



Transformational Technologies for Global Industries

Annual General Meeting
November 2023
ASX: SPN

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Corporate Snapshot



86m

Shares on issue

\$23m

Market Cap*

\$0.27

Share price*

\$2.0m

Cash (30 Sep 2023)

~38.5%

Top 20 s/holders

7.7%

University of Adelaide

BOARD OF DIRECTORS



Stephen Hunt
Executive Chairman



Adrien Wing
Non-Executive Director



Daniel Eddington
Non-Executive Director

EXECUTIVE MANAGEMENT TEAM



Denis Wright
General Manager
Graphene Materials



Nick O'Loughlin
General Manager
Renewable Energy



Kristen Kubank
Chief Financial Officer

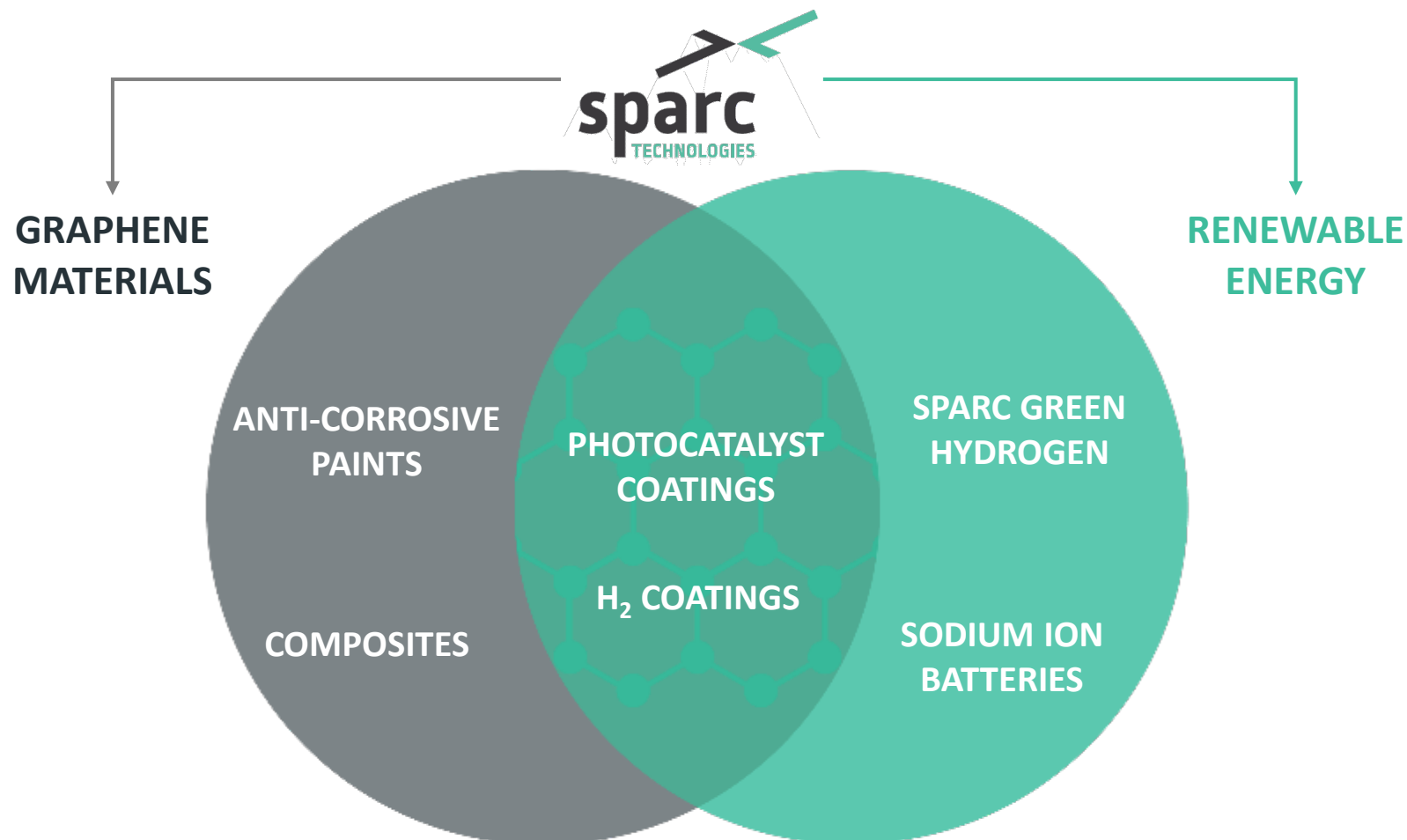
Unique Technology Portfolio

- ▶ Sparc is developing a **portfolio of technologies** that target a world increasingly focused on **sustainability** and **environmental outcomes**

- ▶ Sparc has two core business lines:

Graphene Materials focusing on developing high performance anticorrosive paints and other protective coatings

Renewable Energy with a majority shareholding in Sparc Hydrogen and an emerging project in sodium ion batteries



GRAPHENE

Unique Approach to
a Next Generation
Super-material



Sparc's Unique Graphene Position



Based in Kent
Town, Adelaide



Production of
commercially
applicable graphene-
based materials



World leading
'Graphene in
Coatings' R&D team



Patent application
for graphene-based
additive filed

Key innovation partners:

The Problem – Corrosion of Steel



The Cost and Carbon Problem

- ▶ **\$78 billion spent on remediating assets affected by corrosion in Australia per annum¹**
- ▶ **Corroded steel replacement accounts for up to 3.4% of global greenhouse gas (GHG) emissions²**

The Business Interruption Problem

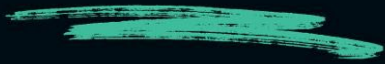
- ▶ Asset shutdowns
- ▶ Loss of productivity
- ▶ Personnel safety risks

Introduction to **ecosparc**[®]



ecosparc

CORROSION DEFENCE
REVOLUTIONISED



A Sparc Technologies Product

Sparc Technologies has developed **ecosparc** on the back of **>4 years** of research and development.

ecosparc is a drop-in **graphene-based additive** which is added to currently used **marine and protective coatings** for steel infrastructure.

ecosparc significantly enhances the anti-corrosive properties of these **paints**.

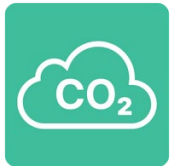
About **ecosparc**[®]



ecosparc is not a paint.

ecosparc, when added in tiny amounts, supercharges coatings currently used to protect steel assets from corrosion.

The benefits of **ecosparc**, including cost and emissions savings, are the direct result of **ecosparc** extending the time between maintenance events.



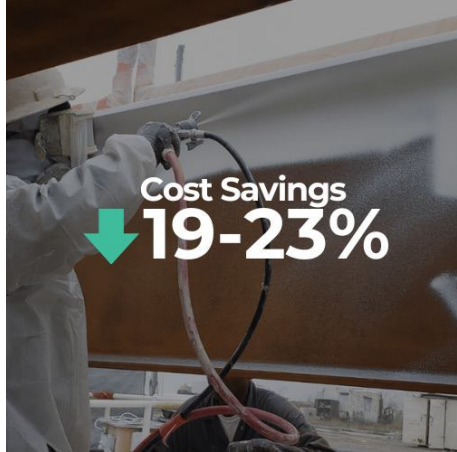
18-21%
reduction in carbon
emissions¹



19-23%
savings in maintenance
costs¹

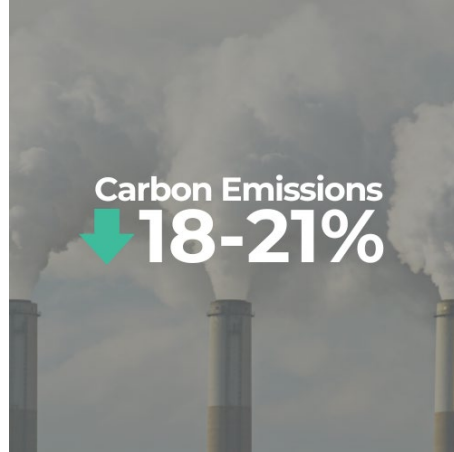


Why Choose **ecosparc**[®]



Cost Savings

Enhancing conventional coatings with **ecosparc** results in a minimum saving in steel maintenance costs of 19-23%¹.



Reduced CO₂ Emissions

Enhancing conventional coatings with **ecosparc** results in a reduction of carbon emissions associated with asset maintenance of 18-21%¹.



Easier Maintenance

Reduced maintenance events;
Fewer on-site check-ups;
Reduced asset downtime;
Increased productivity.



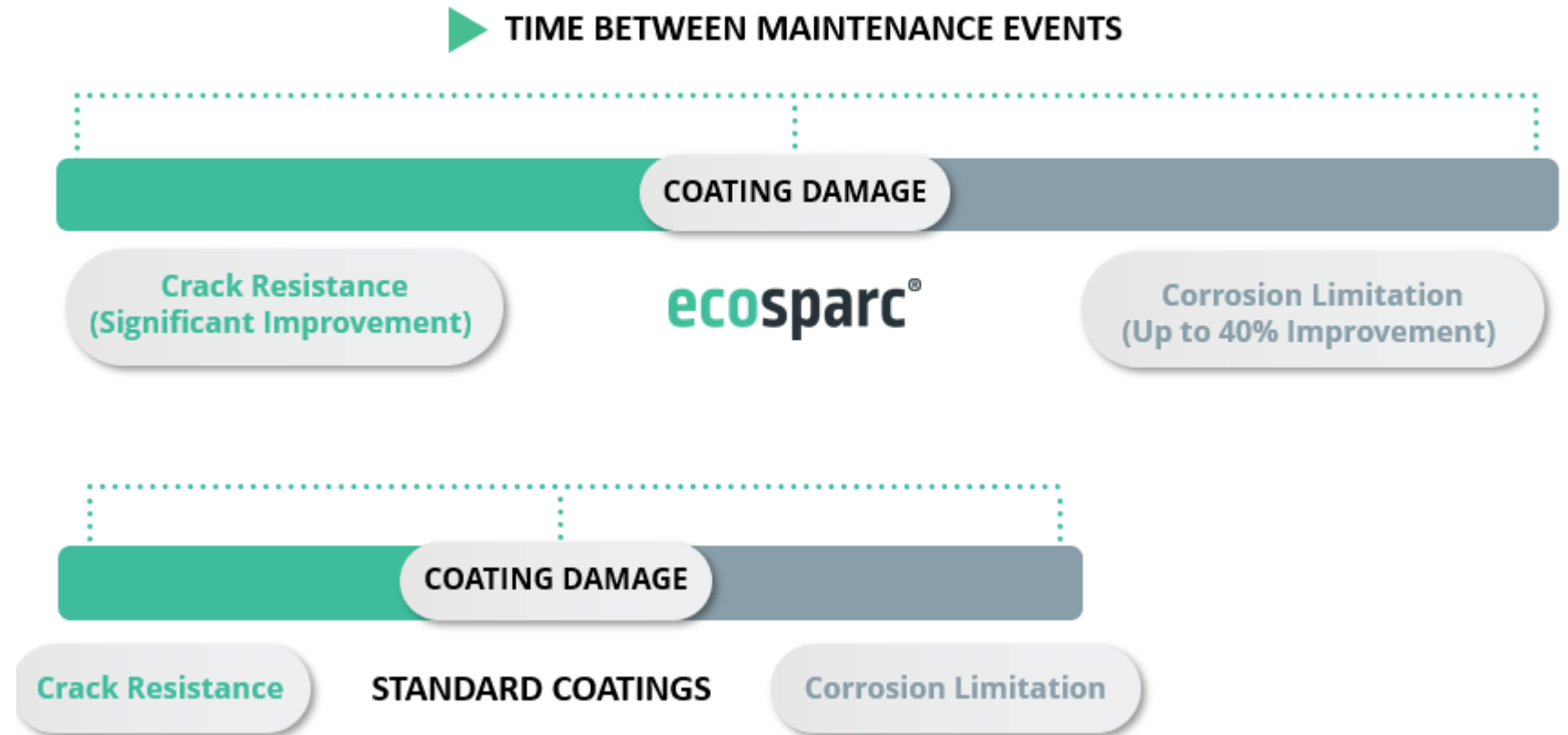
Increased Safety

Enhancing conventional coatings with **ecosparc** will help to protect your workforce.

Dual Anti-Corrosion Mechanism

ecosparc enhanced coatings:

- Delay coating cracking. This delays the onset of corrosion.
- When damage does eventually occur, **ecosparc** further limits corrosion spread by up to 40%.



Ease of Manufacture and Use



- ▶ Commercial production facility can produce enough **ecosparc** to dose 7 million litres of paint.
- ▶ Simple and easy to incorporate into existing coatings.
- ▶ No change to current paint application or removal methods.
- ▶ Only 2% volume of additive required.



The specialist **ecosparc**® formula is manufactured at our Lonsdale facility

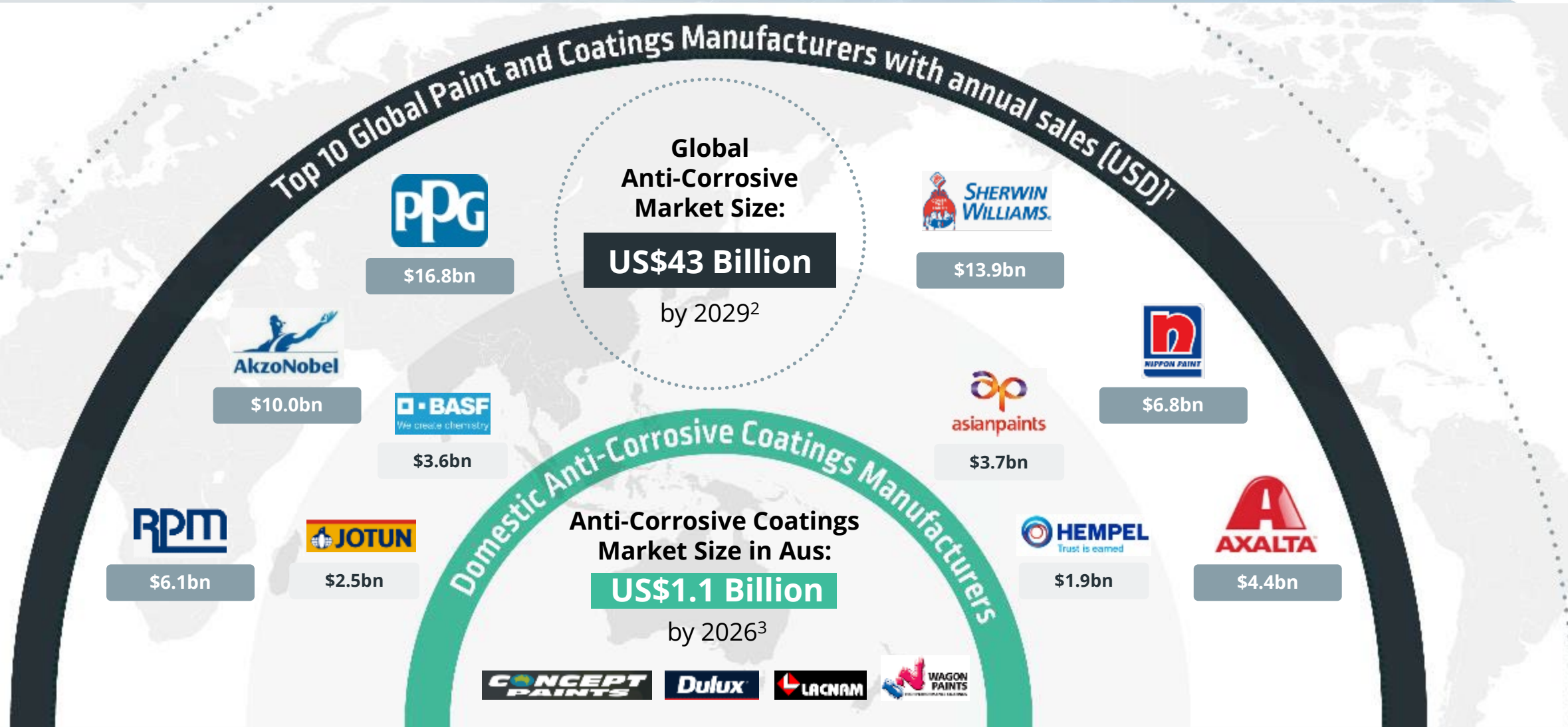


Ecosparc is added to conventional coatings at the point of paint manufacture



To produce **graphene** enhanced high performance coatings

Addressable Market for Anti-Corrosive Coatings



1. Sourced from Coatings World 2022 <https://www.coatingsworld.com/heaps/view/10269/1/>
 2. Sourced from Exactitude Consultancy <https://exactitudeconsultancy.com/reports/3960/anti-corrosion-coatings-market/>
 3. Sourced from Research and Markets 2016 <https://www.prnewswire.com/news-releases/australia-us11-billion-corrosion-protective-coatings-cpc-acid-proof-lining-apl-market-analysis-and-opportunity-assessment-2016-2026---research-and-markets-300345758.html>

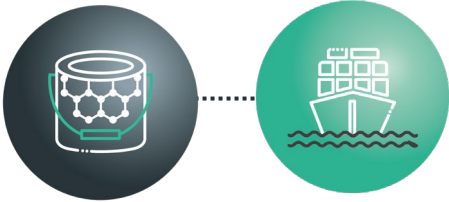
Pathway to Market

Dual track approach to commercialising **ecosparc within the global anti-corrosive coatings market:**

1. Actively working with several of the **world's largest coatings companies** on testing and trials with results due in H1 2024.
2. Partnering with **asset owners** to trial **ecosparc** on relevant steel infrastructure such as steel frames, tanks and other structures close to the ocean. Infrastructure owners being targeted include government, defence, mining, and oil and gas companies.



Other Target Applications



Anti-fouling Paints

- ▶ Fouling is the result of accumulation of marine growth, resulting in reduced vessel speed, increased bunker consumption and the accrual of cleaning costs
- ▶ Sparc is developing antifouling technology which would substantially reduce fouling on marine vessels and structures
- ▶ Global market size is estimated to be growing at 8.2% CAGR reaching US\$13.5bn in 2028¹



Composites

- ▶ Composites are two or more distinct materials that, when combined, create a new material with enhanced properties
- ▶ Composite materials are widely used in aerospace, automotive, construction, and other industries where high performance and lightweight materials are required
- ▶ Sparc's graphene additives are being tested in multiple applications targeting improved flexibility, strength, conductivity and elasticity

Sparc's Competitive Advantage



► The Expertise

- A global coatings team consisting of former senior members of the world's largest global coatings companies
- A specialist 'graphene in coatings' team based out of our labs in Adelaide, Australia

► The Data

- An ISO testing regime which has been run over the past 4 years
- Thousands of data points collected which provide repeatable, rigorous evidence proving just how effective **ecosparc®** is

► Intellectual property

- Patent application filed
- Significant know-how developed

Global Network of Coating Specialists

**Ian Rowell**

- ▶ Sparc North America LLC
- ▶ Former Head of Global Strategy Development for AkzoNobel

**Aidan Mernin**

- ▶ Sparc Technologies Europe Limited
- ▶ Former Technical Director for Marine and Protective Coatings at AkzoNobel and Technical Director for Protective Coatings at Hempel

**Dr. Andrew Smith**

- ▶ Technical Manager – Graphene
- ▶ Former Asia Pacific Senior Regional Technical Manager

**Dr. Denis Wright**

- ▶ General Manager – Graphene
- ▶ Former Senior Regional Manager for Marine and Protective Coatings at Wattyl/Sherwin Williams

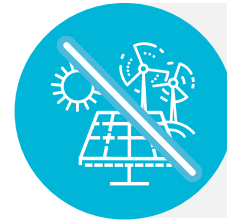
SPARC GREEN HYDROGEN

Next Generation Green Hydrogen Technology



Technology Highlights

- ▶ **Globally disruptive** green hydrogen production technology
- ▶ Direct solar-to-hydrogen via **photocatalytic water splitting**
- ▶ **NO ELECTRICITY REQUIRED** to split water
- ▶ Flexible and **scalable infrastructure**
- ▶ **Prototyping and pilot plant development** underway
- ▶ Targeting a system with **industry leading costs**



**No Wind or Solar
PV Farms**



No Electrolysers



THE UNIVERSITY
of ADELAIDE



Flinders
UNIVERSITY



Technology Advantages

*“Such systems (**photocatalytic water splitting**) offer great potential for cost reduction of electrolytic hydrogen, compared with conventional two-step technologies.” (CSIRO National Hydrogen Roadmap¹)*

	Sparc Green H ₂	Green H ₂	Blue H ₂	Grey H ₂
Description	Photocatalysis	Electrolysis powered by renewables	Grey production with carbon capture	Steam methane reforming
Feedstock	✓ Water	✓ Water	✗ Natural gas, Water	✗ Natural gas, Water
By-product	✓ Oxygen	✓ Oxygen	• Emissions sequestered	✗ CO ₂ , NO _x , SO _x , PM
Scope 1 & 2 emissions²	✓ Nil	✓ Nil	✗ 0.76kg CO ₂ / 1kg H ₂	✗ 8.5kg CO ₂ / 1kg H ₂
Location	✓ Solar resource	✗ Solar +/- wind & HV infrastructure	✗ Natural gas source and suitable storage	✗ Natural gas source
Requisite scale	✓ Scalable	✗ Very large	✗ Very large	✗ Large

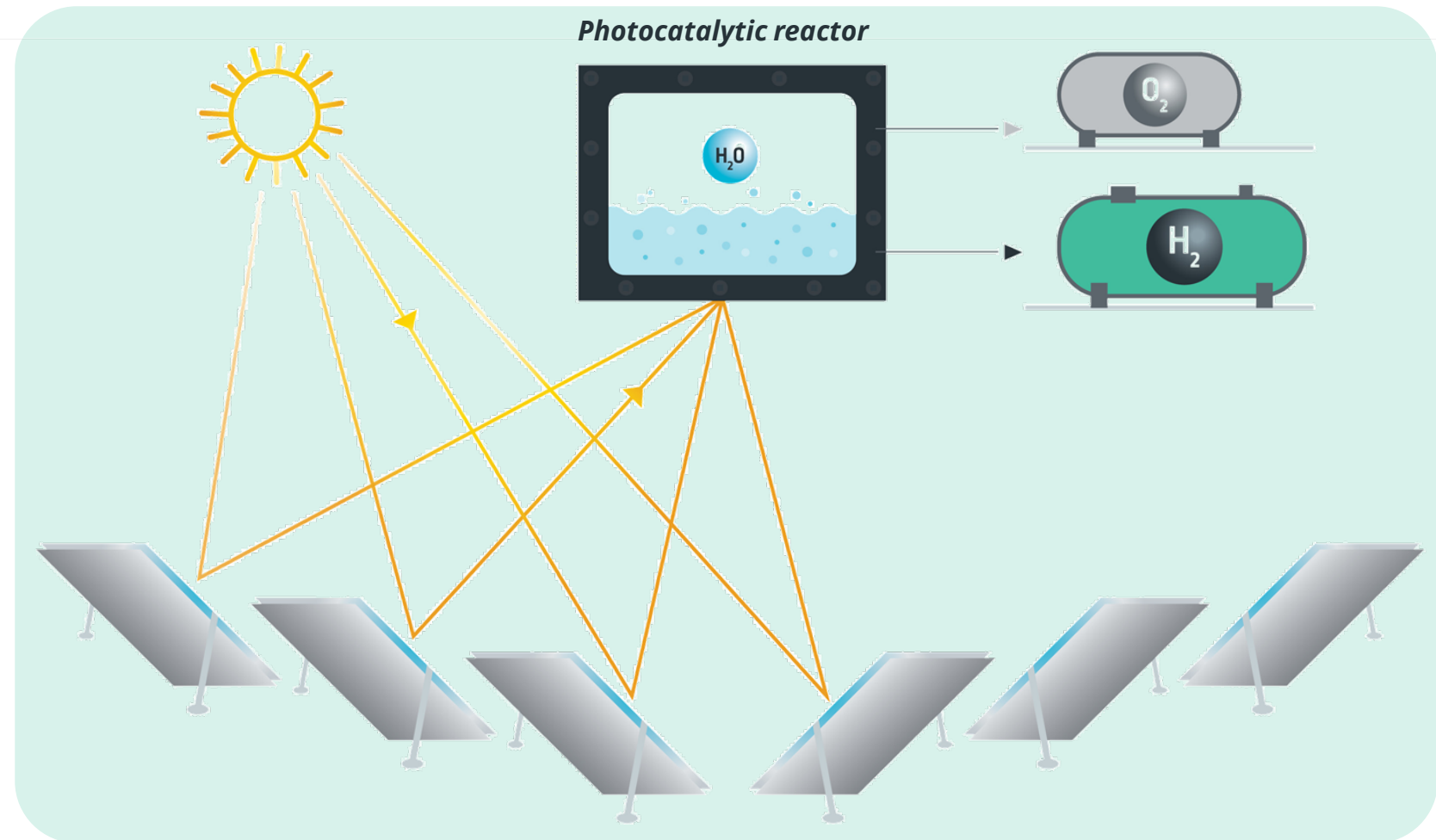
¹ Sourced from Bruce S, Temminghoff M, Hayward J, Schmidt E, Munnings C, Palfreyman D, Hartley P (2018) National Hydrogen Roadmap. CSIRO, Australia

² Sourced from Commonwealth of Australia, 'Australia's National Hydrogen Strategy', 2019

Sparc Hydrogen's Unique Approach



- ▶ Sparc Hydrogen's reactor is one of the only known combinations of concentrated solar with photocatalytic water splitting (PWS):
 - Reduced photocatalyst use.
 - Modular and scalable mirror fields.
- ▶ Sparc Hydrogen's reactor is being designed to:
 - Slot into an off-the-shelf linear Fresnel field.
 - Utilise by-product heat for industry use or power generation.
- ▶ Sparc Hydrogen is working with a leading photocatalyst developer.



Prototype Testing at CSIRO Energy Centre



- ▶ Sparc Hydrogen recently completed the first phase of prototype testing its PWS reactor at the CSIRO Energy Centre in Newcastle.
- ▶ Represents the first demonstration of the technology outside of the laboratory and has produced vital information for reactor scale up towards a pilot plant.
- ▶ Prototype has advanced the technology readiness level (TRL)¹ of Sparc Hydrogen's reactor from 4 to 5.
- ▶ Support and funding provided through CSIRO's Kick-Start Program.



Development Pathway



Sparc Hydrogen joint venture **established** beginning 2022



Preliminary TEA **confirms commercial potential** in Q4 2022



Solar reactor prototype for on-sun testing at CSIRO in **Q4 2023**

~A\$470k AEA grant funding awarded Oct-23



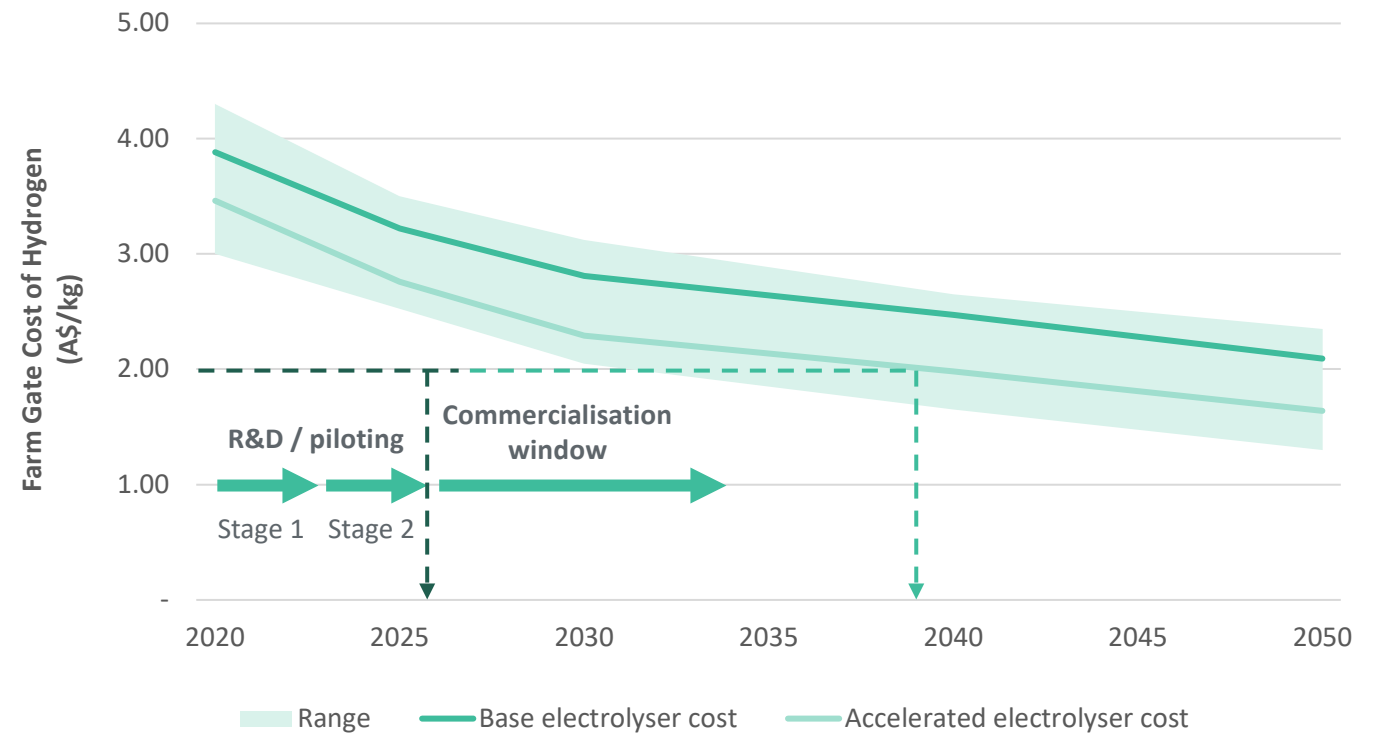
Pilot plant engineering, design and funding workstreams **H1 2024**

Increasing technology and commercial readiness

The Green Hydrogen Race is On

- ▶ Conventional green hydrogen (electrolysis) projects will not reach industry and Government cost targets until well into the 2030s, at best.
- ▶ There is a **substantial window of opportunity** for **new technologies** such as Sparc Hydrogen to commercialise **low-cost hydrogen** production.
- ▶ Sparc Hydrogen is well placed to benefit from funding support from Australia, the US, EU and other jurisdictions with clean hydrogen policies.

Forecast cost of green hydrogen via electrolysis¹



Best-in-Class Partners



- ▶ 52% Sparc Hydrogen shareholder¹
- ▶ JV management and coordination
- ▶ Technology commercialisation expertise



- ▶ 20% Sparc Hydrogen shareholder¹
- ▶ Global leader in green hydrogen
- ▶ Substantial project development experience



- ▶ 28% Sparc Hydrogen shareholder¹
- ▶ Developer and contributor of IP²
- ▶ Leading R&D work and providing lab facilities

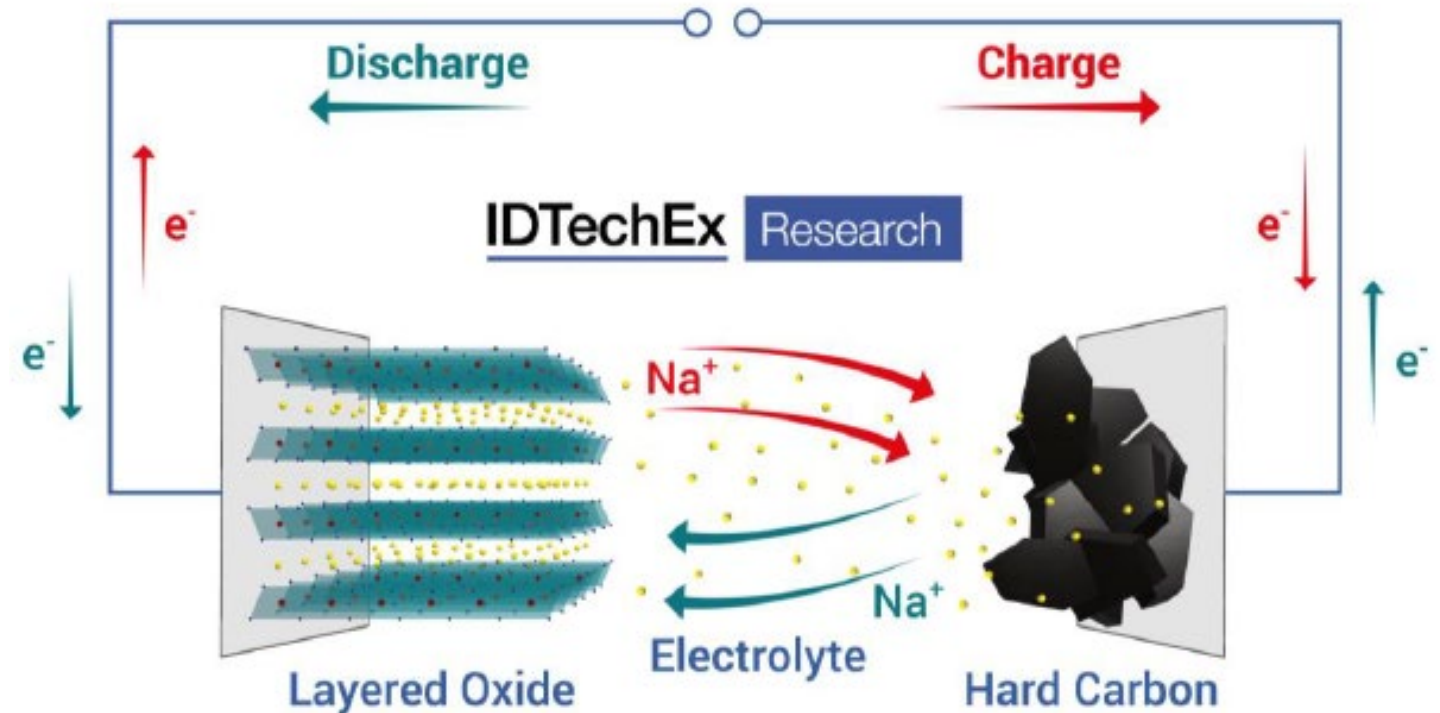
SODIUM ION BATTERIES

Emerging Low-Cost
Alternative to
Lithium-ion Batteries



Introduction to Sodium-Ion Batteries

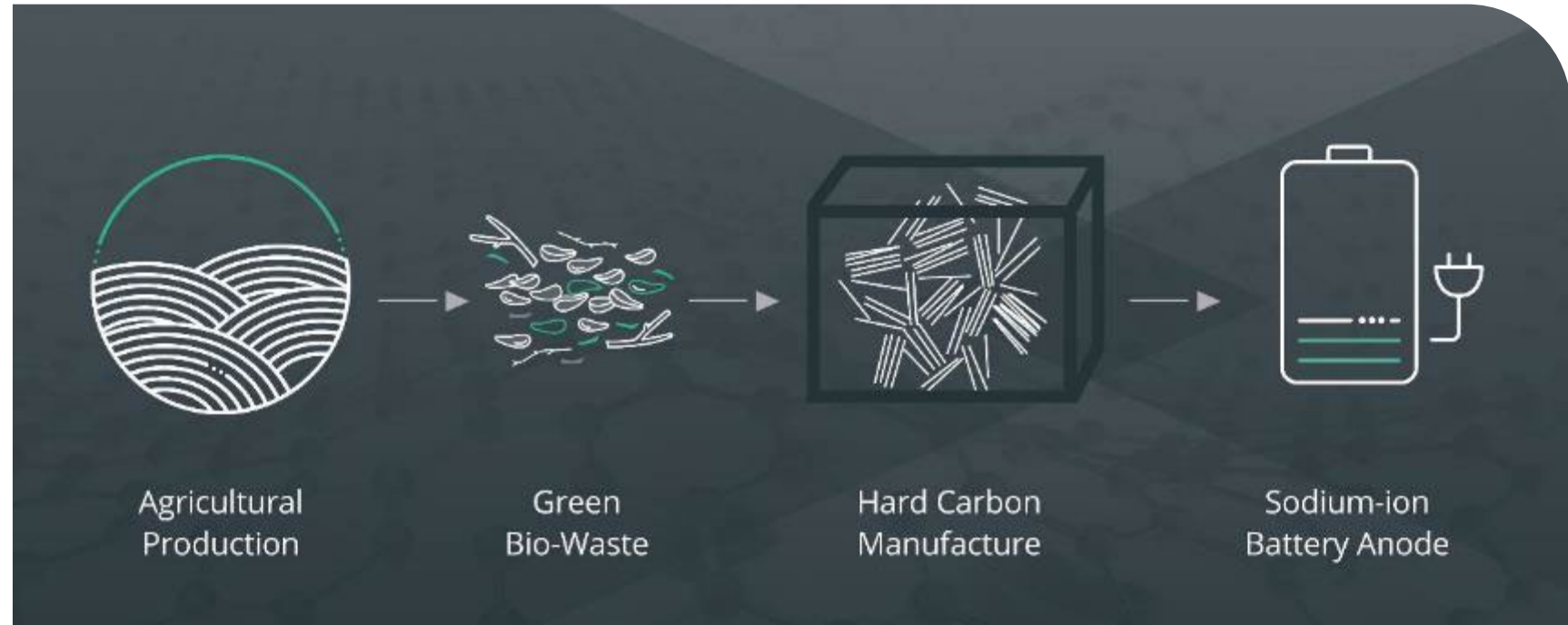
- ▶ Sodium ion batteries (SIBs) are an **alternative battery technology** which work based on the same 'rocking-chair' principle of reversible cation intercalation as lithium-ion batteries
- ▶ The use of low cost, sustainable, abundant materials in sodium-ion batteries is a key advantage over lithium-ion -> sodium is over **1,000 times more abundant than lithium** in the earth's crust
- ▶ According to IDTechEx research, the 2024 market value for SIBs is US\$0.6bn growing to **US\$11.6bn in 2033 (39% CAGR)** driven by rapid uptake in **stationary storage** and **light-duty EV applications**



Source: IDTechEx

Hard Carbon Anode Project

- ▶ Sparc, in collaboration with Queensland University of Technology, is developing a high performing hard carbon anode material for SIBs.
- ▶ Key features of the technology under development include:
 - Low cost, sustainably sourced green bio-waste feedstock.
 - Faster, less energy intensive processing.
- ▶ Development of hard carbon materials for SIBs is analogous to synthetic graphite for lithium-ion batteries.



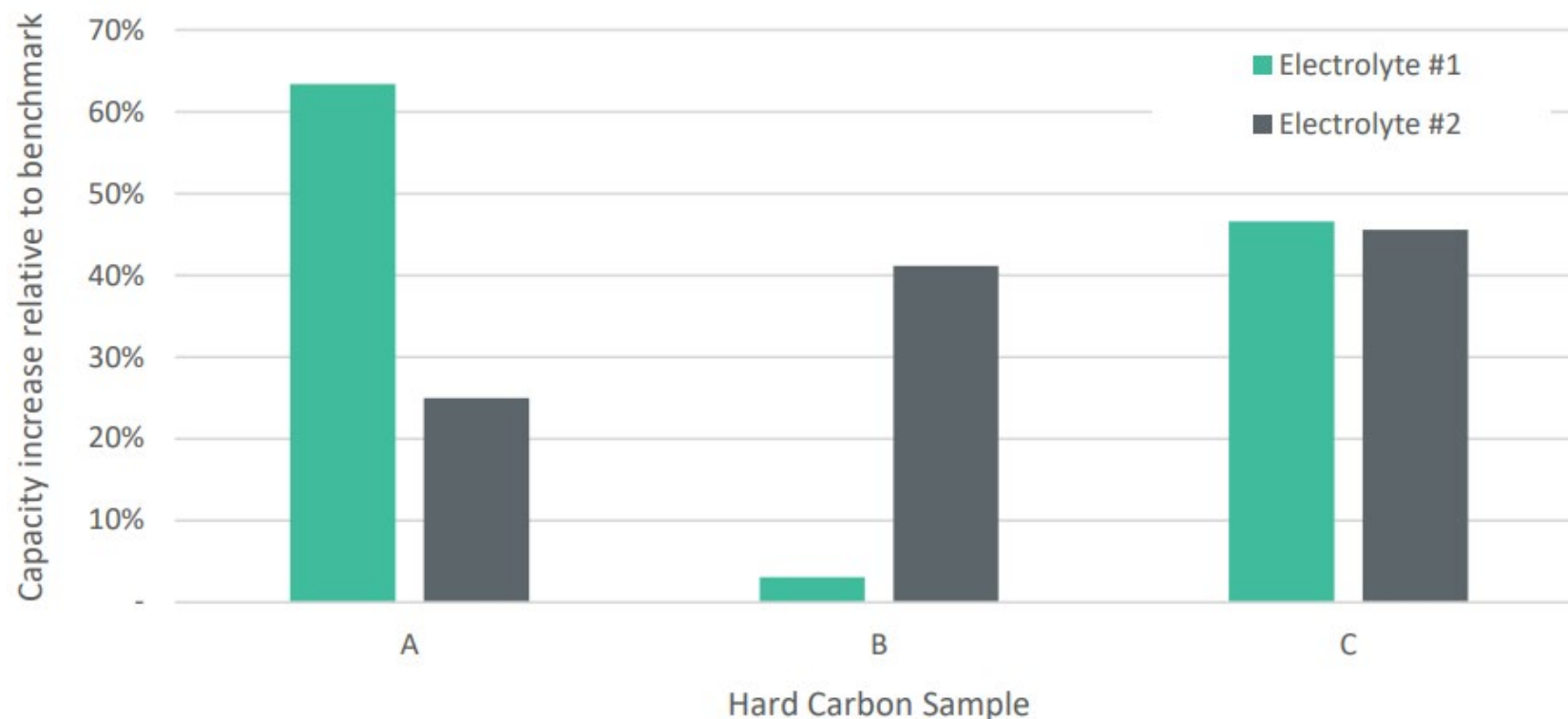
**Lower cost and no
scarcity of raw
materials**

**Safety and
ease of transport**

**Similar
manufacturing
techniques to Li-ion**

Positive Capacity Results Achieved

- ▶ Testing has demonstrated up to **63% improved reversible capacity¹** versus commercially available hard carbon materials.
- ▶ The technology under development has the potential to **reduce the carbon footprint** of SIB anode material whilst improving performance.
- ▶ In Oct-23, Sparc and QUT were awarded **~A\$384k in AEA grant funding** which will be used for full cell testing and scale up.



¹ Refer to Sparc Technologies' announcement on 29 September 2023 for further detailed results.

Momentum Building in Sodium-Ion



"acquires battery tech firm Faradion for GBP100m"

Dec-21



"Invests in Natron Energy's Sodium-Ion Battery Technology"

Nov-22



"BYD to launch electric hatchbacks with new Sodium-ion batteries"

Dec-22



"begins operation of NAS batteries for self-wheeling of renewable energy"

Jan-23



"BYD to build 30GWh sodium battery plant"

Nov-23

Jul-21



"Unveils Its Latest Breakthrough Technology by Releasing Its First Generation of Sodium-ion Batteries"

Oct-22



"Will Mass Produce Sodium-Ion Batteries in 2023"

Dec-22



"United Airlines is investing in sodium-ion battery development"

Feb-23



"Hina Battery becomes 1st battery maker to put sodium-ion batteries in EVs in China"

Nov-23



"State of the art sodium-ion battery with best-in-class energy density of 160Wh/kg"

Contacts



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