THE UNIVERSITY OF QUEENSLAND
AUSTRALIA
CREATE CHANGE

Queensland battery manufacturing: Policies and Projects

VRFB 40th anniversary symposium

October 2024

Policy defines success of industry development

Export focus benefits domestic industry
Strategy and policy framework defines success

Improve access to:	Policy Support	Foster collaboration / partnership / integration
Finance	• **Low-cost loans** from the state • Steer investors to strategy	Government Industry Research
International markets	• **Bargain** with states • Bargain with multi-nationals	
Research	• **Gaps** in technology • Competitive advantage	
Training and education	• Engineering & **Technology** • Workforce excellence	
Government	• **Strategy** provides focus • Breakdown bottlenecks • Procurement processes	

National Battery Strategy

Battery Breakthrough Initiative

$523m

Active materials, cell manufacturing, pack manufacturing

Building Future Battery Capabilities

$20m

Supply chain navigator tool, battery scale-up, best practice guidelines/standards, battery industry skills and training.

Australian Battery Precinct Business Case

$6m

$100m commitment to Queensland

Policy integration problem

Batteries required to meet Net Zero Plan, Capacity Investment Scheme, Future Made in Australia but no local content required

Net Zero Sector Plan	Electricity & Energy	Transport	Agriculture & Land	Resources
Mature technologies			Off grid energy storage	Off grid energy storage
Early-stage technologies	LDES New battery chemistries	Batteries for electric heavy vehicles		Batteries for electric mining vehicles & equipment

National Battery Strategy - High Value Opportunities

Queensland ecosystem

Manufacture batteries for renewable grids	Manufacture active materials for global supply	Batteries for transport	Innovate for safer batteries
Vecco - Sumitomo	**Vecco**	***GMG***	***Alpha HPA***
ESI-AP (Redflow)	**RVT**	***Li-S Energy***	***ESI-AP***
RVT – Rongke	**CMG**	***Volvo Group***	***ZED***
Multicom-StorEn	**QEM**		
Feline	***Alpha HPA***		
GMG	***AnteoTech***		
LI-S Energy	***Enserv***		
ZED	***Lava Blue***		
Cleveland Bay	***QPM***		
Prohelion, Vaulta	***VSPC***		

Vanadium Proponents – VECCO Group (Debella)

Plans to develop: mine, beneficiation, flotation, roasting, leaching & filtration, SAP, solvent extraction, molybdenum ion exchange, AMW and vanadium purification, molybdenum purification, HPA Production

Plans to produce: V2O5, HPA, molybdenum

Electrolyte facility: capacity 35MWh, started production 2023, expansion to 350MWh in 2026

Investors: Idemitsu, Coeclerici Group

Collaboration agreement: Idemitsu (investor) & Sumitomo Electric

Pilot installation of VRFB with VECCO electrolyte: Energex (Berrinbah)

Qld Resources Common User Facility

Accelerate development of mining projects, promote investment

- Pilot processes
- Train staff
- Samples for off-take
- By-products, waste streams, recyclable materials

Status: working with potential customers on equipment, design, access and operation

Operational 2025

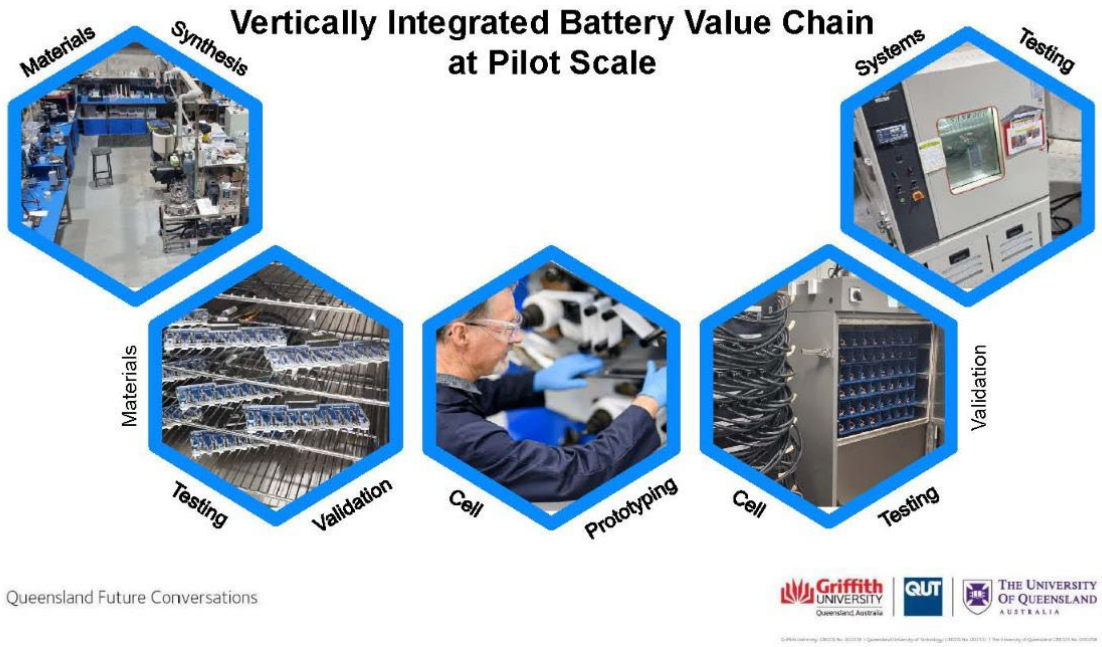
Future Industries Hub - Flexi-lab

- Mackay, Resources Centre of Excellence
- Waste processing and vanadium
- Funding $9.2m
- Concept design completed in June
- Final stage of detailed design, equipment selection
- Construction by Mackay engineering firm, UQ technical advisor (Prof Mohsen Yahyaei)
- Commissioning late 2025

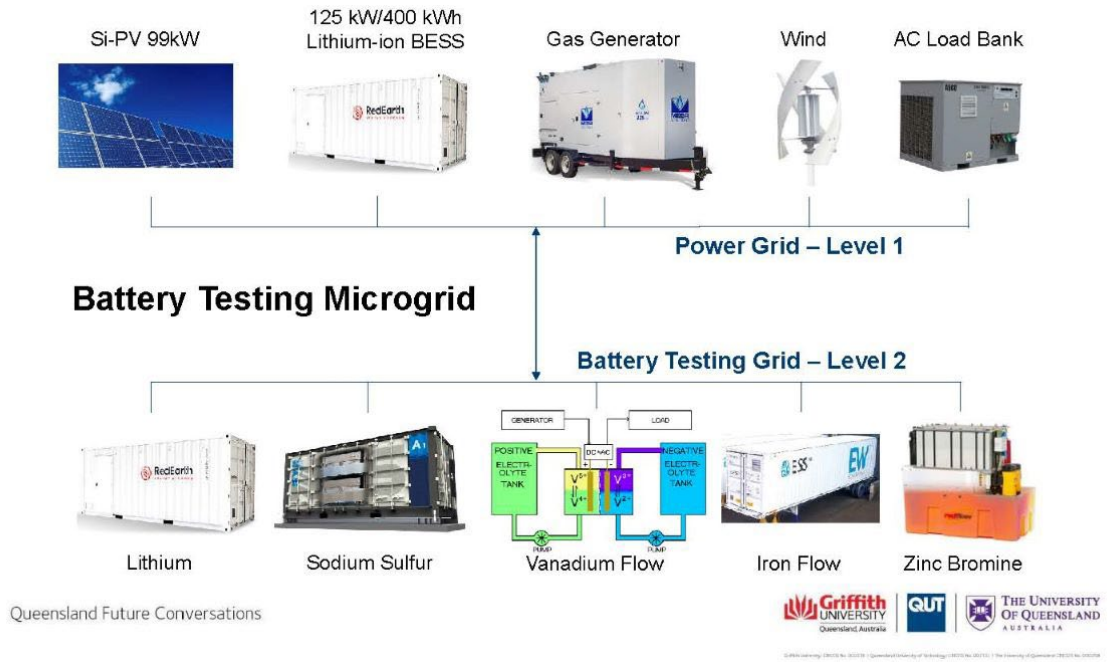
Energex Berrinba – VECCO VRFB Trial Project

- 250kW / 750kWh VRFB
- First Sumitomo Electric VRFB installation in Aus
- Trial to assess medium duration storage for deployment in Energex distribution network
- Sumitomo Electric to build co-operative framework with local VRFBs in the Aus market

QUT's Queensland energy storage technology hub



- RE Battery Testing Microgrid with 100kW roof-top solar PV array – up to 250kW testing
- Training facility for Li-ion & RFB battery component and cell production, prototyping & testing
- Curated test results DB for battery materials/cells /systems performance under standardised conditions



- Lab & pilot-scale synthesis capabilities for battery active materials – LFP, NCM, solid-state electrolytes
- Fabrication/prototyping of standardised cell formats at pilot-scale (coin, cylindrical, single/multi-layer pouch)
- Battery materials/cells/systems research, development, testing and qualification – Li-ion, Na-ion, SSEs, RFBs

Queensland Future Conversations: Josh Watts, 2023

Stanwell Clean Energy Hub

- Stanwell power station operating as clean energy hub by 2032-33
- Build Future Energy and Innovation Training Hub (FEITH) - $100m
- Sandbox to test new energy technology
- Skills academy and demonstration centre

Vanadium Proponents – QEM (Julia Creek Project)

- Large Vanadium / Oil resource
- Pilot plant delivering good results
- Proposed off-taker for renewable power
- Vanadium-rich waste stream for conversion to battery electrolyte
  - Sun Metals
  - University of Queensland hydrometallurgy group

Vanadium Proponents – Richmond Vanadium (LilyVale)

- Plans to develop mine
- Plans to produce vanadium pentoxide (V2O5) & electrolyte
- Bankable Feasibility Study scheduled for completion Q2 2025
- Collaboration agreement (non-binding) with Dalian Rongke Power Group & Trina Solar announced in May 2024
- On panel helping to determine the Queensland Government's common user facility Future User Engagement Protocol.

Vanadium Proponents – Multicom Resources (Saint Elmo)

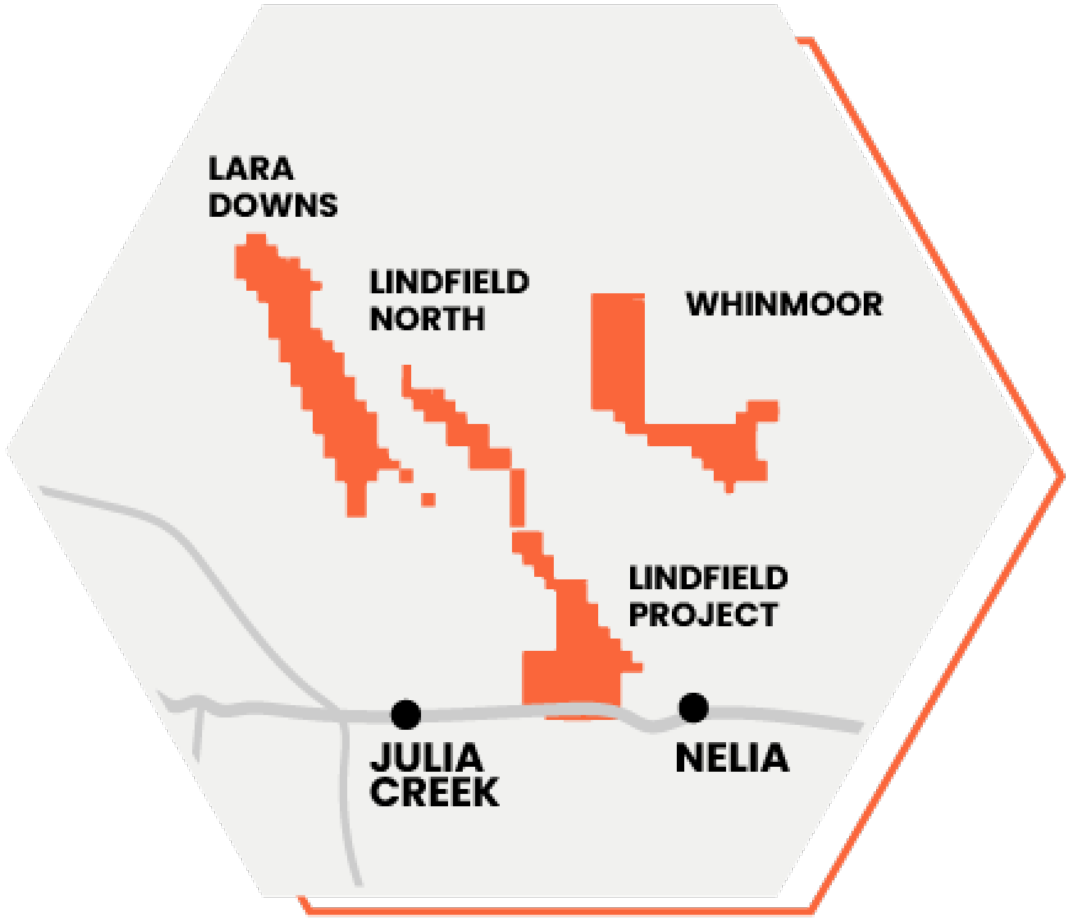
Plans to develop: mine, concentrator & 2 refineries on site

Plans to produce: V_2O_5 & HPA

With subsidiary Freedom Energy - partnering with US based StorEn Technologies to manufacture VRFBs in Queensland

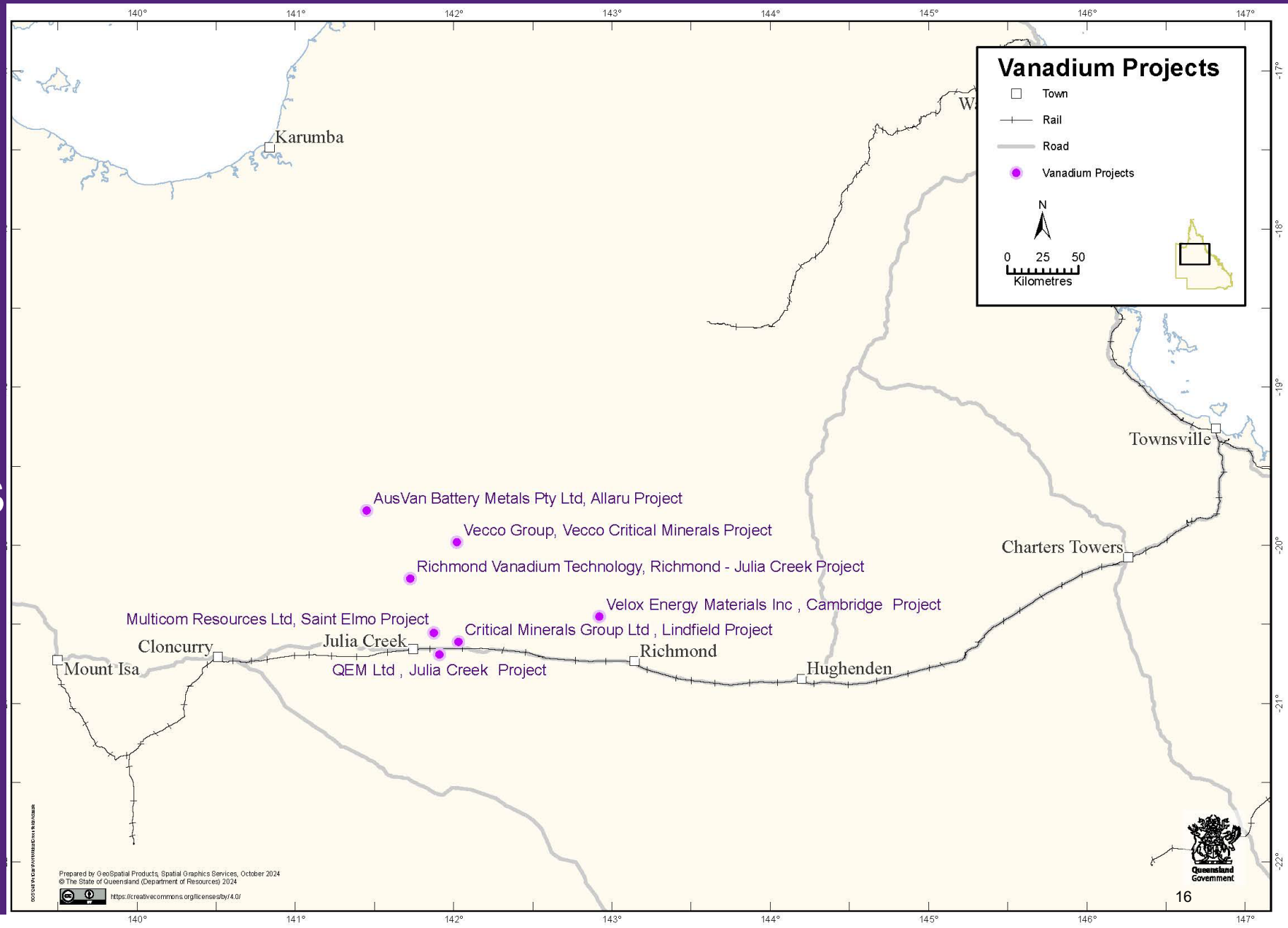
Construction underway, operations in 2025

Vanadium Proponents – Critical Minerals Group (Lindfield)



- Plans to develop: mine, processing and electrolyte plants
- Plans to produce: V205, electrolyte, HPA, molybedun trioxide
- Partners: Idemitsu (investor), QldGovt ($2m grant), Lava Blue (license), Sedgman (DFS), MET Lab (pilot)

Queensland vanadium projects



Research support through the QLD Critical Minerals Strategy

Critical Minerals and Circular Economy Research Alliance

$8million award to Sustainable Minerals Institute for 4 years

For identification, discovery and development of critical minerals

Critical minerals industry and robust value chain needs new data, technologies, approaches, and workforce capabilities

Supplements analysis of critical mineral recovery from mine waste

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Thank you

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