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Department of Industry, Science, Energy and Resources
Via https://consult.industry.gov.au/
30 July 2021

Dear Minister

Re: A Hydrogen Guarantee of Origin scheme for Australia

The Australian Aluminium Council (the Council) welcomes the opportunity to provide feedback to the on the proposed approach for a Hydrogen Guarantee of Origin (GO) scheme for Australia, as outlined in the discussion paper (the Paper) released on 21 June 2021. In responding to the Paper, the Council has only responded to the stakeholder questions of direct relevance to the industry.

Australian Industry

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. Australia's aluminium, alumina and bauxite industries combined have total Scope 1 and Scope 2 emissions of just under 35Mt CO_2-e, which is around 6% of national emissions.

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

Hydrogen and the Aluminium Industry

As the Paper notes, hydrogen will be an internationally traded commodity and Australia is well placed to be a major exporter. However, as the paper also notes, hydrogen can be an input into downstream products, reducing emissions associated with their production. Similar to hydrogen, there *will* be a need for guaranteeing the origin of the emissions associated with these products over time. For the aluminium industry, there is already a global standard and certification scheme, the Aluminium Stewardship Initiative. It is important that hydrogen GO schemes are internationally consistent to facilitate efficient international trade and enables informed choice for customers of both hydrogen and other Australian exports, including alumina and aluminium.

While Australia should seek to grow suitable export markets for hydrogen globally, the Council believes that the before opportunities to export hydrogen are investigated, Australia should maximise the domestic application to capitalise on its own strategic advantage and maximise economic value. Today's aluminium industry contributes around $13B[1] 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 hydrogen, prioritised over exports. This would capitalise on Australia's national advantage providing jobs and value to the economy.

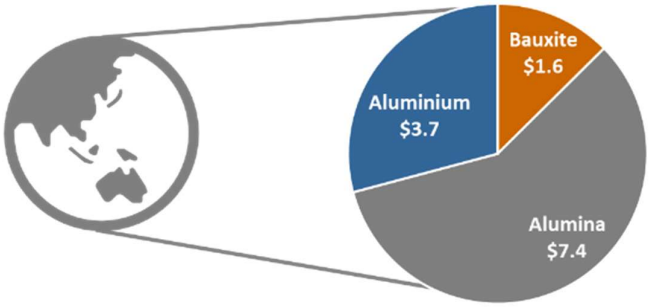

Figure 2. 2019-2020 Industry Export Value[2]

The industry is currently investigating options which include the use of renewable hydrogen in its processes, particularly in the production of alumina. Australian Renewable Energy Agency[3] (ARENA) recently announced funding to support a Rio Tinto feasibility study investigating the potential to partially decarbonise its alumina refining operations using renewable hydrogen. Conventional alumina refining combusts natural gas to achieve the high temperatures necessary in the calcination process. Rio Tinto will investigate the technical implications of displacing natural gas with renewable hydrogen at its Yarwun alumina refinery in Gladstone. The study would inform the viability of a potential demonstration project to validate the findings. The study will see an improved understanding of the potential for renewable hydrogen to be used in the alumina refining process and the scope of development works required to implement hydrogen fuelled calcination technology at an existing

[1] 2019-2020 Data https://publications.industry.gov.au/publications/resourcesandenergyquarterlydecember2020/documents/Resources-and-Energy-Quarterly-Dec-2020.pdf

[2] 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/

[3] https://arena.gov.au/news/renewable-hydrogen-could-reduce-emissions-in-alumina-refining/

alumina refinery. Importantly, the findings of this study may have applications in other high temperature Australian manufacturing processes, beyond alumina and even beyond the mineral processing sector. Additionally, if successful, the technical and commercial lessons could lead to the implementation of hydrogen calcination technology, not only in Australia, but also internationally.

Additionally, hydrogen is likely to have a role as an alternative technology in large vehicle transport; potentially including bauxite mining.

1. An initial focus on hydrogen production is proposed to facilitate timely establishment of a hydrogen GO scheme. Do you agree with this as a starting point?
The Council supports this as a starting point.

5. Do you agree that ISO standards and the GHG protocol provide the appropriate basis for the overarching framework for a hydrogen GO scheme?
6. Should IPCC Guidelines, the NGERS determination and the Climate Active Electricity Accounting rules be leveraged to provide guidance on the detailed emissions calculations?
The Council notes that an alternative voluntary scheme, which includes State Government partners, is being developed (https://www.smartenergy.org.au/zero-carbon-certification-scheme). The Council believes it is important that all schemes have a common methodology, to minimise confusion by consumers and optimise participation.

Consistent with other international processes, such as the Aluminium Stewardship Initiative, the Council believes that wherever possible Australian systems should mirror international standards, guidelines and protocols.

8. Do you agree that the Australian government should lead the administration of an Australian GO scheme? If not, why not?
9. Do you agree that the scheme should be administered by the Clean Energy Regulator?
10. What should be the role of industry in co-designing a government led scheme?
The Council supports the Australian Government scheme should be administered by the Clean Energy Regulator. The design of the scheme should be facilitated in a co-design process with industry.

Aluminium Industry and Electricity
Hydrogen can be produced using an electricity intense process, through the electrolysis of water. In determining the guarantee of origin, the accounting for the source of this electricity is very important. As another electricity intense sector, the guarantee of origin for the source of electricity emissions is also of direct relevance to the aluminium industry.

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 and three grid connected bauxite mines.

Australia is the largest producer of alumina outside of China and the world's largest exporter of alumina. Alumina refineries and bauxite mines 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 in both the NEM and SWIS electricity markets. ARENA[4] recently announced $11.3 million in funding to Alcoa of Australia Limited (Alcoa) to demonstrate technology

[4] https://arena.gov.au/news/alcoa-to-investigate-low-emissions-alumina/

that can electrify the production of steam in its alumina refining process using renewable energy. Approximately 70 per cent of the total fossil fuels consumed in alumina refining relates to the production of steam in boilers. Mechanical Vapour Recompression (MVR) is a potential alternative to produce steam using renewable electricity.

Scope 2 Emissions

As the Paper notes, the Greenhouse Gas Protocol (GHG Protocol) identifies a best-practice dual-reporting framework for scope 2 emissions comprising both location-based and market-based reporting.

In Australia, the location-based method is applied in the National Greenhouse and Energy Reporting (NGER) Scheme. However, even the current location-based methodology for the calculation of state-based factors is leading to an underestimation of the percentage of renewables used:

1. *Exclusion of rooftop solar from the calculation* - To December 2020, the small-scale renewable energy capacity was 13 GW[5] in Australia and supply is estimated to continue to grow by 40% year on year. While small-scale renewables add complexity, they should not be ignored in their entirety, as is the case in the current calculations.
2. *Inconsistent allocation of generation facilities to different states in different data sets* - In the National Electricity Market (NEM) the physical location of generation facilities may not align with interconnectors. For example, the Australian Energy Market Operator (AEMO) allocates the Snowy Hydro Ltd, Murray 1 and 2 sites to Victoria[6] but under the National Greenhouse and Energy Reporting (NGER) Scheme they are included for New South Wales.
3. *Use of rolling average data*: The current method (using three years of a historical rolling average of NGER grid connected generators) creates a considerable time lag between the Scope 1 emissions from these generators and their publication. The three-year rolling average is a historic legacy which was aimed smoothing annual variations when NGER was developed to align with the former Carbon Pollution Reduction Scheme and Clean Energy Future policies.

These issues arise in respect of the NGER Measurement determination values for all State and Territory jurisdictions. In the NEM states, this can be complicated by interstate transfers, but it can easily be seen in the SWIS, when comparing publicly available data derived from the Clean Energy Regulator for Designated Generation Facilities[7] (Figure *3*). In the SWIS this is showing a difference of 0.05 t CO_2-e/MWh for the 2019-2020 year. Using the same methodology, noting the issue of interstate transfers, it is estimated that the NEM variation is approximately 0.06 t CO_2-e/MWh. This lag in the Scope 2 factor, means the actual footprint of electricity users is material less than it currently appears. NGER Electricity use in 2019-20 was 83 Mt CO_2-e, however based on the estimates above; this is likely to be an overestimate in the order of at least 6 Mt CO_2-e, due to the lag in rolling average alone. The actual emissions; if sent out generation from rooftop solar was to be included, are likely to be even lower.

[5] http://www.cleanenergyregulator.gov.au/csf/market-information/Pages/quarterly-Market-report.aspx
[6] https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/generation_information/2021/nem-generation-information-july-2021.xlsx?la=en
[7] http://www.cleanenergyregulator.gov.au/

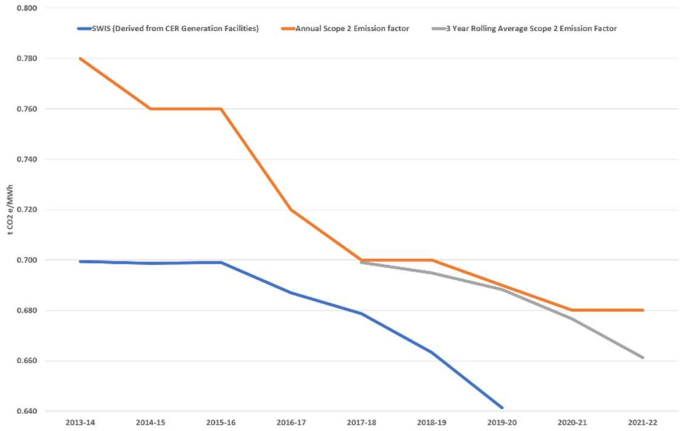

Figure 3. Comparison of Scope 2 Estimates in the SWIS

The Paper proposes using Large-scale Generation Certificates (LGCs) generated under the Renewable Energy Target (RET) as part of a market-based method. Under the RET, the Renewable Power Percentage (RPP) defines the number of LGCs which liable entities (generally electricity retailers) are required to surrender to meet their Large-Scale Renewable Energy Target obligations. However, the RET is a specific scheme aimed at providing additional funding for additional renewable generation, over and above that which existed prior to 2001. The RPP does not recognise existing renewable generation which existed prior to 2001 commonly known as "below baseline" renewables nor does it recognise roof top solar. The use of the RET or RPP as a proxy for "renewable energy consumed" is flawed because:

- It does not apply to Emission Intense Trade Exposed (EITE) facilities;
- It does not recognise pre-existing renewables;
- It does not recognise self-generation; and
- It does not recognise roof top solar Small-scale Technology Certificates (STCs) and their contribution.

The Paper outlines the limitations of the use of LGCs in the market-based approach in the long term. However, the Council believes that as demonstrated Figure 3 there are more immediate issues with the estimation of renewables; even prior to the end of the RET in 2030.

The Council would like to work with the Department and Regulator to address these concerns with the current and future methodologies, to ensure accurate accounting for electricity related emissions for all industries, including a future hydrogen industry. The Council would like to see the NGER Scope 2 calculation process updated to better align with the location-based method outlined in the GHG Protocol Scope 2 Guidance[8] referenced in the NGER Technical Guidelines[9]. For the location-based method this would:

- Use the NGERs data from only the last reporting year;
- Use the NEM review data, as used in the Victorian Renewable Energy Targets (VRET)[10] calculations (or equivalent for other grids), for estimated rooftop solar PV system grid export for the same time period as the NGER data;
- Use the AEMO NEM generation information to ensure that facilities are allocated consistently by state; and
- Continue to account for transfers of electricity between states in the NEM.

[8] https://www.wri.org/publication/ghg-protocol-scope-2-guidance
[9] https://publications.industry.gov.au/publications/climate-change/climate-science-data/greenhouse-gas-measurement/publications/nger-technical-guidelines-reporting-year-2017-18.html
[10] https://www.energy.vic.gov.au/__data/assets/pdf_file/0026/506825/VRET_2019-20_Progress_Report.pdf

Additionally, for the residual mix factor (RMF), the Council proposes that this should be calculated at the same time as the location-based method, but also removing the large-scale renewable energy target (LRET) target (33,000,000 MWh) and any voluntary LGC or guarantees of origin surrendered from the national on-grid generation.

These improvements to the Scope 2 calculation methodology would result in NGER emission factors better reflecting other internationally recognised reporting methods, and the evolving nature of the Australian electricity emissions profile. The Council recognises that there may be additional methodologies in the current calculation which it is not aware of.

17. Do you agree that the calculation of electricity (scope 2) emissions should be based on the market-based method?
18. Would you suggest any changes to the Climate Active approach (set out in detail in Attachment D) for the purposes of a hydrogen GO scheme?
19. What are your views on using voluntary surrender of LGCs to verify the consumption of renewable electricity under the market-based method, compared to the alternative of a location-based method?
20. Do you agree that a means of identifying consumption of below-LRET-baseline renewable electricity generation would be beneficial for the hydrogen certification scheme?
21. What are your views on establishing a new renewable guarantee-of-origin certificate for verifying below-baseline and post-2030 renewable electricity?
22. What would be the effect of having a general certification scheme for renewable electricity?
23. Do you agree that certification should recognise other sources of renewable electricity, including those outlined above?
The Council believes the neither the location based, or potential market-based method is already an effective solution. Revision of the methodology of scope 2 estimation under NGER is required, to address these current issues, as detailed above. Once this is completed, some of the proposals outlined in the Paper and Questions may become redundant.

In general, the Council supports a mechanism to track all renewable energy generation, including small scale and that arising indirectly from storage, in order to provide a least cost tracking for all electricity users; not just the hydrogen industry.

Given the importance of climate and energy policy to the sector, the Council would like to continue to work with the Department, on this, and other policy developments. In particular, the Council will seek to proactively work with the Department and Regulator to resolve the issues associated with accounting for electricity related emissions. I will be in touch directly to discuss how this can be achieved.

Yours sincerely,

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