

THE CREATIVE SPARC

inspire...innovate...ignite...



AFR BUSINESS SUMMIT 2023

Two short weeks ago, the Harrison Group attended the AFR Business Summit. This year's theme for the summit was 'Crunch Time for Prosperity', which couldn't be anymore appropriate. Given the ongoing war in Ukraine, the slowing (but still prevalent) COVID-19 pandemic and rising global interest rates (and recession fears), this is a very turbulent time. Given these events, and that this is a *business summit*, you'd be right to think that some of the major topics would relate to say increased productivity, improving the Australian manufacturing sector, or finding ways to ensure reliable raw material supply chains. All of these were touched on, but so too was climate change and Australia's potential response to a growing global renewables sector.

Regardless of the speaker or panel members, the drive to renewable, green energy and its impacts on business and trade were a major topic. With the Australian economy so dependent on the mining sector, the move away from fossil fuels in the coming years and decades is a cause of concern. But, innovation can and should drive us into new fertile

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**AFR BUSINESS SUMMIT
2023**

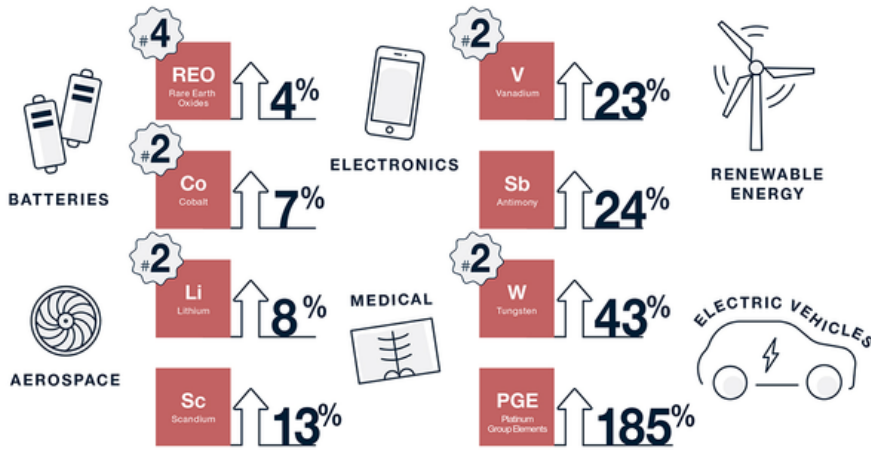
**DRILLING FOR
HYDROGEN??**

QUOTE AND FUN FACT

business ventures. As battery storage systems and EVs grow in use and demand, the critical minerals needed to support these industries will also grow. Australia is uniquely positioned for this, as we have such a large amount of these minerals, especially lithium, throughout the country.

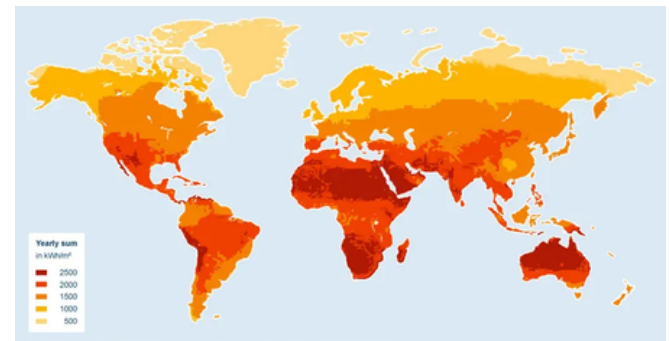
Australian critical minerals 2020

Critical minerals are essential for modern technology and clean energy transition. Australia's economic resources increased for many critical minerals in 2020; world rankings remain strong.



Along with the critical minerals and mining sector, the growing focus on the green hydrogen economy was also a hot topic at the summit. And while this discussion was due in part to Andrew Forrest's Q&A talk during the summit, the sentiments were also echoed by the OECD Secretary General, Mathias Cormann. Green hydrogen production probably won't be useful for battery storage or fuel cell vehicles - but it will have a place in steel production, firming energy supply, potentially diesel replacement and agriculture spaces. Regardless of end use, when European countries are signing contracts for green and blue hydrogen supplies, the market demand is there and growing.

Along with the science and technology of the renewable energy sector, the other hot topic was the Inflation Reduction Act in the US and its implications for climate and energy. The IRA is the single largest investment by the US government into clean energy and climate. It is setting the US up to be a world superpower in renewable energy technology, and far and away eclipses the National Reconstruction Fund, still to pass Parliament. And while much of the discussion regarding the



IRA and its implications centred around the investment dollars that the US is offering to entice renewable manufacturing there, it doesn't negate the development of the technology and IP here in Australia. The abundance of wind and solar here far exceeds the US, and that abundance could be used to generate green hydrogen to export to countries overseas. Along with exporting Australian energy supplies, expanding and improving on existing battery technology would allow for rapid electrification of the country and reducing the need for firming energy resources such as natural gas. In either event, the inherent natural resources of Australia, if properly developed through innovation and technological advances, can lead to another prosperity boom for the country.

DRILLING GREEN HYDROGEN??

When you think of green hydrogen, it tends to be using renewable energy to electrolyse water into hydrogen and oxygen. When you think of drilling and mining, it tends to be for fossil fuels - coal, oil and natural gas. BUT what if you could *drill* for naturally occurring hydrogen? That's what was found nearly a decade ago in Mali. A well of nearly 98% pure hydrogen. A constantly renewing

source based on iron reactions with water in deep deposits under extreme pressure and temperature. The potential to *drill* for hydrogen could make the economics of the process even more appealing, bringing it within sight of the USD\$1/kg moonshot. With potential deposits in Australia, it further strengthens our capabilities as a renewables superpower.

HOW SPARC IS CONTRIBUTING TO RENEWABLES

At SPARC, we're investigating the enabling technologies to improve the uptake and effectiveness of renewable energies. Lithium-ion, lithium-sulfur, lithium-air, zinc flow batteries, and the list is even longer - everyone of these technologies is vying for dominance in the move away from fossil fuels. But they all have commonalities, dependence on the mining industry and its carbon footprint to supply the raw materials for them. This is one aspect which SPARC is investigating - how to improve the efficiency of the critical mineral supply chain without increasing energy input and carbon footprint output of the process. It's a vital aspect, and one which we hope to successfully capitalise on during the current Australian government's Critical Minerals Development Program grant funding round.

This is just one aspect to the renewable energy sector that we're currently researching. We're also looking into various chemistries to reduce or eliminate dendrite formation in battery storage systems - a major mode of battery short-circuiting and combustion. The hydrogen economy also requires research and development as well. Not only for the various catalysts required for water electrolyzers and ammonia production, but also to address hydrogen embrittlement in storage and piping systems. Many government and industry models rely on existing petrochemical infrastructure to do the heavy lifting in the hydrogen transport discussions, however these materials are incompatible with hydrogen. Stress cracks and fatigues lead to hydride formations and ruptures resulting in hydrogen leakage. It's these aspects which SPARC can contribute - the further enablement of the emerging technologies necessary to combat the major global issues affecting us now, as well as developing the emerging technologies directly.

To see more of the crazy ideas we have in development, or work with us on crazy ideas of your own, reach out to us at sparc@harrison.com.au or our [website](#).



QUOTE & FUN FACT

We would like to welcome Sam Baylis-Jones to SPARC (shown in the video above). He's joining us as an intern from the University of New South Wales where he's in the midst of his chemical engineering degree. Sam has previously completed his bachelor of science immunology from the University of Sydney. Sam joins us as the first university intern for our system, one which we hope to continue and build on more in the future as a means

of developing and strengthening our research collaboration ties with universities and the community. Welcome to the team, Sam!!

"If we knew what it was we were doing, it would not be called research, would it?"
- Albert Einstein, German physicist and Nobel laureate