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Western Australia's role in the green energy transition

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The Perth USAsia Centre's Indo-Pacific Analysis Briefs seek to provide perceptive and contemporary insights from across the region. The series features leading analysts from Asia, Australia and the US to deliver up-to-the-minute assessments on issues of national and regional importance. This series will shine a light on the issues that remain critically important to Australia and the Indo-Pacific at a time when global events may otherwise dominate the news cycle.



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Alana was named as a 2025 Young Women to Watch in International Affairs, and served as a member of the United States Studies Centre's 2025 Women in the Alliance network.







KEY MESSAGES

- 1** The green energy transition is redefining power, competition, and prosperity. It's primarily about decarbonisation, but it's also a political and economic transformation.
- 2** Australia, and particularly Western Australia, is central to this shift. With vast reserves of critical minerals and growing capacity in refining, hydrogen, and battery industries, WA is poised to become a trusted, strategic supplier in green energy markets.
- 3** Energy, climate, and security are now inseparable. Building resilient, low carbon supply chains and value adding industries is both a climate imperative and a national security strategy, anchored in regional partnerships with countries like Japan, Korea, and India.

Introduction: Energy, climate and competition

The global shift towards renewable energy is more than an environmental necessity. It is transforming the foundations of economic power, trade, and security. Across the Indo-Pacific region, governments are racing to decarbonise their economies, reduce dependence on fossil fuels, and build secure, sustainable energy systems. This process, known as the *green energy transition*, is reshaping domestic policy and is an important point of tension in global geostrategic competition.

For countries like Australia, the transition represents a once-in-a-generation opportunity.

As global demand for critical minerals, technologies, and clean energy surges, Australia's natural endowments, strong governance, and human-rights track record make it a trusted partner in the emerging clean energy economy.¹ Western Australia (WA) sits at the heart of this transition. The state's abundance of critical minerals and other natural resources, and proximity to key Indo-Pacific markets position it as a central player in the region's energy and strategic future.²

What is the green energy transition?

At its core, the green energy transition is the global movement away from fossil fuels (coal, oil, and gas), towards low- and zero-emission energy sources such as solar, wind, and hydrogen.³ It involves not only generating cleaner energy but also decarbonising entire sectors of the economy, like transport, manufacturing, construction, and heavy industry.⁴







Technological advances and policy momentum have accelerated the shift. The cost of solar power dropped by 85 per cent between 2010 and 2019, and wind and battery technologies have followed similar trajectories.⁵ Investment in clean energy now exceeds investment in fossil fuels by almost two to one, a trend that will continue as countries strive to meet net-zero commitments.⁶

However, the transition is not simply about replacing old energy systems with new ones. It depends on vast supply chains for critical minerals such as lithium, nickel, cobalt, and rare earth elements—all essential to the manufacturing of batteries, electric vehicles, and renewable energy technologies.

As demand for these resources increases, competition for their supply and processing capacity has become a feature of the global energy landscape.

The scale of change is unprecedented. The International Energy Agency projects that demand for lithium will increase from 165 kilotonnes in 2023, to 1,326 kilotonnes in 2040—a projected rise of 703.6 per cent—while the demand for nickel and rare earths will likely double.⁷ Meeting this demand sustainably and securely has become one of the defining economic and strategic challenges of our time.

TABLE 1: Demand for critical minerals.

	2023 demand (kt)	Projected 2040 demand (kt)	Projected % increase by 2040
COPPER 	25,855	36,379	40.7
LITHIUM 	165	1,326	703.63
NICKEL 	3,104	6,238	100.97
COBALT 	215	454	111.16
GRAPHITE 	4,632	16,023	245.92
RARE EARTH ELEMENTS 	93	169	81.72

Data sourced from IEA dashboards⁸

The climate imperative

The urgency behind the green energy transition is rooted in the science of climate change. The Intergovernmental Panel on Climate Change (IPCC) warns that global emissions must decline by almost half this decade to limit warming to 1.5 degrees Celsius above pre-industrial levels, a threshold beyond which the risks of severe climate disruption escalate rapidly.⁹ The Indo-Pacific region is home to more than half of the world's population and around 60 per cent of global emissions, thus it will determine whether the 1.5 degree target is achievable.¹⁰

For vulnerable states across the Pacific and Southeast Asia, climate change is not an abstract concern but an existential threat.

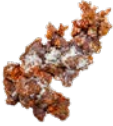


Rising sea levels, extreme weather, and declining food and water security are already undermining livelihoods and stability. These realities are driving many regional governments to prioritise renewable energy and climate adaptation, recognising that a sustainable energy transition is also a security imperative.¹¹

Australia has its own targets: to reduce emissions to 62–70 per cent below 2005 levels by 2035 and achieve net zero by 2050.¹² Achieving this goal will require major investment in renewable capacity, transmission infrastructure, and industrial transformation. Yet it also presents an opportunity for Australia—and particularly WA—to strengthen regional partnerships and drive clean energy collaboration across the Indo-Pacific.

The strategic dimension: Energy, security and competition

While climate action provides the moral and environmental rationale, strategic competition is now a key force shaping the green energy transition. Clean energy supply chains have become a new arena for geopolitical contest, determining not only who powers the global economy, but who controls the technologies and materials that underpin it.¹³

TABLE 2: 2030 projected top critical minerals producers.

		Projected top 3 producers (mining) by 2030	Projected top 3 producers (refining) by 2030
COPPER		Chile (23%) Democratic Republic of the Congo (14%) Peru (10%)	China (46%) Democratic Republic of the Congo (7%) Chile (5%)
LITHIUM		Australia (33%) China (23%) Chile (12%)	China (57%) Chile (15%) Argentina (13%)
NICKEL		Indonesia (62%) Philippines (8%) New Caledonia (6%)	Indonesia (44%) China (21%) Japan (6%)
COBALT		Democratic Republic of the Congo (66%) Indonesia (10%) Russia (3%)	China (74%) Finland (6%) Japan (4%)
GRAPHITE		*Top 3 producers (all grades) China (82%) Madagascar (3%) Mozambique (2%)	*Top 3 producers (battery grade) China (93%) Japan (3%) United States (1%)
RARE EARTH ELEMENTS		China (54%) Australia (18%) Myanmar (9%)	China (77%) Malaysia (12%) Australia (3%)

Data sourced from IEA dashboards.¹⁴

China currently dominates the global processing of critical minerals, refining around 70 per cent of the world's lithium, 60 per cent of cobalt, and nearly 90 per cent of rare earths.¹⁵ This concentration poses vulnerabilities for countries seeking to build resilient, diversified, and transparent supply chains. As a result, major economies are moving to secure alternative sources and supply chains through alliances, trade agreements, and industrial policy.¹⁶

Internationally, laws such as the European Union's *Critical Raw Materials Act* (2023)¹⁷ have contributed to greater investment in cleaner, more secure supply chains. Within the Indo-Pacific region, initiatives such as the Minerals Security Partnership¹⁸, the Indo-Pacific Economic Framework (IPEF)¹⁹, and the Quad Critical Minerals Initiative²⁰ aim to link likeminded countries in new networks of cooperation. These efforts are not only about sustainability, but also sovereignty and strategic autonomy.

Energy transition technologies are increasingly viewed as strategic infrastructure. Whoever leads in areas like hydrogen production, battery storage, and grid technologies will shape the energy geopolitics of the future.²¹ This dynamic is blurring the boundaries between economic and security policy.

For many nations, energy independence and climate ambition are now inseparable from national resilience and strategic influence.

For Australia, this shift reinforces the importance of secure supply chains, stable investment frameworks, and deepening partnerships with trusted regional allies. Japan and South Korea are already major investors in Australia's hydrogen and ammonia projects, while India's growing clean technology ambitions create new openings for collaboration. These partnerships extend beyond trade—they form the foundation of a shared vision for stability and decarbonisation.²²

Western Australia's role

WA sits at the crossroads of this transformation. It's resource-rich, strategically located, and closely connected to Indo-Pacific markets. The state produces more than half of the world's lithium and holds significant reserves in nickel, cobalt, and rare earth elements, which are materials essential to batteries, wind turbines, and electric vehicles.²³ Its reliable governance and regulatory environment make it one of the world's most trusted suppliers of critical resources.

CRITICAL MINERALS AND VALUE-ADDING

WA's mining and resources sector is rapidly expanding beyond extraction towards refining and manufacturing. The Kwinana Strategic Industrial Area's nickel sulphate and lithium hydroxide refineries, the Kemerton Strategic Industrial Area's lithium hydroxide processing, and the rare earths processing plant in Kalgoorlie demonstrate just some of the growing downstream capability.²⁴ These projects aim to capture more value onshore and strengthen Australia's position within allied supply chains.

The WA government's *Battery and Critical Minerals Strategy 2024-2030*²⁵ emphasises this opportunity, identifying local processing and manufacturing as strategic priorities.

HYDROGEN AND RENEWABLE ENERGY HUBS

WA is also leading in renewable hydrogen and green-ammonia production, particularly in the Pilbara and Mid West regions. Projects like the Australian Renewable Energy Hub²⁶ and the Murchison hydrogen project²⁷ aim to export clean fuels to countries like Japan, Korea, and Singapore who will heavily rely on imported hydrogen to meet their decarbonisation goals.

At the same time, emerging battery-precinct projects, such as in Kwinana²⁸ and Collie²⁹, are building foundations of an integrated clean energy ecosystem that links mining, processing, power generation, and exporting. With the right policy settings, WA could evolve from a commodities exporter to a global centre for clean-energy innovation.

STRATEGIC PARTNERSHIPS AND ECONOMIC RESILIENCE

WA's role extends beyond economics. As energy and security increasingly converge, the state's industrial base supports Australia's broader strategic objectives. Reliable supply chains for critical minerals and hydrogen align directly with AUKUS, the Quad, and other regional frameworks designed to bolster allied resilience and reduce dependence on contested or insecure markets.

By fostering transparent investment rules, environmental stewardship, and Indigenous engagement, WA can enhance its reputation as a partner of choice. Building local skills and infrastructure is essential—particularly in engineering, energy transmission, and advanced manufacturing—and ensuring that regional communities benefit from the clean energy boom will help secure long term public support and social licence.



Policy implications: From climate to strategy

The green energy transition represents one of the greatest structural shifts in global history. For Australia, success will depend on connecting three objectives: climate ambition, economic opportunity, and strategic resilience.

The way forward:

- 1 Link climate and national security policy.**
Energy resilience must be recognised as a pillar of national security. Diversified, low-carbon energy systems reduce exposure to global shocks, protect critical infrastructure, and enhance sovereign capability.³⁰
- 2 Invest in value-adding and manufacturing.**
Moving up the value chain from resource extraction, to processing, component manufacturing, and technology development, will allow Australia to capture more of the clean energy dividend. Partnerships with allies like Japan, Korea, and the United States can de-risk investment and create shared standards.³¹
- 3 Strengthen regional cooperation.**
The Indo-Pacific's clean energy challenge is also an opportunity for diplomacy. Australia can use its expertise, resources, and credibility to build partnerships that advance both climate and strategic goals.
- 4 Build public confidence and capability.**
The transition will require major workforce reskilling, new infrastructure, and community buy-in. Public communication, education, and equitable distribution of benefits will be critical to maintaining political and social support.

The green energy transition is reshaping how nations produce, trade, and project power. It's a critical climate policy, but it's also an economic transformation and a strategic imperative. As the Indo-Pacific moves towards a cleaner energy future, those who can supply, innovate and lead in sustainable technologies will define the next era of regional influence. WA's combination of natural resources, industrial capacity, and Indo-Pacific connections give it an outsized role in this new landscape.



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