Sparc Green Hydrogen

February 2022

ASX: SPN

Transformational Technology for Global Industries

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Sparc Investment Highlights

Sparc is pioneering new technologies to disrupt and transform industry and science for a cleaner, greener and healthier world

1

World leading team and partners - the University of Adelaide and Fortescue Future Industries

2

Profound opportunity to reshape multi-billion dollar global markets underpinned by exclusive IP

3

Target markets are driven by ESG tailwinds including clean energy and environmentally friendly technologies

4

Unique position to leverage into other technologies related to graphene and green hydrogen

** Cautionary Note: Access to markets is subject to the Company being able to successfully develop and commercialise the graphene or hydrogen technologies. Sparc does not have any distribution or offtake agreements for graphene in place at this stage. As with any entity seeking to enter into a global marketplace, any product developed by Sparc will have applications that are constrained by market segment, relevant regulations, industrial application and geographical barriers.*

Corporate Overview

SPARC TECHNOLOGIES BOARD

Stephen Hunt
Executive Chairman

Mike Bartels
Managing Director

Tom Spurling
Non-Exec Director

Daniel Eddington
Non-Exec Director

EXECUTIVE MANAGEMENT TEAM

Peter Wilson
GM Engineering

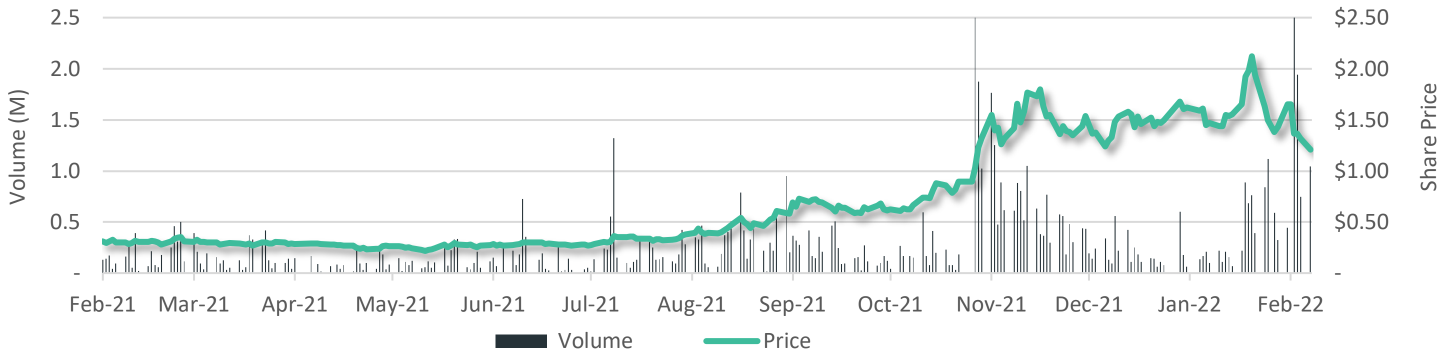
Andrew Smith
TM Industrial Materials

Jake Parker
Chief Technology Officer

Ben Yerbury
TL Bio-Medical & Health

Nick O'Loughlin
Mger Energy & Bus. Dvmt

12 Month Share Price



Capitalisation	
ASX Code	SPN
Share price*	$1.21
Shares on Issue	79.1m
Market Capitalisation	**$95.7m**
Cash (as at 31 Dec 21)	$3.4m
Debt (as at 31 Dec 21)	Nil
Enterprise Value	**$92.3m**

* As at 7 February 2022

Major Shareholders	% held
University of Adelaide	9.8%
Director's and Management	15.1%

SPARC GREEN HYDROGEN

H_2

Sparc Green Hydrogen

Next generation technology to transform global hydrogen production

No Wind or Solar PV Farms Required

No Electrolysis Required

- **Globally disruptive** Sparc Green Hydrogen technology developed by University of Adelaide and Flinders University
- Hydrogen produced **directly from sunlight and water** in a single step process
  - Photocatalytic water splitting
  - Avoids conversion of solar or wind energy into electrical energy then into hydrogen in a green electrolysis process
- Infrastructure requirements less than green electrolysis
  - **No large scale wind or solar PV farms** required
  - Opportunity for **scalable** deployment
  - **Zero carbon** process
- Further research & development work is targeting a system with **industry leading costs**
- Best-in-class partners - **University of Adelaide** and **Fortescue Future Industries**

Fortescue Future Industries: The Best Partner in **Green** Hydrogen

FORTESCUE FUTURE INDUSTRIES

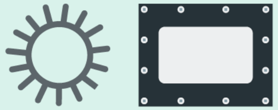
- **Capability** – Targeting 15Mtpa of green hydrogen to the world by 2030…
- **Track Record** – Of transforming industries…
- **Funding** – US$400 - $600m forecast expenditure in FY22
- **Vision** – *"Our vision is to make renewable green hydrogen the most globally traded seaborne energy commodity in the world."*

The Colours of Hydrogen

Sparc Green Hydrogen

Sparc's Green Hydrogen is produced by photocatalytic water splitting. Solar radiation interacts with water and a catalyst in a specially designed solar reactor to produce pure hydrogen and oxygen without any electricity or harmful by-products.

Solar Energy



Photocatalytic Reactor

H_2

Grey Hydrogen

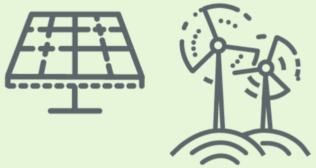
Grey hydrogen is produced using fossil energy sources such as natural gas, which is converted into hydrogen and CO_2 at high temperatures (stream reforming).
In the process, the CO_2 is released into the atmosphere, increasing the greenhouse gas effect. Grey hydrogen is therefore not CO_2-neutral.

Green-house gas Co_2 + H_2

Hydrogen

Fossil Energy

Renewable Energy



H_2

Production of green hydrogen is CO_2-free. The electricity for the electrolysis of water comes from renewable energies. This means that no harmful greenhouse gases are released.

Green Hydrogen

Carbon-Capture-and-Storage + H_2

Blue hydrogen, like grey hydrogen, is produced from hydrocarbons (especially natural gas). However, the CO_2 is captured and stored underground (known as carbon capture and storage, CCS). For blue hydrogen, no additional CO_2 is released into the atmosphere. Methane escapes during natural gas and methane exploration and transport (known as methane leakage).

Blue Hydrogen

Sparc Green Hydrogen Advantages

"Such systems (photocatalytic water splitting) offer great potential for cost reduction of electrolytic hydrogen, compared with conventional two-step technologies." (CSIRO National Hydrogen Roadmap[1])

	Sparc Green H_2	Green H_2	Blue H_2	Grey H_2
Description	Photocatalysis	Electrolysis via renewable electricity	Using SMR with CCUS*	Steam methane reforming (SMR)
Feedstock	✓ Water	✓ Water	✘ Natural gas, Water	✘ Natural gas, Water
By-product	✓ Pure O_2	✓ Pure O_2	• Emissions sequestered	✘ CO_2, NO_x, SO_x, PM
Carbon emissions from process[1]	✓ Nil	✓ nil	✘ 0.76kg CO_2 / 1kg H_2	✘ 8.5kg CO_2 / 1kg H_2
Location restrictions	✓ Solar resource	✘ Solar +/- wind resource & electrical infrastructure	✘ Gas source and UG storage	✘ Gas source
Requisite scale	✓ Scalable	✘ Very large	✘ Very large	✘ Large

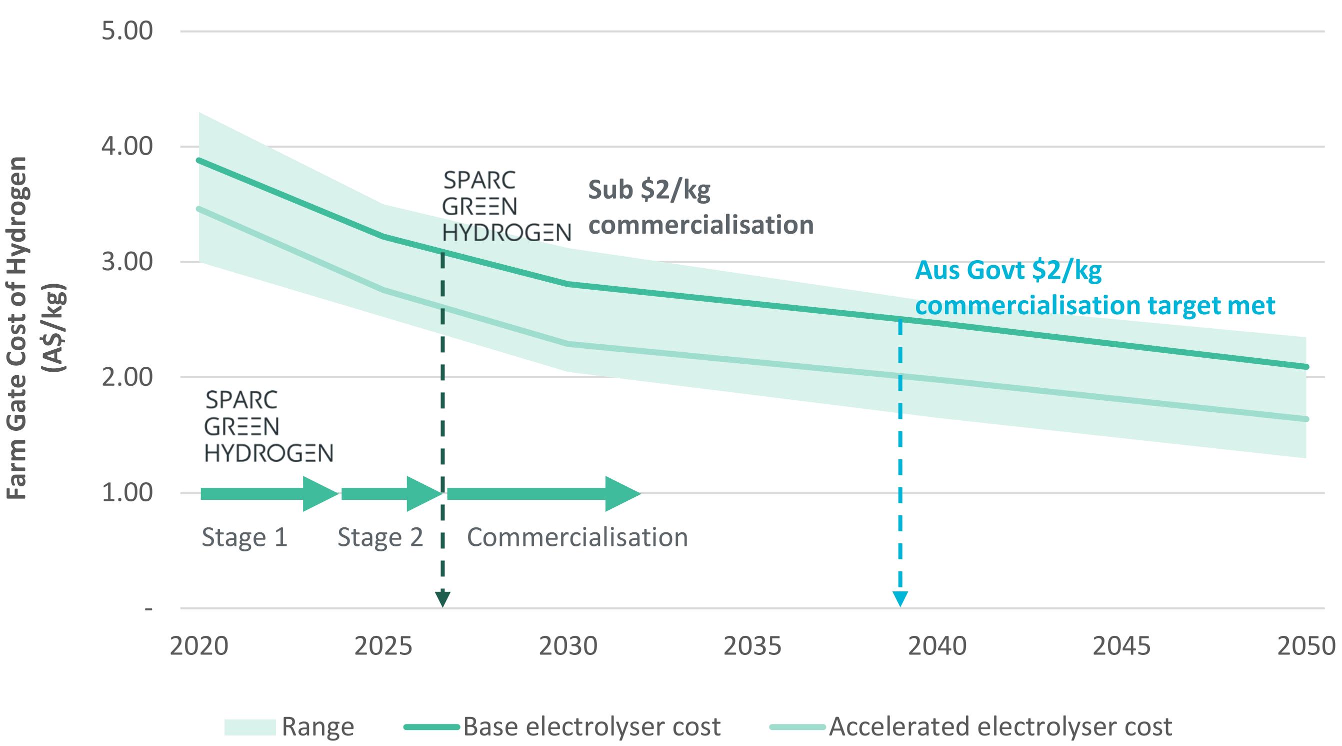
* Carbon capture, use and storage

1 Commonwealth of Australia Australia's National Hydrogen Strategy, 2019

The Race Is On….

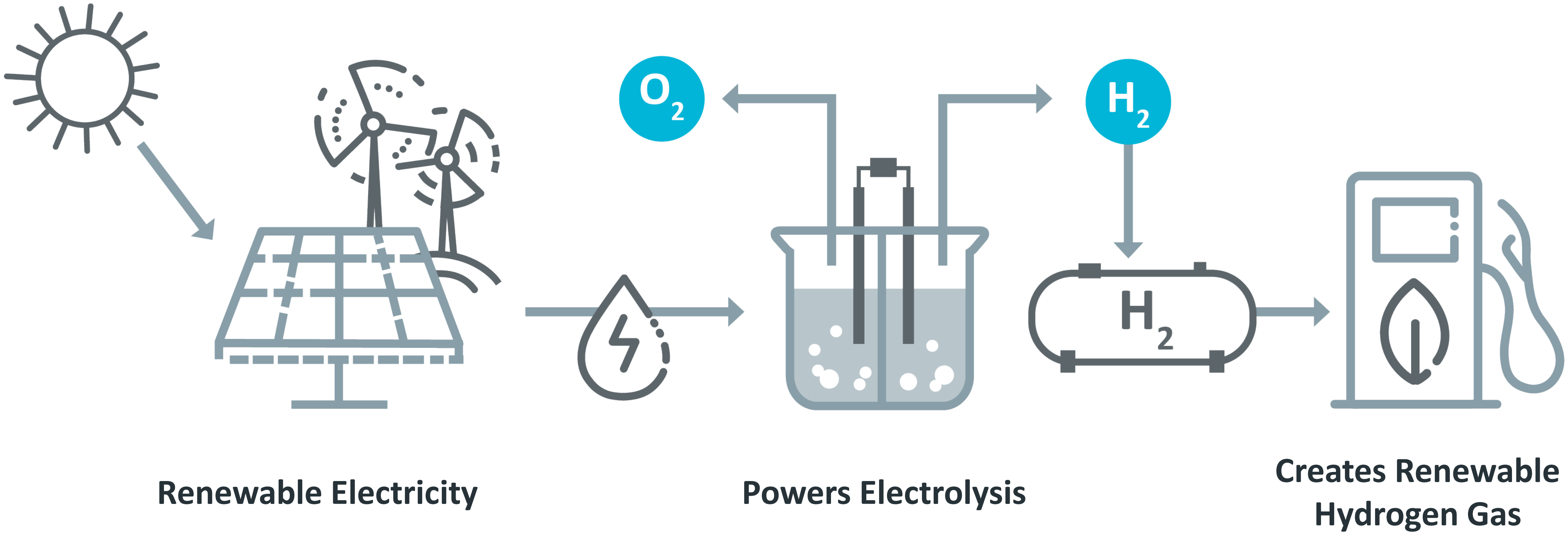
- Producing clean hydrogen **under $2/kg** is a stretch goal under the Australian Government's Technology Investment Roadmap
- Based on a 2021 report by Advisian commissioned for the CEFC conventional green hydrogen projects are forecast to reach this mark in the **late 2030s under an accelerated case**
- Sparc Technologies is aiming to have a commercially ready technology targeting **sub $2/kg** hydrogen production cost **at the completion of the program**
- The introduction of **Fortescue Future Industries** into Sparc Hydrogen is expected to assist and accelerate both project R&D and ultimately, commercialisation of the photocatalytic water splitting technology

Forecast cost of green hydrogen via electrolysis[1]



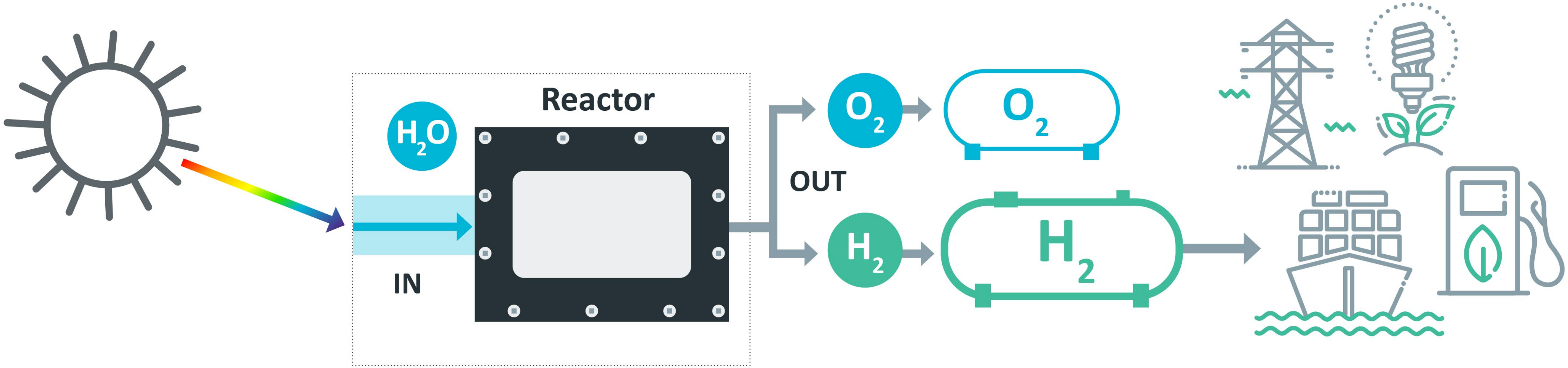
1 Source: Australian hydrogen market study - Sector analysis summary, Advisian, 24 May 2021

What is Conventional Green Hydrogen?



Conventional green hydrogen technologies use electricity derived from solar PV and/or wind farms to produce hydrogen using an electrolyser

How does Sparc Green Hydrogen Work?



Focused Solar UV Rays	Photocatalytic Water Spitting	Hydrogen & Oxygen Storage	Hydrogen at Work

Sparc Green Hydrogen does not use solar PV and/or wind farms, nor electrolysis as with conventional green hydrogen – only a photocatalyst and solar radiation

Sparc Hydrogen Joint Venture Summary

Stage 1: 2.5 years

- Sparc Technologies to fund **$0.45m** and issue 3m shares for **52%**
- FFI to fund **$1.8m** for a **20%** shareholding
- UoA to contribute IP under exclusive license for **28%**
- Work program includes development of a techno-economic assessment (TEA), construction of a new solar reactor, testing of optimal reactor conditions and materials under full solar simulation and proto-type design for an on-sun system

Stage 2: 2.0 years

- Sparc Technologies to fund **$1.025m**
- FFI to fund **$1.475m**
- IP to be assigned to Sparc Hydrogen Pty Ltd on completion
- Stage 2 shareholdings: **SPN 36%, FFI 36%, UoA 28%**
- Work program includes constructing a proto-type solar reactor in on-sun conditions followed by a pilot scale plant

sparc TECHNOLOGIES

FORTESCUE FUTURE INDUSTRIES

THE UNIVERSITY of ADELAIDE

Sparc Hydrogen Pty Ltd

Project IP*
(under exclusive license from UoA)

* A provisional patent application (Australian Provisional Patent Application No. 2021900997 – Photocatalytic Apparatus) in relation to the project was filed by University of Adelaide in April 2021

Project Development to Date

- University of Adelaide and Flinders University developed the photocatalytic water splitting technology with the support of ASTRI (Australian Solar Thermal Research Institute) over 4.5 years.
- The project builds on science which has been known for 50 years.
- Current focus is on optimising the **solar to hydrogen efficiency** (STH %) which is the major sensitivity on cost of H_2 production.
- Key recent breakthroughs include:
  - Unique solar reactor design;
  - Experimental data supporting optimal reactor conditions;
  - Reducing costs for solar based energy systems; and
  - Improved photocatalysts.
- A provisional patent application (Australian Provisional Patent Application No. 2021900997 – Photocatalytic Apparatus) was filed by University of Adelaide in April 2021.

ASTRI Australian Solar Thermal Research Institute

THE UNIVERSITY of ADELAIDE

Flinders UNIVERSITY

Key Project Milestones – Stage 1

Next 12 months

- Delivery of a preliminary Techno Economic Assessment (TEA)
- Ongoing design and development of solar reactor
- Demonstration of increased STH % efficiencies

12 – 24 months

- Optimisation of solar reactor conditions and STH %
- Testing of photocatalysts under full solar simulation
- Revised TEA based on testing results
- Design of prototype for field based operation

Sparc Green Hydrogen

World leading partners in green hydrogen

Disruptive 100% green hydrogen technology

Lower infrastructure requirements

Targeting industry leading cost of production

Hydrogen Market

Hydrogen Demand and Uses

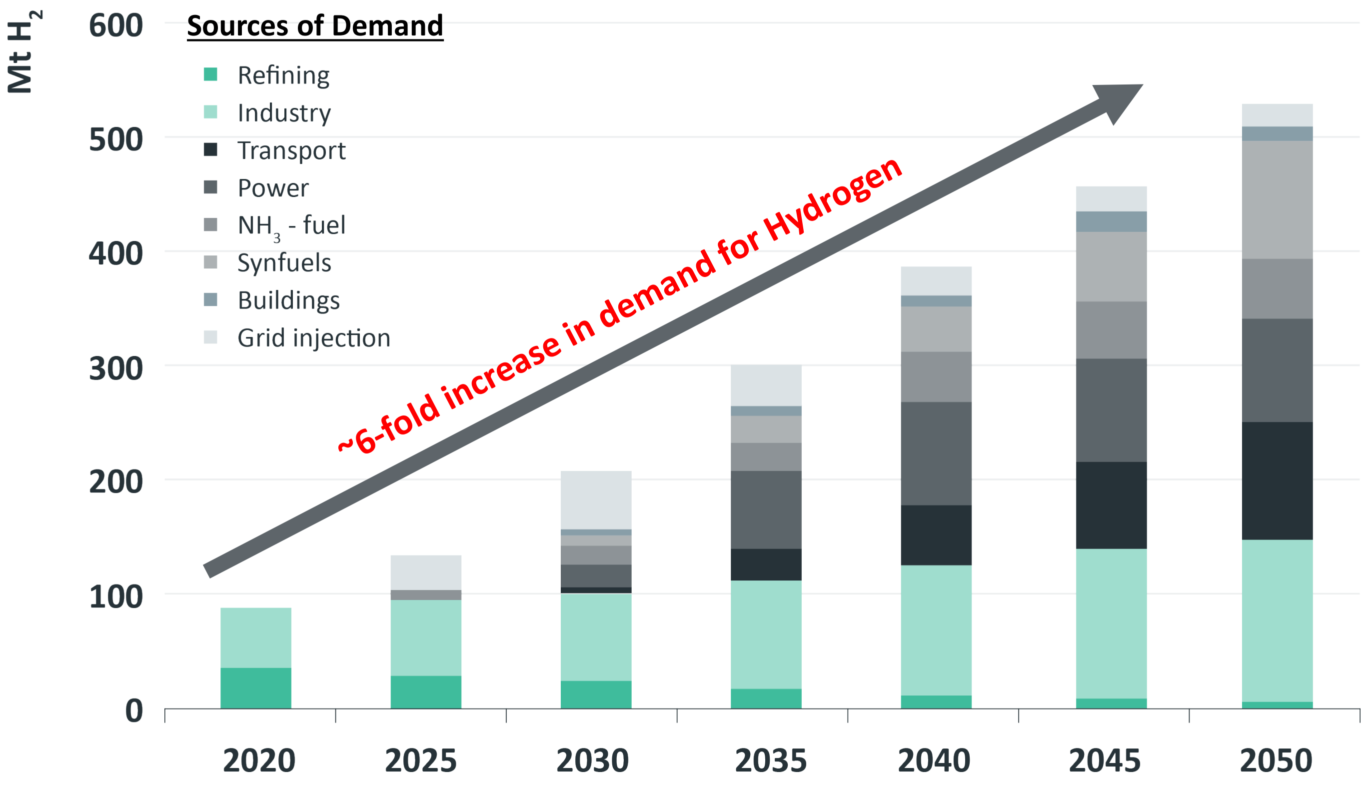
- Demand for hydrogen is expected to grow 6-fold by 2050 under the IEA's Net Zero by 2050 Roadmap[1]

- Clean hydrogen has the potential to aid the de-carbonisation of c.45% of global anthropogenic emissions

- Demand for hydrogen from existing 'hard to de-carbonise' sectors including industrial, heating, transportation and power generation industries is expected to be at the forefront of reducing these emissions

- Forecast investment required to reach government production targets and spending projections across the value chain adds up to more than US$300 billion through 2030[2]

Global hydrogen demand (Mt)[1]



Green Hydrogen is Critical to Meeting Net Zero Targets

- Hydrogen's use as a low / zero carbon fuel is viewed as essential to meeting global net zero targets
- The IEA estimates that US$90bn of public money needs to be invested in clean energy innovation worldwide as quickly as possible, with around half for hydrogen related technologies
- Countries representing almost 90% of global GDP have roadmaps or policies advocating hydrogen
- Regional based commitments include:
  - EU targets installation of 6GW of electrolyser capacity by 2024 and up to 40GW by 2030
  - Biden's Infrastructure Investment and Jobs Act contains US$9.5bn funding for the hydrogen industry
  - China has hydrogen included as one of "six industries of the future" in its latest 5-year plan
  - The Australian Government has committed $1.2bn towards developing a local hydrogen industry, with a goal of clean hydrogen production at under $2/kg by 2030

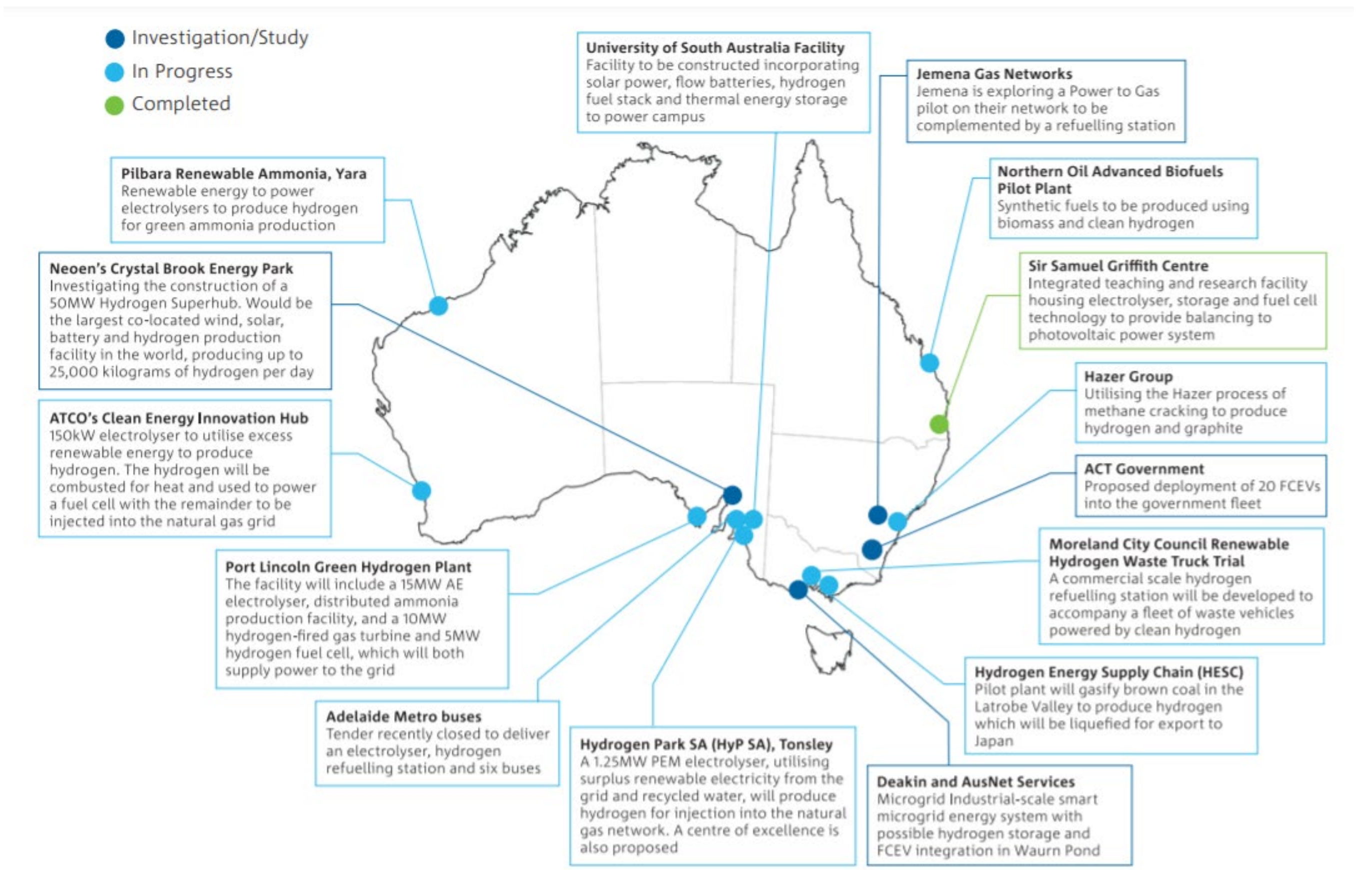
Key factors behind the rapid development of the hydrogen economy

- **Significant cost reduction in green hydrogen production**
- **Technology development to support demand side readiness**
- **Supportive regulatory and policy environment**
- **Development of H_2 markets**

Hydrogen Development in Australia

- The Australian Government has produced a National Hydrogen Strategy aimed at establishing Australia as a major player in the growing hydrogen economy
- Within this strategy seven priority regional sites have been identified as potential hydrogen 'hubs' which will attract funding and R&D
  - Eyre Peninsula (SA)
  - Pilbara (WA)
  - Bell Bay (Tas)
  - Darwin (NT)
  - Gladstone (Qld)
  - Latrobe Valley (Vic)
  - Hunter Valley (NSW)
- Australia's abundance of land, natural resources (wind and solar), good infrastructure, skilled workforce and proximity to Asia make it a leading candidate for supplying low cost, green hydrogen to the world

Australian hydrogen demonstration projects[1]



1 National Hydrogen Roadmap – Pathways to an economically sustainable hydrogen industry in Australia, CSIRO 2018

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Released with the authority of the Board – 9 February 2022

Appendix: Sparc Technologies Board

Stephen Hunt
Executive Chairman

Stephen is currently a Non Executive Director of American Pacific Borates Ltd. (ASX: ABR). Previous Directorships include, Executive Chairman and a Non Executive Director of ASX listed company, Volt Resources Ltd, (ASX: VRC), Non Executive Director Magnis Energy Technologies Ltd. (ASX: MNS), IMX Resources Ltd and Australian Zircon Ltd. Cumulatively, over 20 years as a Director of ASX listed companies. Earlier experience includes various marketing roles including over 15 years with BHP. Stephen is a member of ARC Research Hub for Graphene Enabled Industry Transformation (the Hub) Industry Advisory Committee (IAC) and also a Director of the charity, Count Me In.

Mike Bartels
Managing Director

Mike has a wealth of experience in sales and marketing with major multinational coatings companies in Australia and internationally. Mike is an expert at developing strategy, setting vision and executing plans to deliver growth. Mike brings a vast depth of experience to Sparc given his previous roles as global head of marketing, business development manager and sales director for paint, protective coatings and insulation products for major multinational coatings companies.

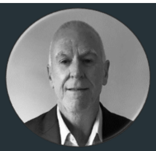
Tom Spurling
Non-Executive Director

Tom held the position of CEO of Ellex Medical Lasers (ASX:ELX) between 2011 and 2019, which has recently been acquired for c.$100m. Tom has 35 years of experience covering acquisitions, listed company equity capital markets in Australia and the USA, marketing strategy development, development and has specific expertise in the introduction of complex new products in highly regulated markets. In addition he brings a wealth of sales management, manufacturing, people management, customer relationships management (both private business and Australian, US and other governments), and significant general managerial expertise.

Daniel Eddington
Non-Executive Director

Dan has over 20 years experience in the financial markets with experience across multiple sectors including the resource, energy and industrial sectors. Dan specialises in equity capital markets and has been responsible for IPO's, placements, reverse takeovers, underwritings, corporate negotiations and corporate advisory for companies predominantly in the resource and technology sectors.

Appendix: Executive Management Team



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Peter Wilson
General Manager & Engineering Manager

Peter is a professional mechanical engineer and manager with over 30 years diverse experience in design, production and business operations in industries ranging from consumer electronics to defence and aerospace. In a range of management roles Peter has also implemented and managed most corporate functions including HR, quality, commercial, engineering and business development. Peter possesses a unique combination of skills and is able to combine them to solve the complex problems associated with rapidly growing companies. Since 2018 Peter has been operating his own engineering & management consultancy.

Andrew Smith
Technical Manager, Industrial Materials

Andrew is a development chemist specialising in Heavy Duty Coatings, specifically, the development and testing of anti-corrosive coatings. Andrew has held senior regional technical management roles for AkzoNobel (world leader in coatings with brands including International, Chartek, Sikkens, Awlgrip, Devoe), in Australia, Asia and the Americas. These roles involved responsibility for product development, testing and integrity, as well as Technical Support functions. Andrew most recently was involved in implementing major restructuring initiatives for AkzoNobel, including rationalisation of manufacturing capability in the South Asia region.

Ben Yerbury
Technical Lead–Bio-Medical & Health

Ben brings a wealth of experience across Australia and New Zealand, Asia Pacific and European markets and their respective reimbursement models and regulatory environments. Ben has direct and wide expertise in launching new, disruptive, technologies and business models to accelerate business growth and build competitive advantages in the medical device industry.

Jake Parker
Chief Technology Officer

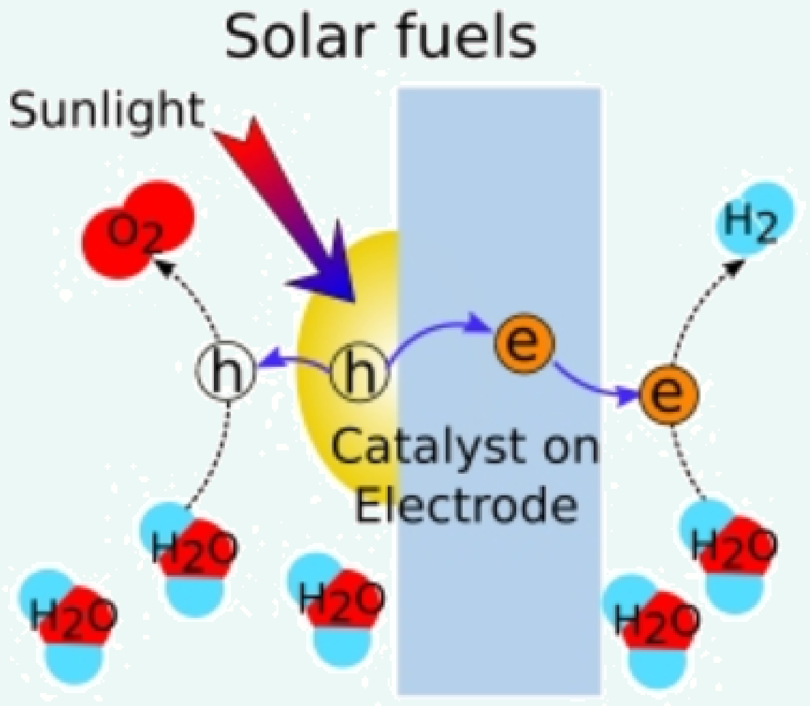
Jake holds a PhD in synthetic biology from the University of Queensland and a Bachelor of Laws from the University of Adelaide, with expertise in protein engineering and biosensors. With a strong view that synthetic biology would have wide-ranging impact on the world, Jake performed his doctoral research between labs at the University of Queensland, Brisbane, and the Weizman Institute of Science in Israel. During his time at the University of Queensland, Jake also co-founded CLIMB, a commercialisation club at his home institute, as well as undertaking an internship with 23Seed, a Shanghai-based accelerator and VC fund.

Nick O'Loughlin
Manager, Energy & Business Development

Nick has 10 years of experience in investment banking and corporate finance in Australia and London. Nick was an Associate Director (Vice President) at Rothschild & Co in London from February 2017 through July 2020, where he advised on several landmark transactions in the resources sector. Prior to that, he was in Standard Chartered Bank's Mining & Metals team. Since finishing at Rothschild & Co, Nick has held consulting roles with Rio Tinto on two renewable energy projects in Australia and with Taylor Collison's corporate team. Nick is also the Chief Development Officer for NYSE listed, Battery Future Acquisition Corp.

Appendix: What is Photocatalytic Water Splitting?

- Photocatalytic water splitting is an artificial photosynthesis process used for the dissociation of water into hydrogen (H2) and oxygen (O2), using light.
- Light energy (photons) induce a separation of negative electrons and positive holes on a semi-conductor surface which can drive reduction-oxidation (Redox) chemical reactions in the presence of a suitable catalyst.
- This process has been known in scientific circles for 50 years but, to date, low reaction efficiencies (solar-to-hydrogen %) and performance of photocatalysts have prevented commercialisation.
- Dramatic improvement in the efficiency and stability of catalysts and research into more efficient solar reactor designs has the ability to unlock the potential of this technology.



I. Excitation of electrons by light energy (photons) creates positive holes on a semi-conductor surface

II. Drives a redox reaction with H+ ions in the water molecule combining with the free electrons on a catalyst to produce H_2

III. $H_20 \rightarrow H_2 + \frac{1}{2}O_2$

Disrupting global industries with transformational technology