

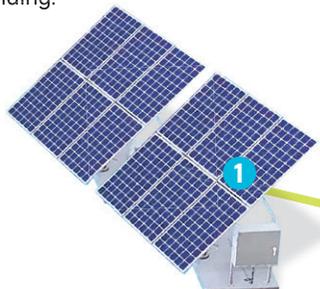
The potential of green hydrogen

Hydrogen gas is a fuel with plenty of potential. But because it is highly combustible, managing it safely is key. Energy utilities firm SP Group has found a way to do this,

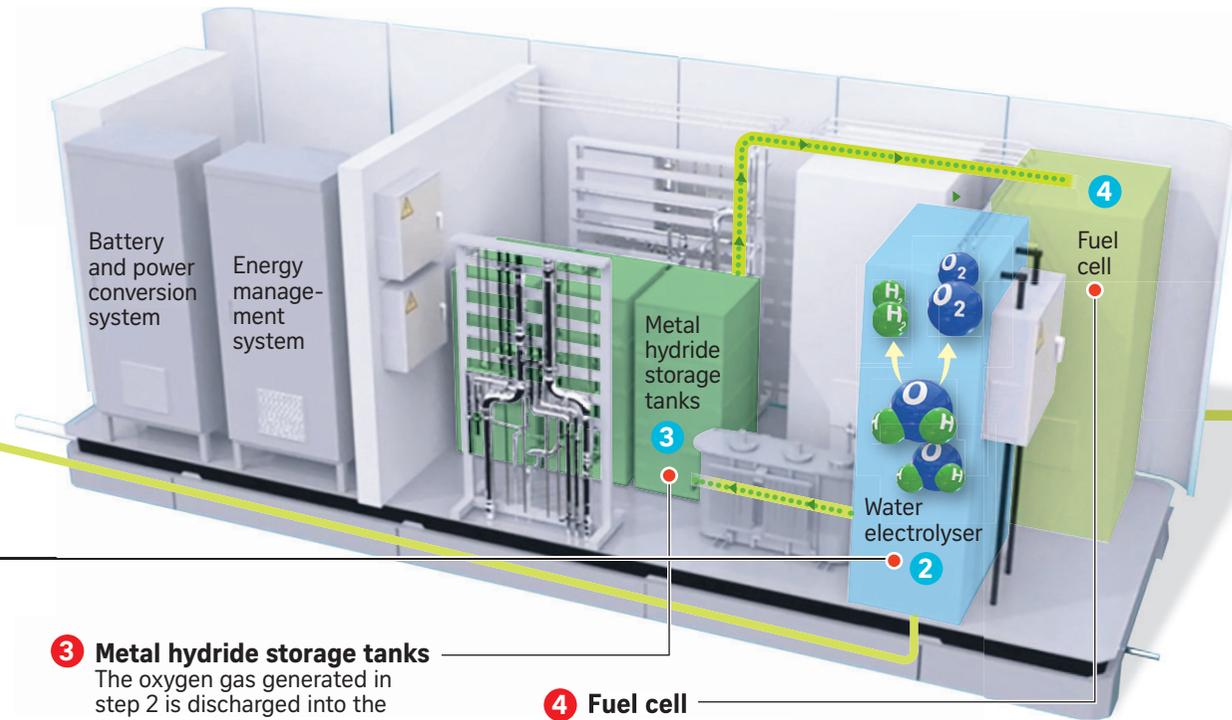
with hydrogen generated using renewable energy. Its concept lab at Woodleigh Park is now 100 per cent powered by renewable energy.

HOW IT WORKS

1 Solar panels
Sunlight is harnessed and converted into electricity. This electricity is used mainly to power the lights, computers and air-conditioners in the building.



2 Water electrolyser
Excess electricity generated by the solar panels during bright, sunny days is channelled to the water electrolyser. At this stage, electricity is used to drive a chemical process known as electrolysis, which separates water (H₂O) into its two component elements, hydrogen (H) and oxygen (O). These are collected in gaseous form – hydrogen gas (H₂) and oxygen gas (O₂).

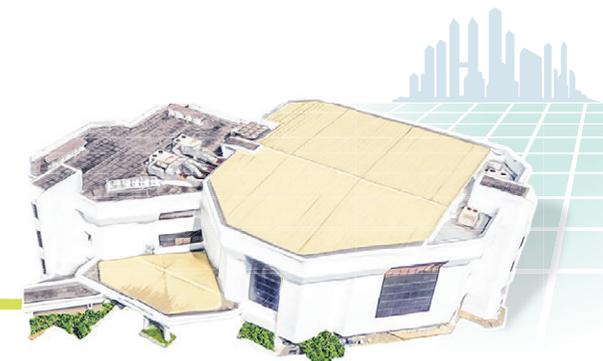


3 Metal hydride storage tanks
The oxygen gas generated in step 2 is discharged into the environment. But the hydrogen gas is stored in metal hydride tanks comprising powder made of a special metal alloy. The hydrogen gas is absorbed by the metal alloy, allowing the gas to be stored safely at low pressure.

4 Fuel cell
When electricity is needed during periods when there is no sunlight, such as at night or during cloudy days, the hydrogen stored in the tanks is converted back into hydrogen gas by heating it with the hot water from the fuel cell. Hydrogen gas is then sent to the fuel cell to combine with oxygen from the atmosphere, to produce electricity and hot water.

ADVANTAGES OF HYDROGEN ENERGY SYSTEM

- Hydrogen gas is generated using a renewable energy source, instead of fossil fuels.
- Hydrogen is stored in a safe way.
- Overcomes challenges such as the intermittency of sunshine, since electricity can be "stored" in the metal hydride tanks.



SP Group's zero emission building

BY THE NUMBERS

The energy consumption of the building is around **2,000kWh** a month

Approximately the monthly consumption of **5** 4-room HDB flats

The indoor floor space of the building is **574 sq m**



It's about the size of a 20-foot container