

TO SAVE A BEACH: THE STORY OF RECKLESS RENEWABLES

Appendix B

The National Snapshot 2026

Technical material prepared for the book by Sandra Bourke and removed from the manuscript for length.

Figures are as at August 2026. Where a figure is an estimate, the assumption is stated in the note.

Sandra Bourke. Published by Connor Court Books, 2026.

Approach and measures

Approach

Every box uses a measure to help understand the scale, the measure is Eraring, Australia's largest coal-fired power station. It has four units and can deliver 2,880 megawatts at full power or 25.2 terawatt-hours. In the year to 30 June 2025 it generated 14.2 terawatt-hours, about one-fourteenth of the electricity traded in the east-coast grid.

Where a box says, "one Eraring", it means that year's output of 14.2 terawatt-hours. A megawatt is a rate of delivery, like the width of a pipe. A megawatt-hour is a quantity delivered, like the water that came through it. One thousand megawatts make a gigawatt; one million megawatt-hours make a terawatt-hour.

A figure marked "estimate" is the author's calculation based on a stated assumption. Three agencies run our electricity system. AEMO is the Australian Energy Market Operator, which runs the east-coast grid and writes its plan; the AER is the Australian Energy Regulator, which sets what networks may charge; the CER is the Clean Energy Regulator, which counts rooftop systems and certificates.

Five things are kept apart in every box and never added: what is operating, what is under construction, what is approved but unbuilt, what is merely proposed, and what AEMO says will be needed. A hosting target is not a project. A turbine number in a consent is a ceiling. Rooftop solar is a separate fleet from grid-scale solar. A battery's megawatts and its megawatt-hours measure different things. Where a figure is an estimate, the assumption is in the note.

Australia’s renewable energy build: a national snapshot

Australia has put up more than 4,700 wind turbines and, by the best available estimate, about a hundred million solar panels, and AEMO, the Australian Energy Market Operator, says the large-scale part of that fleet must nearly triple in the next four years and grow fivefold by 2050.

The Scale

Electricity in 2025	Coal made 49.7 percent of Australia’s electricity. Wind, solar and hydro together made 43.2 percent. Coal outproduced every renewable source combined.
Large-scale wind and solar	23 gigawatts (8 Erarings) operating in the east-coast grid at the start of 2026. The plan calls for 61 gigawatts (+21 Erarings) by 2030 and 117 gigawatts (+40 Erarings) by 2050: nearly triple in four years, five times by mid-century. Much of this will need to be rebuilt every thirty years.
Against the measure	Every wind installation in the country together generated 2.7 Erarings in 2025. Every rooftop generated 2.4. Every grid-scale solar installation together generated 1.3. Coal generated 8.6.
The build rate	Closing the 2030 gap means installing about 8 gigawatts of new large-scale wind and solar per year, roughly 700 megawatts a month. In 2025, 3.4 gigawatts were switched on. The minister’s own arithmetic in 2022: “about forty 7-megawatt wind turbines every month” and “more than 22,000 five hundred-watt panels every day” until 2030.
Storage	Grid batteries on the east coast passed 9,000 megawatts in June 2026. The plan wants 33,000 megawatts by 2030, more than three times as much. Despite being more than 3 times the capacity of Eraring, average battery duration is just 2.4 hours. All of the battery output could replace Eraring for just 6.7 hours.
Transmission	About 6,000 kilometres of new high-voltage line by 2050, a 14 percent extension of a 44,000 kilometre network. At the tower spacing of current projects that is of the order of 13,000 new steel towers, each 45 to 76 metres tall (estimate).
The cost	AEMO puts the large-scale build at \$106 billion in today’s dollars to 2050, and its own operating and fuel costs add \$77 billion: \$183 billion inside AEMO’s model before a household spends a cent on rooftop solar or home batteries. Outside estimates run from \$642 billion to trillions, on wider bases set out below. No government has published a total for public money, and the Budget said the liability under its main underwriting scheme is “not for publication”.

What Is Operating

Wind: more than 4,700 turbines on about 90 sites, 15,381 megawatts. The count is a floor. No national turbine count has been published since 2020, so this one is compiled project by project.

Grid-scale solar: 115 installations totalling 13,043 megawatts. Based on the 1,833 to 2,200 panels per megawatt specified in New South Wales approvals over the past year, this equates to 24 to 29 million panels (estimate).

Rooftops: 4,501,887 small systems, 30.3 gigawatts, on more than one household in three. At an assumed average of 350 to 400 watts per panel across a fleet installed over 15 years, this is 75 to 90 million panels (estimate). More than 500,000 home batteries have been installed under the Cheaper Home Batteries program since July 2025.

Grid batteries: AEMO counts more than 9,000 megawatts in the east-coast grid. The register, which adds Western Australia, counts 50 batteries, 9,694 megawatts, holding 25,555 megawatt-hours. Charged full, with everything else switched off, they would carry the east-coast grid at its average demand for about an hour.

Pumped hydro: three schemes, 2,610 megawatts, the newest finished in 1984. Offshore wind: nil.

What Is Being Built

Ten wind installations, 420 turbines, 2,431 megawatts. Nine grid-scale solar installations, 2,551 megawatts. Eighteen batteries, 3,765 megawatts holding 14,591 megawatt-hours. Two pumped hydro schemes, Snowy 2.0 at 2,200 megawatts and Kidston at 250. Six transmission projects, 1,347 kilometres of new line. The Clean Energy Council's wider count, which adds projects financed but not yet started, was 80 generation projects and 12.2 gigawatts at the end of 2025.

WHAT IS APPROVED OR PROPOSED

AEMO had 347 projects, 75 gigawatts, inside the four formal stages of grid connection in June 2026, 53 percent of it batteries. A further 492 projects, 196 gigawatts, sat at the enquiry stage before that, of which it expects one in four or five to proceed. The register's own count of consents and proposals: 3,350 turbines, every one a maximum in a planning consent rather than a build; 88,722 megawatts of solar, of which 74,200 megawatts is development envelope rather than project; 29,596 megawatts of batteries; 12 pumped hydro schemes; six offshore areas covering 30,006 square kilometres with no commercial licence between them.

What AEMO Says Must Still Be Built

By 2030: 61 gigawatts of large-scale wind and solar, 38 more than today, and 33 gigawatts of batteries. By 2050: 117 gigawatts of large-scale wind and solar; 87 gigawatts on rooftops, nearly three times today's 30, which at today's average system of 10 kilowatts is about 5.5 million more roofs (estimate); 35 gigawatts of storage able to run for four to 12 hours and 5 gigawatts of deep storage from new pumped hydro; 17 gigawatts of gas; about 6,000 kilometres of transmission, of which 3,500 is already committed or anticipated. Most coal leaves by 2038 and all of it by 2049. The 2024 plan had said all coal out by 2038 and 10,000 kilometres of line.

What It Costs: The Estimates, Lowest to Highest

No single figure exists. The published estimates measure different things over different periods, separated here – that in itself is the problem.

AEMO, capital only	\$106 billion to 2050, today's dollars, annualised. Utility-scale generation, storage, firming and network in the east-coast grid. Excludes rooftop solar, home batteries and the distribution networks. The transmission inside it is \$16 billion up front.
AEMO, capital plus running	\$183 billion: the \$106 billion plus the \$77 billion AEMO states for operating and fuel costs over the same period.
Frontier Economics, real cost	\$642 billion, July 2024 dollars, undiscounted, for 2024-25 to 2050-51: \$580 billion of generation capital, operating, fuel and emissions costs plus \$62 billion of transmission, modelled on AEMO's 2024 plan. Excludes consumer resources and distribution. Prepared in consultation with the federal Coalition; AEMO and the Australian Energy Council disputed its basis.
Net Zero Australia, whole energy system	\$7 trillion to \$9 trillion of supply-side capital to 2060, 2020 dollars, undiscounted, for the domestic and export energy systems together, 65 to 77 percent of it clean electricity. In November 2025 the project's own steering committee said the figures "are not indicative of 'the cost of Australia reaching net zero emissions'" and put the incremental cost of domestic net zero at "approximately \$300 billion".
Public money, what is published	\$20 billion of low-cost Commonwealth finance under Rewiring the Nation, \$19 billion of it through the Clean Energy Finance Corporation; Snowy 2.0 at \$12 billion, Commonwealth-owned; the Cheaper Home Batteries program, launched at \$2.3 billion and now estimated at \$7.2 billion; the first Renewable Energy Zone's transmission at \$5.5 billion, recovered from bills. The Centre for Independent Studies put the Clean Energy Finance Corporation, the National Reconstruction Fund and Snowy 2.0 together at about \$32.8 billion of public finance to 2028.
Public money, what is not	The Capacity Investment Scheme underwrites revenue for 15 years on projects the department values at \$67 billion, 32 gigawatts. About 33.7 gigawatts has been selected across 109 projects in nine tenders. The Budget: the maximum liability and estimated payments "are not for publication due to commercial sensitivities". The Parliamentary Budget Office: "unquantifiable". The minister: it "could well be that it doesn't cost the taxpayer a dollar".

Private money in 2025: \$4.4 billion reached financial close for 2.3 gigawatts of new wind and solar, one of the lowest years in a decade, and \$4.8 billion for 4.3 gigawatts of batteries.

Australia’s solar installations, rooftops and grid batteries

One Australian household in three has solar on its roof, the country’s grid-scale solar installations now cover a land area of two to three Lake Macquaries, and the plan written by AEMO, the Australian Energy Market Operator, needs nearly three times today’s rooftop fleet and more than three times today’s grid batteries.

The Scale

Grid-scale solar operating	115 installations, 13,043 megawatts, an estimated 24 to 29 million panels on roughly 200 to 340 square kilometres. Lake Macquarie’s surface is 110 square kilometres.
What they generated	18.7 terawatt-hours in 2025, 1.3 Erarings, or 7.7 percent of the country’s electricity. Averaged over the year, the fleet runs at about a fifth of its rated power, because the sun sets.
Rooftops	4,501,887 systems, 30.3 gigawatts, an estimated 75 to 90 million panels covering about 150 square kilometres of roof. They generated 33.9 terawatt-hours in 2025, 2.4 Erarings, at an average of 14 percent of rated power.
Grid batteries	50 operating, 9,694 megawatts, holding 25,555 megawatt-hours: 2.6 hours at full power, or one hour of the East Coast grid at average demand, or 16 hours of Eraring’s output.
Being built	Nine solar farms, 2,551 megawatts; 21 more financed, 4,249 megawatts; 18 batteries, 3,765 megawatts holding 14,591 megawatt-hours.
Still required	The plan wants 33 gigawatts of grid batteries by 2030, 24 more than today, and rooftop solar rising from 30 to 87 gigawatts by 2050, about 5.5 million more roofs at today’s average system (estimate).
The cost	A 360 megawatt solar installation with a 150 megawatt battery approved in August 2026 carries a capital cost of \$689.5 million. Origin’s first Eraring battery stage, 460 megawatts holding 1,070 megawatt-hours, was about \$600 million. The CSIRO’s 2026 benchmark for a four-hour grid battery is \$385 a kilowatt-hour. The home battery subsidy is now estimated at \$7.2 billion.

What Is Operating

New South Wales holds the largest grid-scale solar fleet at 5,752 megawatts, then Queensland 4,344, Victoria 1,708, South Australia 675, Western Australia 611 and the Australian Capital Territory 32. The largest operating solar installation in the register is Wellington North in the Central West Orana zone, 300 megawatts at the connection point and 436 megawatts at the panels.

The rooftop fleet is the largest single generator in the country by capacity and by count. New systems now average 10.3 kilowatts. More than three-quarters of the subsidised home batteries have gone into outer suburbs and the regions. Home batteries reached 11.4 gigawatt-hours of storage by May 2026, and the

Smart Energy Council put the total at 14 gigawatt-hours in August: already more than half the energy held by every grid battery in the country.

Fifty grid batteries operate: 2,717 megawatts in Queensland, 2,490 in New South Wales, 2,030 in Victoria, 1,360 in Western Australia and 1,097 in South Australia. The largest by power is Waratah Super Battery on the site of the old Munmorah coal station: rated 850 megawatts holding 1,680 megawatt-hours, it has run at 700 megawatts since June 2026 while a third transformer is installed, and 700 megawatts of it is contracted to protect the Sydney transmission lines rather than to trade. It sits on 13.8 hectares. What a big battery looks like: Origin's Eraring battery, being built in four stages to 700 megawatts holding 3,160 megawatt-hours, covers more than 17 hectares with more than 2,000 battery enclosures and 180 kilometres of cabling. Its first stage began commercial operation in late 2025. Full, it would run at its rated power for four and a half hours.

The batteries' record discharge, 3,759 megawatts on the evening of 26 June 2026, was about a sixth of the east-coast grid's average demand.

What Is Being Built

The largest solar installation under construction is Turner River in Western Australia at 690 megawatts. In central Queensland, Smoky Creek and Guthrie's Gap reached financial close on 20 May 2026: two installations of 300 megawatts each, 720 megawatts at the panels, with a 600 megawatt battery holding 2,400 megawatt-hours, across about 1,800 hectares of cleared land near Biloela, 90 percent of the output sold to Rio Tinto for 20 years. Their developer expects close to 2,500 gigawatt-hours a year, about a sixth of an Eraring.

WHAT IS APPROVED OR PROPOSED

The solar pipeline reads 88,722 megawatts. Seven development envelopes, among them a 35,000 megawatt concept in Western Australia and a 20,000 megawatt concept in the Northern Territory, account for 74,200 megawatts of it. Strip them out and 14,522 megawatts of real projects remain, slightly more than everything operating today. The battery pipeline reads 29,596 megawatts and 112,504 megawatt-hours across 97 projects. The largest proposed, Hillview in New South Wales, would hold 8,000 megawatt-hours, nearly a third of everything operating in the country.

WHAT AEMO SAYS IS STILL REQUIRED

For 2029-30 the plan needs 36 gigawatts of large-scale storage holding 473 gigawatt-hours: 18 gigawatts of batteries running under four hours, 15 gigawatts running four to 12 hours, and 2.5 gigawatts of deep storage holding 356 gigawatt-hours, nearly all of it Snowy 2.0. By 2050 it needs 35 gigawatts of four-to-12-hour storage and 5 gigawatts of deep storage, plus 87 gigawatts of rooftop solar. The Clean Energy Regulator's last outlook was for 3 to 3.7 gigawatts of rooftop solar a year, and the government wants two million home batteries by 2030.

READING THE NUMBERS

A battery's megawatts are how fast it can push power out, like the width of a tap. Its megawatt-hours are how much it holds, like the size of the tank. A 100 megawatt battery holding 400 megawatt-hours runs flat in four hours. The two are never added. Solar is quoted two ways: at the connection point (alternating

current) and at the panels (direct current), which is always the larger. Rooftop solar is a separate fleet and is never added to the grid-scale installations. The CSIRO's cost tables could not be read directly for this compilation; the \$385 figure is as reported on the day of release.

Australia’s Pumped Hydro

Australia runs three pumped hydro schemes, the newest finished in 1984; the one it is building has gone from \$2 billion to \$12 billion and is not finished, and the one Queensland has been promised would cost more than both and has no decision to build it.

THE SCALE

Operating	Three schemes, 2,610 megawatts: Tumut 3 (1973), Shoalhaven (1977), Wivenhoe (1984). Together they can push nine-tenths of Eraring’s power, but only for hours, and only after using more electricity to pump the water up than they get back.
Being built	Snowy 2.0: 2,200 megawatts, 350,000 megawatt-hours, 27 kilometres of tunnel, a power station 800 metres underground, about 5,000 workers. Full, it could run at full power for 159 hours, six and a half days. Its stored energy equals nine days of Eraring’s output.
Its cost	Announced in March 2017 at about \$2 billion for completion in 2021. Contracted in 2019 at \$5.1 billion. Reset in August 2023 to \$12 billion and December 2028. A nine-month cost reassessment ordered in October 2025 had not reached the minister by August 2026.
Also being built	Kidston, in two flooded pits of an old north Queensland goldmine: 250 megawatts, 2,000 megawatt-hours, eight hours at full power, \$777 million, under construction since May 2021, now slated to generate in July 2027.
Proposed	Borumba, in the Mary Valley: 2,000 megawatts, 48,000 megawatt-hours, 24 hours at full power, a day and a quarter of Eraring’s output. Costed at \$14.2 billion in June 2023 and \$18.4 billion in December 2024, first power moved from 2030 to July 2033, completion to July 2035. No decision to build.
Cancelled and shelved	Pioneer-Burdekin, 5,000 megawatts and 120,000 megawatt-hours, cancelled in November 2024 at an announced \$12 billion. Mount Rawdon, 2,000 megawatts and 20,000 megawatt-hours in a worked-out goldmine, \$50 million allocated, no decision.
Still required	AEMO’s plan needs 5 gigawatts of deep storage from new pumped hydro by 2050. It counts Snowy 2.0 and Kidston as 2.5 gigawatts by the end of 2028 and Borumba as 2 gigawatts “anticipated”.

What Exists Now

Tumut 3 in the Snowy has run since 1973 and remains the largest at 1,800 megawatts, with six generating units and three pumps. Shoalhaven, 240 megawatts at two sites in Kangaroo Valley, followed in 1977. Wivenhoe, 570 megawatts west of Brisbane, came in 1984 and holds about ten hours of water in its upper pond. Nothing has been finished since.

WHAT IS BEING BUILT

Snowy 2.0 links Tantangara and Talbingo, two reservoirs of the old scheme, through 27 kilometres of tunnel, about twelve Sydney Harbour Tunnels laid end to end, with six reversible turbines in a cavern 800 metres down. Four tunnel-boring machines have been at work; the first broke through into the cavern in May 2026.

In June 2026 the Auditor-General found Snowy Hydro only partly effective in managing delivery, with no agreed baseline schedule and no robust understanding of the forecast cost to complete; the project was 262 days behind at July 2025, with a line of sight to September 2029. Snowy Hydro’s public page still says complete at the end of 2028. Its own annual report targets progressive commissioning in 2030. The Commonwealth Budget carries Snowy 2.0 as a fiscal risk and a contingent liability with no dollar figure attached.

Snowy 2.0 at \$12 billion works out at about \$5,500 for each kilowatt of power and about \$34 for each kilowatt-hour of storage, because it holds so much water. Borumba at \$18.4 billion works out at \$9,200 a kilowatt and \$383 a kilowatt-hour. The CSIRO’s 2026 benchmark for a 24-hour scheme was reported as \$5,687 a kilowatt, or \$237 a kilowatt-hour.

What Remains Proposed

Borumba would raise a new dam wall 300 metres downstream of the existing Borumba Dam and build a new upper reservoir on the ridges about 330 metres above it, joined by tunnels to an underground powerhouse. Announced in 2021, it was reviewed after the October 2024 election; the review found less than a 1 percent chance of first power by the promised 2030. In January 2026 the Coordinator-General extended the project declaration to February 2028. The 2026-27 state budget gave Queensland Hydro \$324.3 million for exploratory and early works, subject to a continuing review. The refreshed business case is due in 2026.

Twelve other schemes remain proposed, 8,485 megawatts between them. None has a decision to build. Two New South Wales proposals were withdrawn in 2025: Origin’s Shoalhaven expansion and the 325 megawatt Central West scheme.

How Long the Water Lasts

Scheme	Power and hours at full output before the upper reservoir is empty
Snowy 2.0 (building)	2,200 megawatts for 159 hours
Borumba (proposed)	2,000 megawatts for 24 hours
Pioneer-Burdekin (cancelled)	5,000 megawatts for 24 hours
Mount Rawdon (proposed)	2,000 megawatts for 10 hours
Wivenhoe (operating)	570 megawatts for about 10 hours
Kidston (building)	250 megawatts for 8 hours
Tumut 3 and Shoalhaven (operating)	hours not published

HOW LONG THEY TAKE

Tumut 3 took about five years to 1973. Wivenhoe took about seven, from 1977 to 1984. Kidston, begun in May 2021, will have taken more than six years if it generates in July 2027. Snowy 2.0, contracted in April

2019, will have taken nine to eleven years on the dates now in circulation. Borumba's own review puts completion 14 years after its 2021 announcement.

READING THE NUMBERS

Pumped hydro generates nothing. It moves electricity from one hour to another and gives back less than it takes, so it adds nothing to a year's supply and is never compared with Eraring's output. Its megawatts say how hard it can push; its megawatt-hours say for how long. A feasibility study, a business case or an exploratory-works allocation is not a decision to build, and none of the proposed schemes here has one. Kidston is registered with AEMO but had neither pumped nor generated at the status date, so it is counted as under construction.

Australia's Coal-Fired Power Stations

Coal still made half of Australia's electricity in 2025 from 15 stations on the east coast, eleven fewer than in 2010, and AEMO, the Australian Energy Market Operator, now expects the last of them to close in 2049, eleven years later than it said two years ago.

THE SCALE

What coal did in 2025	121.5 terawatt-hours, 49.7 percent of the country's electricity, 8.6 Erarings. In the June quarter of 2026 coal still made 53.6 percent of the east-coast grid's supply.
The fleet	15 major stations on the east-coast grid, about 21,000 megawatts. In 2010 there were 26, about 30,000 megawatts. Add Western Australia's three and the national register reads 18 stations, 49 units, 22,428 megawatts.
Its age	Outside Queensland the fleet averages 41 years. Queensland's averages 31. The oldest units still running, at Yallourn, date from 1973; the newest, Kogan Creek, from 2007.
Eraring	Four units, 2,880 megawatts, 14.2 terawatt-hours in 2024-25, running the equivalent of 4,900 hours flat out. To replace that energy with wind would take about 5,400 megawatts of turbines, roughly 870 of the largest machines now going up; with grid-scale solar, about 8,100 megawatts, 15 to 18 million panels on 120 to 210 square kilometres (estimate, energy only, with no allowance for when it is produced).
Closing by 2030, owners' dates	Eraring, 30 April 2029. Yallourn, mid-2028. Collie, 2027, and Muja, 2029, in the west. Gladstone has a retirement notice for March 2029 and an owner saying no final decision has been made. Together, about 6,750 megawatts, 30 percent of the fleet.
No date at all	Queensland's other seven stations have no owner's closure date. AEMO fills the gap with assumptions running to 2049, "in line with the Queensland Energy Roadmap". The 2022 state plan that set 2035 as the target was repealed.
The plan's end date	Most coal out by 2038, all by 2049. The 2024 plan said all out by 2038.

WHAT EXISTS NOW

Queensland has the most stations, eight, and 8,130 megawatts. New South Wales has four stations but slightly more capacity, 8,305 megawatts. Victoria has three brown-coal stations, 4,820 megawatts. Western Australia has three, 1,173 megawatts. South Australia has burned no coal since Northern closed in May 2016. Tasmania and the Northern Territory have none.

WHAT IS COMING

Nothing. No coal-fired power station is under construction in Australia. What is coming is closure, and the dates keep moving.

Eraring was to close in August 2025. A New South Wales underwriting agreement of May 2024 moved that to August 2027. On 20 January 2026 Origin moved it again, to 30 April 2029, within the terms of the same agreement. Yallourn, 1,450 megawatts, held its line at mid-2028, reaffirmed on 6 August 2026, a

date brought forward from 2032. Gladstone, 1,680 megawatts, is contested: a retirement notice names March 2029, Rio Tinto says no final decision has been made and the station could run longer, and AEMO assumes 2035. Loy Yang A, 2,210 megawatts, is scheduled for 2035.

WHAT REMAINS UNCERTAIN

AEMO's own modelled end point for coal moved out eleven years between its 2024 plan and its 2026 plan, from 2038 to 2049. Fifteen stations, 11 fewer than in 2010, still made half the country's power in 2025, and more than half the east-coast grid's power in the winter quarter of 2026.

THE STATIONS

Station	State, capacity, first unit, owner's closure date and basis
Eraring	NSW, 2,880 MW, 1982, 30 April 2029, owner announced
Bayswater	NSW, 2,715 MW, 1985, within a window to 2033, indicative
Vales Point B	NSW, 1,320 MW, 1978, 2033, owner announced
Mount Piper	NSW, 1,390 MW, 1992, 2040, indicative
Gladstone	Qld, 1,680 MW, 1976, March 2029 notice, contested
Stanwell	Qld, 1,460 MW, 1993, none; AEMO assumes 2043 to 2046
Tarong	Qld, 1,400 MW, 1984, none; AEMO assumes 2036
Callide B	Qld, 700 MW, 1988, at least 2031, indicative
Millmerran	Qld, 852 MW, 2002, none; AEMO assumes 2051
Loy Yang A	Vic, 2,210 MW, 1984, 2035, owner announced
Yallourn W	Vic, 1,450 MW, 1973, mid-2028, owner announced
Loy Yang B	Vic, 1,160 MW, 1993, none; AEMO assumes 2047
Collie	WA, 317 MW, 1999, late 2027, owner announced
Muja units 7 and 8	WA, 422 MW, October 2029, owner announced

Reading the Numbers

A closure date is not one thing. An owner's announced date, an indicative range, an AEMO planning assumption, a statutory date and a government agreement are five different objects, and this table keeps them apart. Where sources disagree, both dates appear. Capacity is AEMO's registered capacity. Retired stations are never added to operating capacity.

Australia's Wind Turbines

More than 4,700 wind turbines now turn in Australia, the tallest of them nearly twice the height of the Harbour Bridge arch, and the minister's 2022 arithmetic for 2030 called for forty more every month.

The Scale

Turning now	More than 4,700 turbines, about 90 sites, 15,381 megawatts. Victoria 1,655 turbines, South Australia 969, New South Wales 880, Queensland 601, Western Australia 430, Tasmania 202.
What they generated	38.4 terawatt-hours in 2025, 2.7 Erarings, 15.7 percent of the country's electricity. Averaged over the year, the fleet ran at about 30 percent of its rated power.
How big	The tallest operating, at Wambo in Queensland, stand 247 metres to the blade tip. The Harbour Bridge arch is 134 metres; Sydney Tower is 309. A turbine of the kind at Golden Plains carries three 79-metre blades on an 80-tonne nacelle atop a tower of about 500 tonnes of steel, set in a concrete foundation about 20 metres across and 3 metres deep.
How much land	A consent for 141 turbines now before the NSW planning commission covers a project area of 20,629 hectares, 146 hectares a turbine, of which 656 hectares, 4.7 a turbine, would be cleared or built on. Scaled to the national fleet, which is project areas of the order of 7,000 square kilometres, three and a half Port Phillip Bays, with about 220 square kilometres actually disturbed (estimate). The rest stays in crops or grazing.
Being built	Ten wind farms, 420 turbines, 2,431 megawatts. The Clean Energy Council's wider count of wind financed or under construction at the end of 2025 was 18 projects and 5,398 megawatts.
Consented or proposed	3,350 turbines, 43,452 megawatts, almost every number a maximum in a consent. The biggest, Warracknabeal in Victoria, cleared its environmental assessment on 16 May 2026 for up to 219 turbines standing 280 metres, on about 26,000 hectares.
The rate required	The minister in September 2022: "about forty 7-megawatt wind turbines every month until 2030". At that rate Australia would add about 4,000 turbines by the end of 2030, nearly doubling the fleet. In 2025 it installed 1,323 megawatts, about 220 turbines of today's size, or 18 a month (estimate).

What Exists Now

Victoria carries the most wind installations, 35. South Australia has 23, New South Wales 20, Western Australia 13, Queensland 10 and Tasmania 6. The largest wind installation fully commissioned at the end of 2025 was Stockyard Hill in Victoria, 149 turbines and 530 megawatts. MacIntyre in southern Queensland, 162 turbines and 923 megawatts across 32,000 hectares, was still commissioning in August 2026 after a blade failure, held at about half output while blades are replaced. Golden Plains in Victoria, 215 turbines at 230 metres across 16,723 hectares, has its first stage of 122 turbines operating and its second under construction; at \$3 billion it works out at about \$14 million a turbine. MacIntyre's \$1.96 billion works out at about \$12 million each.

What Is Coming

Golden Plains West adds 93 turbines and 577 megawatts. Uungula, in the Central West Orana zone, is building 69 of a consented 97. Palmer in South Australia is building 53. Lotus Creek, Wambo Stage 2 and Boulder Creek in Queensland add 125 between them. Only 857 megawatts of new wind reached financial close in 2025, down 59 percent on 2024 and the first year in which no wind project closed finance before the December quarter.

WHAT REMAINS PROPOSED

Almost every turbine number in the pipeline is a ceiling. Forest Wind in Queensland is consented for up to 226. Warracknabeal for up to 219. Yanco Delta in New South Wales for up to 208 at 270 metres. Bungaban in Queensland for up to 200. Goyder North in South Australia for up to 135. Liverpool Range, above Coolah, for up to 185 at 215 metres, cut from 267 after consultation. Bullawah, at 300 metres, goes to a public hearing on 1 September 2026. Consents are routinely built out below their ceiling: Uungula is building 69 of 97; Valley of the Winds was lodged at 176 and consented at 131. Projects have also been refused: Chalumbin in far north Queensland, renamed Wooroorra, was cut to 42 turbines and then refused by the Commonwealth Environment Minister, Tanya Plibersek, on 19 April 2024.

READING THE NUMBERS

Capacity and turbine numbers are different quantities: newer machines carry more megawatts each, so the fleet's 4,700 turbines average 3.2 megawatts while new ones are 6 or 7. Three counts are kept apart and never added: turbines turning, turbines being built, and turbines in consents. The third is a ceiling. The land figures are estimates scaled from one NSW assessment report; proponents publish site boundaries and regulators publish disturbance, and the two differ thirty-fold.

Australia’s Renewable Energy Zones

Eleven Renewable Energy Zones have been declared in two states, one of them covering 20,000 square kilometres of the New South Wales central west, and the only one under construction has seen its transmission cost rise from \$650 million to \$5.5 billion before a single line is energised.

The Scale

Declared	11 zones: five in New South Wales, declared between November 2021 and February 2023, and six in Victoria, declared on 29 May 2026. Queensland, which named 12 in policy, has declared none.
What they are built to carry	35.4 gigawatts across the 11 zones, 16.5 in New South Wales and 18.9 in Victoria, a hosting target twelve times Eraring’s rating. New England’s is “up to 8 gigawatts”, which would make it 37.4.
How much land	Central West Orana covers about 20,000 square kilometres centred on Dubbo and Dunedoo, ten Port Phillip Bays. It is the only zone with a published area. Victoria’s planners said their proposed zones covered 7.9 percent of the state, with less than 1 percent of that needed for physical infrastructure.
Projects inside the first zone	Ten projects hold access rights in Central West Orana, 7,151 megawatts, against wires initially built for 4,500. The planning department counted 31 lodged projects, 428 approved turbines and 6.3 million approved panels at June 2025. Grant Piper’s count tabled at the parliamentary inquiry: 53 projects, about 1,000 turbines, more than nine million panels, more than 14 gigawatts.
The transmission	240 kilometres of new line for Central West Orana, 90 of it at 500 kilovolts and 150 at 330, on towers 45 to 70 metres tall set 400 to 600 metres apart: of the order of 400 to 600 towers (estimate). Construction began in June 2025; energisation from 2028.
The cost	Central West Orana’s network was declared in 2021 at \$650 million. The Australian Energy Regulator’s 2025 determination is \$5.5 billion, recovered through electricity bills over a 35-year contract with the ACERES consortium. New England’s network, about 305 kilometres, has no published cost; AEMO expects it in service in January 2034.

What Exists Now

Eleven zones have been declared by a government instrument. New South Wales declared five under the Electricity Infrastructure Investment Act 2020. Victoria declared six by Ministerial Order: South West, Central Highlands, Western, North West, Gippsland and Gippsland Shoreline. A seventh, Central North, was proposed and held back for further consultation.

South Australia designated two release areas in January 2026, Whyalla West at about 6,500 square kilometres and Gawler Ranges East at about 5,200, a total of about 11,700 square kilometres of pastoral and Crown land. A release area is a licensing release, not a zone, and is counted separately.

Queensland has never declared a zone. Its 2024 Act required a regulation and none was made; in 2025 the targets were repealed and the framework renamed regional energy hubs.

What Is Being Built

One zone is under construction. Central West Orana was declared for 3 gigawatts of network capacity, raised to 6 in December 2023, to operate initially at 4.5, and on 16 January 2025 EnergyCo fixed the amount of generation and storage that can connect at 7.7 gigawatts, on the reasoning that wind, solar and batteries do not all export at once. Its transmission is designed, built, financed and operated by ACERZ, a consortium of Acciona, Cobra and Endeavour Energy. EnergyCo says 97 percent of the properties along the route were acquired by agreement. It also says the zone will draw up to \$25 billion of private investment.

THE NUMBERS INSIDE ONE ZONE

Three official counts exist for Central West Orana, and they do not agree because they count different populations. Applications lodged, projects approved, and projects holding network access are three distinct groups, and a project can leave one without entering the next. The distinction that Grant Piper, as a witness, drew between 14 gigawatts of nameplate capacity, what everything could make on its best day, and 6 gigawatts of network capacity, what the wires can carry, is important, and the oversubscription is not in dispute.

THE ZONES

Zone	State, declared, hosting target, network project
Central West Orana	NSW, 5 Nov 2021, 6,000 MW (4,500 initially), CWO REZ Transmission, \$5.5 bn, building
New England	NSW, 17 Dec 2021, 6,000 MW initial, up to 8,000, New England REZ Network, about 305 km, 2034
South West	NSW, 4 Nov 2022, 2,500 MW, existing lines
Hunter-Central Coast	NSW, 9 Dec 2022, 1,000 MW, Hunter Transmission Project
Illawarra	NSW, 27 Feb 2023, 1,000 MW, none zone-specific
Gippsland	Vic, 29 May 2026, 5,200 MW
Central Highlands	Vic, 29 May 2026, 4,000 MW
South West	Vic, 29 May 2026, 3,600 MW
Western	Vic, 29 May 2026, 2,400 MW
Gippsland Shoreline	Vic, 29 May 2026, 2,000 MW, offshore wind connection
North West	Vic, 29 May 2026, 1,700 MW

Reading the Numbers

A hosting target is what a zone's wires are built to carry. It is not built capacity and it is never added to the projects inside the zone. AEMO's 44 candidate zones are a modelling construct with no legal status

and are excluded from every count here. A tower count is an estimate from published spacing; AEMO has not published one.

Australia's Offshore Wind Zones

Six offshore wind zones covering 30,006 square kilometres of sea, an area fifteen times Port Phillip Bay, have been declared off four states, and not one turbine, not one foundation and not one commercial licence exists in any of them.

THE SCALE

Turbines in the water	Nil. None under construction. No commercial licence, the only instrument that permits construction, has ever been granted.
Sea declared	30,006 square kilometres in six areas: Gippsland 15,000, Bass Strait 7,100, Bunbury 4,000, Hunter 1,854, Southern Ocean 1,030, Illawarra 1,022. Every one strategically “reduced” before declaration: the Southern Ocean by four-fifths, Bunbury by half, Gippsland by 46 percent, the Hunter by a third.
What the government says the water could hold	52.4 gigawatts across the six: Bass Strait 20, Bunbury 11.4, Gippsland 10, Hunter 5.2, Southern Ocean 2.9, Illawarra 2.9. That is 18 Erarings by rating. It is an estimate of the sea, not a project.
Licences	16 feasibility licences ever granted, 13 in force: nine in Gippsland (about 18.6 gigawatts), three at Bunbury (about 4 gigawatts), one in the Southern Ocean. A feasibility licence permits investigation, not construction. The Hunter, Illawarra and Bass Strait hold none.
How big the machines would be	Star of the South, the most advanced project, plans up to 147 turbines with tips 271 to 350 metres above the sea, on monopiles up to 11.8 metres across. At 350 metres a turbine would stand taller than Q1 on the Gold Coast, the tallest building in Australia at 322.5 metres.
What one farm would generate	Star of the South at 2,200 megawatts, running at the 40 to 50 percent of rated power typical of offshore wind elsewhere, would generate roughly half to two-thirds of an Eraring a year (estimate). Construction could start around 2030, generation from 2032, taking up to seven years.
The cost	No Australian offshore wind project has a published cost. The CSIRO warns that “a first of a kind premium” will apply when offshore wind is first deployed here. The Hunter project that was offered a licence and declined it was reported at \$10 billion for 2,000 megawatts.

The Hunter

The Hunter area was declared on 12 July 2023: 1,854 square kilometres, almost exactly the size of Port Phillip Bay, at least 20 kilometres offshore at Port Stephens, 35 from the Central Coast and 54 from Norah Head, with turbines capped at 260 metres for aviation. The government estimated it could carry 5.2 gigawatts; at 15 to 20 megawatts a machine, that would be 260 to 350 turbines, and all three numbers are arithmetic, not plans.

Eight applications were received when the window closed in November 2023. One licence was offered, in February 2025, to Novocastrian Wind, a venture of Equinor, two-thirds owned by the Norwegian state, and Oceanex Energy, for a 2,000 megawatt floating project about 20 kilometres offshore. On 22 August

2025 Equinor declined it. Oceanex announced its own closure in December 2025. No feasibility licence has ever been granted in the Hunter zone.

What Remains Proposed

Star of the South holds a feasibility licence granted in May 2024 over 586 square kilometres, 10 to 40 kilometres off the Gippsland coast, with a 30 kilometre cable route inland from Reeves Beach. Ørsted referred Gippsland 1, 2,800 megawatts and up to 200 turbines 56 to 100 kilometres offshore, for environmental assessment on 9 February 2026. On 23 January 2026 the minister offered three licences off Bunbury, announced that no Illawarra licences would be granted because no application could progress, and made a preliminary decision not to offer licences in Bass Strait for want of competitive bids. Victoria has legislated targets of 2 gigawatts of offshore wind by 2032, 4 by 2035 and 9 by 2040, and planned to open its first tender, for 2 gigawatts, in August 2026.

The Zones

Zone	State, declared, area, cut from proposal, government estimate, licences in force
Gippsland	Vic, 19 Dec 2022, 15,000 km², 46 percent, 10 GW, 9
Hunter	NSW, 12 Jul 2023, 1,854 km², about a third, 5.2 GW, 0
Southern Ocean	Vic, 6 Mar 2024, 1,030 km², 80 percent, 2.9 GW, 1
Illawarra	NSW, 15 Jun 2024, 1,022 km², a third, 2.9 GW, 0
Bunbury	WA, 2 Sep 2024, 4,000 km², 48 percent, 11.4 GW, 3
Bass Strait	Tas, Dec 2024, 7,100 km², 30 percent, 20 GW, 0

Reading the Numbers

A declared area is a line on a chart. A feasibility licence permits investigation. A research and demonstration licence permits a trial. An environmental approval is a separate consent again. Only a commercial licence permits construction, and none exists. The capacity-factor range used for the generation estimate is drawn from overseas experience because Australia has none.

Australia's New Transmission Lines

AEMO, the Australian Energy Market Operator, wants about 6,000 kilometres of new high-voltage line by 2050, with about 13,000 steel towers up to 76 metres tall, and the seven major projects, with a first and a latest price, have gone from \$11 billion to \$35.5 billion between them.

The Scale

The grid today	About 44,000 kilometres of transmission line on the east coast. The plan adds about 6,000, a 14 percent extension. Two years ago it said 10,000.
In the register	34 major projects, about 5,020 kilometres of new line: 1,347 under construction, 756 committed, 110 approved, about 1,822 proposed, 490 paused, and 496 recently energised.
What a line is	Project EnergyConnect's 700 New South Wales kilometres needed 1,508 towers and monopoles and 10,385 kilometres of conductor. HumeLink's 365 kilometres need about 850 lattice towers, 50 to 76 metres tall, 300 to 600 metres apart. A 76 metre tower is more than half the height of the Harbour Bridge arch. At that spacing 5,020 kilometres is 11,000 to 12,000 towers and 6,000 kilometres is 13,000 to 14,000 (estimate).
What it costs	Seven projects have both a first estimate and a latest: \$11.1 billion became \$35.5 billion, 3.2 times. Without CopperString it is still 2.5 times. Seventeen projects in the register carry no published cost at all.
Who pays	Network costs are recovered from every electricity bill under the Australian Energy Regulator's revenue determinations. The Commonwealth's contribution is finance, not grants: \$20 billion under Rewiring the Nation, \$19 billion of it through the Clean Energy Finance Corporation, including up to \$1.92 billion for HumeLink and \$700 million of equity for VNI West.
The plan's transmission bill	\$16 billion up front in present-value terms for the plan's own transmission projects, inside the \$106 billion total.

What Is Being Built

Project EnergyConnect runs 700 kilometres of new line from Wagga Wagga to the South Australian border, with the second stage energised in June 2026 and completion in September. Transgrid's original forecast was \$2.1 billion; the cost is \$3.6 billion. HumeLink, 365 kilometres at 500 kilovolts through the Snowy Mountains, was costed at \$1.3 billion in 2020 and is now \$4.895 billion. The Central West Orana zone's 240 kilometres around Coolah and Uarbry were declared at \$650 million and determined at \$5.5 billion. First dirt turned at the Merotherie substation and the workers' camp while access agreements were still being negotiated with landholders.

WHAT IS COMING

CopperString, just under 350 kilometres of 330 kilovolt line east from Hughenden, Queensland, was announced in 2020 at about \$1.8 billion. In April 2025 the Queensland government put it at \$13.9 billion; in October it said \$2.1 billion of savings had been identified, which leaves about \$11.8 billion, a

derived figure no document states. The western link towards Mount Isa is not in that scope. Marinus Link Stage 1, 345 kilometres of undersea and underground cable between Tasmania and Victoria carrying 750 megawatts, was approved by the Australian Energy Regulator in February 2026 at \$3.47 billion, cut from two cables to one, for completion by 2030. The Hunter Transmission Project, 110 kilometres at 500 kilovolts from Bayswater to Olney, won state approval on 29 July 2026 at \$1.364 billion, up from \$900 million, for construction from mid-2027 and completion in late 2029.

What Remains Proposed

VNI West, 475 kilometres across two states, was estimated by AEMO at \$3.9 billion; on 31 July 2025 it raised that to \$7.6 billion and possibly \$11.4 billion. The Western Renewables Link, 190 kilometres of 500 kilovolt line from Bulgana to Sydenham, was costed at \$479 million in 2019 and \$737 million in November 2022, and no figure has been published since. An Inquiry and Advisory Committee reported to the Victorian planning minister on 8 May 2026, and by 18 August 2026 AusNet was still awaiting the minister’s assessment. The New England zone’s network, about 305 kilometres, has no published cost and is not expected in service until 2034.

The Projects

Project	Network, new km, first estimate, latest, status
Project EnergyConnect (NSW)	Transgrid, 700 km, \$2.1 bn, \$3.6 bn, under construction
HumeLink	Transgrid, 365 km, \$1.3 bn, \$4.895 bn, under construction
Central West Orana REZ	EnergyCo NSW and ACERESZ, 240 km, \$650 m, \$5.5 bn, under construction
CopperString (Eastern Link)	Powerlink, 350 km, \$1.8 bn, about \$11.8 bn derived, committed
Marinus Link Stage 1	Marinus Link, 345 km, \$3.47 bn, committed
VNI West	Transgrid and AusNet, 475 km, \$3.9 bn, \$7.6 bn, proposed
New England REZ	EnergyCo NSW, about 305 km, not published, proposed, 2034
Western Renewables Link	AusNet, 190 km, \$479 m, \$737 m (2022), awaiting decision
Hunter Transmission Project	EnergyCo NSW and Transgrid, 110 km, \$900 m, \$1.364 bn, approved

Reading the Numbers

The threshold here is a named project in AEMO’s plan, a zone network project, a line at 220 kilovolts or above with 50 kilometres or more of new route, or an interconnector. Local distribution upgrades are excluded. The register’s 5,020 kilometres and AEMO’s 6,000 are not comparable: one counts named projects now, the other models 2050. Tower counts are estimates from published spacing on three projects.

