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Australian Energy Market Commission (AEMC) Reliability Panel
Review of the System Restart Standard
https://www.aemc.gov.au/market-reviews-advice/review-system-restart-standard-0
30 January 2025

Dear Panel Chair

Re: Review of the System Restart Standard

The Australian Aluminium Council (the Council) represents Australia's bauxite mining, alumina refining, aluminium smelting and downstream processing industries. The aluminium industry has been operating in Australia since 1955, and over the decades has been a significant contributor to the nation's economy. Department of Industry, Science and Resources has recently forecast[1] that earnings for Australian exports of aluminium, alumina and bauxite are expected to rise from $16 billion in 2023–24 to $18 billion in 2024–25. More than $14B of this comes from the alumina and aluminium industries, as value adding mineral processing sectors. The industry includes six large bauxite mines plus several smaller mines which collectively produce over 100 Mt per annum making Australia one of the world's largest producers of bauxite. Australia is the world's largest exporter of alumina with five alumina refineries producing around 20 Mt per annum of alumina. Australia is the seventh largest producer of aluminium, with four aluminium smelters and additional downstream processing industries including more than 20 extrusion presses. Aluminium[2] is one of the commodities most widely used in the global transition to a clean energy future. It is also recognised for its importance to both economic development and low emissions transition. Aluminium is Australia's top manufacturing export. The industry directly employs more than 21,000 people, including 6,600 full time equivalent contractors. It also indirectly supports a further 55,000,000 families predominantly in regional Australia. The integrated industry contributes around $18 B to Australia's GDP.

The Council welcomes the opportunity to make a submission to the AEMC's Reliability Panel on the System Restart Standard (the Standard), as the Council's Members have become increasingly concerned in recent times about the ability of the National Electricity Market (NEM) to re-energise if parts of the power system are affected by a major supply disruption or black system event. Aluminium smelters are particularly vulnerable to prolonged outages but also may play a major role in rapidly stabilising a system following restart. The Council notes that Members may have also provided submissions directly to the AEMC.

Aluminium Industry Energy Use

Australia's aluminium smelters are already a large electricity consumer, with the four smelters using around 2,600 MW or ~10-12% of the electricity consumed in the NEM. Providing electricity is supplied consistently, with firm power, and at internationally competitive prices, aluminium smelting can be run on renewable electricity. As smelters are already electrified, no technological conversion is required. The carbon intensity of the Australian grid is declining rapidly, with this increased penetration of variable renewables. The owners of Australia's four smelters[3] have recently been in the process of recontracting for electricity at the end of

[1] https://www.industry.gov.au/publications/resources-and-energy-quarterly-december-2023
[2] https://www.worldbank.org/en/topic/extractiveindustries/brief/climate-smart-mining-minerals-for-climate-action
[3] https://www.alcoa.com/australia/en/news/releases?id=2024/09/portland-aluminium-secures-new-energy-contract, https://www.tomago.com.au/tomago-aluminium-future-renewable-energy-needs/,

their current terms (2025-2029), with the terms of these new arrangements extending to between 2035-2055.

As there is an increased penetration of variable renewable technologies, there is already an increased demand by the grid for smelters to be able to offer power flexibility and interruptibility. Interruptibility is the short term loss of power to part of or whole potline or whole smelter. Flexibility is the ability to use more or less power than normal, for short term periods (seconds to minutes through to hours) without creating too much process instability. Aluminium smelters already offer a range of services and functions which support the network over varying weather, network demand and operating conditions, including Reliability and Emergency Reserve Trader (RERT) and Frequency Control Ancillary Services (FCAS). Smelters' large and fast-acting interruptibility helps secure and restore stability to the network before and after contingencies occur. The industry has increasingly been called upon to support grid stability and reliability, as the challenges in managing the grid increase. For example, during May and July 2022 Tomago Aluminium provided 62 hours of modulation across 36 events which were a mixture of RERT and responding to high market price. This response by Tomago supported the Australian Energy Market Operator (AEMO) to manage a complex and challenging system and maintain supply to domestic customers. Additionally, smelters are increasingly offering rights in in relation to the short-term reduction of volume at times of peak demand via contractual arrangements[4].

System Restart in the NEM

The National Electricity Market (NEM) is going through a once in a century transformation and as Australia moves towards net zero emissions by 2050, this transition will need to be carefully managed to ensure that all consumers are provided with internationally competitively priced, reliable, low emissions energy. The rate of development of variable power supply is ahead of pace of the development of capacity required to manage this. Capacity is required to support the new build variable power supplies as well as replace existing coal capacity that will exit the system over the coming decades. The NEM is currently heading towards a system which lacks the inertia and demand response requirements needed to address the risk of instability, which is becoming increasingly problematic for Australian consumers in general and particularly industries which rely on firm, uninterrupted power supplies.

Smelters' large and fast-acting interruptibility helps secure and restore stability to the network before and after contingencies occur. The industry has increasingly been called upon to support grid stability and reliability, as the challenges in managing the grid increase. Amongst the roles played by very large and continuous smelter loads are:

- Buffering the erosion of minimum demand periods. While the industry nominally uses 10-12% of the NEM, the Minimum Operational Demand in the NEM was set on 20 October 2024 at only 10,305 GW [5]. At times such as these, the aluminium industry uses more than 25% of the NEM. With AEMO now needing to issue "Minimum System Load" Market Notices[6] for the first time ever, the role of smelters in underpinning critical minimum demand should be recognised and supported;
- Support for the continued economic commitment and operation of large-scale synchronous generation (noting that de-commitment of synchronous units due to inadequate base demand levels can regularly remove large blocks of inertia and system strength from the system);
- Supply of certain essential system services, such as contingency FCAS;
- Generally located in regional areas that help minimise transmission congestion and support the development of REZ's.

https://www.riotinto.com/en/news/releases/2024/rio-tinto-signs-australias-biggest-renewable-power-deal-as-it-works-to-repower-its-gladstone-operations

[4] https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2023/august/portland-smelter-contract-renewal-finalised

[5] https://www.linkedin.com/posts/australian-energy-market-operator_big-news-for-renewable-energy-in-australia-activity-7254236785872941057-D24_?utm_source=share&utm_medium=member_desktop

[6] https://wattclarity.com.au/articles/2024/09/24sept-aemo-minimumsystemload-alert-vic/

- Potential participation in "backstop" reliability schemes such as RERT or Interim Reliability Reserve (IRR); and
- Enhancing system resilience through rapid unscheduled interruptibility in the case of extreme contingency events, which, like more extreme weather conditions, are occurring more frequently in the NEM and increasingly complex to match with dispatch in real time.

However, after around 75 minutes without electricity, aluminium begins to "freeze" in the pots, which can force plant/line interruption and potentially freezing cells with a restart which can take months to complete at significant cost. For example, following a prolonged power outage at Portland Aluminium Smelter in 2016, it took more than 6 months to restore the capacity of the smelter[7].

Further, as outlined in the Paper, AEMO has recently identified challenges in procuring sufficient system restart ancillary services (SRAS) to meet the Standard, in some NEM regions, including for the Queensland sub-region north of Bundaberg from 1 July 2024. This region includes the Boyne Smelter, which would be impacted in this region and where an inability to restore supply in 4 hours is likely to lead to "freezing" of the molten aluminium in the reduction lines at the smelter which would put continued operation and the economic viability of the facility at risk. While smelters are usually identified as sensitive loads, the timeframes for restoration of energy do not currently reflect either the impact of delayed restoration nor does it reflect the role smelters could have in system restart efforts.

It is imperative that the regulatory framework supports the development and implementation of technologies capable of restarting the network infrastructure in emergency events to mitigate this risk.

Conclusion

The Council notes that it is critical that Australia finds a pathway where its world class energy resources are translated into internationally competitive, low emissions, reliable energy to ensure industrial production, emissions and jobs are not exported to other countries. Doing this requires that electricity can be reliably and securely supplied in order to continue to attract the investment required to underpin Australia's s energy transition and industrial transformation.

Australia's industrial energy consumers, particularly aluminium smelters are a key component in preventing systems issues and outages, and their role in mitigating system restart and providing timely reconnections to restabilise the system should be considered.

The Council is happy to provide further information on any of the issues raised in this submission.

Kind regards,

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[7] https://www.alcoa.com/australia/en/news/releases?id=2017/01/portland-aluminium-smelter-in-victoria-australia-to-restart-capacity-lost-after-power-outage&year=y2017