

"Zero Carbon Electricity, On Demand at a Lower Cost"

Market Opportunity

- Renewable energy lacks inertia, placing grid stability into question, running the risk of a blackout
- Legacy transmission infrastructure is creating curtailment (waste)
- Long-term, four plus hours, energy storage is expensive
- Large parts of the economy are dependent on diesel generators – remote location

Our Solution Delivers

- Dispatchable zero-carbon energy
- Inertia into the grid providing grid stability to support the renewable energy transition
- An internal combustion engine that is well understood in the market, easy to scale and can be placed in most locations
- Uses curtailed energy to produce hydrogen for immediate fuel use. Ammonia is used for long-term storage
- Final product will be a 1 MW transportable power station, contained in a 40-foot shipping container

Target Industry Verticals

- Grid Forming/Grid Syncing
- Remote location distributed energy
- Microgrid applications for the built environment

Ballarat Pilot is grid connected and exporting energy to the market

Hydrogenus Energy (HYE) is delighted to announce that, in conjunction with our partner, DW Controls (DWC), the 100kW HYE modified Internal Combustion Engine (HYE-ICE) hydrogen fuelled generator has been connected to and synchronised with the grid.

The pilot at DWC's factory in Ballarat has exported energy to the grid.



Jeremy White, Managing Director of DW Controls presenting the connection process to the Board of Hydrogenus Energy in Ballarat.

This took longer than we thought it would, but the result is that we have developed two different operating regimes:

- for remote site markets, our test engine/generator at Ringwood is set up to output at 50Hz controlled by the ECU, with the genset controller having a minor role.
- for grid connected markets, our pilot at Ballarat is governed by the genset controller, which reads the grid and dictates operating speed to the ECU.

A multi-engine off grid setup will use both modes.

Demonstrations / Sales

The Ballarat pilot is now being operated remotely, i.e. it can be operated from anywhere with an internet connection.

An application for Type B compliance will be made soon. The gas-train installation was carried out by an appropriately licenced gas plumber who is licenced to authorise such installations. We can expect Type B compliance to be formally given, and all components of the installation authorised for commercial use.

HYE and DWC have both received enquiries from companies and organisations wishing to use the HYE-ICE grid synchronised generator. We will be progressing these discussions into Letters of Intent and Purchase Orders over the coming weeks.

Some of the interested parties already produce hydrogen as a by-product of operations that require oxygen, while others use hydrogen fuel cells and are seeking alternative solutions.

Why does exporting energy to the grid matter?

Exporting electricity to the grid is a major technical achievement and certification of our technical capabilities. Importantly, there are two big issues with the energy transition that we can address.

Inertia

PV and wind turbines are not able to provide inertia to the grid. In other words, if the voltage drops, a generation system that uses only PV and wind turbines is not able to correct for the drop in voltage in the manner that a coal-fired power station or a large gas turbine is able to do. To get around this problem, the network operator has been adding large, expensive flywheels, called Synchronous Condensers (Syn-Cons).

However, the problem has arisen that Australia's demand has contributed to a significant increase in cost and time for the delivery of Syn-Cons. AEMO announced in December 2025 that the life of the Eraring Power Station in NSW, Australia's largest, needed to be extended until Syn-Cons could be delivered.

Australia is only a small part of the global electricity industry. However, we are at the leading edge of transitioning electricity grids (with much of the balance being laggards in the take-up of EVs).

The HYE-ICE hydrogen fuelled generator has its own mechanical inertia and is set up to dynamically correct for changing grid frequency to remain synchronised.



Control Unit for the Ballarat demonstration

Transmission

The second issue is that, as rooftop solar and home batteries increase, the volume of electrical energy carried by the grid falls and the unit cost per kWh rises to compensate. This is compounded by the significant capital cost of transmission and opposition to building major transmission lines.

Using coarsely distributed HYE-ICE based power stations could greatly reduce the need for more transmission capacity.

Further Development

The Ballarat pilot has many technical achievements. It is now a commercial product that we will be able to sell after Type B approval has been given.

HYE has commenced work with a Chinese company that has produced and sold devices that are able to crack hydrogen out of ammonia, a compound of nitrogen and hydrogen, (approximately 17.7% hydrogen). Ammonia is a widely used chemical, with fertilisers being about ¾ of its total demand.

The present device produces high purity hydrogen, suitable for Fuel Cells, and stores hydrogen at pressures of 350 atmospheres. These ammonia crackers are large and expensive, with many components that are not required for the HYE-ICE. Our discussions are exploring the production of a simpler, smaller and lower cost ammonia cracker better suited to the HYE-ICE. There is also potential to develop a more efficient device that is integrated with the HYE-ICE using the engine's heat. Our Chief Technology Officer will go to China soon to work on these developments.

When this is done, we will have a gen-set that is directly analogous to a diesel fuelled generator with:

- Slightly higher capital cost;
- Slightly lower fuel cost (in terms of cents / kWh of output)
- Much lower maintenance cost, due to the lack of carbon in the fuel; and
- Similar operating regime.

HYE-ICE can then be packaged into a "turnkey" solution.

Executive Team

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The Middle East conflict highlights Hydrogenus Energy's value.

Fuel security has long been HYE's catchphrase, and the recent and ongoing conflict between the United States/Israel and Iran has not only highlighted the energy risk to Australia and, indeed, the world but also shone a spotlight on the opportunity for HYE.

HYE has received enquiries from domestic and international organisations seeking alternative solutions for fuel security, and our own investigations show that many countries around the world, particularly in our region, are adopting policy initiatives to move away from fossil fuels.

Notwithstanding that, HYE has further development work to complete on a scalable and affordable fuel solution (our trip to China above). History teaches us that commercialisation is not only about having a good product, but also about the timing of bringing your product to market.

Product/Technology Update

All design features included in the production model demonstration are Australian Gas Networks (AGN) compliant products, which reduce complexity and cost. After we receive Type B approval, we will then lodge an application for Type A certification. Type A certification will take time to prepare the formal application and time for assessment and approval. However, once completed, we will have a set of plans that any registered gas plumber will be able to follow, making installation of subsequent projects much quicker and easier.

Government Engagement

HYE has actively contacted State and Federal Government Ministers on both sides of the aisle. Contact has been targeted at the relevant energy ministries as a first step to introduce HYE to the government.

This government engagement is part of a broader communication campaign to increase HYE's profile, as we now have a grid forming demonstration. The initial response from the government has been positive, however, HYE management acknowledges that engagement with the government at any level does take time and patience.



DWC and Hydrogenus Energy team, Ballarat, Victoria

About Hydrogenus Energy

Hydrogenus Energy has developed and patented the Intellectual Property for the modifications required to an Internal Combustion Engine to operate safely, effectively, and efficiently using hydrogen, injected at low pressure, as its only fuel.

The HYE modified ICE (HYE-ICE) hydrogen fuelled generator provides electricity on demand with a very high degree of control, regardless of load changes, and does not require high-purity hydrogen.

HYE is working with complementary IP developers to provide a generator that can be synchronised with the grid, offering grid firming services at a lower cost than a battery when energy is required to be stored for more than 4 hours, and can also provide grid firming services.

Hydrogenus has strong interest from numerous companies and organisations, both locally and internationally, interested in acquiring our products in the near term.