


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
July 2023

Table of Contents

Introduction to ii2030 Methodology

Status of Green Hydrogen in South Africa

The background of the slide is a dark blue-grey color with a repeating pattern of light grey circuit board traces and nodes, creating a technical and digital aesthetic.

Introduction to ii2030 Methodology

ii2030 GH2 in Africa Edition

Green hydrogen can be transformative for Africa. The sector will create **green jobs** and **new opportunities** for local startups and innovators.

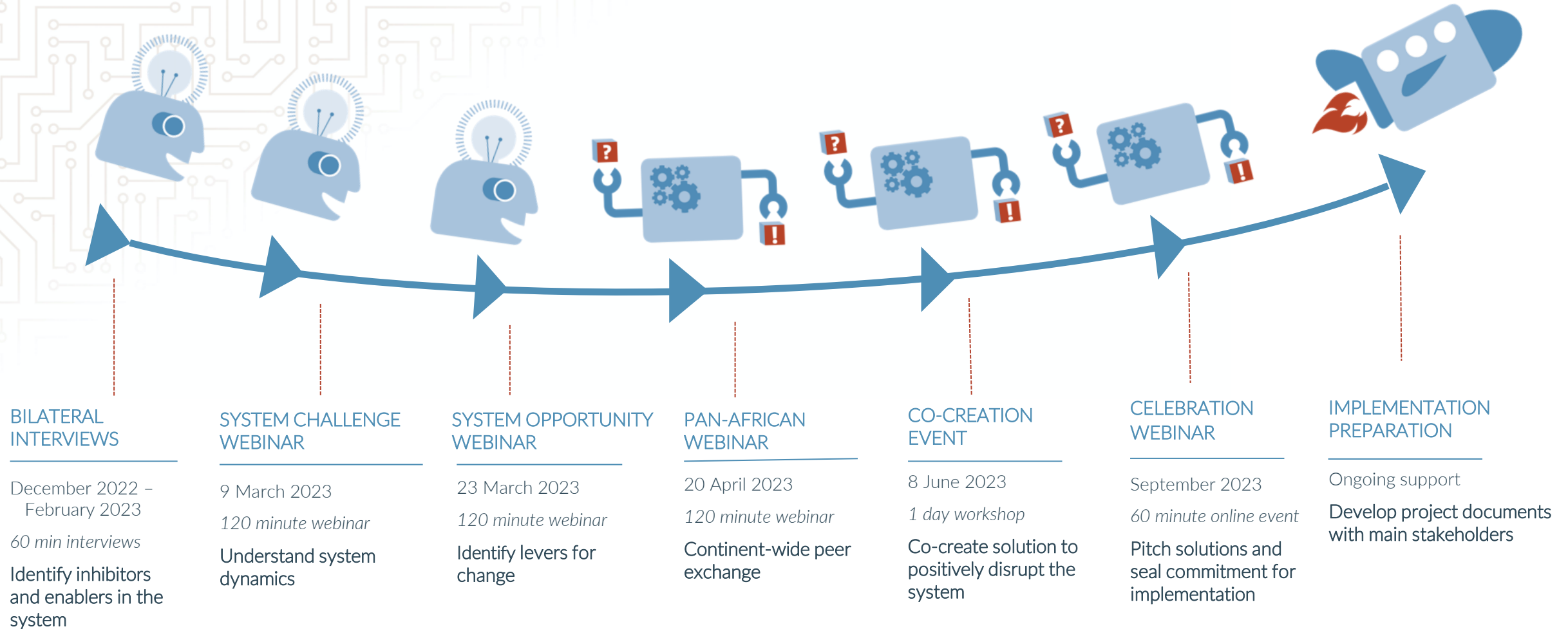
Now is the time to create the fertile ground for entrepreneurs, who often lack access to adequate finance, skills, or even awareness of opportunities in the GH2 sector.

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.



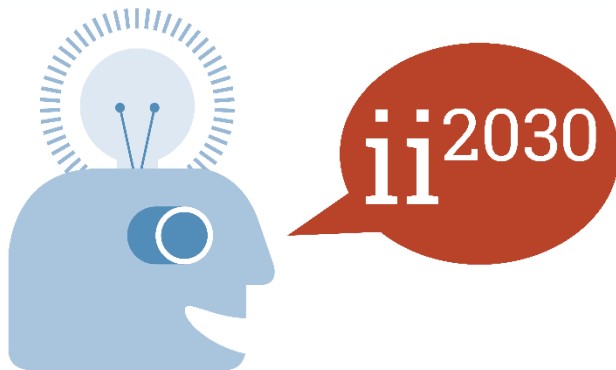
Photo: Co-creation in Cape Town in June 2023 (Endeva)

Methodology Journey: ii2030 GH2 in South Africa

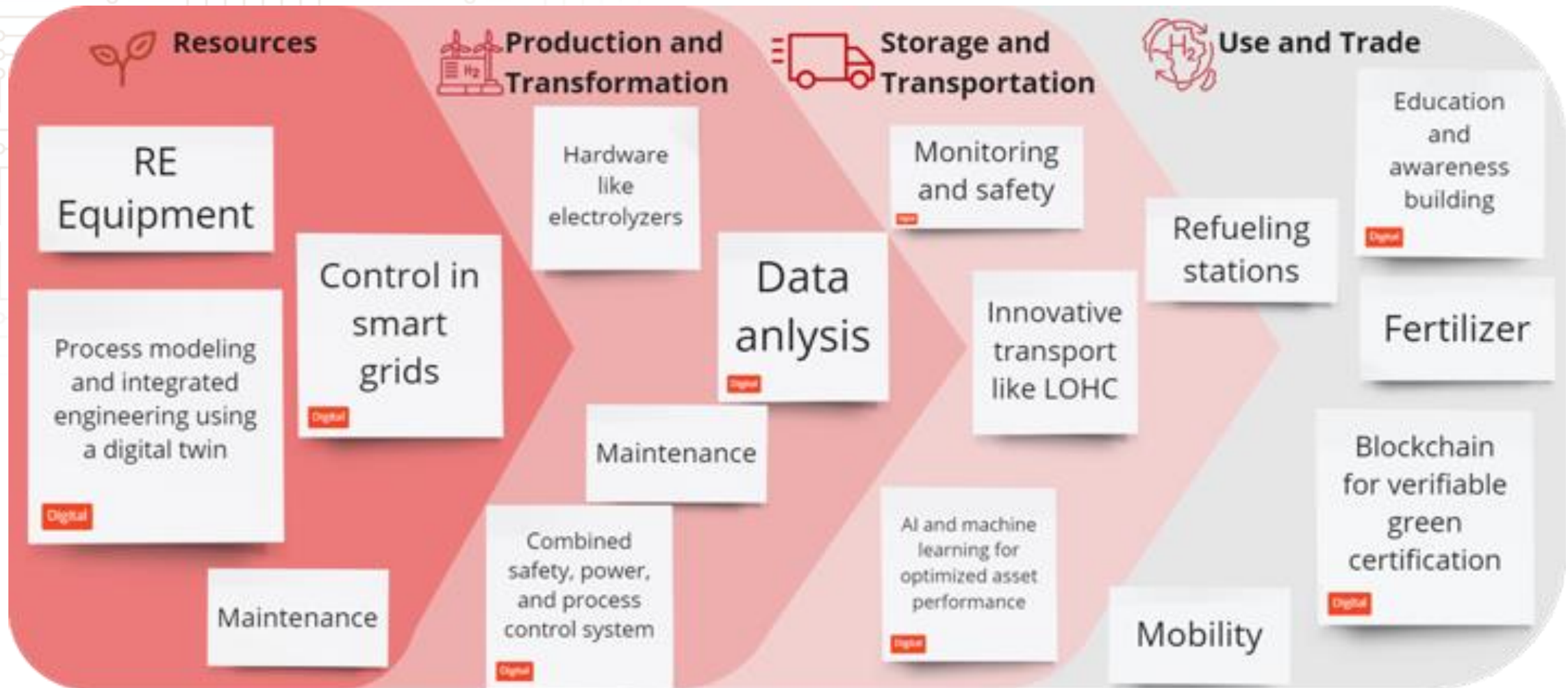


Guiding Question for the ii2030 Green Hydrogen Edition

How might we ensure that (digital) startups and local innovators benefit from the potential in the green hydrogen sector?



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.

Milestones of the Sector

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

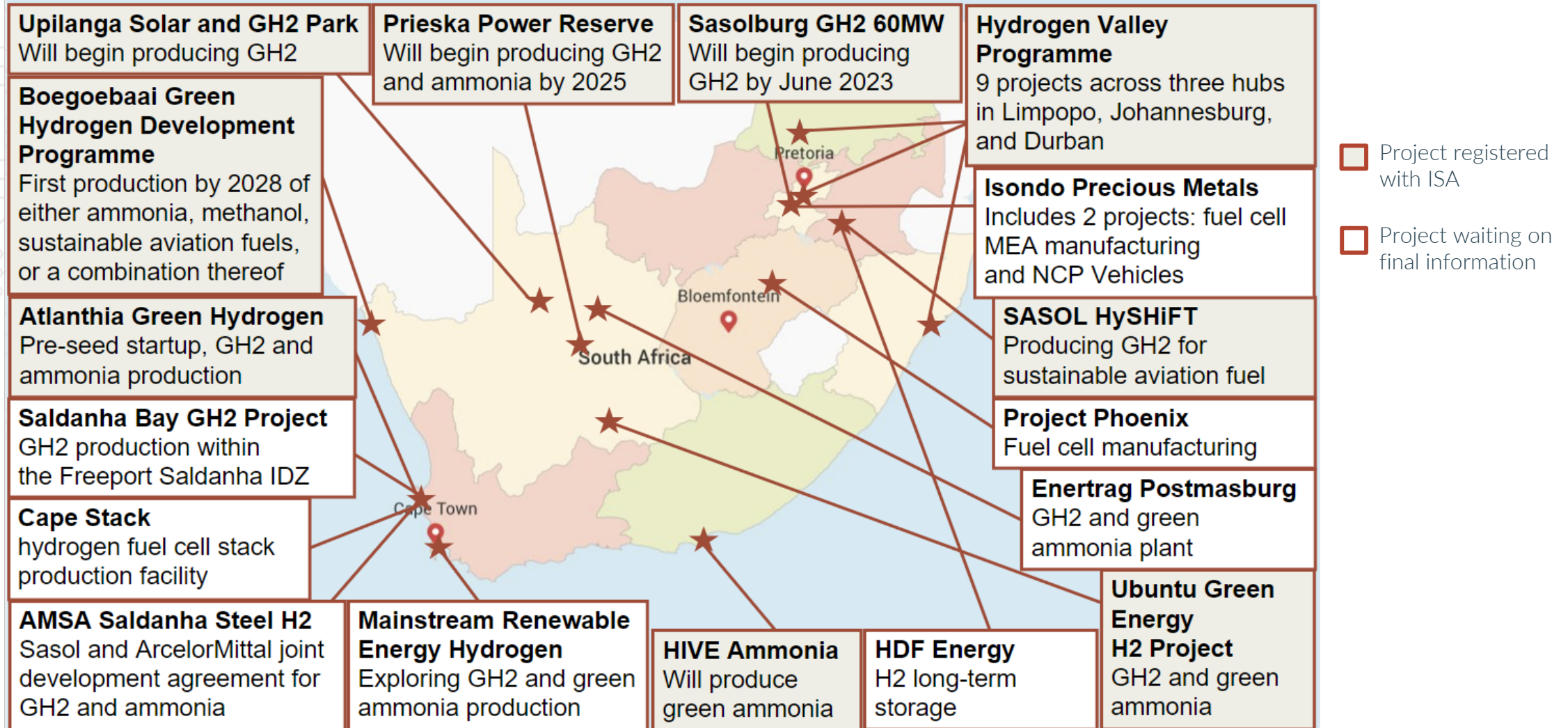
February 2022: the [South African Hydrogen Society Roadmap \(HSRM\)](#) is published by the South African government (Department of Science and Technology of South Africa)

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



The South African Green Hydrogen Strategy

GH2 Projects in South Africa



Key Actors



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 electrolyzers 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

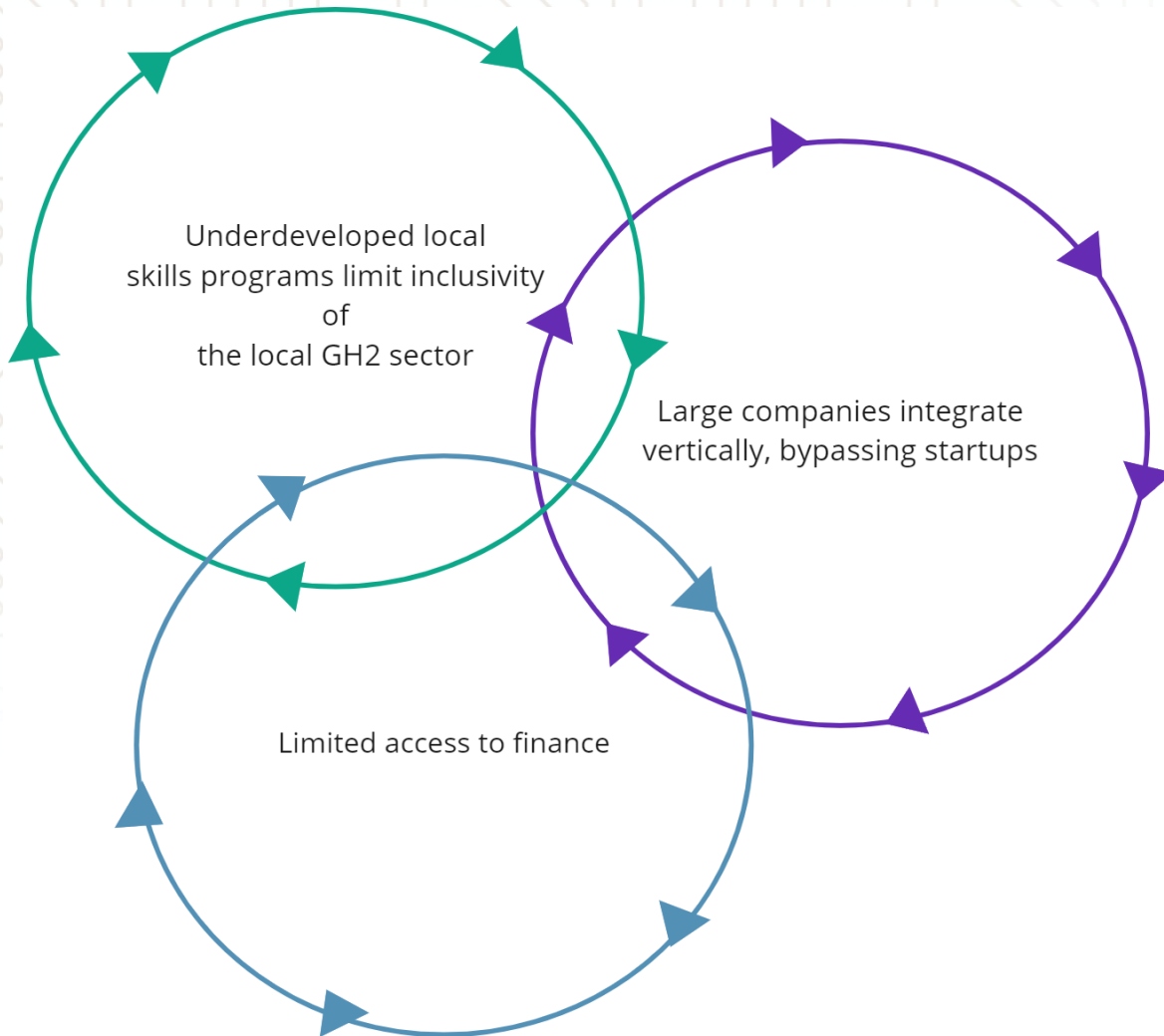


GH2 skills and hiring pools are underdeveloped, complicated by dynamics surrounding gender and race



Gaps in policy and clarity regarding licensing and permits

Core Story of the System



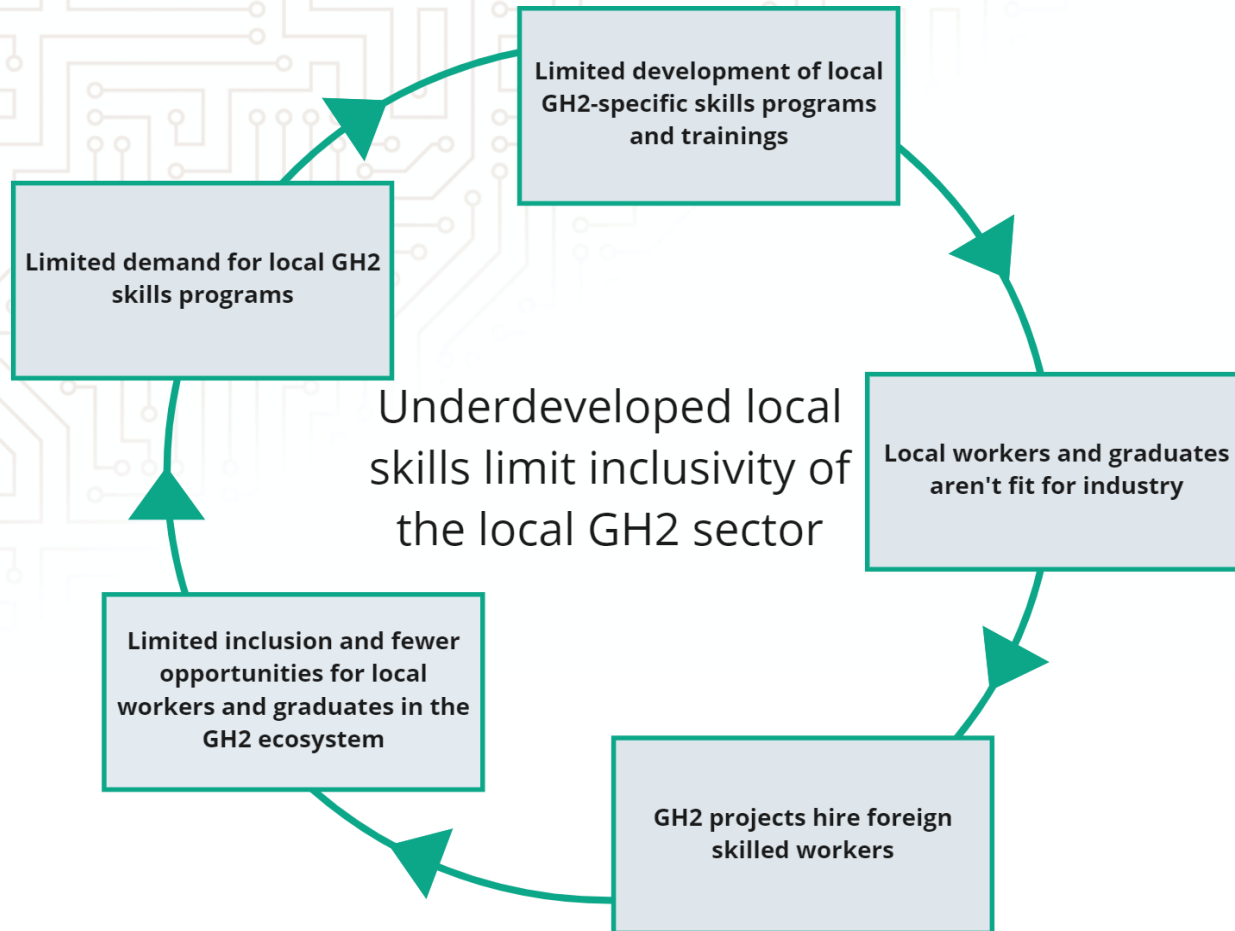
South Africa has a relatively more advanced GH2 ecosystem (PGM industry for electrolysers and fuel cells) and more GH2 application experiences with the HySA.

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).

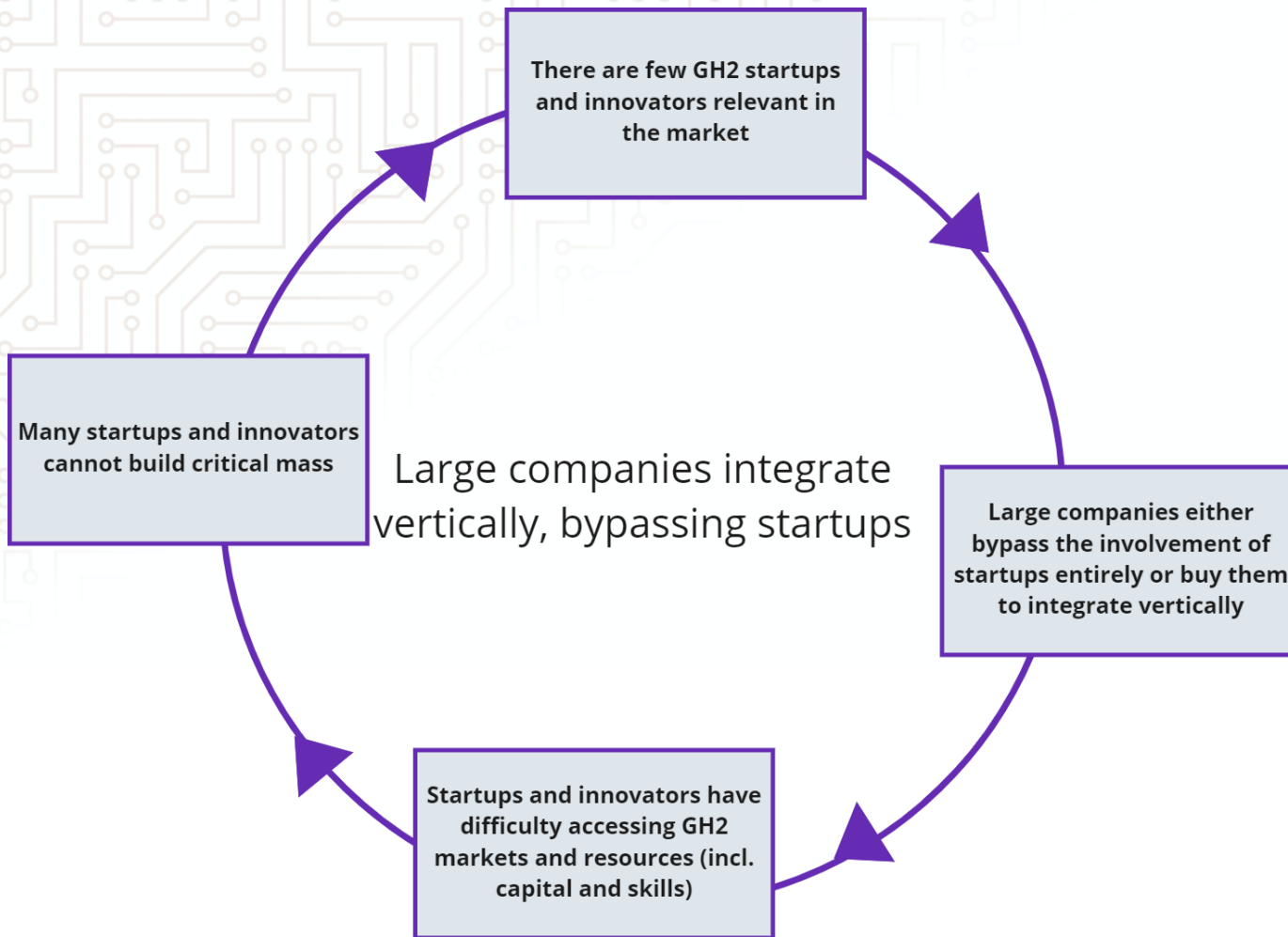
This all severely limits their market access and commercialization.

Loop 1: Skills and Inclusivity



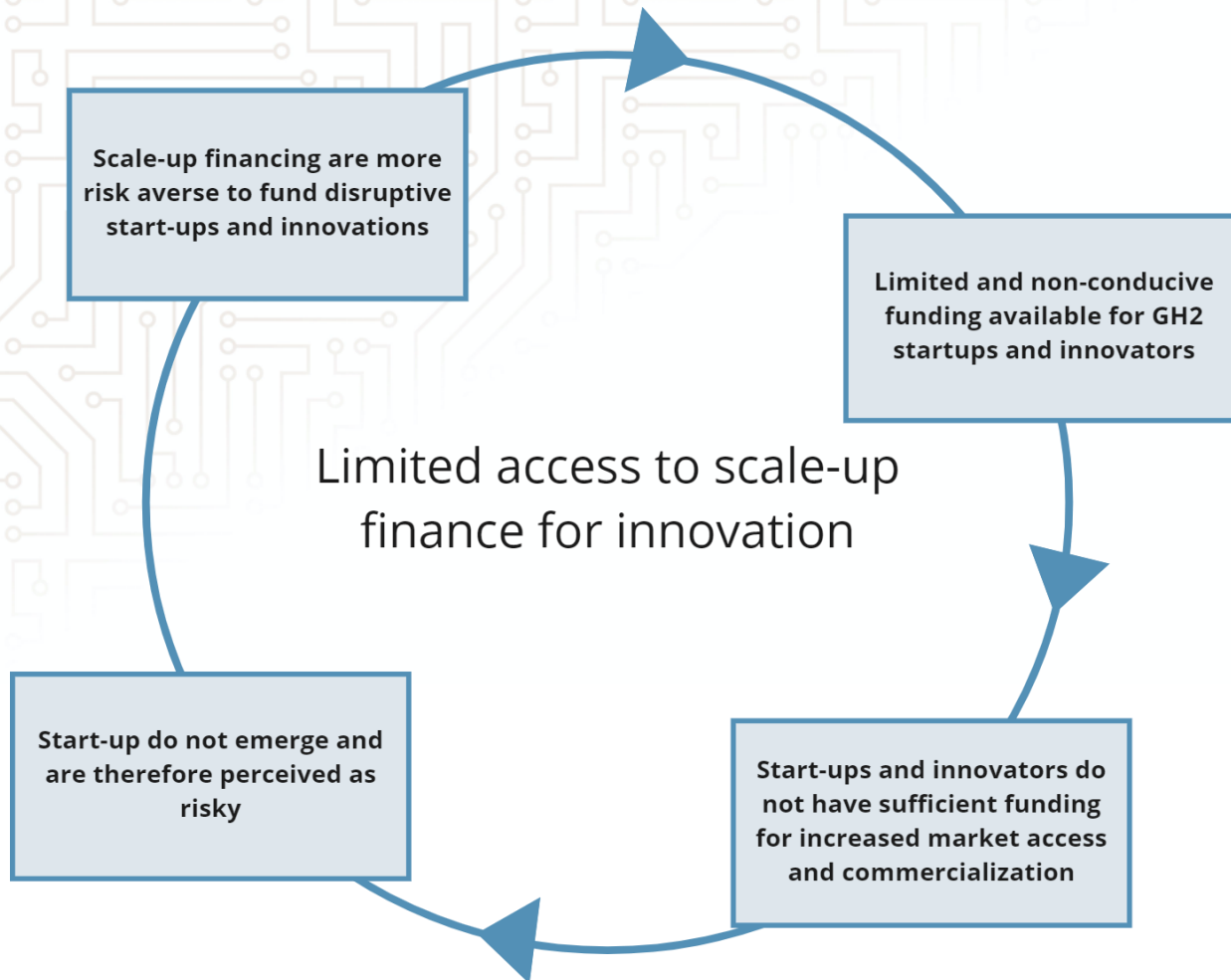
- There are limited GH2-specific skills programs and curricula in the South African ecosystem, thus local graduates and workers aren't fit for industry.
- One effect is that companies hire foreign skilled workers for their GH2 projects.
- This leads to a limited inclusion of local workers and graduates 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



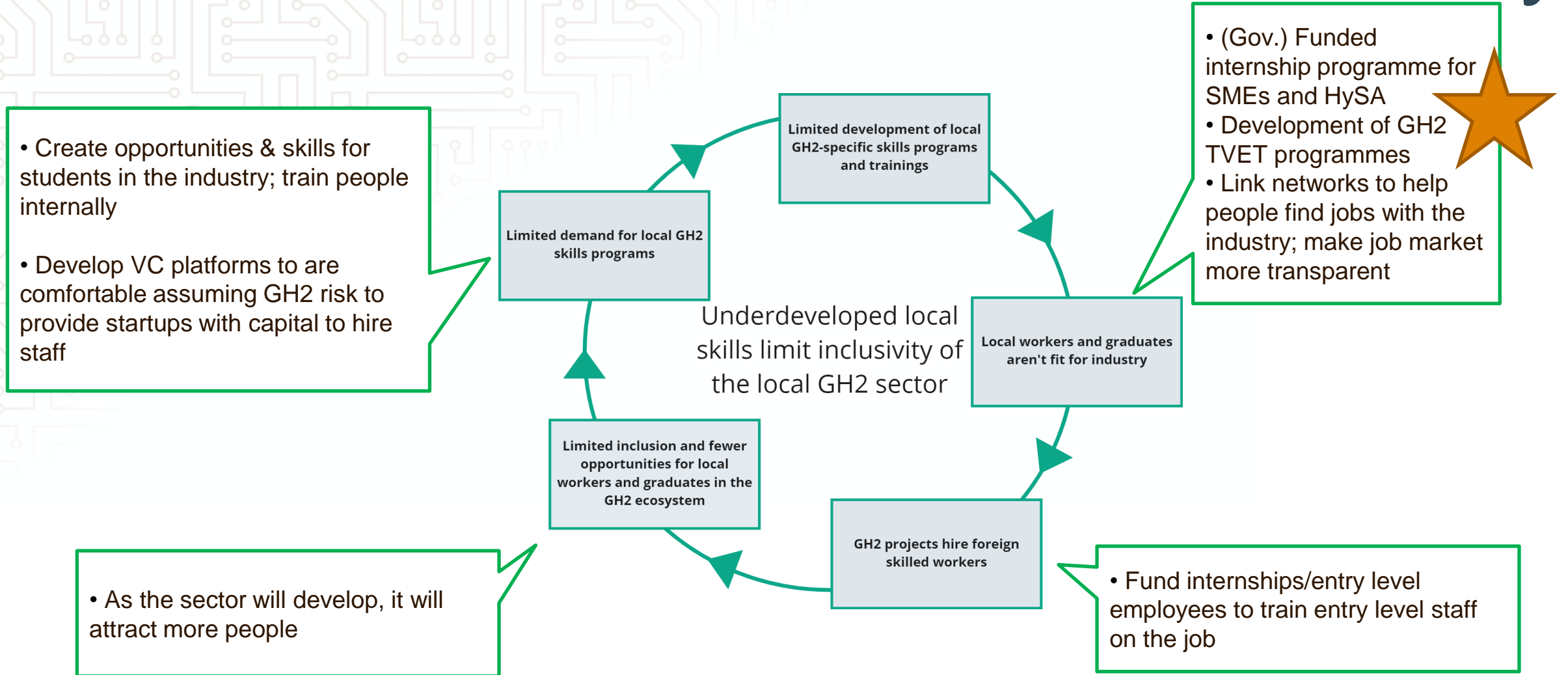
- Providers of growth capital are more risk averse to fund disruptive GH2 start-ups and innovations, notwithstanding the presence of TIA – a funder dedicated to innovative start-ups
- This leads to limited suitable funding available for the scale up activities of GH2 startups and innovators
- Thus, start-ups 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

Levers and Solutions for Change

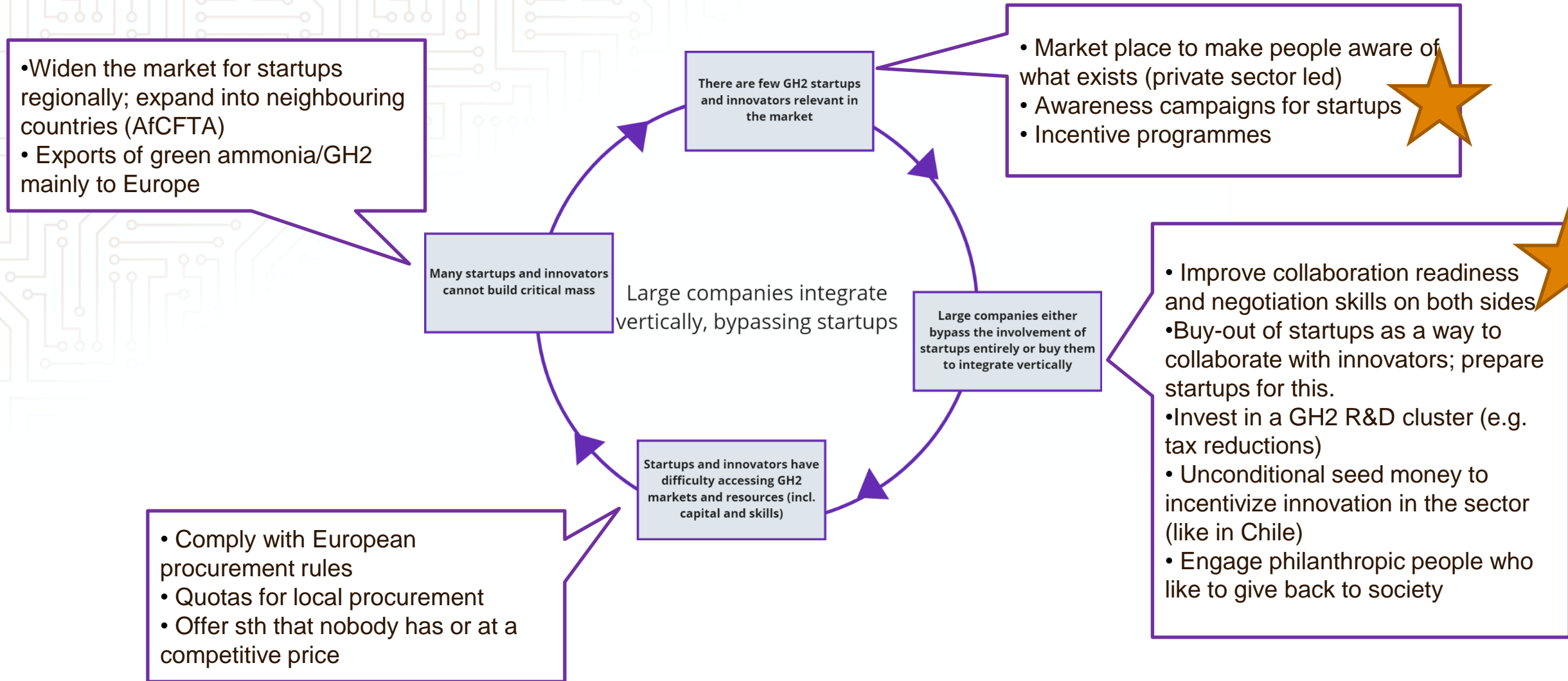


Starts mark the solutions which resonated most with the consultations' participants


Solutions for Skills and Inclusivity



Solutions for Inclusive Value Chain



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.

Scale-up financing are more risk averse to fund disruptive start-ups and innovations


Limited and non-conductive funding available for GH2 startups and innovators


Limited access to scale-up finance for innovation

Start-up do not emerge and are therefore perceived as risky

Start-ups and innovators do not have sufficient funding for increased market access and commercialization

- 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)
- 



Results of Co- Creation: Capacity Building for Startups in the GH2 Sector

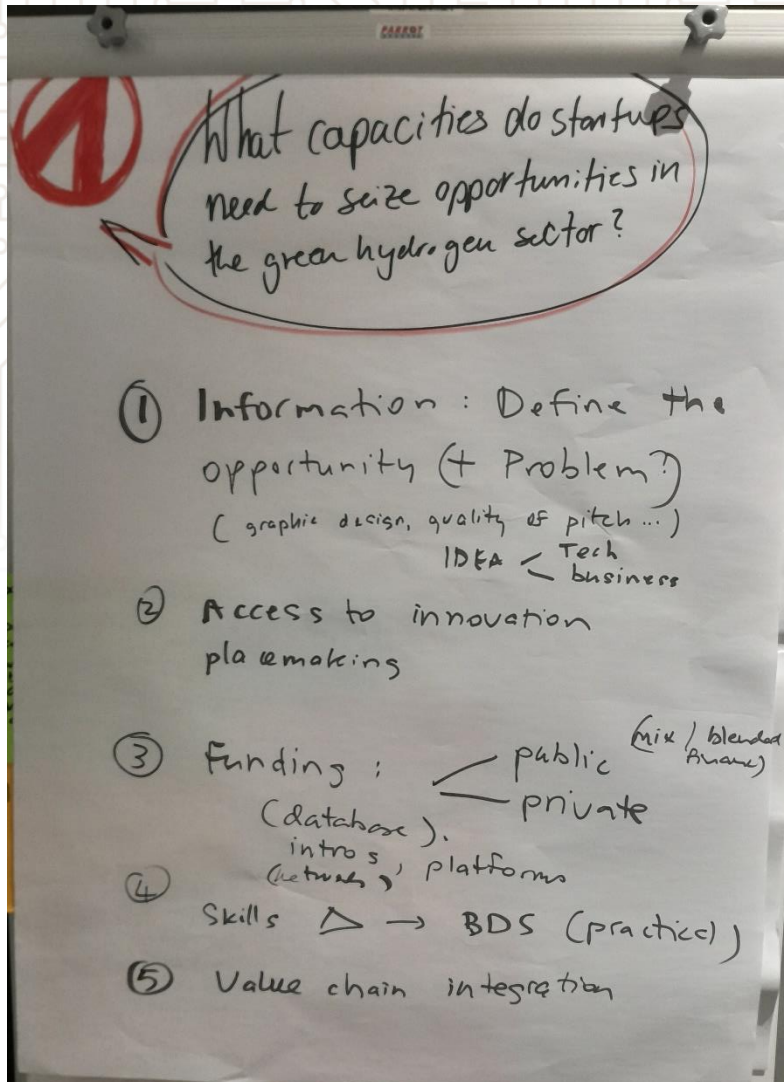
Starting Point for Co-Creation



How can we enable startups to grasp the opportunities in the green hydrogen sector in South Africa and to collaborate successfully with large companies in the sector?

Fast Networking, Q1

"South Africa is a difficult place to be a startup; startups need to be driven, well-networked, and well-funded to succeed."



What capacities do startups need to seize opportunities in the green hydrogen sector?

- 1) Information and awareness of opportunities available for them.
- 2) Access to innovation placemaking: need guidance and platform to transform ideas into a pitch, including defining the problem the startup is addressing. Even access to the internet and electricity are universally important for any startup in South Africa and particularly for GH2.
- 3) Funding (from public and private sector) like Technology Innovation Agency (TIA) or private banks and angel investors. There's a need for a blended mix of funding.
- 4) Skills, practical training, and apprenticeships in large companies and experienced environments.
- 5) Local communities need to be integrated into the value chain to benefit, which can include specifically-targeted skills development.

Fast Networking, Q2

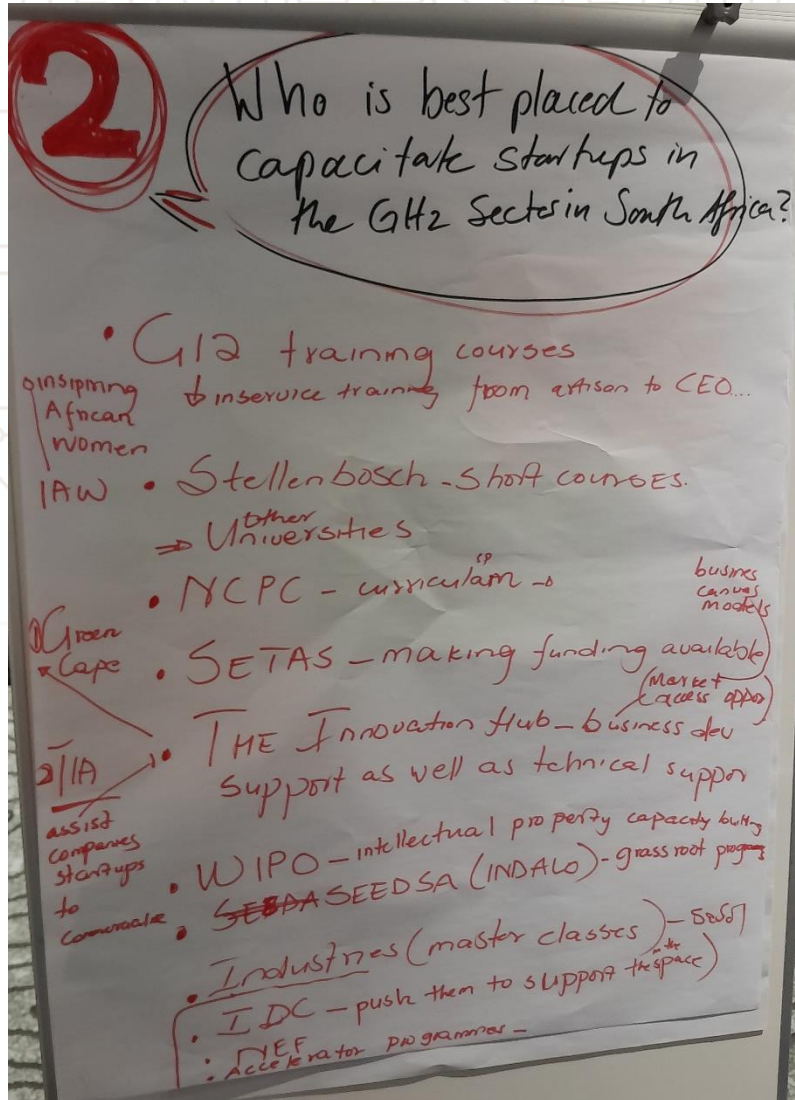
Who is best placed to capacitate startups in the green hydrogen sector in South Africa?

Skills

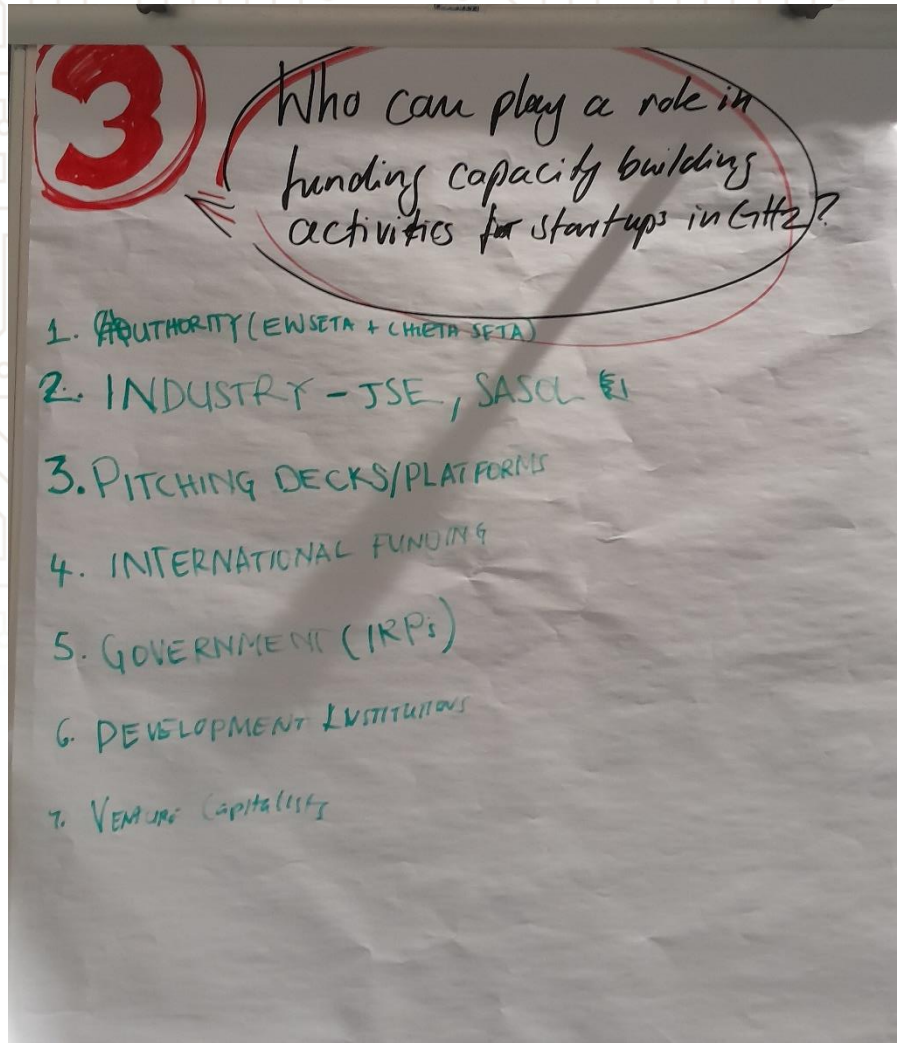
- GIZ, with their training courses, including in service training from artisans to CEO
- Stellenbosch University and other universities, with their short courses
- Industry master classes, ex. SASOL
- National Cleaner Production Centre South Africa (NCPC-SA) for curriculum development
- Sector Education and Training Authorities (SETAs) for making funding available

Startup Development

- The Innovation Hub: incubation and business development and technical support
- World Intellectual Property Organization (WIPO), to protect the property rights of startups
- SEED Enterprise Support Programmes, offering their grassroots programmes for business support and including communities
- Technology Innovation Agency (TIA) is facilitating technology innovation and perhaps market access
- Green Cape and Inspiring African Women support business development for startups
- International Development Corporation (IDC), National Empowerment Fund (NEF) offering accelerator programmes and could be pushed to support the space



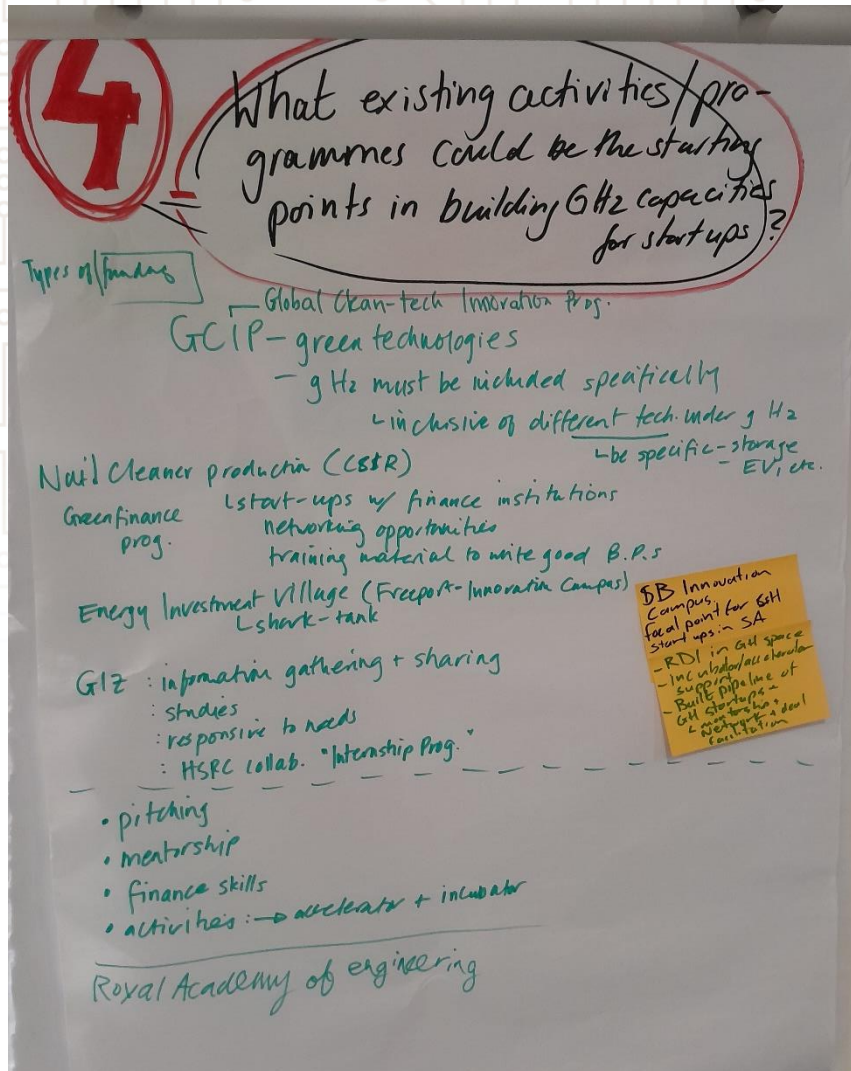
Fast Networking, Q3



Who can play a role in funding capacity building activities for startups in GH2?

- 1) Skills Authorities: Energy & Water Sector Education Training Authority (EWSETA), Chemical Industries Education & Training Authority (CHIETA), Sector Education Training Authority (SETA). These entities build the groundwork, decide what needs to be prioritized, and loops in communities to build the skills and capacity startups need.
- 2) Industry: Johannesburg Stock Exchange (JSE), SASOL. These help to take startups concepts further and aid in commercialisation.
- 3) Pitch decks and platforms: This allows startups to share their ideas and speak directly to potential investors and network.
- 4) International Funding: Kreditanstalt für Wiederaufbau (KfW), GIZ, and the EU. They are pushing to move toward sustainability goals and invest.
- 5) Government Authorities: Technology Innovation Agency (TIA), Integrated Resource Plan (IRP). Aids startups and makes it easier to gain access to funding, grants, and programs that help you build your platform.
- 6) Venture capitalists and angel investors: propel startups to new heights.

Fast Networking, Q4



What existing activities/programmes could be the starting points in building GH2 capacities for startups?

- 1) Global Green Tech Innovation Programme (GCIP), focuses on green technologies: can push for GH2 to be included explicitly in its agenda.
- 2) National Cleaner Production, Council of Scientific & Industrial Research (CSIR): Green Finance Program organizes networking opportunities for startups with finance institutions and develops training materials for startups to write good business plans.
- 3) Energy Investment Village shark tank, Freeport Saldanha Bay Innovation Campus
- 4) GIZ has identified information gathering and sharing as a critical need in the sector, they conduct studies to address information gaps, and they try to understand and respond to the needs. Collaboration with HSRC on an internship program that finances interns.
- 5) Royal Academy of Engineering
- 6) TIA and government agencies: Must include as many people as possible into the agenda to recognize incentives in the GH2 space

The background of the slide is a dark blue-grey color with a repeating pattern of light grey circuit board traces and nodes, creating a technical and digital aesthetic.

Prototypes for Capacity Building for Startups from the Co-Creation Workshop

1: Information Desk and Support Centre



Prototype 1



Prototype 1 – Information/Research

Developers/Group participants: Stellenbosch University, CSIR, the Innovation Hub, SeaH4

Information desk and support centre benefitting a wide spectrum of participants from youth and learners through to technology and business investors.

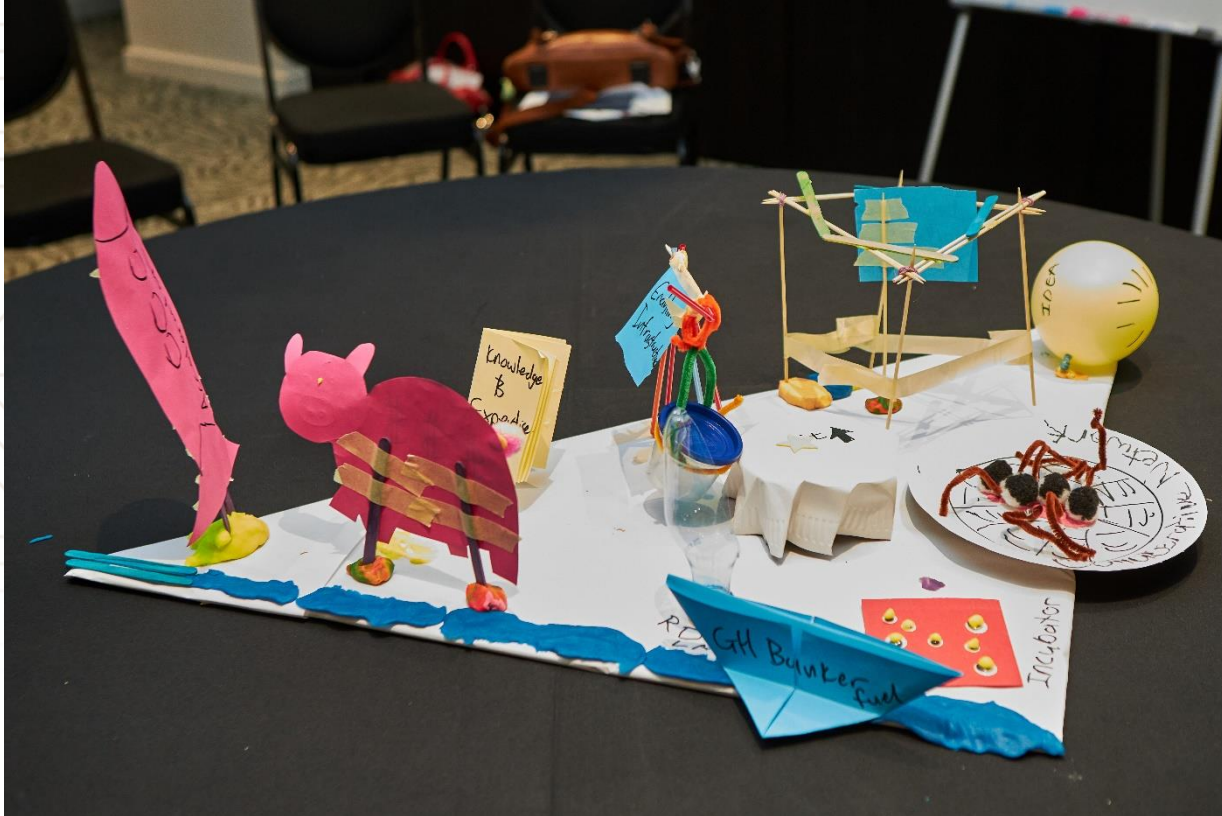
Featuring:

- 1) Electronic communication: radio, internet
- 2) Written communication: billboards to reach audiences that may not have access to electronic devices. Advertising workshops, what is GH2, what is the technology, etc.
- 3) In-person contact sessions: presentations, events
- 4) Information desk and support centre

2: GH2 Innovation Hub



GH2 Innovation Hub



Prototype 2 – GH2 Innovation Hub

Developers/Group participants: RIIS, Saldanha Bay Innovation Campus, TIA, Hyena Energy, Inspiring African Women

A one-stop-shop for GH2 innovation: an epicenter and hub for innovation with all the necessary actors and resources that make innovation ecosystems work.

Featuring:

- 1) Incubator and accelerator programs
- 2) Research development and innovation lab
- 3) Enabling infrastructure supporting email addresses, pitch training, business model canvases, design support, co-creation spaces, etc.
- 4) Resident knowledge and expertise to support startups
- 5) Thought partnership and ideation capability
- 6) Finance
- 7) Positioned near a port

3: The Tinder Bridge



The Tinder Bridge



Prototype 3 – The Tinder Bridge

Developers/Group

Participants: Representatives from GIZ, Hydrofuel Solutions, SANEDI

A match-making platform involving that helps startups cross hurdles including financing, resources, information and offtake by matching with private companies, private investors and offtakers.

Featuring:

- 1) Allows startups to roll out their ideas and get the resources they need to get to a higher level.
- 2) Allows larger companies achieve their ESG goals by capacitating and facilitating startups.
- 3) Could function as a trading platform for GH2 and carbon credits as well as lower the price of electricity.
- 4) Matches startups with private companies, private investors and offtakers.

4: The Aggregator



The Aggregator



Prototype 4 – The Aggregator

Developers/Group participants: Atlantia Green Hydrogen, Inspiring African Women, CSIR

Advising, mentorship, and practical training from experienced persons or entities.

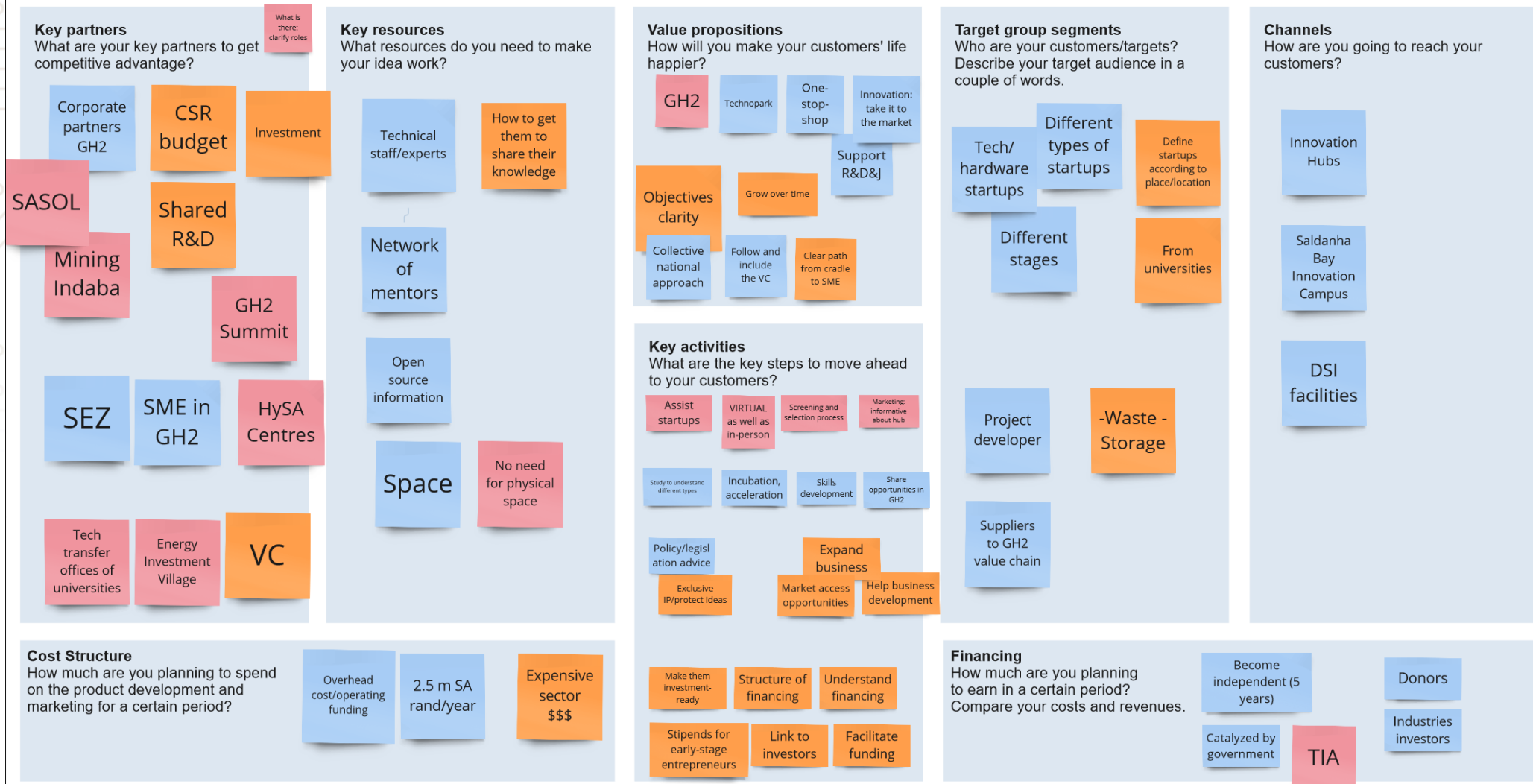
Featuring:

- 1) Advisory services
- 2) Mentorship and training
- 3) Training for mentors, train the trainer programs
- 4) Connecting and mapping startups and SMEs

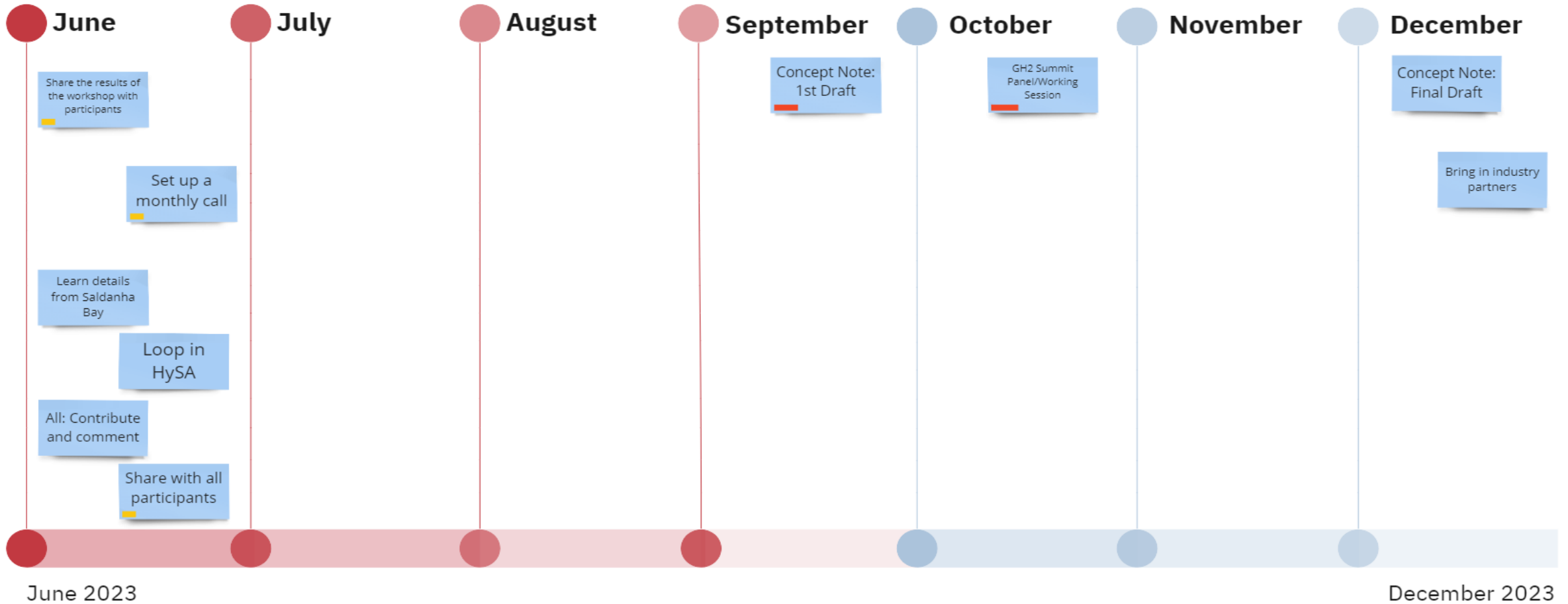
Concept for GH2 Innovation Hub

On the second day of the co-creation workshop, relevant stakeholders started detailing the idea of a Hub for Startups in the GH2 Sector based in a Special Economic Zone.

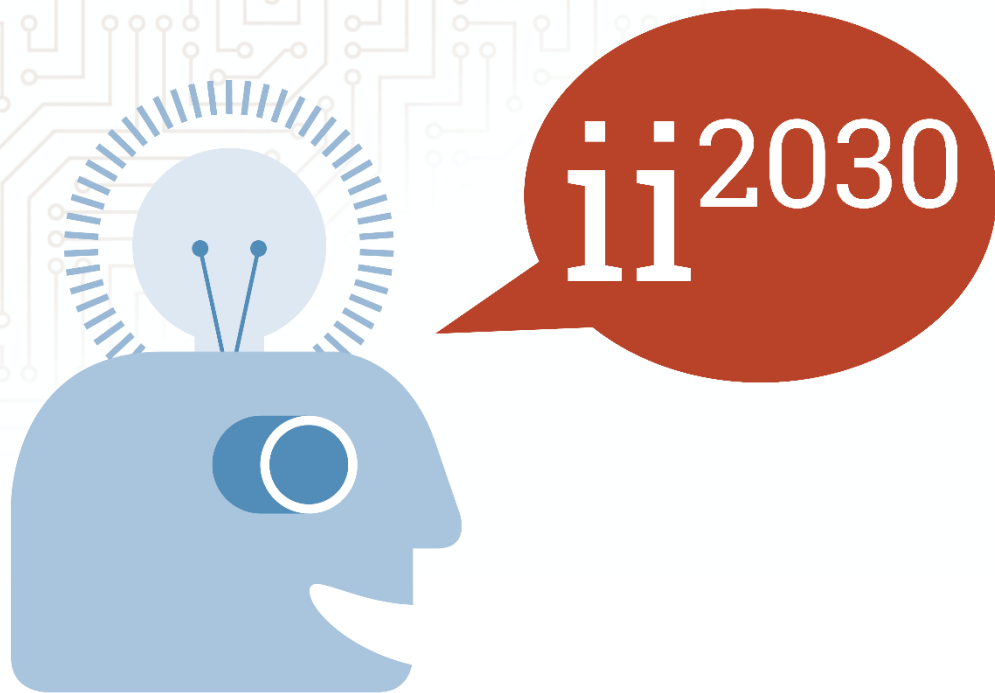
Project Model Canvas



Roadmap to Concept Development



Thank You!



For more information, feedback
or comments, please contact

Claudia Knobloch

c.knobloch@endeva.org