

## Sparc, Fortescue and University of Adelaide Commit to Stage 2 Pilot Plant

### HIGHLIGHTS

- Sparc Technologies, Fortescue and University of Adelaide formally commit to proceed to Stage 2 of the Sparc Hydrogen joint venture
- Novel reactor technology employs a photocatalyst material and sunlight to produce green hydrogen directly from water without electrolyzers
- Stage 2 is focused on construction and testing a first-of-its-kind pilot plant supporting ongoing reactor development and scale-up
- Front-end engineering and design (FEED) for the pilot plant is complete and construction is expected to commence early in 2025

Sparc Technologies Limited (ASX: SPN) (Sparc, Sparc Technologies or the Company) is pleased to announce that Sparc Technologies, Fortescue Limited (ASX:FMG) (Fortescue) and the University of Adelaide (UoA) will proceed to Stage 2 of the Sparc Hydrogen joint venture. The decision to proceed to Stage 2 reflects several key milestones achieved over recent months and is a strong endorsement of the potential of Sparc Hydrogen's novel technology to unlock low-cost green hydrogen via photocatalytic water splitting (PWS).

Stage 2 activities are focused on pilot plant construction and reactor testing along with ongoing laboratory testing of PWS reactors under a range of conditions. Sparc Hydrogen believes that the pilot plant will represent a globally leading facility for R&D and commercialisation of PWS reinforcing Sparc Hydrogen's first mover position in this emerging direct solar to hydrogen technology.

#### Sparc Technologies Managing Director, Mr Nick O'Loughlin, commented:

*"Sparc Technologies is very pleased to be pursuing Stage 2 of the Sparc Hydrogen joint venture alongside its supportive world class partners. A significant amount of work has gone into this positive investment decision which is a reflection on the R&D team, strong IP position and high potential of the technology to unlock low-cost green hydrogen without relying on electrolyzers, stretched electricity grids and related infrastructure."*

#### Fortescue Director of Research & Development, Mr. Michael Dolan, commented:

*"Fortescue is proud to continue its support of Sparc Hydrogen and its innovative photocatalytic water splitting technology. This Australian innovation has the potential to make green hydrogen an even more competitive energy resource by decoupling its cost from the cost of green power. The Phase 2 pilot plant will enable this promising technology to be evaluated at a meaningful scale ahead of potential commercial deployment in the future."*



## University of Adelaide Deputy Vice Chancellor (Research), Professor Anton Middelberg commented:

*"The University is pleased to commit to this next stage of work on photocatalytic water splitting, based on the outstanding research work of Professor Greg Metha and his team. The core IP developed by Professor Metha relates to PWS reactors operating under concentrated solar energy. This investment into constructing a pilot plant enables us to stress-test catalysts developed globally and places South Australia in a position of competitiveness in terms of testing innovative hydrogen technologies."*

### Pilot Plant Progress

Development of the pilot plant has been materially derisked with the following key workstreams well progressed or complete:

- Front-end engineering and design (FEED) study by global engineering and commercial service provider Incitias Pty Ltd is complete validating the technical feasibility of the project.
- Site planning reports have been submitted to the Light Regional Council with approvals expected in January 2025.
- Procurement of long-lead equipment for the pilot plant including the linear Fresnel (**LFR**) concentrated solar system is underway with delivery expected late Q1 2025.
- Design of the pilot scale PWS reactors has been finalised with drawings submitted to manufacturing contractors for review.
- Agreement for the supply of photocatalyst materials for the pilot plant from Shinshu University is ready for execution.
- Lease agreement between Sparc Hydrogen and the University of Adelaide for the Roseworthy site is finalised and ready for execution.
- Engineering, procurement and construction management contract is under review.

Based on the current schedule provided by Incitias, pilot plant construction completion is expected in mid-2025. When built, the pilot plant will allow Sparc Hydrogen to independently and concurrently test different reactor designs and photocatalyst materials. Sparc Hydrogen is not aware of any similar facilities for testing and scale up of photocatalytic water splitting under concentrated solar conditions worldwide.

### Key Pilot Plant Objectives

- Advance Sparc Hydrogen reactor from TRL-5 to at least TRL-6<sup>1</sup> via semi-continuous operation of an 'on-sun' pilot plant using concentrated solar mirrors.
- Real world demonstration of a concentrated solar field integrated with photocatalytic water splitting for green hydrogen production.
- R&D tool allowing on-sun testing of Sparc Hydrogen's PWS reactors, alternate photocatalysts and balance of plant.
- Benchmarking photocatalyst performance and durability under concentrated solar conditions against laboratory testing.
- Verify detailed optical, thermal and production modelling.
- Understand design and engineering issues to guide further scale up.
- Understand operability of key equipment.
- Establish safety protocols and operating procedures.
- Guide further patenting opportunities.
- Showcase technology to new and existing stakeholders and funding bodies.

<sup>1</sup> ARENA, Technology Readiness Levels for Renewable Energy Sectors, Commonwealth of Australia (Australian Renewable Energy Agency) 2014



- Facilitate engagement with key equipment suppliers.
- Solidify Sparc Hydrogen's leading position in the development of concentrated solar based PWS reactors with ability to test under real world conditions.

### Advantages of Photocatalytic Water Splitting (PWS)

Sparc Hydrogen's novel utilisation of PWS technology sets it apart from conventional approaches in the production of green hydrogen. Crucially, PWS does not rely on renewable electricity sources such as solar or wind farms, nor expensive electrolyzers, to produce hydrogen from water. This addresses a fundamental issue in the nascent green hydrogen industry - the cost of renewable electricity. Sparc Hydrogen's pioneering technology employs photocatalyst materials and sunlight to produce green hydrogen directly from water. Hydrogen produced from PWS can serve as a clean fuel or feedstock to decarbonise hard-to-abate industries. The key potential advantages over electrolysis that will be tested and demonstrated by the pilot plant include:

- Photocatalysis does not use electricity to produce hydrogen from water thereby decoupling green hydrogen and energy costs.
- The simplicity of PWS being a direct solar to hydrogen production system drives potential for very low costs.
- Sunlight is the only energy input driving the process delivering emissions free hydrogen.
- Sparc Hydrogen utilises concentrated solar infrastructure which is inherently flexible and scalable.
- PWS has a comparative advantage over electrolysis in off-grid and remote locations.

		Sparc Hydrogen Photocatalysis	Solar PV Electrolysis	Implications for potential end uses
Use case determinants	High solar resource	✓	✓	• Lowest cost production is suited to high solar (DNI) regions
	Remote and/or off-grid	✓	✗	• Photocatalysis can serve mine sites, remote power & refuelling, agriculture where electrolysis can't
	Flexible scale & modularity	✓	✗	• Photocatalysis is better suited to onsite / near site industrial uses
	Comingled gas product	✓	✗	• Suits combustion use cases assuming safety can be managed
	Industrial heat co-product	✓	✗	• Dual H2, heat product users may include alumina, paper & pulp, ammonia

Figure 1: Comparison of PWS and electrolysis using solar PV by key end use determinants

### Stage 2 Documentation

The decision to proceed to Stage 2 is being made under the terms and conditions of the subscription agreement entered into between MIH2 Pty Ltd (a subsidiary of Fortescue), The University of Adelaide, Innovation and Commercial Partners Pty Ltd as trustee for The Adelaide Research & Innovation Investment Trust, Sparc Technologies Limited and Sparc Hydrogen Pty Ltd, dated 31 January 2022 (**Subscription Agreement**). According to the terms of the Subscription Agreement, MIH2 Pty Ltd and Sparc Technologies Limited must contribute A\$2.5 million to Sparc Hydrogen following a positive decision to move forward with Stage 2 as described by this announcement. The parties' respective funding obligations and participating interests under the Subscription Agreement are set out in Appendix 1.

The parties have agreed to the milestones, budget and R&D activities to be conducted at the University of Adelaide during Stage 2. This has been documented in an updated Phase 2 research agreement (**Research Agreement**).



The PWS reactor technology is being exclusively licensed by Sparc Hydrogen from the University of Adelaide under the terms and conditions of a licence deed, dated 31 January 2022 (**Licence Agreement**). The licenced technology will be assigned to Sparc Hydrogen subject to the completion of Stage 2. No royalties are payable by Sparc Hydrogen to the University of Adelaide under the Licence Agreement.

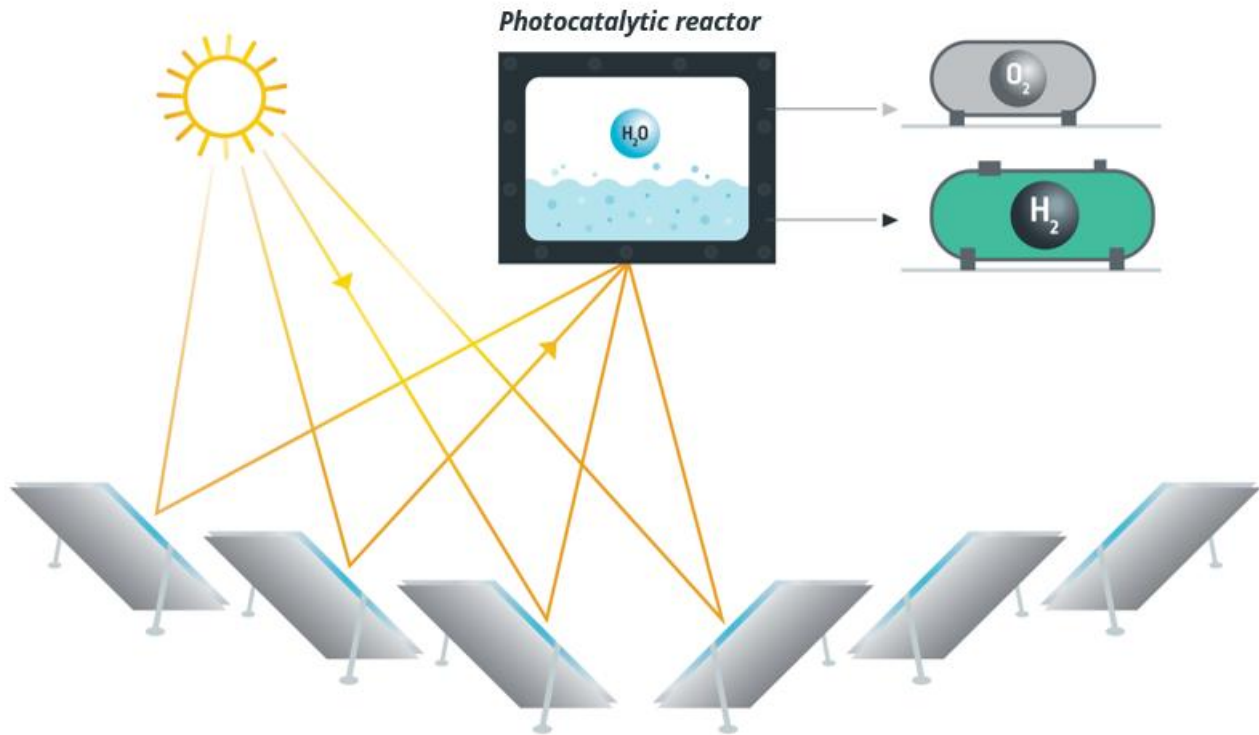
A shareholders agreement pertaining to Sparc Hydrogen exists between Sparc Technologies Limited, Fortescue (via MIH2 Pty Ltd) and UoA (via Innovation and Commercial Partners Pty Ltd) (**Shareholders Agreement**) which contains customary provisions for an agreement of this nature including governance and funding. The Shareholders Agreement together with the Research Agreement, Licence Agreement and Subscription Agreement contain the key terms and provisions which underpin the operation of the Sparc Hydrogen joint venture through to 30 June 2026.

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## About Sparc Hydrogen

Sparc Hydrogen is a joint venture between Sparc Technologies, the University of Adelaide and Fortescue developing next generation green hydrogen technology using a process known as photocatalytic water splitting (PWS). This process requires only sunlight, water and a photocatalyst to produce green hydrogen, without an electrolyser. Sparc Hydrogen's patent pending reactor utilises concentrated sunlight to improve the economics of PWS and to deliver a modular, scalable system. Given lower infrastructure requirements and electricity use, PWS has the potential to deliver a cost and flexibility advantage over electrolysis.



Sparc Hydrogen schematic demonstrating combination of concentrated solar and photocatalytic water splitting

-ENDS-

**Authorised for release by:** Nick O'Loughlin, Managing Director.

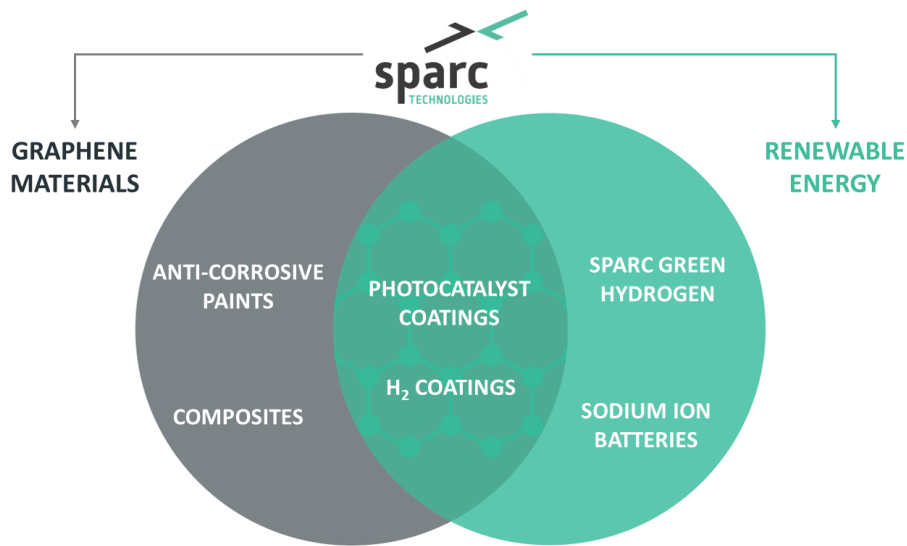
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## About Sparc Technologies



Sparc Technologies Limited ('Sparc', ASX: SPN) is an Australian company pioneering new technologies to disrupt and transform industry while seeking to deliver a more sustainable world. Sparc has established offices in Australia, Europe and North America and is focused on three core areas of technology development.

1. Sparc is the majority shareholder of **Sparc Hydrogen** which is a company pioneering the development of a **photocatalytic water splitting** (PWS) green hydrogen production technology. PWS is an alternative to producing green hydrogen via electrolysis, using only sunlight, water and a photocatalyst. Given lower infrastructure requirements and energy use, the process has the potential to deliver a cost and flexibility advantage over electrolysis.
2. Sparc has spent over 5 years developing a **graphene based additive** product, **ecosparc**<sup>®</sup>, which has demonstrated >40% anti-corrosion improvement in commercially available epoxy-based coatings. Sparc recently commissioned a manufacturing facility to produce **ecosparc**<sup>®</sup> and is engaging with global coatings companies and asset owners to conduct field trials.
3. Sparc is also developing sustainable **sodium ion battery anode technology** utilising agricultural bio-waste materials.

For more information please visit: [sparctechnologies.com.au](https://sparctechnologies.com.au)

For more information about **ecosparc**<sup>®</sup> please visit: [ecosparc.com.au](https://ecosparc.com.au)

For more information about Sparc Hydrogen please visit: [sparchydrogen.com](https://sparchydrogen.com)



## Appendix 1: Sparc Hydrogen Funding and Ownership Structure

	University of Adelaide	Sparc Technologies	Fortescue
<b>Sparc Hydrogen Joint Venture</b>			
<b>Stage 1</b>	IP contribution	Pays \$0.45m and issues 3m SPN shares	Pays \$1.80m
<b>Stage 1 Ownership</b>	<b>28%</b>	<b>52%</b>	<b>20%</b>
<b>Stage 2</b>	Remains the same	Pays \$1.025m	Pays \$1.475m
<b>Stage 2 Ownership</b>	<b>28%</b>	<b>36%</b>	<b>36%</b>

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