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Response to, Western Australian Department of Mines, Industry Regulation and Safety – Energy Policy WA

Reserve Capacity Mechanism Review

Information Paper (Stage 1) and Consultation Paper (Stage 2)

From the **Australian Solar Thermal Industry Association (AUSTELA)**

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Greetings,

We congratulate the Western Australian government for reviewing and upgrading its planning of the Reserve Capacity Mechanism, which underpins the state's South West Interconnected electricity system as it undergoes transformation to a zero emissions future.

We are the Australian Solar Thermal Industry Association (AUSTELA), an industry association that promotes the benefits of concentrating solar thermal power technology (CSP) for power generation and industrial heat applications including solar fuels. Solar thermal involves concentrating the sun's rays with mirrors to heat a fluid, then using the heat to produce steam and drive an electricity turbine. Solar thermal includes storing the heat in molten salt tanks to produce electricity for 12-20 hours or more, or to provide industrial process heat. There are more than 100 CSP plants in operation around the world, but no utility scale systems in Australia.

We have read the RCM Review Information Paper (Stage 1) and Consultation Paper (Stage2). We would like to share some recommendations and concerns regarding the Papers.

Yours sincerely,

Keith Lovegrove
Craig Wood
Victor Marin

Directors, AUSTELA

Comments:

We note that the current consultation paper is stage 2 of an ongoing process. The proposals and specific questions asked of stakeholders are concerned with the fine details of operation of the RCM and will be best addressed as such by current participants who are closely familiar with the existing regime.

We offer a broader perspective in terms of system design and incentives for renewables offering zero emissions firm capacity as grids take-on more intermittent renewables.

- 1. Zero-emissions not specifically included in RCM:** AUSTELA notes that the Reserve Capacity Mechanism Review Papers do not specifically mention or incentivise zero-emission firm capacity – or what might be called a ‘greenhouse signal’ or ‘carbon trigger’. Inclusion of such a mechanism, we believe, would allow for alignment of emissions goals with investment in future firm capacity reserves. We duly note that: *“In July 2022, the Minister for Energy directed EPWA to investigate policy options for penalty regimes for high emission technologies. While not part of the original scope for the RCM Review, EPWA has developed and analysed policy options in conjunction with the RCM Review. Consultation on the implementation of this policy will be conducted separately in due course.”*

We suggest it is essential that the government’s announced policy in this regard becomes an integral part of the RCM if Western Australia is to ultimately reach zero emissions in a least-cost manner.

Recommendation: Modify the RCM rules so that a growing fraction of Class 1 unrestricted firm capacity is mandated to be provided by zero emissions generation, providing a pathway for 100% of reserve capacity being met by renewable technologies, along the timeline to zero emissions overall.

2. CSP is an ideal option for WA that has not been considered: The 2023 SWIS DA document from the WA government forecasts 50GW more capacity in the SWIS by 2042 – 41.8GW of which is large-scale wind and solar – and the DA predicts “large-scale solar paired with long duration energy storage (LDES) as the most cost efficient form of firmed renewable generation.” (p.7) The CSIRO Renewable Energy Storage Roadmap 2023¹ concludes CSP is a cheap utility-scale renewable storage in 2030 and the cheapest in 2050. However, the Reserve Capacity Mechanism does not reference zero-emissions technologies as a class of firm capacity, except to include them as ‘Class 3’ in Capability. This concerns AUSTELA since CSP with storage is a *dispatchable* renewable generation technology, typically with up to 20 hours or more storage and utility-scale application. WA has some of the highest DNI levels in the world and is eminently suited to solar thermal plants, producing dispatchable electricity and grid support from synchronous steam turbines, with enough storage to provide dispatchable power overnight and during reliability events.

Recommendation: Carry out a detailed investigation of the cost and benefits of CSP plants in the SWIS and review the WEM and RCM rules to determine where the rules provide barriers to CSP uptake.

¹ CSIRO, 2023. ‘Renewable Energy Storage Roadmap.’ <https://www.csiro.au/en/work-with-us/services/consultancy-strategic-advice-services/CSIRO-futures/Energy-and-Resources/Renewable-Energy-Storage-Roadmap>

3. Technology-Agnostic: ‘Class 1’ of the Capability Classes appears to have criteria weighted towards diesel, coal and gas due to its reference to 14 hours of fuel. We note that if the criteria were made technology-agnostic – ie. ‘14 hours of firm, unrestricted operation at nameplate capacity’ – that the WA system would incentivise a business case for zero-emissions firm capacity, such as CSP. ‘Class 2’ Capability includes Demand Side Programmes (DSP) and Electric Storage Resource (ESR), which enjoy a ‘derated’ credit (pro-rated against the 14-hour fuel standard). While battery and DSP are excellent tools for decarbonising, they are currently smoothing technologies at the margin rather than providing reliable reserve capacity. **Recommendation:** make the RCM an outcome and target-driven system, allowing the best technology for the task.

4. **BRCP and Price Certainty favour fossil fired generation:** the BRCP is tied to the per MW capital cost of the new entrant technology with the lowest expected capital cost amortised over the expected life of the facility. This test skews the Benchmark towards assets that are relatively cheap to build (eg. gas and diesel) and away from large capital-expenditure assets such as pumped-hydro and CSP, which are designed to operate for 30+ years but with zero fuel cost. Adding to this bias is five-year price certainty for new technologies in relation to the Flexible Capacity Product. The long duration energy storage (LDES) technologies that are dispatchable in the overnight market are high CapEx assets and, to attract investment into them, the price certainty must be over 20 years. Moreover, because the RCM pricing system is conducted in five-year windows, low CapEx assets such as diesel and gas are encouraged while high CapEx assets such as pumped-hydro and solar thermal – built to operate for 30 years and at much lower OpEx levels – are disincentivised. **Recommendation:** Create a zero emissions BRCP for operation of a zero emissions fraction in the RCM. **Recommendation:** extend price certainty (to 25+ years) and expand time-horizons of long duration renewable storage (to 12+ hours) to encourage investment in LDES assets such as CSP and pumped-hydro.

Further comments:

1. **Solar thermal not included in WA energy planning documents:** some of the planning in the WA system has not taken account of the CSIRO’s **Renewable Energy Storage Roadmap**². The CSIRO document forecasts that the NEM will use around 80GWh of renewable thermal energy storage capacity in 2050 for states in the NEM (when total electricity storage is around 950 GWh); the WA grids will use an estimated 70GWh of renewable thermal energy storage capacity in 2050 when there’s 96 GWh of electricity storage in 2050. This is built on the assumption that with its high DNI and scarce water resource, the WA grids should build high levels of solar thermal storage to maintain reliability and security when decarbonised by

² CSIRO, 2023. ‘Renewable Energy Storage Roadmap.’ <https://www.csiro.au/en/work-with-us/services/consultancy-strategic-advice-services/CSIRO-futures/Energy-and-Resources/Renewable-Energy-Storage-Roadmap>

2050. The SWIS DA omits renewable thermal storage technology altogether, meaning the RCM Review in turn is not considering the implications of its design on the potential uptake of the technology. Our understanding is that CSP has simply not been included in the menu of technologies considered in modelling least-cost capacity expansion. We further understand that this partly results from the use of PLEXOS system modelling software that does not offer it as a default option, but for which others have developed a suitable approach.

2. **Pumped hydro energy storage (PHES) included in SWIS DA:** we note that, while solar thermal electricity and storage was omitted from the SWIS DA, PHES was included. We should point out that WA has a scarce water resource, as evidenced by the government's calculation that the state's dams that once received 420 billion litres of water per year are down to 25 billion litres per year.³ At the same time, WA has some of the highest solar DNI levels in the world.
3. **Levelised Cost of Storage:** the CSIRO Roadmap uses the Levelised Cost of Storage (LCOS) to compare the cost effectiveness of storage technologies. Under the LCOS, solar thermal generation and storage is the most cost-effective utility-scale renewable storage in the 4-24 hour segment.
4. **Avoid cul-de-sacs:** measures taken to meet 2030 emissions reduction goals should act as a springboard to full de-carbonisation by 2050 and must not create outcomes that make subsequent steps harder (e.g., construction of new gas-fired generation that lock in further emissions for 20 years should be avoided).
5. **Planning:** the total environmental and economic cost of the energy transition will only be minimised by modelling generation, storage and transmission augmentation on a 'whole of system decarbonisation and cost' basis. This is required as a counterbalance to the prevailing approaches that only solve today's issues. As an example, the market is currently busy delivering short duration batteries which targets the FCAS market. However, the technologies we will build in coming years to replace coal-fired generation, such as CSP and PHES, can provide FCAS at zero additional cost. The market is solving part of the problem today whereas planning for CSP and PHES would deliver a lower-cost outcome by doing the job only once.
6. **Storage is not just pure-play:** mechanisms that target storage only, or "electricity in, electricity out", will omit technologies that have intrinsic storage or dispatchability such as CSP, bioenergy and seasonal hydro.
7. **Tax credits:** the WA government could incentivise long-duration renewable energy storage with a program similar to the United States' Inflation Reduction Act which gives a 30% tax credit to projects deploying complying energy storage or generation technologies. Such a tax credit would lower WA industry's energy costs, thereby improving competitiveness and spurring growth, and drive the creation of a renewable energy technology manufacturing and export industry.
8. **Offtake contracts:** the WA electricity retailers (government owned Synergy in particular) could enter into offtake agreements with long-duration renewable energy storage projects. The term of such arrangements should be at least 25 years, delivering long-term certainty of dispatchable renewable energy supply at low cost.

³ Western Australian government, 2019. <https://www.wa.gov.au/service/natural-resources/water-resources/program-waterwise-perth-action-plan-2019>

9. **Jobs:** the dispatchable renewable electricity options – PHES, CSP and in the future bioenergy – develop regional job opportunities similar to gas- and coal-fired power plants during construction and operation stages.
10. **Sovereign build:** dispatchable renewable electricity such as pumped-hydro and Solar Thermal are not tied to hardware imports from low-cost labour countries. When the electricity system frees itself from captive materials and manufacturing processes carried out in a few foreign countries, the delivery and price of the energy infrastructure comes under the control of the Australian owners and contractors.

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