The Saturday Paper

NEWS

The decision to extend the life of Eraring's power station is a sign of desperation as ageing fossil fuel plants contribute to gaps in supply amid a shortage of renewables. By *Bianca Nogrady*.

Fossil fuels are unreliable backstops in the energy transition

The coal-fired Eraring Power Station in New South Wales. CREDIT: HALANS / FLICKR

Tuesday, May 7, was an ordinary, moderate autumn day in New South Wales; nothing to suggest a risk of excessive electricity use, price spikes or blackouts.

Between 5.15pm and 5.20pm, however, the wholesale spot price of electricity skyrocketed from about $450 per megawatt-hour – typical for that time of day, when people are getting home, turning on lights and heating, starting to cook dinner – to $14,400/MWh. To put this into perspective, the average spot price for the first three months of 2024 was $76/MWh.

Demand was nothing out of the ordinary, but a few major coal-powered generators were experiencing unplanned outages, including two units at the Eraring Power Station near Lake Macquarie. At the same time, transmission lines that connect NSW to Queensland and Victoria were undergoing maintenance, which reduced NSW's ability to draw cheaper electricity from interstate.

Over the next 24 hours, the spot price continued to spike for hours at a time. Finally, at 7.55pm on May 8, the Australian Energy Market Operator (AEMO) – the organisation responsible for the smooth operation of Australia's electricity market – intervened. For only the second time in 25 years, AEMO imposed a short-term price cap on electricity, bringing the wholesale price down to a preset cap of $600/MWh. Generators were required to supply the market at that price, whether they liked it or not.

Most electricity consumers were blissfully unaware of the turmoil. But this price spike, like the energy crisis that affected NSW, Queensland, Victoria and South Australia in June 2022 and also required AEMO's intervention, is a sign Australia's electricity market is in trouble.

The wholesale spot price of electricity is important because it represents the amount of money the electricity market is prepared to pay to keep the lights on. When the shortfall between electricity supply and consumer demand gets a little too wide for comfort, the spot price starts to rise.

When it spikes, it's a signal things are getting desperate, because the spot price is decided by the most expensive type of electricity that's needed to meet demand, not the cheapest.

As the market and its regulators navigate the turbulence of an energy system transitioning from fossil fuels to renewables, experts warn these price surges are likely to become more common. The ageing coal-fired power station fleet is becoming less reliable, and with the development of large-scale renewables and storage lagging, the potential gap between demand and supply is getting larger.

Think of electricity demand as a bucket that's constantly fluctuating in size as the electricity needs of end-users change, minute to minute. Every 24 hours, electricity generators put in bids to contribute supply into that bucket at a range of prices – anything from $1000 to $16,600 for a megawatt-hour – gambling on what they think demand will be and what the market will be prepared to pay.

"Imagine every household had a battery, then in a situation when there is high demand or market prices are high, if we have smart technology we just say, 'Okay, now please discharge your battery', and that will bring down the pressure on the market."

Over the course of that day, the market takes first from the cheapest sources – wind and solar, and coal. Wind and solar are so cheap they're often bid in at negative prices to ensure they're first into the bucket, while coal is usually about $25-$35/MWh. In the middle of a sunny or windy day, those are often enough to fill the bucket, especially in states, such as South Australia, that have an abundance of renewables.

The spot price of electricity is set by whatever is the most expensive source going into the bucket – usually coal. All the generators that have put electricity into the grid at that time will get paid that spot price.

If the bucket gets a lot bigger, however, such as when a heatwave boosts demand, or if something reduces the supply from those cheaper sources – for example, if a coal-fired generator goes offline – then the bucket might need topping up with the more expensive sources of electricity, which in Australia is usually gas or even diesel. When that happens, the electricity spot price is then set by those more expensive generators.

Sean Foley, professor of applied finance at Macquarie University in Sydney, studied the last AEMO-administered price cap in June 2022, which coincided with a surge in gas prices because of the Russian invasion of Ukraine. During that event, gas, coal and even hydropower made incredibly high bids to sell their power. "To me, it looks very difficult to defend why hydro and gas, and potentially coal, were setting prices of $7000 to $10,000 [per megawatt-hour]," says Foley.

It's also not clear exactly why prices spiked so high on May 8. A spokesperson for the Australian Energy Regulator says it will look closely at what led to a situation requiring AEMO's administered price cap, and noted these interventions are rare and "part of the market design to protect customers".

Renewable energy and energy systems analyst Dylan McConnell, at UNSW Sydney, says AEMO's intervention suggests NSW simply does not have enough

power capacity at the moment. A clue to that is the recent news the NSW government has negotiated to keep the Eraring Power Station open for another two years past its originally mooted closure in 2025. That a coal-fired plant is being kept online, even as Australia struggles towards net zero by 2050, "is a sign that the build-out of renewable energy and storage and so on has not been fast enough," McConnell says.

As more coal-fired power units are taken out by age, unprofitability and emissions reductions, this shortfall could get worse and price spikes could be more likely, says energy economist Bruce Mountain, director of the Victoria Energy Policy Centre at Victoria University in Melbourne. "Take out one of the big generating units either in New South Wales or Victoria, and the ones that are left have substantial power to now essentially withhold a bit of capacity and get priced up to gas," Mountain says. "And that creates a big gap that becomes very, very profitable for them."

Generators' high pricing hits both retailers and consumers. Electricity retailers are caught between a rock and a hard place; between the suddenly-high prices generators are demanding, and the much lower prices they have set in their own contracts with customers.

After the pricing crisis in June 2022 that required AEMO's intervention, "we saw retailers go bankrupt", Foley says. "They are in this business of purchasing what the consumers use, and hoping or figuring how to purchase the power for less than it costs them to deliver it," he says. "If you banked on things being $30 to $300 a megawatt-hour, and suddenly they're $10,000 for, like, a month, where do you get that money from?"

Some retailers hedge their bets on the electricity futures and derivatives markets. These short-term price spikes have a long tail for consumers, however, says Stefan Trueck, professor of business analytics and director of Macquarie University's Centre for Transforming Energy Markets. "Even a few extreme price events increase average wholesale electricity prices quite substantially," Trueck says. "Retailers have to get the money back – the only thing they can do in the long run is to increase prices for customers."

The timing of this latest price surge is fortunate for electricity generators, says Chris Thompson, co-founder of electricity retailer Amber, because it comes just ahead of the annual repricing of electricity by the Australian Energy Regulator. "What it did do was it actually increased the prices for future years, the contract for the future years, quite a bit."

Experts say the solution is more storage, both grid-scale and household-scale. "Instead of subsidising solar, it might be better for state governments to subsidise batteries," Trueck says. "Imagine every household had a battery, then in a situation when there is high demand or market prices are high, if we have smart technology we just say, 'Okay, now please discharge your battery', and that will bring down the pressure on the market."

The Australian Energy Market Commission, which advises Australian governments on energy policy, also sees this as an important measure. "Consumer energy resources, such as solar, batteries, electric vehicles and controllable loads, need to be better integrated into the market to achieve the national energy objectives," says AEMC chair Anna Collyer.

Some battery owners can even make a significant profit during these price spikes. Amber is one of only two electricity retailers whose customers pay the wholesale spot price for their electricity, instead of a fixed price. Those with solar panels also get a variable feed-in tariff through the day. If they have a battery as well, they can charge it when electricity is cheap and trade with the grid when it's expensive. "We've had quite a few customers end up making $400 over a couple of days, and we had one customer at least who made over $1000," Thompson says.

A spokesperson for federal Energy Minister Chris Bowen says the government is investing in replacing the ageing coal-fired power fleet through initiatives such as the Capacity Investment Scheme, which aims to deliver an additional 32 gigawatts of renewable energy by 2030. It also wants Australia to become a global player in battery research and manufacture, and to that end has promised nearly $550 million to a National Battery Strategy. However, the government also sees gas as a means to smooth over the market bumps during the transition to renewables.

Mountain agrees that gas-powered generators can provide electricity quickly, and at short notice, which makes it valuable as a source of power. But he argues gas is simply too expensive to have a meaningful role in longer-term energy production. "That'll drive gas out of sustained source of energy production, unless policymakers step in big-time and put a whole lot of taxpayer dollars on the line for it," he says. "And they'll have an enormous fight with the gas producers who want that gas for their export markets."

Trueck believes Australia's electricity grid and market is in for a rough time for the next decade, as coal goes offline and renewables race to fill the gap. "For the NSW market, we already had the second administered pricing event within two years in May 2022, while the market had to be suspended in NSW, Queensland,

South Australia and Victoria in June 2022; we didn't have severe blackouts yet, but that could happen."