

**COVER SHEET FOR A SUBMISSION ON  
AEMO Draft 2020 INTEGRATED SYSTEM PLAN (ISP)**

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<b>Website</b> <b>RESPONSE TO PRIVACY STATEMENT</b>	MMTECHNOLOGY.NET.AU MM TECHNOLOGY AGREE AND WOULD LIKE TO MAKE A NON-CONFIDENTIAL SUBMISSION ON THE ISP.

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**AEMO**

**20 February 2020**

**Email to: ISP@aemo.com.au**

## **A SUBMISSION FOR THE AEMO DRAFT 2020 INTEGRATED SYSTEM PLAN (ISP)**

### **1. Introduction**

This document constitutes a concerned response to AEMO's request for consultation on the Draft ISP 2020. MM Technology was given the opportunity by AEMO to participate in the consultative process on and from a workshop in Brisbane on 3 February and a webinar on 11 February 2020, but was not involved in the prior development of the Draft EISP 2020. We apologise that this response is not in the form proposed on page 82 of the 2020 ISP.

### **2. AEMO Draft ISP or "Field of Dreams" - 'Build it, and they will come.'**

The greater part of the ISP focuses on new or upgraded transmission lines, with only a very limited discussion on renewables firmed generation. In the case of the Draft ISP – the underlying assumption is - to build the transmission assets supporting the plan and the renewable energy developments 'will come'. MM Technology is not so sure, in part because AEMO does not have the power to make the plan happen and plan development fully relies on generators and transmission builders to develop the options and developments outlined in the plan.

There are many other drivers to the decision to build new assets including the potential return on investment and without significant co-linked firming capacity and / or large scale energy storage, renewables by themselves are now developing a “shadowing” effect upon each other in terms of depressing wholesale prices through periods of oversupply and this increasing concentration will exasperate this further.

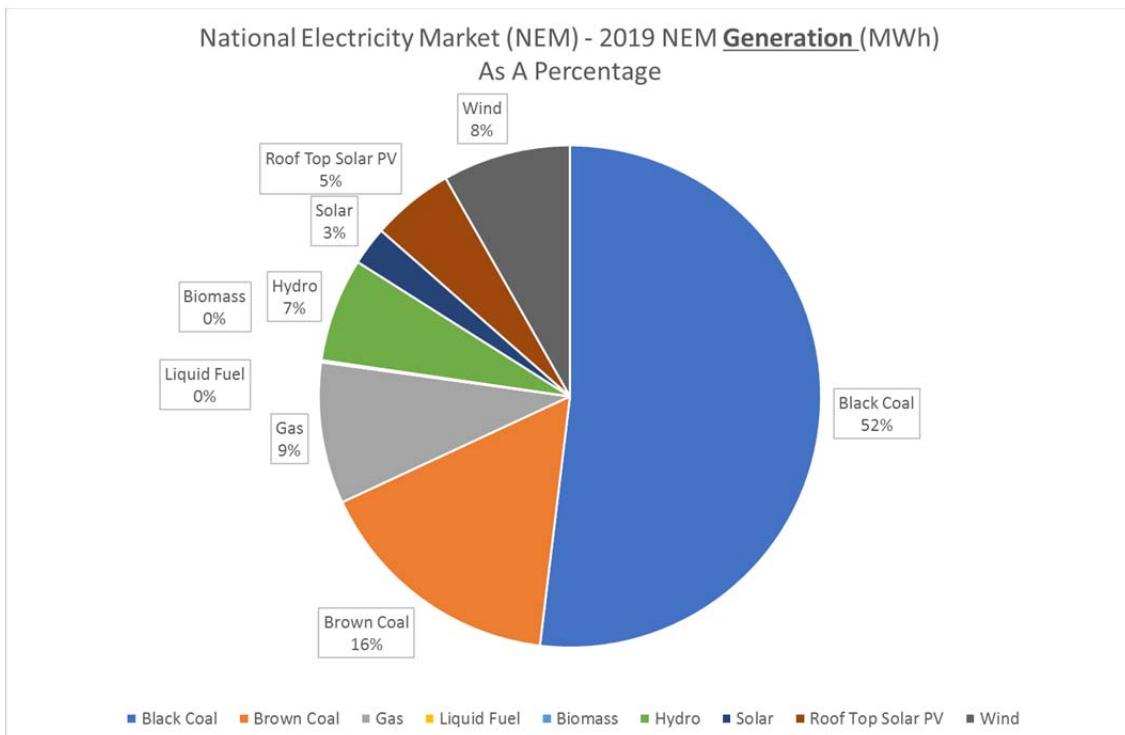
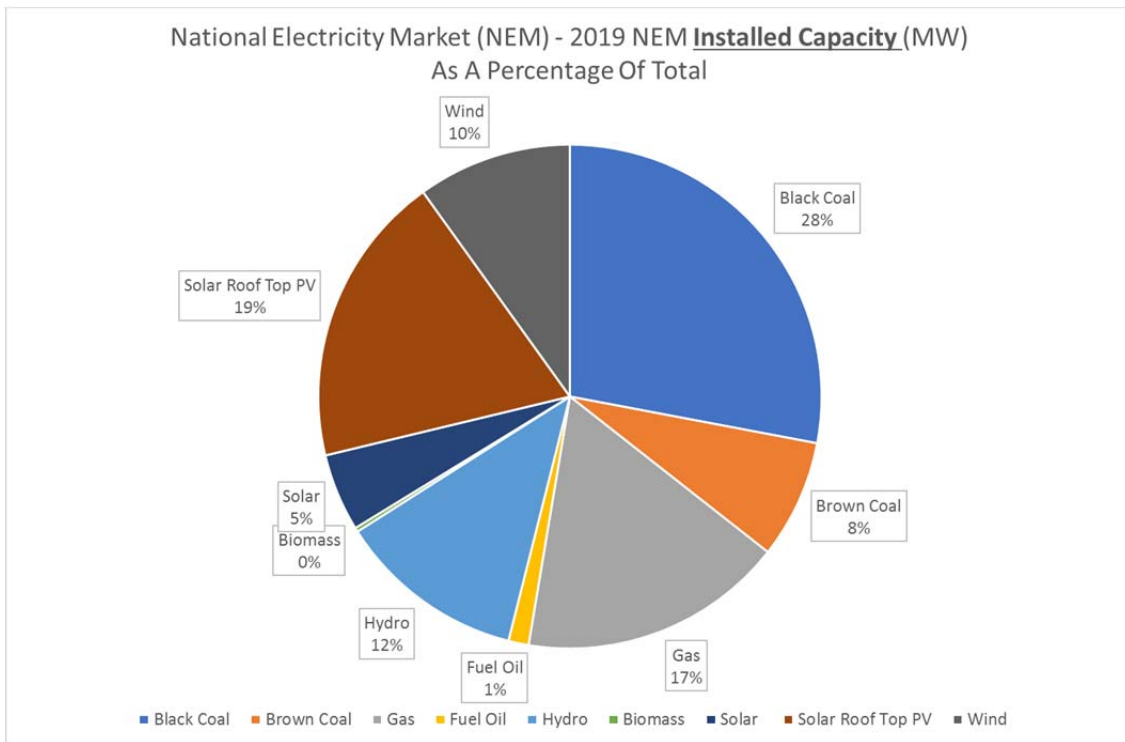
### **3. Coal Fired Power Station Removal Rate is Not Matched by the Status of Renewables Firming**

As a generalisation, the plan is the replacement of Australia's fossil fuel generating fleet with firmed renewables generation, but at this time the status of renewables firming is such that we simply do not have either the dispatchable firming assets or the storage capacity to overcome renewables intermittency. The dispatchable power generation component leaving the NEM grid cannot therefore be completely replaced by firmed renewables at this time. As a consequence the plan represents a high risk for heavy industrial users who require power continuously.

The retirement of the fossil fuel fleet is happening to a relatively fixed timeline, which may in fact be accelerated by climate and emissions concerns, whereas the renewables replacement fleets are not entering the NEM to such a definitive timeline. One of the reasons for this is completion of renewables capacity under the Renewable Energy Target (RET). Angus Taylor is doing deals with the individual states and managing new capacity shortlisted under the Underwriting New Generation Investment scheme but it is doubtful if these initiatives are going to see 33000GW of renewables capacity built and the dispatchable component without other changes to the market or some expansion of the RET.

4. **Plan Reconciliation and Starting Point**

As part of the reconciliation process the Draft ISP should have a starting point in respect of the major generation elements in the NEM. The incremental changes that happen over the ISP two yearly cycle can then be added in each new plan and the achievement toward the overall plan objectives, able to be easily measured. This reconciliation against a base will also highlight key developments in generation or transmission that have to be done or are outstanding.



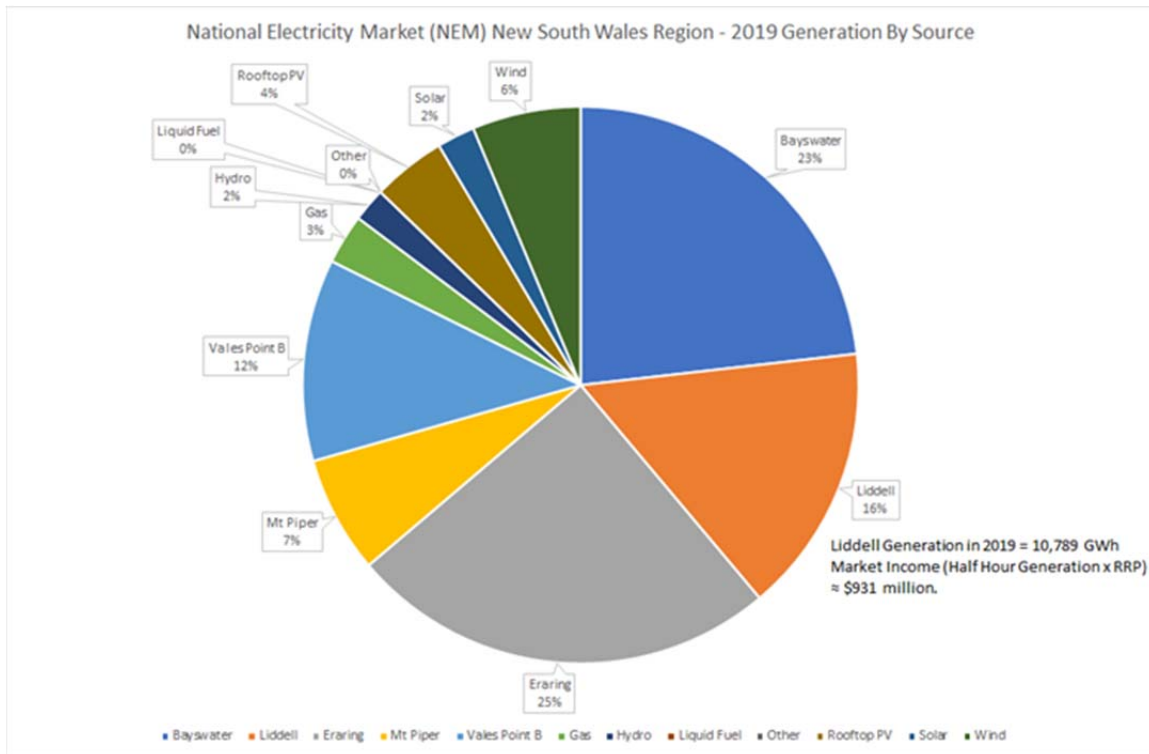
The two pie charts above summarise the position at the end of 2019. They vary in part from the published AEMO numbers for the same period in that a figure is provided for 'as installed' roof top solar. The figures also show the significant disparity in the generation of a MWh between coal and gas generators and power generated from renewable sources. These figures can be used to check on the estimates of renewable generation, both firmed and unfirmed, required to replace the retiring fossil fuel fleet.

**5. The NEM Has a Deficit of Dispatchable Power as AEMO has Demonstrated by Establishing Summer Season Reserves**

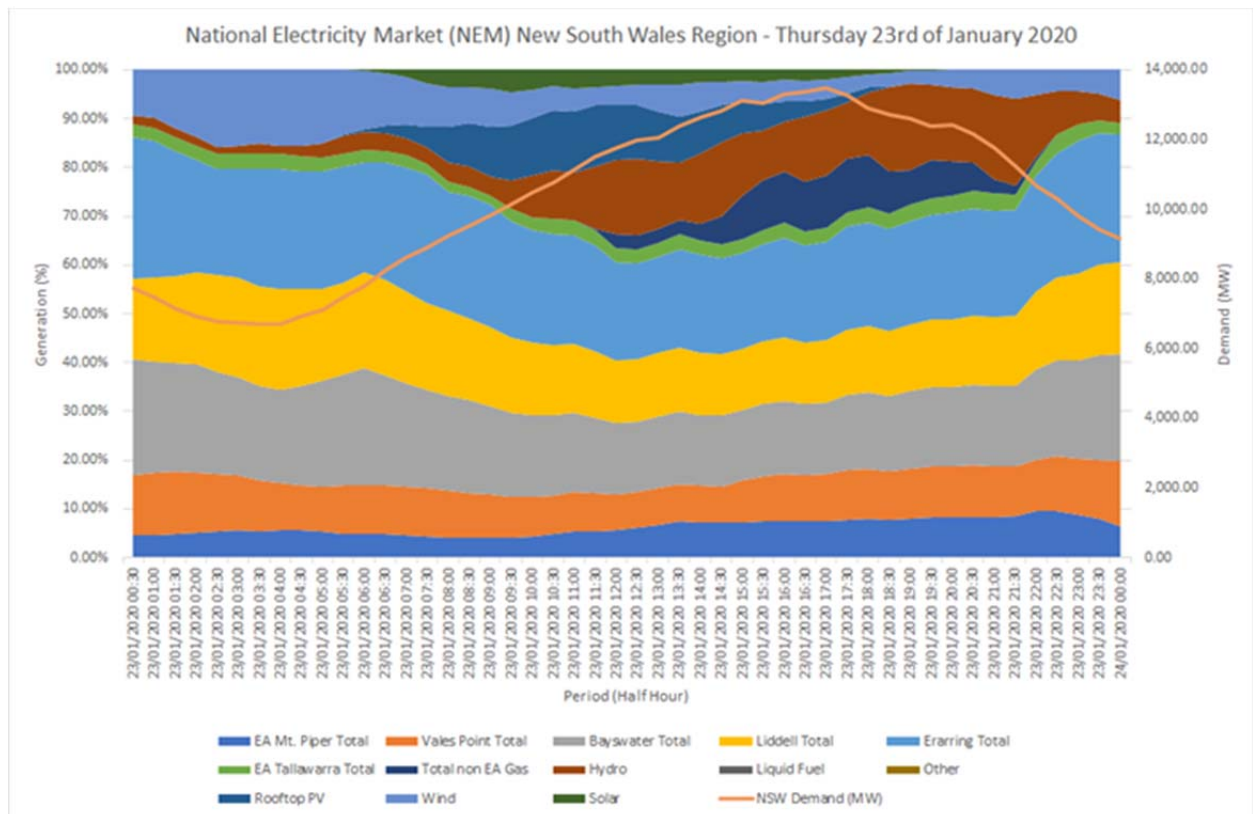
In response point 4 above, MM Technology argues for a broad known generation fleet starting point and submits that should be 1 Jan 2020. Critically we also submit to AEMO that as at that date the NEM was already running with a deficit of dispatchable power, as represented by the fragility of the grid and the generating assets supporting it to satisfy demand both daily and seasonal demand.

We further argue that the volume of Reliability and Emergency Reserve Trader (RERT) contracts involving companies putting more energy into the grid or big industrial users curbing power usage during times of peak demand is a reasonable measure of the current deficit of dispatchable power currently pertaining in the grid. On this basis we submit that the dispatchable power deficit is currently in the order of 1850 MW and that the position will get materially worse i.e. by a further 1400-1600MW if Liddell is closed as currently planned in 2022/23.

Even though Liddell's planned retirement from the NEM will be happening before the 2022 NEM ISP, there is no discussion on the retirement of Liddell Power Station, now scheduled for 2022 / 2023 and its likely impact on wholesale power prices in NSW. The exhibits below show that Liddell has performed particularly well in 2019, satisfying some 16% of the NSW region electrical demand generating some 10,789 GWh. As can be seen, the estimated revenue for Liddell in 2019 dwarfs any of the capital estimates required for further upgrades. The two figures show the annual and a typical day generation contributions of Liddell to the NSW NEM regional demand.



It should be noted that the 23 January 2020 represented, was a significantly stressful day for the NEM in New South Wales. Liddell’s contribution was significant and prevented wide scale loss of electricity supply. Whilst renewables played a minor role in New South Wales on the day and this indeed declined significantly as demand increased).



Whilst AGL gave assurances to the Federal Government that the dispatchable power of Liddell would be replaced in a plan they were then developing, no such plan, on the public record has evolved apart from a minor upgrade (100 MW+) to Bayswater Power Station. Though Federal Government initiatives we will also have some additional peaking gas plant coming on line, the 1600 MW effective dispatchable power currently produced by Liddell has not been replaced under power station developments actually on foot.

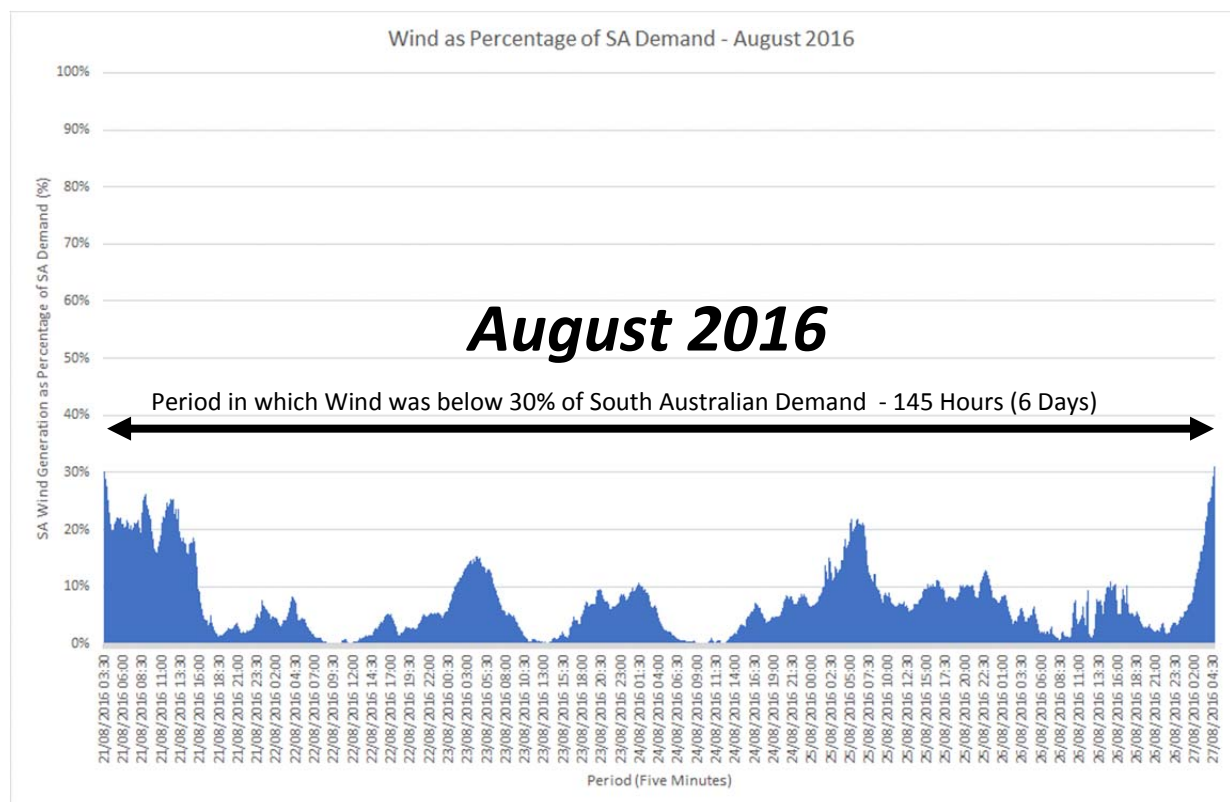
**In summary therefore and based on the known or announced build of dispatchable power the NEM deficit will increase to 3350MW on the closure of Liddell in early 2023.**

**6. AEMO Must Ensure that Dispatchable Power Generation is in Place Prior to the Incremental Removal from the NEM of the Coal Fired Fleet on a Relatively Fixed Timetable**

As a consequence AEMO, AER and the ESB need to put in place mechanisms that ensure new dispatchable power generation is in place prior to incremental retirement of the fossil fuel fleet. In other words, let's not follow the South Australian example and blow up the retired coal fired power stations until we are 100% certain with reasonable operating experience, that we can replace them with firmed renewables that have proven their capacity to supply 24/7 reliable power to heavy industrial as well as domestic demands.

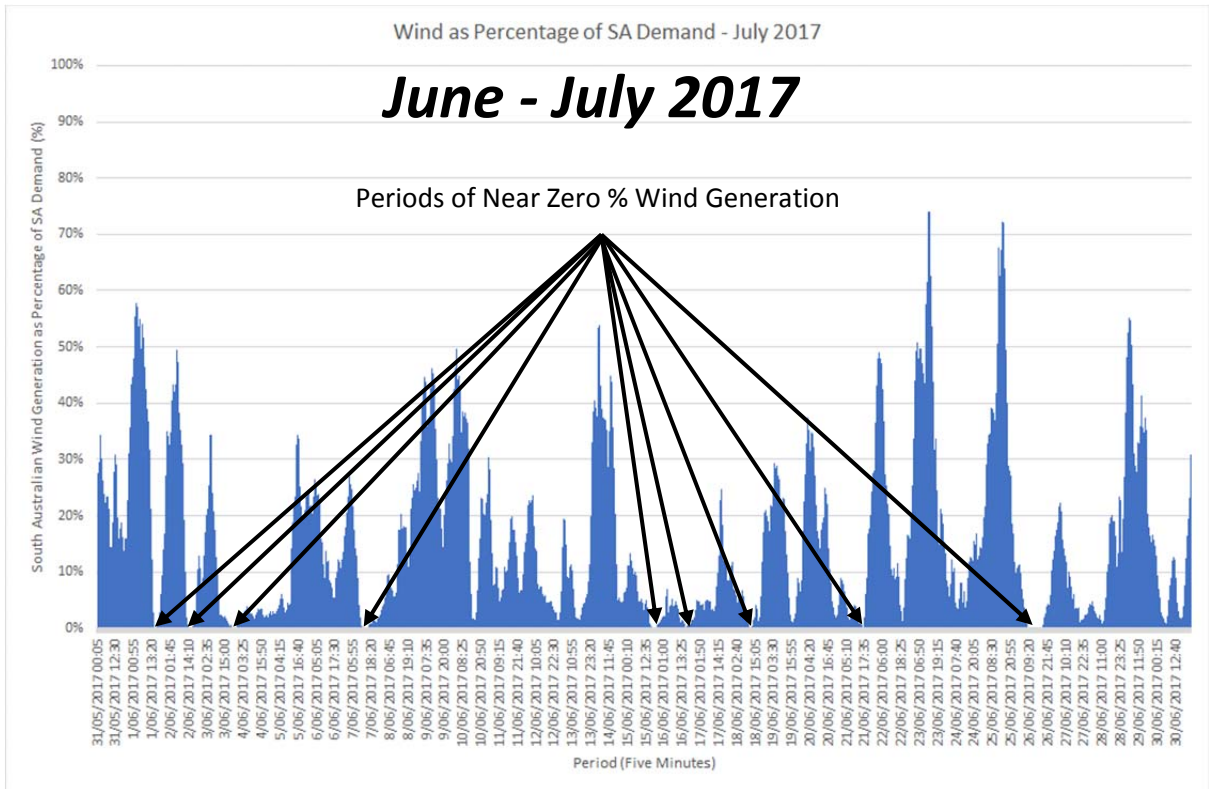
At point 3 above we point out that renewables firming technology is not at a technical level where it can readily replace the retiring coal fired fleet - this particularly true in the case of wind power where energy storage ideally would have the capacity to provide six days of coverage.

Consider the exhibits below based on South Australia.

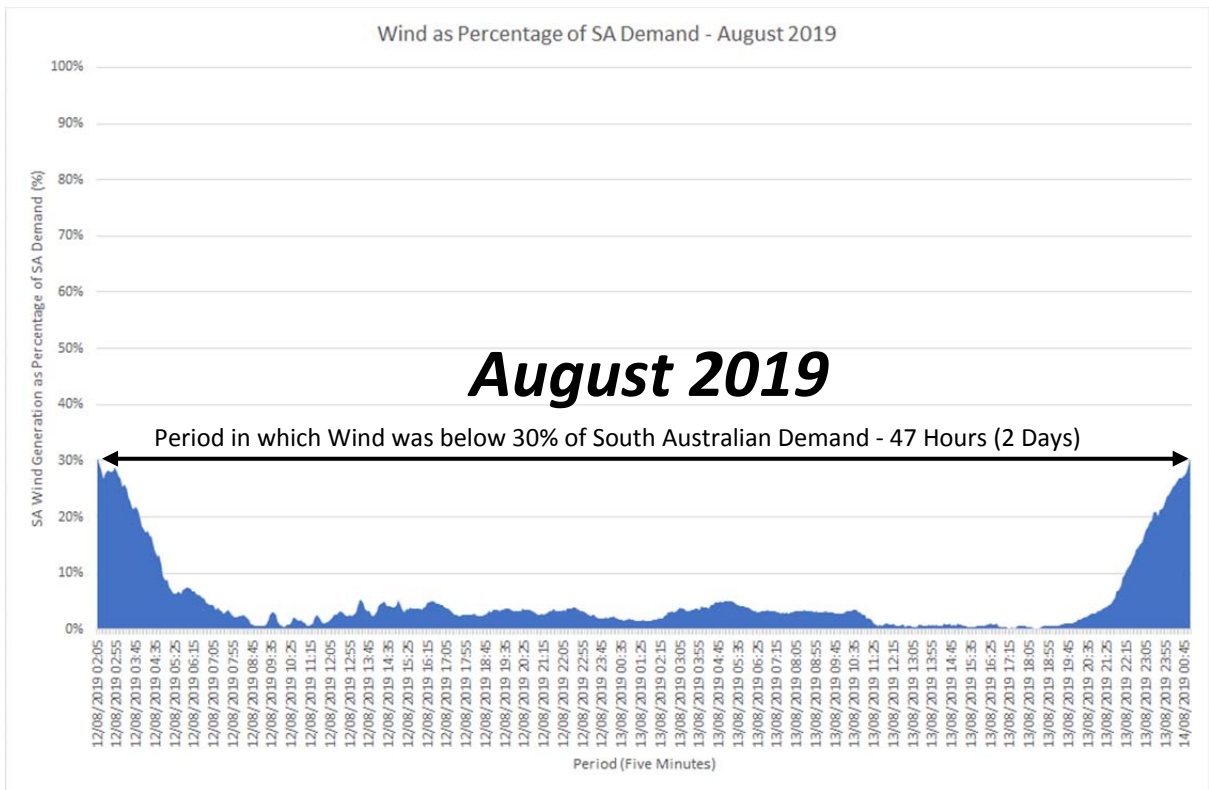


Some periods of Very Low Wind Generation have lasted significant periods.





There can be multiple periods of Very Low Wind Generation over a very short time



Periods of Very Low Wind Generation in South Australia continue even though there is rapidly increasing Installed Capacity

Luckily under current planning, there is a six year gap before the next coal powered fleet retirement, giving the opportunity for the further development of renewables firming.

Of real concern to wind farm generated renewables is the requirement for long-term renewable storage in the case of wind. Batteries can provide only very short- term time coverage. Whilst the Musk/Tesla battery in SA is providing valuable stability services to the NEM grid it can only provide 100MW of power for less than 1.5 hours.

The predicted growth of rooftop solar in the ISP, with its prediction of solar PV in future, accounting for between 13 per cent and 22 per cent of total energy in two decades is also of concern because this growth is not currently being matched by the installation of home battery systems due to capital cost. **Therefore a rapidly growing renewable generation stream will not be either fully backed up or reliably firming thereby adding to grid and market instability.**

#### **7. No Discussion on the Imminent removal of Aluminium Smelter Electrical Demand**

Even though the strong closure possibility, driven by both high relative cost and carbon footprint, has been flagged by Rio Tinto and Alcoa, there is no substantive discussion on the loss of aluminium smelters or some of them on power demand (in NSW, Tomago and in Victoria, Portland). There is no undertaking from AEMO as the author of the ISP the replacement of the fossil fuelled generation fleet by firming renewables that large scale industrial demand can be met. MM Technology hopes that the one of the undisclosed costs of a full firming renewables generating fleet is not the loss of high energy users like the aluminium smelters who provided significant employment and add to the Australia's GDP.

#### **8. Hydrogen Should Have Been Included In The 2020 ISP**

Hydrogen has been excluded from the Draft ISP. MM Technology believes that hydrogen's exclusion is a mistake because:

- The Olympics in Japan later this year will highlight the importance of hydrogen to the future Japanese economy and the World and accelerate its consideration firstly as a transport fuel with advantages over electric vehicles
- Hydrogen is one of the critically important longer-term firming technologies and
- Hydrogen production renewables and renewables supporting the NEM will have the same, or overlapping, footprints as well as possibly sharing their outputs between the NEM and the production of hydrogen.



## 9. Climate Change

MM Technology got the impression in the Brisbane Workshop that a Chapter on "Climate Change" was likely to be included in the final ISP 2020.

A long Australia-wide drought followed by a season of catastrophic bush fires that impacted very heavily most Eastern States, so that a Federal Government intervention was required, has galvanised attitudes of the press and the vocal component of the Australian public's attitude toward climate change. Emissions from coalfired power stations have come to be seen as the only source of carbon dioxide emissions, which are taken then as being totally to blame for the drought and bushfires. The drought has curbed agricultural emissions and no-one wants to stop using trucks, trains, cars or planes, so transport emissions fly "under the radar".

Flora on this planet consume carbon dioxide, make new carbon-based growth, and expire oxygen in a process known as photosynthesis. **Should the flora gain a voice, given they represent over half the life on the planet**, they would not use the term polluting or dirty in relation to a gas which for them is life-giving. Now the fauna on the planet breathes in the resultant oxygen and exhales carbon dioxide. Most industrial and agricultural activity where the human race largely sources their income and lifestyle has carbon dioxide by product to their activity. Further our planet and Australia are now almost totally reliant on reliably supplied and priced electricity, from the interconnected grid and a NEM that supplies it.

The Australian public however have been led to believe that we can easily transit away from fossil fuelled generation - to a system based on 100% firmed renewables, but have not been told that there are risks associated with the transition and to their electricity-dependent way of life. These risks may have impacts similar to those projected for climate change.

**Should AEMO see fit to include a chapter on "climate change" then MM Technology believes AEMO owes it to the Australian public to point out that there are risks in the transition.** The whole tenor of our response is that the status of renewables firming and storage is such that the transition is not risk-free or certain, particularly for large industrial users of electricity. This may change as technology offers new solutions, but as of the print date of the ISP 2020 this is not, in our opinion, the case.

The whole renewables footprint is going to be massive and consume land that may have been used for food production or other vital uses and no doubt there will be a conflict for land, located at reasonable distances from our load centres and therefore not subject to uneconomic marginal loss factors.

We have seen Germany in particular move away from both nuclear and coalfired generation, with only their brown coal fired power stations still operating, whilst their remaining mines are now subject to activist attacks stopping production on occasions. Germany however is interconnected with countries that do generate nuclear power and they can import this on an "as required basis".

**In Australia's case however we are alone and do not have the security or insurance, of being able to import power in support of 100% of renewables generation.**

## **10. MM Technology's View on the ISP Document and Consultation**

In MM Technology's view, the Draft ISP document is missing a glossary of terms and abbreviations.

There are also examples where tables are split over two pages and include fonts and colour schemes which make them difficult to read.

In the Brisbane workshop it was discussed that the interactive mapping approaches available electronically previously should once again be made available.

The ISP 2020 Draft Report and Appendices, as well as supporting website data constitutes a huge amount of work for which AEMO must be complimented, and consideration needs to be given to just how much will need to be repeated in each two year plan.

MM Technology apologises if the ISP 2020 Draft already covers some of the subjects we have raised but MM Technology has not been cognisant that the items have already been included in the documentation available.

## **11. Conclusion**

For your consideration please.

Thank you for the opportunity of attending the Brisbane Workshop at Aurecon and the subsequent webinar thereby providing the opportunity to provide formal feedback on plan whilst still in draft form.

***Jeff Jamieson*** MM Technology 0419 303 531