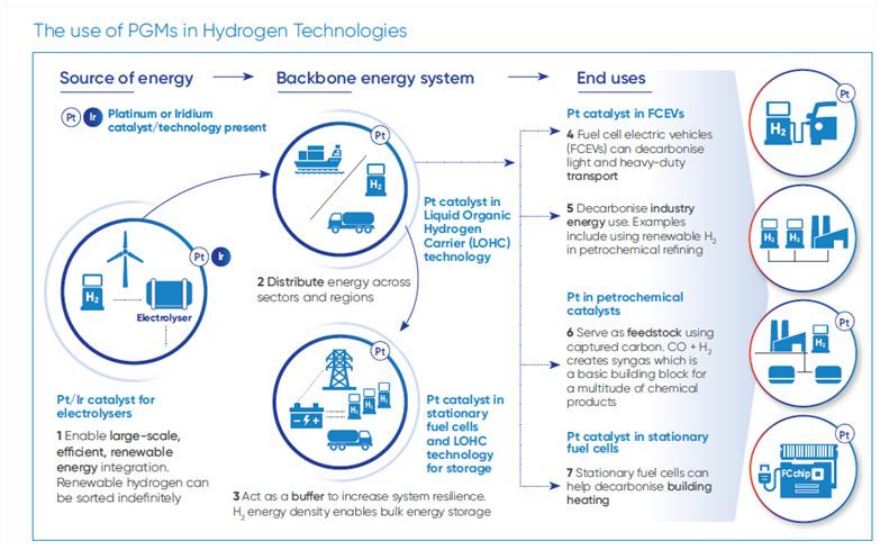
AngloAmerican

Anglo American's role in the Global Hydrogen Economy

28 June 2022

Platinum group metals (PGMs), specifically platinum and iridium, at the heart of core technologies across the value chain

From production to distribution and end use



Source: Anglo American

Hence, our interest is three-fold

1. GROWING DEMAND FOR OUR METALS
2, NEW BUSINESS OPPORTUNITY

3. DECARBONISING OUR OPERATIONS

Carbon neutral across all operations
By 2040

Create & Shape new demand segments

Shaping Businesses

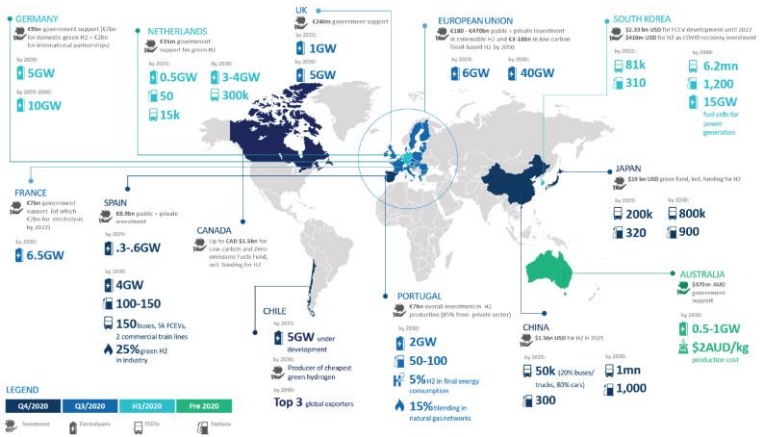
- **Discover & assemble** new ventures
- **Deploy & leverage** growth capital
- **Enable** commercial collaboration

Shaping Operating Environments

- **Advocate** for a favourable policy environment
- **Educate** through targeted communications

Today, investment in H2 continues to grow, driving down the cost of hydrogen, making H2 mobility applications competitive with low carbon alternatives

Hydrogen is no longer the technology of tomorrow



Pledged hydrogen ambition by countries around the globe, in many of these jurisdictions, we are actively doing policy advocacy

Many new and continuing investments worldwide, and lowered H_2 cost

Investment continues to grow:

>200
projects on hydrogen announced worldwide

>70
bn USD pledged by governments for development of hydrogen economy

126 GW
electrolyser installation estimates by 2030[1]

Driving down cost of hydrogen:

2 $/kg
Green hydrogen cost estimated by 2030[2]

Making H_2 mobility applications competitive with low carbon alternatives:

4-6 $/kg
Cost per kg at the nozzle at which >60% of hydrogen mobility applications becomes competitive against low-carbon alternative[3]

Source: FTI Consulting
1. HSBC 2. Bloomberg NEF 3. Hydrogen Council

In so doing, we are moving the Green H_2 & Mobility from an opportunity into demand

Multiple projects in all critical areas

Shaping businesses

H_2 production

- Accelerating technology development of PGM-using / enabling tech (e.g. electrolysis, alternative compression, CO_2 capture)

>5 Research collaborations

>10 New ventures built and investments made

Infrastructure

- Direct funding of refuelling infrastructure with partners
- Research & investment

>15 # of refuelling stations co-funded worldwide

>5 Technology investments / development made

Fuel cell end-uses

- Supporting / co-developing multiple customer solutions – to give consumer choices

2 Vehicle demand aggregation campaigns initiated

~10 Technology investments / development made

Shaping operating environment

Policy advocacy, communications

- Amplifying the voice of the industry, call-to-actions

8 # of jurisdictions of direct / indirect active policy advocacy

>20 Seminars organised / presented

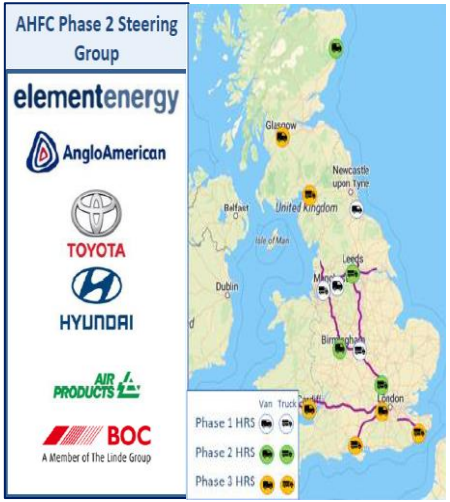
>100 External communications / outreach initiated (with others)

...and more to come

Aggregated Hydrogen Freight Corridors in key global markets

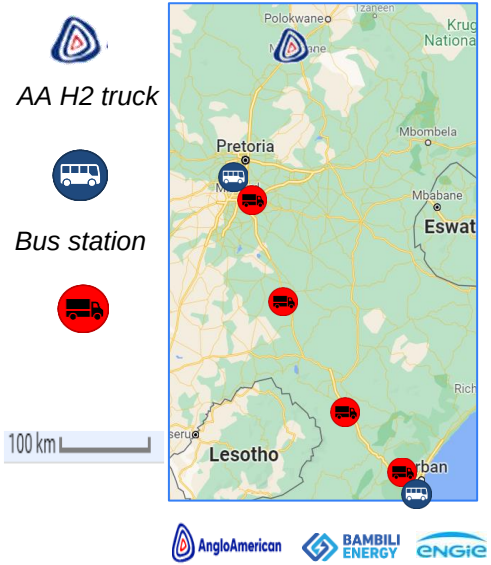
We have helped to create consortia of strategic industry partners to promote the development of hydrogen freight corridors in key geographies such as South Africa and the United Kingdom.

Trucks and vans aggregation in the UK



- End-user group: 24 of the largest fleet operators in the UK
- New member: BOC (Linde Group)
- £700k funding secured for the ZERFT & Tees Valley HTH
- Advocacy links made with DfT, Innovate UK and Highways England

Aggregation in South Africa



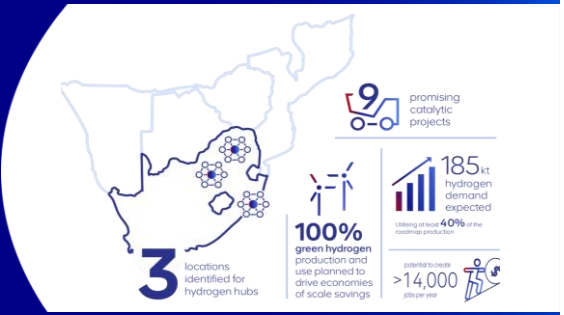
- Spanning Limpopo-Gauteng-KZN
- Focused on heavy duty trucks and buses
- 3-4 Public hydrogen refuelling stations for trucks
- 2 Hydrogen refuelling stations for buses

H2 Valley: Key Outcomes

The hydrogen valley study leverages existing activities within hydrogen along Limpopo-Gauteng-KZN and is focused across 3 main sectors namely mobility, industrial and construction

Anglo American have ongoing activities aligned with 3 of the 9 projects recommended

Shift from a project focus to shaping the ecosystem beyond the mine gate



The South African Hydrogen Valley feasibility study is another example of this ecosystem approach aimed at lowering barriers to entry

6 Key Insights

1

Hubs

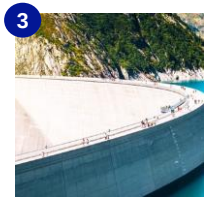
- 3 Green hubs
- Hub & spoke approach

2

Demand

- 185 kt H2 by 2030
- 40% of HSRM
- 1% PGM

3



LCOH

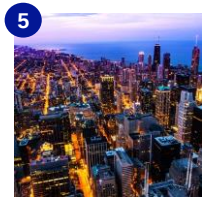
- Co-location
- $4 per kg
- $0,5 per kg for transport

4

Impact[1]

> $3,9B GDP
> $900M taxes
> 14,000 jobs/annum

5



Enablers

- Policy
- Infrastructure
- Market access
- Incentives

6

Projects

- 9 Catalytic projects identified

9 Catalytic projects:

1. Buses in Johannesburg and Pretoria
2. **Hydrogen mining trucks for platinum. Diamond and copper mining**
3. Fuel cell forklifts in Durban and Richard's Bay ports
4. **Heavy duty trucks and hydrogen refueling stations (Jhb-Dbn) – *Project RHynbow***
5. Heavy duty trucks and forklifts in Rustenburg
6. Ethylene production in Sasolburg
7. Ammonia production in Sasolburg
8. Power supply for data Centre in Limpopo
9. **Fuel cell power for offices in Johannesburg and Rustenburg**

AngloAmerican BAMBILI ENERGY science & innovation Department: Science and Innovation REPUBLIC OF SOUTH AFRICA ENGIE

1. These figures are relevant to the Valley and ***NOT*** Anglo American specific data

Membership & participation in key industry bodies

Aiming to create a favorable & supportive policy & regulatory environment for hydrogen adoption at scale, globally

Hydrogen Council

UK HFCA

UK H_2 Mobility

H_2 Sustainable Markets Initiative Hydrogen Taskforce

AHFC Aggregated Hydrogen Freight Consortium

Hydrogen Europe

FCHEA Fuel Cell & Hydrogen Energy Association

California Fuel Cell Partnership – Driving for the Future

Thank you