



# Transformational Technologies for Global Industries

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August 2023

ASX: SPN

TechKnow   
INVEST ROADSHOW

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# SPARC TECHNOLOGIES

**Sparc is pioneering new technologies** to disrupt and transform industry whilst delivering a more **sustainable** world

1

World leading global team and partners including Fortescue Future Industries

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2

Seeking to reshape multi-billion dollar global markets by employing exclusive IP\*

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3

Target markets are driven by sustainability and environmental outcomes

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\* Cautionary Note: Access to markets is subject to the Company being able to successfully develop and commercialise its 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 Snapshot



**85m**

Shares on issue

**\$23m**

Market Cap\*

**\$0.27**

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



**Stephanie Moroz**  
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

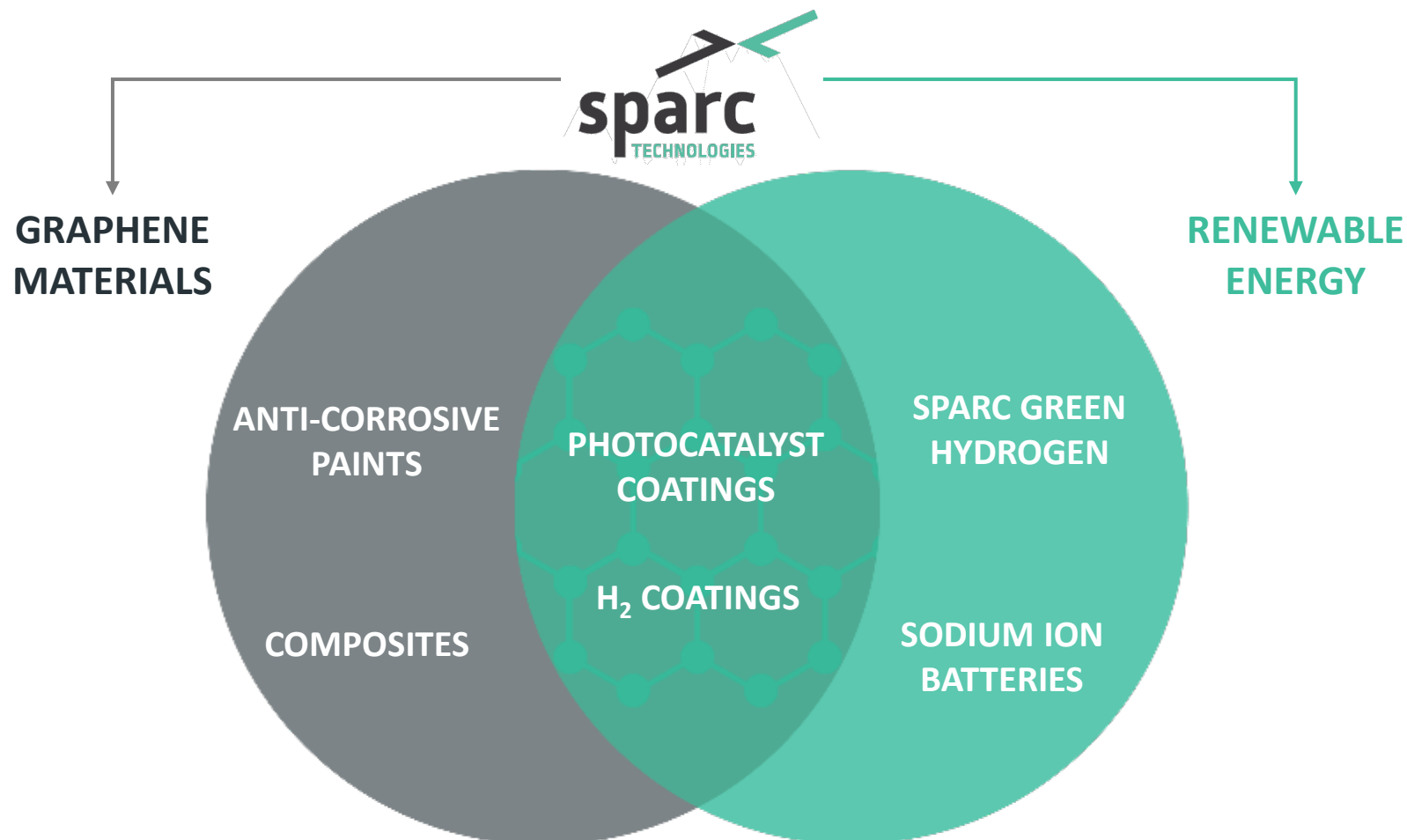
# Technology Portfolio

- ▶ 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



# Sparc's Target Markets



## Graphene Materials



### COATINGS (PAINT)

- ▶ **Marine & Protective Coatings:** Graphene enhanced coatings suitable for steel infrastructure in corrosive environments including offshore, coastal and above-water
- ▶ **Antifouling:** Graphene enhanced environmentally friendly coatings for underwater applications i.e. large ship hulls



### COMPOSITES

- ▶ Graphene enhanced **carbon fibre** and **polymer composites** with a multitude of applications
- ▶ Graphene is demonstrated to improve strength, flexibility, elasticity and/or conductivity

## Renewable Energy



### HYDROGEN

- ▶ **52% shareholder in Sparc Hydrogen**, a joint venture with Fortescue Future Industries and the University of Adelaide
- ▶ Next generation green hydrogen technology using only sunlight, water and a photocatalyst
- ▶ Process does not use electricity to split water



### BATTERIES

- ▶ **Sustainable Hard Carbon Anode Project** with Queensland University of Technology
- ▶ High performing, low cost, sustainable anode material for next generation sodium ion batteries (SIBs)
- ▶ Significant potential to replace Li-ion batteries in certain applications

# GRAPHENE

Unique Approach to  
a Next Generation  
Super-material

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# Next Generation Super-material

## WHAT IS GRAPHENE?

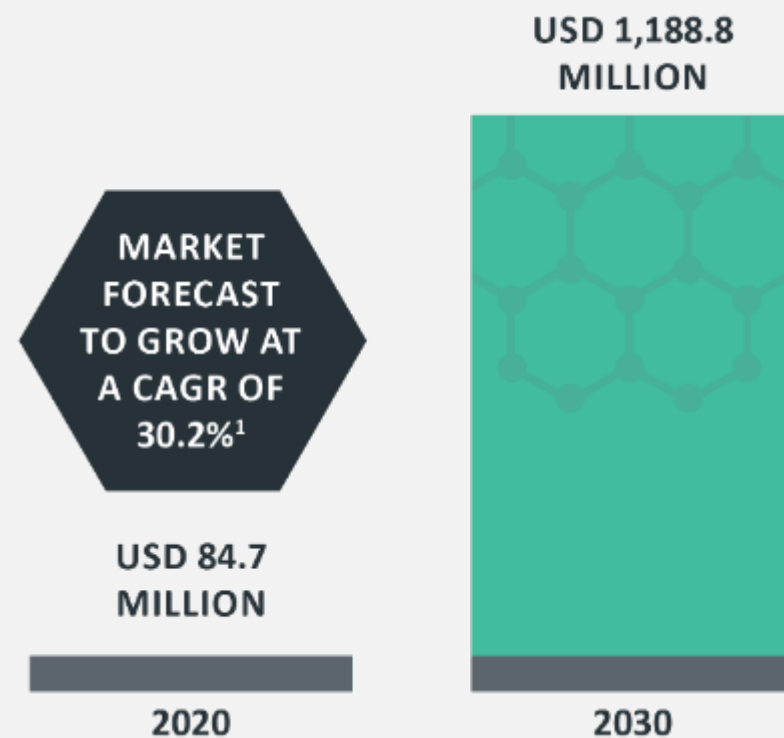
Graphene is a 2D material made of carbon atoms arranged in a hexagonal lattice which creates unique and powerful properties capable of transforming and disrupting global industries.



## PROPERTIES OF GRAPHENE



## GRAPHENE MARKET





# Sparc's Unique Graphene Position



**Production** of commercially applicable graphene based materials



Established expertise in **graphene**



Comprehensive in-house testing delivering **industry recognised data**



Know-how that supports safe handling and **commercial manufacture**



Ongoing product testing supporting **commercial adoption by global customers**



**Patent application** for graphene based additive filed

# Market Ready Product

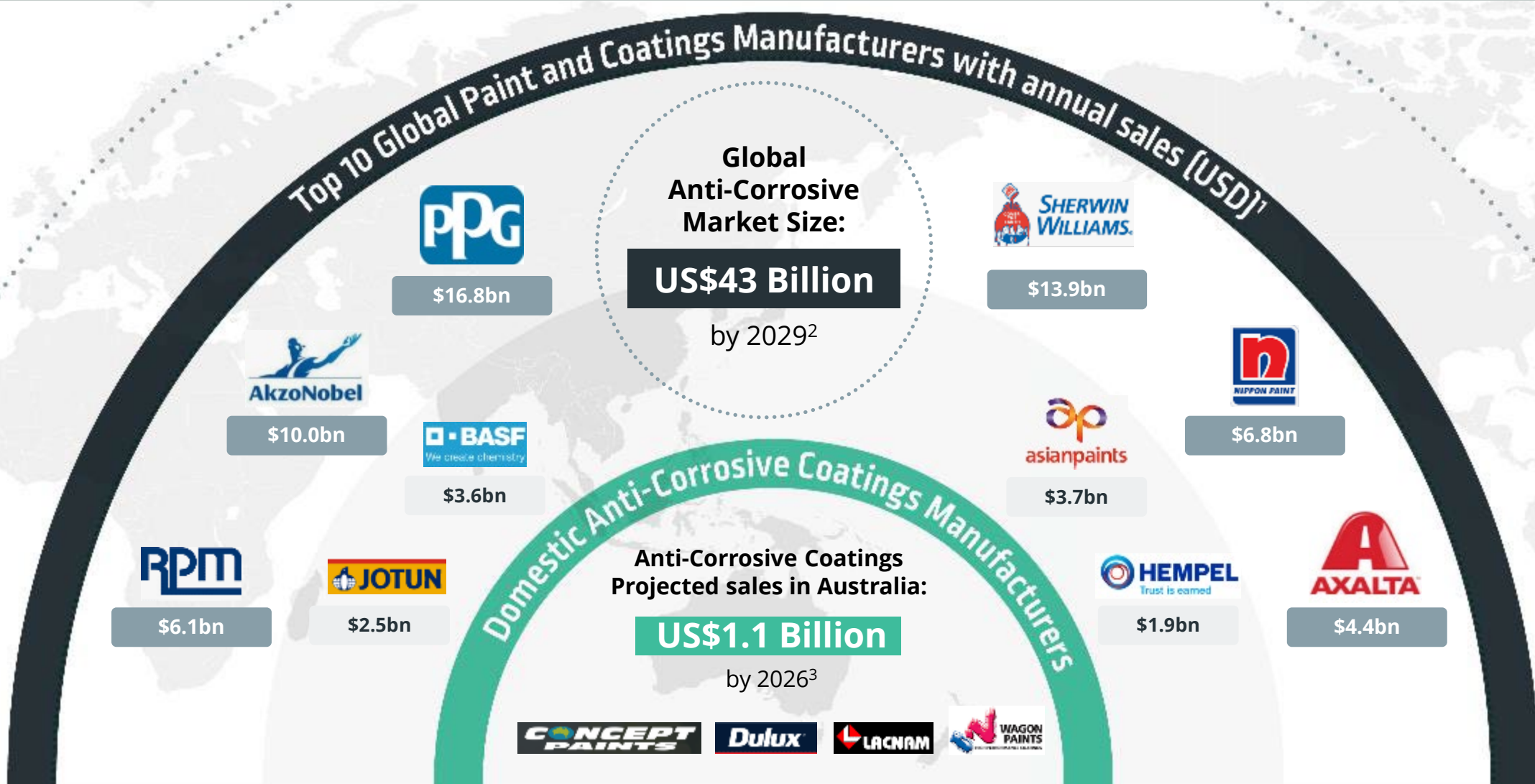


Sparc has developed **ecosparc®**, a *graphene based additive* for targeted applications within **anticorrosive paints** and **composites**

## ecosparc®

- ▶ **Commercial production** facility commissioned in March 2023
- ▶ Extensive product testing to **ISO standards**
- ▶ **Drop-in** product into existing manufacturing processes
- ▶ Proven up to **40% improvement in anti-corrosive performance** leading to:
  - Extending life to first maintenance
  - Lower paint and maintenance costs for asset owners
  - Reduced carbon footprint
- ▶ Significant testing, engagement and validation with **target customers**

# 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>

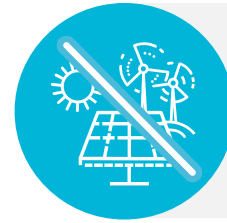
# SPARC GREEN HYDROGEN

## Next Generation Green Hydrogen Technology



# 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 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<sup>1</sup>)*

	Sparc Green H <sub>2</sub>	Green H <sub>2</sub>	Blue H <sub>2</sub>	Grey H <sub>2</sub>
<b>Description</b>	Photocatalysis	Wind and solar farms with electrolysis	Using SMR with CCS*	Steam methane reforming
<b>Feedstock</b>	✓ Water	✓ Water	✗ Natural gas, Water	✗ Natural gas, Water
<b>By-product</b>	✓ Oxygen	✓ Oxygen	• Emissions sequestered	✗ CO <sub>2</sub> , NO <sub>x</sub> , SO <sub>x</sub> , PM
<b>Scope 1 &amp; 2 emissions<sup>2</sup></b>	✓ Nil	✓ Nil	✗ 0.76kg CO <sub>2</sub> / 1kg H <sub>2</sub>	✗ 8.5kg CO <sub>2</sub> / 1kg H <sub>2</sub>
<b>Location</b>	✓ Solar resource	✗ Solar +/- wind & HV infrastructure	✗ Natural gas source and suitable storage	✗ Natural gas source
<b>Requisite scale</b>	✓ Scalable	✗ Very large	✗ Very large	✗ Large

\* Carbon capture and storage

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

<sup>2</sup> Sourced from Commonwealth of Australia, 'Australia's National Hydrogen Strategy', 2019

# 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<sup>1</sup>
- ▶ JV management and coordination
- ▶ Technology commercialisation expertise



- ▶ 20% Sparc Hydrogen shareholder<sup>1</sup>
- ▶ Global leader in green hydrogen
- ▶ Substantial project development experience



- ▶ 28% Sparc Hydrogen shareholder<sup>1</sup>
- ▶ Contributor of IP<sup>2</sup>
- ▶ Leading R&D work and facilities



# Sparc Green Hydrogen



**Disruptive**  
green  
hydrogen  
technology



**World leading**  
**partners**  
in green  
hydrogen



**More flexible**  
and scalable  
with less  
infrastructure



**Targeting**  
industry leading  
low cost of H<sub>2</sub>  
production

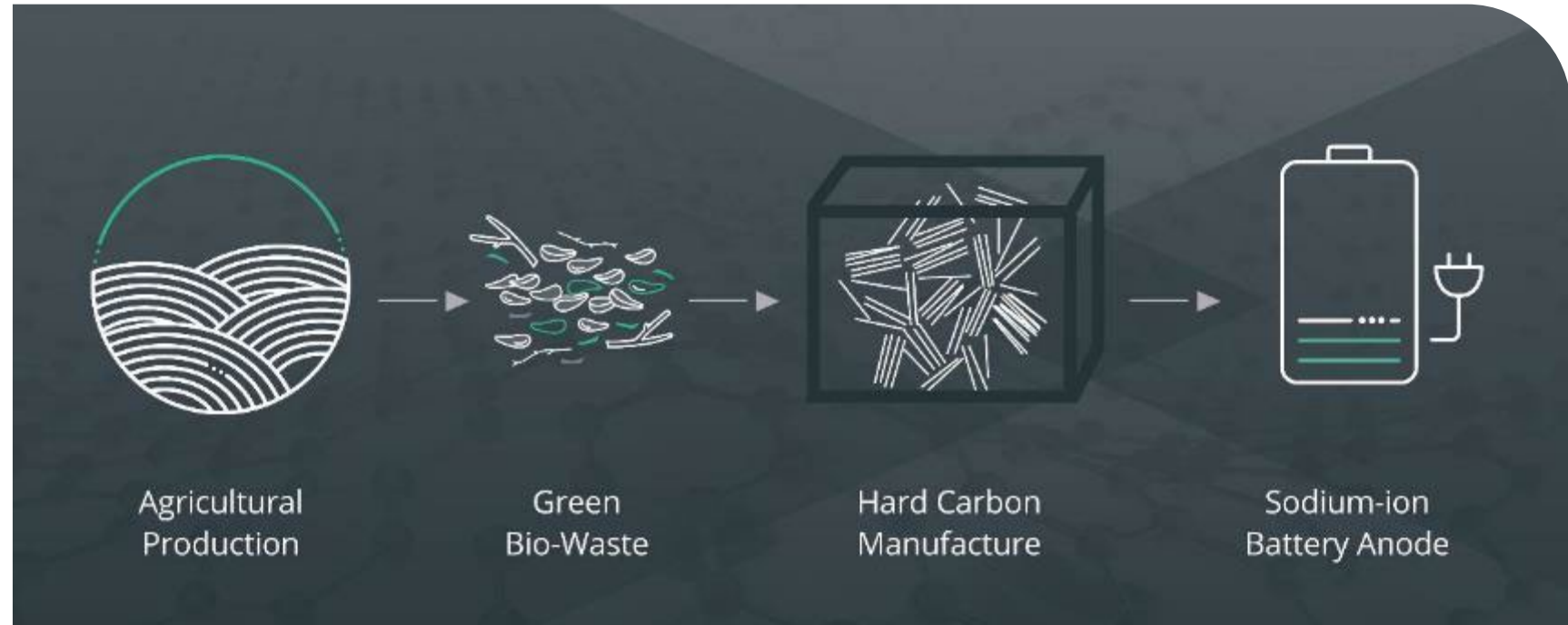
# SODIUM ION BATTERIES

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# Sustainable 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
- ▶ 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 with advantages in grid and industrial scale applications



**Lower cost and  
greater availability  
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
<b>Materials Cost</b>	Low	High	Low ✓
<b>Energy Density</b>	Low	High	Moderate/High
<b>Safety</b>	Moderate	Low	High ✓
<b>Materials Availability</b>	Toxic	Scarce / Critical Minerals	Earth-abundant ✓
<b>Stability</b>	Moderate (high self-discharge)	High (negligible self-discharge)	High (negligible self-discharge) ✓
<b>Round Trip Energy Efficiency</b>	Low (< 75%)	High (> 90%)	High (> 90%) ✓
<b>Temperature Range</b>	-40 °C to 60 °C	-25 °C to 40 °C	-40 °C to 60 °C ✓
<b>Remarks</b>	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](http://www.evreporter.com)

# 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 to launch electric hatchbacks with new Sodium-ion batteries"***

Dec-22



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

Jan-23



Jul-21

Oct-22

Dec-22

Feb-23

**CATL**

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

**CATL**

***"Will Mass Produce Sodium-Ion Batteries in 2023"***



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

**大众安徽**  
VOLKSWAGEN ANHUI

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

# Contacts



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