



NET-ZERO INDUSTRIES

MISSION



Project Title	Hysata 5 MW Electrolyser Demonstration with Stanwell
Industry Partner	HYSATA
Industry Sector	Iron & Steel Chemicals & Refining Other Energy Intensive & Hard to Abate Sectors (Heavy Transportation)
Technology Pathway (Primary)	Low-carbon hydrogen
NIM Pillar	Technology Demonstration
Source	NIM Awards 2024
Description	<p>Hysata an Australian based electrolyser manufacturing company have strategically partnered with Stanwell Corporation, a Queensland, Australia, Government owned power company, for a 5 MW green hydrogen production demonstration using a first-of-its-kind electrolysis technology. Hysata and Stanwell have a commitment to mitigating climate change and helping to meet Australia's obligations under the Paris Agreement. Hysata is rapidly ramping up electrolyser manufacture to enable efficient production of green hydrogen, while Stanwell is developing CQ-H2. At 2.5 GW of electrolyser capacity by the 2030s, CQ-H2 stands as one of the largest green hydrogen projects in the world and is part of Stanwell's aim to transition to a low-emission energy provider.</p> <p>The Hysata demonstration with Stanwell differentiates itself as one of the world's most innovative hydrogen projects through the first commercial deployment of our world leading, 95% efficient (41.5 kWh/kg of H2 produced), capillary fed electrolyser. This ultra-high efficiency electrolyser presents a commercial, technological, and scalable breakthrough in the production of cheap green hydrogen. The 5 MW electrolyser and balance of plant (the supportive infrastructure and equipment for the electrolyser) is currently under development and is slated to begin operations at Stanwell by mid-2025.</p> <p>The electrolyser system will be installed at Stanwell's Future Energy and Innovation Training Hub (FEITH) and will provide facilities to test innovative new energy technologies including renewables, energy storage and hydrogen. The project will prove Hysata's electrolyser capabilities in real-world operating conditions, key to converting Hysata's 14 GW of signed conditional agreements into firm orders. Hysata's demonstration at Stanwell is estimated to abate ~1.88 kt of CO2 over its six month trial period, with Hysata's pipeline of orders estimated to abate megatonnes of CO2 per year.</p>
Innovations Employed	<p>Electrolysis gets a transformative upgrade with Hysata's 95% efficient (41.5 kWh/kg of H2 produced) electrolyser system at Stanwell, centred on an ultra-low resistance membrane & elimination of bubbles. Our electrolyser's differentiated across 3 areas:</p> <p>Less Electricity</p> <p>95% system efficiency implies ~20% less electricity consumption, moving the biggest cost lever in green h2 production.</p>



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Low Capex

Intrinsically inexpensive system with main materials being nickel & polymer; A highly modular, turnkey solution to ensure easy site delivery & plug & play installation to minimise EPC costs, installation time.

Hyperscaling

Product design & development has centered on mass manufacturability; Simple polymeric stack & modular balance of plant are amenable to mass manufacturing enabling us to ramp up rapidly to multi-GW capacity in a capital efficient manner.

Dimension of Novelty

It was new to the International Market

Innovation Collaboration

Cooperation with scientific institution:

University of Wollongong (Australia)

Intellectual Properties

Our journey from an innovative idea to a key player in the hydrogen industry, has been marked by swift growth and technological excellence. To protect our innovative electrolyser technology, Hysata has implemented a robust IP protection strategy, including appointment a Head of Intellectual Property to legally secure our patents and designs.

Our technical innovation is underscored by our twelve patent families, protecting Hysata's ground-breaking electrolyser technology. We continue to file new patents as part of our IP defence strategy. As we diagnose and solve new challenges in electrolysis and improve our technology further, our patent portfolio has expanded respectively.

IP Links

[Hysata](#)

Timetable & Progress

Demonstration system operating in intended environment at pre-commercial scale (TRL 7).

Development started 2021.

Hysata currently has dozens of commercial scale electrolysers under test in an industrial environment.

Financing (Public/ Private)

AUD\$20.9m project from the Australian Renewable Energy Agency (ARENA)

Finance Links

[ARENA - Hysata to build next-generation hydrogen electrolyser](#)

Project Phase TRL

TRL 7

Problems to be Solved and Risks to be Managed

Green h2 is anticipated to contribute ~20% of the total emissions abatement required to reach net-zero by 2050. The challenge in scaling h2 is due to expensive production costs from high electricity costs & electrolyser capex. Existing electrolysers are limited to efficiencies of ~75% & rely on expensive metals making it difficult to achieve low enough production costs to achieve h2 production at scale.

Hysata has developed an electrolyser that is efficient, cheap, modular & mass manufacturable. Our electrolyser system is 95% efficient, a 20% improvement over incumbent technologies & surpasses IRENAs 2050 electrolyser efficiency target.



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Beyond the technological barriers Hysata faced the need for a substantial capital requirement as well as finding an industry-partner willing to demonstrate a unique technology, all while maximising our speed to market. Through an 80-20 equity sharing arrangement between Hysata & Stanwell with a \$21m grant from the Australian Government, it was possible.

Preliminary or Final Results Achieved

The demonstration project with Stanwell has contributed to Hysata's recognition around the world from customers and investors, which has given us the capital and partnerships needed to reach full commercial scale.

Following a highly successful Series B capital raise of A\$172 million in May 2024 that included investment from the largest brands across energy (bp, Vestas) and steel (POSCO), we are currently scaling up our manufacturing capacity commencing with a 100 MW production line.

The 100 MW line will produce electrolysers to deliver early commercial units as part of our capacity reservations and conditional orders pipeline. These agreements are targeted for use in hard-to-abate sectors like green iron where green hydrogen presents a huge decarbonisation and commercial opportunity.

CO2 Emissions Reduction Potential - Implementation and Future Market

By 2030 the global electrolyser market is expected to be worth US\$198 - \$253 billion with 180-230 GW of electrolysers installed. Hysata is targeting customers producing hydrogen for use in the hard-to-abate sectors. This market alone is anticipated to be worth US\$114 - \$206 billion, with 104 - 188 GW of electrolysers installed.

Hysata's electrolyser will have a profound impact on global emissions reduction by focusing on the hard-to-abate sectors, particularly in iron and steel. The electrolysers produced from our 100 MW line will produce enough hydrogen to cleanly process 277,000 tonnes of direct reduced iron, avoiding over half a million tonnes of CO2 emissions every year.

Market Positioning

The breakthrough nature of Hysata's technology has attracted significant market traction. Hysata has signed 14 gigawatts of conditional orders set for delivery from 2025, split across developers, oil & gas, and energy & utilities companies.

Hysata is in active discussions with an additional 40 GW of demand split across customers in the European Union, Australia, Asia, and North America. Additionally, we have entered into a Joint Development Agreement with a leading wind turbine OEM for wind-to-hydrogen collaboration.

Project Location

Australia

Project & Technology Links

[Nature Communication Paper](#)

[Series B Funding Round Bloomberg Article](#)

[Hysata News - Hysata and Stanwell Commercial Demonstration Project](#)