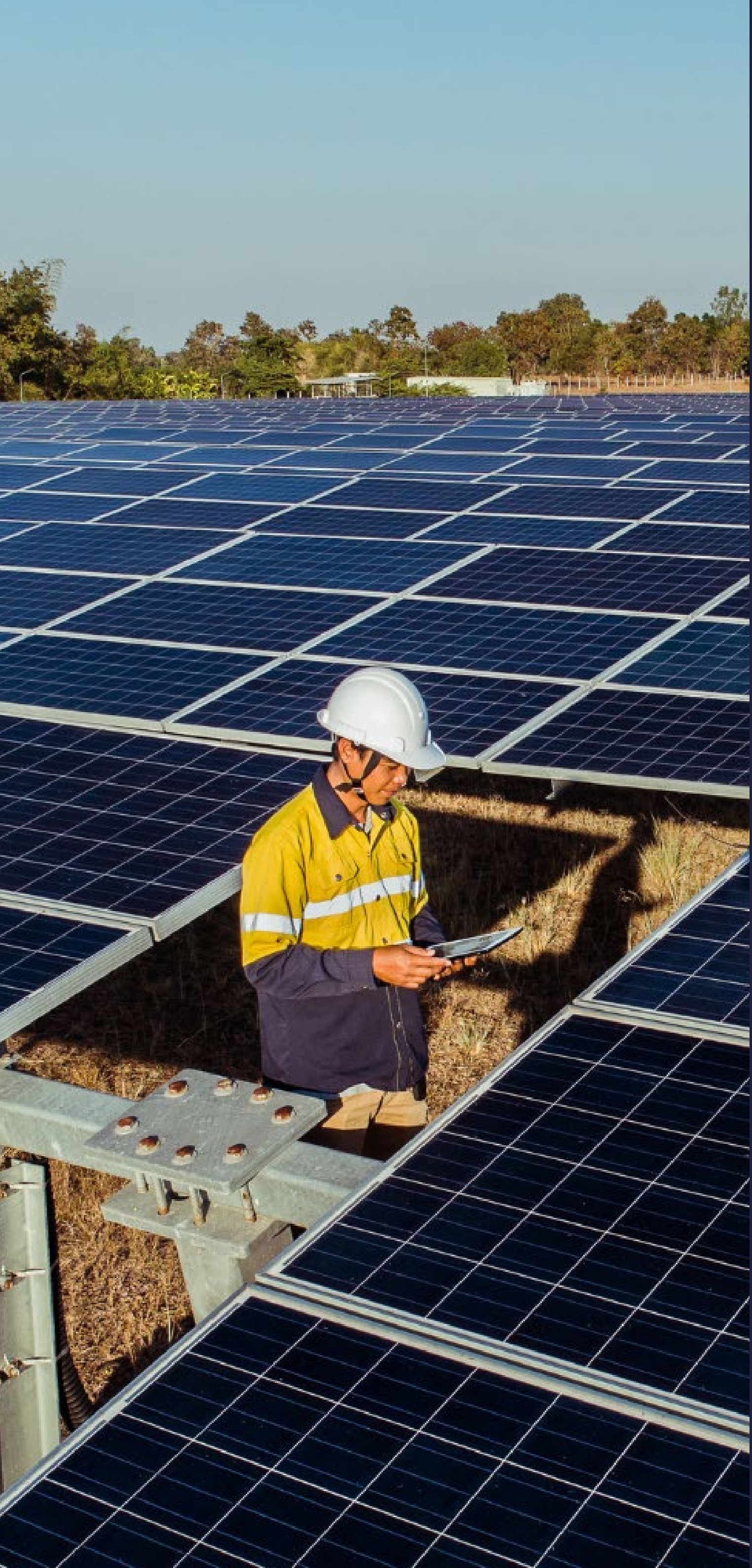


POWERING AUSTRALIA

Cyan Ventures

Deloitte.

HORIZON 2035

Generating Australia's clean power future

Executive summary

As the world rapidly expands solar, wind, and battery technologies, new opportunities are emerging for countries to participate not only in clean energy use but in manufacturing the infrastructure that supports it. For Australia, the energy transition presents a chance to rebuild domestic industrial capability by drawing on its abundant renewable resources, extensive critical mineral reserves, and close connections to fast-growing regional markets. This positions Australia to be a reliable exporter of critical minerals and refined materials essential to global solar, wind, and battery supply chains.

Australia's clean-tech manufacturing opportunity depends on close links between industrial capability and the cost of renewable energy. Expanding local manufacturing in solar, wind and battery supply chains will only be competitive if renewable energy remains affordable. Access to sustained low cost electricity is therefore central to realising growth in energy intensive areas such as solar materials, battery components and wind systems.

Achieving ultra low cost renewable electricity by 2035 would not only lower energy costs across the economy but also help establish globally competitive clean-tech industries. This connection between cheap energy and industrial capability underpins Australia's potential to drive new value in the clean energy transition.

Three anchor opportunities in critical mineral refining, polysilicon production and equipment deployment and balance of plant manufacturing provide the clearest path to long term growth in clean energy generation and manufacturing. Realising these opportunities could generate billions in additional economic and support hundreds of thousands of jobs, establishing the foundations for a globally competitive clean-tech industry as the electricity sector decarbonises.

Acknowledgements

This project received grant funding from the Australian Government.

Opportunity landscape

The electricity sector is essential to Australia's long term decarbonisation efforts, the cost of living and for future industrial competitiveness.[1]

As the country's largest source of emissions, accounting for 35% of the national total, electricity generation also offers one of the most significant pathways for reducing emissions, controlling energy costs, and revitalising industry.[2]

By focusing on clean-tech manufacturing in electricity generation, Australia can capture new economic opportunities from local production while helping to lower the cost of renewable energy.[3]

As global deployment of solar, wind and battery technologies accelerates, new opportunities are emerging not only in energy use but also in manufacturing the infrastructure that supports it. For Australia, this shift creates a chance to rebuild domestic industrial capability by drawing on abundant renewable resources, rich critical mineral reserves and proximity to rapidly growing regional markets.

It also opens a pathway to become a reliable exporter of critical minerals and refined materials that are vital to global solar, wind and battery supply chains.

Pathway to achieving competitiveness

Australia has a narrow but strategic window to build globally competitive clean transport manufacturing industries. Capturing this demand depends on:

1. Unique endowments
2. Access to demand
3. Supply chain ecosystem
4. Strategy

Decarbonising electricity generation through clean-tech manufacturing presents a critical and time sensitive opportunity for growth. Acting now will position Australia to lead the next phase of sustainable industrial development and energy innovation.

Notes/Sources: [1]AEMO (2024); [2]Climateworks (2020); [3]S2S (2024).

1. Unique endowments

- Build ultra-low-cost renewables at scale within industrial clusters
- Incentivise vertical integration to add value to critical chain mineral feedstocks and support onshore refining

2. Demand

- Secure early demand from international markets seeking non-Chinese supply options
- Strengthen access to non-Chinese feedstocks that enable participation in US and EU markets
- Partner with overseas suppliers to adapt foreign-designed technologies for Australian conditions

3. Industrial ecosystem

- Attract international partners to establish lighthouse capabilities and transfer technology know-how
- Develop common-user infrastructure in industrial clusters, optimised for solar, wind, feedstock, residue management, ports and supporting networks

4. Strategy/commercialisation

- Facilitate a stable market for Australian polysilicon and refined minerals through partnerships, trade engagement and predictable pricing
- Support pilot projects and commercialisation of critical new technologies through fab-less production and local R&D and prototyping
- Use grants, production tax credits and concessional finance to accelerate investment in refining, polysilicon production and balance-of-plant innovation

By 2050, anchor opportunities are estimated to deliver A$15.4 billion, primarily driven by expanded refining capacity across lithium, copper, and polysilicon.

Sector overview

As solar and wind capacity expand worldwide, demand is being accelerated by energy intensive digital infrastructure such as data centres and by the electrification of transport and heavy industry.[4] Australia's clean-tech manufacturing sector within renewable energy generation offers a powerful opportunity to capture new economic growth while lowering the cost of renewable electricity.[4]

In 2023, global renewable capacity additions reached 507 gigawatts, a fifty per cent increase on the previous year.[5] For the first time, renewable generation growth is expected to outpace global electricity demand, allowing coal power to decline steadily.[5] By 2035, global generation capacity is projected to grow more than sevenfold, driving almost 800 billion US dollars in annual investment.[5] Yet supply chains for solar, wind and battery technologies remain heavily concentrated, with China controlling between sixty and ninety per cent of key segments. In response, the United States and the European Union are pursuing policies to diversify and reshore manufacturing capacity. Australia is well placed to respond to these global shifts.[6]

The combination of world class renewable resources, critical minerals such as lithium, nickel and rare earths, and deep expertise in solar and battery research provides a strong foundation for manufacturing growth. While high labour and capital costs remain a challenge, co locating refining, processing and renewable generation can reduce input costs and strengthen regional supply chains. With coordinated policy support and industry investment, these advantages can position Australia as a trusted supplier in diversified global markets.

Within this shifting landscape, Australia has identified three anchor opportunities in clean-tech manufacturing: critical mineral refining, polysilicon production and manufacturing of key equipment for battery storage, solar and wind systems. These anchors combine strong potential for long term competitiveness with improved supply chain resilience. Together they could generate more than fifteen billion Australian dollars in value and support over one hundred and thirty thousand jobs by 2050, strengthening national capability and regional development.

Notes/Sources: [4]Australian Energy Council (2024); [5]AEMO (2024); [6]TSI (2024)

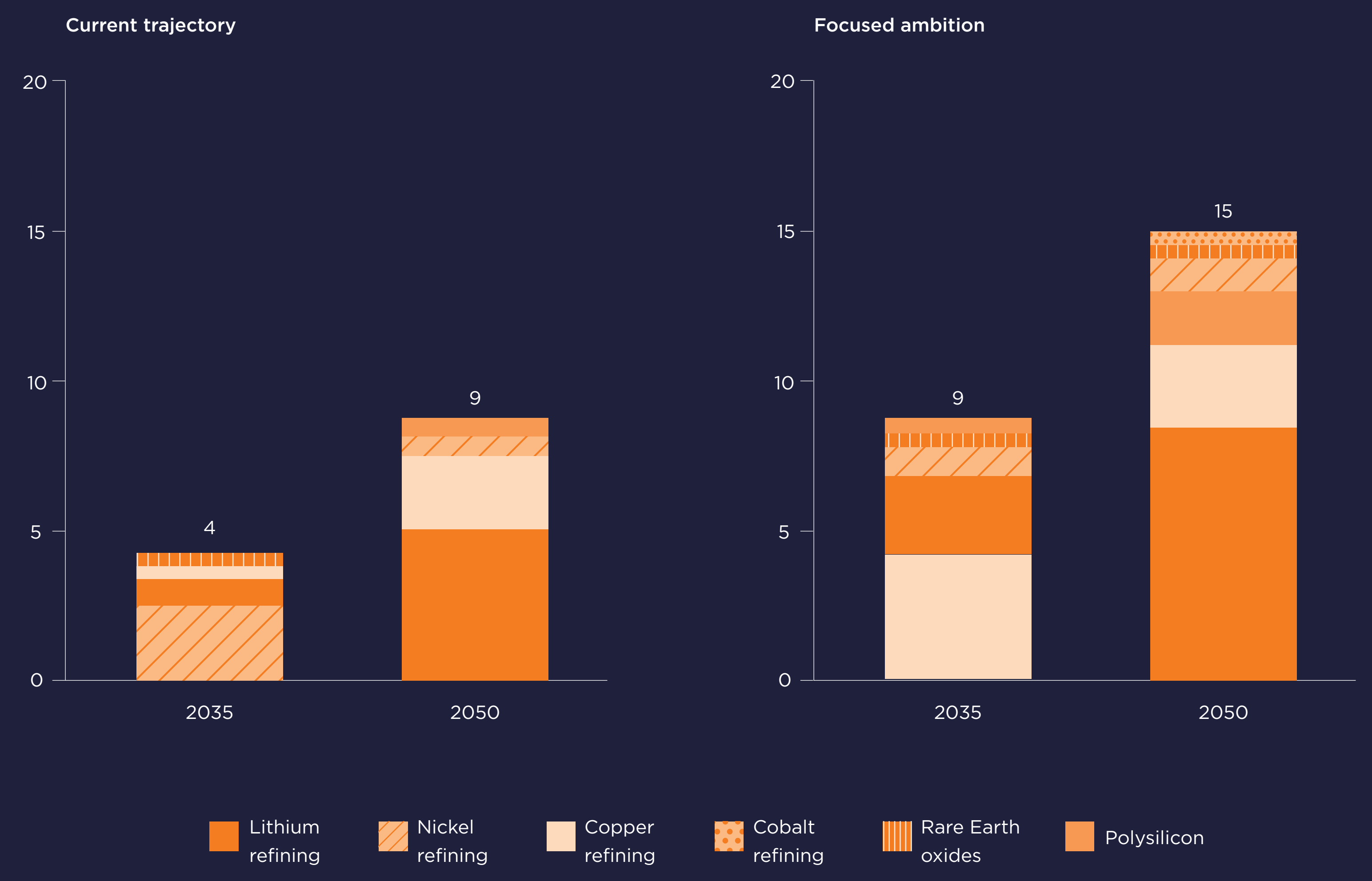
Size of the prize: economic value

If Australia captures the identified generation anchor opportunities, the clean-tech manufacturing sector could become a significant contributor to the national economy.[8]

Under a Current Trajectory scenario, these opportunities are projected to add around A$4 billion in gross value added to the economy by 2035, rising to about A$9 billion by 2050. Under a Focused Ambition scenario, stronger policy support and coordinated industry investment could lift this contribution to roughly A$7 billion by 2035 and more than A$15 billion by 2050.[7,8]

This potential equates to an almost four fold increase in sector value over fifteen years. It reflects the growing contribution of activities such as critical mineral refining, polysilicon production and local manufacturing of solar, wind and battery components.

Notes/Sources: [7]ABS (IO Tables). [8]AEP (Key statistics 2024)



GVA estimation under current trajectory and focused ambition scenarios (A$bn)

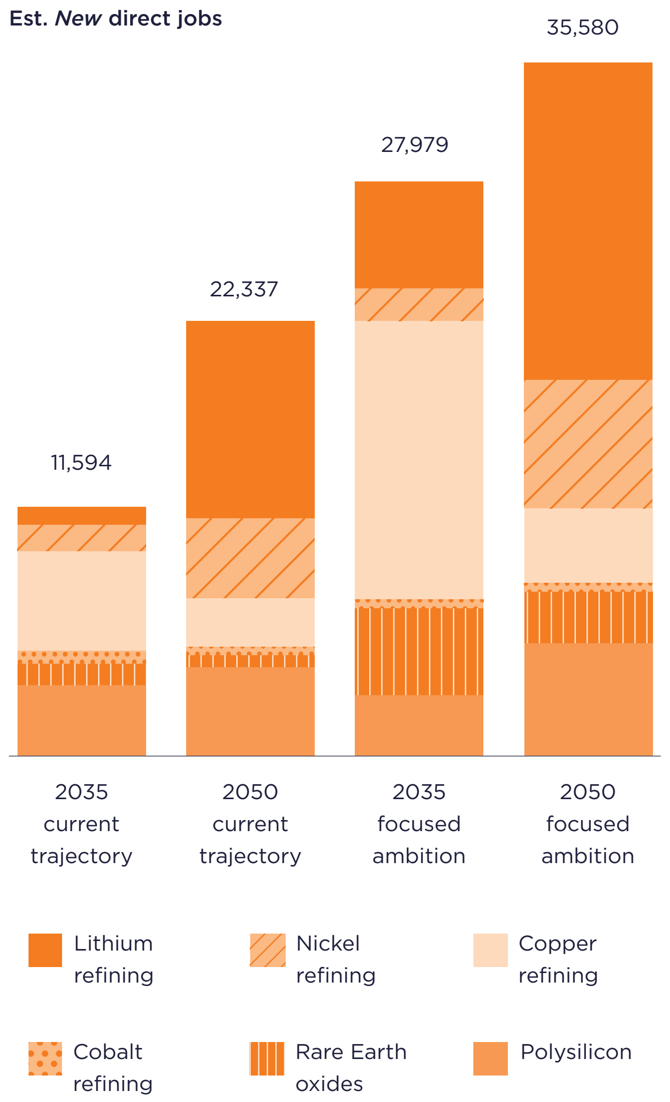
Size of the prize: jobs

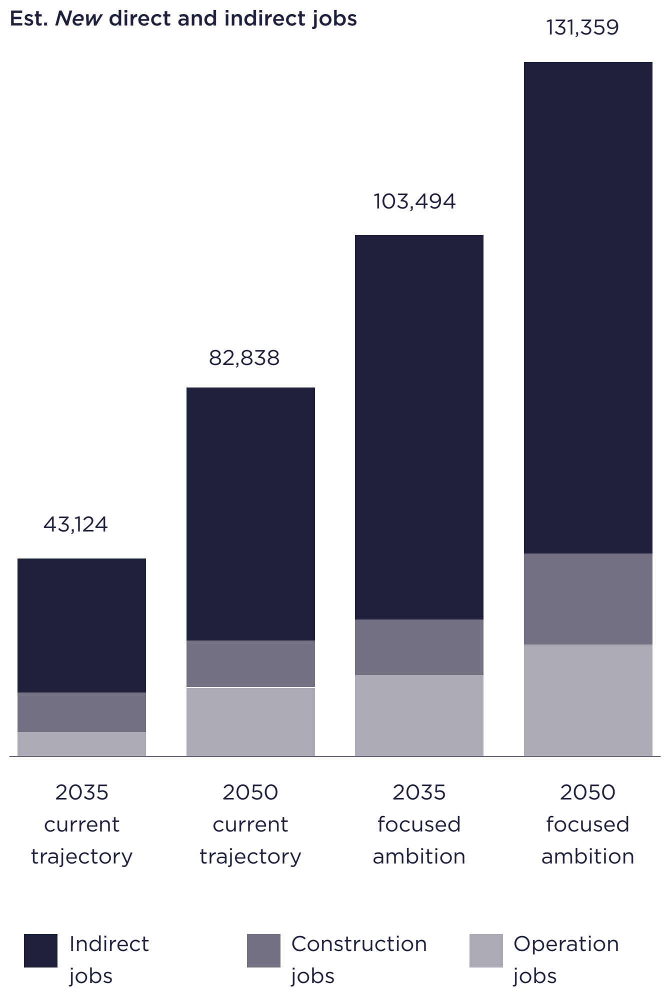
Under the Current Trajectory scenario, anchor opportunities are expected to support around 43,000 jobs by 2035 across construction, operations and indirect roles, rising to nearly 83,000 by 2050.[7,8]

Under the Focused Ambition scenario, stronger government and industry support could lift this to over 100,000 jobs by 2035 and more than 130,000 by 2050. These figures span construction, operations and indirect employment, with major contributions from lithium, copper and polysilicon refining.

Indirect roles capture downstream jobs enabled by support services such as accommodation and hospitality.[8]

Notes/Sources: [7]ABS (IO Tables); [8]AEP (Key statistics 2024)





Jobs estimation under current trajectory and focused ambition scenarios (000' Full-Time Equivalent (FTE)

Anchor opportunities

Three of our key pathways to success are identified as "anchor opportunities." These are opportunities with strong potential for Australia's long-term competitiveness and may also contribute to improving supply chain resilience.

Critical mineral refining

Critical mineral refining offers Australia a strategic opportunity to move up the value chain and reduce reliance on offshore processing. The country holds some of the world's largest reserves of key energy transition minerals, including lithium, nickel, cobalt and rare earths.

Downstream processing remains heavily concentrated in China, which controls over seventy per cent of global refining capacity. Projections show this dominance will continue through at least 2040, underscoring the need for domestic capability to strengthen supply chain resilience and capture greater economic value.

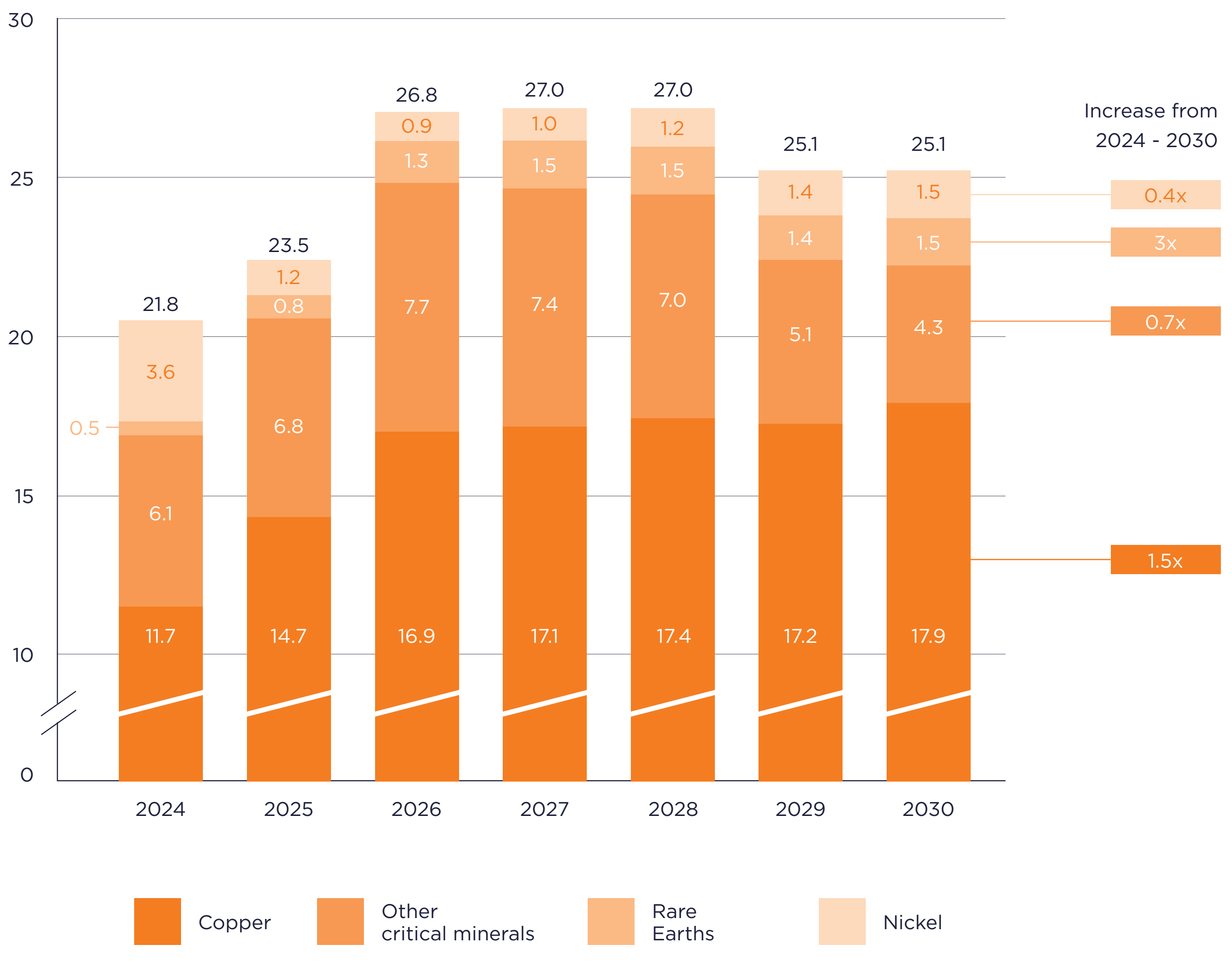
Australia has credible pathways to cut production costs across multiple refined minerals. For example, lithium hydroxide (a key battery input) could drop from US$12.3 per kilogram today to US$7 per kilogram by 2035.[9] Achieving this requires coordinated action across three areas: vertical integration with spodumene mining to leverage reserves, shared infrastructure to cut residue disposal costs, and targeted policy tools such as production tax credits to lower capital intensity.

Beyond lithium, copper and rare earths present major opportunities for value-added refining. Exports from operating and committed projects are projected to reach A$25 billion by 2030, with increasing share from processed materials.

By applying these levers, Australia can improve its global cost position in critical mineral refining and capture more value from downstream processing.

Notes/Sources: [9] Cyan Ventures Analysis

Other critical mineral exports from operating and committed facilities in Australia
Export value (A$bn) 2024-2030



Jobs estimation under current trajectory and focused ambition scenarios (000' Full-Time Equivalent (FTE)

Polysilicon

Australia can become competitive in polysilicon production by leveraging low-cost renewable electricity, engineering expertise and capacity to serve non-Chinese markets. China currently produces over ninety per cent of the world's polysilicon, driven by massive scale and lower labour, capital and overhead costs.

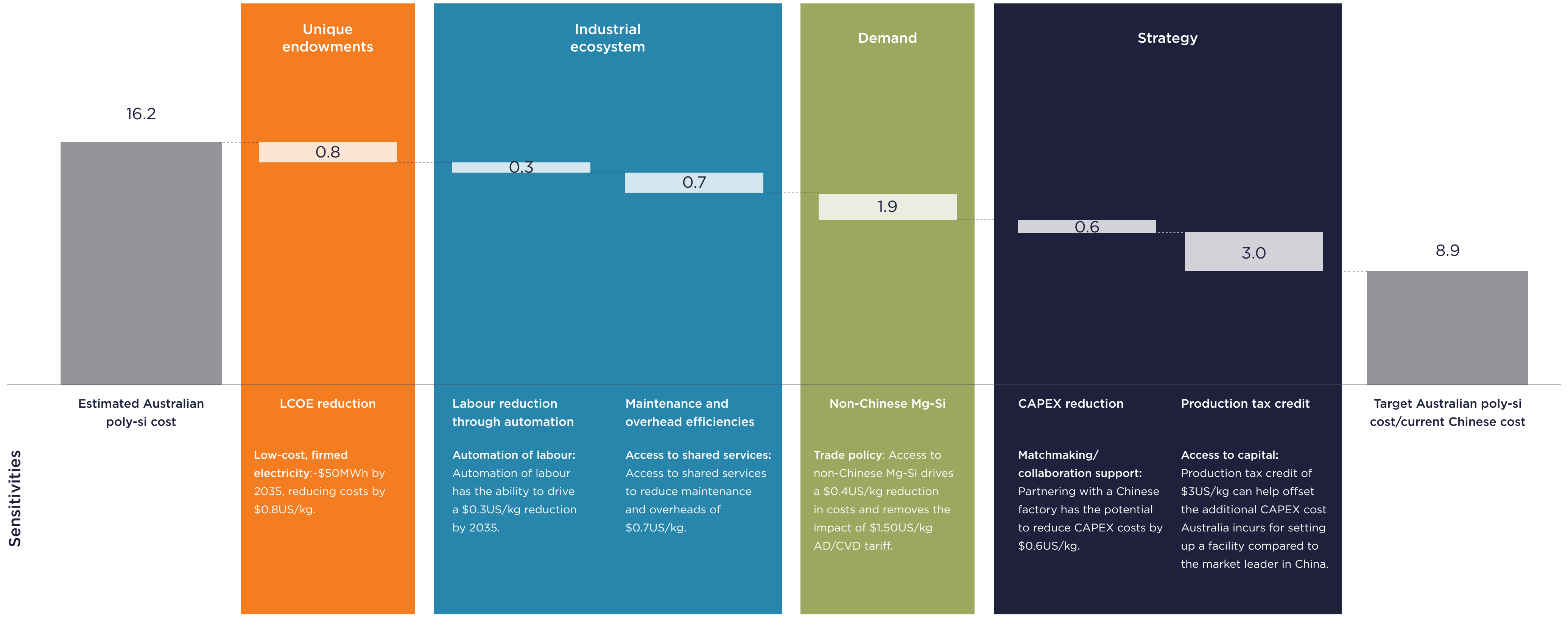
Non-Chinese polysilicon trades at up to four times the price of Chinese material in the United States and three times in the European Union due to trade restrictions and ESG factors.[10] This premium creates a strategic window for Australia despite its current cost disadvantage.

Australia has a clear pathway to reduce production costs from US$16.2 per kilogram today to US$12 per kilogram by 2035, and potentially US$9 per kilogram with production tax credits.[11] Success requires automation to offset labour costs, access to ultra-low-cost renewable energy and long-term offtake agreements with wafer producers.

Australia can establish itself as a reliable supplier of high-purity polysilicon to diversified global markets, supporting energy security while building new domestic clean energy manufacturing capability.

Notes/Sources: [10] Business Analytics IQ (2024). [11] BNEF (2024)

Polysilicon levelised cost of production, 2035
US$ (2025) per kg of silicon



Support required to deliver a competitive polysilicon industry in Australia by 2035

Deployment and Balance of Plant

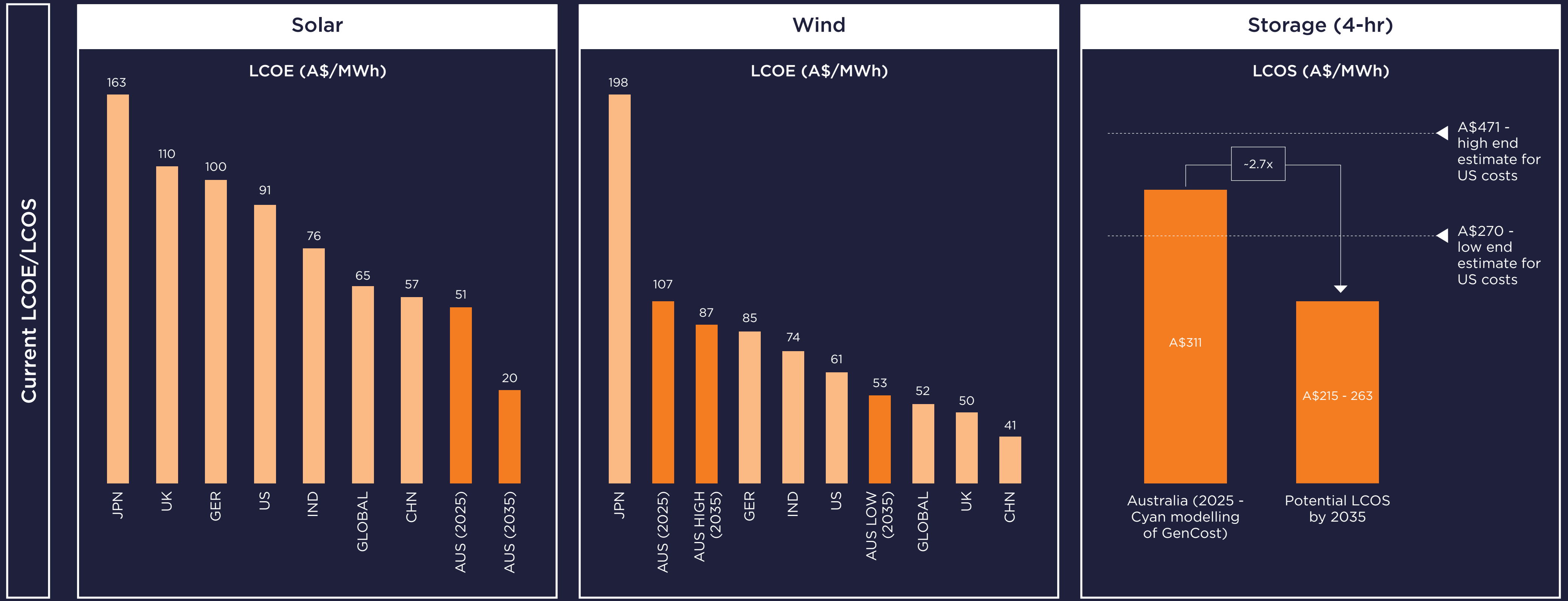
Renewable energy deployment offers Australia a strategic opportunity to lead globally in ultra-low-cost clean-technology. By 2035, the country will add up to 178 gigawatts of new capacity, with solar growing 2.5 times and wind and batteries nearly seven times. Access to low-cost renewable electricity unlocks 80 per cent of clean-tech value opportunities.

Australia can reduce solar electricity costs by up to 61 per cent and battery storage costs by up to 31 per cent by 2035, positioning itself as a global leader in ultra-low-cost renewables.[12] Solar advantages lie in deployment and operations through innovations like modular installation and robotic maintenance. Wind gains come from local civil works and turbine design partnerships. Battery costs fall through domestic deployment innovation.

Success follows a four-part approach across the value chain. Australia can lead where competitive advantages exist, collaborate on high-value innovation, engage by adapting offshore solutions, and source globally priced components.

This positions Australia to deliver the lowest-cost renewable energy worldwide while building domestic capability in deployment and service delivery.

Notes/Sources: [12] 1. IRENA (2024). 2. LCOE for Australia reflects IRENA (2024) estimates in 2023 AUD and 2025 Cyan Ventures modelling of CSIRO (2024). 3. Global Weighted Average based on costs and capacity installed. 4. CSIRO (2024).



Australia can achieve ultra low-cost renewables and global leadership in renewable energy costs by 2035[13]

Notes/Sources: [13] 1. Levelised Cost of Energy (LCOE) refers to the average cost of generating one megawatt-hour of electricity over the lifetime of a plant, incorporating capital, operating, and maintenance costs. Estimates shown here assume a standard run-of-plant profile and do not include costs associated with firming, or storage. 2. Levelised Cost of Storage (LCOS) refers to the average cost of storing and discharging one megawatt-hour of electricity over the lifetime of a storage system. It includes capital, operating, maintenance, and charging costs, and includes assumptions about round-trip efficiency, storage duration, and usage cycles.

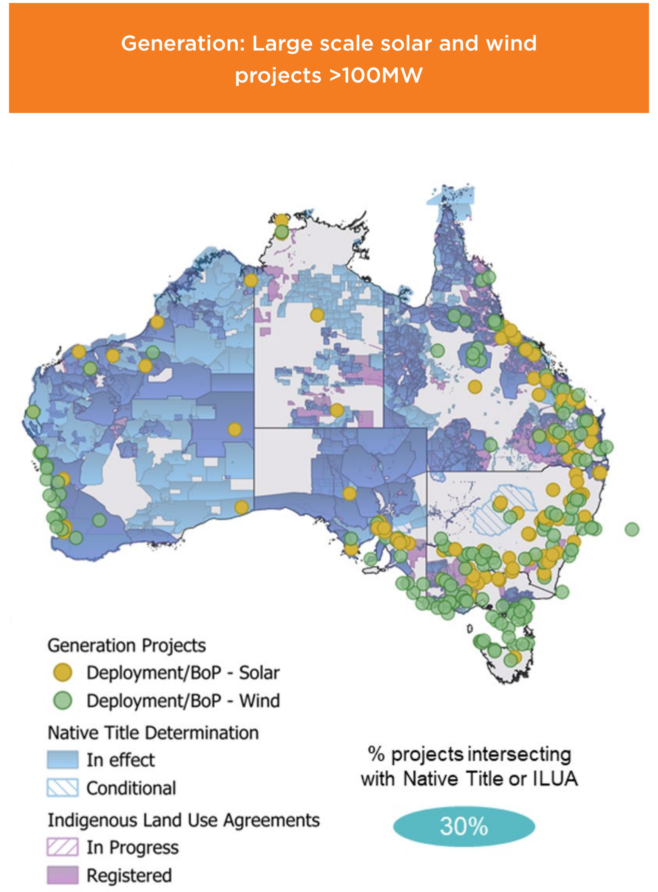
First Nations opportunities

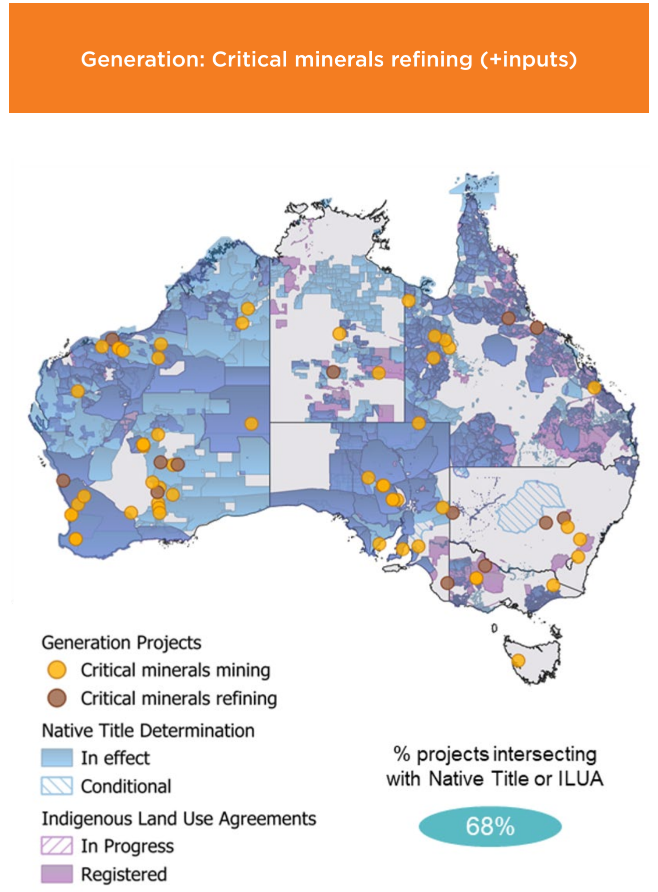
First Nations partnerships accelerate clean energy generation success. Australia's renewables expansion creates generational opportunities to position First Nations leadership at the core of solar, wind, and supporting manufacturing. These opportunities build on strong regional workforces, deep land connections, and self-determination principles that align with sustainable development.

Three strategic pathways open doors for First Nations businesses:

- **Land and sea collaborations** through ILUAs, equity stakes, and services for polysilicon production and critical minerals refining directly linked to renewable generation sites on Country.
- **Core manufacturing entry** into renewables recycling, wind tower production, pre-fabricated anchor cages, innovative solar components, and flow battery systems.
- **Critical ecosystem services** covering project development, construction and EPC contracts, cultural heritage assessments, environmental land management, component fabrication, and long-term operations and maintenance.

These pathways transform First Nations enterprises into essential partners, delivering secure land access, faster approvals, and resilient clean energy supply chains grounded in mutual benefit.





Making it happen

Australia's success in clean-tech manufacturing will depend on combining ultra low-cost renewable energy with targeted industrial strategy.

Immediate priorities include:

Building ultra-low-cost renewables in industrial precincts at scale

Developing market mechanisms with carbon certification

Stimulating domestic demand in priority markets

Scaling for strategic advantage requires reducing input costs through renewables deployed at optimal locations and co-located with industrial users. Strategic international partnerships, global carbon pricing advocacy and supply-side supports such as production tax credits remain essential for achieving cost competitiveness in a global market.

Longer-term success depends on integrated planning that co-locates industrial clusters with renewable energy zones, embeds early and equitable First Nations partnerships in project design, and leverages Australia's strengths in engineering, design, digital systems and project delivery. These actions together convert natural resource advantages into globally competitive clean-tech manufacturing industries.

Achieving Australia's potential

Australia stands ready to lead in clean-tech manufacturing for electricity generation.

From critical mineral refining and polysilicon production to ultra-low-cost renewable deployment, strong partnerships across industry, government and First Nations communities will drive success.

Genuine collaboration turns Australia's renewable resources and industrial strengths into enduring economic advantage.

Success demands collective action now.

We invite industry leaders, policymakers, investors and First Nations organisations to connect with Powering Australia and partner to build a cleaner, stronger and more competitive future.

For more information and to engage with our team, please contact Powering Australia.

Acknowledgement

Powering Australia wishes to acknowledge the First Nations of Australia and recognise their enduring connection to Country through culture, people, place and story. We honour the knowledge systems that have sustained these lands and waters for thousands of generations and recognise the vital role of First Nations leadership and self-determination in shaping a just and sustainable future. As Australia undergoes a significant clean energy and industrial transition, we acknowledge the importance of respectful partnership, cultural integrity, and shared purpose to realise the full opportunity of the Clean Energy Transition.