Ensuring (Digital) Startups and Local Innovators Benefit from Potential in the Green Hydrogen (GH2) Sector in South Africa

Documentation of the ii2030 Green Hydrogen in Africa Edition
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Key Ingredients for ii2030

ii2030 is an initiative that brings together a curated group of participants to explore systems and co-create solutions that enable technology to help us achieve the Sustainable Development Goals at scale.

1. Tech-based opportunity to positively disrupt current systems

2. Curated group of key players from diverse sectors

3. Facilitate a co-creation and co-implementation process
Green hydrogen can be transformative for Africa. The sector will create green jobs and new opportunities for local startups and innovators.

Now is the time to create the fertile ground for entrepreneurs, who often lack access to adequate finance, skills, or even awareness of opportunities in the GH2 sector.

ii2030 is a catalytic process that begins with a problem and an opportunity and ends with a prototype of a systemic solution that can be implemented to strengthen the GH2 support ecosystem for local startups and innovators at the national and pan-African levels.

Photo: Co-creation in Rwanda in 2022 (Endeva)
Methodology Journey: ii2030 GH2 in South Africa

BILATERAL INTERVIEWS
December 2022 – February 2023
60 min interviews
Identify inhibitors and enablers in the system

SYSTEM CHALLENGE WEBINAR
9 March 2023
120 minute webinar
Understand system dynamics

SYSTEM OPPORTUNITY WEBINAR
23 March 2023
120 minute webinar
Identify levers for change

PAN-AFRICAN WEBINAR
20 April 2023
120 minute webinar
Continent-wide peer exchange

CO-CREATION EVENT
8 June 2023
1 day workshop
Co-create solution to positively disrupt the system

CELEBRATION WEBINAR
July 2023
60 minute online event
Pitch solutions and seal commitment for implementation

IMPLEMENTATION PREPARATION
Ongoing support
Develop project documents with main stakeholders
Scope: Opportunities for (Digital) Startups and Innovators
Status of the GH2 Sector in South Africa
GH2 in SA by the Numbers

- South Africa is home of 75% of the world reserves of Platinum Group Metals (PGMs), which are highly relevant for producing electrolysers.

- 2.4 million tons of grey hydrogen are already manufactured per year domestically and used for consumption in the country.

- Sasol aims to produce 3.5 tons of green hydrogen per day for local use, and down the line it will build greenfield projects dedicated to green hydrogen for export purposes, including participating in the German government’s H2Global auction program.

- The potential analysis sees the production capacity is estimated to be about 3.8 million tons of GH2 per year on the long run.
South Africa is determined to become an internationally competitive world leader in green hydrogen, with its large deposits of Platinum (PGMs), renewable energy resources, and local industries.

2008: Launch of Hydrogen South Africa (HySA)

2018: Hosting of the 30th International Partnerships for Hydrogen and Fuel Cells in the Economy (IPHE) Steering Committee Meetings

February 2022: the South African Hydrogen Society Roadmap (HSRM) is published by the South African government (Department of Science and Technology of South Africa)

April 2022: Sasol confirmed it will first manufacture green hydrogen via its existing electrolyser units and ammonia plants.
GH2 Projects in South Africa

- Uplanga Solar and GH2 Park: Will begin producing GH2
- Boe joe Baai Green Hydrogen Development Programme: First production by 2028 of either ammonia, methanol, sustainable aviation fuels, or a combination thereof
- Prieska Power Reserve: Will begin producing GH2 and ammonia by 2025
- Sasolburg GH2 60MW: Will begin producing GH2 by June 2023
- Hydrogen Valley Programme: 9 projects across three hubs in Limpopo, Johannesburg, and Durban
- Isando Precious Metals: Includes 2 projects: fuel cell MEA manufacturing and NCP Vehicles
- SASOL HySHIFT: Producing GH2 for sustainable aviation fuel
- Project Phoenix: Fuel cell manufacturing
- Enertrag Postmasburg: GH2 and green ammonia plant
- Ubuntu Green Energy: H2 Project GH2 and green ammonia
- Atlanticia Green Hydrogen: Pre-seed startup, GH2 and ammonia production
- Saldanha Bay GH2 Project: GH2 production within the Freeport Saldanha IDZ
- Cape Stack: Hydrogen fuel cell stack production facility
- AMSA Saldanha Steel H2: Sasol and ArcelorMittal joint development agreement for GH2 and ammonia
- HIVE Ammonia: Will produce green ammonia
- HDF Energy: H2 long-term storage
Key Actors

- Development partners
- Corporates
- Finance providers
- NGOs, civil society
- Research, skills
- Startups
- ESOs

Institutions and Organizations:
- giz
- SABIA
- endeva
- AEBEL
- Make-IT in Africa
- Government

Supporting Partners:
- CSIR
- NRF
- EWSETA
- CHIETA
- National Research Foundation
- TIPS
- HySA
- CSIR
- Centre for Environmental Rights
- Natural Justice
- Public Investment Corporation
- Industrial Development Corporation
- AngloAmerican
- Sasol
- Freeport Saldanha
- HYDROFUEL SOLUTIONS PTY LTD
- HAPOX
- IDA
Enablers of GH2 Development

Longstanding GH2 sector and experience in related fabrication industries with HySA launched in 2008

Access to natural resources will allow GH2 production at a highly competitive price globally

PGM mining industry drives innovation around PEM electrolysers and H2 fuel cells as well as localization and innovation for GH2 startups

Strong research and incubation system spurs early stage GH2 innovation

High motivation from the presidency in GH2 coordination and prioritization
Inhibitors of GH2 Development

Despite perceived GH2 opportunity, investment remains a prominent issue for innovators in the sector.

Gap in commercialization and offtake for smaller GH2 enterprises.

Large companies often integrate vertically, bypassing the involvement of local startups.

GH2 skills and hiring pools are underdeveloped, complicated by dynamics surrounding gender and race.

Gaps in policy and clarity regarding licensing and permits.
South Africa has a relatively more advanced GH2 ecosystem (PGM industry for electrolysers and fuel cells) and more GH2 application experiences with the HySA.

Yet, we still have a system that is currently optimized to benefit larger players.

The system excludes smaller players and startups who are faced with limited access to finance for their scale-up activities, limited, affordable skill base, and a risk of exclusion from GH2 projects developed by larger players (lack of collaboration).

This all severely limits their market access and commercialization.
Loop 1: Skills and Inclusivity

- There are limited GH2-specific skills programs and curricula in the South African ecosystem, thus local graduates and workers aren’t fit for industry.
- One effect is that companies hire foreign skilled workers for their GH2 projects.
- This leads to a limited inclusion of local workers and graduates in the GH2 ecosystem, and by extension, the exclusion of local communities from the process.
- When there are fewer opportunities in GH2 for local workers and graduates, there is less incentive to develop local GH2 curricula, which closes the loop and leads to limited GH2-specific skills and trainings in the region.
Loop 2: Vertical Integration

• There are few GH2 startups large and advanced enough to play a role in the market. They are lacking the investment to grow or the certification and track record to become partners of the larger companies.
• Thus, larger companies either don’t find these startups (lack of transparency/visibility) and decide to do everything themselves; or they buy their ideas.
• Thus, GH2 startups are not part of the market, thus have difficulties accessing resources like information, capital and skills
• Thus, startups cannot build critical mass to sufficiently advance, grow their innovation and expand their team. Thus, they stay too small to be relevant for the big players.
Loop 3: Access to Finance

- Providers of growth capital are more risk averse to fund disruptive GH2 start-ups and innovations, notwithstanding the presence of TIA – a funder dedicated to innovative start-ups
- This leads to limited suitable funding available for the scale up activities of GH2 startups and innovators
- Thus, start-ups and innovators do not have sufficient funding for increased market access and commercialization
- As a result, start-up do not emerge and are therefore perceived as risky
- This then leads back to the fact that provider of growth capital remain risk averse to fund disruptive start-ups and innovations
Aspirational Future for the Green Hydrogen Sector
The Future We Hope For

**Inclusion of people**
- Transition for the South African economy, get out of load shedding
- See more local companies getting into the GH2 space and getting support
- Build kite ships

**Supply H2**
- H2 to play a vector in energy transition

**Dream becomes true**
- South Africa plays a major role in equipment production

**Create jobs**

**Inclusive**
- Embed production with innovation locations
- Alleviate South Africa's unemployment situation

Collection of South African participants' responses during our first online expert consultation, March 2023
South Africa's robust and inclusive GH2 sector benefits local communities and encourages the participation of local (digital) startups and innovators.
Establish mechanisms that make startups market-ready and facilitate the collaboration of local (digital) startups and innovators with large GH2 projects and companies across the value chain.

A **near star** is a 5- to 10-year goal that is framed as a distant, but foreseeable outcome that could be attained. It should be a significant step toward the guiding star.
How might we ensure that (digital) startups and local innovators benefit from the potential in the green hydrogen sector?
Levers and Solutions for Change

Starts mark the solutions which resonated most with the consultations’ participants
Solutions for Skills and Inclusivity

- Create opportunities & skills for students in the industry; train people internally
- Develop VC platforms to are comfortable assuming GH2 risk to provide startups with capital to hire staff
- As the sector will develop, it will attract more people

Limited demand for local GH2 skills programs

Limited development of local GH2-specific skills programs and trainings

Limited inclusion and fewer opportunities for local workers and graduates in the GH2 ecosystem

GH2 projects hire foreign skilled workers

Local workers and graduates aren't fit for industry

Underdeveloped local skills limit inclusivity of the local GH2 sector

- (Gov.) Funded internship programme for SMEs and HySA
- Development of GH2 TVET programmes
- Link networks to help people find jobs with the industry; make job market more transparent

- Fund internships/entry level employees to train entry level staff on the job
Solutions for Inclusive Value Chain

- Widen the market for startups regionally; expand into neighbouring countries (AfCFTA)
  - Exports of green ammonia/GH2 mainly to Europe

- Export of green ammonia/GH2 mainly to Europe

- Comply with European procurement rules
  - Quotas for local procurement
  - Offer something nobody has or at a competitive price

- Market place to make people aware of what exists (private sector led)
  - Awareness campaigns for startups
  - Incentive programmes

- Improve collaboration readiness and negotiation skills on both sides
  - Buy-out of startups as a way to collaborate with innovators; prepare startups for this.
  - Invest in a GH2 R&D cluster (e.g. tax reductions)
  - Unconditional seed money to incentivize innovation in the sector (like in Chile)
  - Engage philanthropic people who like to give back to society

- Many startups and innovators cannot build critical mass

- There are few GH2 startups and innovators relevant in the market

- Large companies either bypass the involvement of startups entirely or buy them to integrate vertically

- Startups and innovators have difficulty accessing GH2 markets and resources (incl. capital and skills)
Solutions for Access to Finance

- Awareness of the different funding lines that TIA has: SME funding, VC funds etc.
- Government could de-risk some funding; so far the sources are limited
- A unit to help fund seekers to improve the quality of their applications
- Research can play a role to identify niches for startups
- Linkage between research institutions and startups; they spin off from the research institutions
- Bring other players on board in research and the energy department to make startups better prepared for the market; thus less risky.

Limited access to scale-up finance for innovation

- Would be good to have different kinds of tools: Funding for feasibility studies, production cost, technology, securing off-take agreements etc.
- Esp. feasibility studies would help to develop bankable projects.

Interactive portal and directory to inform the various options and processes involved (based on study GIZ is already doing on financing landscape)
Thank you for your attention

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