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Submission in response to the DRAFT 2021 Inputs Assumptions and Scenarios Report

Introduction

This submission is made by me, David Havyatt, acting in my personal capacity in response to the Australian Energy Market Operator's (AEMO) *DRAFT 2021 Inputs Assumptions and Scenarios Report* (Draft IASR). I participated in most of the workshops leading to the development of the Draft IASR in my role as Senior Economist at Energy Consumers Australia until August 202. I have continued to engage as Convenor of the Network of Illawarra Consumers of Energy.[1]

Since the revision of AEMOs role as national transmission planner to be the development of the Integrated System Plan (ISP), AEMO has made great progress in developing its capabilities and improving the planning process. In this submission, however, I argue that AEMO in the current Draft IASR is not meeting the needs of consumers in whose long-term interests all policy is meant to be focussed.

While the core focus of the ISP, especially following the rule changes to make it an 'actionable ISP' remains transmission planning, it is the only exercise that undertakes a systematic review of the electricity system looking forward. As good policy needs to be evidence based, AEMO has a responsibility in undertaking its planning function to ensure policy makers and industry are well informed of the system implications of both policies already taken and the consequences of not taking action.

In developing the Draft IASR AEMO has 'self-censored' itself by a narrow reading of the Rules requirements for ISP development. As will be argued below this self-censorship has resulted in an inadequate 'central scenario' in the Draft IASR.

In addition, a close reading of the Rules without an equally close reading of the Best Practice Forecasting Guideline has, we will argue, resulted in a Draft IASR that is incomplete.

The submission will address these matters in three sections; the Rules requirement, the deficiencies in relation to emissions reduction, the resulting deficiencies of the Central Scenario and Diversified Technology Scenario, and the incompleteness of the Draft IASR. No comment is being offered on the remaining items as my views were clearly expressed in the various workshops, and AEMO is paying the ISP Consumer Panel to provide this perspective.[2]

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[1] I have not attended to developing the network sufficiently for it to be anything other than an ongoing aspiration.
[2] I note that the ISP Consumer Panel is only required to provide AEMO with a report on the IASR itself, but it is my understanding that the ISP Consumer Panel is preparing a submission.

The Rules requirements

The requirements for AEMO's development of the ISP are laid out in 5.22 of the National Electricity Rules (NER). 5.22.1 and 5.22.2 together specify that AEMO must publish an ISP every two years that is a **whole of power system plan** for efficient development to achieve the **power system needs** for a planning horizon of **at least** 20 years.

The Glossary in Chapter 10 of the NER defines the power system as 'The electricity power system of the national grid including associated generation and transmission and distribution networks for the supply of electricity, operated as an integrated arrangement.'

The 'power system needs' are defined in 5.22.3(a) as:

> (1) the reliability standard;
> (2) power system security;
> (3) system standards; and
> (4) standards or technical requirements in Schedule 5.1 or in an applicable regulatory instrument

Schedule 5.1 is titled *Network Performance Requirements to be Provided or Co-ordinated by Network Service Providers.*

5.22.3(b) provides that in determining power system needs of a jurisdiction AEMO **may** consider **a current environmental or energy policy** of the jurisdiction if one of a list of criteria are satisfied.

The first concern I have with interpretation is that AEMO insists on only conducting the analysis in the Draft IASR for the minimum allowed 20 years. Given the long-lived nature of the assets, especially the transmission assets, AEMO should plan to 2050, not just 20 years. As we will see below 2050 is an important year in the current policy position of every NEM jurisdiction.

It is my contention that AEMO is reading the provision of 5.22.3(b) incorrectly. It does not state that AEMO **may only** consider such policies if one of the criteria are satisfied, only that it may. When it was suggested at an ESB convened meeting that the ability of AEMO to consider other policy positions should be formally included, the legal adviser on the drafting of the Rules stated this didn't need to be added because the existing drafting **did not** constrain AEMO.

It is my understanding that AEMO interprets the Rule as providing a constraint because they don't know how to model the impact of a policy unless the policy exists in detail. This is inconsistent with the whole intent of the plan, which deals with a host of uncertainties about technologies, costs, demand and the economy. Indeed, assuming no further detailed policy change – especially policy changes that have at least been committed to publicly as targets – is the antithesis of good planning. No further detailed policy and hence no implementation is the least likely outcome.

The Deficiency in Relation to Emissions Reduction

In the workshops to develop the scenarios AEMO sought and received feedback on what year of reaching net zero participants thought was consistent with the scenario. This information has not been presented in the draft IASR and has instead been replaced by a set of assumptions that put the relationship between global achievement and Australian action backward.

In this approach the RCP scenarios have been mapped against an Australian emission profile as if the RCP was a **target** rather than a projection. Australia's commitment under Paris is to work towards a maximum of 2 degrees and ideally 1.5 degrees. To suggest that our domestic emissions trajectory should be targeted at achieving a **higher** temperature scenario would on its own be a violation of our commitment to the agreement.

Figure 2 in the Draft IASR represents this back-to-front thinking. The preceding paragraph states very clearly '1.5ºC target sees domestic Australian emissions falling rapidly, reaching net zero in the early 2040s, while a 2ºC target also reaches net zero before 2050.'

To put it bluntly any scenario that does not achieve net zero by 2050 is inconsistent with our obligations under the Paris Agreement. It is valid to include such assumptions, but in doing so it must be recognised that the realisation of that scenario breaches Australia's treaty commitments.

This same section of the Draft IASR includes an ongoing commitment to the use of fossil fuels. It states:

> *Some operation of thermal plant may be cost-effective to maintain synchronous and peaking support capabilities, and it would then become more cost-effective to reduce emissions in other sectors of the economy than to decarbonise the final incremental emissions-intensive activities in the electricity grid.*
>
> *There are zero-emissions synchronous technologies available that would potentially be able to deliver these services while maintaining a carbon-neutral NEM; however, given the lack of surety and detail on these options in the NEM setting,* ***AEMO currently considers that it is appropriate to allow some fossil-fuelled generation to remain in the electricity system provided the cumulative carbon budget is not exceeded****.*
>
> *Nevertheless, when applying the RCP 1.9 and RCP 2.6 targets with the methodology described above, Australia is required to achieve net zero emissions by 2050 at the latest. With no negative emission technologies modelled in the electricity sector, the proposed NEM-specific carbon budget implicitly assumes that the land use, land use change and forestry (LULUCF) sector (or another sector) will balance leftover emissions from energy by acting as a carbon sink.*

The challenge that modelling net zero policies constitute are appreciated, however they have very clear implications for the forecasts of demand and generation mix. System demand needs to include the additional demand sufficient to achieve full electrification of transportation and domestic and industrial heat. Where hydrogen may be an opportunity to substitute for gas, then the potential requirements for on-system generation of electricity for that purpose.

Similarly, a net zero by 2050 central scenario requires addressing the design of the system without **any** fossil-fuel powered synchronous generators with consequent implications for system security and system strength. These are both modelling parameters that are consistent with policy goals.

It is not possible for AEMO to model an economy wide net zero. AEMO should model a net zero energy system, and assume that any credits available from other sectors (e.g. land use changes) will be offsetting other emissions.

These last two considerations mean that AEMO is making a serious error in modelling a system expecting to include some fossil-fuelled generation even under the most robust emission reduction strategies.

The AEMO obsession with fossil-fuelled synchronous generation — even thirty years out — is a triumph of obstinance or conservatism over rational thought. Firstly, the development of grid-forming inverters combined with the proliferation of large scale rapid response storage (i.e, batteries) is likely to be a more secure and easier to operate grid that one relying on synchronous generators. Secondly, if there is a need for synchronous generators they need not be fossil-fuelled. Concentrating solar-thermal generation is renewable synchronous generation, as is a thermal plant fuelled by ammonia manufactured from green hydrogen.

The Deficiency of the Central and Diversified Technology Scenarios

The Central Scenario is by definition the 'most likely scenario' for the purposes of planning and investment case analysis. The Draft IASR describes the proposed Central Scenario as:

> Very similar to the 2020 ISP Central scenario, although with firmer net zero decarbonisation objectives in the long term, and updated to include new government policy commitments and current market trends.

These 'firmer net-zero decarbonisation objectives' are described as:

> Australia achieving the 2030 ambition of reducing emissions by 26-28% on 2005 levels, and proceeding towards net zero emission in the second half of this century.

The language of 'net zero emission in the second half of this century' is the language most recently used by the Prime Minister. More significantly every NEM jurisdiction has an objective for net zero carbon by 2050. These objectives are detailed in Appendix 1 to this submission. Ultimately all the Commonwealth is in energy is the chair of the Ministerial meeting and the party with the most money to spend on solutions.

To say the Central scenario shouldn't model these is like saying it shouldn't model economic conditions, because they too will depend on as yet unannounced government policies.

AEMO asserts that the Central Scenario maps well to the IEAs World Energy Outlook 2020 Stated Policies Scenario (STEPS), saying:

> The proposed Central scenario aligns suitably to STEPS, as it reflects currently legislated and/or funded policy positions, although some Australian commitment to continue reducing emissions beyond currently legislated targets is assumed, in line with recent Federal Government announcements of intent to achieve net zero emissions in the second half of this century. (Draft IASR P. 48)

The test used to describe STEPS reads:

> COVID-19 is brought under control and the global economy returns to pre-crisis levels in 2021. This scenario reflects all of today's announced policy intentions and targets, if they are backed up by detailed measures for their realisation. It is consistent with temperature increases of around 2.7ºC in 2100.

The Commonwealth Government's position is largely irrelevant, the scenario in Australia's case needs to be based on the policy intent of the jurisdictions not the Commonwealth. Furthermore, there are technically more programs in place to support the State and Territory targets than there are to support the 'proceeding towards net zero emissions in the second half of the century.'[3]

As a net-zero by 2050 scenario the Central Scenario then becomes consistent with the IES SDS and should be modelled using RCP 2.6 (1.8 degrees).

A similar concern exists with respect to the treatment of distribution networks as 'black boxes' that just represent a pool of demand and forecast DER. The purpose of the ISP clearly extends into a consideration of distribution networks and AEMO should be beginning to not forecast DER but to model it as a variable to be optimised by the use of new rules or new policies. Instead of an Integrated

[3] On behalf of NICE the author prepared a submission to the 'Steggall Bills' in which the inefficiency of the disparate state programs was identified. This proposed that 'real action' can only occur through the Commonwealth exerting its powers over interstate trade and foreign affairs and executing a takeover of legislative responsibility for energy, and the Commonwealth vesting those powers in a strong accountable independent authority not subject to political direction.

System Plan we are still being offered a slightly enhanced national transmission plan. Consumers need better analysis than this.

Finally, the presentation of the Gas Statement of Opportunities (GSOO) to the January 2021 Forecasting Reference Group (FRG) also as a central scenario appeared to be inconsistent with the net zero carbon by 2050 goal of all the jurisdictions. The GSOO proposed very little substitution for gas in the period out to 2041.

The Diversified Technology Scenario looks more like Commonwealth policy than even the poorly designed Central Scenario. This scenario is not consistent with the IEA SDS scenario in any way – and as the note in the Draft IASR suggests the Australian ambition under this scenario is equivalent to RCP 4.5 (2.6 degrees).

In summary, the Central Scenario needs to be modelled as a net-zero carbon energy system by 2050. Under this change the Central Scenario needs to be reclassified as IEA scenario SDS and consistent with RCP 2.6. Irrespective of any changes, the Diversified Technology Scenario needs to be reclassified as IEA scenario STEPS and consistent with RCP 4.5.

The Incomplete Draft IASR

The Draft IASR doesn't get mentioned in the Rules. What is mentioned is the need for AEMO to follow the Australian Energy Regulator's (AER) *Forecasting Best Practice Guideline* (the Guideline).[4] Section 2.2 of the Guideline advises that AEMO **must** follow the single stage process included in Appendix B of the guideline.

It is this process that invokes the Draft IASR. Under the process once AEMO has finished holding meetings with Consulted Persons it must publish a draft report that, among others, sets out its conclusions and any determinations on the matter under consultation. In presenting the Draft IASR AEMO has also published a 2021 Inputs and Assumptions Workbook. In this Workbook all the sheets that relate to demand input contain the data from the 2020 ESOO.

While we acknowledge that there will be further consultation based on yet more modelling to fill in these parameters, the lack of an update makes it impossible to ascertain whether the data in aggregate will be consistent with the scenario description. Working for ECA I analysed the 2020 ISP and identified that even the most extreme 'Step Change' scenario was inconsistent with attaining net zero carbon emissions across the economy. We have been provided with no data to make an assessment whether the translation of the scenario into inputs maintains the integrity of the scenario.

Conclusion

The forecasting team at AEMO is a skilled, energetic group of professionals. The approach to the scenarios seems to have changed since the workshops, and these changes have been to the detriment of the Draft IASR and would result in a deficient ISP. I can only assume that the positions described – especially that over the carbon emissions under the Central scenario – have been specified by other parts of the organisation pandering to the Australian Government.

Any questions on this submission should be directed to David Havyatt at david@havyatt.com.au or on 0414 467 271.

[4] https://www.aer.gov.au/system/files/AER%20-%20Forecasting%20best%20practice%20guidelines%20-%2025%20August%202020.pdf

Appendix 1 – Jurisdiction Net Zero objectives

NSW *Achieving Net-Zero Emissions by 2050: Fact Sheet*

The NSW Government has committed to an aspirational objective of achieving net-zero emissions by 2050. This aspirational objective is intended to provide a clear statement of the government's intent, commitment, and level of ambition and to set expectations about future emissions pathways that will help the private sector and government agencies to plan and act. It is consistent with the Paris Agreement which the Commonwealth Government has committed to ratifying, and is intended to complement, rather than replicate or duplicate the Commonwealth Government's shorter term national emissions reduction targets.
https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Climate-change/achieving-net-zero-emissions-by-2050-fact-sheet-160604.pdf

Victoria *Emissions reduction targets*

The Victorian Government has set a long-term target of net zero emissions by 2050.

Victoria's Climate Change Act 2017 establishes a long-term target of net zero greenhouse gas emissions by 2050. The Act also requires five yearly interim emissions reduction targets to be set to keep Victoria on track to meet this long-term target.

https://www.climatechange.vic.gov.au/reducing-emissions/emissions-targets

Tasmania Acting on Climate Change

Tasmania has a proud history as a quiet leader on climate action, with a strong track record of renewable energy and innovation, helping to reduce our emissions and those of the nation.

We were the first state to achieve zero net emissions, and we have the lowest per capita emissions of all States and Territories. We are also one of the lowest net emitters of carbon dioxide on the planet, but we know there is more that we can, and should do.

Which is why our Government has today announced a review of our target of net zero emissions by 2050.

I have requested that central agencies, DPAC and Treasury, conduct a detailed analysis of the pathway our state would need to take and the challenges and opportunities available in achieving net zero emissions before 2050. The process will be informed by science, economics, and the views of our businesses and community.

The detailed analysis and targeted consultation will occur over the next 6 months and will be used to responsibly and sensibly inform amendments to the Climate Change (State Action) Act and Tasmania's new Action Plan for 2021 onwards.

http://www.premier.tas.gov.au/releases/acting_on_climate_change

South Australia *South Australia's greenhouse gas emissions*

The South Australian government has set goals to reduce South Australia's greenhouse gas emissions by more than 50% below 2005 levels by 2030, and to achieve net zero emissions by 2050.

https://www.environment.sa.gov.au/topics/climate-change/south-australias-greenhouse-gas-emissions

Queensland *Climate Transition Strategy*

The Queensland Climate Transition Strategy (PDF, 2 MB) sets a vision of a zero net emissions future that supports jobs, industries, communities and our environment.

We have made three key climate change commitments:

1. Powering Queensland with 50% renewable energy by 2030.
2. Doing our fair share in the global effort to arrest damaging climate change by achieving zero net emissions by 2050.
3. Demonstrating our commitment to reducing carbon pollution by setting an interim emissions reductions target of at least 30% below 2005 levels by 2030.

https://www.qld.gov.au/environment/climate/climate-change/transition/queensland-climate-transition-strategy

ACT *Climate Change Strategy*

Building on our successes, the ACT Climate Change Strategy 2019–2025 outlines the next steps the community, business and Government will take to reduce emissions by 50–60% (below 1990 levels) by 2025 and establish a pathway for achieving net zero emissions by 2045.

https://www.environment.act.gov.au/cc/act-climate-change-strategy