonia = 1,7000,000 t/p.a. *(cumulative)*	Domestic (SADC) = (TBC) International = (TBC)



Proposed Hyphen Wind and Solar Generation

Key Proposal Highlights

5GW of renewable capacity by 2030

2GW commissioned by Jan 2027 and balance before end of the decade

30% SMEs and local companies

Commitment by Hyphen to local content with audits of local skills and capabilities ongoing

20% of youth participation

Commitment by Hyphen. Skills development and bursary programs already underway

N$152,000 CTC average wage

Average CTC for Hyphen workforce to ensure reduced inequality

N$330,000,000 land rentals per year

Annual land rentals to be paid during 40-year operations period

N$100,000,000 land rental per year

Annual land rentals to be paid during feasibility study period

15,000 full-time construction employees

Number of jobs created during the 4-year construction period

90% Namibian employees

Hyphen commitment for the percentage of local Namibian workforce during construction and operations

Royalties, Government ownership participation and taxes

Government to be the economic partner in the project receiving these benefits directly or through the sovereign wealth fund

Feasibility Period 2-years

Duration to complete the feasibility study for the project once Implementation Agreement concluded between Hyphen and Government

Strategic Partnerships

Germany

Federal Ministry of Education & Research : Joint Communiqué of Intent (JCoI)

Germany commits to contributing up to EUR 40 million in grant funding to deepen green hydrogen cooperation with Namibia in selected priority areas which include the development of Pilot Plants across Namibia, developing a Green Hydrogen National Strategy and Scholarships.

Ministry for Economic Affairs and Climate Action: Joint Declaration of Intent

Through the Agreement, the countries have pledged to work together in the production, processing, storage, and transportation of green hydrogen products, along with its marketing and support of green hydrogen projects by the private sector.

Belgium

Energy Minister Thomas Alweendo signed an MoU with the Belgian Government under which Belgium will assist Namibia to develop a hydrogen refueling station and medium-sized solar power plant.

Netherlands

The Agreement enables collaboration on various areas of mutual interest, especially positioning the ports as green hydrogen export hubs and facilitating the forecast growth and flow of the green hydrogen supply chain from Namibia to Rotterdam in the Netherlands. The agreement gives Namibia a great opportunity to form part of the energy supply mix to serve north-western Europe. As part of its readiness planning, Namport has set aside 350 hectares of land at the Port of Walvis Bay North Port for allocation to Green Hydrogen-related industries

Potential Partnerships

The Namibian Government considers green hydrogen as an emerging market opportunity with the potential to spur national and regional economic growth. As such, the government is currently focused on stimulating and developing various relationships to support the green hydrogen industry.

According to ESMAP and the World Bank, Namibia has an offshore wind resource potential of over 720 GW of both Fixed (19 GW) and Floating (701 GW) turbines. Preliminary market estimates note that at scale, the //Kharas Region stands to absorb potential FDI of US$6 billion, produce 2 million tons of Ammonia, generate in excess of $800 million in revenue p.a. and house generation assets of 5GW with the capability to produce power at less than 3 US cents/kWh. Such an investment would require various partnerships. An updated in-depth All of Country Analysis will now be conducted during the crafting of the Nation's upcoming synthetic fuels strategy.

Below is a summary of potential partnership areas the Government is welcoming through SDG Namibia One:

Group	Sub-group	Potential Areas of Collaboration
Off-takers	International ammonia importers	• Namibia as a supplier of globally low-cost green ammonia (<$400/t NH3).
	Domestic hydrogen	• Value case of hydrogen solution, e.g., TCO on trucks. • Any government actions (e.g., VAT break) that might help instigate switch to hydrogen.
	Regional power (SAPP)	• Scale power export terms: price, profile (firmness / variability). • Transmission investment to enable – financing approach.
	Regional hydrogen	• Competitiveness of Namibia H2 production & transport to SA for synfuel N. Cape; potential synfuel production in Namibia.
Financing	Philanthropic capital	• Support early-stage development, blended financing.
	Foreign Governments	• Grants & CfDs to advance Namibia's Hydrogen industry.
	Development banks	• Invest into feasibility stage & blended finance.
	ECAs	• Attractive terms on project finance.
Tech providers	Electrolysers	• Possible multi-year consistent order of electrolysers (across multiple projects and phases) – to negotiate very large discount.
	Domestic H2 end-sectors	• Launching pilots in Namibia to demonstrate tech with low-cost hydrogen.
Developers	RE, H2 & NH3 production	• Potential strategic PPPs that build core Namibia H2 industry.
	Future downstream value chain	• Locating downstream process (steel and synfuel production) in Namibia – key considerations (e.g., source for iron ore and CO2), and potential timelines.

Joint Communiqué of Intent (JCoI)

Website: www.gh2namibia.com/jcoi/

Bundesministerium
für Bildung
und Forschung

As Outlined in Vision 2030, Namibia believes in creating a conducive environment for working together as the key to economic progress and social harmony. This is the essence of partnership. Bilateral Development Cooperation is an integral part of the special relationship between Namibia and Germany - since 1990, more than one billion euros of public funds have been made available for this purpose. Namibia thus has the highest per capita input by the German government in Africa.

The JCoI is built on these core tenants between Namibia and Germany where the parties are committed to promote cooperation in the fields of green hydrogen and its associated derivatives, renewable electricity, and associated infrastructure development. Core objectives and desired outcomes from the JCoI include:

1. Exchanging information regarding their respective renewable energy policies, institutional arrangements, and regulatory frameworks.

2. Enhancing strategic and technical partnership between the two countries' national hydrogen institutions, energy regulatory authorities and national power utilities.

3. Technology transferring and cooperating in research and development.

4. Addressing the challenges of global climate change, especially carbon dioxide emissions from power plants using fossil fuels.

5. Conducting of Feasibility Studies immediately after the subscription signing of this joint communiqué between the sides and third parties to enable the:

- Assessment of Namibian potential to produce green hydrogen and green hydrogen-based energy carriers using renewable energies for domestic use as well as for export to Germany and other markets.

JCoI Components

Euro 30 MIL
Development of strategic pilot plants in Namibia.

Euro 5 MIL
Development of a National Green Hydrogen Strategy

Euro 5 MIL
200 Scholarships for Namibians

Partnerships
Access to Markets and Partners

Namibia Green Hydrogen Research Institute (NGHRI)

Website: www.nghri.com

The aspirations of Vision 2030 are that: "Namibia has high economic growth and full employment where manufacturing and service industries are the primary sources of income, and micro-, small, and medium-sized enterprises are essential. It is also envisioned that a productive society will have a diversified economy with manufacturing exporting industries and a well-developed and modernized commercial agricultural sector, which is environmentally sustainable. Economic growth and full employment with equitable wealth and resources eliminate poverty.

NGHRI will look to contribute to the achievement of Vision 2030 by ensuring that Namibians, young and old, have the skillset required to productively enter the secondary and tertiary sectors of the economy and contribute to the successful construction of this industry.

The NGHRI will consist of six centers, namely:

1. Clean Hydrogen Production, and Storage,
2. New Materials and Delivery,
3. Hydrogen Fuel Cell Technology and Mobility Applications,
4. Hydrogen Energy Use, Economics, Law, Environment and Society,
5. Hydrogen Capacity Building, Competence and Standards, and
6. Hydrogen Digital and Emerging Technologies.

A multi-pronged approach to carrying out the feasibility study will be adopted involving collection, collation, and analysis of information, data, and projections from a wide range of reports and review of national documents complemented by site visits to ascertain conditions on the ground.

The following are the main objectives of the proposed NGHRI:

- To strengthen research and development initiatives towards sustainable energy production.
- To train transformational business leaders and job creators.
- To produce high-in-demand skills to better and quicker commercialize their business ideas.
- To promote innovation and entrepreneurship into creative business disciplines, leading to business growth.
- To establish linkages for research and development on Green Hydrogen value chain.
- To build capacity, mentor, and nurture existing and new Green Hydrogen developments.
- To create linkages to activities within the business sector

Namibia Green Hydrogen Research institute (NGHRI)					
Centre for Clean Hydrogen Production	Centre for Hydrogen Storage, New Materials and Delivery	Centre for Hydrogen Fuel Cell Technology for Mobility Applications	Centre for Hydrogen Energy Use, Economics, Law, Environment and Society	Centre for Hydrogen Capacity Building, Competence and Standards	Centre for Hydrogen Digital and Emerging Technologies
Formulation of enabling policies, end use and environmental sustainability options for widespread hydrogen energy usage.					

The institute is anticipated to serve as a national research and capacity building hub hosted by the University of Namibia, to conduct local research and development, provide innovative solutions, upskill, and reskill Namibians and develop local businesses across the Green Hydrogen value chain. This development comes at a prudent time as Namibia develops into a hub of Green Hydrogen in Africa.

> The environmental benefits of hydrogen are outstanding. When used as an energy source, hydrogen produces no emissions besides water. Zero polluting emissions, an amazing advance over the current sources of energy that we use.

Namibia's Green Hydrogen Opportunity

Namibia's Green Hydrogen Opportunity

There is widespread acknowledgement that hydrogen will play a pivotal role in decarbonising the global economy. Volumes could reach 500-800 Mt H2 by mid-century. The world is moving, and so are we. Namibia has the potential to achieve highly competitive green hydrogen production costs.

	Certain 'downstream' hydrogen products – e.g.: green ammonia and methanol – can be produced in Namibia and delivered globally at lower cost vs. local production. These products represent half of the 2050 demand for Hydrogen.
	In target off-takers sectors – e.g., fertilizer, shipping, chemicals – early movers are already taking steps to consume clean Hydrogen. At the same time, globally competitive suppliers – e.g., Chile, Australia, Saudi Arabia – are moving to meet these markets.
	That value can be unlocked by exporting green ammonia (to start) at highly competitive prices: < $400 / t-NH3 by 2030. Exporting excess clean power further improves the economics and helps decarbonize power in Southern Africa.
	Potential to export additional Hydrogen-related products (e.g., synfuels, HBI/steel) longer term.

As the world economy works to transition to net zero emissions, Namibia's vast renewable resources offer a once in a generation opportunity to jump start Namibia's industrialization, achieve energy security and increase prosperity for its citizens as envisioned under HPPII and Vision 2030, while making a crucial contribution to solving the global climate challenge through the provision of affordable clean energy to the global economy and meeting Namibia's pledges to the Glasgow Breakthrough agenda.

Development outcomes for Namibia, climate outcomes for the world as follows:

Development outcomes for Namibia

	**Boost of US$ 15 - 20 bn / Year**
	**>> 100,000 domestic jobs**

Potential benefits to Namibia would accrue over time and by 2040 could reach and surpass:

- GDP boost of $15bn-$19bn/year1
- Well over 100,000 domestic jobs2
- $6bn-$8bn contribution to trade balance3
- National energy independence with potential for improved energy access

Climate outcomes for the world

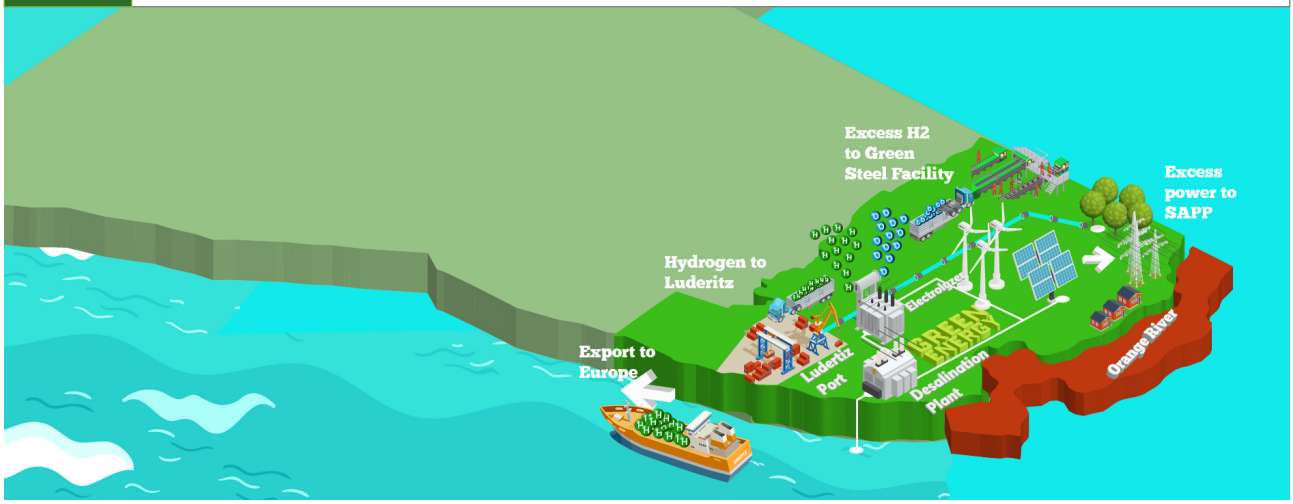
	Potential to Export 14GW clean power into South African Power Pool (SAPP)
CO_2	GHG emissions avoidance of 45-60 Mt CO2e/year4 by 2040

Potential to drive scale-up and maturation of southern Africa solar and wind renewables supply chains at reasonable cost & risk by initially serving ammonia projects underpinned by offtake agreements with blue chips in export markets.

- Project synergies: oversize solar & wind generation to export excess clean power to SAPP, helping South Africa's transition.
- 140-180 Mt CO2e/year avoided by 2040 assuming 5% of expected global green ammonia market served by Namibian exports.

'SDG Namibia One': a blended finance platform to tackle multiple challenges

	Access catalytic capital from multiple sources
	Reduce Transmission Costs
	Streamline collaboration with public and private stakeholders
	Build capacity around the hydrogen industry
	Accelerate pipeline development



Above: Simplified visual layout of the SCDI (Southern Corridor Development initiative) the the //Kharas Region

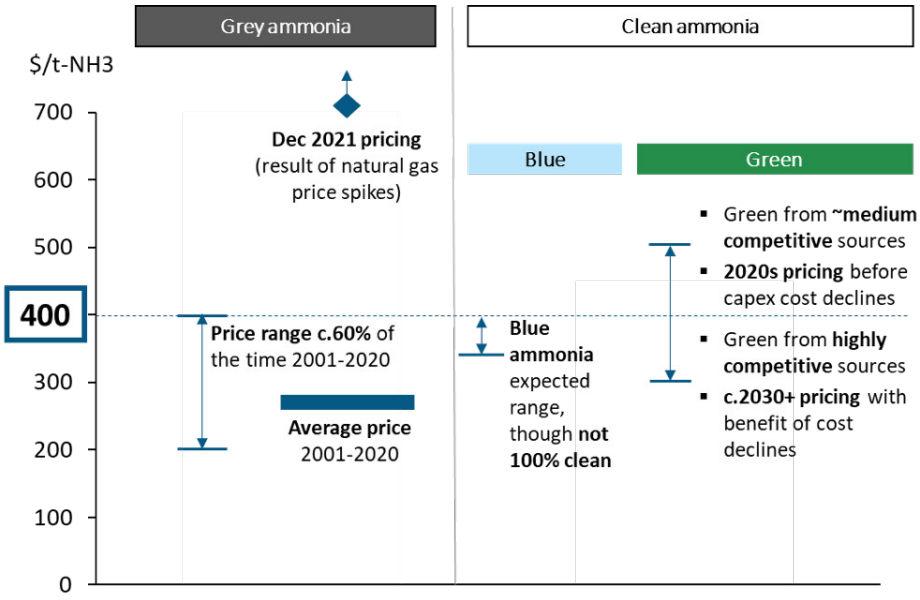
“Preliminary market estimates note that at scale the //Kharas Region stands to absorb potential FDI of US$6 billion, produce 2 million tonnes of Ammonia, generate in excess of $800 million in revenue p.a. and house generation assets of 5GW with the capability to produce power at less than 3 US cents/kWh. Such an investment would be transformative not only for the Southern Region of Namibia but for the country as a whole and while the probability of it coming to fruition still requires various feasibility studies to be conducted, the significance of the opportunity warrants a coordinated and focused effort to unlock.”

Harambee Prosperity Plan II

Access to capital and cost of capital are critical to reducing the cost of ammonia

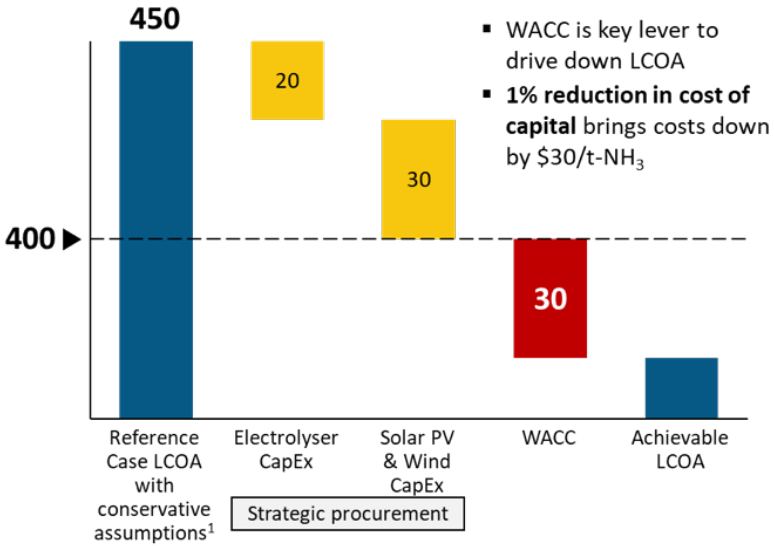
Target levelized cost of ammonia (LCOA)

Below $400 / t-NH3 green ammonia is competitive with blue and even with grey; towards $350 / t-NH3 it is highly competitive



Achievable LCOA ($/t-NH3, 2030)

Namibia stands to achieve < $400 / t-NH3; cost of capital is a critical factor, climate & development capital can help

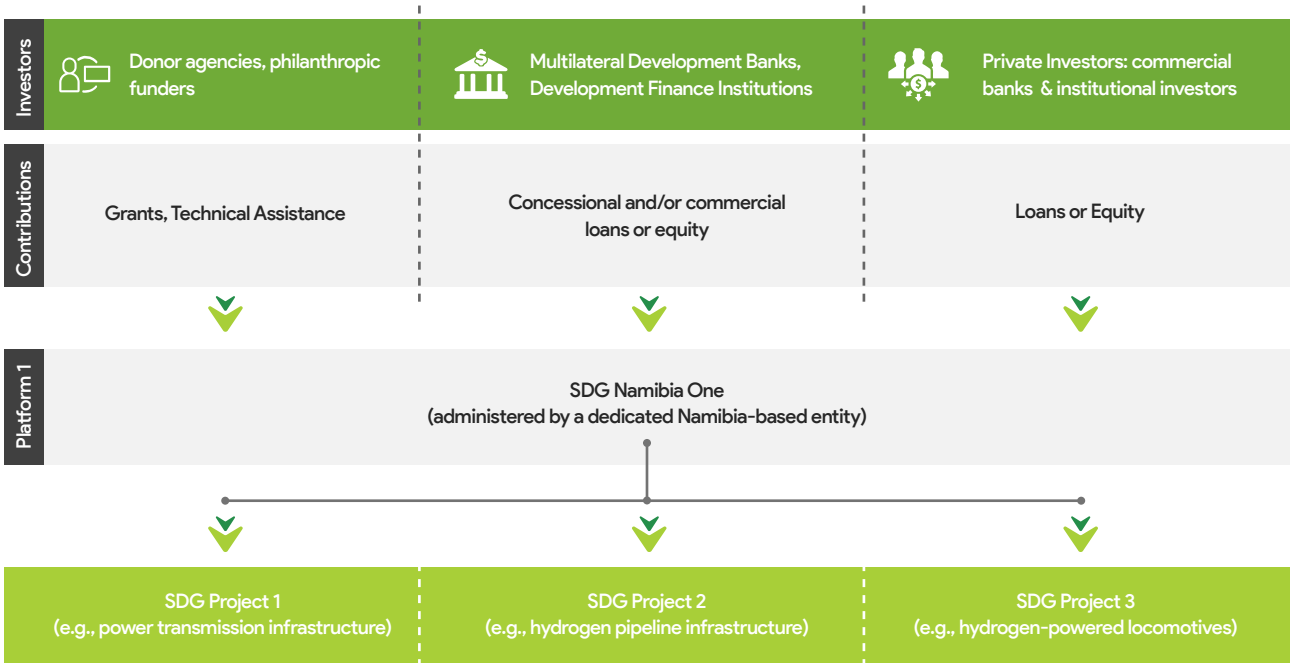


[1] Includes reasonably conservative assumptions on (i) CapEx prices for solar ($525/kW), wind ($824/kW), electrolysers ($274/kW), and ammonia plant ($685/t-NH3); (ii) average system-wide cost of capital of 7.3% (weighted by system component). Source: Vestas & Siemens Gamesa (2020), 'Ammonfuel: an industrial view of ammonia as a marine fuel'

'SDG Namibia One' to act as a one-stop shop connecting and blending multiple capital sources with green projects

The potential benefits at global, regional, national, and local levels of developing Namibia's green hydrogen industry are staggering. Such benefits include reduced emissions, secure and low-cost source of energy, supply chain and infrastructure development, boost to GDP and jobs, improved access to electricity and clean water.

Capturing the benefits of a green hydrogen economy will require unprecedented national and international coordination and collaboration. It will be crucial to link Namibia's green hydrogen ambitions with a comprehensive sustainable financing strategy to support the commercialisation and growth of the industry – including streamlining access to development finance, accelerating project development and mitigating certain investor risks. A new Namibian financing platform – "SDG Namibia One" – housed within Namibia's Environment Investment Fund could be the unlock needed to accelerate the development of Namibia's green hydrogen economy by reducing transaction costs of accessing and deploying public, private and philanthropic capital, building dedicated capacity within government and strategically linking decisions on regulation & policy, project pipeline, jobs and investment.

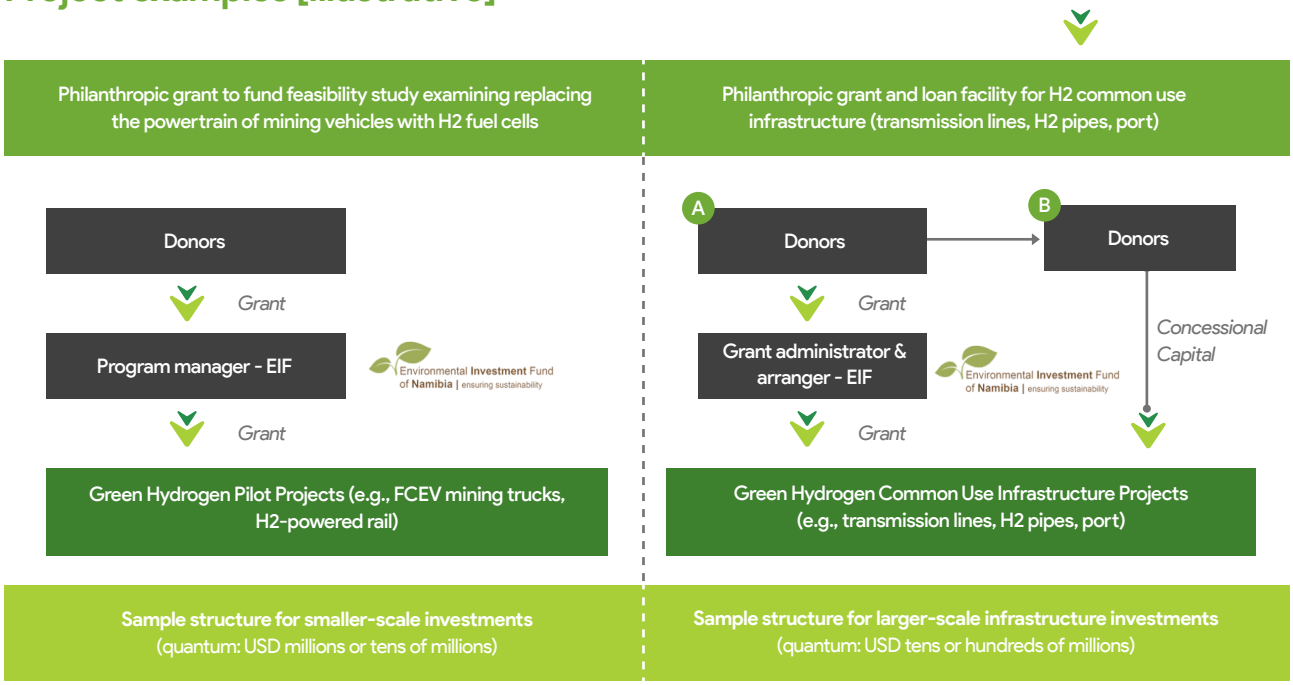


EIF track record & capabilities that align with SDG Namibia One goals

Goals of SDG Namibia One Platform

	Access catalytic capital from multiple sources.	EIF is the 20th institution in the world to be accredited by the Green Climate Fund (GCF) and the first in Southern Africa; strong partnerships with GCF, GEF agencies (e.g., UNDP, UNEP), and MDB's/DFI's (e.g., AFD, KfW, , AfDB, DBSA).
	Streamline collaboration with public and private stakeholders.	Since its launch in 2012, EIF has worked with multiple partners including donors, DFIs, commercial institutions (e.g., FNB Namibia, Bank Windhoek and Nedbank), c.300 Namibia-based NGO's, and Namibia's 2 largest universities.
	Build capacity around the hydrogen industry.	Due to its history, footprint, and deep domestic networks, EIF builds institutional and human resource capacity ensuring maximal benefit to Namibians and the environment (+USD40m grant funding deployed, benefiting +200,000 Namibians).
	Accelerate pipeline development.	As a semi-autonomous institution residing under the Ministry of Finance, EIF has familiarity with policy landscape, regulatory/permitting processes, and relationships with a network of local technical service providers & advisors.

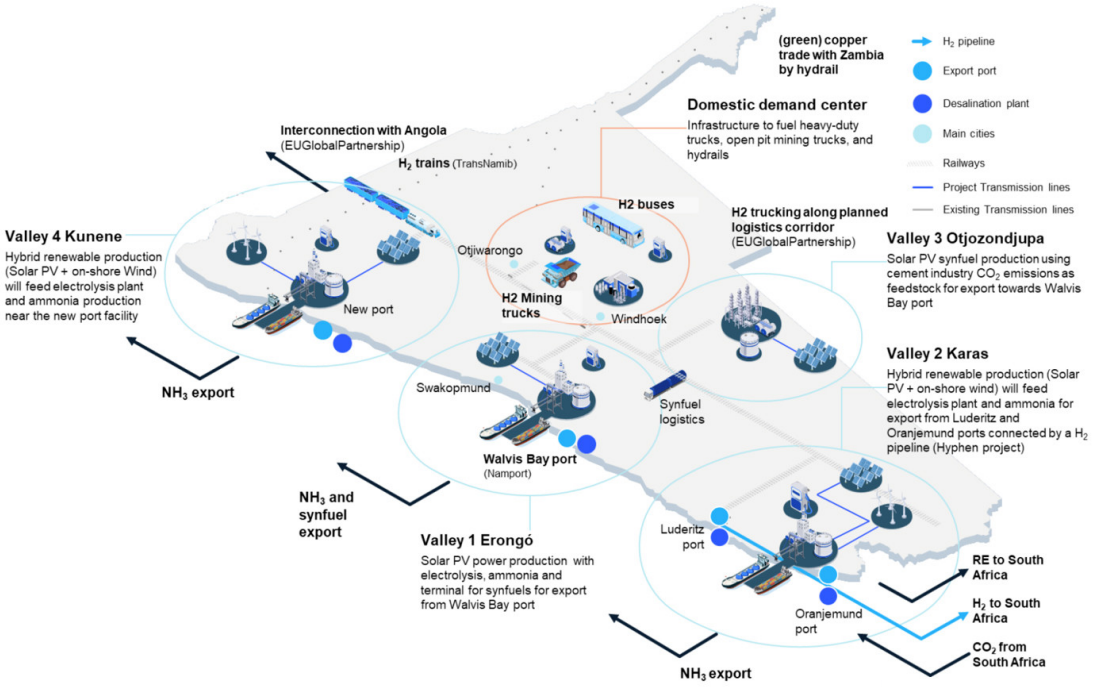
Project examples [illustrative]



> With an initial strategy in place, we are now swiftly establishing an ecosystem of partners, building capacity, and identifying fit-for-purpose financing solutions."

Vision 2030 & The Future of Green Hydrogen in Namibia

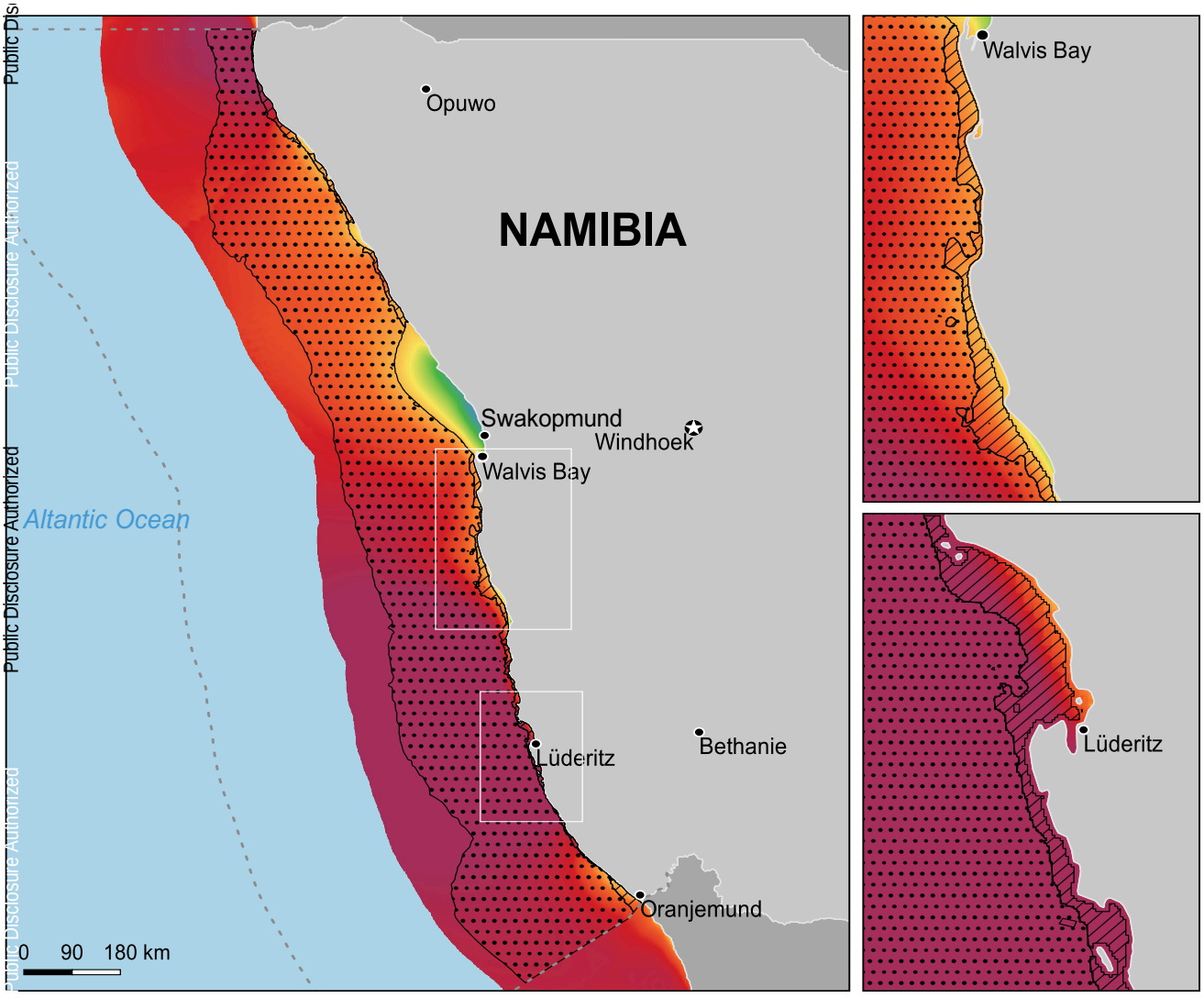
We will develop a granular vision for the Namibian and regional hydrogen Ecosystem.



We will build on existing plans to further refine and detail out the concept for ecosystem clusters within Namibia, reflecting natural synergies and existing assets.

Offshore Wind Technical Potential in Namibia

Fixed: 19GW || Floating: 701GW || Total: 720GW



This map shows the estimated technical potential for fixed and floating offshore wind in Namibia in terms of installed power capacity in megawatts (MW) within 200 kilometers of the shoreline. It is provided under a World Bank Group (WBG) initiative on offshore wind that is funded and led by the Energy Sector Management Assistance Program (ESMAP). For more information and to obtain maps for other WBG client countries please visit: **https://esmap.org/offshore-wind.**

The methodology used to create this map is described in the WBG report published in October 2019 titled ***Going Global: Expanding Offshore Wind to Emerging Markets.*** The wind resource data is from the Global Wind Atlas (version 3.0), a free, web-based application that provides data with a 250 m resolution based on the latest input datasets and modeling methodologies. For more information: **https://globalwindatlas.info.**

WORLD BANK GROUP
THE WORLD BANK IBRD • IDA | IFC International Finance Corporation
ESMAP Energy Sector Management Assistance Program

Published: March 2020 (revised May 2020)

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Rare Earths Potential

On drill sites once the borehole is completed and core has been marked before it has been transported. Wet core pictures once the cutting line has been marked at the core shed. Finally, once the same intervals and numbers have been marked on the core.

a).

b).

NI 43-101 Technical Report Mineral Resources Estimation - Eisenberg Carbonatite Project on Rare Earth Elements, Kalkfeld, Namibia

Mineral Resource Statement

The results presented in the table below at a 0.2 TREO3 cut-off and have all been classified as inferred while total inferred mineral resources - separated into Light Rare Earth Elements (LREE) and Heavy Rare Earth Elements (HREE), at the same cut-off are show in the following table.

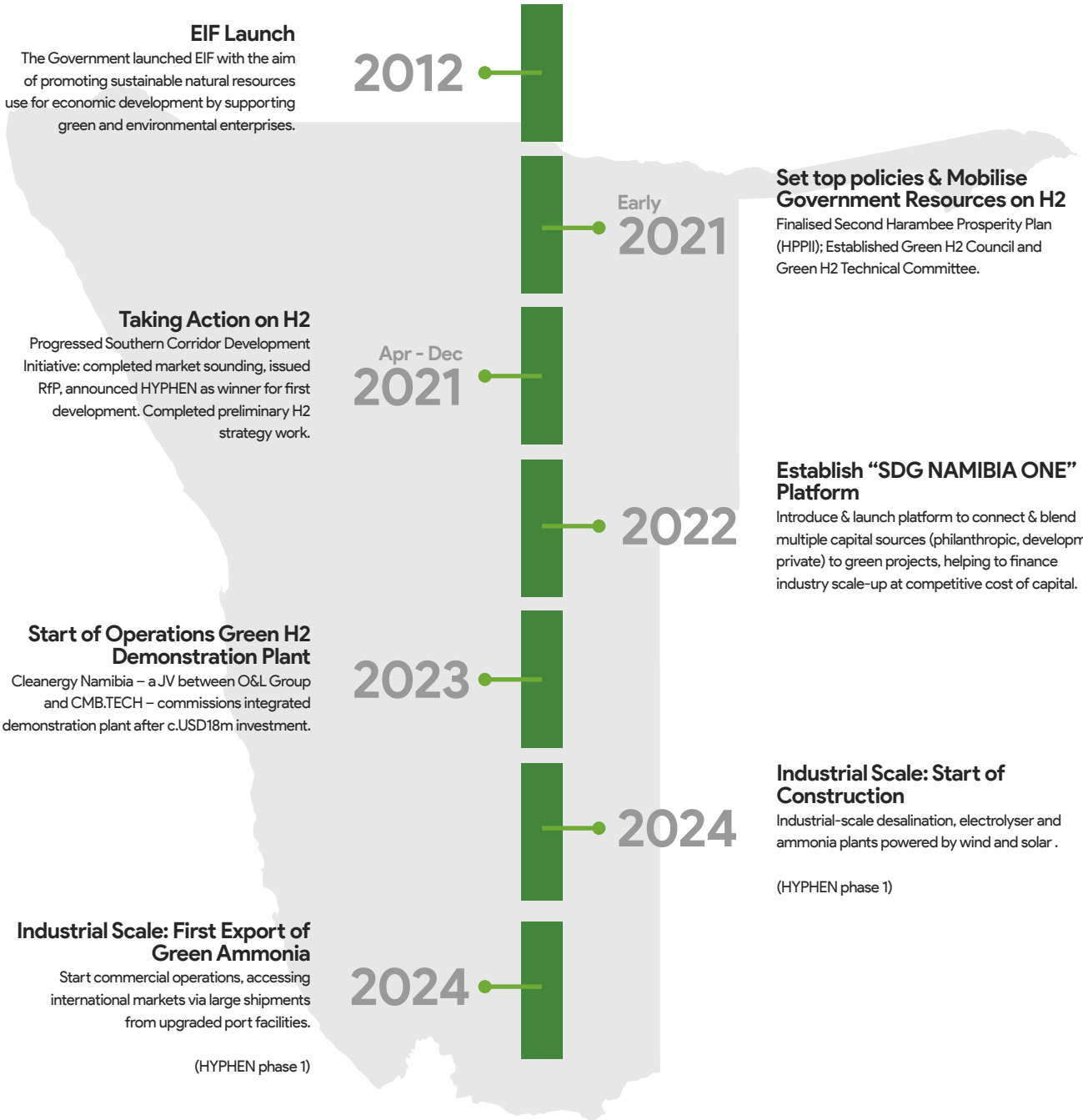
Inferred mineral Resource at 0.2% TREO cut-off REE in ppm.

Tonnages (Mt)	Grades in ppm							
	Ce	La	Nd	Pr	Eu	Gd	Sm	Th4
569.740	3579	2040	1242	377	65	75	142	372
	Dy	Er	Ho	Lu	Tb	Tm	Y	Yb
	45	17	7	2	10	2	196	11

Inferred mineral Resources as LREE and HREE (in ppm) at 0.2% TREO cut-off.

Tonnages (Mt)	LREE (ppm)	HREE (ppm)	%TREO
569.740	7519	290	0.92

Where to next?



EIF Launch
The Government launched EIF with the aim of promoting sustainable natural resources use for economic development by supporting green and environmental enterprises.

2012

Early 2021

Set top policies & Mobilise Government Resources on H2
Finalised Second Harambee Prosperity Plan (HPPII); Established Green H2 Council and Green H2 Technical Committee.

Taking Action on H2
Progressed Southern Corridor Development Initiative: completed market sounding, issued RfP, announced HYPHEN as winner for first development. Completed preliminary H2 strategy work.

Apr - Dec 2021

2022

Establish "SDG NAMIBIA ONE" Platform
Introduce & launch platform to connect & blend multiple capital sources (philanthropic, development, private) to green projects, helping to finance industry scale-up at competitive cost of capital.

Start of Operations Green H2 Demonstration Plant
Cleanergy Namibia – a JV between O&L Group and CMB.TECH – commissions integrated demonstration plant after c.USD18m investment.

2023

Industrial Scale: Start of Construction
Industrial-scale desalination, electrolyser and ammonia plants powered by wind and solar .

(HYPHEN phase 1)

2024

Industrial Scale: First Export of Green Ammonia
Start commercial operations, accessing international markets via large shipments from upgraded port facilities.

(HYPHEN phase 1)

“We shall capitalise on Namibia’s comparative advantages and provide suitable incentives to use our natural resources in the most appropriate and efficient way possible. This would ensure that the decision-makers of today will continue to create a safer, healthier and more prosperous future for all Namibians.”

Vision 2030

Linkages HPPII, Global Priorities and SDG Namibia One

The Government of Namibia is focusing efforts on achieving large-scale, low-cost Renewable Energy development and designing models for sustainably maximizing fiscal revenue and local development in Renewable Energy investments and green ammonia production. A core component of this is aligning Namibia's Development Plans (like the Harambee Prosperity Plan II) with Global Priorities. Below are some striking parallels between global priorities as outlined in strategic programs, policies, and Agreements. The common denominator in these is the facilitation of clean energy projects to curb climate change, globally.

Harambee Prosperity Plan II

Investigate the feasibility of Green Hydrogen and Ammonia as a transformative strategic industry.
(Goal 3: Economic Advancement)

Terra Carta

Acknowledge the need for net zero commitments to be achieved by 2050 and where possible, much sooner. Setting more ambitious timelines will emphasize and catalyze immediate action while encouraging continuous innovation and Improvement.

EU Green Deal

The European Green Deal will transform the EU into a modern, resource-efficient and competitive economy ensuring:
No net emissions of greenhouse gases by 2050

World Build Back Better (W3B)

Climate friendly. The investments will be made in a manner consistent with achieving the goals of the Paris Climate Agreement.

Cop 26 & Paris Agreement

The main objectives of the COP26 meeting where to commit to more ambitious targets to reduce greenhouse gas emissions by 2030. The Glasgow Breakthrough include Green Hydrogen production.

Sustainable Development Goals

SDG 7: By 2030. Enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil fuel technology and promote investment in energy infrastructure and clean energy technology.

Call to Action

Namibia invites likeminded Governments, Organizations, Persons, and Stakeholders to collaborate to realize SDG Namibia One. This call to action may be in the form of

1. **Off-takers** : Purchase of Namibia Green hydrogen products and/or derivatives
2. **Financing** : Providing grant and/or affordable financing to Namibian Stakeholders
3. **Tech providers** : Develop, manufacture, or provide technologies for our projects
4. **Developers** : Develop Green Hydrogen Projects in Namibia

To get in touch on any of the above, please contact The Namibia Presidency using the contact details at the back of this book.

COP26 Break Through

Climate Change Conference 2021

COP26 Break Through

Overview

The Paris Agreement commits the world to limit the rise in global temperature to well below 2°C and pursue efforts to limit it to 1.5°C (compared to pre-industrial levels). To keep that 1.5°C target alive Nations must halve global emissions by 2030 and reach global net zero emissions by the middle of the century.

The Glasgow Breakthroughs are the first set of global leader-led common targets under The Breakthrough Agenda. The commitments set ambitious goals for 2030 to dramatically accelerate the innovation and deployment of clean technologies in five key sectors of the economy – Power, Road Transport, Steel, Hydrogen, and Agriculture.

The Glasgow Breakthroughs aim to make:	
POWER	Clean power the most affordable and reliable option for all countries to meet their power needs efficiently by 2030.
ROAD TRANSPORT	Zero emission vehicles the new normal – accessible, affordable, and sustainable in all regions by 2030.
STEEL	Near-zero emission steel the preferred choice in global markets, with efficient use and near-zero emission steel production established and growing in every region by 2030.
HYDROGEN	Affordable renewable and low carbon hydrogen globally available by 2030.
AGRICULTURE	Climate-smart, sustainable agriculture the most attractive and widely adopted option for farmers everywhere by 2030.

Namibia is resolutely committed to the Paris Agreement, and to taking practical and ambitious action to reduce emissions and ensure a climate-resilient economy. To this end, Namibia has prioritized addressing the 5 Glasgow Breakthroughs. Below is a summary of how the various projects address a sector in the priority areas.

Project / Program	Power	Transportation	Steel	Hydrogen	Agriculture
Green Hydrogen Strategy	**YES**	**YES**	**YES**	**YES**	**YES**
Various Pilot Plants	**YES**	**YES**	**YES**	**YES**	**YES**

“Namibia’s world-class solar and wind resources give it a long-term competitive advantage in producing green hydrogen and green ammonia.”

The World Bank

Republic of Namibia

The Presidency

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Harambee Prosperity Plan II
Performance Delivery Unit