



DEEPTECH TO ACCELERATE THE ENERGY TRANSITION

OCTOBER '22

Setup Sydrogen as Joint Venture



Highlights



Joint Venture (2021) between Nanofilm and Temasek to enable the transition to Hydrogen Economy



Integrated Solution provider with Deep Tech components



Leveraging Nanofilm's Core Technologies



Centre of Excellence in Singapore for Product Development



R&D with Support from Leading Universities



Powering hydrogen end-use applications for adoption

Backed by Strategic Shareholders



Differentiated technology

- >80 patents & trademarks
- 3,000 employees
- 4 production sites & 3 R&D centers

TEMASEK

Global network

- Diverse portfolio across geographies and sectors
- 900 employees across offices in 9 countries

65%

35%



...up to **S\$140mn** in initial investment

Deeptech to Accelerate Hydrogen Adoption

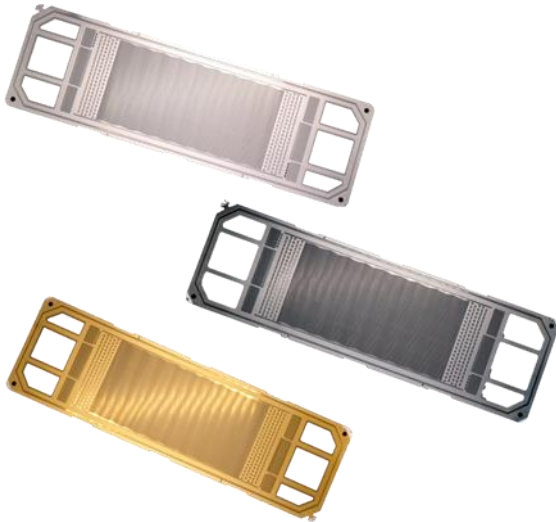


Despite early adopters, there are hurdles to overcome for widespread adoption for cost and performance.

	Status Today	Technology Solution
Bipolar Plates	<ul style="list-style-type: none">✗ Expensive Graphite Plates✗ Unable to scale production	<ul style="list-style-type: none">✓ Stainless Steel Bipolar Plates✓ Enabled by nanotechnology coating to withstand acidic environment
Catalysts	<ul style="list-style-type: none">✗ Expensive	<ul style="list-style-type: none">✓ Lower precious metal use✓ Long lasting and durable
Nascent Infrastructure	<ul style="list-style-type: none">✗ Lack of infrastructure	<ul style="list-style-type: none">✓ Integrated systems with on-site hydrogen generation

Components

Bipolar Plates, Catalyst, Membrane
Electrode Assemblies



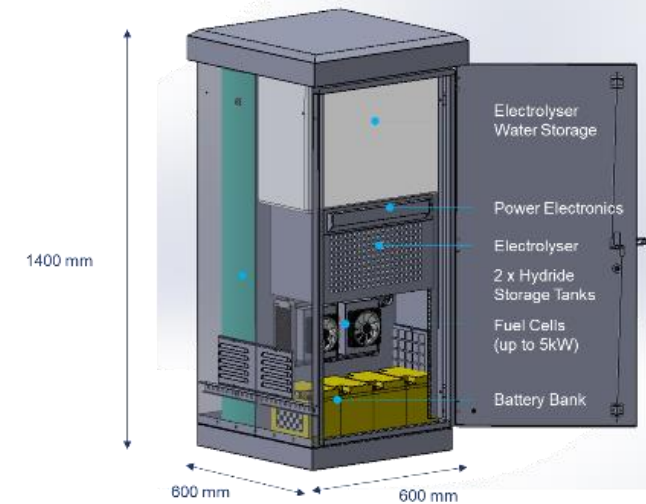
Subsystems

Electrolysers, Methanol reformers, Fuel Cell
Stacks, Solid state Storage



Integrated Solutions

Low Power and High-Power Systems



Technology Foundation

- Leveraging Nanofilm's established portfolio of Deep Tech solutions
- Serving Chinese Automotive market

Modular Subsystems

- Providing flexibility to customers
- Meeting usage and energy storage requirements

Complete turnkey solutions

- Accelerating end-user adoption

Leveraging Deeptech and Vertical Integration

System Product lines



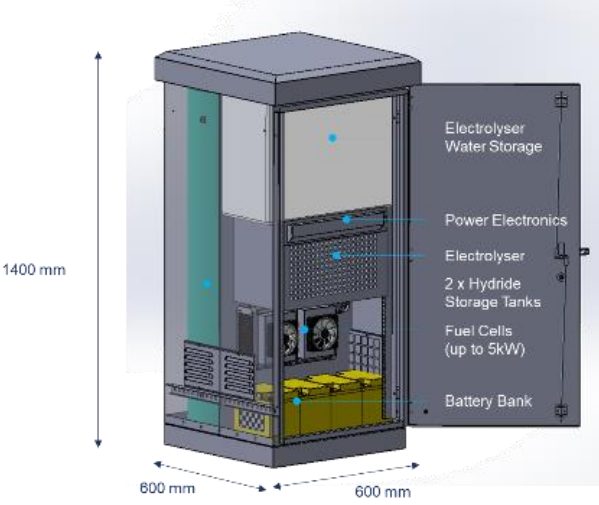
Portable Low Power
~100-500W

Low Power Backup
1-5kW

High Power Generation and Backup
100-130kW

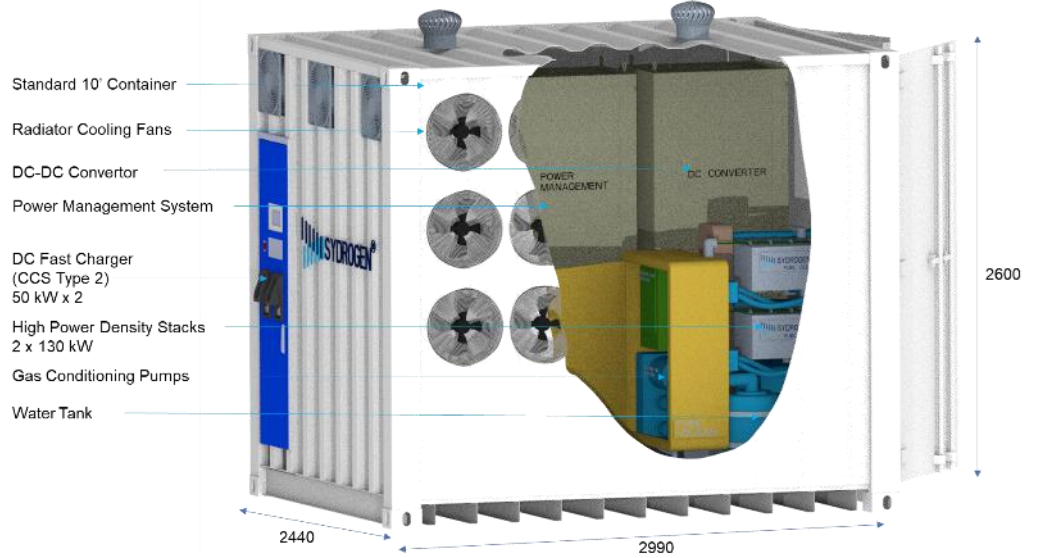
1MW

Future development



Key Features

- Solid state gas storage (Low temperature, metal hydride)
- Only water and electricity input (Onboard electrolyser)



Key Features

- Grid Relief for EV Charging Hotspots, other high-power uses
- Utilises standard H₂ cylinders; *piped H₂*

Key Applications

Distributed Power

Electric Vehicle Charging

Mission Critical Applications

Delivering a resilient energy infrastructure



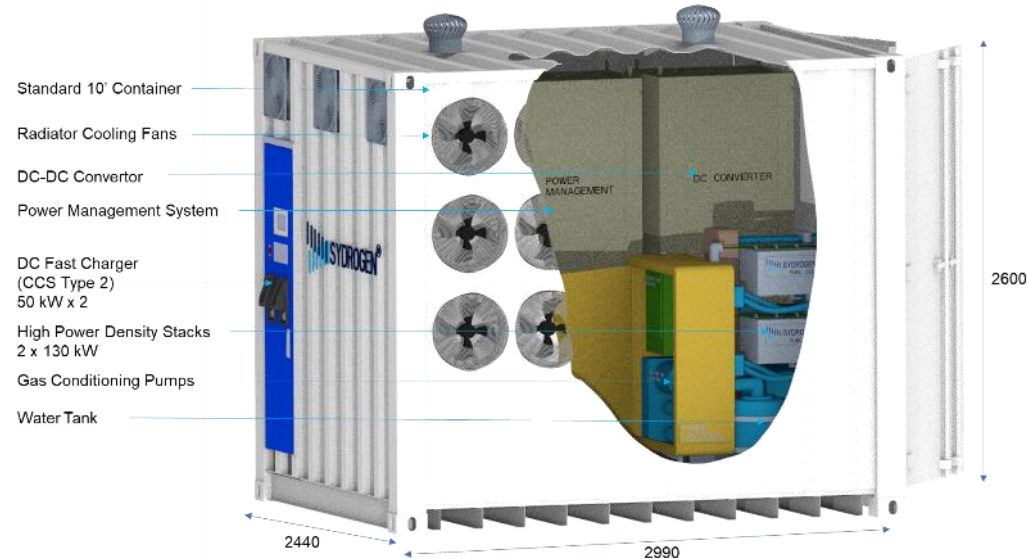
Piloting piped Hydrogen for distributed power generation

Location



Hydrogen production facility
– future receptacle for green H₂ imports

Power Generation



End-Application



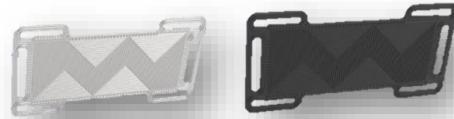
Powering Electric vehicle charging stations

Accelerating the Energy Transition, Together

Partnerships for demonstration projects

DeepTech Components

Key Foundational technologies



H₂ Supply Chain



Including carrier fuels:
Methanol, Ammonia, other
Organic carriers

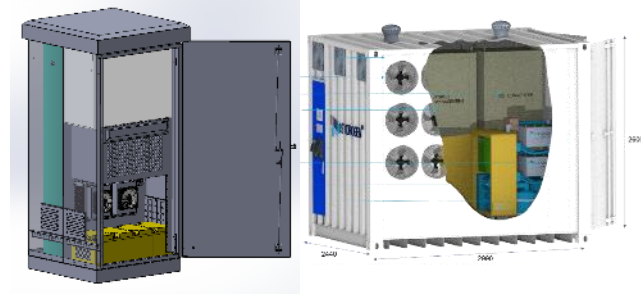
H₂ Production



Green H₂ producers

**Accelerating the
Energy Transition**

Integrated Solutions



Turnkey for end-users

End-uses

Mobility

- Cars
- Trucks
- Ships
- Drones

Distributed Power

- Primary
- Secondary
- Backup
- Household
(Power & Heat)

Grid Support

- Electric Vehicle
Charging



THANK YOU

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