Submission No 88

SUSTAINABILITY OF ENERGY SUPPLY AND RESOURCES IN NSW

Organisation: ITK Services

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Submission to Enquiry into Sustainability of energy supply and resources in NSW

About ITK

ITK Services is a consultancy that provides analysis of the electricity and gas industries and associated decarbonization targets in Australia. We forecast pool electricity prices, advise on PPAs and advise on investment fundamentals. Its principal David Leitch has more than 30 years research experience with some of Australia's leading investment banks. Coauthor Ben Willacy former roles included senior coal research responsibilities with Wood Mackenzie, a global consulting firm, and also cofounder of SERRA a solar farm database and analysis tool acquired by Rystad.

ITK has spent considerable time over the past few years in analyzing the current state and outlook for the NSW electricity industry.

We welcome the Committee's invitation to make a submission as we recognize the importance of the issue. We would happy to respond to questions.

Summary

In a nutshell NSW thermal generators are almost certain to lose significant market share over the next few years. The only thing that might obviate that is an early closure of Yallourn in Victoria. Because NSW generators are going to lose market share the risks of early closure of another NSW generator are material. Although it makes early closure even more likely**, the appropriate policy in NSW is to ensure that enough transmission and new supply (mostly low cost VRE) is built before closure of any further NSW thermal generators**. The alternative policy is either extend the life of the existing coal generators or to build new ones. In ITK's view its ridiculous to see NSW's vibrant economy being being powered indefinitely by very ageing coal generators running on low quality coal. Equally the prospect of building new coal generation in a carbon constrained world is almost impossible to support rationally. Thus our recommendation is that NSW policy be relatively aggressively focused on building new transmission, and incentivizing new VRE build. We do not prove but it is clear that this will be of great benefit to various NSW regional economies. Primarily though appropriate transmission and VRE focused policy will increase reliability and lower average prices. However we caution the enquiry that prices at any particular point of time are unlikely to represent, indeed should not represent in a properly functioning market, long term average prices calculated retrospectively. Price in a competitive market is dynamic and self adjusting. The old adage that the "cure for high prices is high prices" remains totally true. As big coal generators close they will push up prices whereas the impact of individual typically much smaller renewable projects is harder to discern in isolation.

- NSW imported about 5% of its net electricity requirement in FY19 and ITK expects that to rise to about 18% by 2022 (see Fig 2). This represents both a threat to NSW energy security as imports are riskier than local production and an opportunity for NSW investment and business.

- A surplus of electricity both in Victoria/South Australia and in QLD is likely to lead even larger loss of market share by NSW thermal generators over time potentially bringing forward closure dates of further NSW generators.
- NSW thermal coal has to compete in the export market. At times this can lead to high costs for NSW generators at other times to low costs. At least one generator, Mt Piper, has only limited access to coal. In general NSW thermal generators have reduced contract cover for their coal and there is presently little reason to expect them to write longer term contracts. At the time of writing this submission and increase in production of coal in China and increases in supply generally in Asia are depressing regional thermal coal prices perhaps below sustainable costs.
- NSW has a very large renewable energy resource. Studies by both Aurecon for Transgrid and by the AEMO suggest that many GW of PV and several GW of wind are available on land where energy production is likely to be the highest value use. It goes almost without saying that most of this is located in regional NSW.
- Two and perhaps three factors hold back development of the resource:
    - Lack of transmission access; and
    - Insufficient revenue certainty to justify the investment
    - Insufficient policy signals from the NSW Govt.
- NSW also hosts some large but fragile industrial demand loads. Tomago aluminium smelter is the largest single point consumer of electricity in NSW and indeed the NEM but faces an uncertain future. Reliability of supply is of key importance to their operation but so too is price.
- ITK believes that any rational analysis of NSW's situation will show that more transmission, both inter state and intra state will at a minimum improve energy security and in all likelihood lead to lower prices by enabling supply, and low cost supply at that, to increase faster than demand.
- However transmission takes 7 years to build under current regulatory rules**.** ITK's recommendation is that **NSW should facilitate more transmission investment by providing seed capital, in the same way that say Westconnex or indeed land development can be seed funded by Govt before being later sold back to the private sector**. The essential point of the investment would be to provide the certainty necessary to get the transmission built as early as possible. By speculatively building in front of regulatory approval up to 3 years can be saved on transmission investment
- Almost any rational analysis will also show that wind and solar levelized cost of energy [LCOE], that is the price required to justify new investment, is lower for VRE than for competing technologies. For sufficiently high spot thermal coal prices such as prevailed in NSW in 2018 its likely that the LCOE for wind and solar is approximately equal to the $/MWh cost of running the existing thermal fleet in NSW or at least that part which is exposed to spot coal costs. This statement allows for the significant maintenance capital expenditure on the fleet which we estimate at between $7 and $10 MWh.

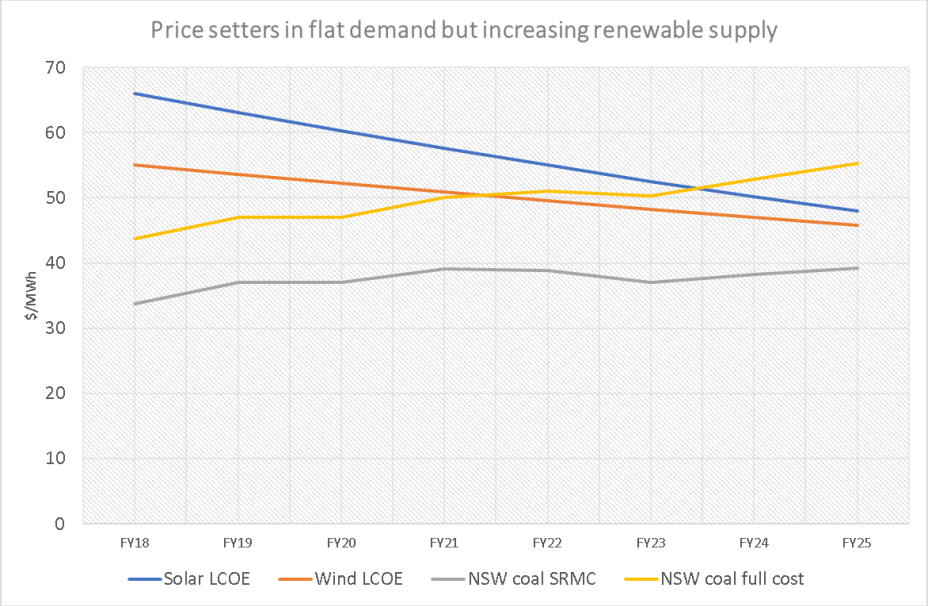

Figure 1 LCOE of wind and solar compared to operating costs of NSW coal generators. Source: ITK

- Although the economics of new variable renewable energy [VRE] are clear that will not in our view be enough to justify building the required amount of VRE to ensure NSW has a reliable energy supply. In our view there remains a role for policy to incentivize new investment subject to the caveat that the transmission exists to support it. Policy mechanisms have been explored in depth at a Federal and State level over the past decade. There is no question that the economically most equitable solution is some form of carbon tax or price but this has proved to be the most difficult to gain consensus. Alternative policies include a Clean Energy Target and or combined with some form reverse auction (tender) for new investment. As well as the investment directly generated from a reverse auction its signaling power to the electricity sector is also important. **ITK recommends that the Govt set enforceable clean energy % targets for each of 2025, 2030 and 2035 and that the Govt finance 1000 MW of VRE over three years using some form of reverse auction.**
- New VRE will over time crowd out the existing thermal generators and lead to one or another closing The policy challenge is to ensure that there is enough new supply both VRE and firming to replace a thermal generator that closes. Federal policy in the form the Reliability Guarantee exists to minimize this risk but in our view NSW policy should safeguard the interests of NSW consumers over and above what is implied by the reliability obligation.
- **ITK is supportive of policies that increase behind the meter solar and storage such as the NSW Govt "Empowering Homes Program**". Household batteries offer good opportunities to "peak shave" load and increase grid resiliency.
- **ITK also recommends that the Govt fund some research into low inertia grids, built using power electronics and their potential application in NSW.**

NSW demand and supply outlook current policy

ITK's present forecasts for demand and supply in NSW to 2030 are summarized below.

NSW supply and demand								
TWh	**2019**	**2022**	**2025**	**2030**	**2019**	**2022**	**2025**	**2030**
Demand	**73**	**75**	**77**	**80**				
Supply								
Rooftop solar	2	3	4	6	3%	4%	6%	7%
Utility solar	2	6	11	13	2%	9%	14%	16%
Wind	4	8	9	12	6%	10%	12%	15%
VIC imports	0	7	11	10	0%	9%	14%	13%
QLD imports	4	7	4	2	5%	9%	5%	2%
Coal	60	43	35	32	82%	58%	45%	40%
Hydro	1	1	1	1	1%	1%	1%	2%
Gas	1	0	2	3	1%	0%	3%	4%
Exports	0	0	0	0	0%	0%	0%	0%
Total supply	**73**	**75**	**77**	**80**	100%	100%	100%	100%

Figure 2 Summary of NSW supply and demand. Source: ITK

These forecasts assume

- Build out of announced projects;
- Closure of Liddell;
- Construction of Snowy 2.
- Construction of increased transmission , Vic- NSW, QLD-NSW, SA-NSW
- 100 extra MW at Bayswater
- 1.2 GW of as yet unannounced new VRE commenced each year of FY19-FY25 under current policy conditions
- About 1 GW per year of new behind the meter generation across the NEM. Arguably in NSW this will be supported by the NSW

ITK's model is based on lower variable cost fuels being dispatched ahead of higher variable cost. So when wind and solar are available with close to zero marginal variable cost they displace coal and gas. Lower variable cost Victorian coal and qld coal also displace nsw coal generation as increases in those States wind and solar penetration forces coal generation to seek alternative markets.

ITK assumes that a certain amount of new supply will be built each year. Unlike most conventional models we do not assume the new supply is induced by price, we simply assume there will be enough policy and price support. ITK accepts that this is a questionable assumption, but we defend it by noting that the amount of supply, on an annual basis is small relative to what has been achieved in recent years and that in fact there are both policy (50% renewables by 2030 in QLD and Victoria) and price signals.

Unannounced forecast new supply (MW)						
FY	**New South Wales**	**Queensland**	**Victoria**	**South Australia**	**Tasmania**	**Total**
2019	-	-	-	-	-	-
2020	-	-	-	-	-	-
2021	30	100	100	-	-	230
2022	300	450	450	100	100	1,400
2023	575	600	233	183	100	1,692
2024	700	600	333	267	100	2,000
2025	600	650	333	267	-	1,850
VRETotal	**2,205**	**2,400**	**1,450**	**817**	**300**	**7,172**

Figure 3 Assumed annanounced new supply. Source: ITK

Further the figure below shows projects either just commissioning or going ahead/under construction but yet to commission as well as unannounced new supply by quarter out to 2022.

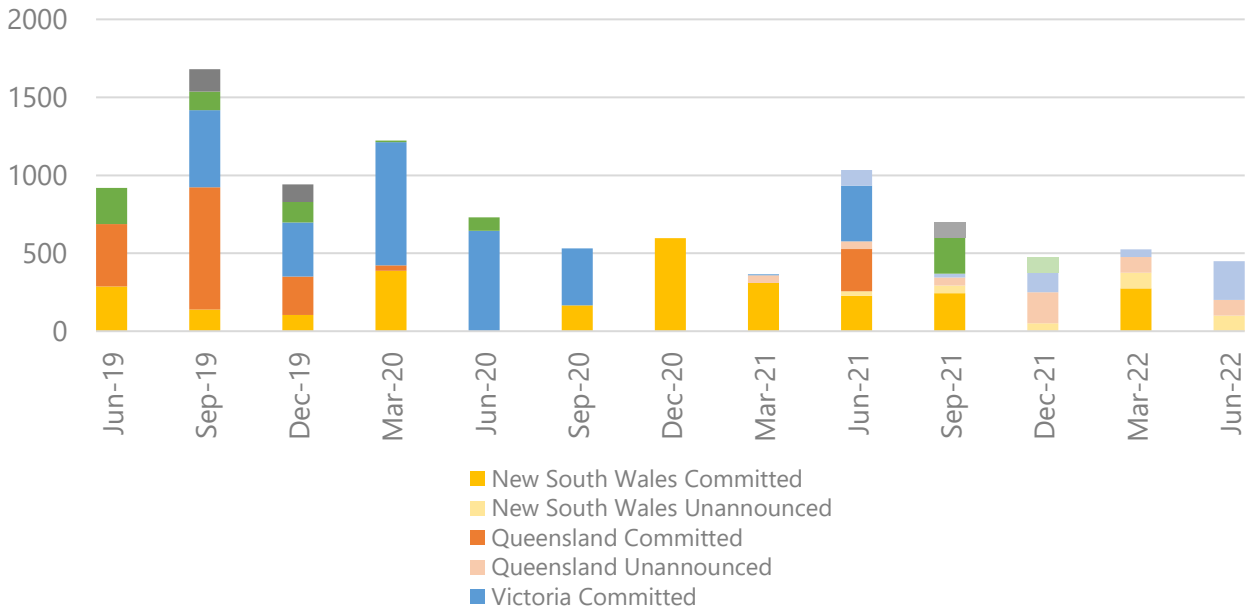

Figure 4 quarterly estimates of new supply commissiong. Source: ITk

We draw the committee's attention to the quantity of new supply certain to come online over the next 12 months, albeit little is in NSW.

NSW potential for renewable energy

In our view the best analysis of the potential is by Aurecon for Transgrid in 2018. The following figures are reproduced from Transgrid's submission to the ISP noting that better resource areas are shown in green. The analysis is to the 50 metre level and takes account not just resource quality but alternative land values and proximity to existing transmission.

Figure 5: Wind generation development ratings for New South Wales[17]

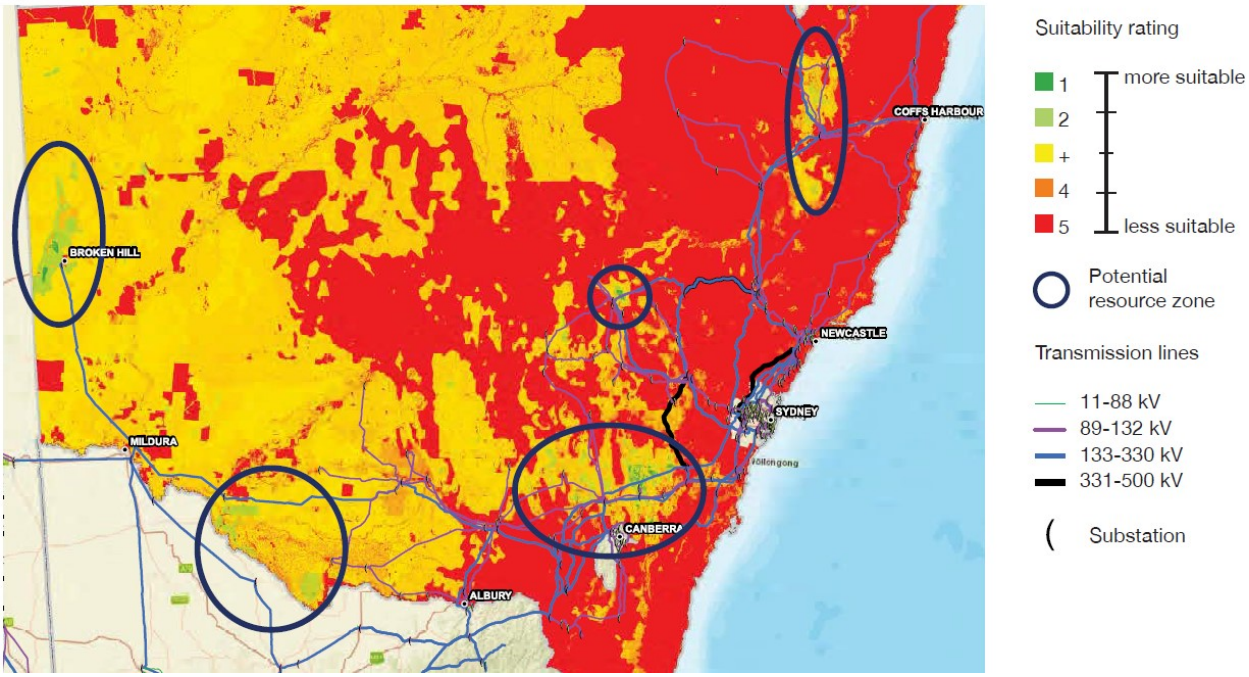

Figure 5 Wind potential NSW. Source: Transgrid

Figure 6: Solar generation development ratings for New South Wales[17]

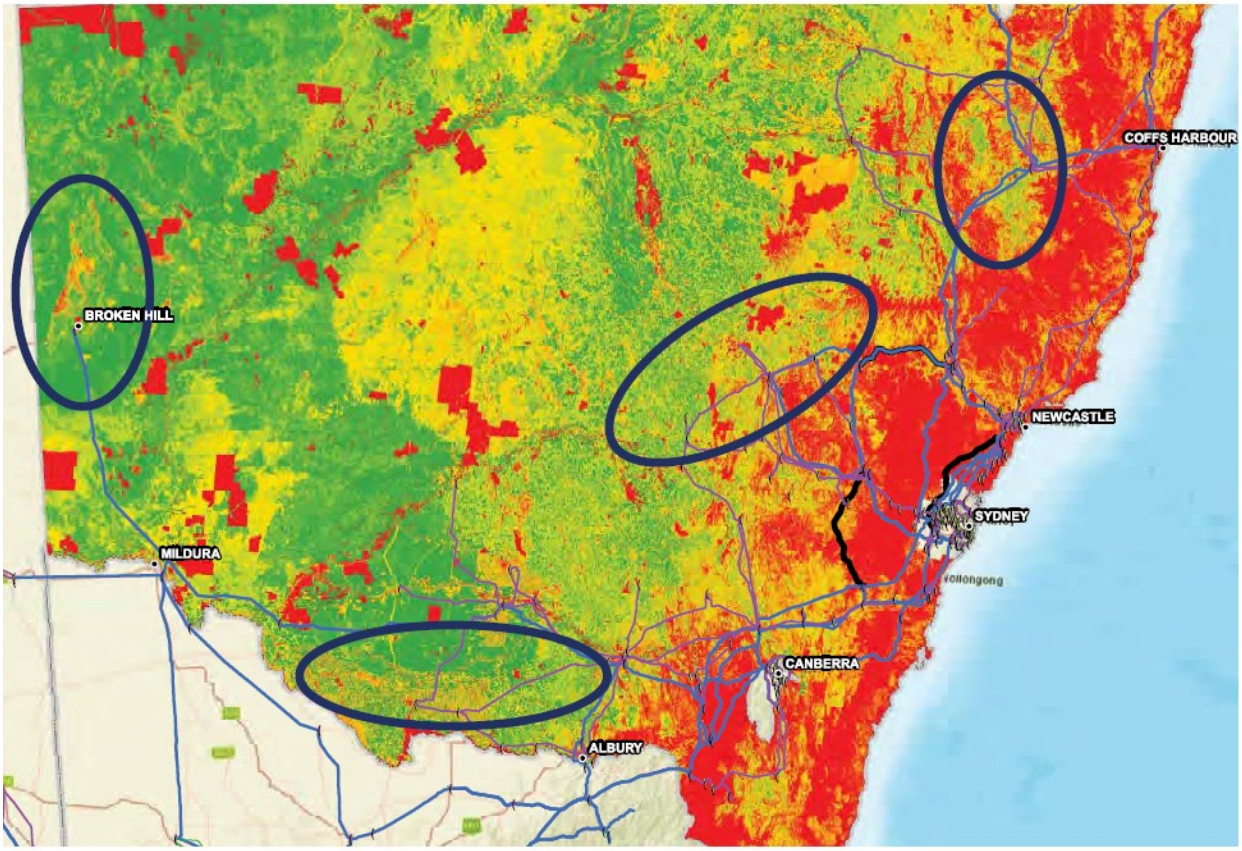

Figure 6 Solar potential NSW. Source: Transgrid

The map makes clear the vast, greater

than 18 GW of solar potential and the smaller but still quite significant wind resource. A summary of the three best areas identified by Transgrid in 2018 is:

Close to 30 GW of resource potential in 3 key areas						
	High quality resource		**Distance to load**	**Indicative transmission cost**	**Firming capacity comment**	**Comment**
	Solar	**Wind**	**km**	**000 $/MW**		On Melb /Sydney path
South East NSW & ACT	> 5 GW	> 5 GW	330	224	Snow. Gas transmission	on Bribane /Sydney path
Northern NSW	> 5 GW	4 GW	500	285	Pumped Hydro east of Armidale	On Adelaide /Sydney path
Southern NSW & North West Victoria	> 5 GW	4 GW	520	376	N. A.	
Total	> 15 GW	> 13 GW				

Figure 7 Selected NSW VRE areas of potential. Source: Transgrid

We can use these number to illustrate the broad picture of building up NSW energy supply by 50% prior to 2030. Note that the figure below does not deal with the amount of firming investment required.

Investment in NSW to add 50% more capacity				
		Wind	**Solar**	**Total**
Generation	$m/MW	1.7	1.5	
Transmission	$m/MW	0.275	0.275	
Total capex	$m/MW	1.975	1.775	
MW	built	6000	4000	10000
Total capex	$bn	11.9	7.1	19.0
Of which transmission	$bn			2.8
Capacity factor		43%	27%	
Energy produced	TWh/year	22.6	9.5	32.1
NSW energy demand	TWh/year			68.0

Figure 8 Capital and energy output of VRE buildout in NSW. Source: ITK

Transmission constraints at present:

Taking the 2019 Transgrid Planning Report at its word there is only about 2000 MW of available transmission connection capacity in the entirety of NSW.

NSW new connection potential	
	MW
Barrier Ranges	0
Southwest NSW	0
Southern NSW	0
South East NSW*	800
Central NSW	400
Northern NSW	800
Total	**2000**
*** 800 North , 0 South**	

Figure 9 New connection capacity availability in Transgrid. Source: Transgrid planning report collated by ITK

This issue has been highlighted on numerous occasions. There is also some more modest connection capacity within the distribution networks.

Transmission approval process and returns

New transmission investment is required to satisfy a test, the RIT-T test, before it can be built and eventually included in the regulatory asset base of a transmission company. Historically it is a matter of fact that little new transmission has been built in the past decade. A good description of the process can be found at ESB's ISP action plan pp 9-12

The test essentially requires that consumers at both ends of the proposed transmission link be better off and that the proposed investment is the most optimal way of achieving this.

As described by Amy Kean, NSW renewable energy advocate, at a conference in late 2018 this is essentially a six-seven year process. Two years to satisfy the RIT-T test , two years for planning and easements and two years for build, plus more time for testing.

Any new transmission process started to day would not be operation until 2026 under those rules.

The ESB in December 2018 outlined how rule changes could reduce the post RIT regulatory process provided the AER became involved at an early stage. Its worth summarizing how the ESB saw the Stage 1 proposals of the Integrated System Plan [ISP] at that time. Note the issue about reliability concerns in NSW.

Project	Expected RIT -T process without rules changes	Projected time for physical implementation	Expected completion	Required Completion	Impact of delay	Status Sep '19
Q/NSW Upgrade (QNI)	2 years + Commenced Nov 2018	2 3⁄4 years	**Dec 2022-Feb 24**	**Dec-21**	Reliability concerns in NSW	With AER
Vic/NSW Upgrade (VNI)	2 years + Commenced Nov 2018	3 years	**Late 2022**	**Dec-21**	Reliability concerns in NSW	With AER
Western and North Western Vic Renewables Integ'n	Expected completion by August 2019 (if no disputes)	2-4 years	**2024-25**	**2023**	Delayed market benefits for consumers	

Figure 10 Status of Selected state 1 ISP projects. Source: ESB, ITK

Clearly at that time the projects were running late, in the case of the QNI upgrade by around 2 years. Recent conversations with Transgrid indicate that the AER and Transgrid are working closely on the projects and that is positive. Its also the case though that on the basis that NSW is materially reconfiguring its transmission there is an argument for doing larger expansions rather than smaller ones. Yet these would be harder to justify under the narrow terms of the RIT-T

For those interested in the precise status of transmission upgrades and their current status an interview with Andrew Kingsmill, planning manager with Transgrid can be heard here. Andrew Kingsmill

Looking to returns. The AER's made an allowance for Transgrid regulatory revenue covering the 2018-2023 period in 2018. In essence the numbers work to transmission costing $11.30/MWh. Compared to household tariffs of say $350 MWh this is a relatively trivial charge. Even compared to prices paid by industrial companies of say $140 MWh its still less than 10% of the bill.

Transgrid is allowed to earn a notional equity return of 7.25% on the 40% of its regulatory asset base assumed to be equity funded for regulatory revenue calculation purposes. This level of return requires regulatory certainty to justify investment. For instance the allowed equity beta for regulated assets is 0.6. Equity investors contemplating risky investments would generally use a higher Beta.

Its unreasonable therefore to expect Transgrid to invest until effectively not only has a contingent project satisfied the RIT-T but also that the amount of assets that will included in the regulatory asset base is known with confidence..

Equally there is a good argument that (i) more than six years is too long to wait for new transmission when wind and PV plants can be built in less than two years and (ii) there is no certainty of an RIT-T process actually being passed even though longer term considerations would make the investment reasonable from a broader perspective.

This is the gap that we think Government can fill. Even if we assume the cost of equity for a project of given risk is equal between the private and public sector, it will still be the case that Government marginal cost of debt is low.

Government can essentially provide a guarantee to Transgrid of regulatory support for transmission investment. This would allow Transgrid to completely eliminate the regulatory process in making its investment decision. With care it could even allow the transmission to be appropriate sized for future needs. ITK has not worked up this proposition further because this is a simple enquiry submission but we are available to explain this in more detail if required.

Firming initial comments

At the outset its important to note that NSW is likely to have a strong portfolio of firming energy up to at least 2030. Its unlikely that the VRE penetration rate will be above say 60% by 2030 even with reasonably aggressive policy support. By definition that means that 40% of the energy is being supplied by firmed power. More specifically the flexibility of NSW coal plants is excellent considering their age. Mark Collette, energy executive, EnergyAustralia has noted that units at Mt Piper can ramp down to 150 MW and up again without too much drama, Eraring (scheduled to close in 2032) was purpose built with ramping and flexibility in mind. The reason the coal plants in NSW are relatively flexible is because historically demand itself is very volatile.

In addition to the coal, gas, access to Snowy Hydro conventional resources, interstate transmission, future supply firming tools will included pumped hydro, demand response and batteries. More peaking gas is also possible. Residential batteries have excellent potential to peak shave.

In ITK's view there are essentially two different firming markets, (1) the daily morning and evening peak. (2) periods or seasons of extended low solar or wind ouput. Regarding the daily peaks this market can

essentially be met by any peaking source but actually batteries are typically used in sub 1 hour markets and batteries, moderate pumped hydro, reciprocating engine gas are well suited in the 1-4 hour markets. Some demand response may also be available. In ITK's view given how quickly batteries can be installed there is little need for intervention or support in daily peak market. That said a leg up for some of the various non Snowy pumped hydro proposals such as that by Origin to expand Shoalhaven, or Energy Estate's New England proposal as part of the New England REZ would not go astray.

We illustrate this point with ITK's present forecast of average supply over a year by time of day for 2019, 2022 and 2025 as presented in the figures below. These figures are used to estimate the total energy over the year by fuel presented in Fig 2. ITK presently assumes that the firming, ramping power is provided by existing coal. However we expect part of that to be replaced by pumped hydro and battery as those sources are likely to be more economic by then, given that on average power prices during the middle of the day may be quite low for many months of an average year.

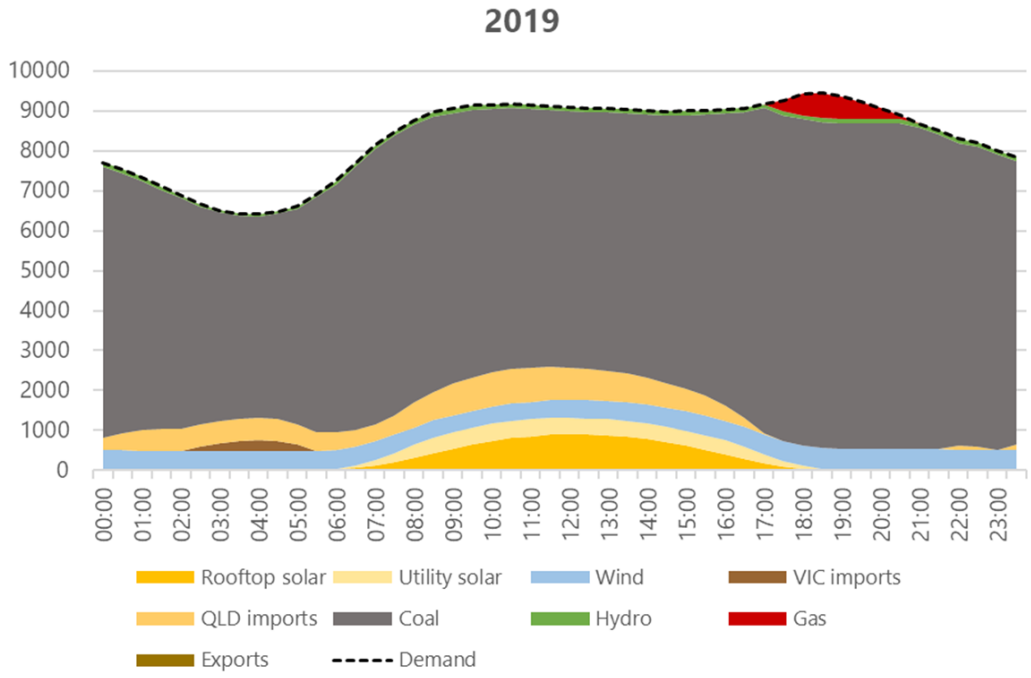

Figure 11 Average NSW supply by time of day 2019. Source:Nemreview,, ITK

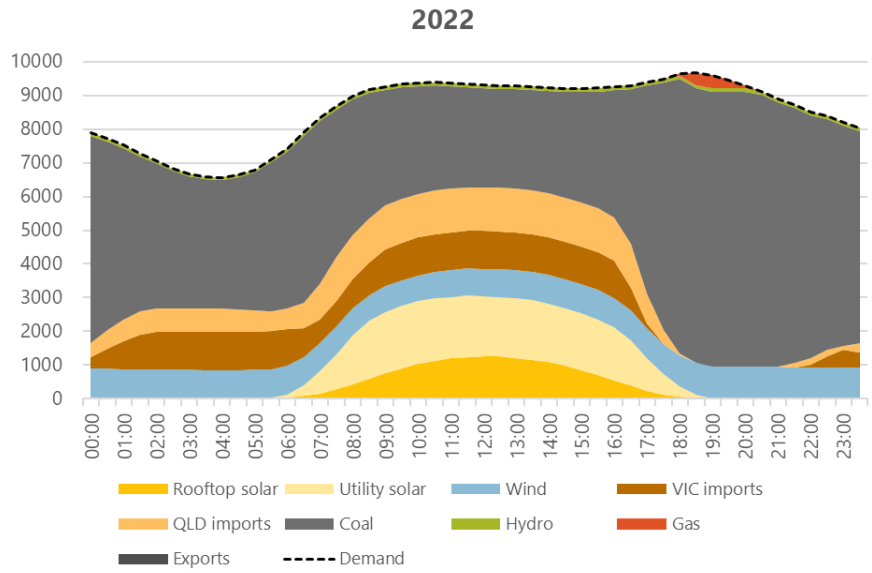

Figure 12 Average NSW supply by time of day 2022. Source: ITK

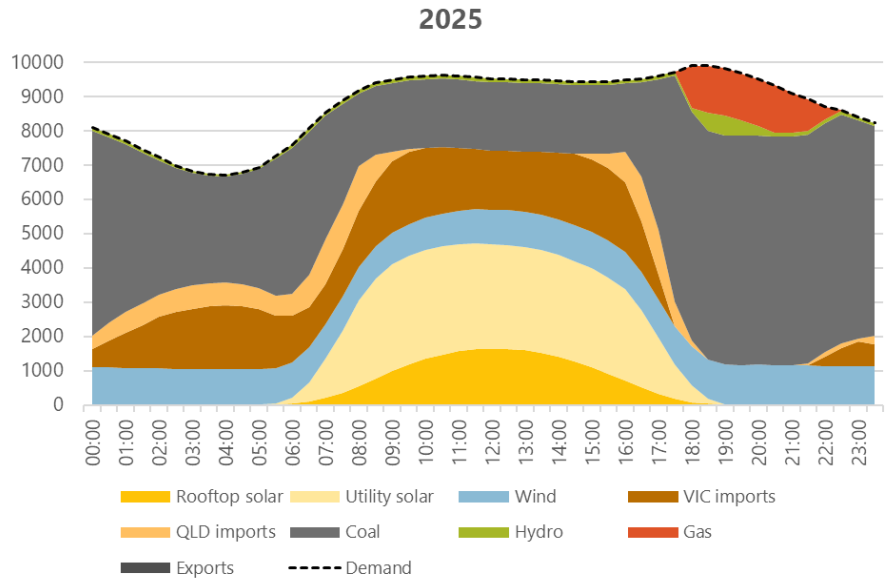

Figure 13 Average NSW supply by time of day 2025 Source: ITK

In general we'd note that even in 205 the contribution by wind located in NSW in the evening is only moderate. Similarly on average we do not expect imports to contribute much supply to the evening peak. In that sense the volatility of the wind to the daily average is not actually that important its expected on average contribute only about 12% of supply and of course there is no solar. NSW coal generation even in 2025 will on average be required to ramp from about 2000 MW to 6000 MW each day. NSW coal generation supplies 7000 MW on average at peak in 2019.

Early closure of additional NSW coal generator

The obvious question is what if more coal generation closes early due to say lack of total revenue? The obvious candidate for early closure is Vales Point B representing say 1000 MW of supply. Notionally ITK expects that could be met by say 400 MW of pumped hydro, 400 MW of four hour battery and say 400 MW of efficient gas (combined cycle or reciprocating engine) possibly with some more imports.

In ITK's view with a forward looking approach where the NSW Govt. generally embraces what most in the electricity industry see as the inevitable way forward the planning adjustments can be made early. The private sector can be expected to respond to price signals, but the risk the NSW Govt needs to be across is that response coming too late. Snowy 2 should be able to respond in the daily market but both Snowy management and ITK believe that the Snowy 2 model is more about responding to seasonal shortages of VRE supply rather than in the daily market. This reflects the long duration (175 hours) of Snowy 2 and equally the 200 hours pumping required to fully replenish empty storage at Snowy 2.

In ITK's view there is sufficient coal generation capacity such that if the remaining generators all operated reliably no closure of Vales Point would not mandate new firming investment. However it clearly would be prudent to facilitate some more such investment as lower reliability of NSW generation seems more likely than not.

Again ITK have not developed these ideas further in this submission but could do so at request.

Variability of NSW variable renewable energy [VRE]

In this section we look briefly at the variability of NSW residential solar, the variability of the Morree single axis tracking plant, and the variability of wind generation in NSW over the past three years.

There are some data issues principally that the residential solar and wind capacity have increased over that time.

Additionally although Moree gives a great indication of the variability of one plant its completely obvious that a portfolio of plants across NSW is expected to show lower volatility in daylight hours than a single plant.

Moree

The following figure shows the Moree PV plant average daily output by time of day from Jan 1, 2017 until Sep 5 2019 and lines representing two standard deviations either side (essentially the 95% confidence interval for normally distributed data). The two standard deviation line has been adjusted to prevent it going below zero or above the maximum output recorded for that half hour.

The essential point is that looking at the downside, even for this one relatively small solar farm there is a 95% chance it will be producing at least about 45% of its average output during daylight hours. ITK has a strong expectation that when more data from other solar farms are included over a broader area of NSW that deviation will reduce significantly.

95% is still far from totally reliable. Again ITK does not compare this with coal unit

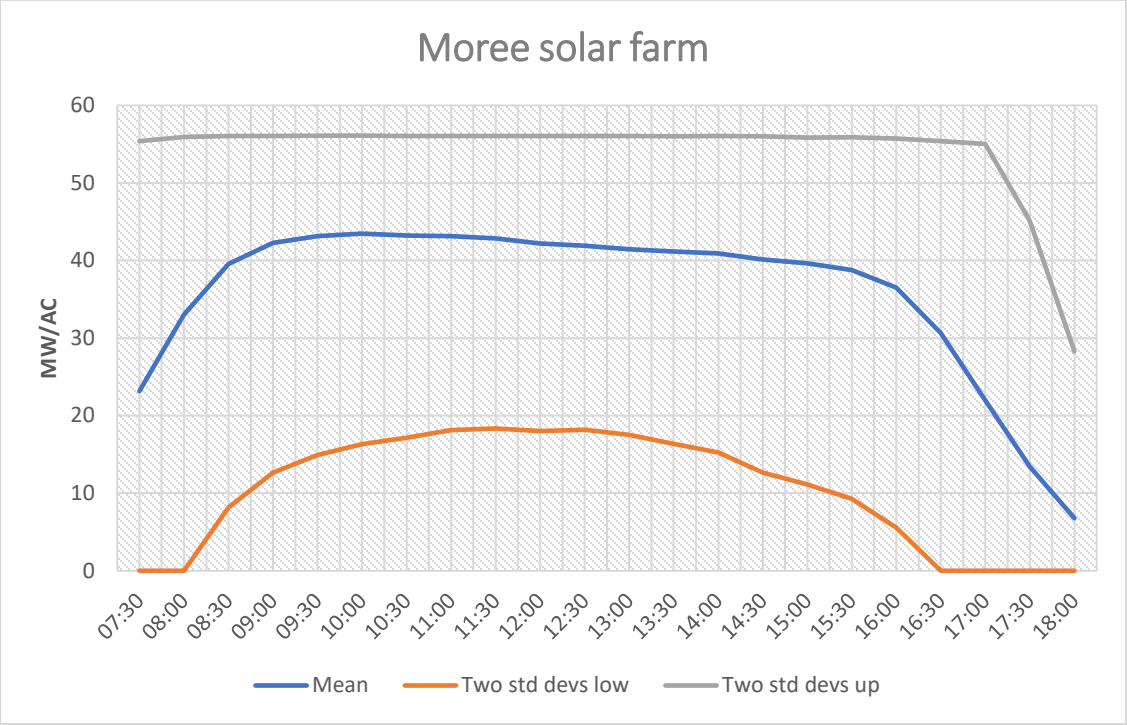

Figure 14 Moree solar farm. Variabliity of average output 2017-2019. Source: ITK

NSW behind the meter solar

NSW rooftop solar has gone from contributing about 620 MW at 1:30 pm in 2017 to about 1000 MW in 2019 year to date. As such the standard deviation in absolute terms is increasing but its relatively constant as a percentage of the mean. We show the graph for calendar 2018

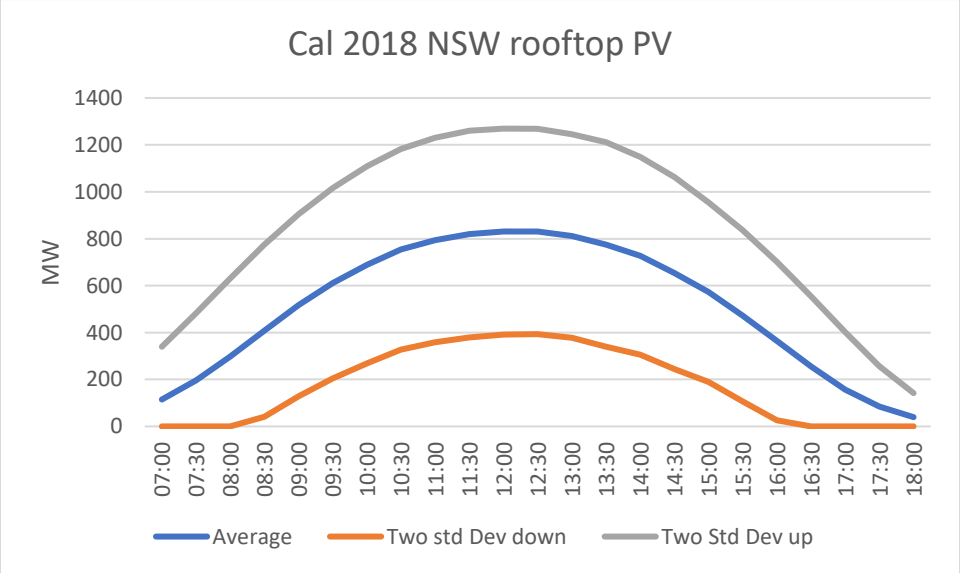

Figure 15 NSW Rooftop solar variablity calendar 2018. Source: NEM Review

Two standard deviations is about 45% of average output in the middle of the day. Seasonality accounts for a good part of this. In ITK's view rooftop solar is reasonably predicable to a 95% confidence level but

its clear there will be times for short term back up of it. In ITK's view this is an excellent role for batteries to play. Once again if the Committee was interested ITK could demonstrate how significantly a 1 hour battery could reduce that standard deviation.

Wind

Wind generation in NSW has increased and will increase further just like solar.

Again we look at mean daily production by time of day. The obvious point here is the increasing tendency as wind farms in Northern NSW and Western NSW come on line is that the wind, at least in 2019 year to date drops off in the middle of the day and increases a bit around evening peak. In this way it is complementary to solar. More data is needed to confirm whether this is likely to be the recurring pattern or not.

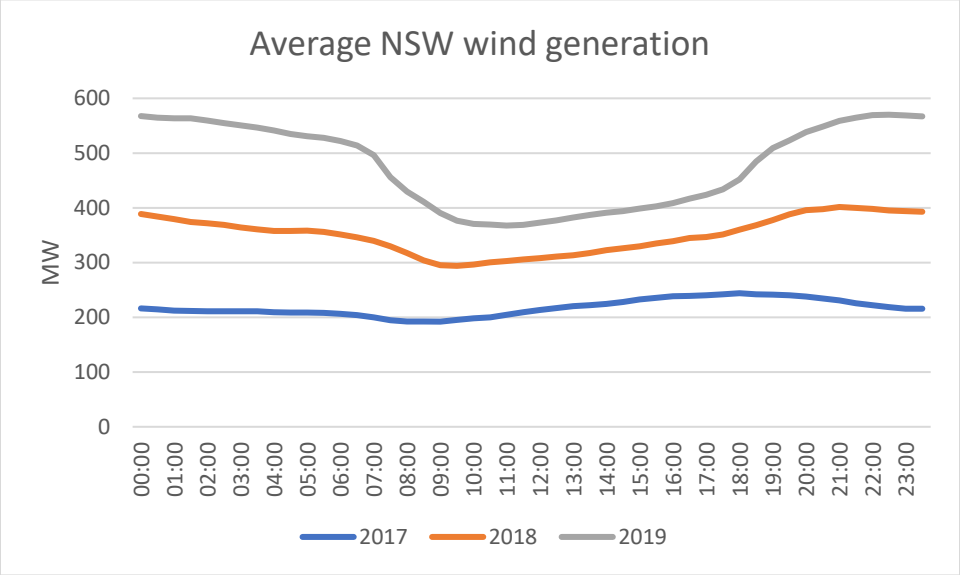

Figure 16 Average of NSW wind generation by time of day. Source: NEM Review

However wind in NSW is quite variable. Essentially Fig 17 below shows that you can't be 95% confident that there will be any wind generation at a particular time in NSW.

Other work shows that the overall NEM wide portfolio variance of wind across all States is significantly less than the variance in any one State. Once again this points to the advantage of having enough transmission to import and export from and to other regions.

There is much more that can be said about managing the wind variability but essentially the same tools as for solar, namely import/export buffers, short duration pumped hydro, fast start gas, batteries and some demand management are likely to be able to provide an entirely adequate portfolio buffer. ITK can if the Committee desires easily illustrate how a combined portfolio can deliver reliable energy to NSW at costs comparable to average actual pool prices paid in 2019.

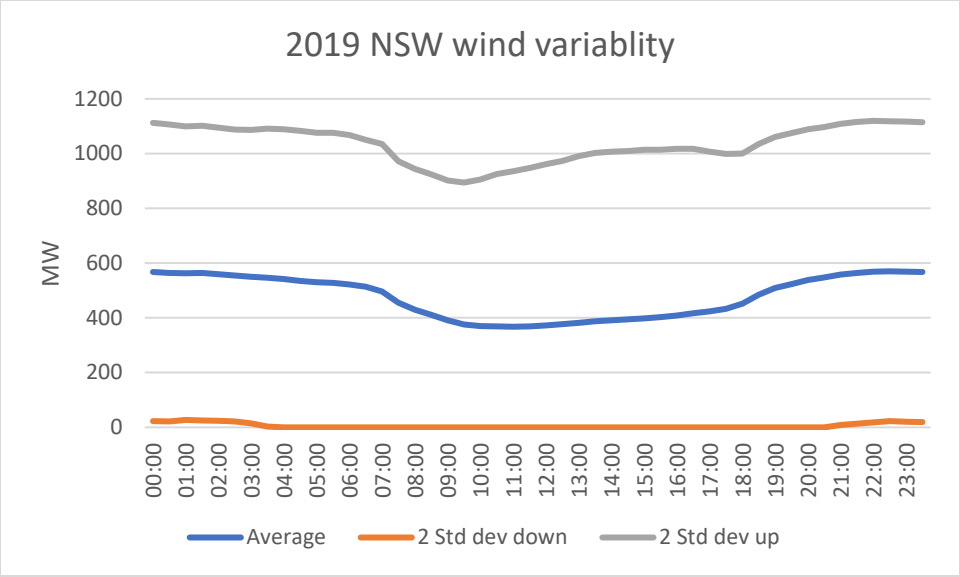

Figure 17 2019 wind generation variablity in NSW. Source: NEM Review

NSW coal generation sustainability issues

ITK regards NSW coal generators as having significant issues beyond the next few years.

The age of the generators will be well known to the Committee. Here it is only necessary to point out that Origin has three times announced in its annual report that Eraring will close in 2032. AGL has also indicated closure for Bayswater in 2035. Although no closure date has been set for either Vales Point B or Mt Piper we note that both of those power stations have coal issues.

In the case of Vales Point its owners do not have the balance sheet capacity generally expected. In 2018 a very old coal mining company Chain Valley found it could not survive supplying coal to Vales Point on the agreed terms and in the end the owner of Vales Point, Sunset Power and associates were effectively obliged to buy Chain Valley owners out in order to keep operating the mine. In our view this is symptomatic of 40 year power stations having consumed much of the coal readily available and having to buy from new mines where the development costs are typically much higher and there will also often be higher transport costs.

Mt Piper, owned by EnergyAustralia, depends on the Springvale 2 coal mine for the vast majority of its coal. That mine has had coal quality issues in the past 12 months that have restricted output from Mt Piper. As there is no rail unloader at Mt Piper there is little or no economic possibility of getting in coal from the major thermal coal mines in the Hunter and increasingly North West of NSW. As was seen by the requirement of NSW Parliament to pass legislation overcoming an adverse environmental court judgement regarding water quality at Springvale mine, the single source of coal supply is a reliability issue.

New coal mine approvals in NSW can be had but they are increasingly difficult and likely to become more so. At least one mine development application has already been rejected on carbon emission grounds and while some may dismiss this the better, in ITK's opinion, view is its an early straw in the wind.

Capital expenditure at the NSW coal generators continues to be reasonably high. AGL owner of Bayswater and Liddell has indicated it will be spending about $350 m per year on its thermal fleet over the next few years. We estimate that over the entirety of AGLs coal generation production that works to around $10 MWh.

New coal mine proposals in the Central Coast regions are located very close to population centres which seems sub optimal.

The coal burnt in NSW generators is low quality, relatively high in ash, compared to the thermal coal NSW sells to Japan. Again the health aspects of mining and burning high ash coal close to population centres, are likely worth reviewing quite independent of the carbon issues.

Final thoughts

ITK reiterates that NSW contains very large resources of renewable energy, mostly located in regional areas. A pro renewable development, pro transmission development, pro renewable energy zones, pro modern forms of firming is likely to provide the best medium and longer term solution to providing NSW consumers with the electricity they need at a globally competitive price.

The alternative policy of trying to hold back renewables, trying to prop up the ageing coal generators will leave the dynamic NSW economy poorly placed in a few years time.

Please feel free to contact the author of this submission should you require more information

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