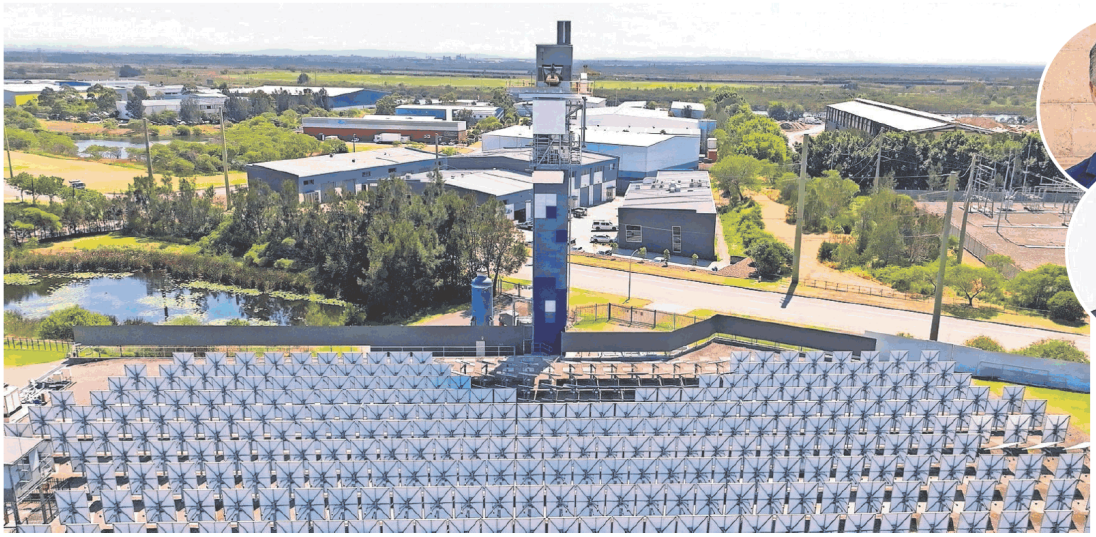
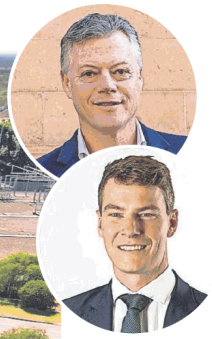
ADVERTISING FEATURE

Sustainable energy projects





Sparc Technologies chairman Stephen Hunt (top) and general manager for renewable energy Nick O'Loughlin. The Sparc Hydrogen JV is demonstrating photocatalytic water splitting at the CSIRO's concentrated solar field in Newcastle.

Breaking new ground in green hydrogen

With ample resources of sun and wind as well as open spaces, Australia is in an enviable position to lead the green hydrogen energy revolution.

According to the federal government's 2022 *State of Hydrogen* report, Australia has a slate of announced hydrogen investments worth between $230 billion and $300 billion – accounting for 40 per cent of the world's clean-energy projects.

The trouble is, the economics of producing green hydrogen by using electricity to split water don't yet stack up, and the cost of the requisite renewable energy inputs and electrolysers needs to be reduced significantly.

This challenge is not lost on ASX-listed Sparc Technologies, which is honing a ground-breaking method for producing green hydrogen without using electricity to split water.

The method, photocatalytic water splitting (PWS), has been known about for more than 50 years but has not yet been commercialised as a technique for producing green hydrogen at scale.

"There's a huge interest in green hydrogen," says Sparc chairman Stephen Hunt.

"But many pundits are questioning the economic viability of conventional green hydrogen using electricity derived from wind and solar to power an electrolyser."

Tapping the sun's radiation and thermal properties, PWS uses an engineered photocatalyst material to convert water into hydrogen directly.

"PWS eliminates the need for an electrolyser – an expensive component – and the need to produce green electricity as an intermediate step to producing hydrogen," Hunt says.

The PWS project sits under the auspices of the Sparc Hydrogen joint venture, consisting of Sparc Technologies (52 per cent), the University of Adelaide (28 per cent) and Fortescue Future Industries (20 per cent).

The JV is currently undertaking a world-leading demonstration of the tech at the CSIRO's concentrated solar field in Newcastle, where a prototype reactor has been mounted on a solar tower for testing.

Nick O'Loughlin, Sparc's general manager for renewable energy, says the prototype marks the first time that a photocatalytic water splitting reactor has been tested in a concentrated solar field, which uses mirrors to focus the sun's rays to a central point.

"We commenced testing in mid-September and have generated some good data which will feed into reactor development," he says.

Should the results continue to be positive, the JV will move to setting up a pilot plant at a site in the Adelaide region.

"The pilot plant will be the first demonstration of the full system: the chosen mirror field, PWS reactor and the balance of plant," O'Loughlin says. "Aside from being a key step in de-risking and scaling our reactor technology, we see the pilot plant as being a calling-card for the nascent PWS industry."

"Better photocatalysts for PWS are being developed all the time and we want to be the go-to reactor for testing."

The JV plans an investment decision in the first half of 2024, with a view to commencing operations about six months later.

> "Everything we do revolves around sustainability and striving to develop technologies which benefit the environment by lowering carbon emissions."
> Stephen Hunt

In addition, Sparc is also working on improving sodium-ion batteries, which are gaining the attention of the market as a viable alternative to lithium-ion batteries.

As well as avoiding the need for increasingly expensive and scarce lithium, sodium-ion batteries don't pose the risk of catching on fire and are forecast to be much cheaper when produced at scale.

Hunt says sodium-ion batteries have enormous potential to displace lithium in stationary power applications such as South Australia's Hornsdale Power Reserve, the world's first "big battery".

They are also gaining attention in electric vehicles (EVs), with the world's biggest lithium-ion battery maker, China's CATL, planning to launch a sodium-ion battery for use in low-range EVs.

If sodium-ion batteries were the perfect alternative, car makers would be using them extensively already. Their key drawback currently is that they produce less energy per kilogram, which ultimately leads to a shorter driving range.

Sparc is seeking to help overcome this problem by perfecting a high-performance hard-carbon anode for sodium-ion batteries. Hard carbon is normally produced synthetically with petroleum-based feedstocks, but in Sparc's case is derived from agricultural biowaste.

For more than a year, Sparc has been carrying out lab testing with Queensland University of Technology. The "very encouraging" results so far show the material is able to hold up to 63 per cent more charge than a commercial hard carbon benchmark.

Sparc's third – and most commercially advanced – technology is a graphene additive product, ecosparc, for anticorrosive coatings and composite materials.

Testing in coatings has shown that ecosparc can increase the time between maintenance of steel structures, reducing costs and carbon emissions by around 20 per cent over the life of these assets. Ecosparc is being produced in commercial quantities and should generate early revenue for Sparc.

Hunt says Sparc has a unique basket of technologies which should be attractive to investors, especially given the company's subdued $18 million market capitalisation.

"There is a lot of synergy around what we are doing, even though at first glance it might not appear so," he says. "Everything we do revolves around sustainability and striving to develop technologies which benefit the environment by lowering carbon emissions."