Overview of the Scaling Green Hydrogen CRC Bid

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Australia is an energy powerhouse

Table 3.1: Australian energy production, by fuel type

| | 2019–20 | | Average annual growth | |
|-------------|----------|------------|-----------------------|------------|
| | | share | 2019–20 | 10 years |
| | PJ | (per cent) | (per cent) | (per cent) |
| Black coal | 12,316.8 | 61.4 | -2.2 | 3.2 |
| Brown coal | 425.4 | 2.1 | -4.3 | -5.9 |
| Natural gas | 5,944.9 | 29.6 | 7.9 | 11.3 |
| Oil and NGL | 798.4 | 4.0 | 18.0 | -1.9 |
| LPG | 151.0 | 0.8 | 47.8 | 5.9 |
| Renewables | 418.8 | 2.1 | 4.6 | 4.0 |
| Total | 20,055.3 | 100.0 | 1.7 | 4.4 |

We also import about 2,500 petajoules per annum

Source: Department of Industry, Science, Energy and Resources (2021) Australian Energy

Statistics, Table J

Solar PV and wind energy are the lowest cost electricity



Cheap renewables will drive: ✤ Decarbonisation of our grid ✤ Mass electrification Green hydrogen and derivatives

ES Figure 0-1 Calculated LCOE by technology and category for 2030

GenCost 2020-21 Final Report, CSIRO

Australia's emissions



Not all of Australia's emissions can be eliminated by direct electrification

* LULUCF refers to land use, land use change and forestry emissions Source: Adapted from Australian Government, 2019.

A lot underway but how big could the opportunity get?



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Transitioning Australia's energy sector

- ✤ 20,000 PJ = 5,500 TWh
- 5500 TWh would require about 11 billion solar panels
- Australia receives 58 million PJ of solar radiation per annum





Our challenge is scale not capacity

What is a Cooperative Research Centre?

CRC grants provide funding for collaborations to solve industry identified problems. CRCs must:

- \odot be a medium to long-term industry-led collaborative research program
- aim to solve industry identified problems and improve the competitiveness, productivity and sustainability of Australian industries
- ⊙ include an industry-focused education and training program, including a PhD program that builds capability and capacity
- ⊙ increase Research and Development (R&D) capacity in Small to Medium Enterprises (SMEs)
- \odot encourage industry take up of research

There is no specified limit to funding for each CRC. However, the number of CRCs funded in each selection round depends on the applications received and available funding.

Applicants must at least match the amount of grant funding sought through cash and/or in-kind contributions.

Rationale for Scaling Green Hydrogen



- Mass electrification is underway but not everything will be able to be directly electrified, particularly chemicals; long-distance heavy transport; energy exports; and steel.
- Green hydrogen and derivatives will be critical as chemical carriers of green electrons.
- Green hydrogen production will lead to a massive increase in renewable electricity demand.
- \odot Existing domestic electricity and water systems are not ready for this scale-up.
- We will need a sovereign manufacturing and service capability to both realise our domestic and export production potential and create a global HETS (Hydrogen Equipment, Technology & Services) sector in its own right.
- There is no clear pathway for moving from O+ TW to 1 TW of installed electrolyser H capacity.

Research Themes

1. Scaling Green Hydrogen Production

2. Water for Scaling Green Hydrogen

3. Scaling Green Hydrogen to Chemicals

4. Scaling Green Hydrogen for Mobility







Hydrogen Hydrogen



Workforce Skills and Education Program

The dedicated workforce skills and education program will deliver:

- Green Hydrogen Fellows initiative
- \odot Industry training program through TAFEs and VETs
- Higher Degree by Research (HDR) for PhDs and Masters by Research.
- Masters by Coursework programs for mid-career professional development
- Modules in undergraduate programs
- Micro-credential programs
- \odot Customised community education programs
- \odot Talent attraction to the green hydrogen sector



SME and Industry Commercialisation Program

- The CRC will have a commercialisation focus to build Australia's hydrogenrelated manufacturing and services supply chain. We will look to partner with regional hydrogen clusters and hubs to facilitate the growth in capability and capacity of Australia's SMEs and emerging entrepreneurs. Initiatives may include:
 - Webinars and other events to increase the profile and engagement of local spin-outs, start-ups and SMEs within the green hydrogen and related sectors
 - Connections to existing enterprise support programs for technology enterprises in the green hydrogen sector
 - \odot Promotion of opportunities to provide early commercialisation engagement \mathbb{H}_2 with industry partners

Professor Caroline McMillen Chief Scientist of South Australia (Chair)

Professor Roy Green

Kellie Charlesworth

Andy Holmes

Nicky Ison

Andrew Dickson

Chair, Port of Newcastle; and Special Advisor, UTS

Queensland Business Leader – Energy Transition, Arup

Former COO, BP Fuels Asia Pacific & Air BP, and President, BP ANZ

Former Energy Transition Manager, WWF Australia

Development Director, CWP Global; Board Member, Smart Energy Council; Chair, Australia Committee, Ammonia Energy Association



Round 24 Indicative Timeline

- May 2022 Stage 1 opens
- July 2022 Stage 1 closes
- \odot November 2022 Stage 2 opens
- February 2023 Stage 2 closes
- April 2023 Outcomes announced
- October 2023 Funding commences



What are we aiming for in Stage 1?

| Yearly cash contributions for 10 years | Total |
|--|--|
| \$100,000 | \$12M |
| \$250,000 | \$20M |
| \$100,000 | \$16M |
| | \$2M |
| | \$50M |
| Commonwealth Government CRC Round 24 funding request | |
| | Yearly cash contributions for 10 years \$100,000 \$250,000 \$100,000 funding request |

Value Proposition

- Single access point to the country's experts and capability in a diverse range of hydrogen and hydrogen-related specialisations
- \odot Value adding through:
 - $\odot\,$ Linkages to partners, solutions, suppliers and projects
 - $\odot\,$ Access to workforce skills and education development
 - $\odot\,$ Commercialisation opportunities for new IP
- $\odot\,$ Cost effective way to have research project work undertaken
 - $\odot\,$ Contributions may be eligible for the R&D tax concession
 - $\odot\,$ Contributions are leveraged by Commonwealth and other partners' investments



Thanks

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