NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY
Faculty of Engineering and Spatial Sciences
Integrated Land Management institute

Green Hydrogen: Towards Just Energy Futures

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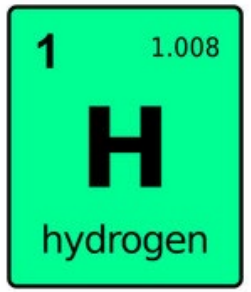
Panel Discussion @ NUST Integrated Land Management Institute

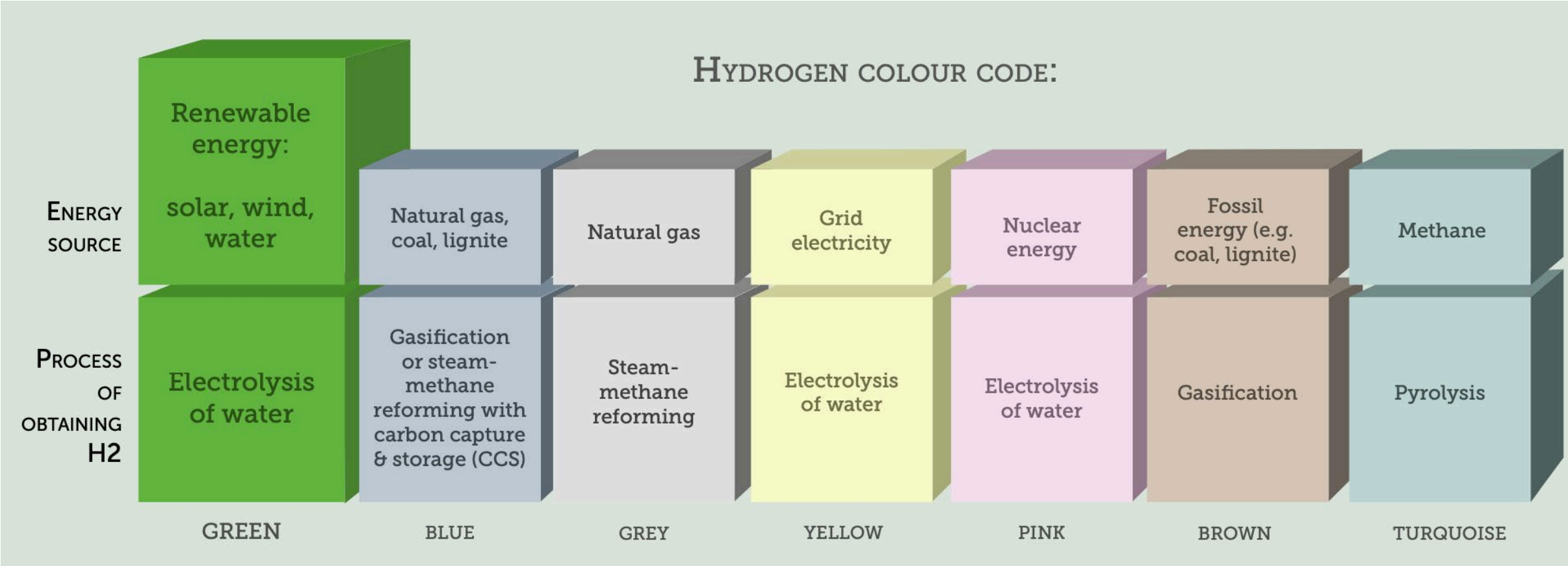
5 July 2022

What is Green Hydrogen (GH2)?



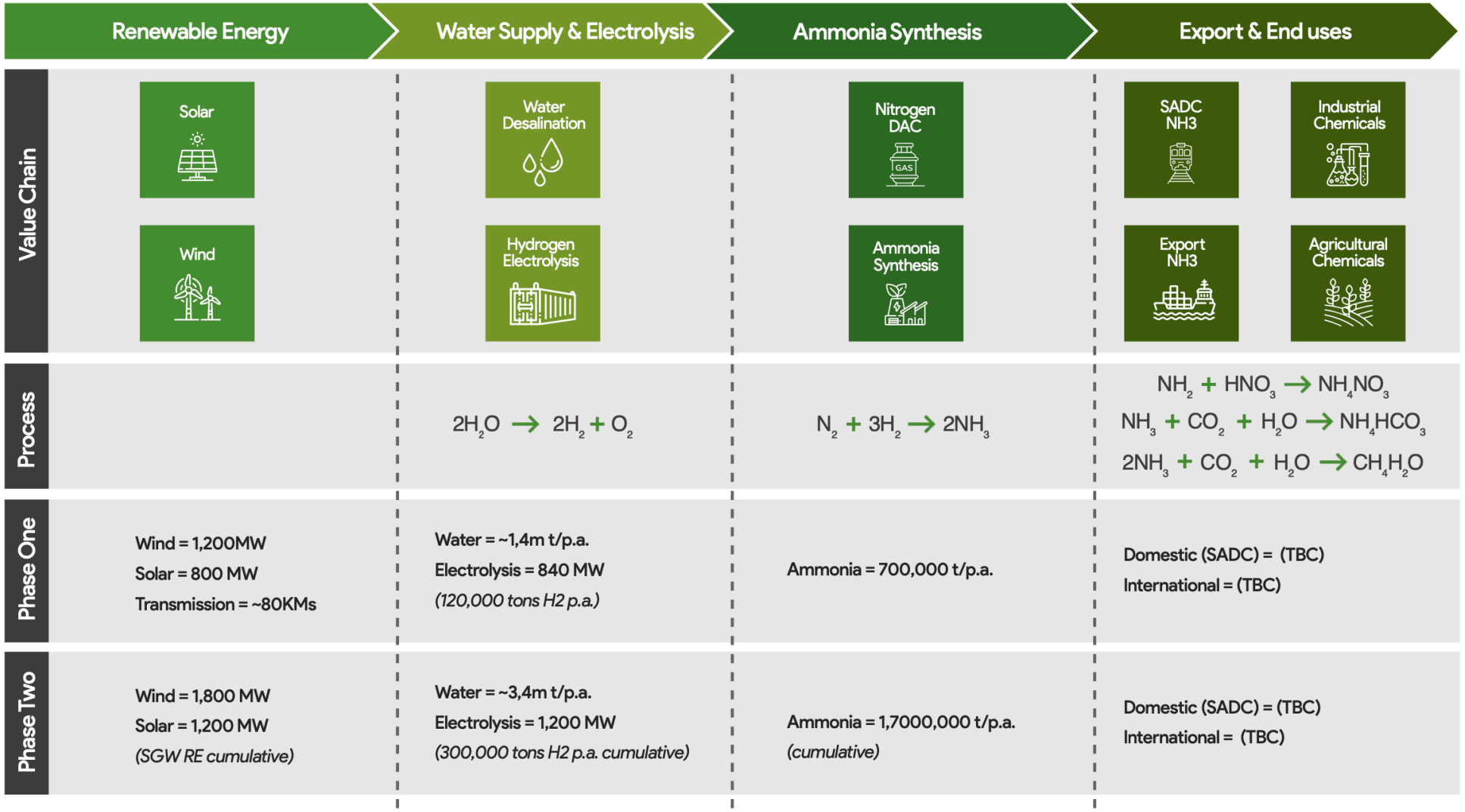
- Hydrogen (H) the most abundant element in the universe
- Hydrogen gas (H2) is very energy dense – 2.6 times more per kilogram than natural gas and three times more than kerosene
- Green hydrogen is produced via electrolysis – splitting water intro hydrogen and oxygen – using renewable energy from wind and solar
- GH2 a ‘greedy’ energy product - involves creating energy by using energy
- Difficult to transport in gas and liquid form -- hence plans to convert it into green ammonia (NH_3) for ease of transport

Green vs other types of hydrogen



Source: Powershift Africa (2022) Civil Society Perspectives on Green Hydrogen Production and Power-to-X Products in Africa

Namibia’s green hydrogen process



Source: Government of Namibia (2022) Traction: Namibia’s Green Hydrogen Overview

The story so far…

Date	Event
March 2020	President Geingob announces creation of Namibia Investment Promotion and Development Board
June 2020	Germany publishes one of the world's first National Hydrogen Strategies
December 2020	World Bank publishes "Green Hydrogen Opportunities for Namibia – Phase I Report"
March 2021	President Geingob launches Harambee Prosperity Plan II with the Southern Corridor Development Initiative
March 2021	Fortescue Future Industries visits Luderitz on an exploratory mission to establish a green hydrogen project
May 2021	President Geingob creates inter-ministerial Green Hydrogen Council
June 2021	Namibia Green Hydrogen Research Institute established at UNAM
August 2021	Namibia signs a €40 million hydrogen partnership with Germany and a Joint Communique of Intent
September 2021	Namibia receives nine bids from local, regional, and international developers to create large-scale green hydrogen projects for the SCDI
October 2021	Namibia hosts a Namibia Energy Roundtable at the World Economic Forum.

Source: IPPR (2022) '(Almost) everything you wanted to know about green hydrogen and Namibia (but were afraid to ask)', IPPR Special Briefing

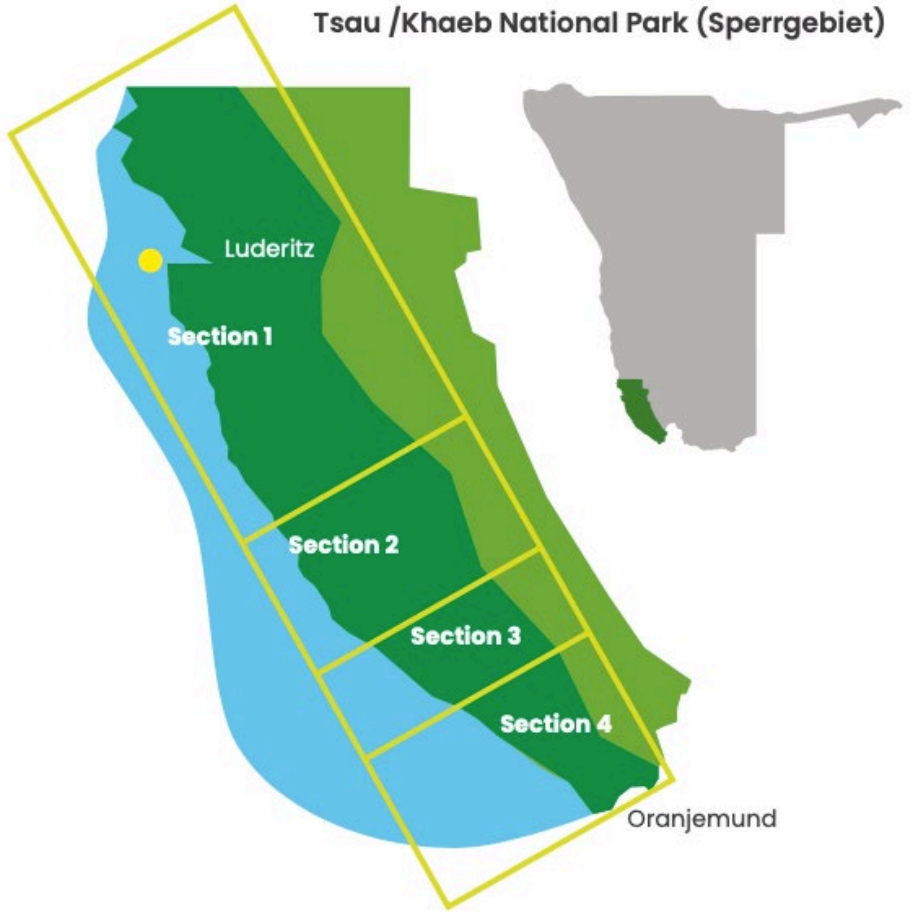
The story so far…

Date	**Event**
November 2021	Hyphen Energy announced as the preferred bidder to develop a US$9.4 billion green hydrogen project in the Tsau/Khaeb national park at COP 26
November 2021	Namibia Ports Authority signs an MoU with Europe's largest port operator the Port of Rotterdam to create the infrastructure needed to transport renewable fuels to Europe
November 2021	Government signs MoU with the Belgian Government on green hydrogen cooperation
April 2022	Government launches three bids: national green hydrogen strategy, GH2 pilot projects and 200 scholarships

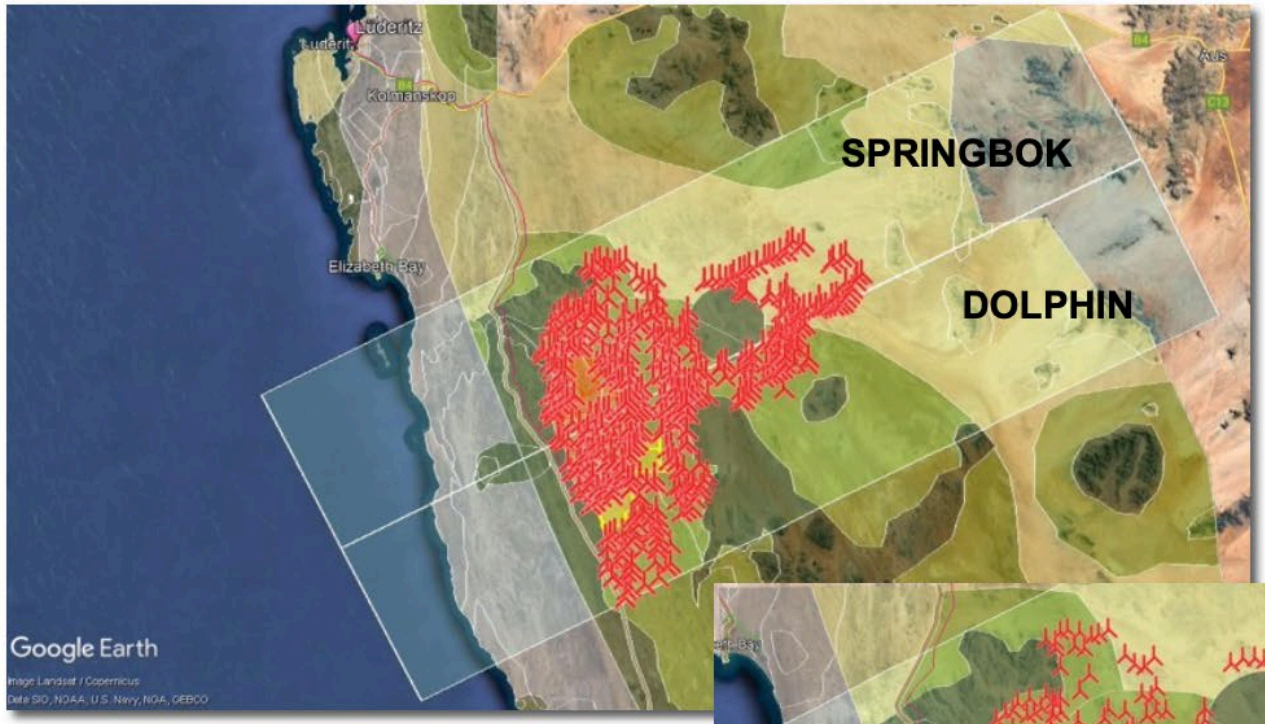
Source: IPPR (2022) '(Almost) everything you wanted to know about green hydrogen and Namibia (but were afraid to ask)', IPPR Special Briefing

The largest tender in Namibian history

- Sections 2 and 3 of Tsau/Khaeb NP tendered to Hyphen Energy
- Hyphen bought the right to operate the project for 40 years
- Production of up to 300 000 tonnes of green hydrogen per year
- Cost of project approx. **US$ 9.4 billion**



Springbok and Dolphin Phase 1 & 2 Renewable Energy Layout



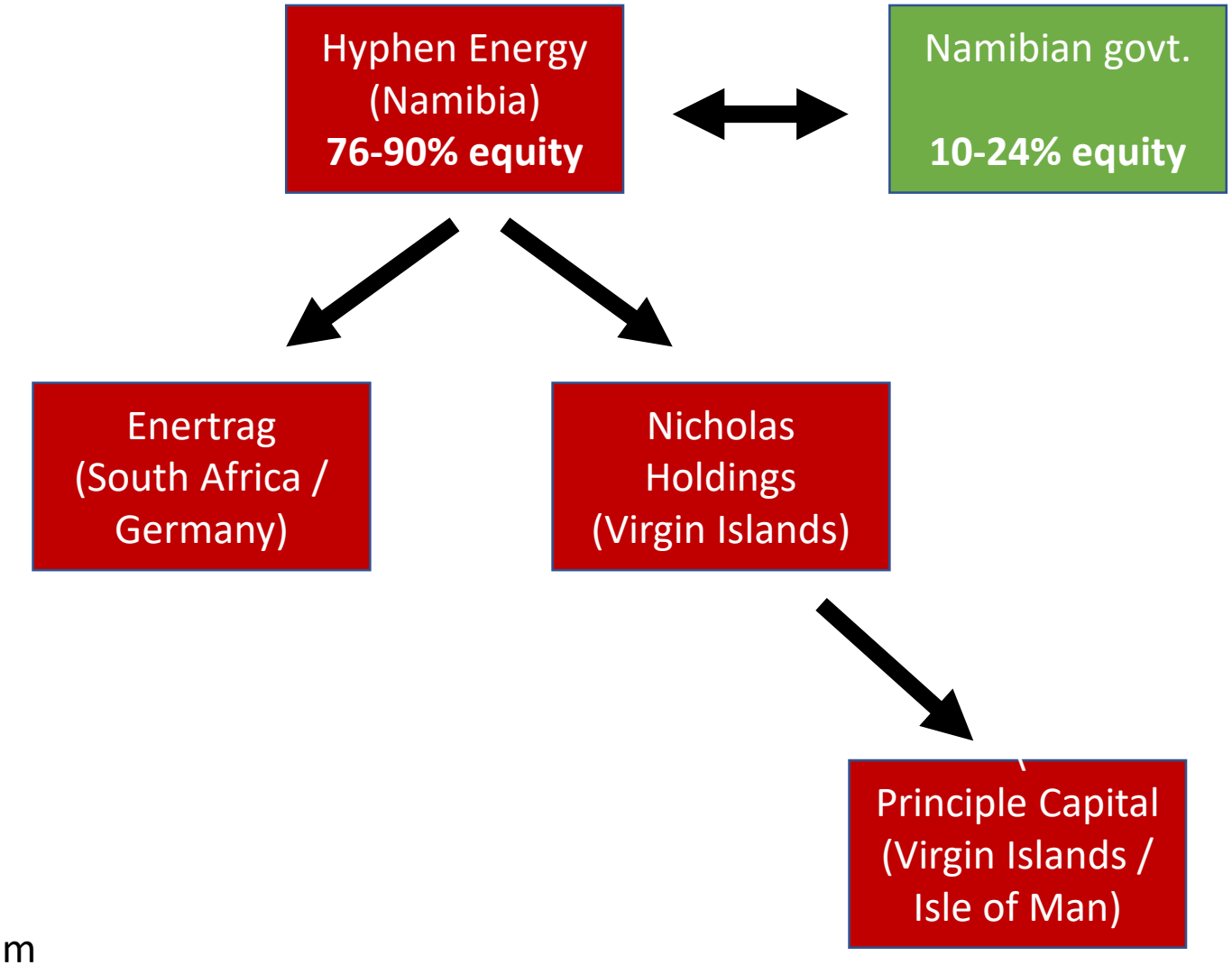
	Special Value	No development zone as per environmental consultant guidance
	Minimal Disturbance	This is a zone of no permanent development, but it does make allowance for renewable assets
	Wildlife Disturbance	This is a zone of no permanent development, but it does make allowance for renewable developments.
	Managed Resource	Same guidelines as minimal and wildlife disturbance zones.

Consideration for the sensitive environmental zones was key in designing the buildable area within the park. All special value areas were identified as non-buildable

The Nature Conservation Amendment Act under Section 17(2)(k) empowers the minister of environment and tourism "to establish a renewable electricity source for the purposes of the management of game parks, nature reserves and other protected areas or protection of the environment or the combating of climate change" (The Namibian, 2020)

Source: Hyphen (2021) 'Southern Corridor Development Initiative', Namibian green hydrogen roadshow discussion document, 13 December

Financing



Sources: HyphenAfrica.com
IPPR (2022) Procurement Tracker Namibia, No.16, April 2022

Key commitments

- ‘GDP boost of c.$20bn/year, $6bn-$8bn contribution to trade balance and national energy independence’
- 15,000 FT employees during construction phase (4-5 years)
- 3,000 operational and management jobs (post-construction)
- N$152,000 CTC average wage
- 20% youth participation
- 200 scholarships for Namibians as part of upskilling programme (domestic and overseas)
- Fulfilling vision 2030: ‘Economic growth and **full employment** with **equitable wealth** and resources **eliminate poverty**’

Source: Government of Namibia (2022) Traction: Namibia’s Green Hydrogen Overview

Options for use of revenues

- Challenge: investing into broader economy to drive wholesale uplift

OPTIONS

(a) Direct Dividend Payments	(b) National Budget Allocation	(c) National Resource Fund
Description		
▪ **Cash transfers** directly to citizens	▪ Invest in development via **budget process** ▪ **Annual or multi-year** development plans	▪ **Extra-budgetary fund** domestic & foreign ▪ **Fiscal rules** set by multi-year govt. objectives
Examples		
▪ **Alaska** Permanent Fund **Dividend Scheme** ▪ Mongolia Cash Transfer Program	▪ Nigeria Excess Crude Account ▪ **Botswana Sustainable Budget Index**	▪ Norwegian Oil Fund ▪ Abu Dhabi **Investment Authority**
Pros & cons		
(+) **Direct poverty alleviation**, especially if targeted (+) Limits risk of political instability if equitable (-) Increase to expenditure, **not investment** (-) Limited domestic absorptive capacity risks **inflationary pressure & currency appreciation**	(+) Supports **strategic spending programmes** – e.g.: education, infrastructure (+) Lifts civil service salaries → **attract & retain talent** (-) Limited domestic absorptive capacity risks **inflationary pressure & currency appreciation**	(+) **Limits risk** of domestic economic **overheating** (+) Secures **revenue continuity** including counter-cyclical (-) **Risk** of mismanagement against multi-year objectives **if fiscal rules not consistently followed** (-) Lack of direct benefit to public can disenfranchise

Source: Government of Namibia (2022) Namibia's green hydrogen opportunity: key questions and initial answers

Towards hydrogen justice: key questions

1. Procedural justice

How are green hydrogen governance structures evolving and how inclusive are they?

2. Recognitional justice

Whose interests, needs and vulnerabilities are recognised in the development of GH2 strategies and planning processes?

3. Relational justice

How does resource-intensive GH2 production intervene in the relationship between humans and the environment (including human-land and human-water relations)?

Source: After Muller (2022) 'Green hydrogen risks and hydrogen justice', Sustainability Politics Event, Brunel University, 18 May

Towards hydrogen justice: key questions (2)

4. Epistemic justice

How do knowledge transfers take place in the GH2 economy? Whose knowledge counts?

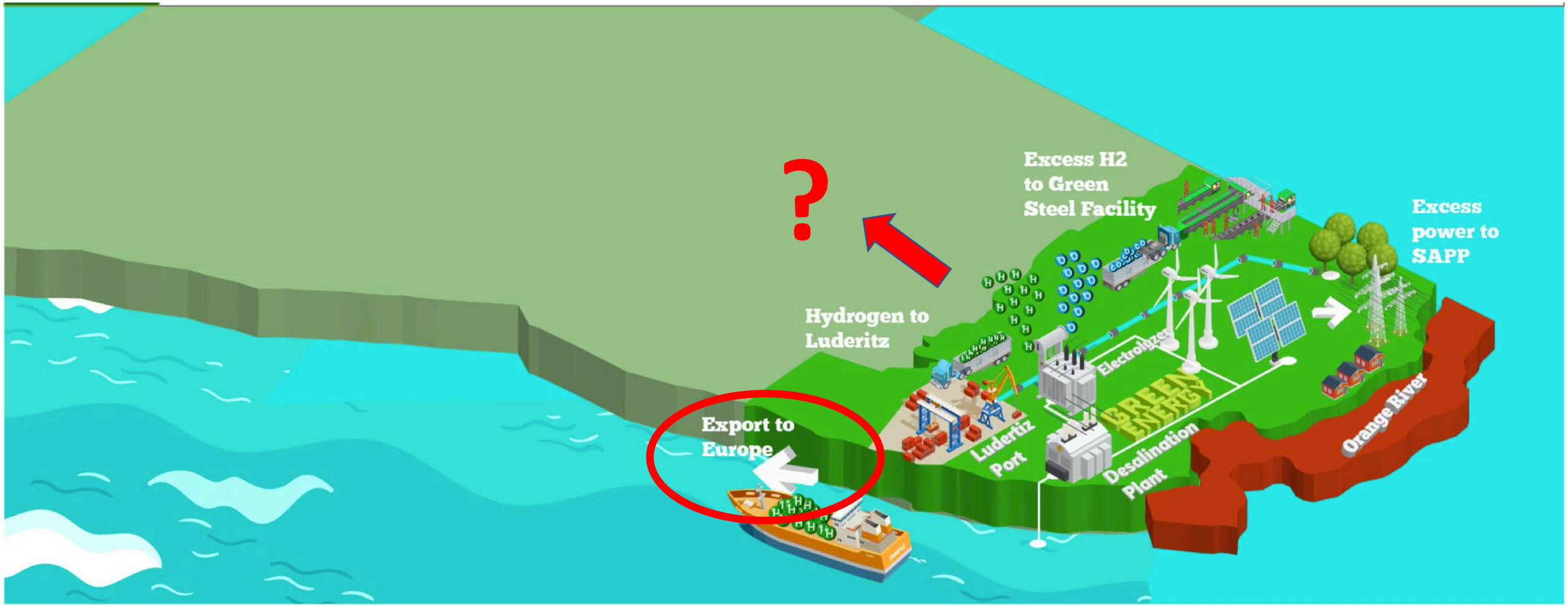
5. Distributive justice

How are the costs and benefits of GH2 distributed along the value chain and among the general population?

6. Restorative justice

To what extent will hydrogen economies address or accentuate historical injustices, relating e.g. to land appropriation, exclusion and exploitative labour practices?

Source: After Muller (2022) 'Green hydrogen risks and hydrogen justice', Sustainability Politics Event, Brunel University, 18 May



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

Source: Government of Namibia (2022) Traction: Namibia's Green Hydrogen Overview

DISCUSSION

Towards GH2 industry standards

Every hydrogen strategy needs to be embedded in a broader, country-specific energy focussed on the needs of local people through:

1. Ending energy poverty and creating energy access,
2. Accelerating RE deployment, Oowering key industries and sectors for Africa's socio-economic transformation, and
3. Maximising energy efficiency.

This strategy must include commitments to:

a) A sustainable approach to (local) development and climate action

b) Strict social and environmental safeguards

c) Multi-stakeholder partnerships and community participation

d) Good governance and transparency on all sides

e) Changes in the global power chain including an energy power reshuffle

Source: Powershift Africa (2022) Civil Society Perspectives on Green Hydrogen Production and Power-to-X Products in Africa

GH2 Bibliography and further reading

Government and IFI reports

Government of Namibia (2022) *Namibia's Green Hydrogen Opportunity: Key Questions & Initial Answers*, January 2022

Government of Namibia (2022) *Traction: Namibia's Green Hydrogen Overview*, April 2022

World Bank (2020) *Green Hydrogen Opportunities for Namibia: Phase I Report*, December 2020

World Bank (2020) *Green Hydrogen in Developing Countries*

Private sector reports

Hyphen (2021) 'Southern Corridor Development Initiative', Namibian Green Hydrogen Roadshow Discussion Document, 13 December

McKinsey & Co (2021) *Roadmap to Build Namibia's Green Hydrogen Sector*, May 2021

Port of Rotterdam (2021) *Namibia-Port of Rotterdam Hydrogen Supply Chain: Pre-Feasibility Report*, May 2021

GH2 Bibliography and further reading

Civil society reports

Konrad Adenauer Stiftung (2021) *Issues, challenges and opportunities to develop green hydrogen in Namibia*, October 2021

IPPR (2022) '(Almost) everything you wanted to know about green hydrogen and Namibia (but were afraid to ask)', IPPR Special Briefing, February 2022

IPPR (2022) 'Procurement Tracker Namibia', No.16, April 2022

IRENA (2020) *Green Hydrogen: A Guide to Policymaking*, IRENA: Abu Dhabi

IRENA (2022) *Geopolitics of the Energy Transformation: The Hydrogen Factor,* IRENA: Abu Dhabi

Powershift Africa (2022) 'Civil Society Perspectives on Green Hydrogen Production and Power-to-X Products in Africa'

Academic research

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