

*Good Morning Shoppers,*

*Investors have raised concerns over government intervention aimed at stimulating new supply in Australia's power grid, arguing the move threatens to fundamentally alter the shape of the national electricity market. Decisions by the NSW and Victorian governments to break away from a national policy approach have upset some of the nation's most powerful energy players, concerned by a hit to their existing generation and worried the move on top of Scott Morrison's own interventionist threats may dampen investment. Governments have intervened to ensure enough renewables and back-up power including hydro, batteries and gas are in place when coal plants shut. However, private investors were worried it would distort investment signals and damage the market, the Australian Energy Regulator said.*

*"Stakeholders argued that by 'picking winners', government underwriting could potentially shape the generation mix the market would provide, rather than market signals," the AER says in its biennial report on the performance of the electricity market. Australian.*

*A huge 7000 megawatts of battery storage projects are in the works around Australia, much more than in official forecasts, triggering warnings to developers about rapidly evolving market conditions. About 900 MW of the total are already committed for development and on track to come online by 2024, says analysis by Cornwall Insight Australia, which points to a race to first get to market to capture new revenue streams that may wane once more storage is brought online. The boom, driven by a need to smooth out weather-dependent renewables and to support the grid as coal power stations close, originates from a famous Twitter exchange in 2017 between billionaires Mike Cannon-Brookes and Elon Musk. That led to a battery with a maximum output of 100 MW and storage capacity of 129 megawatt-hours – at the time the world's biggest – being installed in South Australia. AFR.*

*Australia's three remaining oil refineries will get immediate support to keep operating under an \$83.5m, six-month rescue package to safeguard the nation's fuel security. Energy Minister Angus Taylor will unveil the measure on Monday, bringing forward support announced in the September budget that was scheduled to flow from July 2021. The move follows weeks of talks with refinery operators and unions, who had warned that plants could be forced to shut amid mounting losses. The refineries will receive at least 1 cent*

*a litre for petrol, diesel and jet fuel they produce from January 1. The grant funding will help carry the refineries through until the middle of next year, when a legislated, long-term market mechanism will be put in place to supply the subsidy. "The production payments will help the industry withstand the economic shock of this crisis, protecting local jobs and industry, bolstering our fuel security and shielding motorists from higher prices," Mr Taylor said. Australian.*

*Solar and wind are the cheapest forms of power generation in Australia even after taking into account the cost of storage and transmission, underlining expectations of the accelerating transition to renewables, the CSIRO says. The clean energy sources remain the most cost competitive even if renewables were to supply up to 100 per cent of power for Australia's grid, analysis released on Friday shows. Critics of renewables have waged an argument that the cheap price of solar and wind generation fails to take into account the cost of backing up those variable supplies with storage such as hydro and batteries along with transmission charges. However, the CSIRO study assessed the total cost including back-up, known as the levelised cost of energy, and found it would add up to a maximum of \$29 per megawatt hour in 2030. "We found that the additional costs to support a combination of solar PV and wind generation in 2030 is estimated between \$0 to \$29/MWh depending on the variable renewable energy share and region of the national electricity market," Australia's national science agency said. Australian.*

*A lack of confidence in prospects for wholesale electricity prices and worries about government intervention in the energy market and the Canberra-backed Snowy 2.0 project are deterring investment in new generation, the Australian Energy Regulator has found. Significant uncertainty over the timing of shutdowns of coal power stations is also weighing on the mind of potential investors, as is uncertainty about large demand loads such as smelters, the regulator found in an annual review. The findings come after the Morrison government in September issued an ultimatum for private companies to commit to 1000 megawatts of new dispatchable generation in NSW by April or it would order government-owned Snowy Hydro to build gas-fired power stations. The Snowy 2.0 pumped hydro project, and federal and state government schemes for underwriting new plants, have also caused private generators to think twice about planned new generators. AFR.*

*Whitehaven Coal has pleaded guilty to 19 charges and faces more than \$20 million in fines for illegally drilling water bore holes, failing to rehabilitate drill sites and bulldozing land to build unauthorised roads at its Narrabri coal mine. The illegal behaviour was first detected in June 2019 on Crown land*

*incorporating the Pilliga East State Forest and on land owned by Narrabri Coal, a subsidiary of the \$1.4 billion ASX-listed company that operates the mine, 24 kilometres from Boggabri. Each offence carries a maximum penalty of \$1.1 million. The mining company had attempted to settle the matter out of court with a \$542,500 payment Glenn Campbell. The matter will return to the Land and Environment Court decision for submissions on penalty on December 16. The mining company had tried to settle the matter out of court with a \$542,500 payment, but that was rejected because of "the seriousness of the conduct alleged and the collective merits of the initiatives proposed." AFR.*

*Big investors are still lining up to buy high-quality renewable energy projects, which are hitting the market thanks to electricity grid bottlenecks and plunging prices for solar and wind power. Analysts say a healthy secondary market for wind and solar farms is developing in Australia despite major problems in the grid, now that many projects are complete, off-take agreements locked in, connections plugged in, and earnings potential is modelled for the next decade. They point to the recent takeover of Australia's home-grown renewables firm Infigen and investor interest in Tilt Renewables as an indication of strong appetite for established firms with growth potential and staff with deep knowledge of the complex Australian power grid. Wind and solar farms owned by Blackrock, QIC, Neoen and Wirsol are among those that have borne the brunt of grid constraints as new renewables come online in capacity-constrained corners of the network. AFR.*

*Solar and wind energy are still the cheapest source of new energy in Australia, new analysis suggests, as the Morrison government eyes carbon capture and storage to help meet future emissions targets. The latest CSIRO and the Australian Energy Market Operator shows renewable sources of energy are significantly cheaper per kilowatt hour than coal or gas with carbon capture. Even with the extra costs of integrating them into the grid, this is expected to be the case until 2050. The cost of solar panels and batteries is also falling faster than through other technologies. "Costs reductions for technologies not currently being widely deployed, such as carbon capture and storage, nuclear small modular reactors, solar thermal and ocean energy are lagging and would require stronger global investment to realise their full potential," the report says. Canberra Times.*

*For the last five to six years, maybe longer, there has been debate about what technology would replace the ageing and increasingly unfit-for-purpose and uncompetitive coal generation fleet of the National Electricity Market. The New South Wales Electricity Infrastructure Roadmap, together with the*

*renewable energy commitments from Queensland Victoria, South Australia, Tasmania and the ACT governments, has settled that argument for all but the die-hards. Hats off to NSW energy minister Matt Kean who, in political terms, had legislation passed that was supported by the Liberal Party, the National Party, the ALP and the Greens. Think about that and smile. It's a genuinely powerful political achievement. It's what real politics is actually about. It's much better than anything anyone has been able to achieve at a Federal level since John Howard. The transition in electricity is gathering pace. It's not just all these state announcements, it's the will of business and the will of the people as expressed via the enormous growth in rooftop solar. Three gigawatts in calendar 2020, or thereabouts, is about four times as much as I had estimated a few years back. RenewEconomy.*

*Have a great day, cheers*

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**AUD/USD: 75.33**  
/75.38

**AUD/EUR: 62.18**  
/62.22

**ENERGY  
MARKET  
CLOSING  
PRICES**

<b>INDEX</b>	<b>UNITS</b>	<b>PRICE</b>	<b>CHANGE</b>	<b>CONTRACT</b>
WTI Crude Oil (Nymex)	USD/bbl	46.57	-0.21	Jan-21
Brent Cude (ICE)	USD/bbl	49.97	-0.28	Feb-21
Natural Gas (Nymex)	USD/MMBtu	2.59	+0.04	Jan-21
ECX Emissions (ICE)	EUR/MT	30.73	-0.39	Dec-20



## **Energy investors 'fear government intervention' will alter electricity market - Australian**

Investors have raised concerns over government intervention aimed at stimulating new supply in Australia's power grid, arguing the move threatens to fundamentally alter the shape of the national electricity market.

Decisions by the NSW and Victorian governments to break away from a national policy approach have upset some of the nation's most powerful energy players, concerned by a hit to their existing generation and worried the move on top of Scott Morrison's own interventionist threats may dampen investment.

Governments have intervened to ensure enough renewables and back-up power including hydro, batteries and gas are in place when coal plants shut. However, private investors were worried it would distort investment signals and damage the market, the Australian Energy Regulator said.

"Stakeholders argued that by 'picking winners', government underwriting could potentially shape the generation mix the market would provide, rather than market signals," the AER says in its biennial report on the performance of the electricity market.

"It was noted the scale of underwriting currently proposed has the potential to fundamentally change market dynamics.

"It was felt that market investment would increasingly be driven not by market signals, but by responding to government incentives.

"This was considered to be a fundamental change to how the national electricity market operated to date."

The NSW government aims to attract \$32bn in private investment over the next decade focused on 12 gigawatts of renewable generation and 2GW of long-duration storage, while Victoria has broken away from a national approach after changing its electricity act, adding more transmission and storage generation, including a giant battery to ensure it doesn't get caught short when coal plants close.

The Morrison government's wholly owned Snowy Hydro business is also looking to build a 350MW gas generator in the Hunter Valley at Kurri Kurri if

private investors fail to step up and build new supplies before AGL Energy's Liddell coal unit closes.

"The appetite for private investment is affected by the perceived risk of government intervention," the AER says.

"But if private investment is not forthcoming, governments invest or intervene to fill forecast gaps, which in turn inhibits further private sector investment. Ultimately, this could lead to a situation where most generation is built, or at least supported, by government."

The role of the giant federal government-owned Snowy 2.0 hydro expansion, due by 2026, was also raised as a concern among some power investors.

"It was argued the size of Snowy 2.0 would crowd out investment in NSW, other than large-scale solar, wind and batteries, for the foreseeable future.

"Concerns were also raised about the market power Snowy Hydro could possess once Snowy 2.0 was commissioned, given its already large flexible generation fleet," the report says.

Criticism from Australia's big power giants have so far had little impact. NSW Energy Minister Matt Kean launched a blistering attack on the nation's big electricity generators for pulling back on investment decisions, arguing they were making super profits and should "get out of the way" if they didn't like the state's controversial energy policy.

The situation has partly been exacerbated by a lack of private investment in supplies like gas plants to back up renewables.

"Our analysis has identified that although a price signal has been sustained for combined cycle gas turbines for a number of years, there has not been new entry. High-cost, long-term generation projects are inherently risky in an environment of future uncertainty."

The AER also said it had not found a concerning exercise of market power among generators while annual prices in 2019-20 were below \$85 per megawatt hour in all regions for the first time since 2014-15.

"Generators are changing their bidding behaviour in line with falling input costs. This is exactly the behaviour that we want to see, as energy companies must put customers first," Energy Minister Angus Taylor said.

## **Battery boom triggers warning for developers - AFR**

A huge 7000 megawatts of battery storage projects are in the works around Australia, much more than in official forecasts, triggering warnings to developers about rapidly evolving market conditions.

About 900 MW of the total are already committed for development and on track to come online by 2024, says analysis by Cornwall Insight Australia, which points to a race to first get to market to capture new revenue streams that may wane once more storage is brought online.

The boom, driven by a need to smooth out weather-dependent renewables and to support the grid as coal power stations close, originates from a famous Twitter exchange in 2017 between billionaires Mike Cannon-Brookes and Elon Musk.

That led to a battery with a maximum output of 100 MW and storage capacity of 129 megawatt-hours – at the time the world's biggest – being installed in South Australia.

Since then, there have been announcements of multiple new projects. Victoria has the most proposed projects at over 4000 MW, equivalent to more than 40 per cent of recent peak electricity demand, the energy consultancy said, advising that the impact on the grid and on market conditions may need to be formally re-evaluated.

The pace of new storage projects is running well ahead of base case forecasts from the Australian Energy Market Operator after a spate of announcements in recent weeks and months on new proposals from AGL Energy, France's Neoen, NSW grid operator TransGrid and others.

Even if only 10 per cent of the projected capacity in the pipeline is developed, that's still about 1500 MW of storage by 2024, more than 13 times AEMO's forecast in its blueprint for the future power grid, the Integrated System Plan, Cornwall noted.

"The question then becomes, given the size of the storage pipeline and the recent commitment to deliver the largest battery in Australia of 300MW, do we already need to re-evaluate the amount of storage projected to be built in the NEM?" said principal consultant Ben Cerini. He advised that new project developers may be getting a false idea of the market.

Among recently announced projects is a monster 300 MW, 450 MWh battery in Victoria, to be developed by Neoen, which has also expanded the original Hornsdale battery in South Australia by 50 per cent.

The average power of currently proposed storage projects is about 150 MW, Cornwall said.

Mr Cerini noted the strong pipeline of projects in the National Electricity Market has emerged despite "challenging" economics and value streams for batteries that are still developing and can be volatile.

The Hornsdale battery delivered more than \$150 million in savings in its first two years, according to independent analysis, much of it from supplying ultra-fast-response services to keep the electricity network stable. But the market for such services is small, opening the risk that more recently installed systems may not earn similar revenues.

"As we have seen, those that move quickly will be rewarded and be in the best possible position to take advantage of new revenue streams when (not if) they arrive," Mr Cerini said.

He noted that AEMO's forecast for storage in its 2020 plan is based on batteries supplementing energy supply and may not take into account systems developed for grid support services.

Neoen's mega 300 MW battery to be built in Geelong is supported by a grid services contract with the Victorian state government, which ran a tender that was also open to other forms of plant including gas power generation.

NSW currently has 1,300 MW of planned storage, some 9 per cent of recent peak demand, but is well on the way to the 2,300 MW of storage identified in the state's new electricity infrastructure road map, Cornwall said.

Energy Minister Angus Taylor has announced \$5.7 million of funding to support what is expected to be the world's largest solar-powered "flow" battery, which uses a different technology to the lithium ion-dominated pipeline of new projects.

The 8 MWh battery will be installed by Adelaide-based Yadlamalka Energy Trust alongside a 6 MW solar farm in South Australia's far north. The \$20.3 million project should produce 10 gigawatt-hours a year of dispatchable solar power, enough for almost 1500 homes.

Vanadium flow batteries, developed at the University of New South Wales in the 1980s, are bulkier than lithium ion ones but offer longer storage, last for decades and are non-flammable.

Darren Miller, CEO of the Australian Renewable Energy Agency, which is providing the government funding, said they "could play a major role in addressing the emerging need for medium-duration storage, complementing

the role of more established technologies such as pumped hydro energy storage and lithium ion batteries in the Australian market".

The battery, which will have a maximum output of 2 MW, will be supplied by London-listed Invinity Energy Systems and will provide both energy and frequency control services to the power system.

### **Refinery rescue deal to safeguard fuel stocks - Australian**

Australia's three remaining oil refineries will get immediate support to keep operating under an \$83.5m, six-month rescue package to safeguard the nation's fuel security.

Energy Minister Angus Taylor will unveil the measure on Monday, bringing forward support announced in the September budget that was scheduled to flow from July 2021.

The move follows weeks of talks with refinery operators and unions, who had warned that plants could be forced to shut amid mounting losses.

The refineries will receive at least 1 cent a litre for petrol, diesel and jet fuel they produce from January 1.

The grant funding will help carry the refineries through until the middle of next year, when a legislated, long-term market mechanism will be put in place to supply the subsidy.

"The production payments will help the industry withstand the economic shock of this crisis, protecting local jobs and industry, bolstering our fuel security and shielding motorists from higher prices," Mr Taylor said.

He will announce the support, which will be included in this week's Mid-Year Economic and Fiscal Outlook, at Geelong's Viva plant on Monday.

Ampol's Lytton facility in Brisbane and ExxonMobil's Altona refinery in Melbourne will also receive the production payments.

All three were facing potential closure amid a plunge in global fuel demand during the COVID crisis.

BP announced in October it would close its Kwinana refinery in Western Australia, leaving the entire west coast to rely on imported fuel and raising fears over the future of its east-coast counterparts.

The payment is based on calculations that show if all refineries left the market, wholesale prices would jump by 1c a litre for Australian fuel users.

To receive it, refineries must agree to continue to operate for the duration of the program and maintain an “open book”, allowing the government to monitor their financial operations.

“The long-term market mechanism for the production payment will come into effect no later than 1 July, 2021,” Mr Taylor said. “The government is continuing to work with industry to finalise the market mechanism design in the coming months.”

The government has also allocated \$200m in grants to build an additional 780 million litres of onshore diesel storage and created a new minimum stockholding obligation for key transport fuels.

Scott Morrison warned in September the economy was underpinned by fuel security.

“The events of 2020 have reminded us that we cannot be complacent. We need a sovereign fuel supply to shield us from potential shocks in the future,” the Prime Minister said.

Under International Energy Agency protocols, nations should have 90 days of oil supplies in reserve. The latest Australian petroleum statistics show the nation has 35 days of “consumption cover” in crude oil and refinery feedstocks, and an average 31 days of supplies across all fuel types.

Australia purchased \$94m of crude oil at record low global prices for storage in the US Strategic Petroleum Reserve in case of global emergencies.

National security consultant John Blackburn warned at a recent parliamentary inquiry on the impacts of COVID-19 on Australia’s foreign affairs and defence that “buying oil stocks to stick in a cabin in America is not going to do anything for our domestic oil or fuel security”.

Three Australian refineries, in addition to BP’s Kwinana operation, have shut since 2012. The remaining plants produce less than half of the country’s fuel needs, with most imported from bigger facilities in Singapore, South Korea and Japan.

**Sun rises as cheapest ‘levelised’ energy cost - Australian**

Solar and wind are the cheapest forms of power generation in Australia even after taking into account the cost of storage and transmission, underlining expectations of the accelerating transition to renewables, the CSIRO says.

The clean energy sources remain the most cost competitive even if renewables were to supply up to 100 per cent of power for Australia's grid, analysis released on Friday shows.

Critics of renewables have waged an argument that the cheap price of solar and wind generation fails to take into account the cost of backing up those variable supplies with storage such as hydro and batteries along with transmission charges.

However, the CSIRO study assessed the total cost including back-up, known as the levelised cost of energy, and found it would add up to a maximum of \$29 per megawatt hour in 2030.

"We found that the additional costs to support a combination of solar PV and wind generation in 2030 is estimated between \$0 to \$29/MWh depending on the variable renewable energy share and region of the national electricity market," Australia's national science agency said.

"When added to variable renewable generation costs and compared to other technology options, these new estimates indicated that wind and solar PV are the least cost generation technologies for the electricity system for an expected level of deployment."

The calculations are based on new investments being made in renewable energy zones, transmission to boost the grid and greater levels of batteries and pumped hydro storage to meet demand during low periods of renewable generation.

Solar and batteries will continue to enjoy the biggest cost reductions, but prospective technologies such as carbon capture and storage and small nuclear reactors will still require a big global investment push to reach their potential.

"Costs reductions for technologies not currently being widely deployed, such as carbon capture and storage, nuclear small modular reactors, solar thermal and ocean energy are lagging and would require stronger global investment to realise their full potential," CSIRO chief energy economist Paul Graham said.

The cost of building new wind generation is unlikely to fall as quickly due to the maturing of the supply source.

"Wind capital costs are falling more slowly than solar, reflecting their relative maturity as an energy source; however wind capital costs continue to make

gains through capturing more energy from the same wind resources, which means they will continue to be competitive," the CSIRO noted.

Coal still accounts for about 70 per cent of electricity in the power grid, but the Australian Energy Market Operator forecasts 63 per cent of the country's coal-fired generation will retire by 2040.

By 2035, nearly 90 per cent of power demand could be met by renewable generation during periods through the day, forecasts by the Australian Energy Market Operator show.

However, that will require up to 50GW of large-scale solar and wind to be added under the most aggressive plan to cut emissions, representing nearly all the current capacity of the market to be built in just two decades.

That goal will also need massive investment in storage to back up renewables, with up to 19GW of dispatchable resources such as batteries, pumped hydro and fast-start gas plants called for in the next two decades.

### **Power investors balk amid lower prices, intervention - AFR**

A lack of confidence in prospects for wholesale electricity prices and worries about government intervention in the energy market and the Canberra-backed Snowy 2.0 project are deterring investment in new generation, the Australian Energy Regulator has found.

Significant uncertainty over the timing of shutdowns of coal power stations is also weighing on the mind of potential investors, as is uncertainty about large demand loads such as smelters, the regulator found in an annual review.

The findings come after the Morrison government in September issued an ultimatum for private companies to commit to 1000 megawatts of new dispatchable generation in NSW by April or it would order government-owned Snowy Hydro to build gas-fired power stations.

The Snowy 2.0 pumped hydro project, and federal and state government schemes for underwriting new plants, have also caused private generators to think twice about planned new generators.

"A range of market participants highlighted concerns with government investment and intervention," the AER said in its report, noting that some participants argued that investment decisions by government-owned businesses, including Snowy 2.0, "may not always be market driven".

"Issues were also raised with the various schemes governments are putting in place to underwrite generation investment."

AER chairwoman Clare Savage said the process being run by the Kerry Schott-led Energy Security Board to reform the National Electricity Market for post-2025 conditions would be critical to shape the future direction.

"Recognising that governments will continue to pursue their policy objectives, it is desirable that there is a mechanism to embed these approaches in a common framework," Ms Savage said, pointing to the "NEM 2025" review project as an opportunity to achieve that.

The AER, meanwhile, found no evidence of major electricity suppliers exercising market power despite the concentration of the market, which has however been reduced by the influx of new wind and solar farms.

It found that declines in generation fuel costs have flowed through to lower bid prices into the NEM, particularly by coal power generators, and that spikes in prices to more than \$5000 per megawatt-hour were generally driven by extreme weather and high demand.

"In this report we did not find a concerning exercise of market power by generators," Ms Savage said, while noting the wholesale market could be vulnerable to that.

The findings contrast with accusations in previous years by the federal government that Queensland's state-owned generators were "gaming the system", and concerns that AGL Energy and other majors unreasonably profited from the closure of the Hazelwood coal power station in Victoria.

Federal Energy Minister Angus Taylor welcomed the modified behaviour by generators and their lower bid prices in line with falling input costs.

"This is exactly the behaviour that we want to see, as energy companies must put customers first by passing on cost reductions," he said.

Mr Taylor said the government would continue to take "strong action" to bring down the cost of energy for all Australians, with tools at its disposal including the "big stick" legislation that requires suppliers pass on lower costs to customers.

Softer coal and gas prices and more renewable power generators helped average wholesale prices on the NEM drop below \$85/MWh on average last financial year for the first time since 2014-15, the AER said, two years after reporting on historically high average prices following the Hazelwood shutdown.

Prices dropped by 30-40 per cent in South Australia, Queensland and Victoria, and by 14 per cent in NSW.

It pointed to "significant changes" in daytime prices and competition dynamics, with a record number of negative prices during the day as solar power generation surged, but prices tending to be higher during the evening peak demand period.

"While there is significant amounts of low-priced capacity offered in the evening peak, particularly by coal-fired generation, hydro generators are playing a far more important price-setting role," the AER said, noting the trend would likely continue, making flexible supply such as hydro and storage more important.

Mr Taylor said the decline in prices to six-year lows last financial year was "good news" for Australians, supporting the recovery from the COVID-19 pandemic, helping industry and supporting jobs.

### **Whitehaven pleads guilty, faces \$20m in fines - AFR**

Whitehaven Coal has pleaded guilty to 19 charges and faces more than \$20 million in fines for illegally drilling water bore holes, failing to rehabilitate drill sites and bulldozing land to build unauthorised roads at its Narrabri coal mine.

The illegal behaviour was first detected in June 2019 on Crown land incorporating the Pilliga East State Forest and on land owned by Narrabri Coal, a subsidiary of the \$1.4 billion ASX-listed company that operates the mine, 24 kilometres from Boggabri. Each offence carries a maximum penalty of \$1.1 million.

The mining company had attempted to settle the matter out of court with a \$542,500 payment Glenn Campbell

The matter will return to the Land and Environment Court decision for submissions on penalty on December 16.

The mining company had tried to settle the matter out of court with a \$542,500 payment, but that was rejected because of "the seriousness of the conduct alleged and the collective merits of the initiatives proposed."

The coal miner's proposed payment included forking out \$50,000 to the NSW Minerals Council "to fund further guidance on leading practice in exploration" and \$89,000 to improve the coal mine's site management with Geographic Information System.

The bulk of the proposed payment – \$203,500 – was aimed at the regulator's coffers, to pay for costs associated with investigating the miner.

### **Investors flock to brisk wind and solar market - AFR**

Big investors are still lining up to buy high-quality renewable energy projects, which are hitting the market thanks to electricity grid bottlenecks and plunging prices for solar and wind power.

Analysts say a healthy secondary market for wind and solar farms is developing in Australia despite major problems in the grid, now that many projects are complete, off-take agreements locked in, connections plugged in, and earnings potential is modelled for the next decade.

They point to the recent takeover of Australia's home-grown renewables firm Infigen and investor interest in Tilt Renewables as an indication of strong appetite for established firms with growth potential and staff with deep knowledge of the complex Australian power grid.

Wind and solar farms owned by Blackrock, QIC, Neoen and Wirsol are among those that have borne the brunt of grid constraints as new renewables come online in capacity-constrained corners of the network.

London-listed infrastructure developer John Laing Group halted all new investments in Australia and put its solar and wind assets up for sale, eventually selling its wind farms for \$285 million to Australian fund manager First Sentier Investors in October.

"I suspect the reason several overseas new entrants want to sell is that their Australian market investments have proved to be a journey of one horrible shock after another," Green Energy Markets director Tristan Edis says.

"They have learnt to their great regret that the Australian electricity market involves far more risks than they appreciated when they jumped in. John Laing, New Energy Solar and I suspect also BlackRock would sit in this camp."

Wood MacKenzie analyst Rishab Shrestha said depressed electricity prices and curtailments caused by grid bottlenecks are major risks for investors.

"The revenue has come down quite significantly. Electricity prices were down 11 per cent year on year, even more so in the first half of the year due to the COVID-19 oil price impact," he said.

"There's two aspects of curtailment. First, systems strength issues where the market operator cuts off wind and solar farms to ensure the grid is reliable.

The second kind of curtailment is the negative electricity prices ... so that's a double whammy over there."

New Energy Solar is angling to sell all of its Australian solar farms – the 110 megawatt Beryl plant and 55MW Manildra facilities in NSW – after a writedown due to weak electricity prices.

Spanish group Fotowatio Renewable Ventures (FRV) is offering a 49 per cent stake in the Australian solar farm portfolio. And Partners Group is selling a 54 per cent stake in the \$450m Ararat Wind Farm in Victoria.

BlackRock is selling The Gretel Solar Portfolio, which includes the 60MW Hayman Solar Farm, and the 180MW Daydream Solar Farm.

Even so, sellers are finding strong demand for renewables groups with a project pipeline and experienced staff.

Infigen Energy was privatised and delisted from the Australian Stock Exchange in November after Spanish utility Iberdrola acquired it, and Windlab was bought by billionaire Andrew Forrest. AustralianSuper is bidding for Tilt Renewables, the last listed pure renewables player of scale in Australia.

"What you get when you buy those companies is you're buying personnel who have a good ability to assess the quality of the assets and they're around to bear the consequences of the decisions," Mr Edis said.

"When you're buying individual assets you're dependent on the quality of your advisers and trying to evaluate how good your advisers are is not necessarily straightforward if you don't understand the underlying industry."

He said sellers are obliged to hand over all relevant information but they're discouraged from telling the buyer the "bad news" because that will influence the price of the asset, whereas there is more of an incentive for firms to be upfront with potential buyers

"If you own the company itself and the assets , those staff promotions hinge on the performance of the assets over time. If all these assets go bad , the CEO goes down the gurgler and prestige goes down with it," he said.

Underlining the strong demand from deep-pocketed long-term investors, Amazon aims to become the world's biggest buyer of renewable energy and has announced 26 new utility-scale wind and solar projects, including a wind farm in Victoria.

The investment in the 96.6MW Hawkesdale wind farm north of Warrnambool is Amazon's third investment in renewable energy in Australia.

It brings the tech giant's total investment in renewables so far this year to 35 projects and more than 4000MW of capacity – the largest corporate investment in renewable energy in a single year. Its full portfolio is expected to help meet its 2030 goal of 100 per cent clean energy five years early.

### **Renewables cheaper than carbon capture: CSIRO - Canberra Times**

Solar and wind energy are still the cheapest source of new energy in Australia, new analysis suggests, as the Morrison government eyes carbon capture and storage to help meet future emissions targets.

The latest CSIRO and the Australian Energy Market Operator shows renewable sources of energy are significantly cheaper per kilowatt hour than coal or gas with carbon capture.

Even with the extra costs of integrating them into the grid, this is expected to be the case until 2050.

The cost of solar panels and batteries is also falling faster than through other technologies.

"Costs reductions for technologies not currently being widely deployed, such as carbon capture and storage, nuclear small modular reactors, solar thermal and ocean energy are lagging and would require stronger global investment to realise their full potential," the report says.

Under the Morrison government's new technology roadmap, Australia's green banks are set to prioritise investments in hydrogen and carbon capture technologies in a bid to reduce carbon emissions while accelerating the country's economic recovery from the coronavirus pandemic.

An extra \$18 billion will be invested in new energy technologies over the next 10 years.

The government will only invest in coal, gas, solar and wind if there is a clear market failure, like a shortage of dispatchable generation, or to shore up jobs in key industries.

Australia is currently on track to meet its 2030 climate change targets of 26 to 28 per cent below 2005 levels.

The country's position against the target has improved by more than 300 million tonnes since last year, meaning Australia won't have to rely on controversial Kyoto carryover credits.

## **The NEM has been badly wounded, and the federal government has blood on its hands - RenewEconomy**

For the last five to six years, maybe longer, there has been debate about what technology would replace the ageing and increasingly unfit-for-purpose and uncompetitive coal generation fleet of the National Electricity Market.

The New South Wales Electricity Infrastructure Roadmap, together with the renewable energy commitments from Queensland Victoria, South Australia, Tasmania and the ACT governments, has settled that argument for all but the die-hards.

Hats off to NSW energy minister Matt Kean who, in political terms, had legislation passed that was supported by the Liberal Party, the National Party, the ALP and the Greens. Think about that and smile. It's a genuinely powerful political achievement. It's what real politics is actually about. It's much better than anything anyone has been able to achieve at a Federal level since John Howard.

The transition in electricity is gathering pace. It's not just all these state announcements, it's the will of business and the will of the people as expressed via the enormous growth in rooftop solar. Three gigawatts in calendar 2020, or thereabouts, is about four times as much as I had estimated a few years back.

Business shows what it thinks by putting in place PPA (power purchase agreements) deals for long-term supply of wind and or solar, even though business has to establish a new cost centre to do this and to contract for much longer than they really should have to.

In short, state governments, the general population, and an increasing number of big and small businesses have voted with their wallets on this issue. The federal government has been left completely isolated. In electricity, at least, the idea of a gas-lead recovery is risible. It's hard to find anyone who takes it seriously.

The next big event to happen in gas will be in early 2021, when Squadron Energy confirms the go ahead of LNG importation at Pt Kembla. That again will show what gas customers are actually thinking. And it pretty much rules out having gas cheap enough to do bulk power generation.

For what it's worth, ITK thinks LNG imports are a good idea, cheap insurance, gas can come from QLD, WA, or the US. When we don't need it any more, ie within the next 20 years, it's easy to shut down. Gas is hard to replace right now in process heating and as a chemical feedstock for plastics and fertilizer. I digress.

The point of this note is three-fold:

1/ The Federal government's lack of policy has destroyed significant functionality of the National Electricity Market. The pool price no longer is much use as an investment signal and nor is new entrant cost an indicator of what electricity prices are going to be. The above puts the case in "tell me what you really think terms" but that's kind of where it is.

The pool price is not an investment signal because new investment is being driven by government support and state-based reliability requirements. There is a carbon agenda underlying the state approaches, but it's only part of the agenda and it's hidden away. Because the State may or may not bear part of the cost but its cost of capital is factored in, therefore the pool price only reflects that part of the cost that, say in NSW's case, doesn't end up in distribution charges. A carbon intensity scheme or much better an economy wide carbon price would have obviated all the state schemes.

2/ There is a risk of coal closures happening in a disorderly fashion, and being overly concentrated in, say, a five-year time frame. If we are no longer using the market to justify investment, is it not time to consider a different mechanism, such as the auctions used in Germany, to manage coal closures here in Australia.

3/ We also show, using NEM Review, the load shapes of generation in the NEM at the moment (when renewables are running at 30% of supply) and show that it's NSW and, to a lesser extent, Queensland coal that is having to do the flexing. Looking forward, the two vulnerable stations after Liddell are Vales Point, which has lots of flexibility as it has neither closure costs nor long term coal contracts, and Yallourn. So far Yallourn's output is flat; that is, there is no sign of it having to flex up and down. On ITK numbers, new supply in Victoria is mostly wind and we don't expect wind to increase the need for brown coal to flex. It's solar that does that, and it will be solar in NSW and QLD, much of it rooftop. And rooftop cares not one whit what the price is in the spot market.

The risk that is surely becoming obvious to all and sundry is that several coal stations may all decide to close within a short space of time. And by a short space of time I mean, say, three to five years.

There are mitigations to this risk:

1/ Market structure. Ownership of coal generation is concentrated. AGL and CLP both own brown coal generation in Victoria and black coal generation in NSW. They have choices. The QLD government owns most of the coal generation capacity in QLD. It can manage what it does.

2/ Revenue opportunities. The prevailing theory for coal generators is that as higher cost players leave the market it creates "head room" for the remaining

players. In ITK's view the two problems with that are (a) investors don't want the last of the old technology, they want the best of the new stuff and (b) there is so much new wind and solar coming that any relief will be temporary and moderated. However we'd be the first to agree that our view on this could be wrong and needs much more rigorous analysis than the thought bubble style of commentary presented here.

3/ Even closed stations could be held in reserve. We can come back to this.

The ISP states that in the "Step Change" scenario up to 50GW of new VRE (variable renewable energy) is required with QLD and NSW each installing 16GW and VIC 7GW by 2040. But, in fact, with the NSW roadmap we are going to be running ahead of that pace over the next decade, in NSW at least, and actually QLD announcements this year are also ahead of the pace required.

The table below shows selected coal plant closures based on what is shown in the ISP and which reflects mostly a 50 year technical life.

ITK considered that even before the NSW Roadmap announcement some plants would close before the notional date shown in the ISP. Specifically, Gladstone power station sells the bulk of its output to the Boyne Island aluminium smelter. That contract ends in early 2029 and represents a hard decision point for Gladstone. Gladstone is one of the oldest power stations in the NEM and were it known to be closing would open up large opportunities for wind and solar in North Queensland, and perhaps more hydro/pumped hydro, all of which would be valuable in a NEM context.

Once the NSW roadmap is taken into account we can make the following points. Aurora Energy, the NSW government's modeler, specifically noted the roadmap is designed to ensure new capacity in terms of both power and energy is built ahead of the the scheduled coal generation closures, so that the plants can be closed without energy security being at risk.

However, that quite obviously means that for some years there will be a surplus. And a surplus means lower prices perhaps down to loss levels, and some coal generation units, most likely Vales Point B may not wish to go through that.

The following table shows some selected coal stations together with their expected closure from the ISP point of view, as well as their energy and median power contributions over the past 12 months.

The ones highlighted in yellow are essentially power stations where in ITK's view there is potentially an early closure.

Even if they don't close early there is a cluster of closures around the end of the decade. That may not be the best outcome.

In ITK's view the electricity function is not really being used for new investment price signals right now. Because of the federal government's refusal to put in place credible carbon policy, state governments have stepped in. State governments do not, and should not, have the national interest or even the health of the NEM as a major policy driver. They are concerned to look after the interests of their state. Of course, they will consider the impact of their actions, but it isn't the imperative.

New contracts being offered by state governments and legislation such as Tasmania's 200% renewable target essentially mean that some part of the cost of new supply may never show up in the "pool" or standard contract market.

On top of that is the incredible pressure being exerted by the rooftop market. If we take Sunwiz figures, and why wouldn't we, there is now over 11GW of rooftop installed in the NEM. And that amount has doubled in just three years, That's the part that astonished me, quite frankly.

On ITK numbers, rooftop solar at this time of the year is 10% of total supply 24/7, equal to wind, and it's growth is more obvious just now, although wind is about to have its own burst of growth.

Across the NEM in the past couple of weeks, rooftop solar has been producing around 6.5 – 7GW in the middle of the day, as estimated by AEMO (no one actually knows for sure) and that's around 25% of peak operational (utility scale) supply.

These numbers are not to be underestimated in any sense, but the most important to note here is that for all intents and purposes the vast majority of rooftop solar users could not care less whether electricity prices are negative \$1,000/MWh or positive \$10,000/MWh. The systems just produce power willy nilly.

For rooftop solar the electricity market is so irrelevant that the vast majority of users would have only the haziest of ideas it exists at all. And yet it represents more or less 20-25% of supply in the middle of the day and as I say 10% of total supply during Summer. And it's still growing faster than the wisteria out front.

So, between investment which is now more driven by state decarbonisation policies than actual price signals, and consumer preferences for price insensitive rooftop solar, what is the function of the spot market?

Its one remaining job seems to be to work out what firming energy will be supplied at dinner time every evening. Of course that is hyperbole, but it's the direction we are heading.

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