CLIMATE ENERGY FINANCE

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More coal subsidies to extend Eraring?

Heads, Origin wins; Tails, taxpayers lose

There is no case to pay Origin Energy a minimum of $120-150m p.a. in coal subsidies to keep Eraring open. There is enough replacement capacity in the pipeline in NSW to offset the capacity withdrawn when Eraring closes. Any state investment should instead be directed to rapid deployment of distributed firmed renewables.

For author quotes and a quote from Nexa CEO Stephanie Bashir, energy analyst and former senior policy director at AGL, see media release here.

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EXECUTIVE SUMMARY

We note recent reports that Origin Energy is in talks with the NSW government to extend its hyper-expensive, high-emissions, end of life 2.88 gigawatt (GW) Eraring coal fired power plant, Australia's biggest coal generator, beyond its slated closure date of August 2025. We evaluate the range of additional subsidies required to extend Eraring's operation and conclude the following:

1. Coal power is uneconomic, and the annual $120-150m subsidy required to keep Eraring open adds to the more than half a billion dollars of public funding already enjoyed by Origin

We reviewed available data to estimate that to keep all 4 units of Eraring open beyond 2025, NSW electricity users would bear the brunt of yet another subsidy of a minimum $120-150m annually.

NSW electricity consumers are already funding Origin an estimated $468m, comprising $318m of coal subsidies for Eraring in FY2024, and ~$150m in the six months to June 2023.

This is in the context that in 2013, the then state government paid Origin $75m in taxpayer monies to take over Eraring when the asset was 'privatised', or more accurately, gifted.

As Origin enjoys massive government largesse courtesy of the people of NSW, it reports an average pretax cash contribution from Eraring of $382m pa over FY2019-FY2021. Eraring's performance is not disclosed since, but Origin reported in 1HFY2024 that it doubled its underlying earnings overall.

2. Eraring is not needed post 1QCY2026. The NSW government therefore should not subsidise it

Combined with new interstate grid transmission and gas peakers, we have identified enough new firmed zero-emissions replacement capacity under development in NSW to offset Eraring's closure. This gives us even more confidence in the findings of our July 2023 Eraring report[1] and our January 2024 update[2] that, with delivery on projects under development, the lights will stay on in NSW if Eraring is progressively phased out starting in March 2025, as we recommend, and closed by March 2026, and there will be no risk to energy security, reliability or supply.

We conclude that annual coal subsidies of $120-150m to Origin to extend all of Eraring's 4 units cannot be justified on energy security or public interest grounds – this is in effect a massive tax on the people of NSW that transfers wealth to a private coal asset operator.

3. The NSW government should reorient its policy and investment focus to firmed renewables

The NSW government stands on the brink of a time-critical, golden opportunity to transform the state's energy system. It's incumbent on it to now build on the energy transition momentum of the previous NSW Government and recent energy price moderation, as seen in the Australian Energy Regulator this month flagging NSW retail pricing declines from 1 July after years of damaging hyperinflation.

To this end, its policy and investment focus should be on consumer and commercial and Industrial (C&I) distributed firmed renewables and associated grid orchestration and demand management measures, as well as a much-needed acceleration of chronically delayed state planning approvals for the utility-scale renewables and transmission rollout.

[1] CEF, The Lights Will Stay On: NSW Electricity Plan 2023-2030, 18 July 2023
[2] CEF, Updated: The Lights will Stay On: NSW Electricity Plan 2024-2030, 19 January 2024.

RECOMMENDATIONS

Public monies should be invested in accelerating the rollout of zero-emissions energy in NSW to deliver clean, low-cost power to homes and businesses, slashing energy bills and enabling the state to achieve its emissions reduction and renewables targets – not in prolonging the lifespan of high-emissions, increasingly unreliable coal clunkers past their use-by date.

Based on our calculations, the additional $120-150m p.a. in costs to NSW electricity consumers of subsidising Eraring's extension cannot be justified. Our evaluation of the replacement utility-scale and distributed firmed renewables capacity coming online demonstrates that the security and reliability of NSW's energy supply can be maintained.

We therefore recommend that NSW Climate and Energy Minister Penny Sharpe and the NSW Government:

1. Commit to the scheduled closure of Eraring and rule out subsidies to Origin Energy for its extension.

2. Bring-forward phased closure of 2 of the 4 generator units at Eraring to March 2025, supporting a six month delay of closure of the remaining 2 units from August 2025 to March 2026, after the peak demand period of summer 2025/2026. Under this closure schedule, Origin would still use the same total amount of coal as a full 4 unit closure in August 2025.

3. Redirect any taxpayer subsidy it is contemplating for Eraring to zero-emissions solutions, including distributed Consumer Energy Resources (CER) and Commercial and Industrial (C&I) renewables resources, such as rooftop solar and batteries, as well as incentivising virtual power plants, demand side participation and growing grid orchestration capacities. The opportunity cost of subsidising Origin is material; for example, the $120-150m pa to underwrite Eraring's extension is more than 6 times the total funding pa NSW has committed to electrifying and solarising social housing ($87.5m over 4 years/~$22m pa).

4. Complement the above with an accelerated rollout of the state's utility-scale renewables infrastructure pipeline including wind, solar, batteries and transmission, while leveraging existing transmission capacity wherever possible, to rapidly decarbonise the grid and further build momentum on modest NSW retail energy price declines in the Australian Energy Regulator's (AER) Default Market Offer (DMO) of March 2024, mitigating cost-of-living pressures.

5. Introduce a progressive coal royalty regime. NSW will belatedly lift the coal royalty rate from 7-8% of revenue to a flat rate of 10-11% as of 1 July 2024, but only a progressive tiered system based on coal prices, as introduced in Queensland, is effective in ensuring that when coal price hyperinflation inflicts energy poverty on NSW citizens, additional state revenues are able to be returned to the people in the form of energy bill offsets, and to help fund public investment in distributed consumer energy resources.

SECTION 1 More Taxpayer Subsidies for Origin?

1.1 Cost of delaying Eraring's closure

CEF estimates to keep all 4 units of Eraring open beyond 2025 would cost NSW electricity users at least $120-150m annually, assuming current forward electricity prices and spot thermal coal export prices. The NSW government should instead invest in accelerating deployment of low cost, zero-emissions solutions like domestic and commercial and industrial (C&I) rooftop solar, batteries, and incentivising virtual power plant (VPP), demand side participation (DSP),[3] and growing grid orchestration capacities.

Figure 1.1: Eraring Coal Power Station Profit & Loss (A$m, FY2019-FY2021 & CY2026)

		FY2019	FY2020	FY2021	CY2026
		Act.	Act.	Act.	Est.
Gross Operational Capacity	MW	2,880	2,880	2,880	2,880
Generation volumes					
Gross Generation	TWh	18.0	14.9	14.5	14.5
Net Generation at node	TWh	16.5	13.6	13.3	13.3
Net utilisation	%	65%	54%	53%	53%
Prices					
NSW time weighted prices	A$/MWh	89	72	65	101
Earing Volume weighted prices	A$/MWh	90	78	76	101
Pool revenue	A$m	1494	1065	1008	1,343
Cash costs	A$m	-929	-802	-688	-1,463
Pretax cashflow	A$m	565	263	320	-120
Coal Cost	A$m	-715	-552	-501	-1,082
Fuel oil	A$m	-5	-5	-6	-16
Opex - direct site	A$m	-107	-135	-135	-146
Opex - Overhead	A$m	-17	-17	-17	-20
Capex	A$m	-83	-94	-29	-200
Cash costs	A$m	-929	-802	-688	-1,463
Earing Cash costs	A$/MWh	-56	-59	-52	-110
Earing Cash costs	A$/MWh	-56	-59	-52	-110
Coal Deliveries	Mtpa	6.7	6.8	5.4	n.a.
Coal use (estimated)	Mtpa	7.6	6.2	6.1	6.1
Coal use (estimated)	Mt/TWh	0.46	0.46	0.46	0.46
Coal price assumed - current spot	US$/t - 6,000kcal				132
Coal price assumed - current spot	A$/t - 5,500kcal	94	88	82	177

Source: Origin Energy Accounts, CEF Calculations

[3] Nexa Advisory, Accelerating Commercial & Industrial Demand Side Participation in NSW, 21 February 2024

CEF replicates the disclosed Profit & Loss of Eraring for FY2019-FY2021 in Figure 1.1,[4] adding our estimate of coal use and hence coal cost per tonne. This shows that Eraring was exceptionally profitable when NSW pooled electricity prices were just $65-89/MWh over FY2019-FY2021, even at Origin's then high estimated procurement costs of domestic coal of A$82-94/tonne (t).

NSW wholesale electricity forward pricing

Using the ASX forward wholesale electricity prices for NSW for calendar year (CY) 2026 of A$100.89/megawatt hour (MWh) as in Figure 1.2, and assuming current spot 6,000kcal coal prices of US$132/t are maintained – for more detail, please refer Section 2 (Figure 2.1) – this suggests Eraring would lose some A$120m annually to run at a net 53% utilisation rate for all 4 of its units, generating 13.3 terawatt hours (TWh) pa.

Beyond the subsidy required to fund the purchase of thermal coal on the spot market, we assume capital expenditure (capex) costs of $200m (Origin Energy in 2021 estimated $38-41m per unit pa).[5] Eraring was commissioned in 1982, so by 2025 it will be 43 years old, beyond the average 40 year closure life seen in Australia over the last decade and implying an increased maintenance burden.

Figure 1.2: NSW Wholesale Electricity Forward Prices (A$/MWh)

Calendar Year Price as at Fri 15 Mar 2024

	NSW	VIC	QLD	SA
2025	98.57	63.01	87.11	83.46
2026	100.89	59.86	85.12	80.05
2027	108.50	58.25	84.26	83.00

Source: ASX Australian Electricity Wrap (15 March 2024)

Thermal coal export prices have fallen 70% from their US$440/t peak, but remain double the long term average prior to the implementation of sanctions against Russian fossil fuel exports post Putin's invasion of Ukraine. CEF does not expect the sanctions to be lifted by western nations any time soon, nor do we expect western nations will again tie energy security to Russian supply.

If the forward 6,000kcal coal price in CY2026 were to drop 12% to US$115/t (A$175/t), adjusting for coal quality differences, Eraring could be run at a breakeven cost, everything else being equal.

The ASX market is pricing NSW forward electricity prices in CY2026 at a 18% premium to Queensland, and a 74% premium to Victoria, so the likely assumption is a relative tightening of NSW supply into CY2026, implying the market is pricing in a partial closure of Eraring.

[4] FOI documents released on 16 May 2022 by the NSW Department of Premier & Cabinet relating to the Earing Power Station, with specific reference to Project Emu Term Sheet, July 2021

[5] Our earlier CEF estimate of $200-400m pa assumed higher capex estimates of $250m pa to fund an end of life extension to ensure the plant runs safely (but we have taken an estimate half way between these two datapoints). We also previously assumed the cost of using more expensive 6,000kcal export grade thermal coal, whereas the coal cap legislation discloses the benchmark is set at lower quality 5,500kcal benchmark coal. We had also assumed more supply of new renewable energy generation, but the failure to approve new projects has kept NSW wholesale prices higher for longer.

Any move by the NSW government to make NSW electricity consumers subsidise Eraring to stay open would increase supply and likely lower the forward wholesale price, which in turn would increase the losses Eraring would generate.

As such, any deal with the NSW government would likely see Origin pass both coal cost volatility and wholesale electricity price risk onto NSW consumers, meaning a subsidy of $120-150m annually plus any additional profit margin Origin can extract, as our best estimate of the subsidy required to pay.

The irony is that had the NSW government approved more renewable energy projects, the wholesale pricing would be lower, and hence the subsidy required to keep Eraring open would have been higher.

Origin Energy has already benefited from taxpayers' money as it rakes in booming profits

As we explore in Section 2 below, then NSW Treasurer Mike Baird announced in July 2013 that NSW taxpayers paid Origin net $75m to take the Eraring coal fired power plant off public hands. The Shoalhaven pumped hydro power plant was thrown in for free.

The coal plant was originally to be sold for over $200m, inclusive of a long term coal supply agreement from the yet-to-be-developed Cobbora coal mine. When the NSW government canceled the development and allied supply agreement, taxpayers were on the hook to compensate Eraring.[6]

Origin Energy also acquired the retail arms of Integral Energy and Country Energy from the NSW government for $2.3bn in December 2010.[7]

More recently, the coal supply cap subsidies to the company over the last 18 months have totalled some $468m in public monies, as we detail in Section 2.

Yet Origin Energy reports it booked an average pretax cash contribution of $382m annually over FY2019-FY2021 from the Eraring coal fired power plant. Origin Energy's first half of FY2024 results saw the overall group double its underlying earnings.[8]

If ever there was a perfect case-study of the negative impacts on taxpayers of privatisation of strategic public assets, Eraring is it.

[6] NSW Government, Government sells Eraring Energy to Origin and Terminates Cobbora Contract, 1 July 2013
[7] SMH, Origin buys NSW power assets for $3.25b,15 December 2010
[8] https://reneweconomy.com.au/baseload-getting-more-dificult-origin-doubles-profits-still-coy-on-eraring-and-green-energy-transition/

Origin Energy financial results

Origin Energy's investor results report from February 2024 highlighted the massive improvement in gross profit for electricity genretailing of $950m for the six months to December 2024. This reflects the integrated nature of this division in terms of power generation, trading, hedging and electricity and gas retailing. Origin Energy references their 7.1% annualised return on capital employed in the last 24 months, a vast improvement on the previous breakeven return, but this averaging calculation deliberately masks the peak cycle returns actually delivered in the last six months.

Figure 1.3: NSW Wholesale Electricity Forward Prices (A$/MWh)

		FY2024 est.	
Use		6.1	Mtpa
Coal price	Spot	132	US$/t
	AUD/USD	0.66	
	Spot thermal 6,000kcal NAR	199	A$/t
Eraring purchase price (assuming 5,500kcal)		177	A$/t
Coal cost		1,082	A$m
Coal cap for 5,500kcal		125	A$/t
NSW electricity consumer subsidy		52	A$/t
NSW elecrticity consumer subsidy		318	A$m

Source: Origin Energy 1HFY2024 Results Briefing, CEF Calculations

1.2 A phased 2025/26 closure of Eraring – proposed schedule

A phased early closure of 2 units at Eraring in March 2025 would support a six month delay of closure of the remaining 2 units till March 2026, after the peak demand of the summer season. This equates to no change in total coal use compared to a full closure in August 2025.

If there are delays to commissioning beyond the contracted December 2025 of Round 2 and Round 3 utility scale renewables and firming tender winners under NSW' Electricity Infrastructure Roadmap, the NSW government could then provide a 6 month extension on 2 units at a cost of just $30-40m ($60-75m for 12 months), but this should be conditional upon whether export coal prices remain at the current double long term averages.

In February 2022, Origin Energy announced the earlier than previously flagged timetable for closure of Eraring in August 2025, giving the required 3.5 years minimum notice.[9] Preliminary negotiations occurred between Origin Energy and the NSW government in 2021 proposed a phased closure, with 2 of the 4 units of 720MW each to close on 28 February 2025, and the last two units to be delayed, possibly out to 30 June 2028, if an agreement for subsidies could be reached.[10] No agreement for NSW government compensation to Origin to implement this proposal was reached.

Figure 1.4: Eraring Net Capacity

Number of Units	4	
Gross capacity per unit	720	MW
Gross Capacity	2,880	MW
De-rated at high termperatures	-400	MW
Aux Load	-180	MW
Firm Capacity	2,300	MW

Source: CEF Calculations

CEF would recommend that a phased approach to on-time closure – aligned with the original date of August 2022 – be taken by Climate and Energy Minister Penny Sharpe.

The closure of 2 of the 4 units at Eraring from March 2025 would support a six month delay to decommissioning of the remaining 2 units until March 2026, after the summer of 2025/26. Origin would still use the same total amount of coal as a full 4 unit closure in August 2025.

We note that some of the largest new capacity firming solutions, such as the 460MW/920MWh Eraring battery and expansion of Origin's already very successful virtual power plant (VPP) program, are entirely in Origin's hands for on-time delivery.

Given Origin Energy was gifted the Eraring coal plant by NSW taxpayers, it is entirely reasonable that Origin CEO Frank Calabria now negotiates in good faith to ensure NSW grid reliability by progressing these key developments to commissioning in a timely way.

[9] Origin Energy, Origin proposes to accelerate exit from coal-fired generation, 17 February 2022
[10] FOI documents released on 16 May 2022 by the NSW Department of Premier & Cabinet relating to the Earing Power Station, with specific reference to Project Emu Term Sheet, July 2021

If there are delays beyond the contracted December 2025 to the commissioning of new renewables and battery project Round 2 and Round 3 tender winners under the NSW Electricity Infrastructure Roadmap, the NSW government could then provide a 6-12 month extension on 2 units at a cost of just $30-40m for 6 months ($60-75m for 12 months), but this should be conditional upon whether export coal prices remain at US$132/t, double long term averages.

SECTION 2 Existing Public Subsidies to Origin Under Coal Cap

Origin will receive an estimated coal price cap taxpayer subsidy of ~$318m in FY2024 for Eraring. Together with the estimated ~$150m it received in 2HFY2023, this brings the total payment to Origin to some $468m since the emergency coal cap intervention was implemented at the end of 2022.

The NSW Government introduced a temporary 18 month cap on the price of coal for NSW coal power stations as part of the commonwealth government's November 2022 Energy Price Relief Plan to shield Australians from the worst impacts of global coal and gas price hyperinflation triggered by sanctions on Russia off the back of its war on Ukraine.

On 21 December 2022, NSW Parliament passed a bill to give the government the powers to declare a coal market price emergency and to impose price caps on coal used in the NSW power sector of A$125/t (for 5,500kcal high ash thermal coal) until 30 June 2024. [11]

On 22 December 2022, then NSW Premier Perottet declared a coal market price emergency, activating the cap.[12]

Eraring uses an estimated 6 million tonnes per annum (Mtpa) of coal when running at a 50-55% capacity utilisation rate, and with no long term coal supply agreement in place, Origin was caught entirely exposed when global spot thermal coal prices rose nine-fold in response to the sanctions against Russia.

CEF estimates that Eraring has been the major beneficiary of the coal cap; as noted above, it booked a doubling in underlying earnings in the half year to December 2023 driven by the energy business, which increased gross profits to $950m from $39m over 1HFY23.

Looking forward, as per Figure 2.1, CEF estimates that the Newcastle coal export price (for 6,000kcal coal) in FY2024 will average around US$132/t, down 70% from its US$440/t peak, but double the long term average internationally traded price. This is some four times the long-term market price for other NSW coal power plants that have in place long term domestic supply agreements.

An estimated export price average of US$132/t translates to A$199/t, we have assumed a 11% discount for lower quality 5,500kcal domestic coal use to get A$177/t. Assuming For Eraring this means NSW consumers are on the hook for A$52/t = A$177-125/t – then on 6.1Mtpa this represents an estimated Eraring coal subsidy of $318m for FY2024.

This is in addition to an estimated $150m NSW electricity customer-funded coal subsidy in the six months to June 2023, for a total of $468m in subsidies to Origin.

[11] NSW Government, Coal Market Price Emergency (Directions for Coal Mines) Notice 2023 No. 2
[12] NSW Government, NSW coal market price emergency

Figure 2.1: Eraring Subsidy from the coal cap FY2024

		FY2024 est.	
Use		6.1	Mtpa
Coal price	Spot	132	US$/t
	AUD/USD	0.66	
	Spot thermal 6,000kcal NAR	199	A$/t
Eraring purchase price (assuming 5,500kcal)		177	A$/t
Coal cost		1,082	A$m
Coal cap for 5,500kcal		125	A$/t
NSW electricity consumer subsidy		52	A$/t
NSW elecrticity consumer subsidy		318	A$m

Source: CEF Calculations

Coal price inflation puts pressure on power prices as NSW fails to adequately tax exporters

On a related theme, as export coal prices remain double their long term average, this puts upward pressure on NSW electricity prices.

As noted above, despite thermal coal's 70% price drop from its all-time record high of US$440/t, the export price remains stubbornly at close to double its long term pre-Russian invasion price average of US$70-75/t – Figure 2.2.

This is unfortunate for the unhedged Eraring and hence for NSW electricity users, and should provide further impetus for the government to pivot its public subsidy programs to accelerate the rollout of low-cost zero-emissions renewables, rather than further entrenching and extending volatile and expensive coal power in the state.

The NSW government has missed its opportunity to adequately tax the war-driven superprofits of fossil fuel multinationals and ensure a fair return to the people of the state.

It failed to follow Queensland's Treasurer Cameron Dick's move in June 2022 to introduce an aggressively progressive six-tier coal royalty rate that ratchets up as the coal price rises. This has delivered a windfall of more than A$10bn annually to QLD, enabling the government to invest in new replacement zero-emissions capacity, grid transmission and pumped hydro storage (PHS) while concurrently delivering the country's most generous energy bill rebates to Queeenslanders, alleviating the energy poverty inflicted on them by war profiteering resources giants.

NSW residential and industrial consumers have borne the global hyperinflation of methane gas prices directly and indirectly by a trebling of wholesale electricity prices, also elevated by the concurrent ninefold rise in thermal coal prices.

Come 1 July 2024, NSW coal royalties will rise from 7-8% to 10-11% of revenues. While this

spells a welcome boost to state revenues, the failure to make the royalty regime progressive means the vast majority of the current windfall war-profits profits will continue to go to mostly foreign tax-haven based private resources billionaires.

This dramatically limits the state government's scope to provide energy bill relief to NSW consumers, and curtails revenues available to underwrite and accelerate the deployment of household and industry renewable energy resources.

This should provide more incentive for the government to rule out expenditure of public capital on Origin.

Figure 2.2: Thermal Coal – Newcastle 6,000kcal NAR Export Prices (US$/t)

Source: Trading Economics, 17 March 2024

SECTION 3 Firmed Renewables to Replace Eraring

There is more than enough new renewables, BESS, grid transmission and grid orchestration capacity coming online by summer 2025/26 to offset the phased closure of Eraring with no risk to supply or grid reliability, assuming our recommended closure schedule of 2 units in March 2025, and 2 units in March 2026, post summer's peak. For context, a subsidy to Origin of $120-150m pa to extend Eraring is more than 6 times the total funding pa NSW has committed to electrifying social housing ($87.5m over 4 years/~$22m pa). This money should be redirected to further boost investment in deployment of distributed firmed renewables.

3.1 Firmed renewables capacity pipeline in NSW

Figure 3.1 shows new BESS and gas peaker capacity scheduled to be commissioned by summer 2025/26, more than sufficient to offset the loss of the 2.3GW of net Eraring capacity.

Figure 3.1: Extra NSW firming to come on line by Summer 2025/26 (MW/MWh)

		Capacity MW	Capacity MWh
Waratah (WSB)	Akaysha Energy / EnergyCo	850	1,680
Liddell BESS	AGL Energy	500	1,000
Eraring BESS	Origin Energy	460	920
Orana BESS	BlackRock's Akaysha Energy	415	1,660
Origin VPP	Origin Energy (NSW share of uplift)	413	826
Richmond Valley BESS	Ark Energy	275	2,200
New England BESS	ACEN Australia	200	400
VPP	EnelX	90	180
Smithfield BESS	Iberdrola	72	144
Limondale BESS	RWE Australia	50	400
Golburn River BESS	Lighthouse bp	49	392
Kurri Kurri	Snowy Hydro	660	n.a.
Tallawarra B	EnergyAustralia	320	n.a.
Total Dispatchable capacity		**4,354**	
Erarring cpaacity on peak day		**2,300**	

Source: Corporate Announcements, Climate Energy Finance estimates

Figure 3.2 shows new gas peakers, utility renewables, rooftop solar and interstate transmission capacity scheduled to be commissioned by summer 2025/26.

Figure 3.2: Extra NSW generation capacity to come on line (by Summer 2025/26 (MWh))

		Capacity MW	Assumed Utilisation Rate	Generation Available in 24 hour period MWh
Kurri Kurri	Snowy Hydro	660	80%	12,672
Tallawarra B	EnergyAustralia	320	80%	6,144
Golburn River Solar	Lighthouse bp	550	27%	3,564
Culcairn Solar Farm	Neoen Australia	440	27%	2,851
Wellington North Solar	BJEi	400	27%	2,592
Stubbo Solar Farm	ACEN Australia	400	27%	2,592
Uungula Wind Farm	Squadron Energy	400	35%	3,360
Rye Park Wind Farm	Tilt Renewables	396	35%	3,326
Wollar Solar Farm	BJEi	280	27%	1,814
Flyers Creek Wind Farm	Iberdrola	145	35%	1,218
Crookwell 3 Wind Farm	Global Power Generation	58	35%	487
Rooftop solar		1,705	15%	6,098
Project EnergyConnect		800	70%	13,440
Total additional generation / supply in a 24 hour period available				**60,160**
Eraring generation in the 24 hours of 29 Feb 2024				**54,300**

Source: Corporate Announcements, Climate Energy Finance estimates

This illustrates the additional generation and firming capacity across different technologies that will be available for a peak electricity demand event similar to the 29 February 2024, and benchmarks that against the generation delivered by Eraring on the day.

Beyond 2025/26, we find a very strong proposed pipeline of some 50GW of firmed renewables, many already in the approval process. We hope to see wholesale improvements in project approval delays with the Department of Planning and Environment restructure that came into effect in January,[13] and the promised review of planning department delays by Minister Paul Scully in March 2024.

AEMO modelling supports our findings

Further increasing our confidence in our modelling, the Australian Energy Market Operator's (AEMO) models no energy security issue for NSW on Eraring's closure.

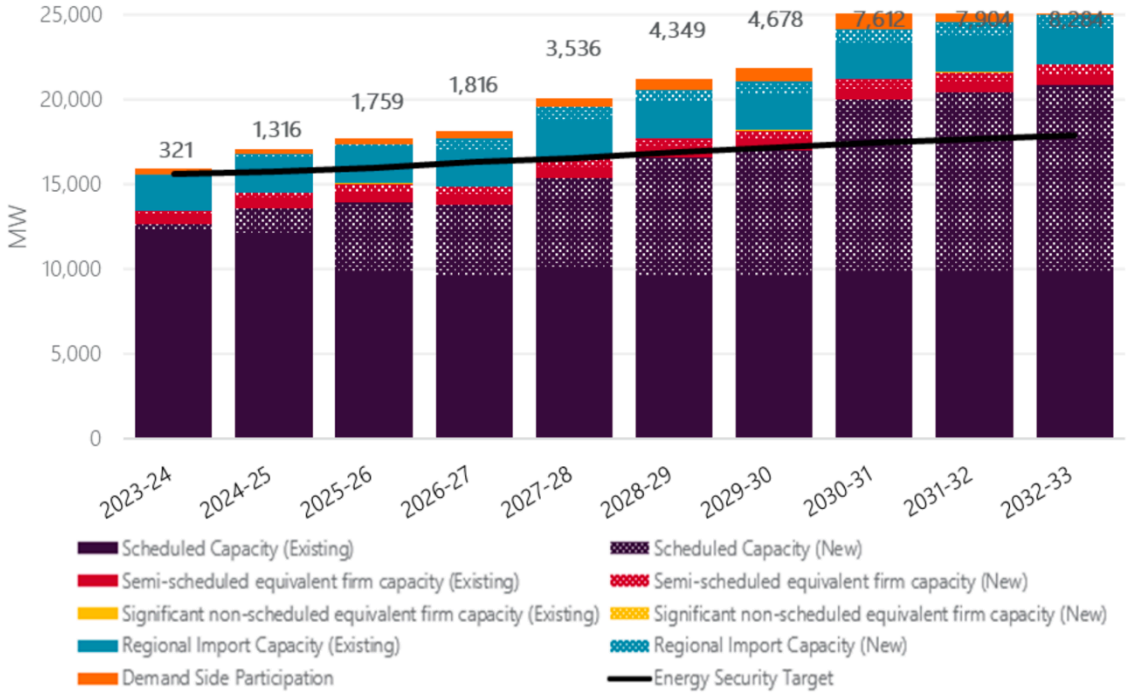
AEMO's October 2023 Energy Security Target Monitor Report for NSW Climate and Energy Minister Penny Sharpe shows that once federal and state capacity schemes are included, there is no NSW reliability gap forecast in any year this coming decade out to 2033, notwithstanding

[13] NSW Department of Planning and Environment, 1 January 2024

the on-time closure of Eraring in 2025.[14]

The Round 2 tender of November 2023, conducted under the NSW Electricity Infrastructure Roadmap, is set to deliver 1,070MW of battery energy storage system (BESS) firming capacity by the end of 2025, building on the 1,445MW of new firmed renewables capacity awarded in Round 1 tender in May 2023. The December 2023 Round 3 tender underwrites another 1,274MW of firmed renewable capacity. June 2024 will see Round 4 awards. We conclude that NSW is on track to deliver on the commitments AEMO has assumed in its analysis – Figure 3.3.

Figure 3.3: NSW Electricity Security Target, FY2024-FY2033



Source: AEMO Energy Security Target Monitor Report, October 2023

Deflation of firmed renewables cost supports further acceleration of rollout

We further note that the deflation of costs for renewables and storage helps underpin acceleration of their deployment, with the relative capital costs of solar and BESS improving dramatically, as has the technology.

BloombergNEF estimates global battery system costs fell 80% in the last decade, and Goldman Sachs forecast battery prices will fall another 40% in the two years to 2025, a forecast many now see as too conservative. Solar module prices declined 45% yoy in calendar year (CY) 2023 as the rise and rise of solar continues, lifting the likely arbitrage value of time-shifting solar generation into the evening peak.

[14] AEMO Energy Security Target Monitor Report, October 2023

3.2 Electricity supply and demand modelling in NSW

As renewables' share of generation grows, demand growth is well below AEMO estimates.

CEF's NSW electricity model leverages the OpenNEM database and extrapolates our estimates of new wind, solar (CER and utility scale), methane gas peakers and interstate grid transmission on an annual basis out to 2030 into generation – Figure 3.4.

This confirms there is more than enough new firmed renewables capacity to replace Eraring's 12TWh pa of generation under the assumed phased closure schedule that we describe in this report – and even including the closure of Vales Point in 2029, cutting a further 7TWh pa of coal fired power generation.

We note that total renewable energy share of generation in NSW – utility scale wind and solar, rooftop solar and hydro – was a record high 31.3% in NSW in CY2023, up from 28.9% in CY2022, having more than doubled in the last five years.

On demand overall, while there was growth, it was by just 0.6% year on year (yoy), below our +1.0% forecast, and well below AEMO's +2.7% compound annual growth rate (CAGR) forecast of average annual demand through to 2030 and beyond.

While high prices do suppress demand, we note that extrapolating AEMO's overly high demand growth assumptions out to 2030 means grid reliability gap risks are potentially overstated. Over the last two decades, electricity demand in NSW has been essentially flat.

This lower observed demand growth provides additional insurance, helping guarantee NSW electricity supply reliability, even if some firmed renewables replacement projects are delayed during delivery.

In our view, AEMO is thus over-focussed on reliability and under focused on energy affordability, a particularly key consideration as consumers have been impacted by combined energy, climate and cost of living crises. See Appendix for details of wholesale and retail electricity price trends in the context of the latest Default Market Offer from the Australian Energy Regulator.

Figure 3.4: CEF's NSW Electricity Model of Demand and Supply (Annually, TWh)

Calendar Year	Total Demand TWh	Total Demand annaulised	Total RE Generation TWh	Rooftop included in Total RE	RE Share (utility + rooftop)	Rooftop share	NSW Fossil fuel share	Coal Share	Coal power TWh
2011	77.8	0.0%	2.6	0.4	3.4%	0.5%	86.9%	82.2%	63.9
2012	73.8	-5.1%	4.6	0.6	6.2%	0.8%	82.6%	77.0%	56.8
2013	71.3	-3.4%	4.5	0.8	6.3%	1.1%	86.8%	80.7%	57.5
2014	71.0	-0.4%	3.3	0.9	4.6%	1.3%	82.1%	76.7%	54.4
2015	71.8	1.2%	4.9	1.2	6.8%	1.6%	81.7%	76.2%	54.7
2016	72.5	0.9%	7.5	1.4	10.4%	1.9%	78.5%	74.9%	54.3
2017	73.2	1.0%	6.0	1.5	8.2%	2.1%	82.8%	78.8%	57.6
2018	73.3	0.2%	9.1	2.2	12.3%	3.0%	80.1%	78.3%	57.4
2019	74.1	1.1%	10.7	3.0	14.5%	4.0%	79.3%	76.6%	56.7
2020	72.6	-2.0%	12.8	3.8	17.7%	5.2%	74.0%	72.5%	52.7
2021	72.3	-0.5%	16.5	5.0	22.8%	6.9%	69.6%	68.2%	49.3
2022	74.0	2.5%	20.5	5.9	27.7%	7.9%	65.7%	62.4%	46.2
2023	74.5	0.0%	23.1	7.7	31.1%	10.3%	60.4%	58.5%	43.5
2024	75.2	1.0%	26.8	9.2	35.6%	12.3%	56.9%	54.8%	41.2
2025	76.0	1.0%	25.6	10.8	33.7%	14.2%	55.6%	53.2%	40.4
2026	76.7	1.0%	32.5	12.4	42.3%	16.1%	47.1%	44.7%	34.3
2027	77.5	1.0%	39.4	13.9	50.8%	18.0%	38.7%	36.3%	28.2
2028	78.3	1.0%	41.0	15.5	52.4%	19.8%	37.3%	34.9%	27.3
2029	79.1	1.0%	42.6	17.1	53.9%	21.6%	35.9%	33.5%	26.5
2030	79.9	1.0%	50.3	18.6	63.0%	23.3%	26.8%	24.5%	19.6

Source: Climate Energy Finance

3.3 The key role of Distributed Energy Resources

To ensure increased supply and permanently drive lower energy costs in NSW, we now need to see the state government and Energy Minister Penny Sharpe rapidly and emphatically invest in accelerating deployment of distributed energy resources (DER) such as rooftop solar and batteries across the state, in households and businesses.

Minister Sharpe should prioritise further upgrades to social housing. A public subsidy of up to $150m pa to Origin to extend Eraring is more than 6 times the total funding pa the government has committed to solarising, electrifying and improving the energy efficiency of social housing ($87.5m over 4 years/~$22m pa).[15] This money would better be redirected to further boost investment in distributed consumer energy resources to permanently lower energy costs and drive decarbonisation.

Th NSW Government should also continue to work to overcome the constraints against strata title dwellings solarising and electrifying, and a bring forward a solution to the split incentive preventing most renters from benefiting from electrification of everything, where the cost-saving benefits of installing renewables accrue to the tenant rather than the landlord who covers the capital costs, disincentivising the latter.

The more local distributed supply and storage, the less need for ever expanding grid transmission investment, beyond the identified critical projects, and hence consumer costs – a key reason retail prices are not moderating as quickly as would otherwise be the case, with the costs of poles and wires comprising 30 to 40% of bills in NSW across the distribution networks.

Note, while wholesale electricity prices saw a drop in CY2023, according to the AER's draft pricing decision released this month (see Appendix) network charges have increased for all customer types from a low of +$67 (Endeavour Energy, residential no controlled load) to a high of +$475 (Essential Energy, Small business). That is an average increase in network costs of 11.7% and small businesses in the Essential area will see a 20% increase in network charges.

DER is also the fastest to deploy, obviating the 5-10 years timeframe for transmission projects to be evaluated, approved and built. Optimising and leveraging existing grid infrastructure with smart technology solutions available today to identify "spare" capacity already in the network is also needed.

We need to see community energy generation capacity, supply and grid resilience enhanced with virtual power plants (VPP), where consumer and industry solar and batteries operate as a network for energy generation, electric vehicle to grid charging (V2G) as our fleet transitions to EVs, and demand side participation (DSP), which encourages consumers to adjust or timeshift their electricity usage in response to market signals or grid conditions in return for a financial reward.

To enable DER and community energy programs to reflect real value to consumers, and while the NSW Consumer Energy Resource Strategy[16] development is underway, we also need network tariff reforms that prioritise flexibility to ensure that NSW consumers can continue to

[15] DPIE, Over 200m is cost of living energy upgrades forever 30000 NSW households, 16 January 2024
[16] NSW Consumer Energy Resources Strategy, 25 January 2024.

benefit from their DER investments. These include mandating the requirement for distribution networks to make their network capacity and operations data publicly available. The Essential trial with NEARA, a new grid capacity modelling technology, has demonstrated the benefit to the grid and consumers of this approach, and we urge the NSW government to mandate this across all the distribution networks in NSW.[17]

Complementing distributed energy resources, we also need much faster planning approval of utility scale renewable energy developments in NSW. Current delays of 3-10 years for approvals of solar and wind developments are ridiculous and untenable in the face of the concurrent current energy, cost of living and climate crises impacting households and businesses.

A comprehensive program to rollout both large-scale wind, solar and batteries and consumer energy is also critical for federal and state renewable energy and emissions reduction targets, especially in the light of the passage last year of the NSW Climate Change Act that legislates emissions reductions of by 50% by 2030, an ambitious 70% by 2035, and net zero by 2050, and allows regulations to prescribe interim targets.

The NSW government stands on the brink of a golden opportunity to transform the state's energy system. It's incumbent on it to now build on the energy transition momentum of the previous state government and reductions we are finally about to see in NSW energy bills after years of hyperinflation (see Appendix) and put permanent downward pressure on power prices.

That means an end to fossil fuels – and coal power, including Eraring – and a redirection of public capital investment to the transition to cheap, clean firmed renewables, in the interests of all.

[17] Nexa Advisory, Putting The Power In People's Hands Distributed Energy Resources – a key contributor to the clean energy transition, October 2023

APPENDIX | NSW Electricity Pricing

NSW saw wholesale electricity prices drop 47% yoy to average $105/MWh in CY2023. After two years of ~20% pa retail electricity price increases, it is overdue that consumers see some price relief.

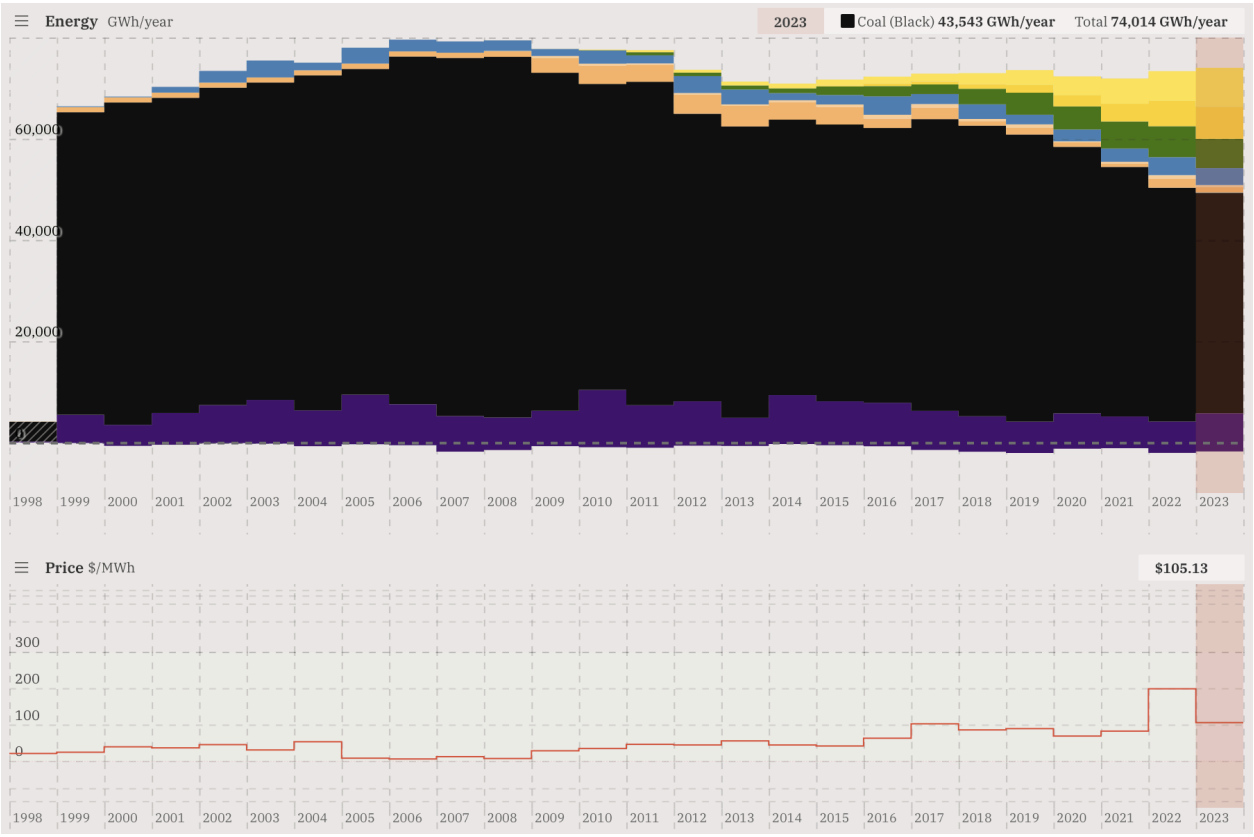
The AER Draft Default Market Offer released on 19 March 2024 earmarked modest retail price declines for NSW consumers from 1 July 2024, with a double digit decline for small and medium enterprise (SME) customers.

To permanently drive lower energy costs in NSW, Energy Minister Penny Sharpe must invest in accelerating deployment of distributed energy resources (DER) e.g. rooftop solar and batteries in households and businesses – obviating the consumer cost and time delays of transmission infrastructure – and ensure planning approvals are accelerated for utility-scale renewables and storage, leveraging existing grid transmission capacity wherever possible.

Wholesale pricing

NSW wholesale electricity prices in CY2023 dropped 47% to average A$105/MWh vs the record high average of $198/MWh in CY2022 – Figure A1.

Figure A1: NSW Electricity Fuel Mix and Pricing, 1998-2023



Source: OpenNEM

Retail Pricing

Sydney Ausgrid electricity consumers will see 3% retail price declines for the new financial year starting 1 July 2024 under the Default Market Offer (DMO) draft ruling from the Australian Energy Regulator (AER) of 19 March 2024, and small and medium enterprise (SME) customers a much more significant decline of 10%. Prices for Endeavour Energy in the greater Sydney region will see retail consumers prices fall 2-7% year on year, and SME's 4%. Essential Energy customers' bills will be flat year-on-year.[18]

While this moderation is relatively marginal, it cannot come soon enough. The DMO in effect from 1 July 2023, saw price increases of 21-24% for retail customers without controlled load, depending on region, and 20-25% with controlled load (smart meters and CER). Small business customers also saw region-dependent increases of 15-29%. This added to the 9-18% increases for NSW residential customers and 4-14% increases for small businesses from 1 July 2022.

With the wholesale price representing ~30% of the NSW retail price, everything else being equal (Figure A2), we should have been looking at near double digit retail price reduction in the March 2024 DMO. However, with grid transmission and distribution representing ~50% of the average retail bill, and with regulated monopolies getting a significant increase in their regulated returns due to rising interest rates feeding directly into their weighted average cost of capital (WACC), overall consumer and industrial rate reductions were significantly moderated.

Given the enormous cost of living pressures from rampant fossil fuel energy price inflation over the last two years, the consequent increase in general inflation and hence mortgage rates, and evident strong profitability of the gentailers (refer AGL Energy and Origin Energy's February 2024 interim results), the relief we will see in mid 2024 is both modest and overdue.

However, there are a number of complicating factors at play.

As we noted above, unlike Queensland, NSW is still to see any increase in coal royalty rates, since the implementation of the NSW government's 2023 policy announcement that it will boost royalties was deferred till July 2024, a massive missed opportunity for additional one-off revenue inflows to finance temporary energy bill relief for those most suffering from energy poverty in the state.[19]

We further note that the idea spouted by a few gentailers and climate and energy luddites early this year that the DMO should increase to compensate energy firms for the massively lower price of wholesale electricity pricing due to the low cost nature of solar is ridiculous.[20]

The notion that this undermines the investor appeal in gentailer business models is likewise ludicrous, given the statement comes after the titanic $20bn bid for control of Origin Energy by Brookfield thwarted by AustralianSuper, a year after the battle for control of AGL Energy. Far from undermining the value of the retailing business, it illustrates how strategically important it is for accelerating the energy transition.

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[18] Australian Energy Regulator, Default Market Offer (DMO) 2024–25 Draft Determination, 19 March 2024

[19] The Guardian, 'Massive missed opportunity': NSW could make $23bn with tiered tax on record coal profits, 21 September 2022

[20] The Australian, Broken power system still fuelled by calls for subsidy, 3 January 2024

Figure A2: NSW Wholesale Electricity Price Futures, A$/MWh

Avg Rate Movement Since:	1-Feb-2024	1-Jan-2024	1-Dec-2023	1-Sep-2023	1-Mar-2023	1-Mar-2022
NSW – Average	⇩ 4.21%	⇩ 5.31%	⇩ 7.12%	⇩ 20.51%	⇩ 10.85%	⇧ 9.82%

Source: Leading Edge Energy, ASX Futures