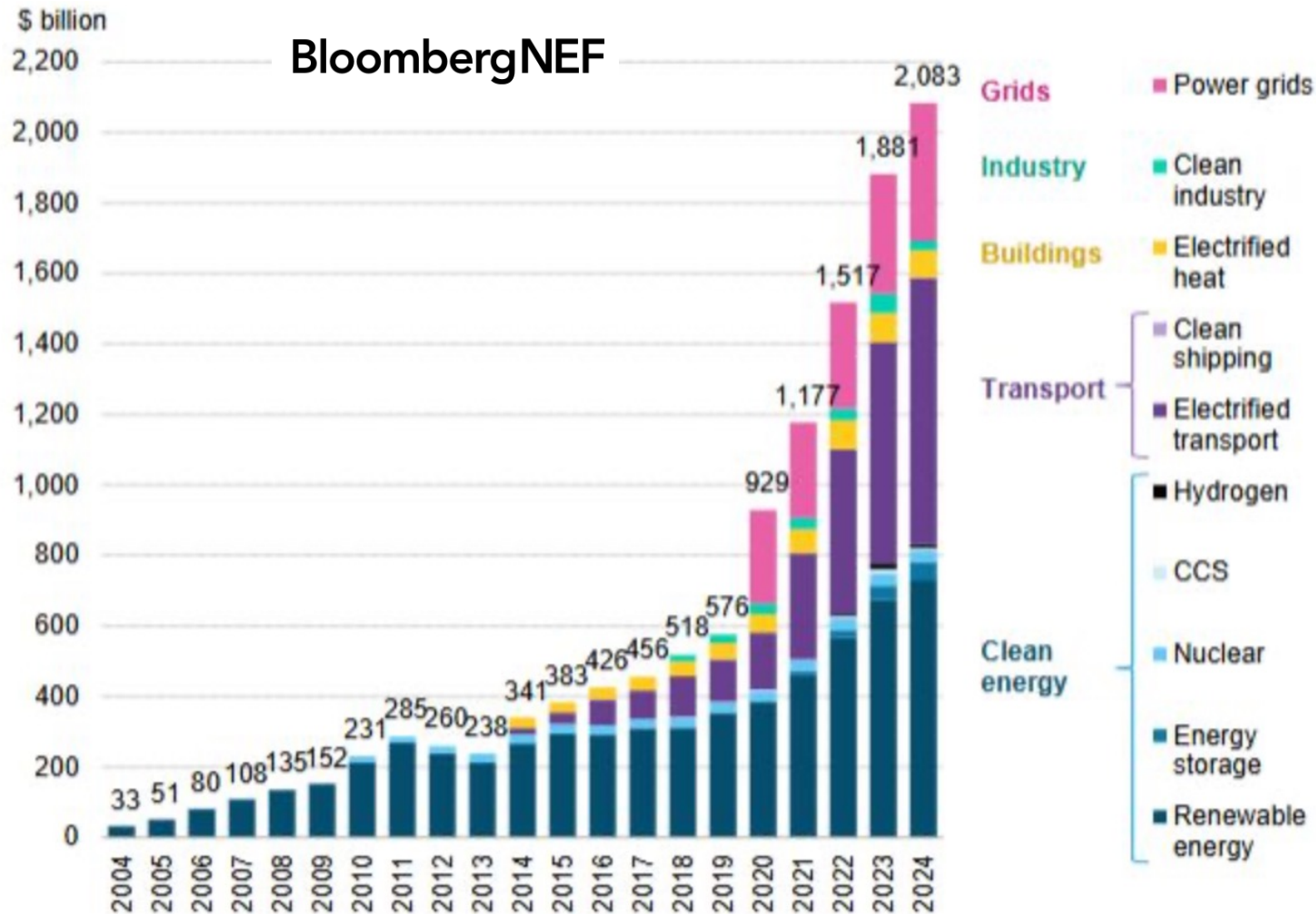


The future is now, new pathways for change: For Australia, the opportunities, and risks, are huge

Tim Buckley, Founder Climate Energy Finance,
tim@climateenergyfinance.org 11 March 2025

Global capital is moving, at scale

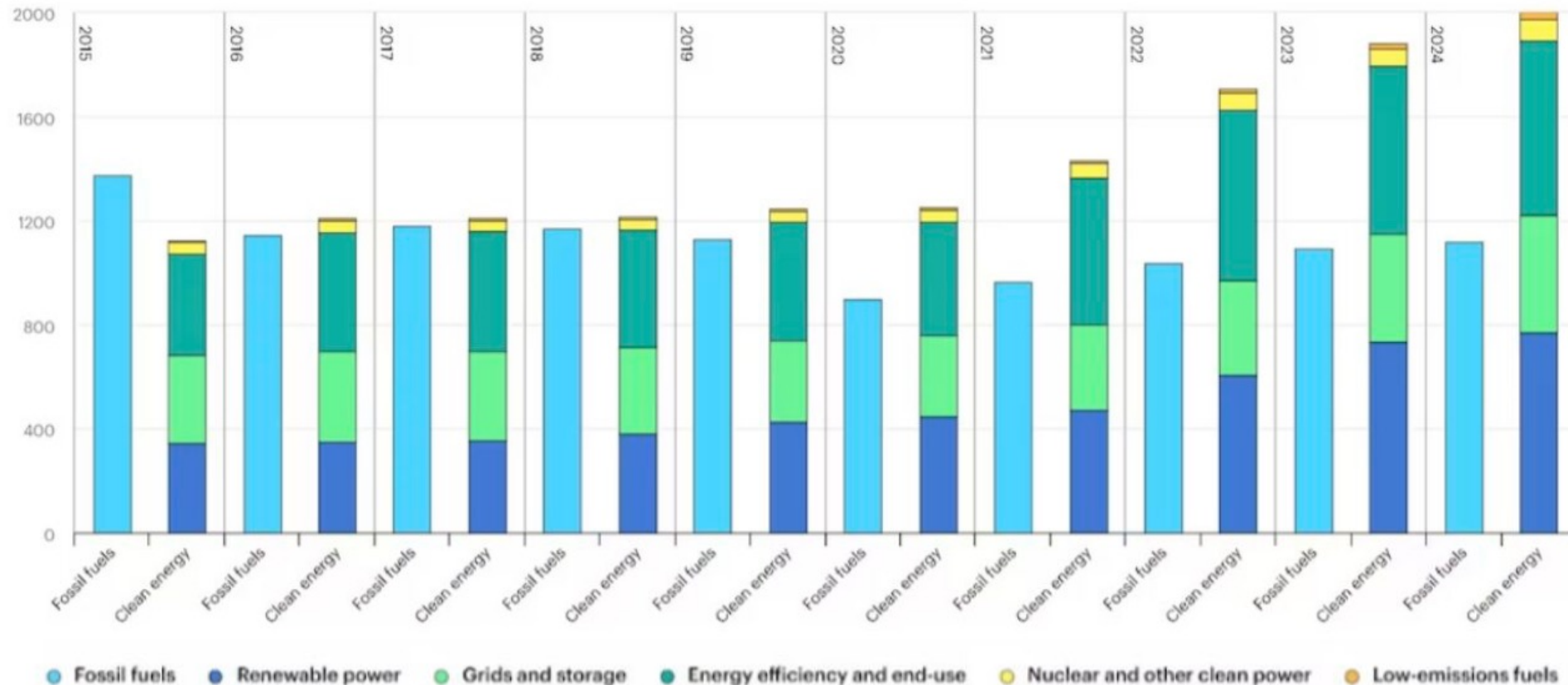
The world invested US\$2.1 trillion in cleantech in 2024, +11% yoy



Global capital is moving, at scale

The world invested US\$2.1 trillion in cleantech in 2024, double the global investment in fossil fuels

billion USD (2023, MER)



Source: IEA World Energy Investments 2024

Global capital is moving, at scale

The European Commission announced another €100+ billion for clean industrial investments

Europe's clean industrial future

27 February 2025

Yesterday, one of the year's most awaited legislative pronouncements was unveiled, as European Commission President Ursula von der Leyen [presented the EU Clean Industrial Deal](#) — a roadmap to strengthen Europe's industrial competitiveness & accelerate decarbonisation.

Bringing together energy-intensive industries & clean-tech innovation, the [Clean Industrial Deal](#) sets the course for a climate-neutral and resilient European economy. Landing as a response to geopolitical tensions, economic slowdowns, and increasing global competition, the deal has been labelled a big win for clean-tech manufacturers and industrial decarbonisation aiming to ensure that Europe's industries remain at the forefront of the green transition. Key initiatives are:

- €100+ billion mobilised for clean industrial investments, including a new Industrial Decarbonisation Bank.
- Made in Europe" incentives to ensure EU procurement prioritises sustainable, locally produced clean tech.
- Support for energy-intensive sectors (steel, cement, chemicals) to cut emissions while maintaining competitiveness.
- An [Affordable Energy Action Plan](#) to lower energy bills for industries, businesses and households and speed up the roll-out of clean energy and accelerate electrification and interconnectivity, making the link between security of supply and competitiveness abundantly clear.
- Looser state aid rules to help industries transition to low-carbon production and green manufacturing.
- New Circular Economy & Raw Materials Plan in 2026 to reduce waste and secure key industrial materials.
- Skills & workforce development to create new green jobs in industrial regions.
- Carbon Border Tax (CBAM) adjustments to protect EU industries from carbon-intensive imports.

Europe has the largest ETS globally by value, with a carbon price of €60-80/t

Very hard for Australian finance and industry to act without one. The Safeguard Mechanism is a good start, we need to advocate for an Asian CBAM.

NSW Treasury states all Government agencies must apply a shadow carbon price of A\$130/t (rising to A\$350/t in 2024 \$ terms by 2040) when valuing carbon emission impacts in cost-benefit analysis (CBA).

https://www.treasury.nsw.gov.au/sites/default/files/2024-12/tpg24-34_carbon-emissions-in-the-investment-framework-v1.pdf

Australia has made Significant Progress since 2023

Strategic public capital is a key facilitator, in the absence of a CO₂ price signal

FMIA, CIS, RTN, NRF, Future Fund, CEFC, ARENA, EFA, NAIF

Capacity Investment Scheme

The Capacity Investment Scheme (CIS) is an Australian Government revenue underwriting scheme to accelerate investment in:

- 23 GW of renewable capacity representing \$52 billion in investment
- 9 GW of clean dispatchable capacity representing \$15 billion in investment.

South Australia
 Australian Associated Press
 20 Feb 2025

Troubled Whyalla steelworks gets \$2.4bn government bailout as hunt for new owner begins

“Crucial support:” Federal Labor launches \$2bn green aluminium production credit scheme

 RENEW ECONOMY **Andrew Brown** Jan 20, 2025

Rio Tinto says aluminium could run on renewables and batteries

FINANCIAL REVIEW Feb 6, 2025

Rewiring the Nation Fund

The \$19 billion Rewiring the Nation (RTN) Fund is a significant expansion of CEFC investment capacity, with a particular focus on facilitating the timely delivery of grid and transmission projects, using CEFC capital to accelerate the benefits of grid transformation to consumers, including helping to lower consumer energy costs.

\$200 million investment in critical minerals to build Australia's future

15 January 2025

The Hon Ed Husic MP
 Minister for Industry and Science

The Albanese Government’s National Reconstruction Fund Corporation (NRFC) will invest \$200 million in Arafura Rare Earths to help build Australia’s Future.

China's Electrification and Decarbonisation is Accelerating

China's electricity grid capacity grew +15% yoy in CY2024, by 429GW; 87% of being zero emissions capacity
 Australia installs as much renewable energy capacity in a year as China does every week

New Capacity Installed in China in Jan-Dec 2024

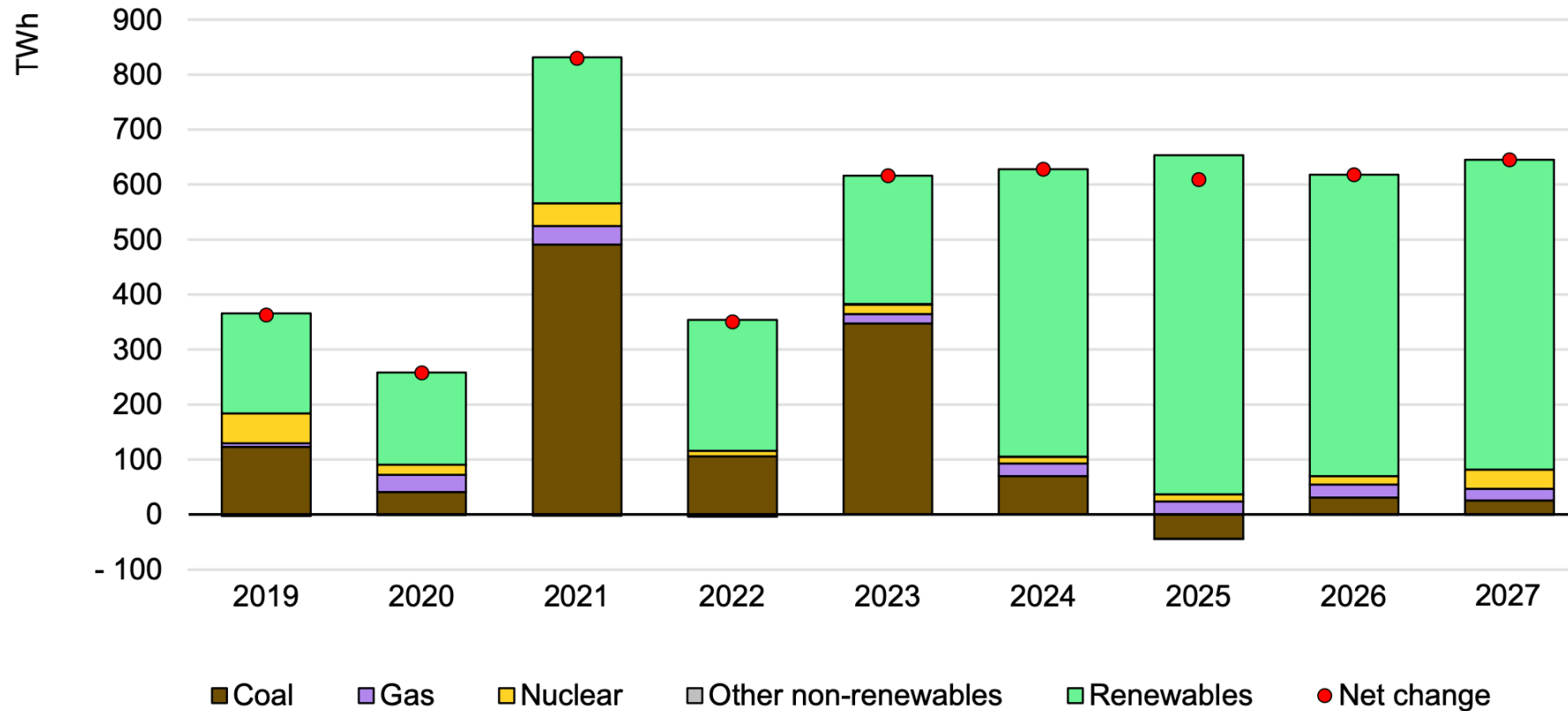
		Jan-Dec 2024	Share of new adds (%)	Change (yoy %)	Dec-24	Share of new adds (%)
Thermal Power	GW	54.1	13%	4%	6.7	6%
Hydropower	GW	14.4	3%	3%	4.4	4%
Nuclear Power	GW	3.9	1%	7%	2.7	2%
Wind Power	GW	79.3	18%	18%	27.6	25%
Solar Power	GW	277.2	65%	45%	70.9	64%
Total capacity added	GW	429.0	100%	15%	112.3	100%
Renewable Energy adds	GW	370.9	86%	25%	102.9	92%
Zero Emissions Capacity Adds	GW	374.8	87%	25%	105.6	94%
Investment in Completed Power Grid Project	1 billion yuan	608.3		15%	79.3	

Source: NBS, CEF Estimates

China's Electrification and Decarbonisation is Accelerating

The IEA models peak coal in China in 2024, and ~95% of electricity generation growing being zero emissions

Year-on-year change in electricity generation in China, 2019-2027

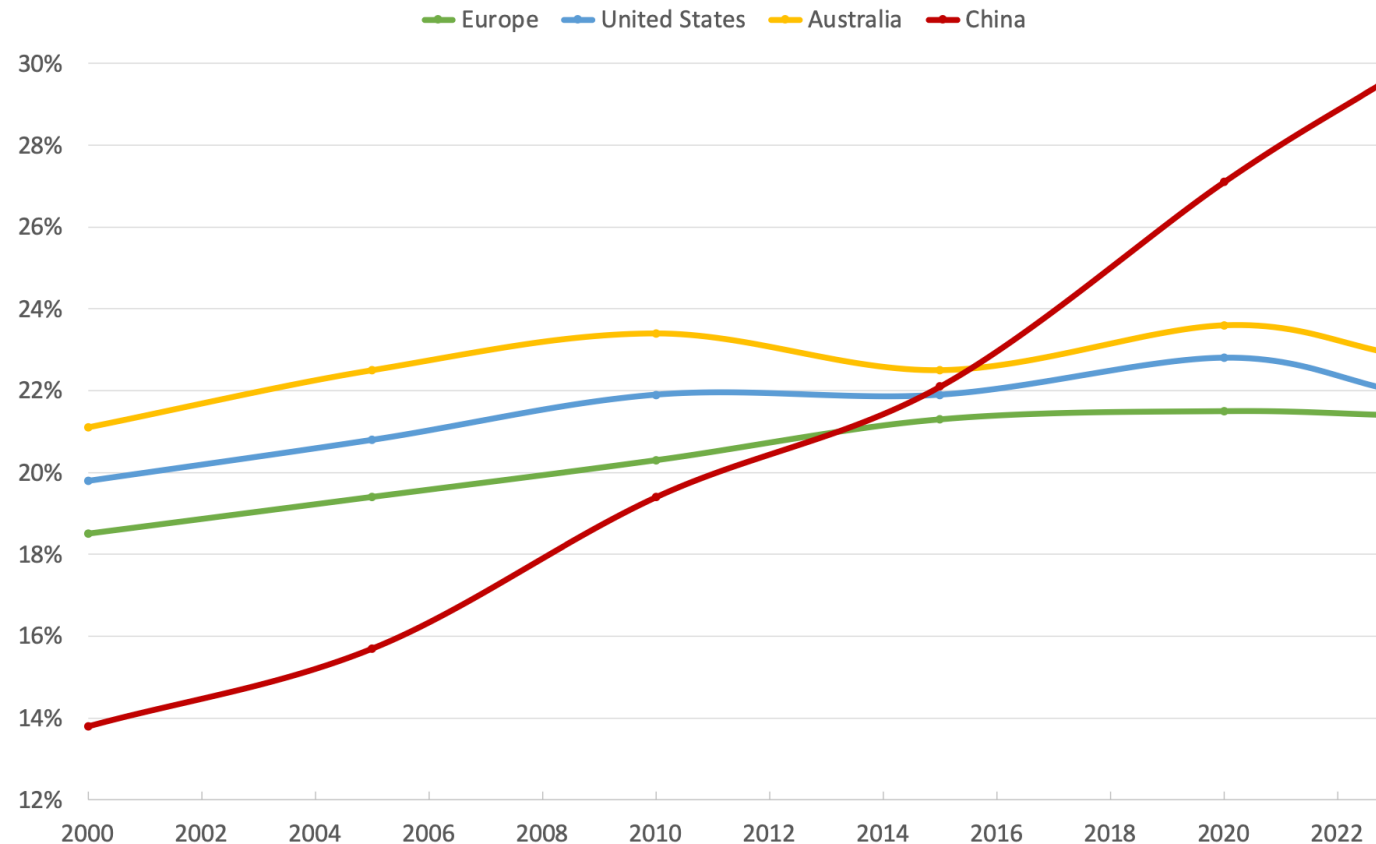


Source: IEA Electricity 2025
<https://iea.blob.core.windows.net/assets/77522eb7-49c8-4611-851e-59bd5b93454c/Electricity2025.pdf>

China's Electrification and Decarbonisation is Accelerating

China leads the world in its three-decade long program of progressive electrification of everything

Figure 4: Share of electricity in final energy consumption



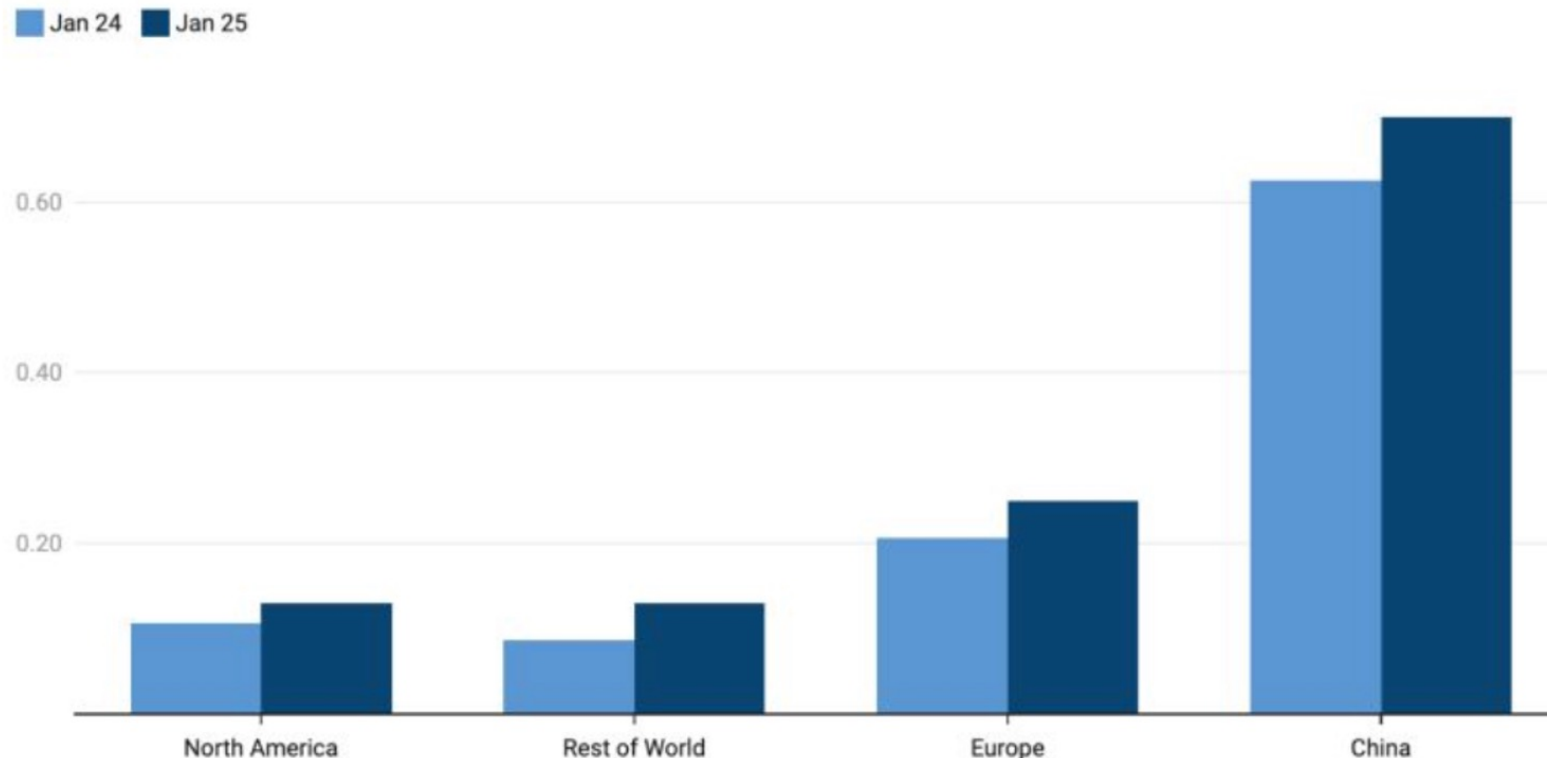
Source: Enerdata, CEF calculations

China's Electrification and Decarbonisation is Accelerating

China leads the world in new energy vehicle adoption; we need to avoid taking a western centric perspective

Global EV sales grew by 18% year-on-year in January 2025

EV sales, million units



Source: Rho Motion

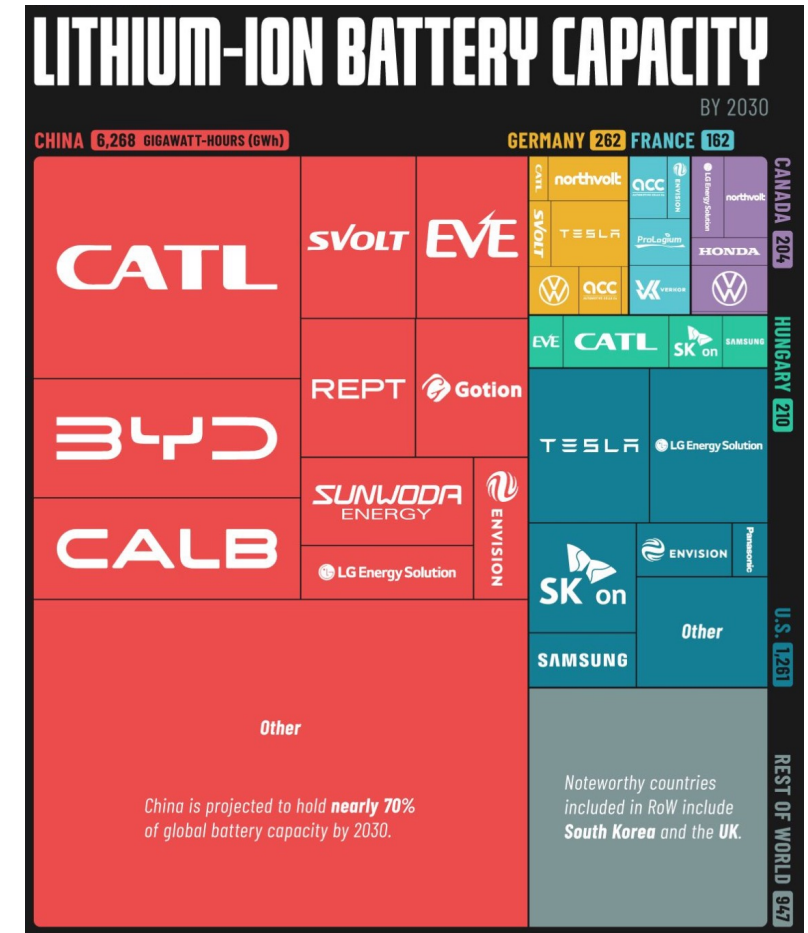
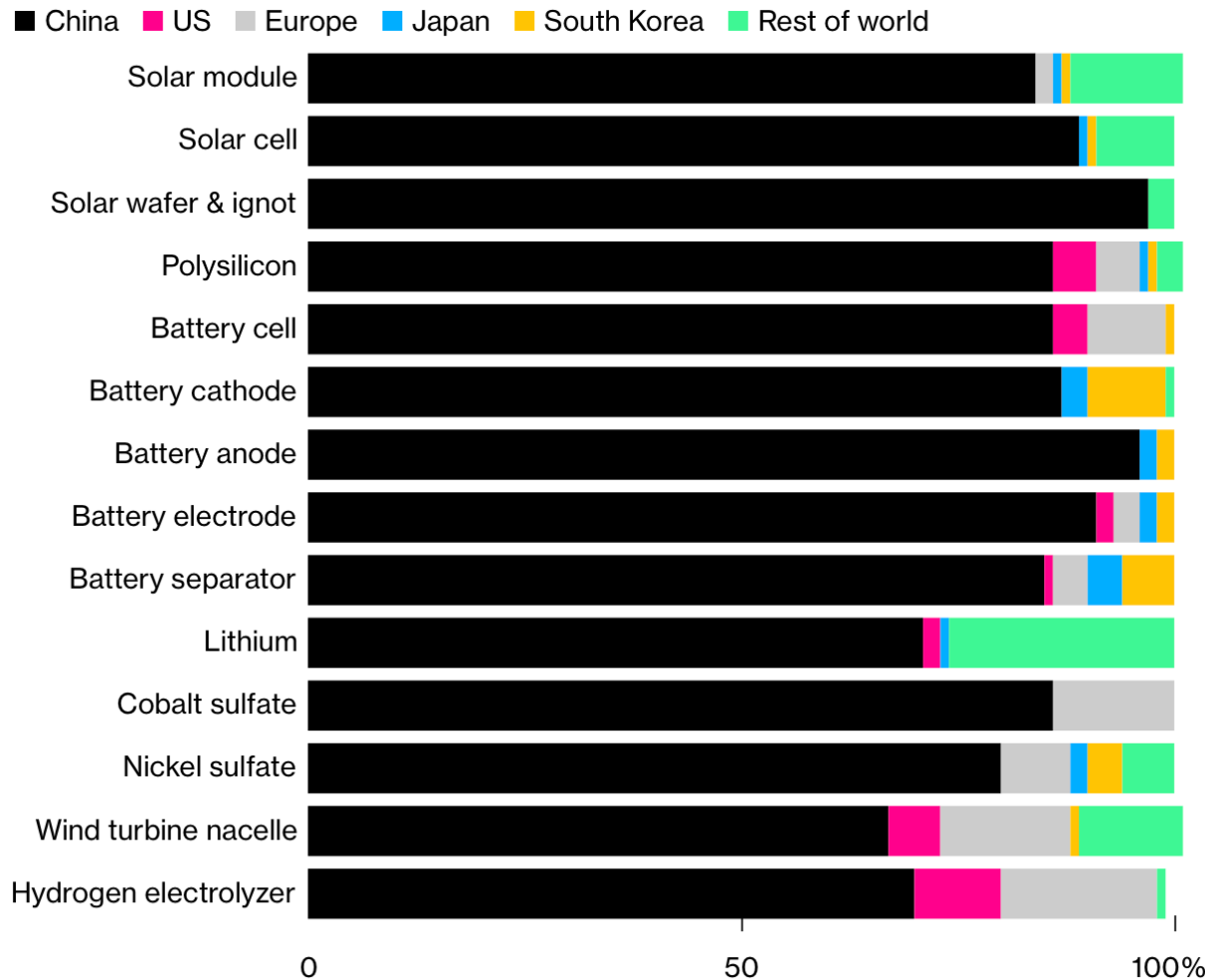
CarbonBrief
CLEAR ON CLIMATE

China's wholesale new energy vehicle sales in 2MCY2025 were 1.732 million, +49% y-o-y. This was a record 54% share of total vehicle sales in China.

<https://www.chinaz.com/2025/03/05/1672811.shtml>

China's Electrification and Decarbonisation is Accelerating

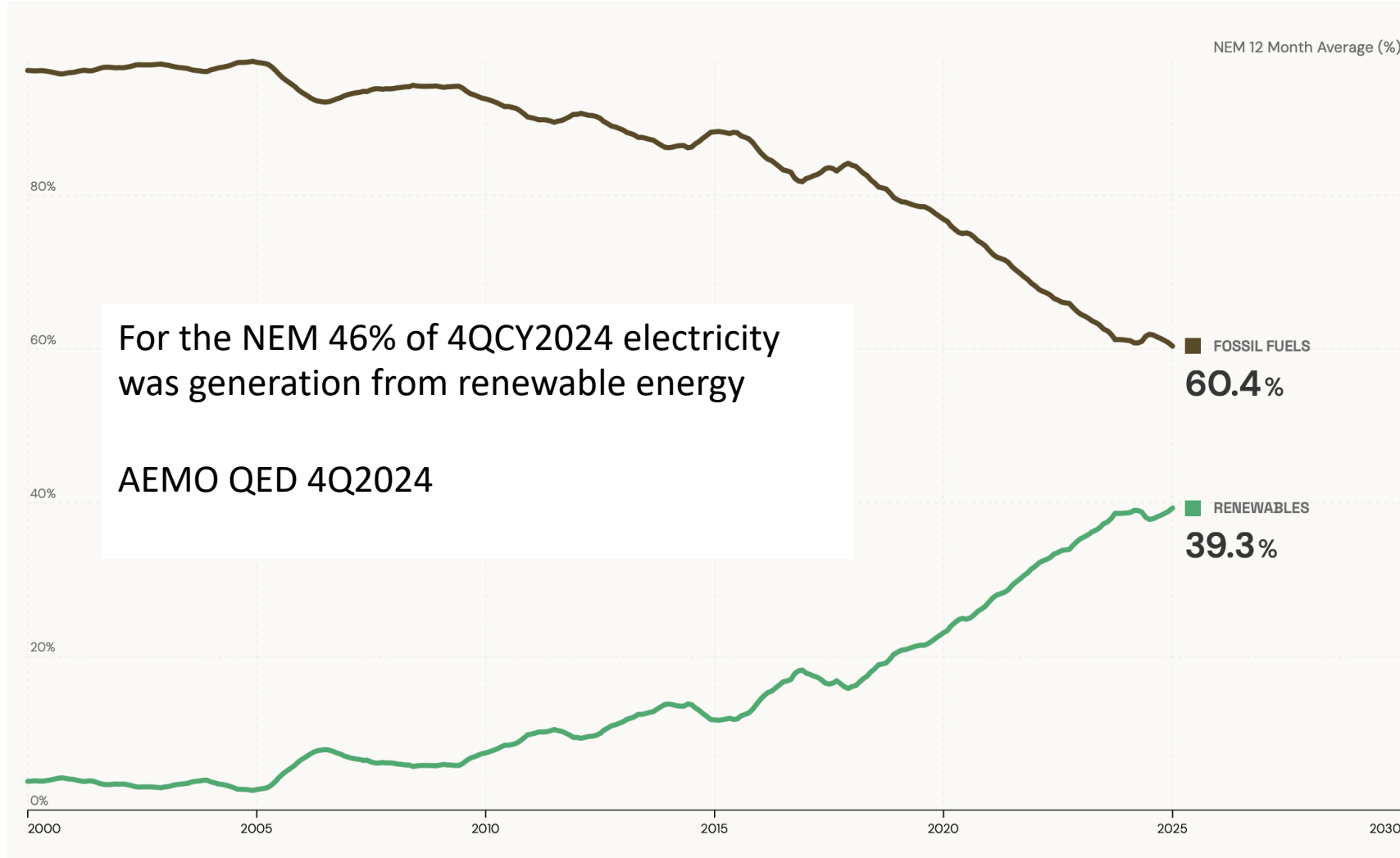
China now dominates global cleantech manufacturing, RD&D, domestic installs, exports and OFDI



Source: BloombergNEF, <https://www.bloomberg.com/news/newsletters/2024-04-16/china-extends-clean-tech-dominance-over-us-despite-biden-s-ira-blueprint>

NEM Electrification and Decarbonisation

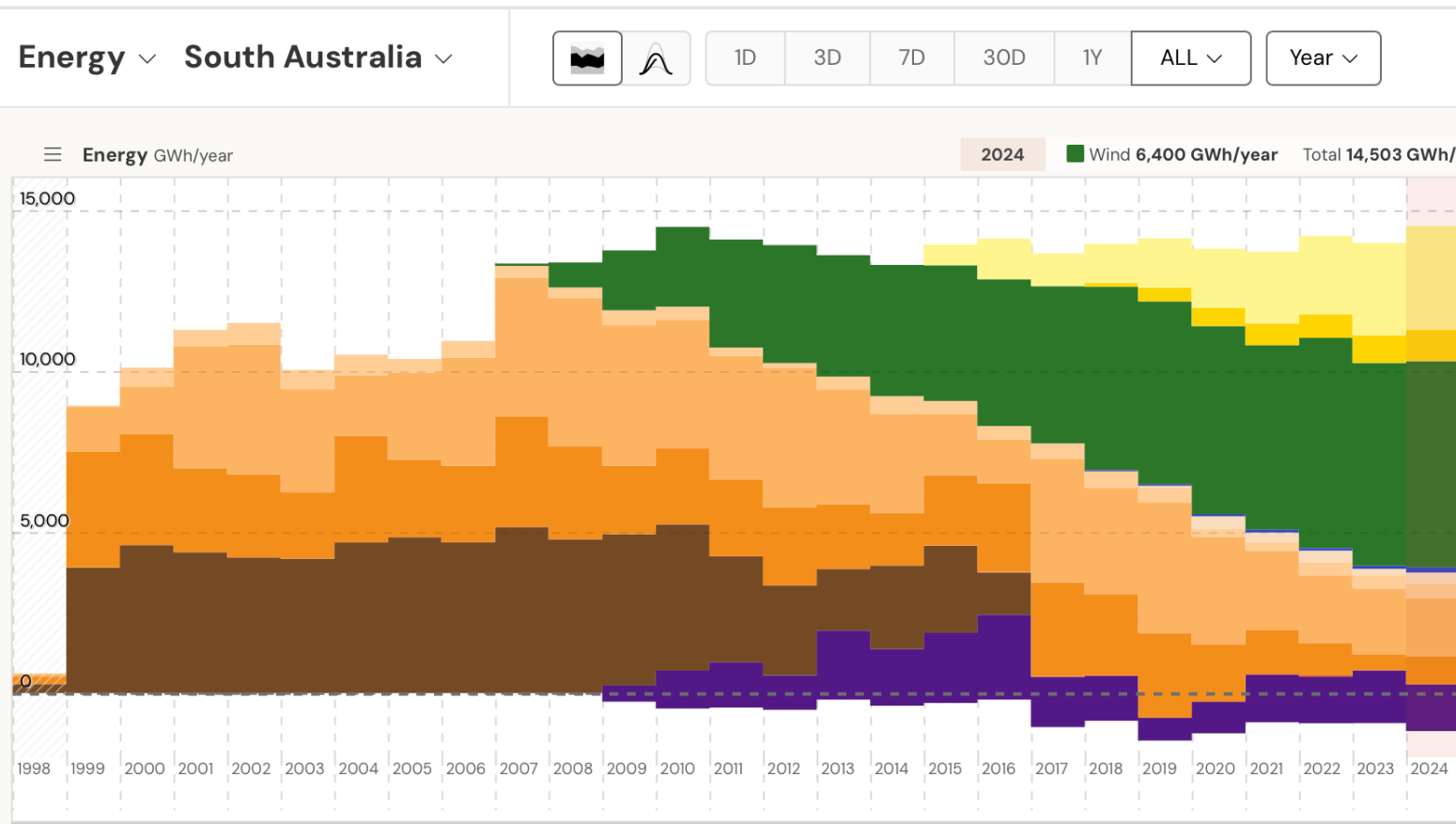
Electrification & Decarbonisation – National Electricity Market (NEM) CY2024 @ 39.3% renewables; 2MCY2025 @ 44.0%



South Australia – Decarbonisation Leader

Electrification & Decarbonisation: SA CY2024 averaged 71.9% variable renewable energy (2MCY2025 73.6%)

Open Electricity

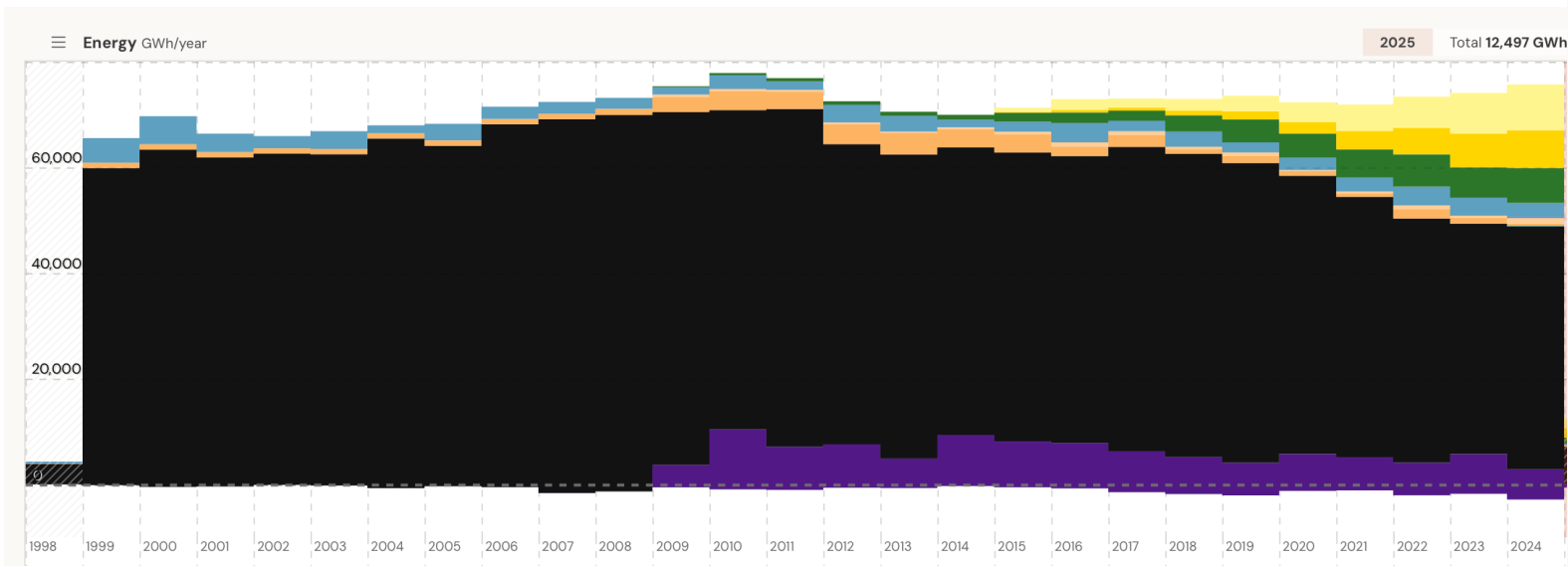


	Energy GWh	Contribution to demand	Av.Value \$/MWh
Sources			
Solar (Rooftop)	3,214	21.8%	\$27.20
Solar (Utility)	976	6.6%	\$44.06
Wind	6,400	43.5%	\$64.59
Battery (Discharging)	167	1.1%	\$263.83
Gas (Reciprocating)	344	2.3%	\$230.06
Gas (OCGT)	459	3.1%	\$445.34
Gas (CCGT)	1,794	12.2%	\$211.81
Gas (Steam)	874	5.9%	\$172.97
Distillate	9.7	0.07%	\$1,581.53
Coal (Brown)	0	0.0%	-
Imports	1,444	9.8%	\$0.00
Loads			
Exports	-957	-6.5%	\$0.00
Battery (Charging)	-223	-1.5%	\$26.61
Net	14,503		
Renewables	10,591	71.9%	

Source: Open Electricity, <https://explore.openelectricity.org.au/energy/sa1/?range=all&interval=1y&view=discrete-time&group=Detailed>
 AEMO QED 4QCY2024 <https://aemo.com.au/energy-systems/major-publications/quarterly-energy-dynamics-qed>

NSW Decarbonisation is Accelerating, From a Slow Start

Electrification & Decarbonisation – NSW CY2024 averaged 33% renewable energy (40.8% Jan-Feb'25)

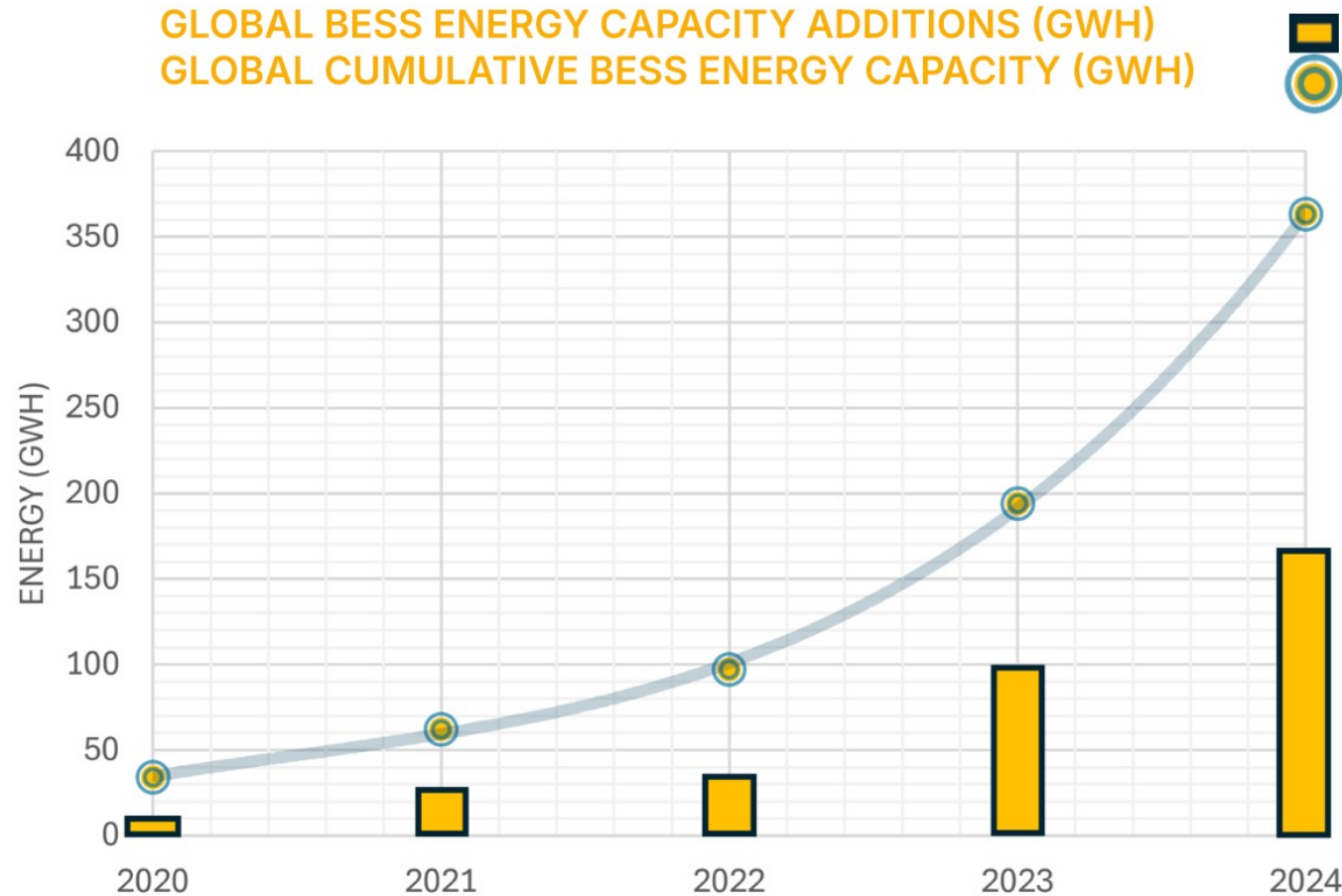


NSW needs to move decisively to unlock \$20-30bn new energy infrastructure investment over the coming decade.

	Energy GWh	Contribution to demand	Av.Value \$/MWh
Sources			
Solar (Rooftop)	1,883	14.9%	\$59.72
Solar (Utility)	1,743	13.8%	\$55.97
Wind	1,197	9.4%	\$88.96
Hydro	311	2.5%	\$172.72
Battery (Discharging)	20.5	0.2%	\$174.03
Gas (OCGT)	125	1.0%	\$160.60
Gas (CCGT)	47	0.4%	\$121.54
Distillate	0.09	0.0007%	\$1,628.86
Bioenergy (Biomass)	29.1	0.2%	\$88.05
Coal (Black)	7,111	56.1%	\$99.38
Imports	659	5.2%	\$0.00
Loads			
Exports	-459	-3.6%	\$0.00
Pumps	-136	-1.1%	\$8.04
Battery (Charging)	-33	-0.3%	\$51.32
Net	12,497		
Renewables	5,162	40.8%	

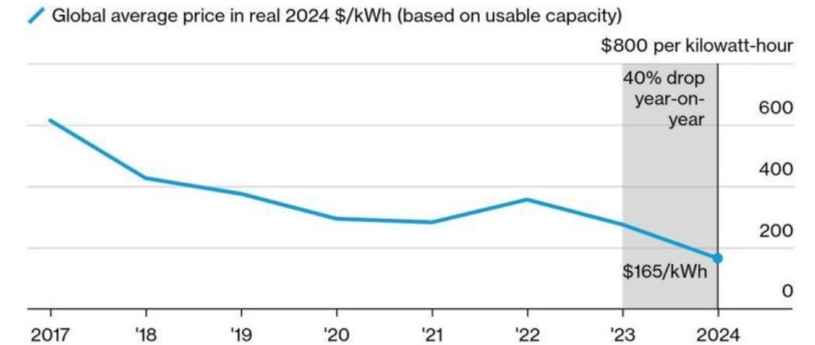
NSW Decarbonisation is Accelerating, From a Slow Start

BESS + Solar + V2G / EV => Accelerating Energy System Disruption



Energy Storage System Costs Drop 40% to Lowest in 2024

Historical prices for turnkey energy storage systems



Source: BloombergNEF

Note: Turnkey systems include all project equipment excluding EPC and grid connection. Pricing based on usable capacity. Prices for 2023 and 2024 are for all durations and volume-weighted averages by region, while 2017-2022 prices are for four-hour systems only. Additional details in BNEF report.

BloombergNEF

Source: PowerSwitch, Volta Foundation 2024 Battery Report

<https://volta.foundation/battery-report-2024>

NSW Decarbonisation is Accelerating, From a Slow Start

Electrification & Decarbonisation – grid reliability

NSW 27 Feb 2025 LTESA Tender 5 Awarded

Successful projects in NSW Roadmap Tender Round 5

Project name	Proponent	Technology	Capacity	Storage duration
ACEN Phoenix PHES	ACEN Phoenix Pty Ltd	PHES	800 MW / 11,990 MWh	15 hours
Stoney Creek BESS	Enervest Utility Pty Ltd	BESS (Lithium-ion)	125 MW / 1,000 MWh	8 hours
Griffith BESS	Ekus Energy Projects (Australia) Pty Ltd	BESS (Lithium-ion)	100 MW / 800 MWh	8 hours

NSW: Decarbonisation or Deindustrialisation?

Rio says ‘extremely expensive’ power could seal Tomago fate in 2029

Peter Ker AFR Resources reporter Feb 20, 2025

Rio Tinto says Australia’s biggest aluminium smelter at Tomago will be unviable beyond 2028 based on the power price contracts offered to date, and the mining giant wants to decide on the smelter’s future within six months.

Speaking just hours after **Glencore** chief Gary Nagle said high power prices were threatening the future of Queensland’s only copper smelter, Rio CEO Jakob Stausholm said efforts to strike a clean energy future for the Tomago smelter in NSW were lagging the strong progress made for Queensland’s Boyne smelter.



A clean energy transformation of Tomago aluminium smelter in NSW faces a sliding doors moment in 2025

Rio Tinto says aluminium could run on renewables and batteries

Peter Ker Resources reporter Feb 6, 2025 AFR

Rio Tinto is studying the installation of batteries at its Queensland aluminium smelter in the belief that rapid reductions in the cost of energy storage could pave a way for intermittent renewables to provide the smelter’s enormous and constant electricity needs.

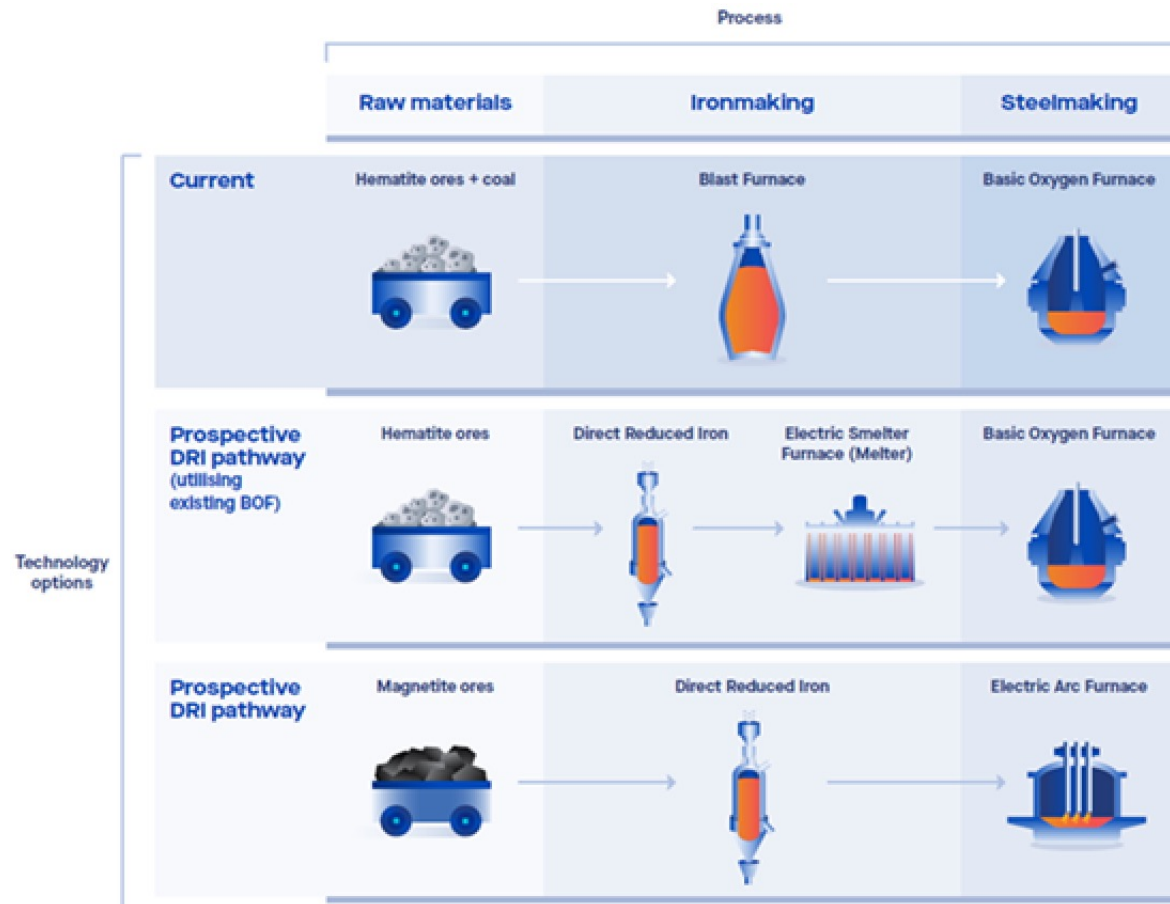
The global boss of Rio’s aluminium division, Jerome Pecresse, toured Rio’s Australasian smelters last week and said there was no reason why batteries could not provide the “firming” power required by smelters when generation from solar and wind ebbs to low levels.



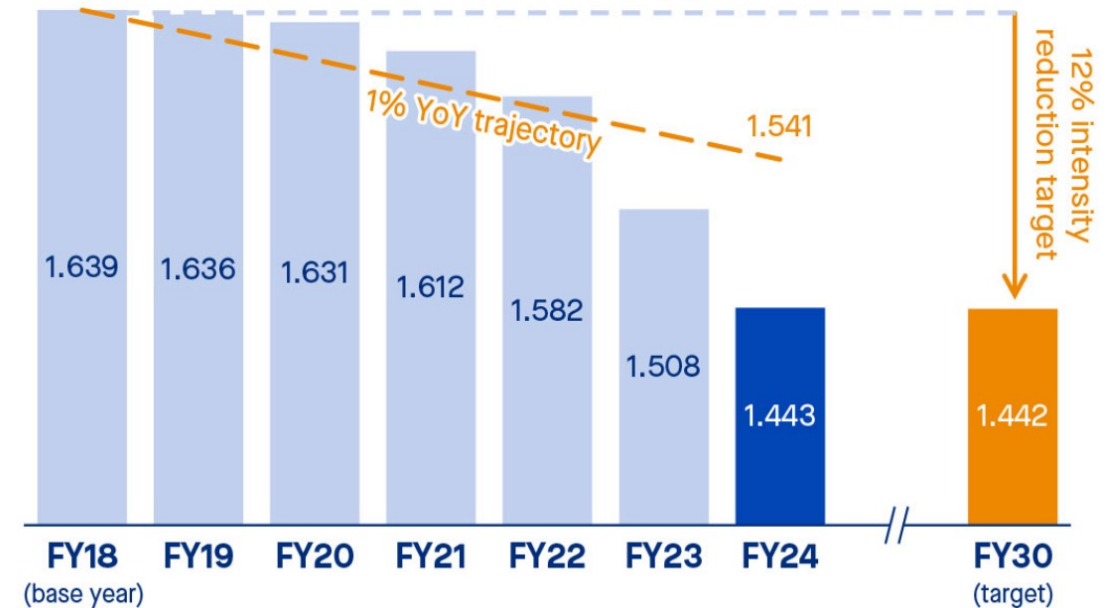
Price premiums for low carbon aluminium are starting to emerge.

NSW: Decarbonisation or Deindustrialisation?

Electrification and decarbonisation – Port Kembla Steelworks



GHG EMISSIONS INTENSITY FOR STEELMAKING ACTIVITIES^{1,2}(tCO₂-e/raw steel tonnes)



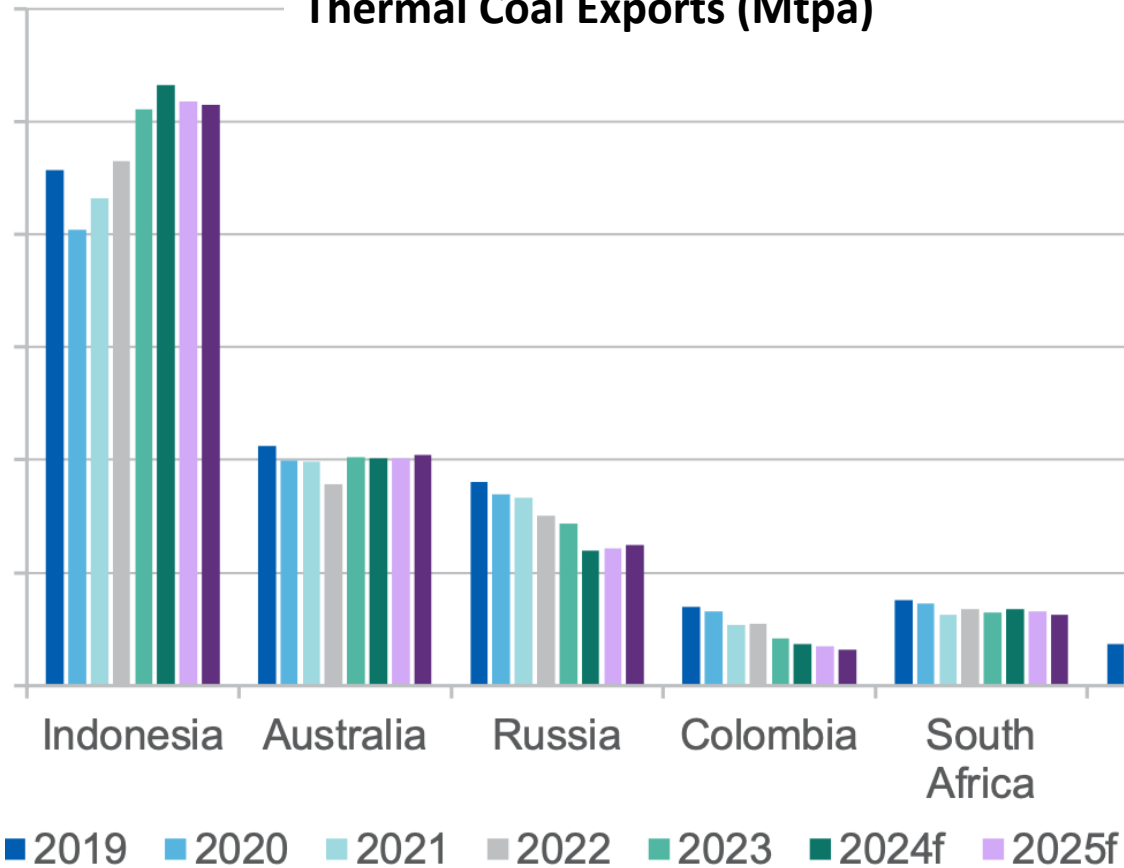
1% pa is far from aligned with NZE by 2050!

NSW: What if our Trade Partners Deliver on their Paris Commitments?

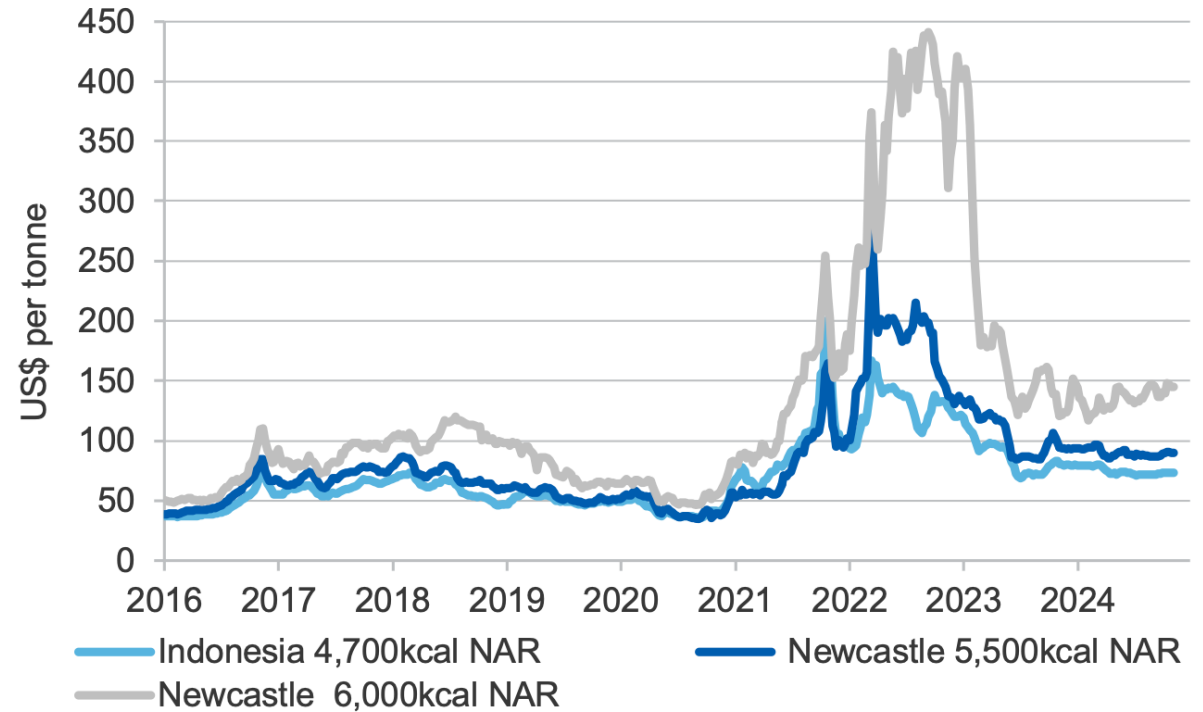
NSW Exports – thermal coal in long term terminal decline

What replaces this export value for NSW as our key North Asian trade partners deliver on their Paris Agreements

Thermal Coal Exports (Mtpa)



Thermal Coal Export Prices (US\$/t)



We need stronger methane MRV under the safeguard mechanism.

Source: DISR, <https://www.industry.gov.au/sites/default/files/2025-02/Resources-and-energy-quarterly-December-2024.pdf>

NSW: Decarbonisation or Deindustrialisation?

A contrived methane gas shortage: Production up 300% over the last decade, Domestic demand down 40%

East Australia Gas Demand - Quarterly Assessment

Demand	4QCY2023 PJ	4QCY2024 PJ	4QCY2024 Share
Domestic markets	57.5	54.4	12%
Gas-fired generation	16.8	20.8	5%
Queensland LNG Export	365.3	382.6	84%
Total	439.6	457.9	100%

New Pt Kembla LNG import facility – locking in expensive gas.

NSW needs to replicate Victoria's Gas Substitution Roadmap.

Thank you

Please contact us for further information

Tim Buckley, Founder of CEF, a not-for-profit public interest thinktank focused on mobilising capital at scale and speed for the energy system transformation. tim@climateenergyfinance.org