

Hydrogenus Energy News



WHAT'S NEW

We will be filing a formal patent application for Australia during July. Our patent application has been reviewed by the Australian Patent Office and their advice is that our claims have industrial application, most are novel and many are inventive.

We have developed close relationships with companies with complementary technologies that significantly reduces the operational risk, the capital required and operational cost of our projects. Some these technologies are at lab scale and likely to be commercially available in the next few months.

We are executed a Memorandum of Understanding for projects in Fiji and are developing another for complimentary ammonia related technology, to facilitate project roll-out.

We will visit our Chinese partner during August to progress our relationship, including the potential for revenue from the lease of our IP for hydrogen powered engines in China.

Patent Application Endorsed

Our HYE News in April advised that we lodged, on 13 March, an application for a patent of our development of an Internal Combustion Engine fuelled by Hydrogen injected at low pressure and subsequently requested the Australian Patent Office to execute an International Type Search.

We received the results of the ITS on 3 June. The conclusion of the ITS was :

- **All** of the 33 claims made in our patent application have industrial applicability;
- 20 of the claims made are novel; and
- 8 of the claims are inventive.

In a meeting with our Patent Attorneys on 3 July, we were advised that :

- It is rare for any claims made to be classified as novel; and
- Almost never get claims classified as inventive.

We are waiting on formal advice from our Patent Attorneys, but it is likely that we will :

- Make a formal application for the grant of Australian Patent this month; and
- File a PCT (Patent Co-operation Treaty) application in March 2025.

Our advice is that most secondary countries (ie. other than USA, major EU nations, Japan and China) will award a patent upon application if that patent has already been granted in a competent jurisdiction (such as Australia), upon payment of the appropriate fee, which is roughly \$A 10k.

This is a very strong result.

Revised Commercialisation Plan

Our HYE News in April provided preliminary information on

- Projects in Fiji;
- The use of Ammonia as fuel; and
- Back-up generators.

These factors have come together in a preferred roll-out strategy.

Board

Mark Smith
Chairperson

Marcus Clayton
Executive Director and
Chief Technology Officer

Shay O'Brien
Chief Executive Officer

Pieter Bruinstroop
Executive Director, CFO
and Company Secretary
0400 3159 35

Contact

pieter.b@hydrogenus-energy.com

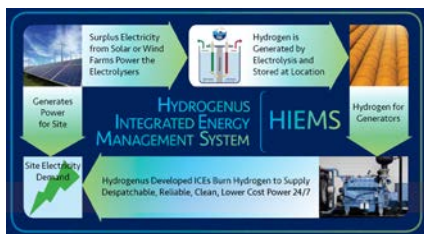
<https://hydrogenus-energy.com/>

Our revised commercial plan is directed at :

- Achievable, near-term impact, by promoting a system that is similar in its operation to diesel fuelled generation; with
- Subsequent production of carbon free ammonia on site when the required technologies, which are operating at lab scale, are available commercially within the next year.

Our Initial Plan

Our initial integrated project layout is shown in the diagram below.



This shows that primary energy is sourced from PVs and / or wind turbines, with excess energy stored as hydrogen, produced on site through the electrolysis of water, which is used to power a Hydrogenus Energy engine when the electricity produced from the sun and / or wind is insufficient.

While all these components are currently commercially available, we are in contact with companies that have developed new technologies that are proven at a lab-scale but are not yet commercially available that are expected to produce significantly better outcomes especially for

- projects of a modest scale, from 80kW to 500kW, which is what is the size available for a new technology; and
- early-stage projects looking to mitigate technical and operational risk.

March 2023

It is feasible to displace diesel fuel with PV and / or wind turbines. The HYE system could import hydrogen to feed our engines, but hydrogen is a commodity that is :

- not widely traded
- not easily available
- difficult / expensive to handle and store; and
- expensive as a fuel.

Our offering can be enhanced by

- implementing Waste Heat Recovery, as Bennett Clayton did for their project at 76 Berry St, North Sydney, which achieved 88% overall energy efficiency using waste heat for air conditioning and hot water;
- capturing the exhaust from our engine to provide pure water.

October 2024

Our proposed initial step is to import ammonia to site and use a Kraktek device to split the hydrogen out of the ammonia to provide the fuel for the HYE engine when there is insufficient energy from the sun and / or wind.

The operations will be very similar to a diesel generator.

Our preliminary analysis, is that electricity produced from ammonia will have a lower operating cost than electricity produced from diesel fuel, as well as eliminating emissions, including the smell of diesel fuel.

We have a verbal agreement with Kraktek to produce a unit that is better suited to our engine than the device described in our HYE News of April 2024. That unit was developed for Fuel Cell demands of very high purity of hydrogen, which the HYE ICE does not require.

The revised Kraktek unit can be simpler, cheaper and with better performance.

We are in the process of developing an appropriate Memorandum of Understanding.

March 2025

PV technology is incrementally improving.

HYE has been introduced to a patented design for a blade for a wind turbine that improves output by up to 40% at low wind speeds.

While further testing is to be done, the commercialisation concept is a Vertical Axis Wind Turbine, about 1.5m in height, on a stand, with a diameter of about the same, rated at 5kW. The advantage of a VAWT is that the VAWT can be deployed in a grid with 3m centres, so that a roof area of 100m square could produce 500kW, which is a higher energy density than possible with conventional Horizontal Axis Wind Turbines, and also be safe for birds.

October 2025

We expect that the devices required to produce ammonia on site, using renewable power, at a lower cost than imported ammonia will be commercially available in 2025.

This process uses an electrolyser that electrolyses steam rather than liquid water, which means that it is able to use almost any quality of water.

The device has been successfully tested using sea water, though in commercial use it will need filtration to dispose of physical waste.

The device is much more efficient than currently commercially available electrolyzers.

The device is much lower cost especially at smaller sizes.

This device integrated with a HYE ICE will significantly reduce, if not eliminate, the need for a separate de-salination plant.

Conclusions

Our suite of technologies has the potential to provide lower cost electrical energy and significant savings in energy demand by using Waste Heat Recovery and the potential for de-salination from the combination of the new electrolyser technology and the exhaust from our engine.

Projects

All our potential projects involve at least some of the elements described in our Revised Commercial Plan.

Fiji

We are executing an agreement with Kastel Technologies, post our Letter of Intent executed in December 2023. Kastel will be our agent and market the rollout the suite of technologies described above among the Pacific Island Forum nations, other than Australia.

Kastel has initial interest from a number of island resorts, hotels, Nadi Airport and the Ministry of Energy.

Marcus Clayton and Shay O'Brien will visit these potential projects in August to assess the most appropriate path for each potential project and their order of priority.

Telecommunications

Our partner in this space, accesstel, provides engineering services to 3 of the 4 telecommunications companies in Australia.

2 of these companies have attended demonstrations at our Ringwood workshops and are in the process of assessing our ammonia-based roll-out, coupled with emergency back-up for power and telecommunications.

Other Projects

The revised commercial plan is a staged roll-out; it provides electricity now, with cost saving and other benefits.

The concept is to ultimately produce green ammonia on site when that technology is sufficiently developed.

This concept is being used for a project with a high degree of certainty, located in a National Park in Victoria (it may be that the ammonia is produced nearby and trucked in rather than spoil the National Park with PVs and wind turbines).

China

Our HYE News of April 2024 described the reaction of the supplier of our test engine to our development.

We have received a request from that company for the supply of our technology for engines to be supplied to requests from the Middle East.

We are planning for our Chief Technology Officer, Marcus Clayton, to travel to China to meet (again, though the last meeting in person was many years ago) our engine supplier. Marcus will be accompanied on this visit by one of our shareholders who is very experienced in business in China, and is very fluent in both language and culture.

One purpose for the visit is to investigate the production of engines with certain modifications that are required for our purposes but are outside of our patent.

The second purpose will be some assessment of the likely market for engines.

The third purpose will be to understand and subsequently develop appropriate means for the protection of our IP. These are likely to include

- a legal structure by which our Chinese partners are incentivised to pursue local breaches of our IP
- encryption of the code in the ECU, to be supplied by a MoTeC / Bosch factory in China, where geo-location, communications and anti-tampering land mine type safeguards imbedded in the code.



Registered Office
Block Arcade, Suite 324
96 Elizabeth Street
MELBOURNE, VIC 3000

Workshop
17 Eugene Terrace
RINGWOOD VIC 3134