

INTRODUCING ISONDO PRECIOUS METALS (IPM)

A proudly South African black owned Platinum Group Metal (PGM)
Technology Company



- 1]** Manufacturing of PGM catalysts and MEA's for fuel cells & electrolyzers (SIP1)
- 2]** Deployment of hydrogen refuelling stations in Johannesburg for fuel cell heavy duty vehicles via Access to 7 tonnes per day of industrial hydrogen
Foundational project for rapid decarbonisation of transportation (SIP2)

ISONDO – FUEL CELL MEA AND CATALYST MANUFACTURING AND RECYCLING

Product portfolio - Setting up manufacturing & recycling of components underpinning green hydrogen industry



Major MEA production equipment acquired or on order



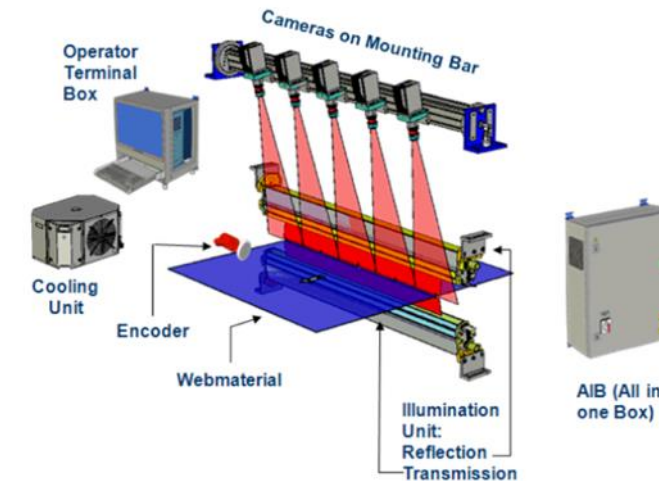
Continuous roll to roll coating line; Laminator



Intermediate & batch coaters



- Batch and continuous processes carefully selected to enable rapid scale-up
- Process development oriented to maximise efficiency of material utilization
- Extensive focus on process and quality control, including advanced, in-line optical imaging and artificial Intelligence
- Process and quality control information essential to minimise rejects and optimise costs



Optical imaging quality control system

Catalyst manufacturing capability - Equipment specified

- Comprehensive in-house capability being acquired to produce a full range of:
 - Fuel cell catalysts
 - Electrolyser catalysts
 - Supported PGM containing process catalysts (e.g., PGM on Al₂O₃, ZrO₂, CeO₂ etc)
 - Speciality PGM chemicals
- Processes include:
 - Wet synthesis methods
 - Dry (fusion) processes
 - Inert and reducing (H₂) atmosphere



IPM precious metals catalysts and chemicals capability	Fuel cell catalysts - Anode	Fuel cell catalysts - Cathode	Electrolyser catalysts - Anode	Electrolyser catalysts - Cathode	Other catalysts	Speciality pgm chemicals
Wet chemical processes	Carbon supported Pt and Pt/X alloys	Carbon supported Pt and Pt/X alloys	Inorganic supported Ir, Ir/Ru	Carbon supported Pt (Cathode)	Supported PGM process catalysts	PGM salts
Fusion processes	-	-	Ir, Ir/Ru	-	PGM process catalysts	PGM process catalysts

State-of-the-art manufacturing facility undergoing construction at the OR Tambo SEZ



Facility will be complete BY Q4 2023

Building Progress



Ready for internal fitout – June 2023

3D Walkthrough of IPMs Facility



- ISONDO – HYDROGEN REFUELLING STATION
& FUEL CELL TRUCK/BUS DEPLOYMENT
MORE THAN 300 VEHICLES

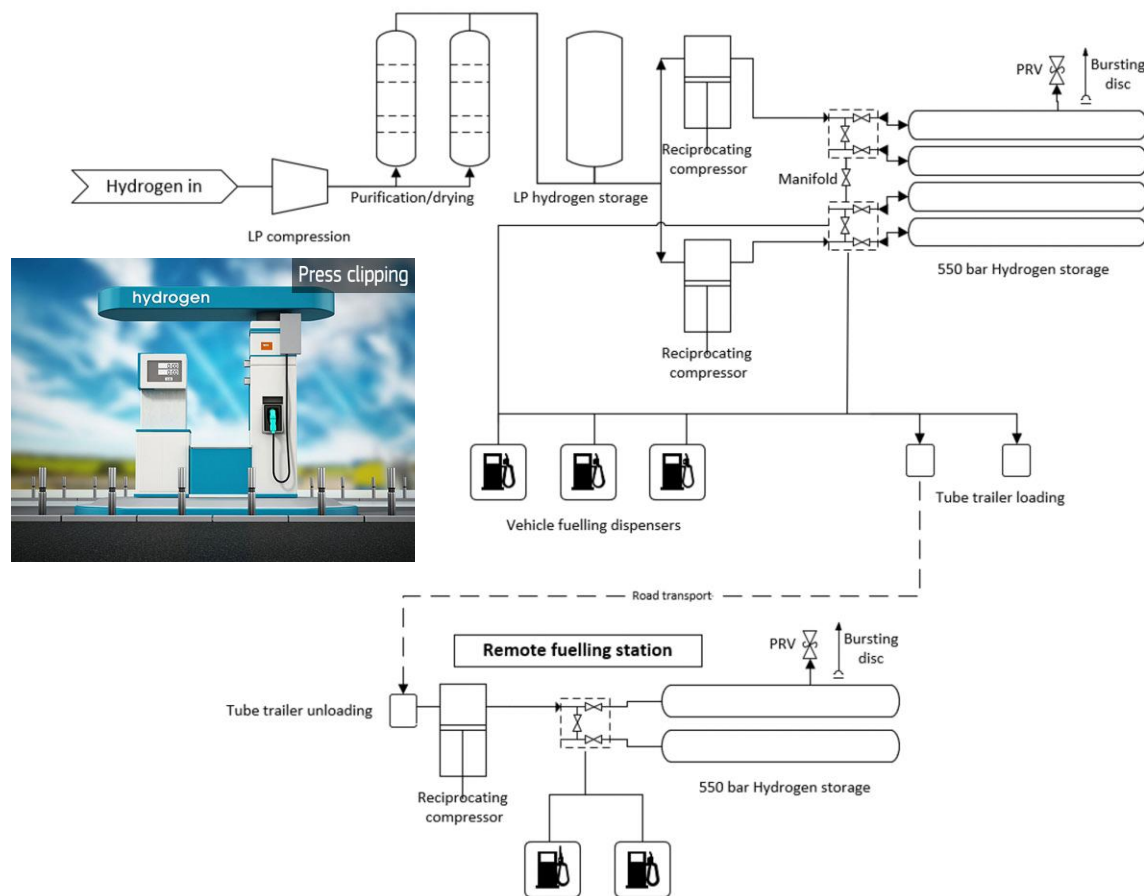
IPM has a solution – HRS rollout in greater JNB - lower cost refuelling of more than 300 fuel cell buses/trucks/cars



Isondo – secured exclusive access to 7 tonnes per day of H2 (biggest in SA) for decarbonisation of transport across Gauteng Province – Green H2 to the extent that its produced via solar power – biggest SA project to achieve early and affordable decarbonisation of transport and industry:

- This project overcomes the greatest barrier to the adoption of hydrogen - **COST**
 - By-product hydrogen is **available immediately at minimal cost – can already be deployed at the equivalent cost of diesel**
 - **Capital investment in expensive electrolysis equipment is avoided**
 - Project saves significant CO2 emission (up to **30,000 tonnes per year**)
 - Central location – key to financial returns
- The project is a **full turn-key deployment** - international team with experience in deploying HRS globally - first station can be installed & vehicles running by 2023
- Project modelling shows positive NPV/payback – without state subsidies
- Provides the basis for downstream opportunities that arise in:
 - **Local assembly of fuel cell buses/trucks (dtic APDP)**
 - **Homologation of FCEV using H2 available in central Gauteng**
 - **Embedding local beneficiation industry**
 - **Technical skills development** in this new emerging industry

Phased project rollout



- 1.5MW of PV installed on site – plan to add another 10MW
- Potential to wheel another 20MW green power (Solar)
- **Inputs into H2 production will be entirely green energy based**

- Waste hydrogen purified and compressed for storage on site - 7,000kg per day
- **PHASE 1A - POC: 5 trucks/buses** - 1 H2 pump – trial by fleet operators
- **PHASE 1B:** Hydrogen dispensed on site to **50 trucks/buses** - 1,200kg/day H2
- **PHASE 2&3:** Hydrogen transported to nearby 'daughter' stations and **200 vehicles** (e.g., at existing bus and truck depots;)
– 2,400kg per day per station
- **Total cost – R1.8 Billion**
- **Combined CO₂ saving of 30,000 tonnes per year**