Consultation for a proposed low carbon premium methodology

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1 Purpose of the Consultation Paper

The purpose of this Consultation Paper is to share with our subscribers CRU's proposed methodology and product specification for low-carbon aluminium premiums. Over the past few months, we have noticed rising interest in low carbon premiums among our subscribers and a few of them have asked if we would consider launching our own assessment. For some time, we have been sceptical about the genuine need for a green premium – as we explain later in this document – but we also understand that a premium is not only based on fundamentals but also on sentiment. Therefore, we believe it is the right time to address this question, but we first want to develop a solid methodology.

This document is aimed at sharing ideas in what we believe would constitute a robust methodology, but we want to ask our subscribers to kindly provide feedback. That will allow us to ensure any premia we develop match market requirements.

We are therefore asking all subscribers who review this consultation paper to kindly submit their feedback to the following email guillaume.osouf@crugroup.com. All replies will be considered in the development of our methodology. Once the methodology is done, we will be able to start our assessment and start publishing low carbon premiums.

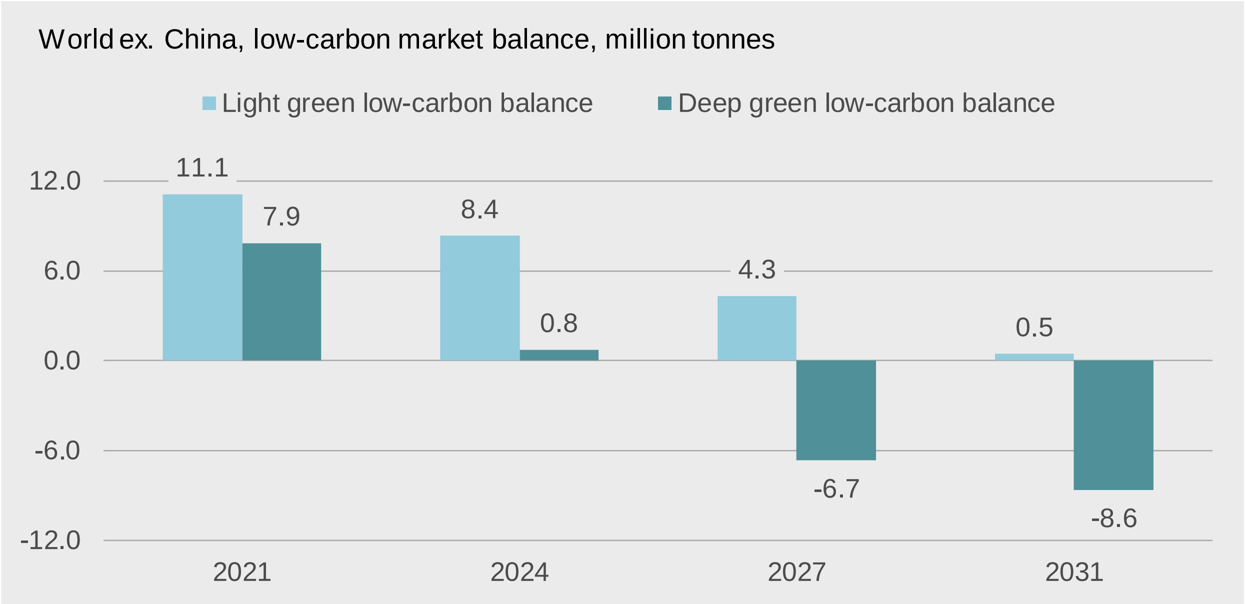
2 CRU's take on low carbon premiums

Demand for low-carbon aluminium has grown sharply since 2021. Several purchase deals have been highly publicised, including sales to BMW, Mercedes-Benz and Apple, but market feedback continues to indicate that this premium is relatively nominal. There is certainly no shortage of low carbon aluminium production – we estimate almost 21 million tonnes were produced in 2021 globally, rising by an average of 4.5% y/y CAGR over the next five years.

Market price differentials, premiums or discounts, form in response to a perceived deficit or surplus of a preferred commodity. Delivered billet in the EU now comes at a large premium because demand is strong, and imported products incur tariffs and costs of delivery. Most scrap grades are offered at a discount to the LME because there are technical issues in processing that would make it less preferable to virgin P1020 metal.

Beyond costs of production and delivery, a price differential is founded on the balance of demand against available supplies. Our research indicates that the emission reduction goals of end-use sectors vary dramatically in ambition. The packaging and automotive segments have come out very strongly in favour of emission reductions, with several companies taking aim at 2040 net zero goals. In consumer durables, only premium producers appear to be making real commitments, but the largest stakeholders remain mostly quiet on this issue. In building and construction, some corporates have shown desire to reduce the emissions impact of their supply chains. For other sectors, this remains conspicuously absent despite a few promises to reduce emissions in manufacturing and in the lifetime of products.

Low carbon Aluminium remains in surplus globally, but this is changing quickly



DATA: CRU; Note: Light green scenario assumes 50%, and dark green scenario assumes 80% low carbon Al demand from key sectors by 2031. Key sectors are transport, construction and packaging end uses. Low carbon Al defined as <4t CO2e /t Al for Scope 1 and 2 emissions.

Understanding this, forms the basis of the analysis above: a deep green scenario assumes 80% of demand by 2031 from transport, packaging and construction will be for low carbon aluminium. A more realistic scenario is the light green case, which projects that up to 50% of this demand will be for low-carbon aluminium. In the conservative case, the world ex. China balance only tightens by the end of the decade.

In conclusion, while the fundamentals alone suggest little support for a low carbon premium in the short term, this does not prevent it from forming. The key is perception of an implied value. Low carbon aluminium branding has ballooned in the past two years in an effort to differentiate a homogenous product. A P1020 ingot produced in Canada is identical to one produced in the Middle East, but it does not present the hidden cost of an additional 5 to 6 tonnes of carbon emissions generated per tonne of aluminium. If end-users see this as value, they will be willing to pay for it despite the surplus, and this is when a premium will form. An inverse dynamic may also be true – high carbon aluminium could be sold at discount to the prevailing LME 3-month price, as scrap does, if minimum requirements are set for exchange traded metal.

3 Defining what is low-carbon aluminium

The amount of CO2e generated during the production process is key

Defining low-carbon aluminium can be difficult and this is perhaps where we will need your feedback the most. The principle is to define low-carbon aluminium in a way broad enough so that we can capture as much liquidity as possible, but it also needs to reflect the very high standards required to achieve the low carbon grade.

For that purpose, we propose to define low-carbon aluminium by the amount of carbon dioxide equivalents (CO2e) that are generated in the atmosphere during the production process. The term “production process” can be quite broad, this is why we suggest the standard greenhouse gases

(GHG) Protocol methodology is followed. GHGs are classified as by the protocol and are measured in carbon dioxide equivalents.

Scope 1 GHG emissions are those from sources that lie within the entity boundary of the mine or plant. The entity describes a standard set of processes that each mine or plant could have, allowing for differences in technology routes. Scope 1 emissions can come from electricity generation if the mine or plant contains a power plant within its entity boundary, meaning most of the power from the plant is used in that activity.

Scope 2 GHG emissions are those from electricity and other types of energy purchased by the mine or plant and brought into the entity boundary of the mine or plant. Scope 2 emissions can also include purchased heat streams.

Scope 3 GHG emissions are consequences of the actions of the mine or plant but are outside the entity boundary. Scope 3 emissions may occur upstream or downstream from the entity.

Scope 1 emissions are also called direct emissions. Scope 2 GHG emissions are also called indirect emissions but are not the only type of indirect emissions: Scope 3 emissions are also indirect emissions.

We propose to define **low-carbon aluminium** as primary aluminium having a maximum of 4 tonnes of CO_2e per tonne of aluminium produced within scope 1 & 2 & 3 third party anode purchases. The inclusion of scope 3 third party anode purchases is to level the playing field across all smelters, and to match with the CRU Emissions Analysis Tool (EAT), which we intend to use for our assessment The tool is explained in more detailed later in this document.

Overall, and following a period of informal consultation with our market contacts, we feel this is the most commonly accepted definition of low-carbon aluminium, but please do let us know if you think differently.

Questions:

1) Do you believe our definition of low-carbon aluminium is accurate, or do you consider we should either reduce or increase the threshold of 4 tonnes of CO2e per tonne of aluminium?
2) Do you agree with including emissions from scope 3 third party anode purchases in line with the EAT tool or should we limit ourselves to scopes 1 & 2?

Can scrap be included in the definition of low carbon aluminium?

We believe the concept of low-carbon aluminium should not be limited only to primary aluminium produced via the traditional electrolysis process. Indeed, we expect scrap will be increasingly blended with primary aluminium in the production of cast aluminium to further reduce the carbon footprint. The International Aluminium Institute (IAI) stipulates that aluminium using either post or pre-consumer scrap emits on average 0.5 t of CO2e per ton of aluminium. This is significantly lower than the typical emission levels of the traditional electrolysis process and will therefore be used more and more by smelters to reduce their carbon footprint.

Some producers have already announced new technologies aimed at turning scrap into high-purity aluminium of a quality that is supposed to match, and even exceed, the one obtained through the traditional electrolysis process. This kind of technology is only in its early stages but could reach commercial scale fairly soon. Overall, as this practice expands, the share of scrap in green aluminium will surely go up in the coming years.

Questions:

3) Do you think it is acceptable to consider a metal as primary if scrap is used in the production process as long as the performance of the end product is as good as using the electrolysis process?

4) Should we exclude any other form of production process different to electrolysis from the definition of green aluminium?

An assessment built on proprietary data

As per the proposed definition of low carbon aluminium, we shall look at all primary aluminium smelters and only assess metal produced from smelters that have emissions equal or below 4 tonnes of CO2e per tonne of aluminium produced. For this purpose, we propose to use a proprietary CRU tool: **the Emissions Analysis Tool (EAT)**.

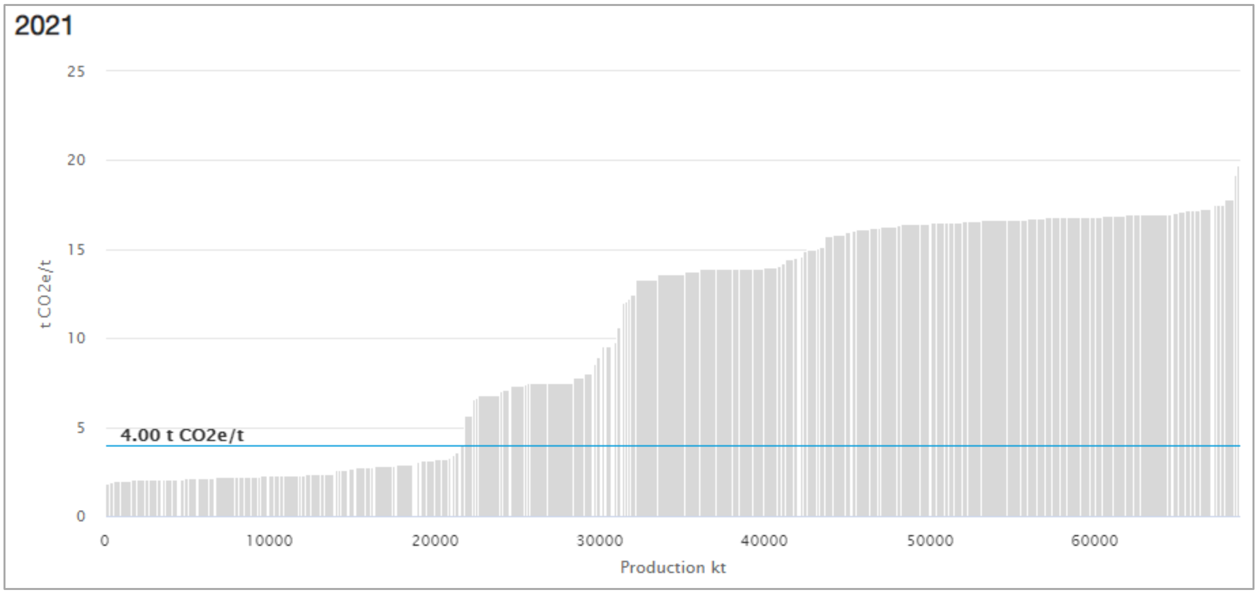
The EAT is a CRU proprietary tool that estimates emissions of all relevant global warming greenhouse gases (GHGs) in metal, fertiliser, and mining industries. GHGs are classified as by the protocol (scope 1, 2 and 3) and are measured in carbon dioxide equivalents (CO2e). The higher the CO2e, the higher the impact that the activity has on the environment.

Emission benchmarks used are primarily specified by the Intergovernmental Panel on Climate Change (IPCC), although the most relevant alternative source is used where this is not available. This is combined with an in-depth asset-by-asset understanding of the equipment and materials in use and levels of production, to model an emissions footprint for every primary producer globally. All technical assumptions and calculation methodology are available on request.

The Aluminium Stewardship Initiative (ASI) has signed a memorandum of understanding with CRU to incorporate and integrate ASI’s sustainability data into the EAT to increase transparency in the value chain. Any ASI certifications are also indicated for each smelter.

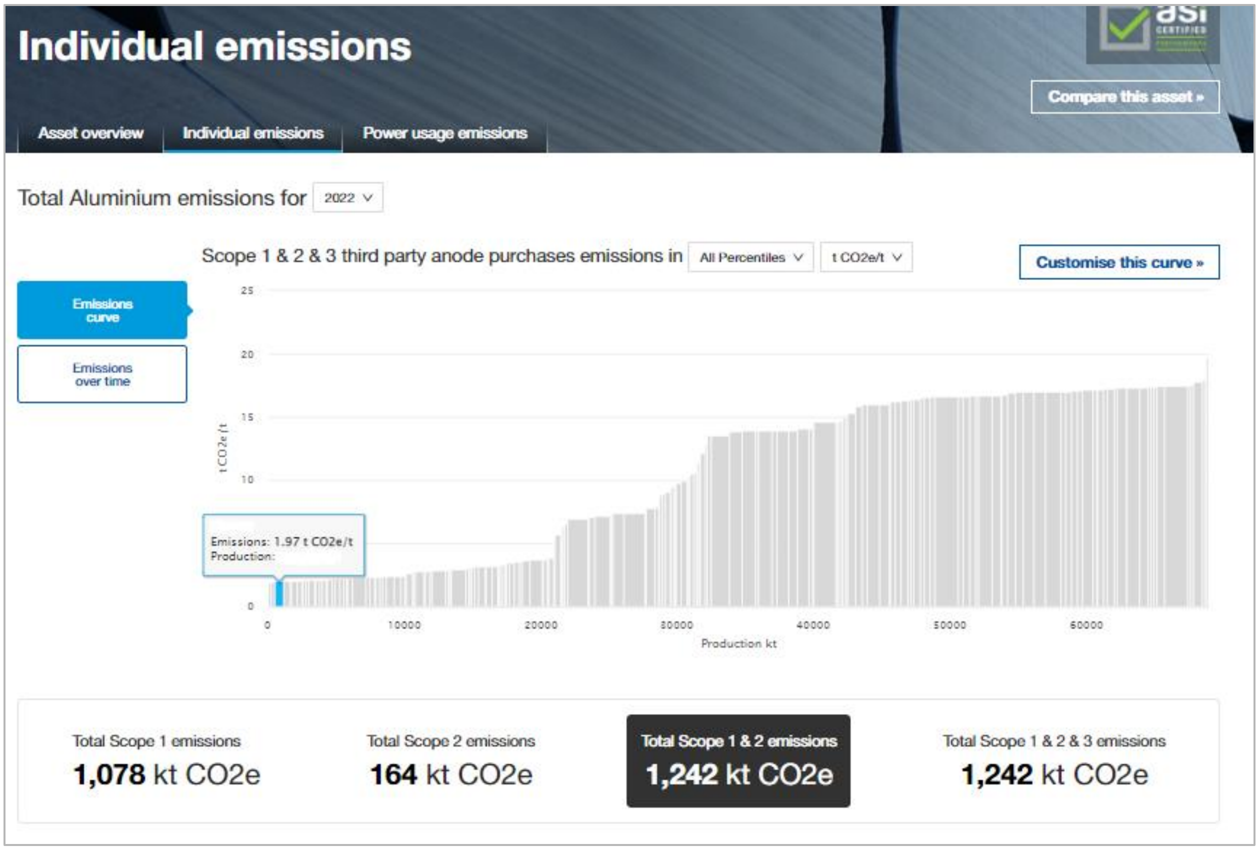
The LME has also announced recently that it would incorporate EAT’s emissions estimates into its new digital credentials register, LMEpassport. LMEpassport was introduced in August 2021 as a digital register for the provenance information for traded metals and it also supports the voluntary registration and distribution of sustainability data and certifications.

The accompanying chart below shows total emissions under scope 1, 2 & 3 third party anode purchases on the vertical axis, and individual smelters with cumulative production on the horizontal axis. The blue horizontal line represents the 4 tonnes of CO2e per tonne of aluminium threshold. Only smelters below the line qualify as producing low-carbon aluminium.



DATA: CRU's Emissions Analysis Tool

Furthermore, on the screenshots taken from the EAT tool below we can see how the information is displayed for an individual smelter – in this case, we take the example of one smelter in Canada. Besides the amount of CO_2e emission per tonne of aluminium, we can see the total amount of emissions the smelter generates and where those emissions are coming from.



	SCOPE 1	SCOPE 1 & 2
Prebake	**1,060** kt CO2e emissions	**1,217** kt CO2e emissions
Prebake process carbon plant	**117** kt CO2e	**119** kt CO2e
Prebake process potline	**944** kt CO2e	**1,098** kt CO2e
	SCOPE 1	SCOPE 1 & 2
Casthouse	**18** kt CO2e emissions	**18** kt CO2e emissions
Casthouse	**18** kt CO2e	**18** kt CO2e
	SCOPE 1	SCOPE 1 & 2
Ancilliary	**-** kt CO2e emissions	**7** kt CO2e emissions
Ancilliary services	- kt CO2e	**7** kt CO2e

SOURCE: CRU's Emissions Analysis Tool

Questions:

5) Do you believe that using EAT as our primary tool to identify where green aluminium is produced is the right approach? Or do you believe other methods should be used?

6) If you believe EAT is not sufficient, could you suggest alternative tools we could use?

A brand-based assessment

As we explained earlier in this paper, many producers have released low-carbon brands in recent years but some of these brands come from smelters that emit more than our low-carbon threshold. Indeed, a smelter that uses predominantly gas as its source of power and therefore emits more than 4 tonnes of CO2e per tonne of aluminium, might be using renewable sources for a small part of its production. This would qualify as low-carbon aluminium and should be accounted in our assessment although the smelter overall emits over the threshold.

Questions:

7) Are you in favour of a brand-oriented assessment that would also look at smelters that emit above our threshold as long as the aluminium in question is green?

4 An upcharge over ingot, not VAP

Other market sources have suggested that the green premium could be an upcharge over primary ingot and/or value-added products (VAP) such as billet, primary foundry alloys, wire rod and slab. However, we believe the green premium should be an upcharge over ingot only. This is because all physical transactions are priced as LME + regional ingot upcharge + VAP upcharge if applicable. Therefore, it is more natural the green premium comes after the ingot premium, and before any VAP surcharge.

Questions:

8) Do you agree with the approach that a green premium should be an upcharge to ingot only or do you think there should be different green premiums according to the shapes?
9) If you think there should be different green premiums across all VAP shapes, could you express your view and why?

5 A quarterly assessment involving the entire value chain

We think one assessment every quarter should be sufficient for low carbon premiums, at this stage. However, we do not rule out the possibility to do more frequent assessments in the future if market liquidity allows.

As for the process, the assessor will contact smelters who, at the time of the assessment, qualify under the 4 tonnes of CO2e per tonne of aluminium threshold. The assessor will then contact the relevant smelters and ask if a green premium is applied to any product. The levels will be recorded, and CRU will average and use its expert judgement to determine the premium level. If our discussions with producers reveal that no premium is charged for low carbon aluminium, CRU will record the value as nil or $0 /t.

The price assessor will also collect information from merchants who sell metal from smelters, which qualify under the low-carbon definition; and consumers who specifically request for low-carbon aluminium. Indeed, talking to consumers is key as we believe more and more will be keen to pay a premium for their metal as a way to offer hard evidence to their own customers that they are buying green.

CRU aims to build a solid list of data providers from all parts of the value chain and will welcome any subscribers willing to participate in our green premium assessment.

For the determination of low-carbon premiums, we will only consider verified transactions. This means that the price assessor will need to see supporting documentation, such as extract of contracts, to be able to account for a premium in their calculation. We believe this is a necessity, especially early in the process, due to the market-sensitive nature of low-carbon premiums.

The premium shall be expressed as an upcharge in dollars per tonne to the ingot premium, plus any applicable VAP surcharge as follows:

LME + ingot premium + low carbon premium + VAP premium

The first region that we will assess low carbon premiums for will be Europe and we will consider adding other regions such as the US or Asia depending on market liquidity.

Questions:

10) Do you think a quarterly assessment is sufficient, or do you think we should do more regular assessments?
11) Do you think a zero/nil value should be recorded as a premium or instead should be ignored?
12) Do you agree with the principle that all parties involved with low-carbon premiums should be contacted for the assessment and not just producers?
13) Would your company want to participate in this project and become one of CRU's data providers?
14) Do you agree with us starting to assess premiums only in Europe first or should we include other regions? If so, which ones?

6 Contract Specifications

In summary, below is what we believe should be the contract specifications related to green premiums.

Low-carbon premium on primary aluminium ingot (Europe)

Material:	99.7% minimum LME high-grade aluminium
Frequency:	Quarterly
Currency:	US dollar
Weight Unit:	metric tonne
Size:	Typical volumes 100-1000 tonnes.
Timing:	Prompt business for up to 7-30 days ahead.
Pricing:	Premium above LME cash + Rotterdam duty-paid premium + VAP surcharge
Emission:	<= 4 tonnes of CO_2e per tonne of aluminium produced

I would like to thank everyone who wants to participate in this very important project for CRU.

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