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25 January 2023

Dear Chair

Re: Safeguard Mechanism (Crediting) Amendment Bill 2022 [Provisions]

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. It includes five large (>10 Mt per annum) bauxite mines plus several smaller mines which collectively produce over 100 Mt per annum making Australia the world's largest producer of bauxite. Australia is the world's largest exporter of alumina with six 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 is Australia's highest earning manufacturing export. The industry directly employs more than 17,000 people, including 4,000 full time equivalent contractors. It also indirectly supports around 60,000 families predominantly in regional Australia.

The Council and its Members have been providing detailed feedback to the Government, Departments and other stakeholders on its views of the Safeguard Mechanism (Crediting) Amendment Bill 2022 [Safeguard Bill] and welcomes the opportunity to provide feedback to this Committee.

Aluminium Industry Context

Most of the large bauxite mines, all six alumina refineries plus all four aluminium smelters are covered facilities under the safeguard mechanism. In 2021, Scope 1 and 2 emissions from Australia's integrated aluminium industry (bauxite, alumina, aluminium) were about 34 Mt CO_2-e, which was 7% of Australia's national emissions. About 16.9 Mt CO_2-e of this was Scope 1 emissions from Safeguard facilities, representing 12% of Safeguard emissions for the 2020/21 reporting year. Energy typically accounts for 30-40% of the industries cost base, and therefore energy efficiency is a key focus of for these processes. The integrated nature of bauxite mining, alumina refining, aluminium smelting and extrusion processes in Australia means that efficient and effective regulatory processes for each step is critically important to the ongoing operation of the overall system.

Transformational Pathways

In September 2022 Mission Possible Partnership in collaboration with the International Aluminium Institute released Making Net Zero Aluminium Possible: A Transition Strategy for a 1.5°C-compliant Aluminium Sector[1] (the Strategy). The release of the Strategy was supported by the Council and its members. This work brought together companies across the global industry, including those operating across the value chain in Australia. The Strategy recognised that it is possible to meet rising aluminium demand, reduce emissions from the sector to net zero by 2050, and align with a 1.5°C target. The Strategy also highlighted that a global investment of approximately US$1 trillion will be required for the aluminium sector transition, including significant investment to supply the required zero-emissions electricity. It outlined not only actions the industry needs to take, but also actions required by Governments to support this. In particular, developing policy which is predictable, stable and transparent to enable businesses to confidently plan for this substantial investment. Governments also have a vital role to play designing electricity markets to support the transition and minimising the risks of carbon leakage.

The Australian Renewable Energy Agency (ARENA) in consultation with Alcoa, Rio Tinto and South32 has published a Roadmap for Decarbonising Australian Alumina[2]. The Roadmap identifies four key themes for decarbonisation that could transform the way alumina refineries consume and use energy by enabling the uptake of renewables and removing the use of fossil fuels. It also provides a framework for future policy and investment decisions and serves as a call to action to collaboratively transition the sector into an industry at the forefront of the transition to net zero.

In addition to this, the Council has produced a series of five factsheets:

1. Australia's role in a global aluminium decarbonisation pathway;
2. How Australian bauxite will help meet global demand for aluminium;
3. Australia's role in developing low carbon alumina refining technologies for the world;
4. The role of Australia's aluminium smelters in providing baseload stability in a decarbonising grid; and
5. Decarbonisation of Australia's electricity supply, which the Council sees as the single biggest opportunity to decarbonise the vertically integrated domestic aluminium industry.

The Council intends to update these factsheets annually; reflecting not only progress in decarbonisation in the industry; but also updating the industry's views of the evolution of decarbonisation technologies, based on research undertaken in Australia and through global partnerships. The single biggest opportunity to decarbonise the energy intensive Australian vertically integrated aluminium industry is through the combination of electrification of existing processes and decarbonisation of the electricity supply.

Australia's grid-connected mines, refineries and particularly smelters perform an enabling function in grid stabilisation which helps with increased penetration of variable renewable electricity. The carbon intensity of the Australian grid is declining rapidly[3], with this increased penetration of variable renewables. Our industry also will have the opportunity, as part of contract renewal, to contract a substantial share of electricity supply from firmed renewable electricity from on grid sources or behind the meter sources and members have signalled their intentions to do so[4].

[1] https://missionpossiblepartnership.org/wp-content/uploads/2022/10/Making-1.5-Aligned-Aluminium-possible.pdf
[2] https://arena.gov.au/assets/2022/11/roadmap-for-decarbonising-australian-alumina-refining-report.pdf
[3] https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/market-operations/settlements-and-payments/settlements/carbon-dioxide-equivalent-intensity-index
[4] https://www.riotinto.com/-/media/Content/Documents/Invest/Presentations/2021/RT-Investor-Seminar-2021-combined.pdf?rev=2e127f507f204ecc81e2d22527949560

In 2021 the industry's indirect emissions associated with the consumption of grid purchased electricity are around 17.6 Mt CO_2-e, of which 95% is from the production of primary aluminium (**Figure 1**). However, technologies which electrify the digestion process in alumina refineries could offset an additional 11 Mt CO_2-e of the 13.7 Mt alumina Scope 1 emissions. Alumina refineries will require technology changes for both digestion and calcination processes to meet zero-emissions goals; either in the form of electrification or adaptation to use hydrogen for process heating. Development of this technology and its application will be stepwise as new technologies to reduce overall emissions become viable. The required thresholds for implementation will be differentiated by refinery (and processes within a refinery); locational access to energy, including supporting transmission infrastructure; the local emissions intensity of electricity supply and bauxite type. The investment required to implement these changes will be substantial.

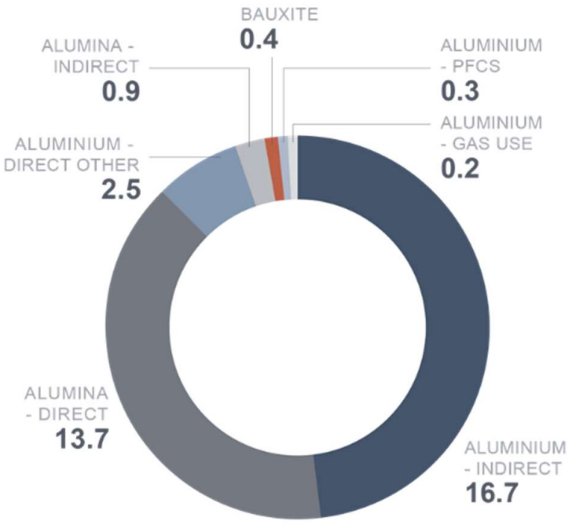

Figure 1. 2020 Industry Emissions (Mt CO_2-e)

Providing electricity is supplied consistently, with firm power, and at internationally competitive prices, aluminium smelting can be run on renewable electricity. For aluminium smelters, more than 95% of Scope 1 emissions could be eliminated with conversion to inert anodes (eliminating direct anode consumption, energy used in carbon bakes plus perfluorocarbons). The technology for inert anodes is currently under development and will be more easily *assessed* in 5 years. Deployment of this technology is not anticipated to be readily available before 2030. Additionally, this would only be implemented in conjunction with long-term internationally competitive electricity contracts to underpin investment and available renewable electricity supply because they are more electricity-intensive (~10-15%). And even with competitive low emissions electricity, the investment would be substantial, and implementation would vary from smelter to smelter, or even potline to potline.

Electrification

Australia's alumina industry already has some of the lowest emissions in the world, with an average emissions intensity for alumina of 0.7 t CO_2-e/t compared to the global industry average of 1.2 t CO_2-e/t. Alumina refining is an energy intensive process, using about 10.5 GJ / t produced. Digestion and calcination are the two most energy intensive steps, with digestion consuming around two thirds of this energy. Currently, this energy is largely derived from gas and coal, as well as electricity. All of Australia's alumina refineries have some combined heat and power generation (cogeneration) facilities which use coal, gas, or biomass fuels. Cogeneration is an efficient way to produce process heat from the waste steam from electricity generation, resulting in the refineries using, and in some circumstances, also exporting low emissions electricity.

Around 150 PJ of energy, derived from gas or coal, is currently used in the digestion phase in alumina refineries to generate steam and electricity. This has the potential to be replaced by internationally competitive renewable electricity, subject to the successful development and commercialisation of refinery side technology (including Mechanical Vapour Recompression, thermal storage and Electric Boilers). This has the potential to require more than 4000 MW of electricity at a national level to replace the existing energy supply, on a like for like basis. This would transform both the National Electricity Market (NEM) and South West Interconnected System (SWIS) electricity markets.

However, this relies on not only the development of commercial and technological solutions for electrification of alumina refineries but also the development of sufficient competitively priced low emissions generation and storage, and transmission capacity at scale to match. The electrification of existing industry, combined with the development of new electricity intensive industries, such as hydrogen, will require substantial volumes of electricity delivered reliably, affordably and at scale. The Council is concerned that if technology development lags, or energy infrastructure is delivered in the manner and at the pace it has historically, this will become the rate limiting step in the transition[5]. For example, the SWIS may not have the generation nor transmission capacity to electrify one alumina refinery, let alone four. For example, Worsley Alumina[6] have confirmed that a substantial expansion and modification of the energy grid would be required to deliver renewable power at the necessary scale for industrial users in the region (SWIS). Therefore, decarbonisation of Worsley Alumina may be in two stages, firstly conversion of the onsite boilers to natural gas and only in the longer term application of new technologies to support increased electrification and renewable energy for the refinery, which would require broader investment in shared energy infrastructure in the region.

It is the internationally competitive cost of zero carbon electricity at industrial scale to facilities, which will enable the greatest transformation of the sector. It is hoped that some technologies for refinery digestion may be able to be deployed prior to 2030. However, access to the required generation, storage and infrastructure outside the facility could be the rate limiting step in the electrification process.

Corporate Ambitions

The major operators and joint venture participants in Australia's aluminium industry have the common ambition of net zero by 2050, supported by interim goals (Table 1). However, when comparing these targets with performance within Australia or at a facility level, it is worth noting that corporate ambitions are set at levels that are in line with their policies and subject to their accounting and transparency rules. All of the Council's members interim ambitions are for *both* Scope 1 and Scope 2, and the application of known technologies such as increasing renewable energy supply will be the major pathways for these to be achieved. In the case of the Council's members, these targets include:

- Corporate targets can be set on ownership, operational control or equity share basis which is different to Safeguard / National Greenhouse and Energy Reporting (NGER) data at the controlling corporation level;
- Corporate targets are frequently set at a multinational level to ensure those facilities in their international portfolio that provide the cost-effective and low-risk emission reductions are actioned first. Therefore, local facility targets may differ from corporate targets, and these may not align with Australian NGER data;

[5] https://www.worley.com/~/media/Files/W/Worley-V3/documents/our-thinking/from-ambition-to-reality/from-ambition-to-reality-report.pdf

[6] P73, https://www.south32.net/docs/default-source/all-financial-results/2022-annual-reporting-suite/sustainable-development-report-2022.pdf

- Corporate and end-market requirements can be Scope 1, Scope 1 plus Scope 2, intensity based, or may include Scope 3. While these are accepted greenhouse gas emissions accounting procedures, they may not align with NGER data;
- Can be reported on calendar or financial years (and financial years vary by corporation) which may not align with NGER data;
- Target setting relies on Government/regulator forecasts of substantial grid electricity decarbonisation by 2030; and
- Additionally, targets are generally set as long-term ambition supported by interim goals. This considers the temporal nature of targets (i.e., short, medium and long-term), and a non-annual approach to ensure businesses do not chase short-term and short-sighted annual reductions, but rather focus on long-term success.

Table 1.Summary of Corporate Ambitions[7]

Company	Interim Goal (s)	Net Zero Ambition
Alcoa	30% reduction in scope 1 & 2 emission intensity by 2025 50% reduction in scope 1 & 2 emissions emission intensity by 2030 from 2015 baseline	Net zero by 2050
Rio Tinto	15% reduction in scope 1 & 2 emissions by 2025 50% reduction in scope 1 & 2 emissions by 2030 From a 2018 baseline (equity basis)	Net zero by 2050
South32	50% reduction in operational carbon emissions (Scope 1 & 2) by 2035 from FY21 baseline	Net zero by 2050
Alumina Ltd[8]	45% reduction in scope 1 and 2 emissions by 2030 (from a 2010 baseline)	Net zero by 2050
Hydro[9]	Reduction of 30% by 2030	Net zero by 2050

Australia's Competitiveness

The Council believes there is an opportunity for Australia to capitalise on its own strategic advantage and maximise economic value. Today's aluminium industry contributes around $16.9B[10] a year to the economy in export value (Figure 2). More than $15B 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. Globally, there is a focus across industry to find solutions for the technology challenges required to decarbonise. There is an opportunity for

[7]Sources: https://www.riotinto.com/en/sustainability/climate-change; https://www.alcoa.com/global/en/stories/releases?id=2021/10/advancing-sustainably-alcoas-2050-net-zero-ambition; https://www.south32.net/docs/default-source/exchange-releases/2021-south32-sustainability-briefing.pdf?sfvrsn=d8a76a71_2; https://www.hydro.com/en/media/news/2021/hydro-capital-markets-day-2021-sustainable-value-creation/

[8] Alumina Ltd are a JV participant in Alcoa World Alumina and Chemicals, which operate two mines and three refineries in Western Australia and has equity in the Portland Aluminium Smelter.

[9] Hydro is a JV participant in Tomago Aluminium Company.

[10] https://www.industry.gov.au/sites/default/files/minisite/static/ba3c15bd-3747-4346-a328-6b5a43672abf/resources-and-energy-quarterly-september-2022/documents/Resources-and-Energy-Quarterly-September-2022-Aluminium.pdf

Australia to lead the world in development and implementation of these technologies, capitalising on Australia's national advantage providing jobs and value to the economy.

Aluminium use is highly correlated with GDP, so as countries urbanise, per capita use of aluminium increases. Aluminium is recognised for its importance to both economic development and low emissions transition. It is expected that by 2050, global demand for aluminium is expected to nearly double. While an increasing proportion will be met through recycled aluminium, there will still be increased production of primary aluminium requiring a comparable increase in global bauxite mining and alumina refining rates.

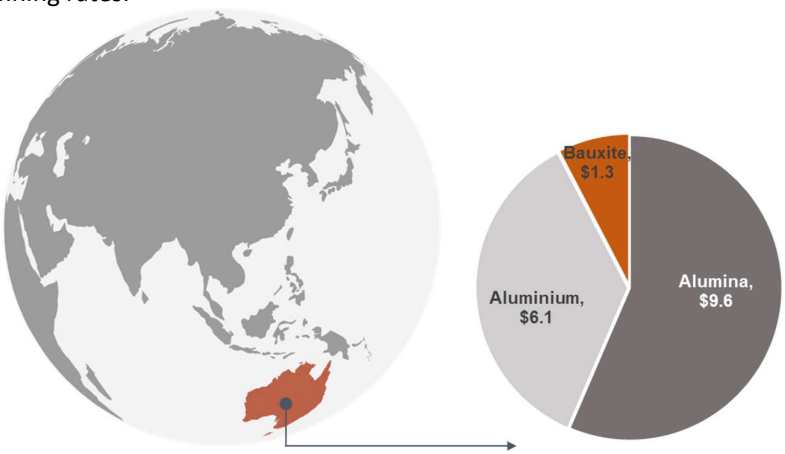

Figure 2. FY 2021-22 Industry Export Value ($B)

It is worth noting that the global competitors for each part of the industry vary with commodity. For bauxite, this is principally Guinea, which is the world's largest exporter, principally to China, including some captive bauxite mines; as well as Brazil, India, and Indonesia. Key competitors in alumina refining are China (>50% global production) and emerging economies such as Brazil, India, Saudi Arabia, Vietnam and Kazakhstan. Similarly, for aluminium smelting, China accounts for almost 60% of global production and the key countries for *growth* are India, United Arab Emirates, Bahrain, Saudi Arabia, and Malaysia.

The Safeguard Mechanism (Crediting) Amendment Bill 2022 [Provisions]

The Council continues to consider how reforms to the Safeguard Mechanism via the Safeguard Mechanism (Crediting) Amendment Bill 2022 [Provisions] can meet the continued global competitiveness of the Australian aluminium industry, while recognising that declining baselines need to be delivered in the context of Australia's target of by net zero by 2050 and 43% by 2030, as well as corporate ambitions over similar periods. The Council has also considered the needs for legislative as well as policy settings which will provide a transition to certainty for businesses through to 2030 and beyond. As each aluminium smelter, alumina refinery and bauxite mine has unique circumstances and contractual arrangements, the Council will present high level comments on the Safeguard Bill and CFI Amendments. Members of the Council may also have made submissions directly to this consultation, highlighting their specific situations. This Council submission should be considered alongside the direct input from our members.

As discussed above, the technology required for transformative decarbonisation in the aluminium industry is under development. The means that in the short term Safeguard Mechanism Credits along with offsets will be important for the success of the Safeguard Mechanism when it transitions to a declining baseline scheme. The Council encourages the Senate to support the Bill to allow the changes for the creation of Safeguard Mechanism Credits.

Conclusion

The Council seeks a national climate and energy policy framework which is equitable, transparent, stable and predictable, while maintaining the economic health of the nation including vital import and export competing industries. The Council wishes to continue to work to achieve optimal outcomes for Australian industry, through 2030 and beyond.

Kind regards,

[redacted]

Marghanita Johnson
Chief Executive Officer
Australian Aluminium Council
[redacted]