Transformational Technologies for Global Industries

October 2023

ASX: SPN

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Corporate Snapshot

85m
Shares on issue

$18m
Market Cap*

$0.21
Share price*

$3m
Cash (30 June 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

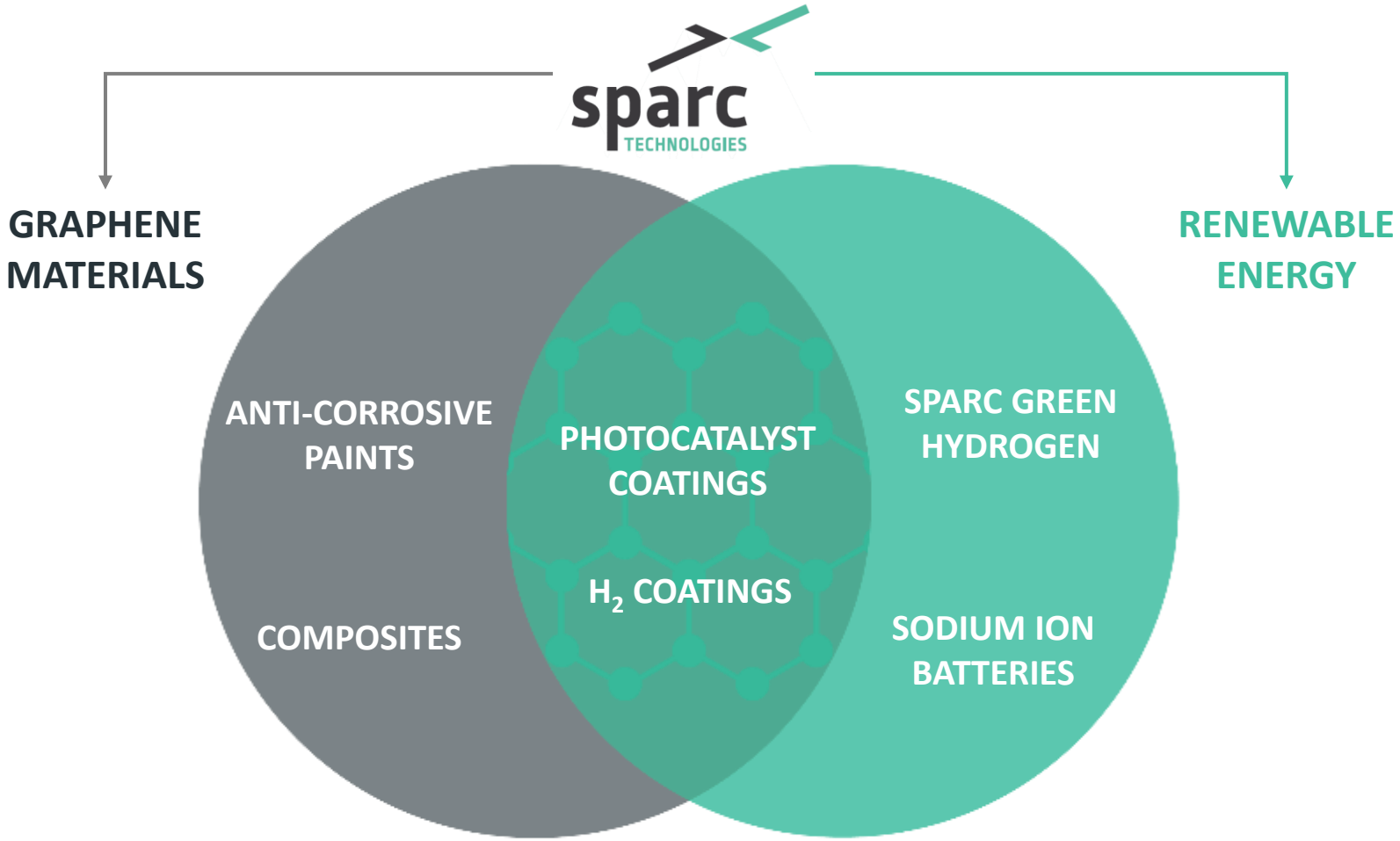
* 28 July 2023

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

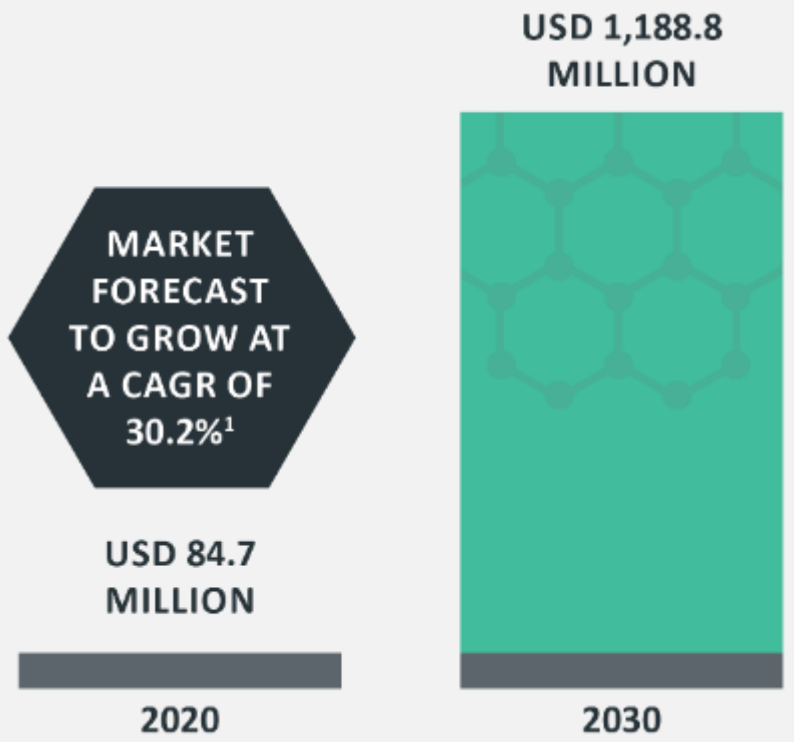
Next Generation Super-material

WHAT IS GRAPHENE?

Graphene is a 2D material made of carbon atoms arranged in a hexagonal lattice which creates unique and powerful properties capable of transforming and disrupting global industries.

PROPERTIES OF GRAPHENE

GRAPHENE MARKET



1 https://www.researchandmarkets.com/reports/5128907

Sparc's Unique Graphene Position

Based in Kent Town, Adelaide

Production of commercially applicable graphene-based materials

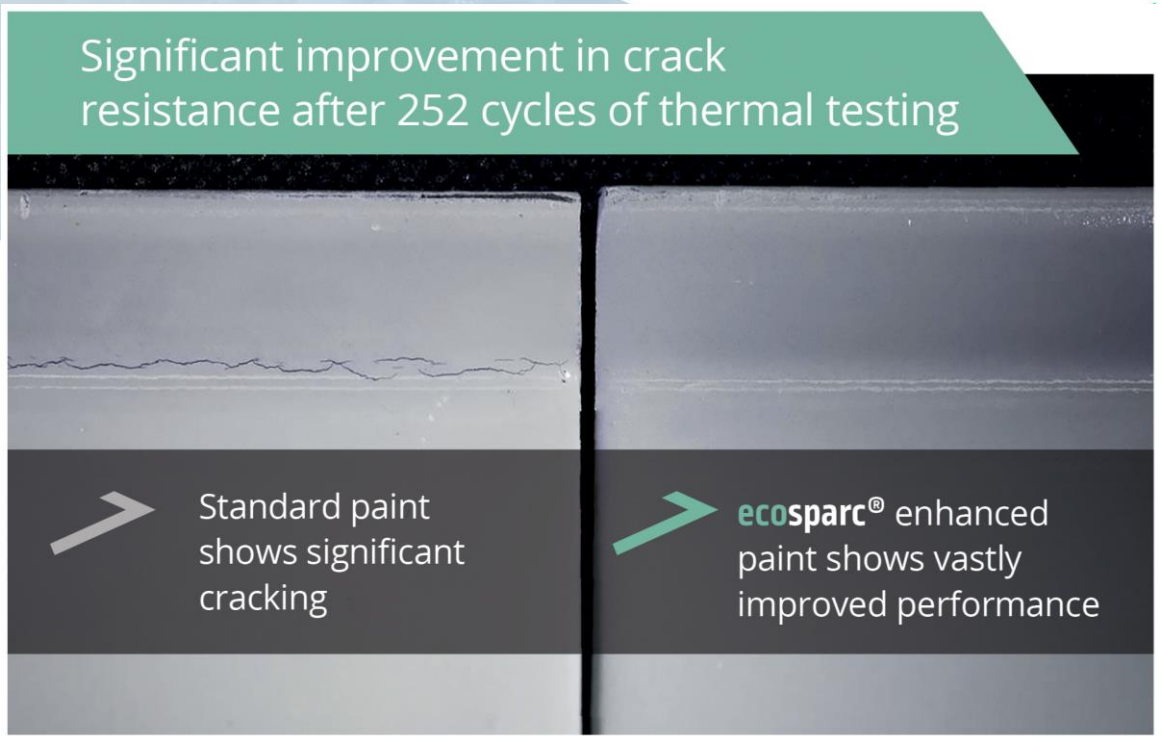
World leading 'Graphene in Coatings' R&D team

Patent application for graphene-based additive filed

The ecosparc® solution

Significant improvement in coating performance across our entire suite of ISO coatings testing

- Significant improvement in crack resistance
- Proven up to **40% improvement in anti-corrosive performance**
- Resulting in an industry leading **high-performance coating**



About ecosparc

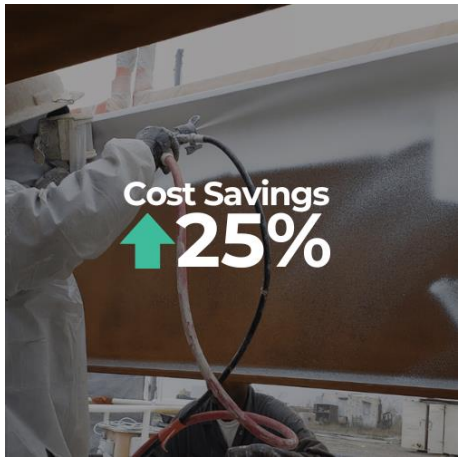
Ecosparc is not a paint. Ecosparc, when added in tiny amounts, supercharges coatings currently used to protect steel assets from corrosion.

The benefits of Ecosparc including cost and emissions savings are the direct result of Ecosparc extending the time between maintenance events by **18-21%.**

18-23%
reduction in carbon emissions

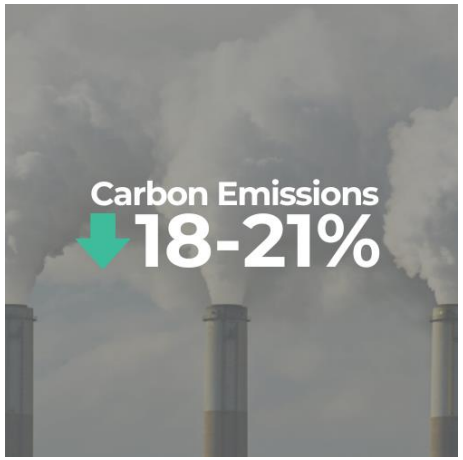
25%+
savings in maintenance costs

Why Choose ecosparc?



Cost Savings

Enhancing conventional coatings with ecosparc results in a minimum saving in re-coatable steel maintenance costs of 25%.



Reduced Carbon Emissions

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

Easier Maintenance

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

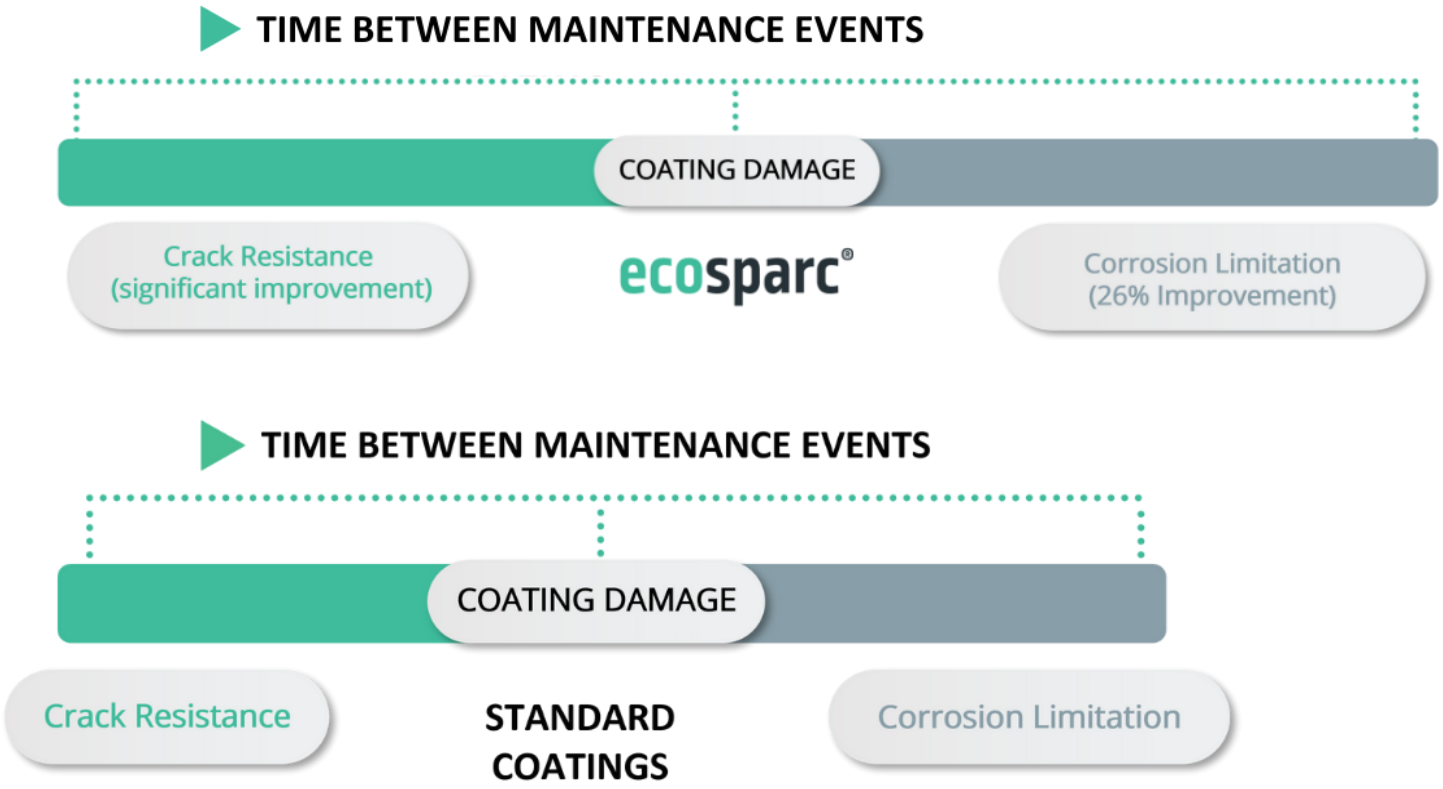
Increased Safety

Enhancing conventional coatings with Ecosparc will help to protect your workforce.

The Dual Anti-Corrosion Mechanism

Ecosparc enhanced coatings:

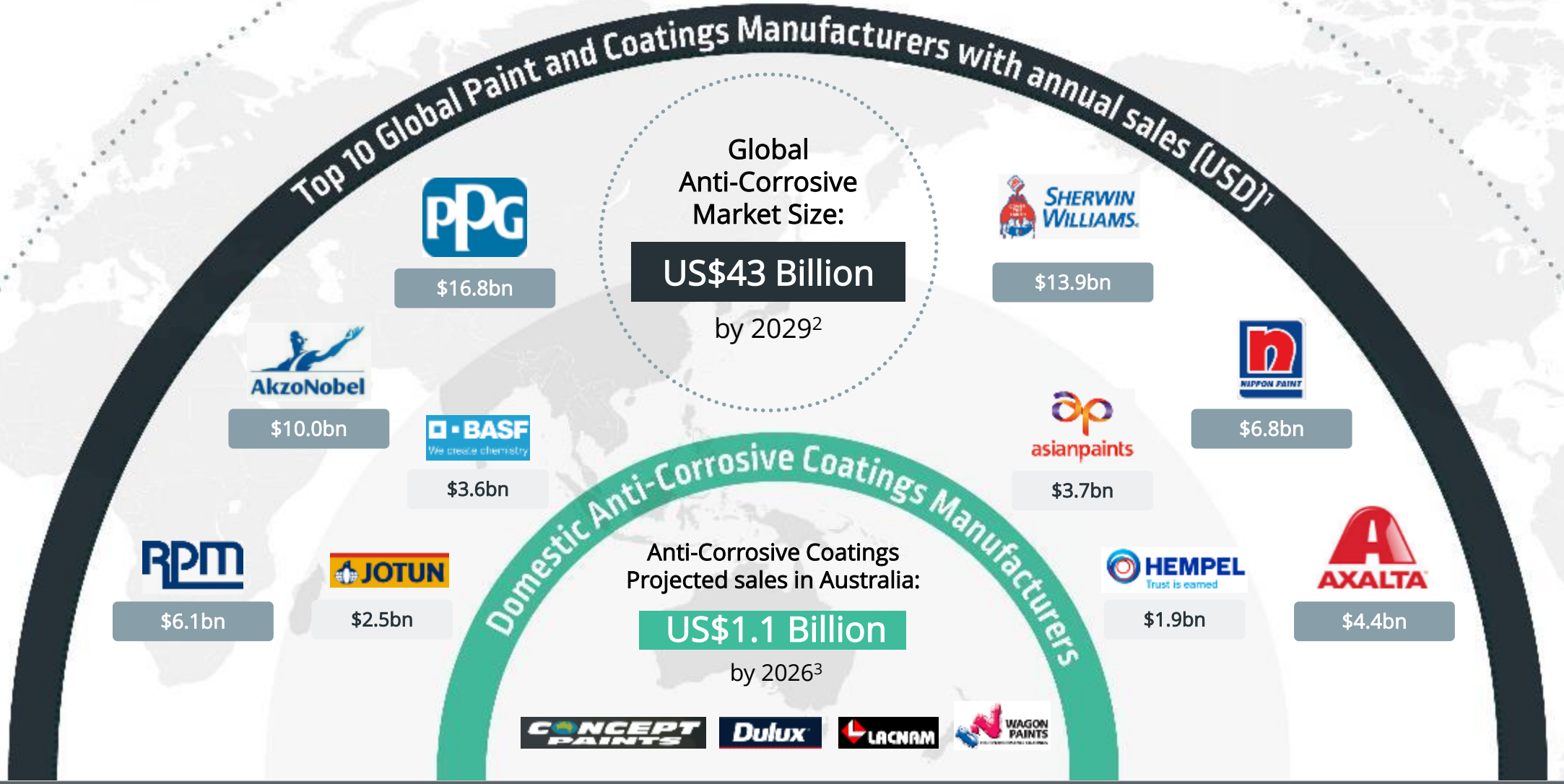
- Delay coating cracking. This delays the onset of corrosion.
- When damage does finally occur ecosparc further limits corrosion spread by a further >25%.



Path to Market – Moving to Commercialisation

- Partnering with asset owners to trial ecosparc on steel infrastructure.
- Ecosparc is currently under trial with several of the world's largest coatings companies.

Significant Addressable Markets



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

Next Generation Green Hydrogen Technology

sparc TECHNOLOGIES

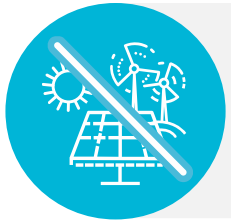
FORTESCUE FUTURE INDUSTRIES

THE UNIVERSITY of ADELAIDE

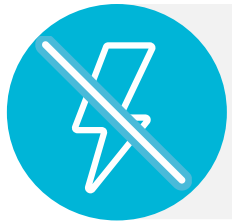
Flinders UNIVERSITY

Technology Highlights

- **Globally disruptive** green hydrogen technology
- **NO ELECTRICITY REQUIRED to split water**
- Opportunity for **scalable deployment and efficient resource use**
- **Prototyping and pilot development** underway
- Targeting a system with **industry leading costs**



No Wind or Solar PV Farms



No Electrolysers

sparc TECHNOLOGIES

FORTESCUE FUTURE INDUSTRIES

THE UNIVERSITY of ADELAIDE

Flinders UNIVERSITY

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	Wind and solar farms with electrolysis	Using SMR with CCS*	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 emissions[2]	✓ 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

* Carbon capture and storage

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

PWS Prototype Testing at CSIRO Energy Centre

- Commencement of testing of Sparc Hydrogen's photocatalytic water splitting reactor at the CSIRO Energy Centre in Newcastle, NSW.
- World leading demonstration of on-sun photocatalytic water splitting under concentrated sunlight.
- Prototype testing will provide valuable information for ongoing R&D and pilot plant design.

Development Pathway

✓ Sparc Hydrogen JV established in Q1 2022

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

Development of **solar reactor prototype** for on-sun testing in **Q3 2023**

Pilot plant development; construction decision due late 2023 / early 2024

Increasing technology and commercial readiness

Best-in-Class Partners

- 52% Sparc Hydrogen shareholder[1]
- JV management and coordination
- Technology commercialisation expertise

- 20% Sparc Hydrogen shareholder[1]
- Global leader in green hydrogen
- Substantial project development experience

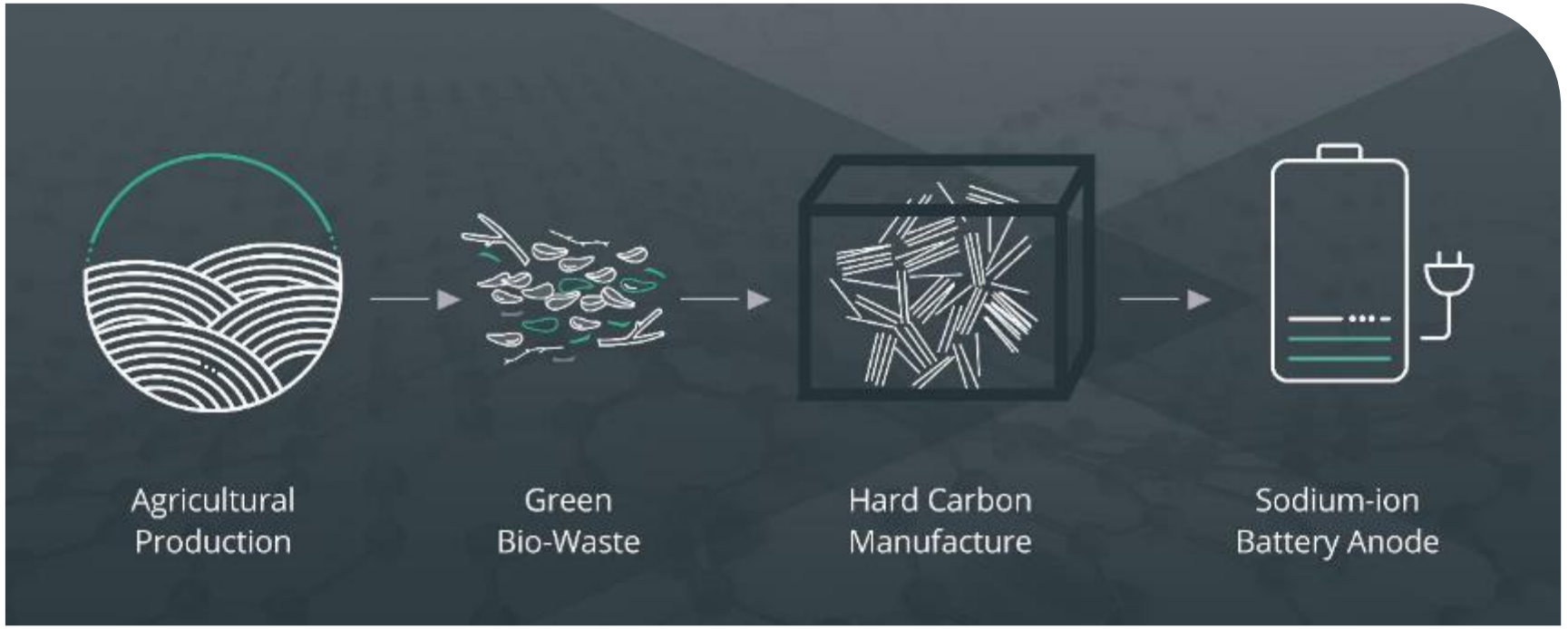
- 28% Sparc Hydrogen shareholder[1]
- Contributor of IP[2]
- Leading R&D work and facilities

1. Stage 1 shareholdings; refer to SPN ASX release 2 February 2022
2. Together with Flinders University

SODIUM ION BATTERIES

Hard Carbon Anode Project

- Sparc, in collaboration with QUT, is developing a hard carbon material using low cost, **sustainably sourced** green bio-waste for the **sodium ion battery** industry. Current HC feed sources which are largely from the petroleum industry.
- Production process significantly reduces processing time and energy use compared to existing methods
- Sodium ion batteries have been identified by Sparc as an attractive future battery technology competitor to LIB with advantages in grid, industrial scale and emerging EVs.



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

Safety and ease of transport

Similar manufacturing techniques to Li-ion

Sodium-Ion Battery Advantages

- Increasing interest in US, EU and Asia in developing sodium-ion battery technology as an alternative to lithium-ion
- The use of lower cost, sustainable, abundant materials in sodium-ion batteries is a key advantage
- Commercialisation is expected in 2023 from large battery producers including CATL, BYD, Reliance Industries and HiNa
- Sparc's exposure to sodium-ion batteries is a differentiator in the Australian market

Parameters	Lead Acid	Lithium ion	Sodium ion
Materials Cost	Low	High	Low ✓
Energy Density	Low	High	Moderate/High
Safety	Moderate	Low	High ✓
Materials Availability	Toxic	Scarce / Critical Minerals	Earth-abundant ✓
Stability	Moderate (high self-discharge)	High (negligible self-discharge)	High (negligible self-discharge) ✓
Round Trip Energy Efficiency	Low (< 75%)	High (> 90%)	High (> 90%) ✓
Temperature Range	-40 ^{0}C to 60 ^{0}C	-25 ^{0}C to 40 ^{0}C	-40 ^{0}C to 60 ^{0}C ✓
Remarks	Mature technology; fast charging not possible	Transportation restrictions; critical materials	Less mature but developing as an alternative to Li-ion

Source: adapted from www.evreporter.com

Positive results for sodium-ion battery materials project

- Additional testing benchmarked against commercial hard carbon materials completed showing **up to 63%** improvement in reversible capacities.
- Reproducibility across alternative bio-waste feedstock sources demonstrated.
- Acceleration of R&D planned and techno-economic analysis underway.

Momentum Building in Sodium-Ion

Reliance Industries Limited

"acquires battery tech firm Faradion for GBP100m"

Dec-21

MERCURIA

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

Nov-22

BYD

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

Dec-22

NGK

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

Jan-23

Jul-21

CATL

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

Oct-22

CATL

"Will Mass Produce Sodium-Ion Batteries in 2023"

Dec-22

UNITED AIRLINES

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

Feb-23

大众安徽 VOLKSWAGEN ANHUI

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

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Released with the authority of the Board – 1 August 2023