

EXCLUSIVE ENVIRONMENT CLIMATE CHANGE HYDROGEN

# 'Alchemy of energy': Breakthrough offers mass hydrogen storage options

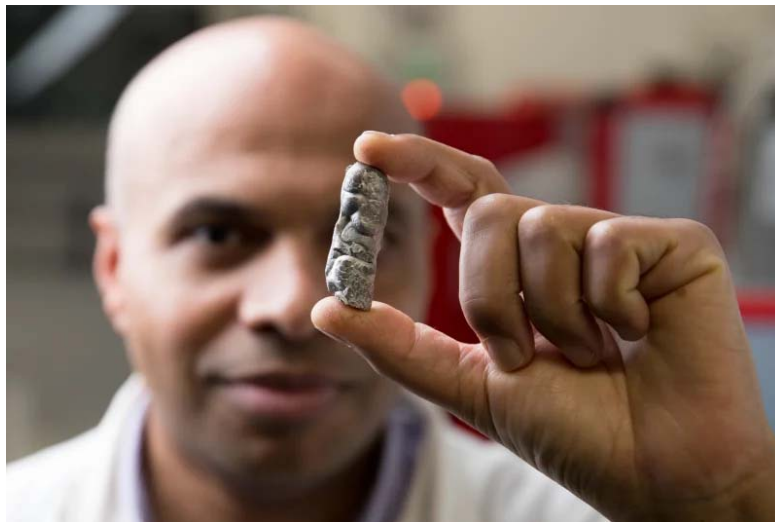
By [Peter Hannam](#)

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The promise of low-cost hydrogen storage to power our homes and businesses may be a lot closer to becoming a reality if new technology developed and owned in Australia can make a speedy transition from the lab.

The country has more than 2 million homes with solar panels and new large-scale solar and wind farms are jostling for access to the power grid.



Professor Kondo-Francois Aguey-Zinsou holds some of the metal material that his team has developed that can store hydrogen in a solid state. JANIE BARRETT

University of NSW researchers led by Kondo-Francois Aguey-Zinsou say they have developed metal alloys capable of storing surplus electricity in the form of hydrogen much more cheaply than lithium batteries to take advantage of the renewables rush.

"You can call me an alchemist, if you will," Professor Aguey-Zinsou said, laughing. "It is a game changer in how we use electricity - it's like the internet revolution."

The scientist said he had spent 20 years developing the metal hydrides that can bond with hydrogen.

The system uses power to create hydrogen, which is then stored until needed for electricity production via a fuel cell.

"We aim to launch the LAVO [brand] commercial product by the end of this year, and start pilot production in the first quarter of next year," Alan Yu, a co-founder of Providence, said, adding the plan was to make the batteries in Australia.

"It's cheaper and cleaner than buying from the grid," Mr Yu, an entrepreneur who also invests in artificial intelligence, said. "This will help households to accelerate the clean energy transition in Australia and save money."

Amy Kean, a board member of the hydrogen centre and director of Stride Renewables, said the household batteries would most likely hold up to 60 kilowatt-hours, or about five times the capacity of existing lithium storage on the market. About 130 centimetres high, the size of a small fridge, each would weigh 196 kilograms.



Alan Yu, a co-founder of the Providence Group that is investing in the new storage devices, and Amy Kean, a board member at UNSW's Hydrogen Energy Research Centre. JANIE BARRETT

The cost could go as low as 2¢ per kW-hour, or less than one-tenth the cost of lithium rivals and buying power from the grid, making the storage highly competitive, Ms Kean said.

Bjorn Sturmborg, a research leader at the Australian National University's Research School of Electrical, Energy and Materials Engineering, said people "shouldn't underestimate the road from the science that works in the lab to mass deployment" in the market.

The conversion of electricity to hydrogen and back again would "multiply the inefficiencies", and he cautioned against expecting a rapid take-up of the product.

"The uses for hydrogen at the moment are extremely niche," Dr Sturmborg said. "This is a new opportunity within the niche."

Mr Yu said his company hoped to add hydrogen storage for the company's planned five-megawatt community-owned solar farm planned for Manilla, near Tamworth in northern NSW.

The batteries, held within two shipping containers, would aim to store about eight hours' worth of electricity, increasing the prospect that the nearby users could move off the grid entirely.

The aim is to develop dozens of such solar farms, backed up with wind and storage, in coming years, he said.

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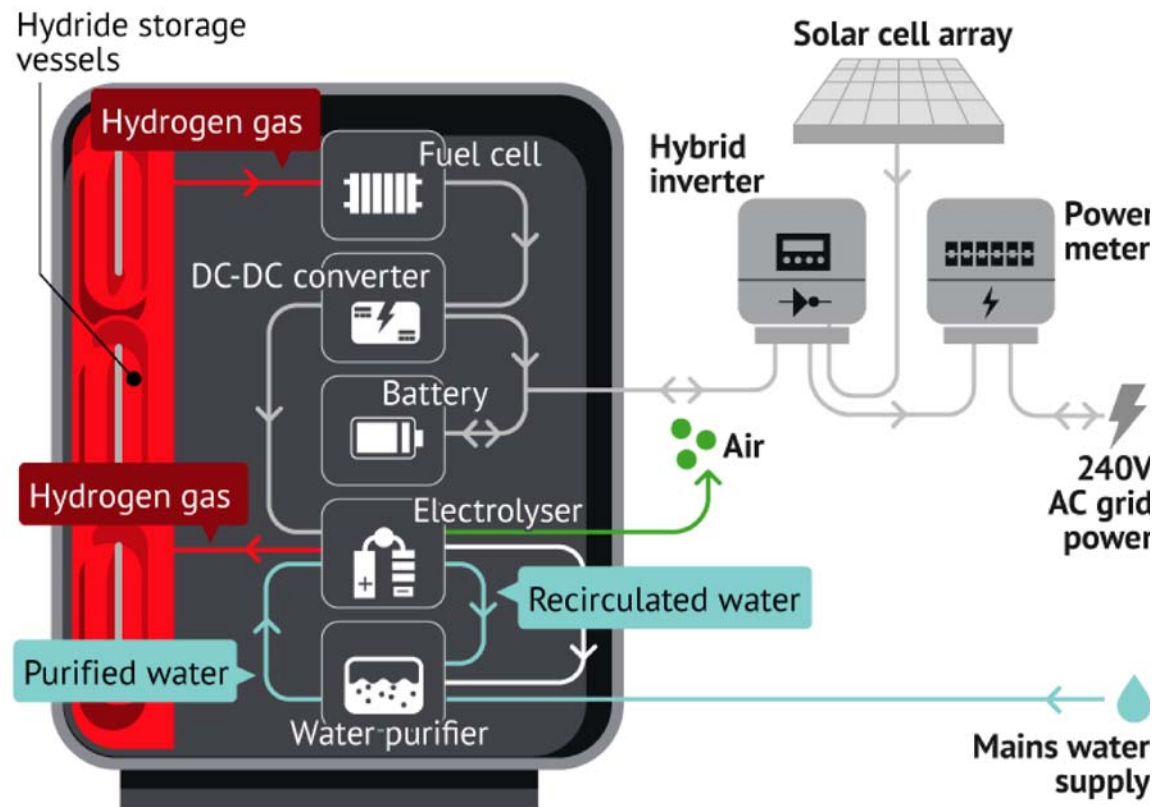
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**Peter Hannam**

## Residential hydrogen energy storage system



Professor Aguey-Zinsou said the alloy contained titanium and "other common materials", but declined to name them, pending the issuance of a formal patent expected within weeks.

The solid-state mix can operate in a range of temperatures – such as from minus-10 to 50 degrees – depending on the climate the storage was intended for.

"It's safe ... it's not flammable," he said. "You cannot create the conditions when you have a certain burst of hydrogen."

Hydrogen has lately emerged as a prospective alternative to fossil fuels. The Morrison government launched a National Hydrogen Strategy late last year, identifying break-even points needed to supplant gas and petrol.



Professor Aguey-Zinsou at the laboratory on the UNSW campus, where his hydrogen storage components are tested. JANIE BARRETT

UNSW's Hydrogen Energy Research Centre, backed by \$10 million from Providence Asset Group, reckons it is ready to produce the world's first hydrogen batteries for households as soon as early 2021.



Peter Hannam writes on environment issues for The Sydney Morning Herald and The Age.