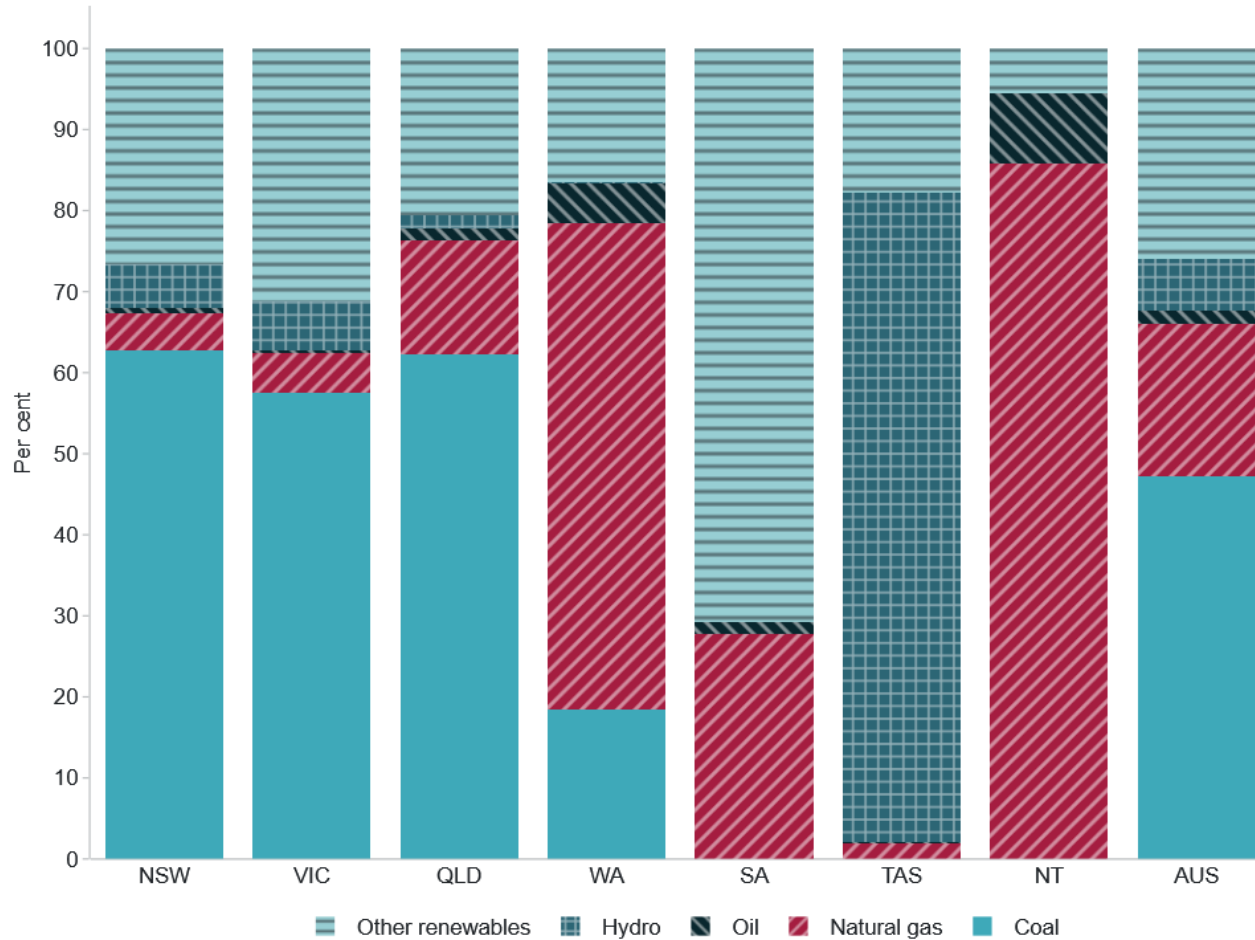


Jens Noack, Caroline Stott, Shane Scarinci, Bin Luo

Flow Batteries in Australia / Queensland

Motivation

Australian electricity generation by fuel mix - 2022



Scott Morrison - Australian Parliament 2017
Australian Prime Minister 2018 - 2022

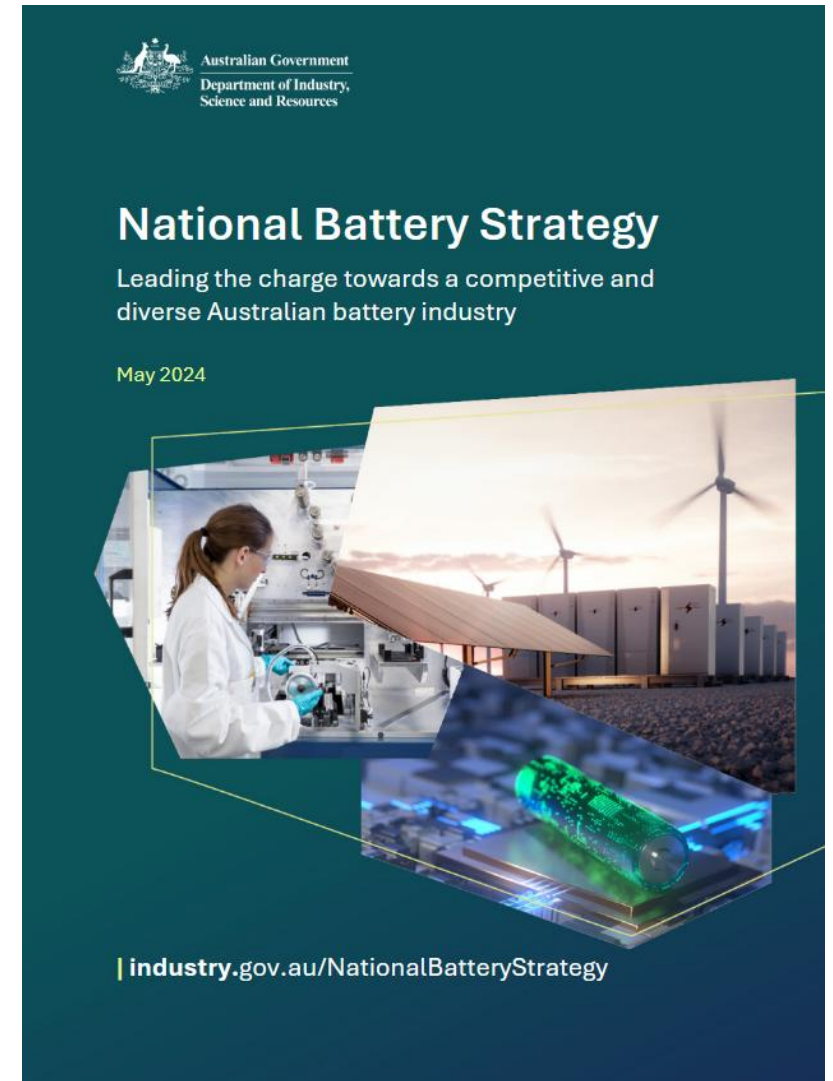
Flow Batteries in Australia

National Battery Strategy

- **Released:** May 2024 by the Australian Department of Industry
- **Objective:** Develop a globally competitive battery industry by 2035
- Aligned with the 'Future Made in Australia' agenda

Five Strategic Priorities:

1. Manufacturing: Expand domestic battery production
2. Knowledge & Skills: Enhance R&D and workforce training
3. Global Supply Chains: Build strategic international partnerships
4. Sustainability: Focus on ESG standards and circular economy
5. Government Coordination: Align actions across federal, state, and industry



Flow Batteries in Australia

Queensland Battery Strategy

- 5-year, A\$570 million strategy launched in early 2024
- **Goal:** Position Queensland as a global battery technology leader
- **Economic impact:** Estimated A\$1.3 billion contribution to the state
- **Job creation:** Approx. 9,100 new clean energy jobs by 2030
- **Focus:** Entire battery value chain – from mining to recycling

Funding Highlights:

- A\$275M: Innovation & commercialization (A\$105M for Battery Industr. Centre)
- A\$92.2M: Supply-chain development (A\$80M in grants)
- A\$202.5M: Market positioning (incl. A\$5M for 'Batteries Queensland')

Strategic Projects:

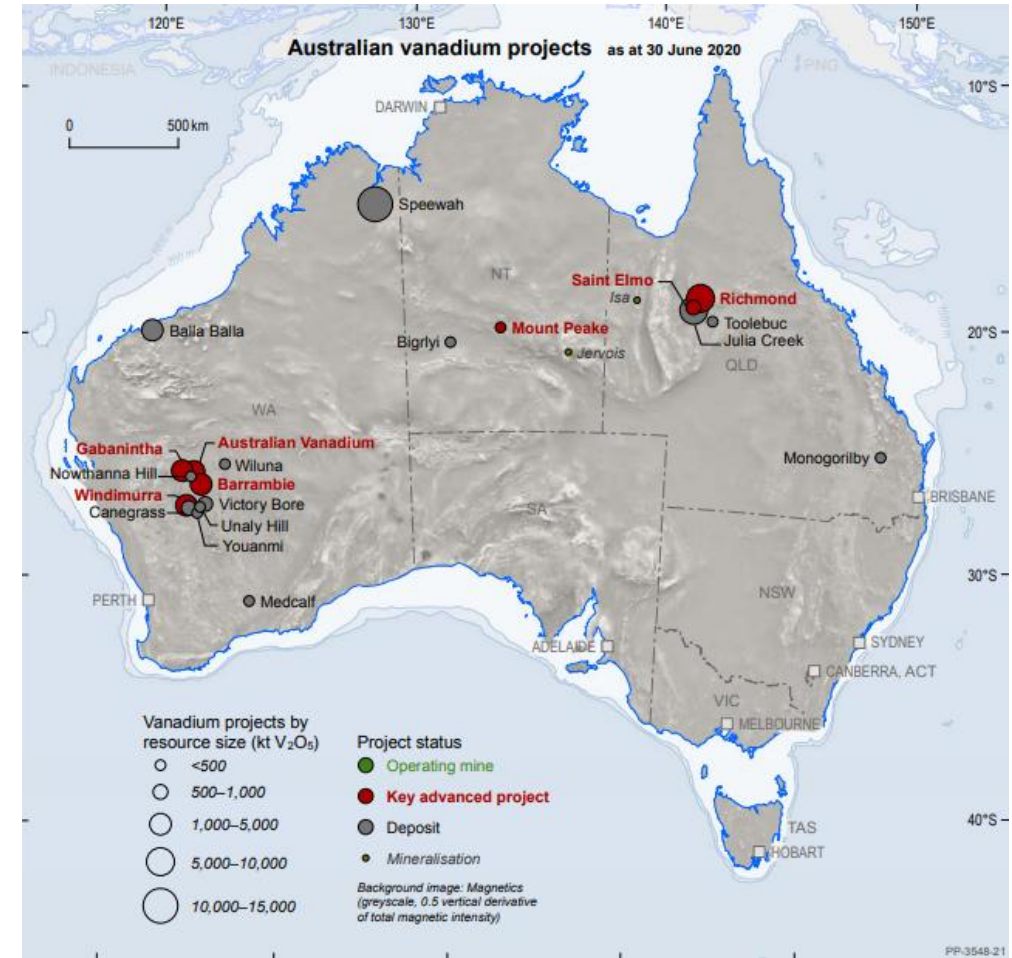
- Support for vanadium & iron-flow battery technologies
- Battery testing infrastructure (NBTC, QUEST Hub)
- Regional hubs: Maryborough, Townsville, North West QLD



Flow Batteries in Australia

Vanadium in Australia

Company (ASX Ticker)	Project / Region → Project / Region	Status & Key Details	Resources / Strategy
Australian Vanadium Ltd (AVL)	Gabarintha, Western Australia	Advanced project: OFS underway, received EPA approval mid-Jan 2025	MRE of 395.4 Mt @ 0.77 % V ₂ O ₅ , including 173.2 Mt @ 1.09 % high-grade
QEM Limited (QEM)	Julia Creek, Queensland	One of the world's largest vanadium deposits; EIS and coordinated-project declared Dec 2024; BFS ongoing	JORC resource: 2 867 Mt @ 0.31 % V ₂ O ₅ (461 Mt Indicated + 2 406 Mt Inferred)
Richmond Vanadium Technology (RVT)	Richmond-Julia Creek, Queensland	BFS completed; open-pit development for high-purity V ₂ O ₅ flakes ≥ 98.6 % purity; initial 25-year life	Focused on pure oxide flakes targeting battery/industry markets
Veeco Group	Debella, Queensland	Electrolyte-production facility under construction in Townsville (from late 2023); mine planned around 2027 with funding from Idemitsu	Vertical integration: mining → processing → vanadium redox flow-battery electrolyte
King River Resources Ltd (KRR)	Pilbara, Western Australia	Exploration-phase; focuses on novel extraction tech	Aims to advance with scalable processing innovations
Various explorers (Audalia – ACP, Aura – AEE, Anson – ASN, Horizon – HRZ, Neometals – NMT)	Various early-stage exploration sites	Limited-resource, early exploration	Opportunistic plays in early-stage resource identification



- 8.5 million tons of vanadium reserves (~1.7 TWh VRFB)
- ~40% of global vanadium reserves
- World resources are 63 million tons (12 TWh VRFB)

Flow Batteries in Australia

Research and Development



40th Anniversary Flow Battery Innovation Symposium

Free

Get tickets



UNSW SYDNEY



Australian National University



MONASH University



DEAKIN UNIVERSITY



THE UNIVERSITY OF SYDNEY

Flow Batteries in Australia

Battery Projects

~ 154 MW / 1380 MWh RFB storage

- **Kalgoorlie Vanadium Flow Battery (50 MW, 500 MWh) VRFB**
Western Australia has committed \$150 million to construct a 50 MW vanadium flow battery in Kalgoorlie-Boulder. Scheduled for operation by 2029, this project aims to enhance grid reliability in the Goldfields region, especially as the state phases out coal-fired power stations
- **Project Lumina (100 MW / 400 MWh -> 100 MW / 800 MWh) VRFB**
In New South Wales, VSUN Energy is advancing Project Lumina, a 100 MW vanadium flow battery initiative. The project has recently achieved a milestone with the appointment of key service providers, including GenusPlus Group and CellCube.
- **Yadlamalka Energy (2 MW / 8 MWh) VRFB**
Combination of large PV array and storage for time shift applications. Batteries from Invinity Energy. Scheduled commissioning in 2023.
- **Allegro Energy (100 kW / 800 kWh -> 5 MW / 60 MWh) VRFB**
Allegro Energy, in collaboration with Origin Energy, is set to install Australia's first locally manufactured microemulsion flow battery at the Eraring Power Station. This technology promises safer and more cost-effective long-duration energy storage solutions.
- **Berrinba, Vecco – Sumitomo (250 kW / 750 kWh) VRFB**
Joint venture between Vecco and Sumitomo, for end-to-end manufacturing in north Queensland. Battery installation for Energy Queensland end 2024.
- **ESIAP (1 MW / 10 MWh) FeRFB**
10 + 10 ESS Batteries at Stanwell Power Station, Rockhampton + future manufacturing in Maryborough