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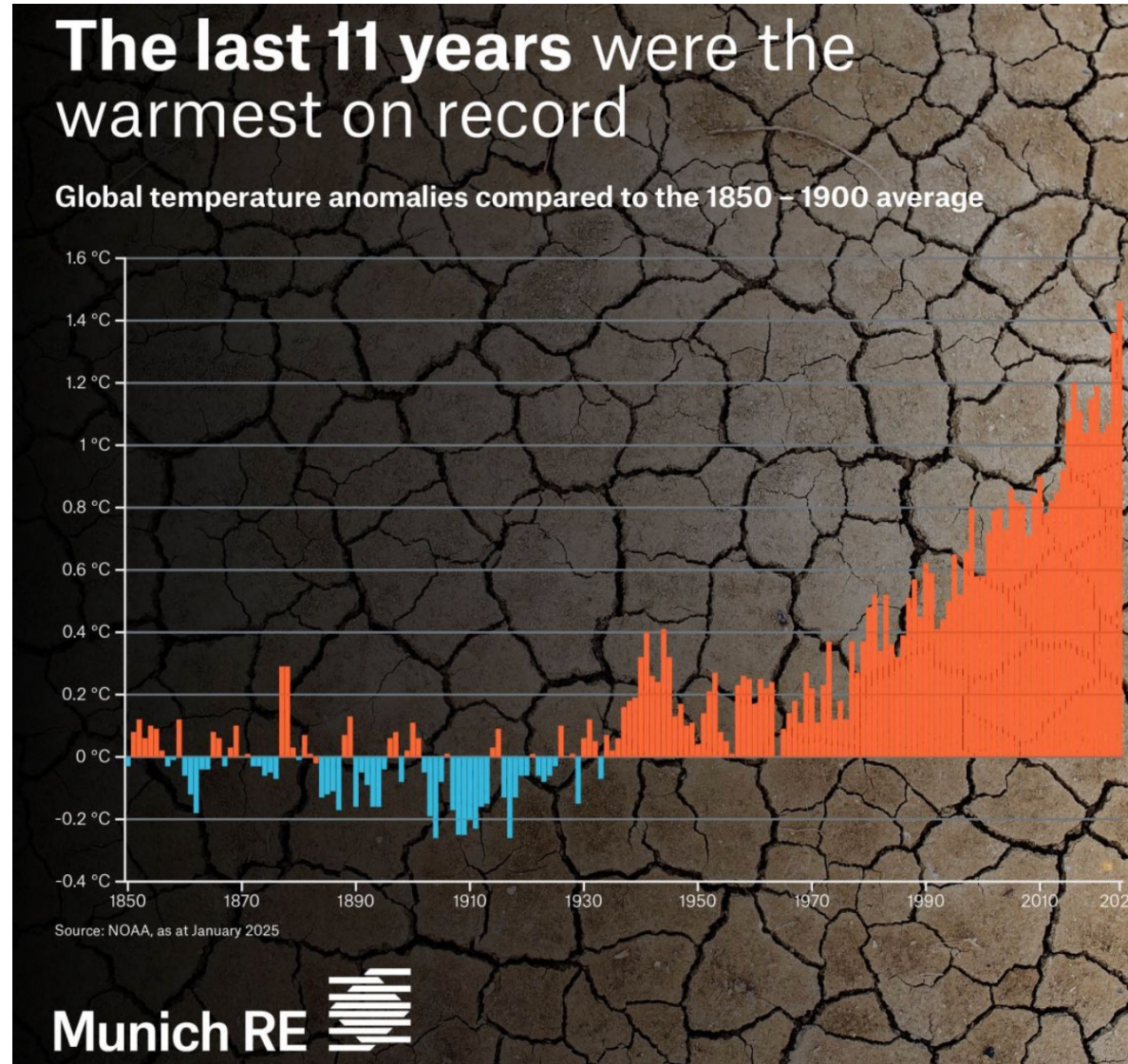
Asia Climate Tech Venture Fair Sentosa

**The Accelerating Technology
Driven Global Energy System
Transformation, & Shifting
Geopolitics of Electrostates**

28 October 2025

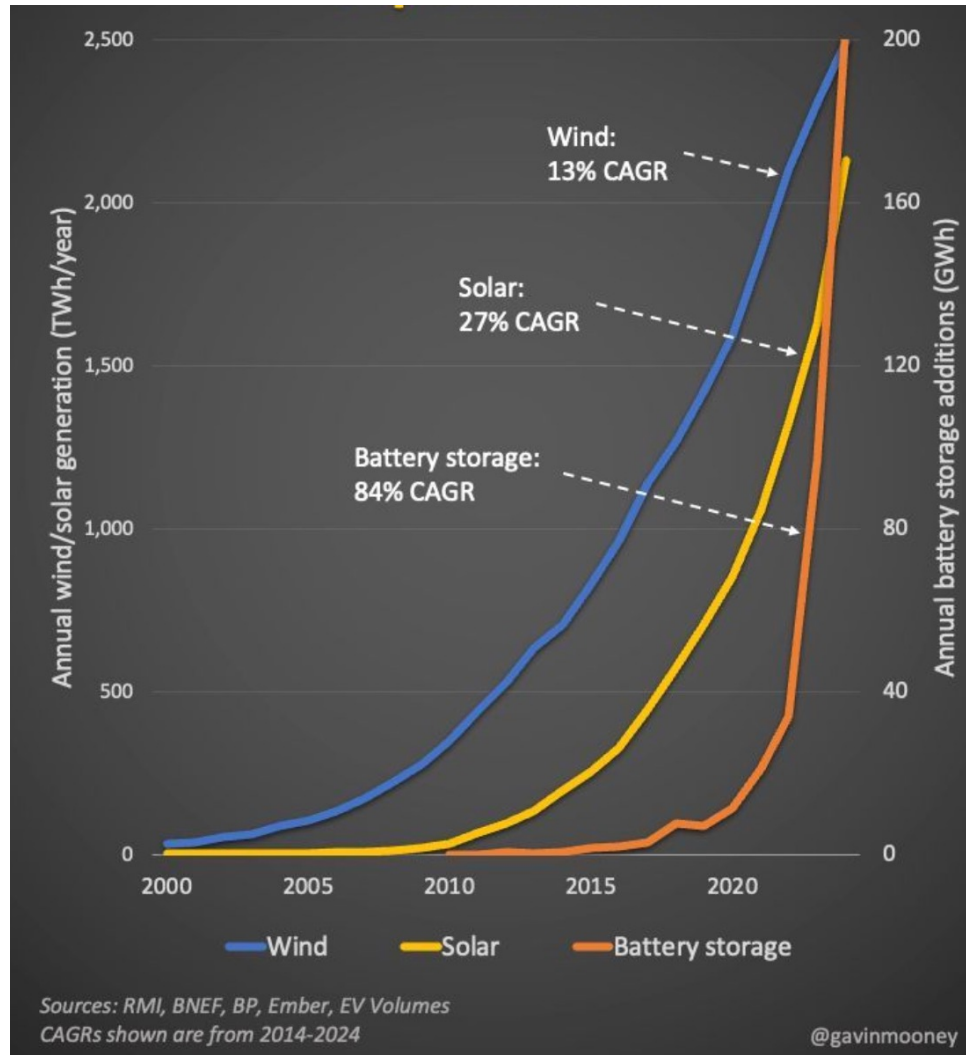
CEF accepts the climate science

CEF is a public interest thinktank with no government or corporate funding



Global Cleantech Investment is Accelerating

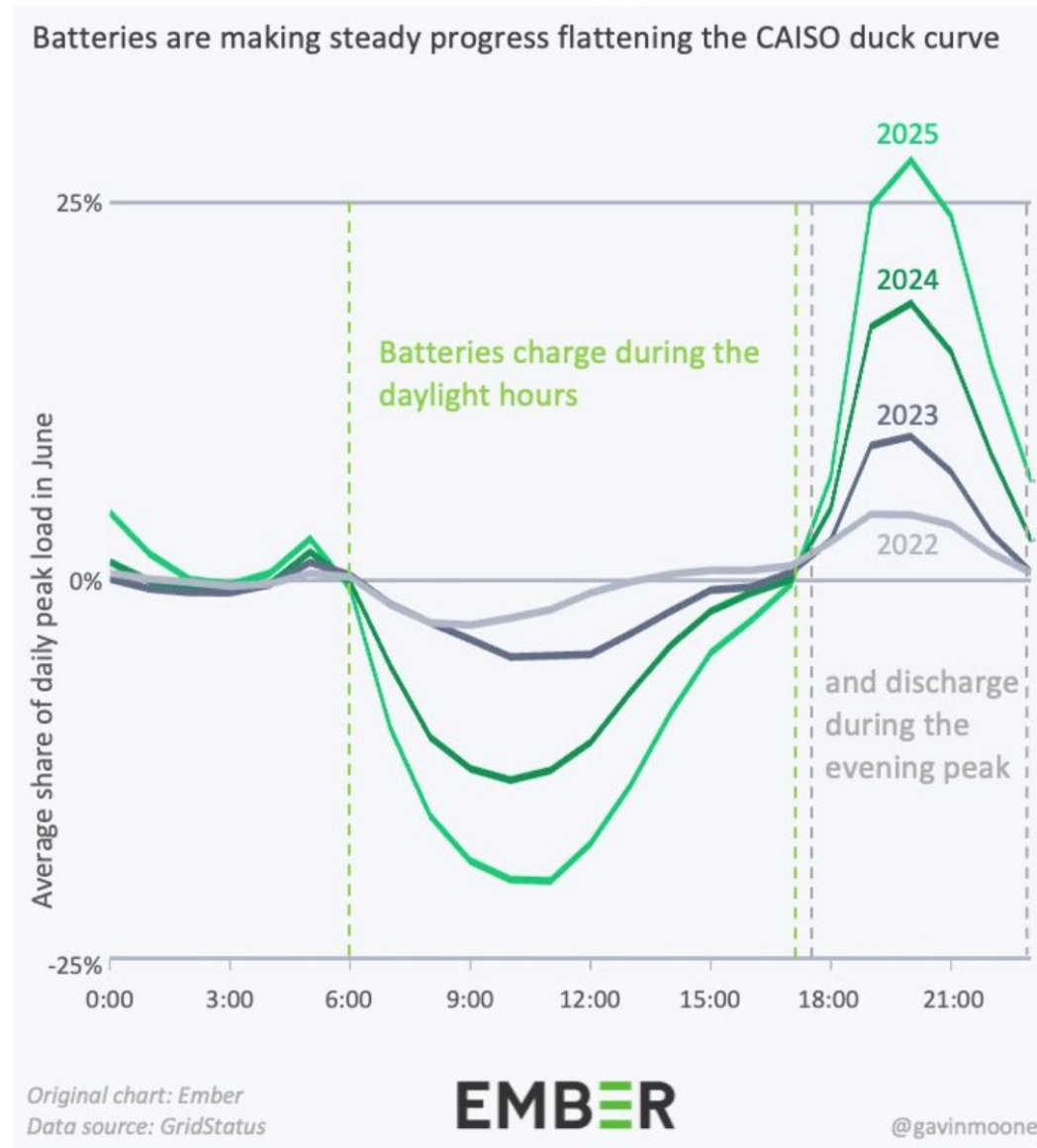
As Battery Prices fell 50% in 2 years, global installations have taken off
Solar + BESS + V2G => Accelerated Energy System Transformation US\$2TRN investment in 2025,
double the expenditure on fossil fuels



IRENA 22 July 2025: In 2024, solar PV was, on average, 41% cheaper than the lowest-cost fossil fuel alternatives, while onshore wind projects was 53% cheaper. Onshore wind remained the most affordable source of new RE electricity at US\$34/MWh, followed by solar PV at US\$43/MWh.

Global Cleantech Investment is Accelerating

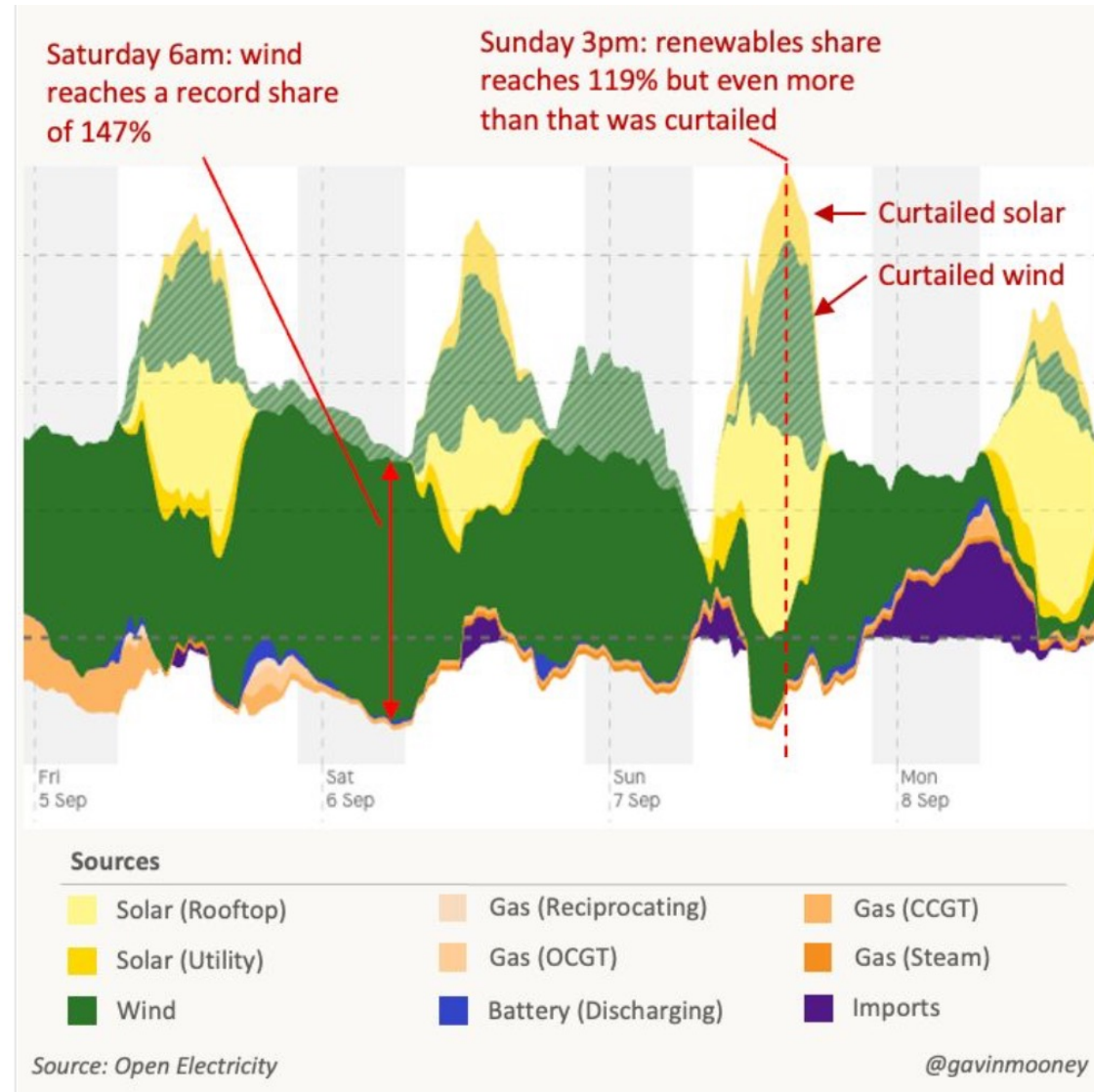
Solar + BESS + V2G => Accelerated Energy System Transformation: California



Source: Gavin Mooney, Kaluza

Global Cleantech Investment is Accelerating

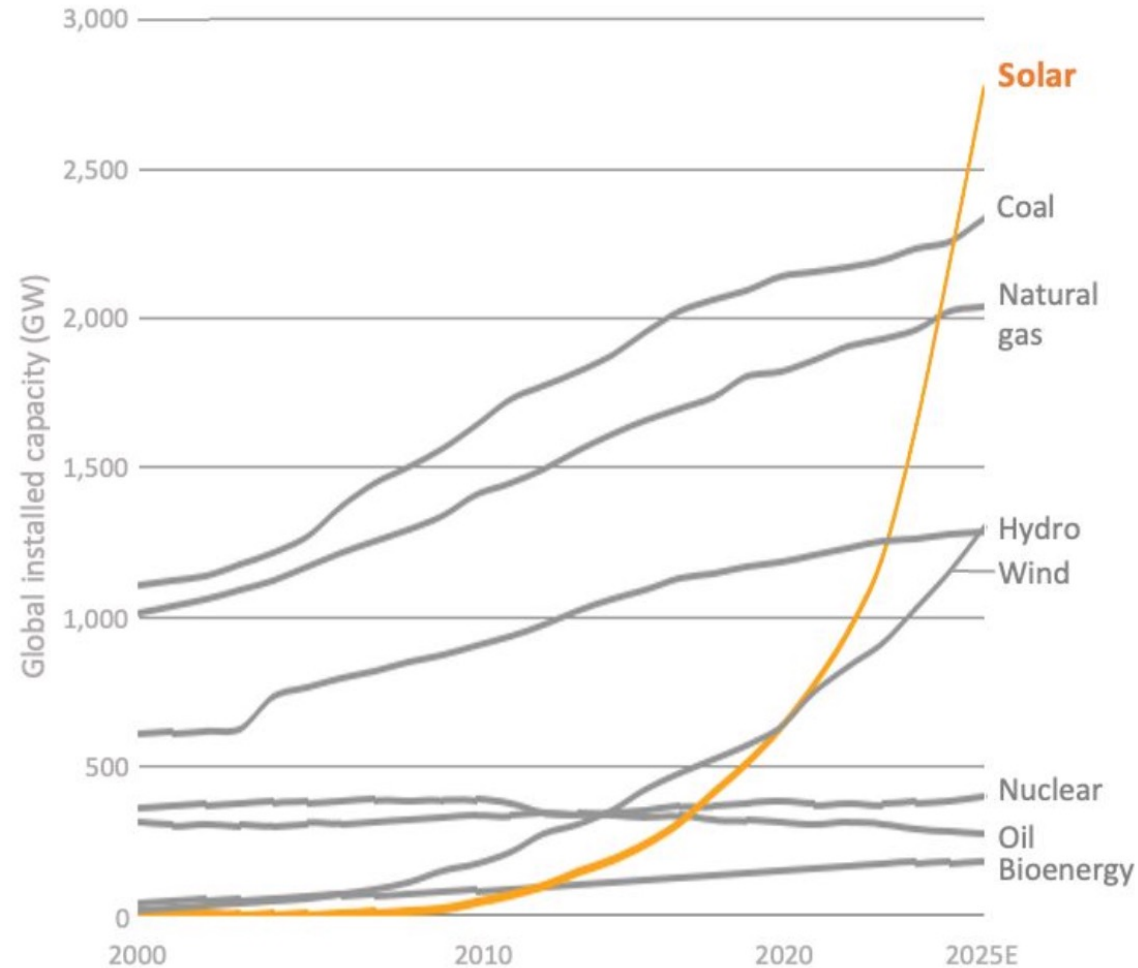
Looking to the grid of the future – look at South Australia today!
Records are falling, with a VRE share CY2024 of 72% (VRE 2.2% curtailment)



Source: Gavin Mooney, Kaluza

Global Cleantech Investment is Accelerating

Solar has gone from the smallest to the largest source of capacity (not generation) globally in just 15 years



6

China is Moving in Decarbonisation, Rapidly

China is still adding flexible coal power plants (too much!), but utilization rates are down to average just 45% in 8MCY2025, balancing ever more VRE! China deployed 295GW of renewable energy capacity in 8M to-date CY2025.

China deploys as much wind 4 days as Australia does each year.

New Capacity Installed in China in Jan-Aug 2025

		Jan-Aug 25	% Share of new adds	% yoy change	Aug-25	% Share of new adds
Fossil Power	GW	50	14%	74%	7.9	39%
Hydropower	GW	7	2%	4%	1.0	5%
Nuclear Power	GW	-	0%	0%	-	0%
Wind Power	GW	58	17%	72%	4.2	20%
Solar Power	GW	231	67%	65%	7.4	36%
Total capacity added	GW	345	100%	64%	20.4	100%
Renewable Energy adds	GW	295	86%	64%	12.5	61%
Zero Emissions Capacity Adds	GW	295	86%	63%	12.5	61%
YTD power grid investment	US\$bn	53		14%		

Source: National Energy Administration; CEF Estimates

China is Moving in Decarbonisation, Rapidly

China's thermal coal use declined -0.4% yoy in 8M CY2025
This trend masks the rapid reduction in oil imports as China progressively electrifies everything, including transport thanks to EVs.

China's Power Generation Mix in Jan-Aug 2025

		Jan-Aug 25	% Change yoy	Share of generation	Aug-25	% Change yoy
Fossil Power	TWh	4,058	-0.4%	59%	610	2.1%
<i>Coal</i>	TWh	3,859	-0.5%	56%	579	1.8%
<i>Gas</i>	TWh	188	0.5%	3%	30	8.0%
<i>Other Fossil</i>	TWh	11	0.2%	0%	2	6.9%
Bioenergy	TWh	130	0.1%	2%	20	5.5%
Hydropower	TWh	847	-4.6%	12%	149	-9.4%
Nuclear Power	TWh	322	10.2%	5%	43	5.9%
Wind Power	TWh	745	16.4%	11%	71	28.7%
Solar Power	TWh	820	41.6%	12%	124	39.3%
TOTAL POWER GENERATION	TWh	6,922	4.8%	100%	1,016	5.3%
Variable Renewable Generation	TWh	1,565	28.4%	23%	194	35.2%
Zero Emissions Power Generation	TWh	2,864	13.2%	41%	406	10.5%

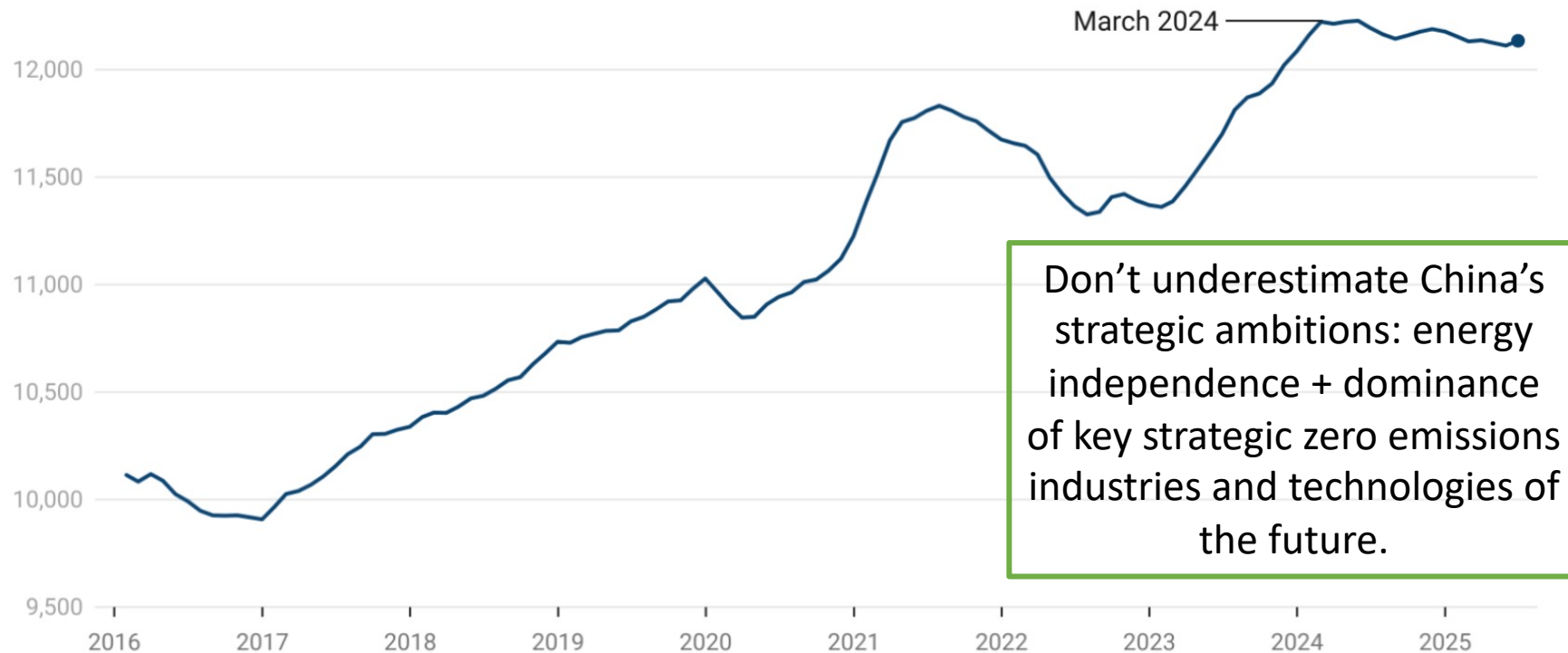
Source: Ember; CEF Estimates

China's electrification leadership drives decarbonisation

China's electrification is about energy security i.e. permanently reducing reliance on imported fossil fuels. Combined with lower steel and cement production => national emissions in China have plateaued.

China's CO2 emissions continued to fall in first half of 2025

Emissions from fossil fuels and cement, MtCO2, rolling 12-month totals



Source: National Bureau of Statistics, China Customs data, WIND information and National Energy Administration

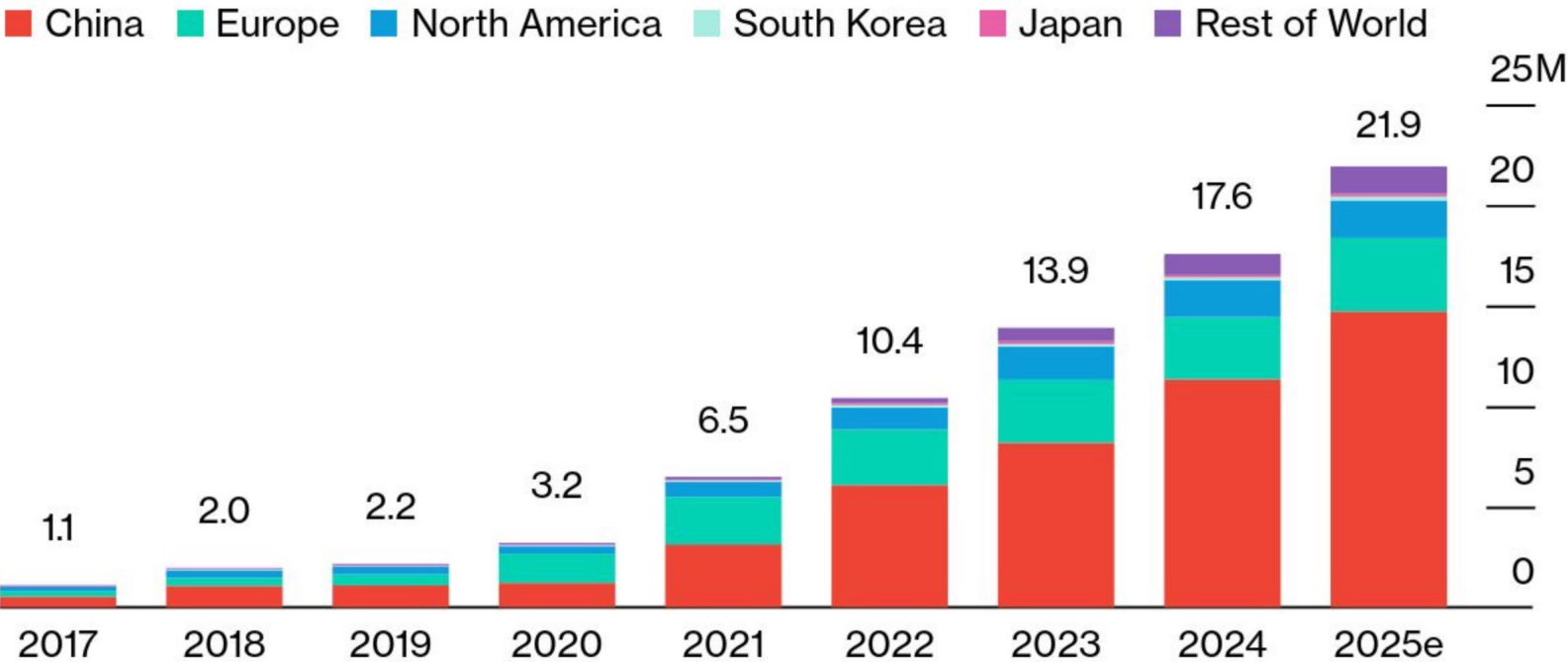
CarbonBrief
CLEAR ON CLIMATE

China's Global Cleantech Investment Dominance

Global EV Sales By Region

Global Passenger EV Sales Set To Grow 25% in 2025

Number of new passenger electric vehicles sold annually



Source: BloombergNEF, MarkLines

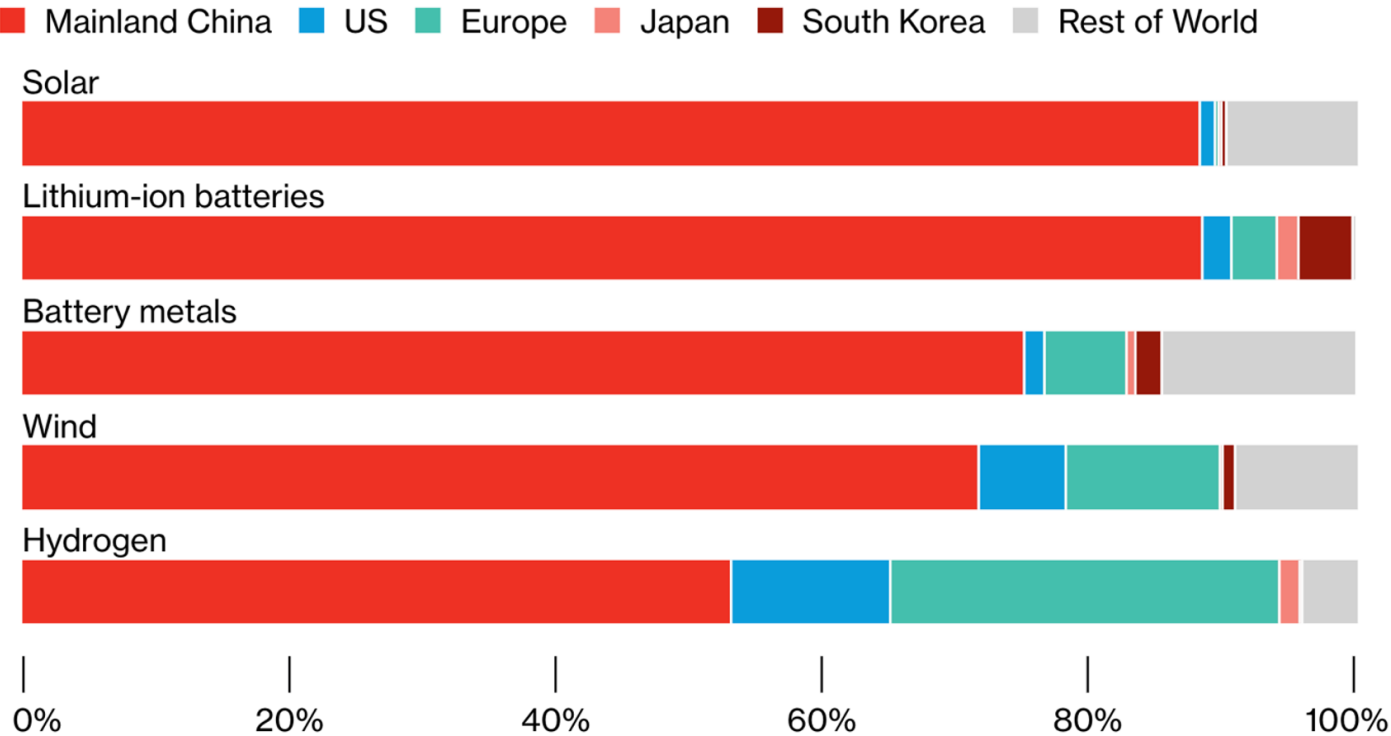
Note: Includes battery-electric vehicles (BEV) and plug-in hybrid vehicles (PHEV).

BloombergNEF

China's Global Cleantech Investment Dominance

Mainland China Dominates Clean-Tech Manufacturing

Clean energy manufacturing capacity by location in 2024



Source: BloombergNEF

Note: Bars show average shares across value chain segments for each sector. Solar includes modules, cells, wafers and polysilicon. Lithium-ion batteries include cells, cathodes, anodes, electrolytes and separators. Metal refining includes lithium, cobalt sulfate and nickel sulfate. Wind is nacelles, and hydrogen is electrolyzer stacks.

China's Global Cleantech Investment Dominance

There's a Race to Power the Future. China Is Pulling Away

Beijing is selling clean energy to the world, Washington is pushing oil and gas. Both are driven by national security.



POWER & MOVES

There's a Race to Power the Future. China Is Pulling Away.

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By David Gelles in New York; Somini Sengupta in Brasília and in Tirunelveli, India; Keith Bradsher in Beijing; and Brad Plumer in Washington June 30, 2025 ***The New York Times***

In China, more wind turbines and solar panels were installed last year than in the rest of the world combined. And China's clean energy boom is going global. Chinese companies are building EV and battery factories in Brazil, Thailand, Morocco, Hungary and beyond.

China's Global Cleantech Investment Dominance



China A Chinese E.V. factory in Brazil



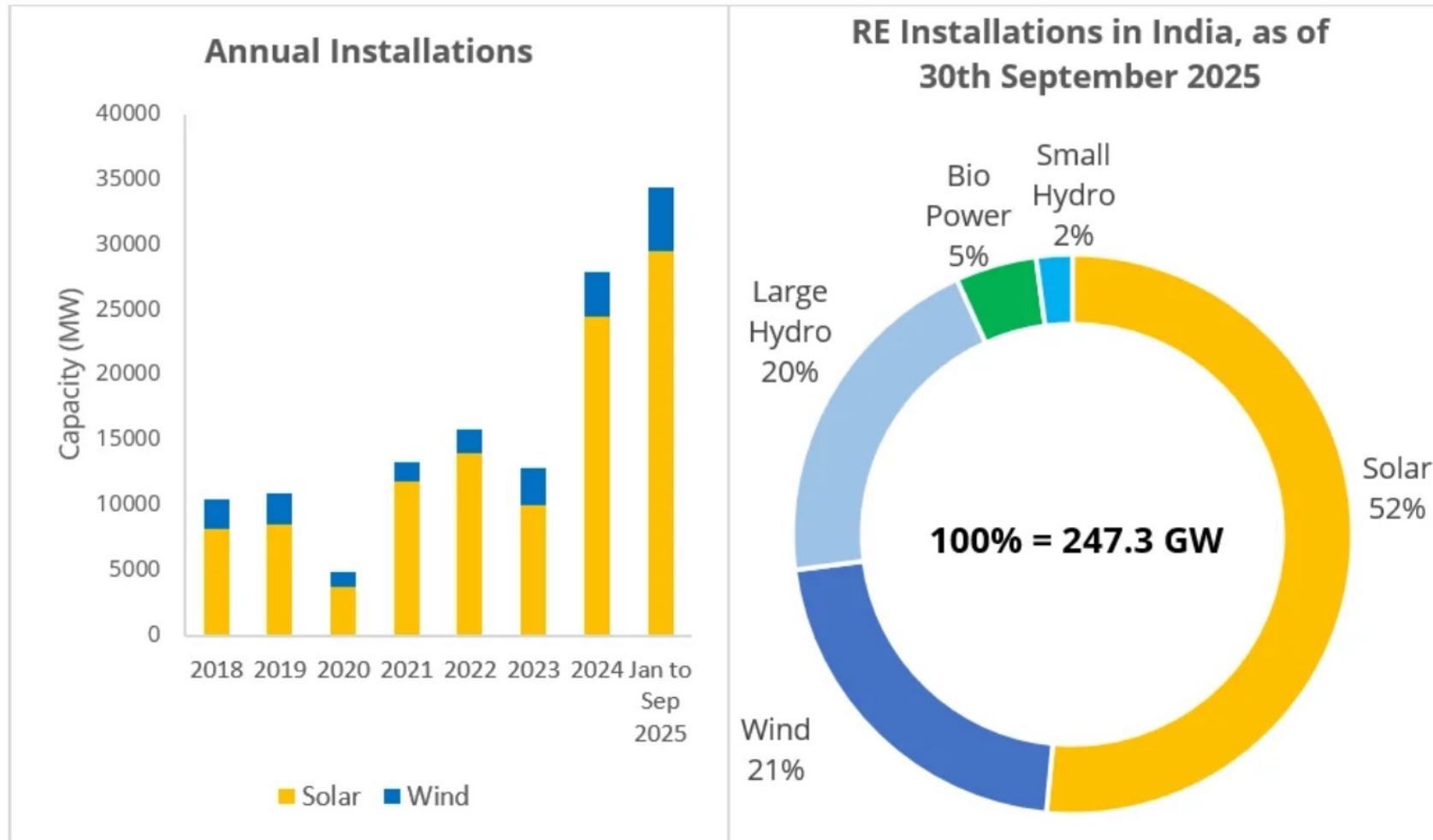
U.S. An export terminal for American gas in Mexico

CEF tracks over 230 transactions since the start of 2023 totalling over US\$175bn in Chinese OFDI in cleantech.

<https://climateenergyfinance.org/wp-content/uploads/2025/05/How-Xi-sparked-Chinas-electricity-revolution-FT-12-May-2025.pdf>

India

India Adds Record 34.4 GW of Solar and Wind Capacity in 9MCY2025

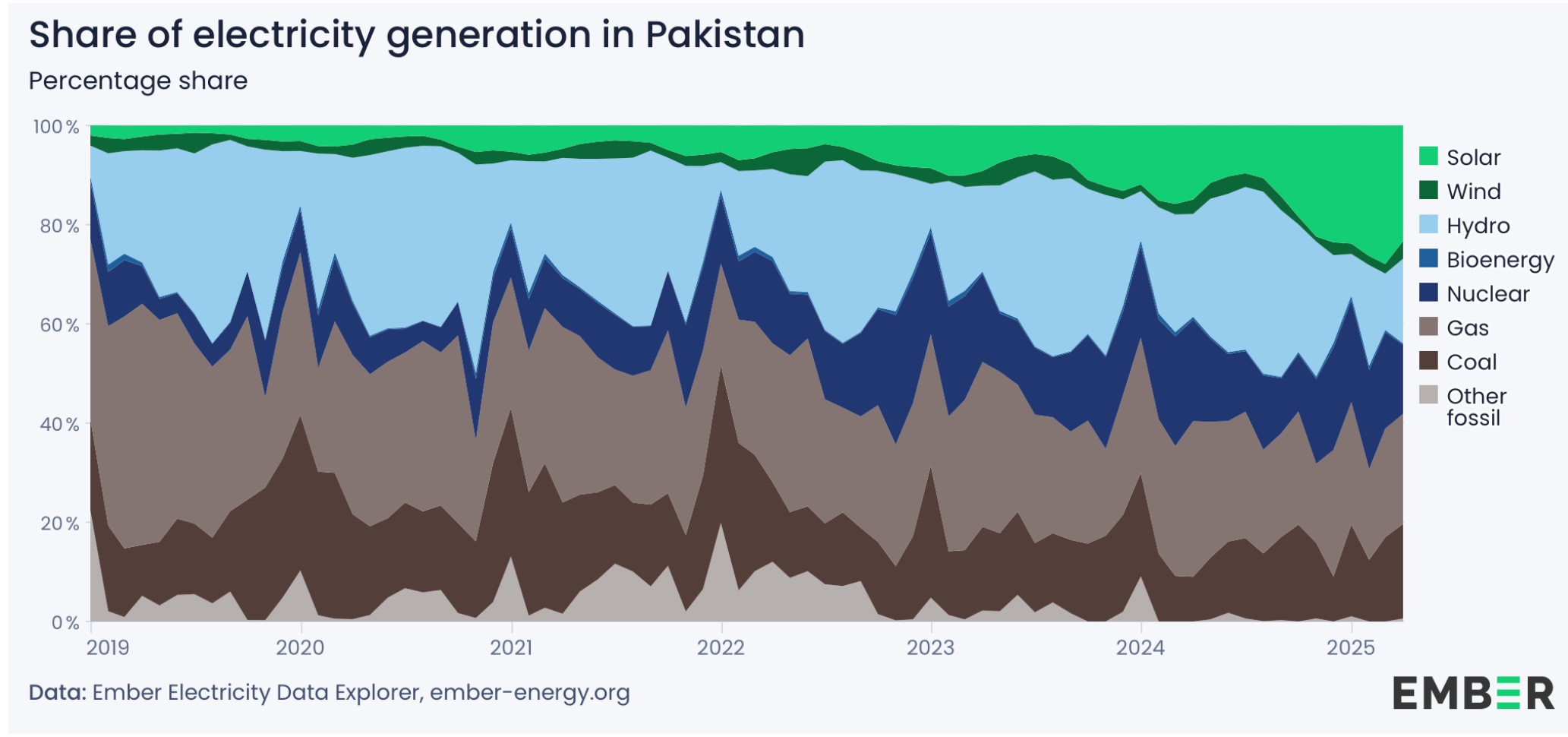


India generation share for Sept'2025:

Solar:	9%
Wind:	6%
Hydro:	15%
Nuclear:	3%
Coal:	66%
Gas:	2%

Pakistan

Share of Pakistan's electricity by fuel type - Monthly



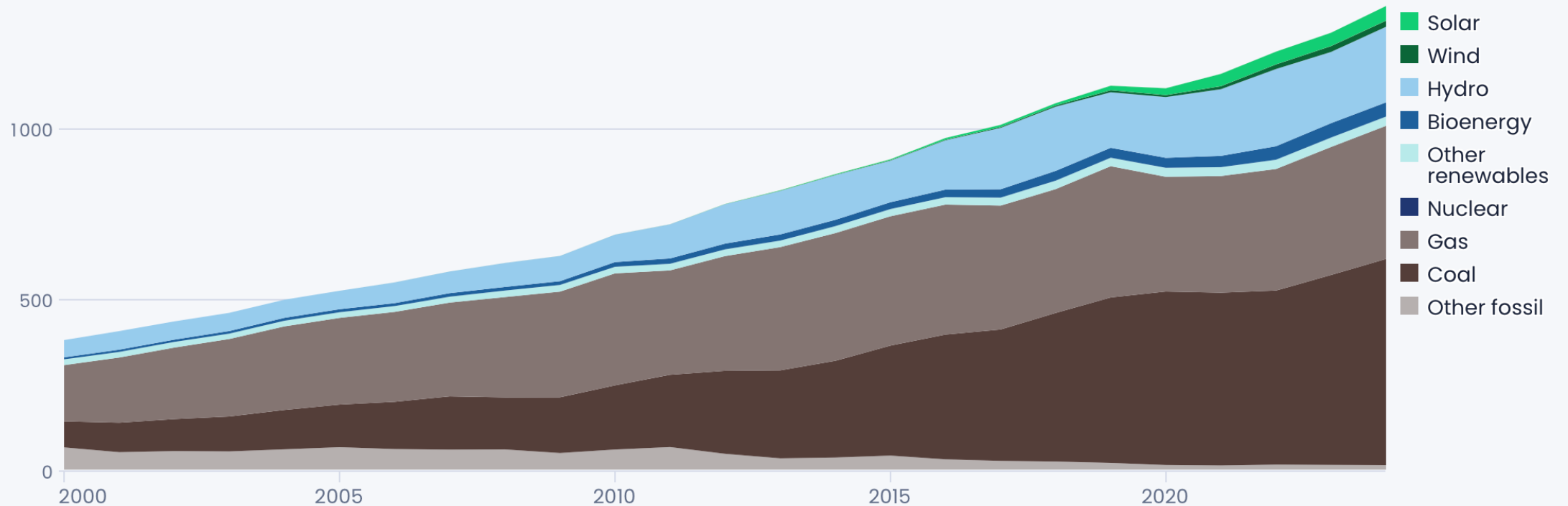
ASEAN

Progress to-date in ASEAN lags

Electricity generation in ASEAN

Terawatt hours

2024: Solar 3%, wind 1%, hydro 16%, biomass 3%



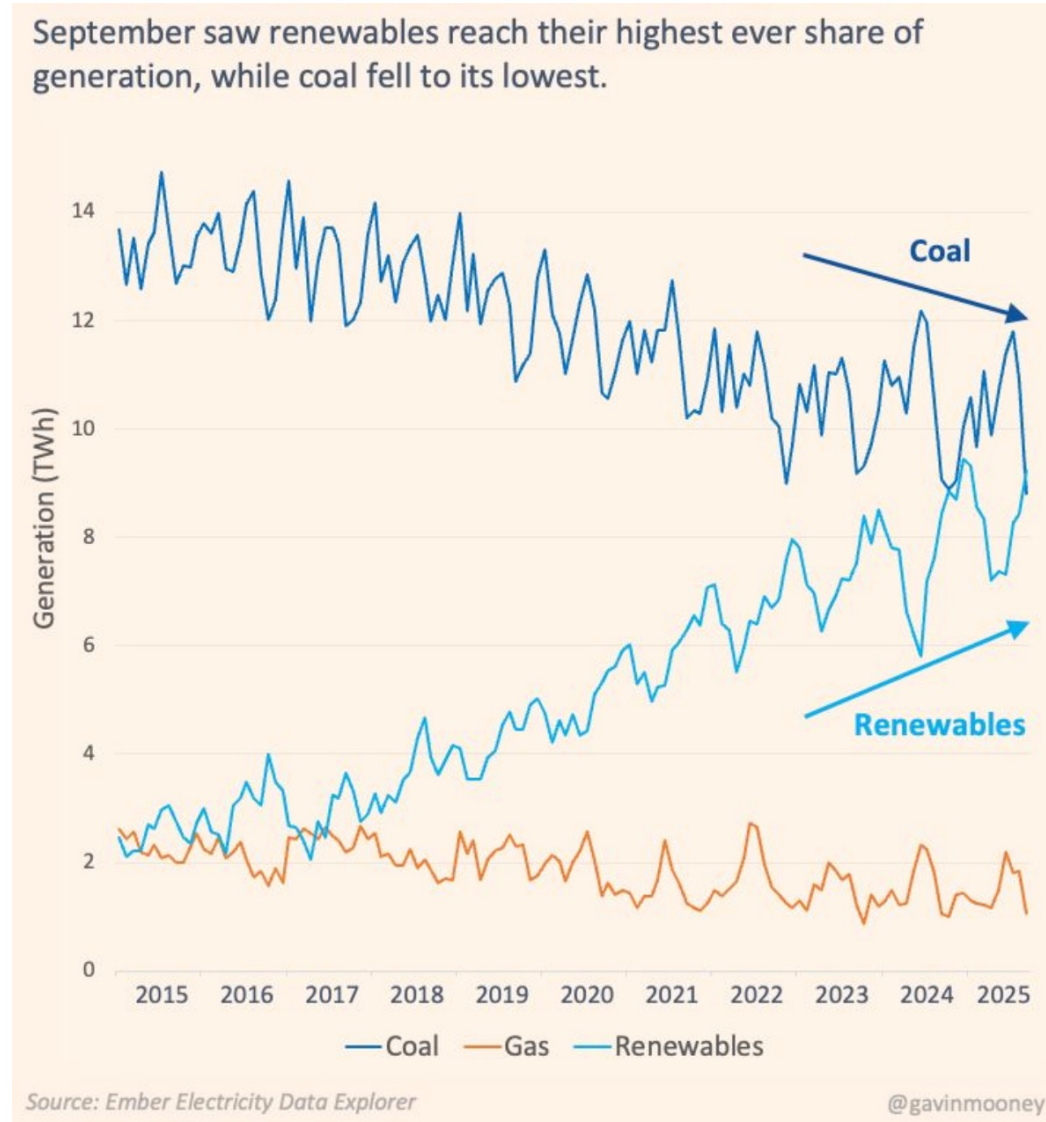
Data: Ember Electricity Data Explorer, ember-energy.org

EMBER

Australia is Half-way to 82% Renewables by 2030

Australia has reached 41% renewable share in FY2025; Halfway to 82% by 2030

In 1H FY2025 renewables share @ 41%:
Hydro: 5.5%
Wind: 13.6%
Utility solar: 8.6%
Rooftop solar: 13.2%

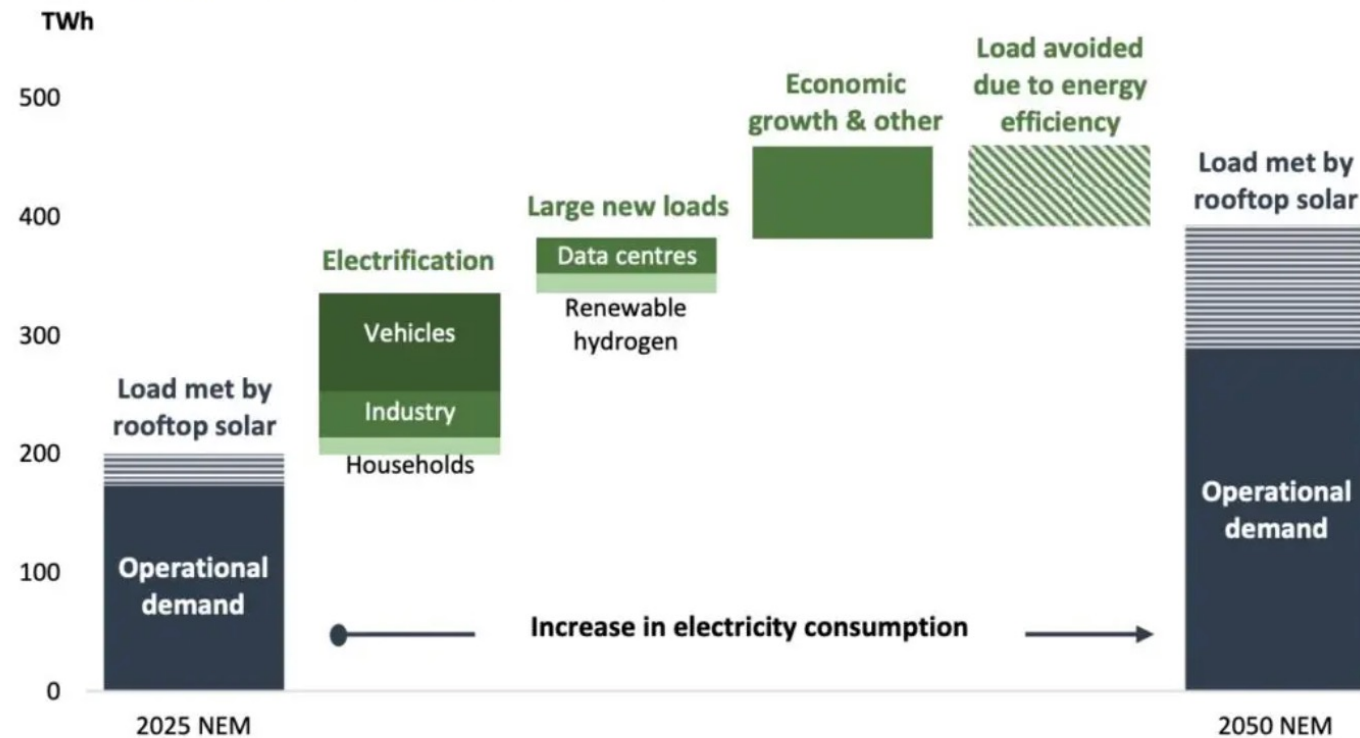


Australia is Half-way to 82% Renewables by 2030

**Progressive ‘Electrification of Everything’ builds electricity demand, and
Rooftop Solar (CER) is a key Solution.**

Figure 3.16: Underlying demand in the NEM will increase significantly to 2050 – with energy efficiency and rooftop solar playing an important role to limit the increase in operational demand.

Electricity consumption in the NEM, TWh, Baseline Scenario

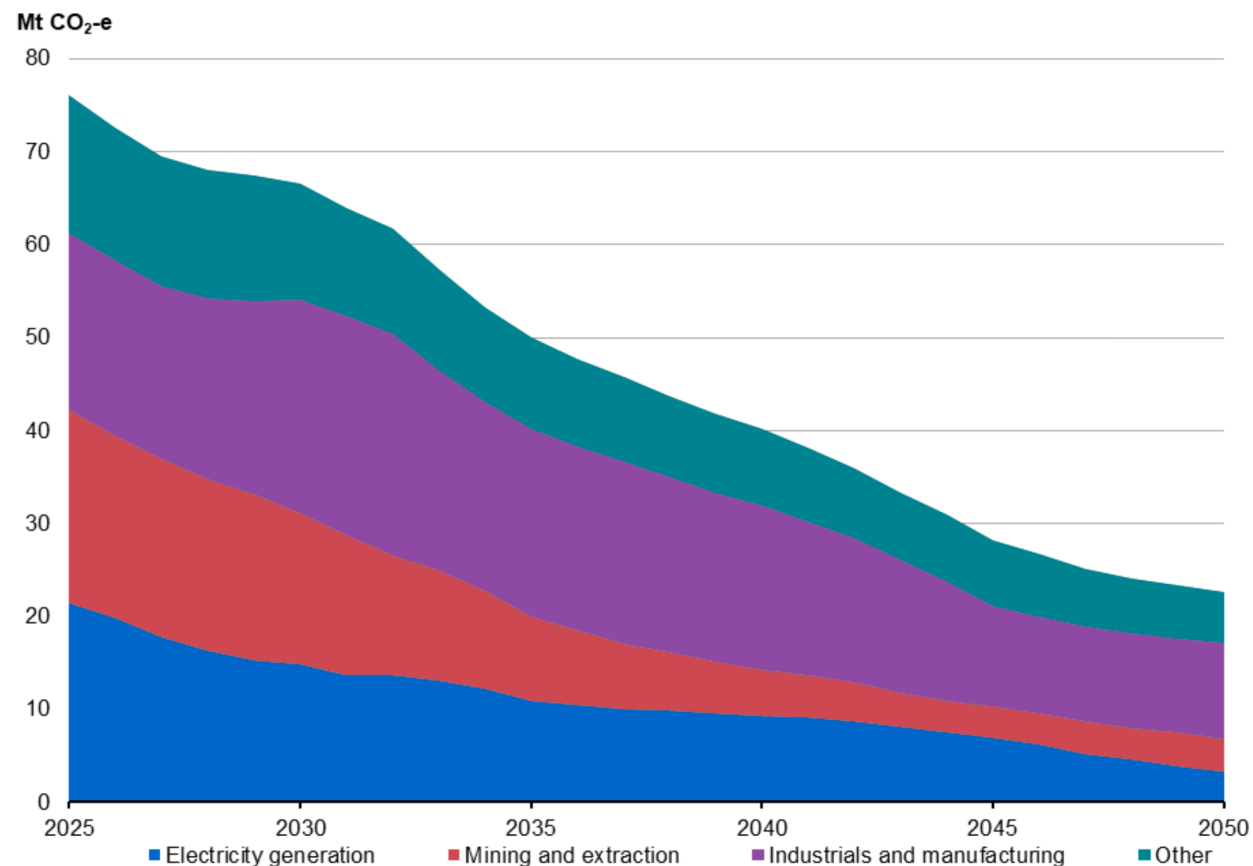


Source: DCCEEW and Treasury modelling. Note: Rooftop solar includes other distributed solar.

Pivoting from Petrostate to Electrostate

Methane is not a transition fuel – it is a fossil fuel, and in decline

**Chart 3.12: Projected emissions from domestic gas use by industry grouping,
Baseline Scenario**



Note: 'Other' includes agriculture, built environment, and transport industries. Some emissions reduction from the use of gas is achieved via carbon capture and storage technologies.

Source: Federal Treasury, September 2025 <https://treasury.gov.au/publication/p2025-700922>

Australia is Responding to China's Challenge

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

\$19bn 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.

CEF's Report Advocating for Carbon Pricing

Climate Energy Finance

05 June 2025



A Price on Carbon: Building Towards an Asian CBAM

A focus on the harmonisation and integration of carbon pricing mechanisms in Asia-Pacific for the steel, aluminium and cement value chains.

Authors:

Matt Pollard, Net Zero Transformation Analyst, CEF

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Source: Climate Energy Finance,

https://climateenergyfinance.org/wp-content/uploads/2025/06/CEF_A-Price-on-Carbon-Building-Towards-an-Asian-CBAM-Report_05June2025.pdf

Regional Call to Action

Climate Science, Energy Security, Technology Development and Economics => Energy System Disruption

- Electrification and decarbonisation is accelerating globally: energy and transport
- The US led trade wars has disrupted global trade – but this reminds all of the value of energy independence
- China leads the world in cleantech R&D, manufacturing, domestic deployments and exports
- China is seeking geopolitical realignments, and is increasingly willing to invest via OFDI
- A price on carbon emissions is coming, firstly in globally traded industry – steel, cement, aluminium – but the rapidly rising cost of climate inaction means ETS + CBAM pressures rising
- ASEAN is lagging, so far. But South Asia, China and Australia all show rapid momentum – and investment flows are US\$100bns pa, as the technology enhancements drive adoption.
- Cleantech is very capital intensive & limited brand value (excepting EVs); very different to IT / biotech / consumer sectors.