The hydrogen sits in the red containers | Photo source Lavo

A HYDROGEN POWER PLANT FOR THE HOME

AGRICULTURE & ENERGY

An energy storage system connects to rooftop solar panels to power a home using hydrogen fuel cells

Spotted: Many of us dream of living off-grid, powering our homes with solar power. In order to make this a reality, a home solar system needs a way to store the energy generated when the sun is not out. At the moment, this can be done using lithium battery systems, such as Tesla's Powerwall. Now, Australian energy company Lavo has built an integrated hybrid hydrogen battery that combines with rooftop solar panels to keep the home lights burning.

The Lavo Green Energy Storage System is a 324 kg (714 lb) box that connects to the homes' solar inverter and mains water, through a water purifier. The Lavo uses solar energy to electrolyse the water, splitting the oxygen and hydrogen. The oxygen is released and the hydrogen is stored in the LAVO's patented metal hydride "sponge".

The hydrogen gas is then converted back into electricity when it is needed, using a fuel cell. There is also a DC converter and a small, 5 kW lithium buffer battery to deliver a regulated voltage. The system includes Wi-Fi connectivity and an app that allows direct monitoring and control – it is essentially a small power plant. The system can store around 40 kilowatt-hours of electricity – enough to power the average home for two days. Anyone needing more power can run several LAVO's in parallel.

The LAVO is not cheap – at A$34,750 it is around three times the cost of a Powerwall, but also holds around three times the energy. The company also expects each one to last around 30 years – roughly double the life expectancy of a lithium battery setup. It could also work as a solution for rural villages, to replace diesel generators, or for those cut off from the main grid by natural disasters.

Lavo Chief Executive Officer Alan Yu has said that the companies' mission is, "to try and change the way people live with energy."

While most electric technology stores energy in lithium batteries, there are a number of people who feel that hydrogen fuel cells are going to be delivering power in the future. This technology has a further way to go, but at Springwise we are already seeing it used in innovations such as a hydrogen-powered aircraft and a hydrogen fuel cell-powered e-bike.

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Takeaway:

LAVO uses metal hydrides to store the hydrogen, which is safer than chemical and gas hydrogen storage methods. This is because the hydrogen is stored as a solid, at low pressure and ambient temperature. Despite the technology's promise, some hurdles remain. For example, the system's maximum continuous power output of 5 kilowatts could limit its use. Air conditioning is common in hot climates, and many systems draw more than 7 kilowatts – which could be a problem when the grid connection is not active. Nonetheless, LAVO gives us a glimpse of what the future of self-generating homes might look like.