

HYDROGEN ENERGY STORAGE

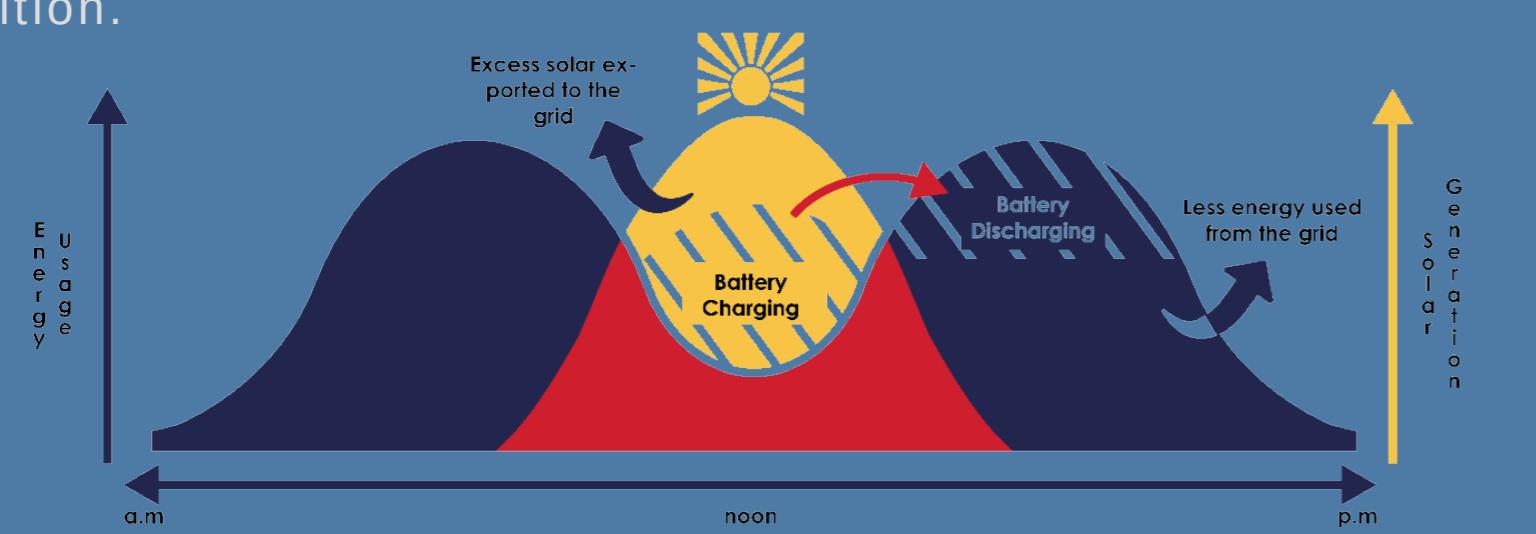
a Metal Hydride System for Domestic Photovoltaic



Read the report!

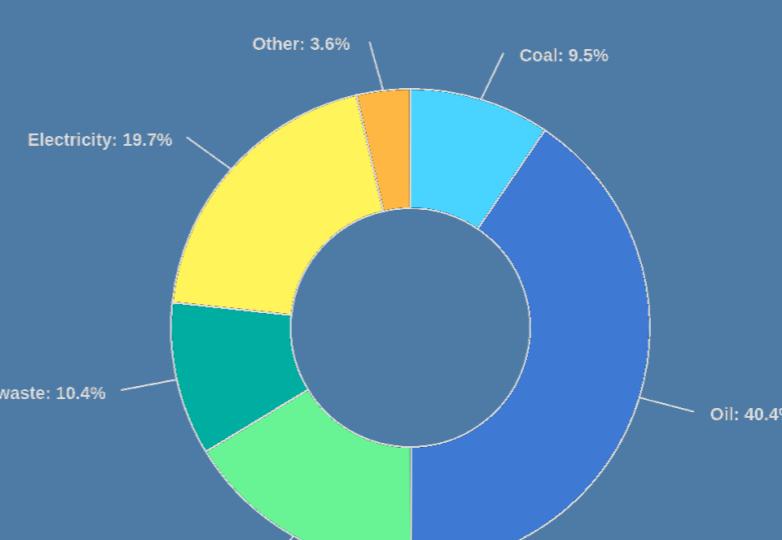
What is Energy Storage?

The challenge with renewable energies is the time mismatch between the generation and the demand. Energy storage is used to save the excess energy during peak production and redistributed at times of low production and high consumption. This makes energy storage a major component in the energy transition.



Not only Transition but Transformation

Electricity covers only 20% of the global energy demand. The renewable electricity transition is not enough to decarbonise all antropic activities.

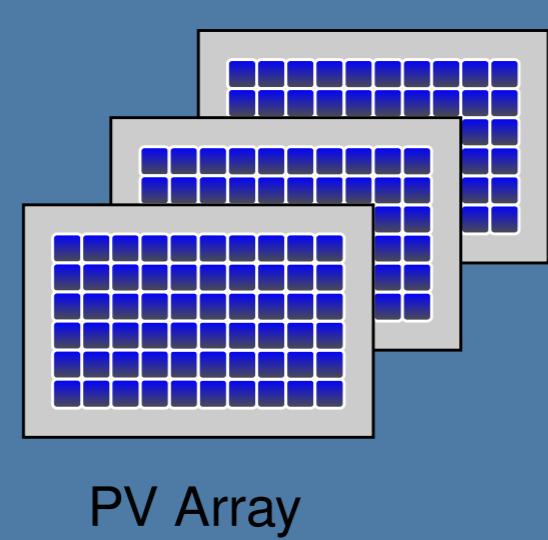


A real transformation of how we source energy is necessary. Hydrogen has the potential of providing this transformation. Hydrogen has 3x the energy of petrol. Thanks to its versatility hydrogen can be produced with renewable electricity and consumed like fossil fuels.

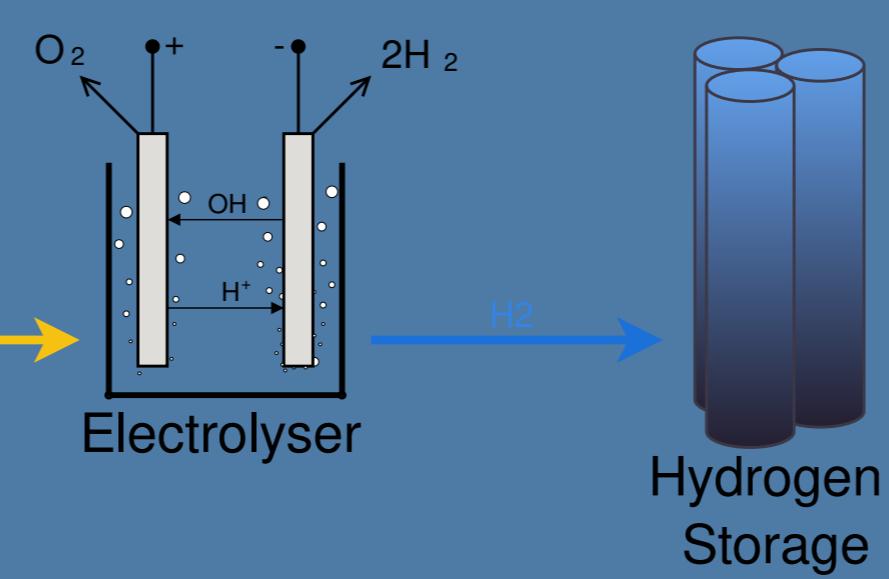
Is it possible to bring Hydrogen Storage at a small-scale?

Batteries:

- Are insufficient for long term storage
- Are not ecofriendly
- But have a fast response time



MPPT + Converters



Hydrogen:

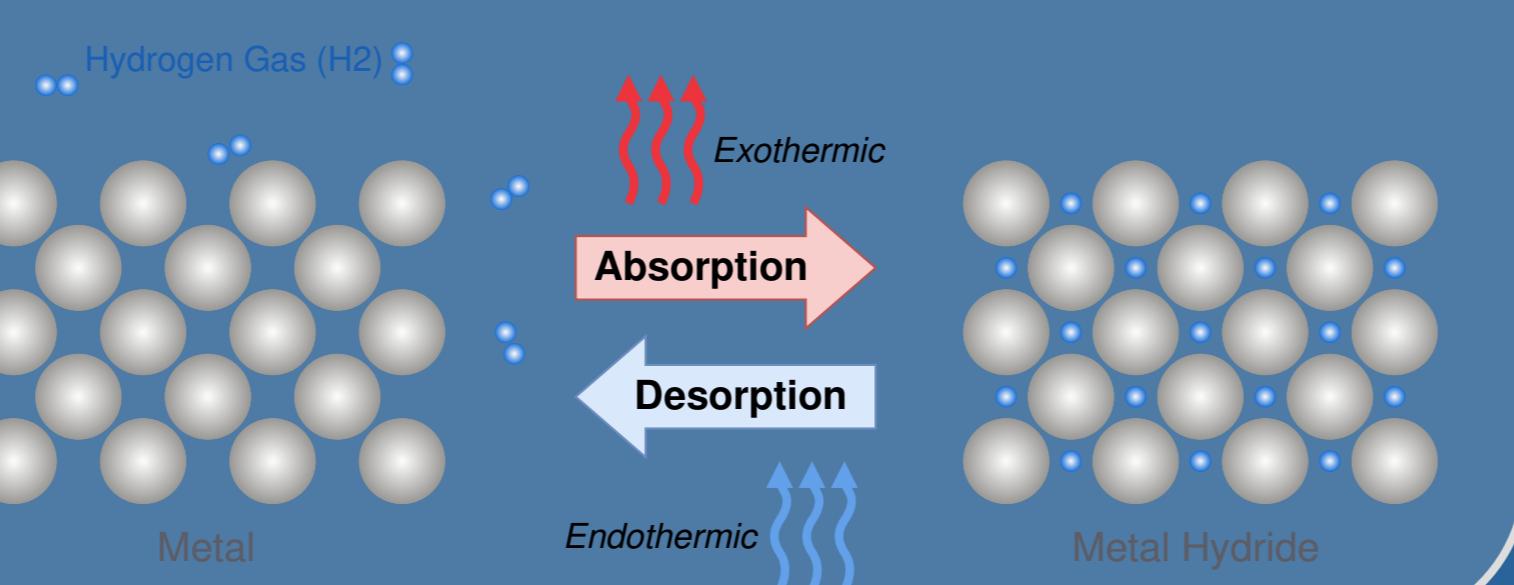
- Has a high gravimetric energy density
- Is stable over time
- But the low volumetric density makes it hard to store

Metal Hydrides

Metal Hydrides are the best way to store hydrogen at home. They have the highest hydrogen storage density, they are fully reversible and inherently safe given the low pressures, safe temperatures and non-flamability.

Loading pressure lower than 30 bar

Thermal management of reaction has been resolved

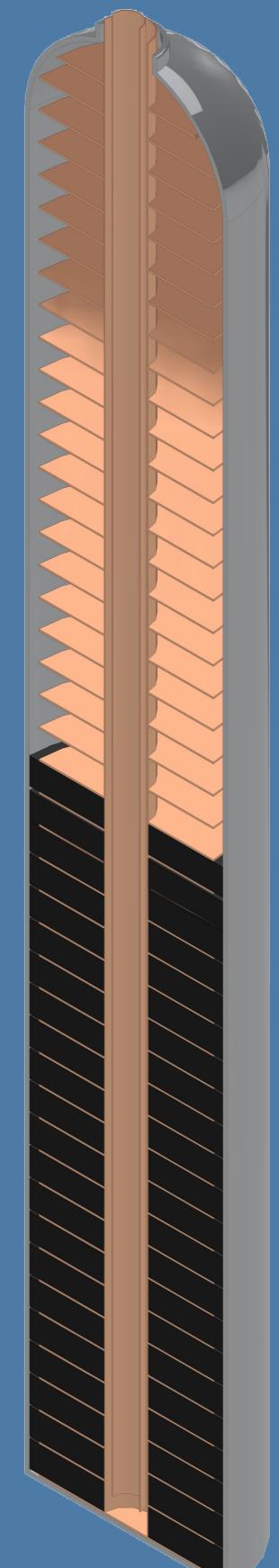


The Tank

The Metal comes in a powder because the increased surface area accelerates the hydrogen gas intake.

But at the same time this decreases thermal conductivity.

Copacting the powder into a disc increases the thermal conductivity by a factor of 30 while maintaining the surface area.



The discs are designed to fit inside a common gas cylinder.

A copper heat exchanger with fins and liquid cooling is used to provide the heat transfer necessary for the hydride reaction.

This cylinder can hold up to 5.5 kg of hydrogen in the form of Magnesium Hydride (MgH_2).

3-way Hybrid Energy Storage System

