House Standing Committee on the Environment and Energy
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Via https://www.aph.gov.au

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Dear Chairman O'Brien

Re: Inquiry into the current circumstances, and the future need and potential for dispatchable energy generation and storage capability in Australia

The Australian Aluminium Council (the Council) welcomes the opportunity to make a submission to the House Standing Committee on the Environment and Energy Inquiry into the current circumstances, and the future need and potential for dispatchable energy generation and storage capability in Australia (the Inquiry). The Council believes a national climate and energy policy framework which is transparent, stable and predictable, while maintaining the economic health of the nation including vital import and export competing industries is crucial in restoring Australia's strategic advantage. This Inquiry is an important step in the continued development of this policy framework.

The Council represents Australia's bauxite mining, alumina refining, aluminium smelting and downstream processing industries. The Australian aluminium industry has been operating in Australia since 1955, and over the decades has been a significant contributor to the Australian economy. Alongside many decades of economic contribution, the industry is globally comparatively young and well maintained. The industry includes five large (>10 Mt per annum) bauxite mines plus several smaller producers which collectively produce over 100 Mt per annum making Australia the world's largest producer of bauxite (Figure 1). The six alumina refineries produce around 20 Mt per annum of alumina and Australia is the world's largest exporter of alumina. There are four aluminium smelters; in addition to downstream processing including more than 20 extrusion presses and Australia is the sixth largest producer of aluminium. Aluminium is Australia's highest earning manufacturing export. The industry directly employs more than 17,000 people, including 4,000 full time equivalent contractors. The industry also indirectly supports around 60,000 families in regional Australia.

Figure 1. Bauxite mining, alumina refining, aluminium smelting and extrusion operations

Aluminium and the National Electricity Market

Within the East Coast National Electricity Market (NEM) the Australian aluminium industry has four aluminium smelters and two alumina refineries and uses more than 10% of the electricity consumed in the NEM. The four smelters collectively use about 2600 MW of electricity, which is more than the states of South Australia and Tasmania combined. Within the South West Interconnected System (SWIS), there are four alumina refineries.

The delivered cost, including transmission, of energy accounts for 30-50% of the cost base in refining and smelting and is the biggest factor determining international industry competitiveness. Energy is one of the few potential advantages Australia has to offer industry and which Government policy can help deliver. The electricity supply requirements of the industry, can be summarised as follows:

- least cost, and an internationally competitive electricity cost;
- consistent electricity supply;
- an ability to secure electricity supply under long-term contractual arrangements; and
- an ability to be compensated adequately for system services which smelters and refineries provide for the network and its stakeholders.

These outcomes need to be delivered within the framework of Australia's Paris Agreement emission targets.

The Council's has articulated its view of design principles for an electricity system (See *Attachment 1*). Aluminium smelters generally have long-term electricity contacts. As each refinery, smelter, and extruder has unique electricity arrangements, the Council will reserve its comments to the Inquiry to a high level.

Australia's mineral processing manufacturing industry is seeking a restoration of what was, for many decades, Australia's strategic advantage. A future where Australia's world class energy resources are not only low emission but again translated into internationally competitive and reliable energy which will ensure industrial production, emissions and jobs are not exported to other countries. An efficient and least cost electricity market should support the transition of economically important industrial sectors such as alumina and aluminium through the energy transition, enabling a greater manufacturing sector in the future. The COVID-19 pandemic has underscored the importance of a manufacturing domestically, supporting a productive and resilient economy. The COVID crisis has demonstrated the advantages of not only the ability to value add within an almost exclusively domestic supply chain but also the importance of local industry which provides the underpinning market for our dependent contracting and downstream manufacturing sector.

A Changing Electricity System

The health of Australia's electricity system has been in the spotlight for many years, and according to the Energy Security Board's (ESB) *2020 Health of the NEM Report*, security remains the most concerning issue as Australia transitions to a low emissions electricity system. Efficient solutions to the challenge of maintaining the electricity system within the required parameters for frequency, voltage, inertia and system strength have been complicated by both the pace of change and current energy market design; which has resulted in the Australian Energy Market Operator (AEMO) increasingly being required to intervene in the market. The Post 2025 Market Reforms are aiming to address some of the market design challenges.

While there are consequences created by the increased penetration of variable renewables and retirement of thermal generation, the Inquiry needs to ensure it contemplates not only "generation and storage"[1], but also the role of the energy users which create and maintain demand, as well as providing a range of services to the market. As AEMO noted in the 2020 Electricity Statement of Opportunities (ESOO) "Declining minimum demand could lead to issues with managing voltage, system strength, and inertia. It is creating near-term operational and planning challenges for sustaining a reliable and secure power system that must be addressed."

[1]https://www.aph.gov.au/About_Parliament/House_of_Representatives/About_the_House_News/Media_Releases/Keeping_the_lights_on

Providing electricity is supplied consistently and at internationally competitive prices, aluminium smelting can be run on increasing proportions of firmed renewable electricity. In the short to medium term, the Council believes the use of thermal plant, such as gas, to firm variable renewables, will be essential as part of a transition to a lower emissions grid. In the medium to longer term, achieving an internationally competitive electricity price is likely to need a range of technologies to firm ever increasing levels of renewables in the grid.

The Council believes that gas will continue to have an important and necessary role in firming variable renewables, as it is technically and economically viable today; while zero emissions alternatives will be more fully developed in the future. The time, cost and complexity of developing viable, large-scale alternatives to the use of gas should not be underestimated.

The Council does not support the need for formal changes to existing obligations around notification for closure or mothballing for thermal plant. Placing additional requirements on generators, may have the unintended consequence of locking in earlier closure than would otherwise be the case, and further reducing dispatchable generation from the market. The Council believes the current requirements offer a reasonable balance, offering more than 3 years notice to the market in most circumstances. The Council recognises that it is unlikely given the current cost of different technologies that replacement capacity in the NEM will ever truly be "like for like"; but instead, will include a range of technologies and market responses.

It is essential during this transition, Australia retains major industrial loads, to ensure the nation can capitalise on its long-term strategic advantages of both energy and value adding mineral processing.

Role of Aluminium Smelters in a Changing System

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. Amongst the roles played by very large and continuous smelter loads are:

- Buffering the erosion of minimum scheduled demand;
- 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;
- 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 high impact events, which like more extreme weather conditions are occurring increasingly frequently in the NEM and are increasingly complex to match with dispatch in real time.

The Council believes that enhancement of system resilience is one of the most important roles smelters play in the market. While the real option value of this role remains largely unrecognised, namely the flexibility that retention of these loads provides in future choices of physical and economic mechanisms to stabilize the system and market, the risk remains that these smelters may not exist in the future and this option is removed. In the absence of these loads the measures required to maintain secure and resilient operation of the grid are likely to require significant additional investment and costs. This is because the system cost would be extremely high to maintain secure and resilient operation of the grid to address low probability high impact occurrences through targeted investment in assets, such as batteries, only required for these "resilience" events. However, aluminium smelters provide jobs, export revenue and stabilise minimum demand 24 hours a day, 365 days a year, as well as providing that the systemic support when required. Without aluminium smelters, the challenge to manage Australia's east coast electricity network and reliably

supply the twenty-two million Australians connected to the NEM and the industries that supply them jobs, would be even harder.

Delivered Cost of Electricity - Transmission

For energy consumers, it is the delivered cost of electricity; including transmission costs; which matters to international competitiveness. Large industrial consumers already bear a disproportionately high proportion of system costs.

The Council acknowledges that the current transmission network is insufficient to support the additional connection of large quantities of renewable generation, which will occur over the next twenty years. The Council supports a more orderly development which should benefit both renewable investors and electricity consumers. The current regime, which requires the AEMO and Transmission Network Service Providers (TNSPs) to connect new generators even if transmission capacity is limited, has resulted in passed increased cost to consumers. Under the current framework, if a transmission investment passes the Regulatory Investment Test for Transmission (RIT-T), it proceeds on a regulated basis funded by electricity consumers. It is recognised that historically major transmission investments have results in these costs being passed to consumers, including industrial users. The ESB is considering an alternate model, through recent consultation on Renewable Energy Zones (REZs) whereby generators would contribute to the cost of shared transmission infrastructure. The Council has supported this model, as it should ensure that the group of projects which are selected aligns with the long-term interests of electricity consumers, therefore reducing the cost and risk to customers.

While the current transmission network will need to be supplemented, this additional transmission capability must be delivered at least cost and risk, through coordinated transmission, storage and generation investments and there must be recognition that users have already paid for the existing supply network. The Council supports a "causer pays" approach whereby generators would contribute to the cost of the shared transmission infrastructure, reducing the cost and risk borne by customers.

Research and Development

Australia is the largest producer of alumina outside of China and the world's largest exporter of alumina. Alumina production is also an area where Australia is highly skilled and has more than 50 years of technical experience with global research headquarters for alumina for both Rio Tinto and Alcoa based in Australia. This experience helps not only Australia, but customers of bauxite, alumina and aluminium, to reach their sustainability and carbon ambitions. This includes the development of low carbon alumina refining technologies, including the potential for adaptation to electrification.

Alumina refineries already provide some demand response to the grid. However, if there was to be an increased supply of competitively priced low or zero emissions electricity, and subject to technological advances, there is the potential to materially increase the electrification of alumina refineries combined with additional demand response, which could supplement reliability in both the NEM and SWIS electricity markets.

While existing Australian alumina production has a lower emissions intensity than the global average (0.7 t CO_2-e/t Al_2O_3 versus 1.2 t CO_2-e/t Al_2O_3), the refining industries total national emissions footprint of 14.5 Mt CO_2-e is significant and predominantly the result of Scope 1 emissions. The Government's priority areas should be expanded to explicitly include both alumina and aluminium in its next Low Emissions Technology Statement.

Australia's Strategic Advantage

The Inquiry's Terms of Reference include "opportunities for Australia to grow and export dispatchable zero-emission power". While Australia should seek to grow suitable export markets and export its products and technologies globally, the Council believes that the before opportunities to export dispatchable zero

emissions power are investigated, Australia should maximise the domestic application of zero emission dispatchable generation to capitalise on its own strategic advantage and maximise economic value.

For decades, aluminium has been part of the solution to Australia's energy, security and regional economic challenges. For example, Bell Bay Aluminium commenced production in 1955 as the southern hemisphere's first alumina refinery (using imported bauxite) and aluminium smelter which was built to overcome national security risks following the second world war. Northern Tasmania was chosen as the site because of its deep-water port and the state's hydroelectric generating capacity. Portland in far western Victoria, was chosen in the early 1980s as the location for a new smelter because it enabled socio economic development of the region and provided a baseload customer for new generation in the Latrobe valley via a new transmission line across the state. While the reasons for building value adding manufacturing capability may change over time, Australia's competitive position need not.

Today's aluminium industry contributes around $13B[2] a year to the economy in export value (Figure 2). Around $11 B of this comes from the alumina and aluminium industries, as value adding mineral processing sectors. Australia is one of the very few countries which has bauxite mining, alumina refining, aluminium smelting and aluminium extrusion industries. Importantly - aluminium is one of the few commodities which Australia mines, which is then processed all the way to a consumer product right here in Australia. The Council believes Australia should seek to maximise its own value adding domestic sectors, providing them with internationally competitive zero emissions dispatchable power. This would capitalise on Australia's national advantage providing jobs and value to the economy.

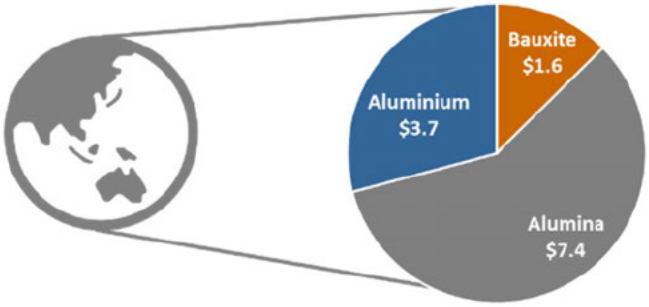

Figure 2. 2019-2020 Industry Export Value[3]

The Council is happy to provide further information on any of the issues raised in this submission. Nothing in this submission is confidential.

Kind regards,

[redacted]

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[redacted]

[2] 2019-2020 Data https://publications.industry.gov.au/publications/resourcesandenergyquarterlydecember2020/documents/Resources-and-Energy-Quarterly-Dec-2020.pdf

[3] Data sourced from Australian Energy Regulator, Wholesale Market Statistics, Annual electricity consumption – NEM and smelter energy use as published at https://aluminium.org.au/sustainability/

Attachment 1

Australian Aluminium Council - Electricity System Design Principles

Engender Australian advantage
Support a future where Australia's 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. As Australia transitions away from a thermal fleet and towards increasingly variable and distributed generation, industrial load provides a physical and commercial "ballast" to the grid. The value of this load as both ballast and interruptible supply needs to be recognised in the development of competitive frameworks.

Avoid shocks to all market participants, including consumers
The approach to transition should be consistent with a rapid evolution, rather than revolution, in electricity reform processes. Transition should seek to avoid shocks and discontinuities where possible and rule makers should work to ensure the preservation of existing commercial contracts (grandfathering) to prevent disadvantage to all market participants who are willing to invest and contract for the long term.

Deliver improvements throughout the transition, not just in the long term
The short term versus long term balance in interpreting the National Electricity Objective is skewed in favour of the long term, which can lead to short term disadvantage. There needs to be a more risk-based approach to changes which reflects the certainty around short term costs and the uncertainty of long-term benefits. The staging of the transition must be recognised, as well as the final outcome, looking for benefits along the pathway. In considering the most beneficial end point, the benefits and costs of the transition, should also be considered.

Recognise the starting point and state-by-state variation in any design
The current energy-only market has not been able to deliver perfect competition, some regions are more balanced than others and many regions have relied on major Government investment to provide supply and manage the transition. Future market reforms need to recognise that the playing field within the market does not start from a basis of levelized competition, regulations will be required which encourage competition in the services which are needed to balance the current imperfections and in jurisdictions where the current market competition levels are unable to drive efficient outcomes. In designing new structures that recognise the reality of the starting point, an important principle of design is that the cost of regulation should not exceed the private benefits.

User participation should be voluntary and recognise the complexity of participation
Even for large, sophisticated industrial users, the procurement of electricity is primarily seen as an input into production; rather than being the core process for the business itself. As the emphasis in market design switches to more demand side participation, assumptions need to be continually tested regarding the complexity of requirements to participate. It is important to recognise that demand side participation will impact on both operational processes and safety; and has the potential to distract from the core business processes of end users. It requires complex technical considerations within the businesses of industrial users that interact with the market. Outsourcing participation to an intermediary does not remove the need for the business to manage its physical interface with the market. Accordingly, services that industrial users could provide – such as demand management, stability, ancillary services, and emergency response – should be provided on a voluntary basis and need to be adequately compensated for.