



DEMAND SCENARIOS FOR ASI **ALUMINIUM**

SEPTEMBER 2021

A CONFIDENTIAL
REPORT PREPARED BY CM GROUP FOR
THE ALUMINIUM STEWARDSHIP INITIATIVE



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TABLE OF CONTENTS

GLOSSARY OF TERMS	ii
EXECUTIVE SUMMARY	1
Overview	1
The View From Within China	3
Implications for ASI standards, uptake and future focus	5
BACKGROUND	7
METHODOLOGY	8
On Certification	10
KEY FINDINGS - ROW	10
On Decarbonisation	11
On Scrap and Recycling	12
KEY FINDINGS - China	13
Aluminium Finished Products Producers	15
Architectural Aluminium Extrusion	15
THE OUTLOOK FOR ASI CERTIFICATION IN CHINA	15
Multiple-Industry Aluminium Extrusion	16
Aluminium Flat Rolled Products	16
Primary and Secondary Producers	16
Auto Original Equipment Manufacturers (OEMs)	17
Auto Parts	17
3C Producers	18
Electric Wire and Cable	18
Recyclers	18
APPENDIX A - WORD DATA	19
APPENDIX B QUESTIONNAIRE TEMPLATE	23

GLOSSARY OF TERMS

Term	Definition
BRI	Belt and Road Initiative
CoC	Chain of Custody
China Double Control Targets	Total annual energy consumption and energy consumption intensity (per unit of GDP)
CNIA	China Non-Ferrous Industry Association
ESG	Environmental, societal and governance
ETS	Emissions trading system
FRPs	Flat rolled products
HRW	Human Rights Watch (NGO)
IPCC	Intergovernmental Panel on Climate Change
IRMA	The Initiative for Responsible Mining Assurance
ISO	International Organization for Standardization
LME	London Metal Exchange
OEMs	Original Equipment Manufacturers (usually refers to car makers and other finished products producers)
MIIT	China's Ministry of Industry and Information Technology
MTPY	Million tonnes per year
REACH	Registration, evaluation and authorization of chemicals (EU chemicals management legislation)
Scope 1 Emissions	Direct emissions from owned or controlled sources
Scope 2 Emissions	Indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reported company
Scope 3 Emissions	All other indirect emissions that occur in a company's value chain*
SEEE	Shanghai Environment and Energy Exchange
China's Twin Carbon Goals	Carbon peak emissions before 2030 and carbon neutrality by 2060

* <https://ghgprotocol.org/scope-3-technical-calculation-guidance>

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EXECUTIVE SUMMARY

2





EXECUTIVE SUMMARY

2





EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

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these systems will evolve and whether they will be adopted in some form by the industry over the longer-term.

There is a sense that the focus of certification systems of the future need to move beyond measuring and comparing, for example, only the performance of specific operations (“what’s happening in your factory?”). They must provide the assurances required by multiple stakeholders and address the gaps that exist in slow-moving and increasingly inadequate regulatory frameworks. As they do, these systems are likely to be viewed as being less open to interpretation

and more inclusive, especially to the sectors of the industry more exposed to constraints placed on them by geographic location.

Also emerging is the growing influence of capital markets in driving responsible sourcing behaviour. Much of the industry sees this influence as likely to increase and, as it does, businesses will be required to either comply with capital market certification requirements or face the prospect of higher borrowing costs and limited funding options.

THE VIEW FROM WITHIN CHINA

China’s aluminium industry is typically less knowledgeable about, and less focused on, responsible sourcing; most of the more than 40 Chinese companies interviewed for this project (out of thousands in the industry) had only limited knowledge of the ASI Performance Standard and Chain of Custody Standard (CoC) and its assurance and certification processes. Despite this, almost all expressed an appetite for, and a willingness to learn more about, the potential benefits to their businesses, especially those with either export aspirations or import reliance.

China’s automotive sector, mostly through its association with European car manufacturers with production bases in China such as BMW and VW, typically have a deeper understanding of ASI certification. This has been an effective means of educating the sector and rolling out ASI certification across China’s enormous OEM, Tier-1 and Tier-2 supply base.

The responsible sourcing focus in China today is clearly on President Xi’s ‘twin carbon goals’, (peak emissions before 2030 and carbon neutrality by 2060). China’s aluminium industry has already begun to align itself with these goals, with several producers already taking major steps to achieve them. In a presentation to Fastmarkets 2021 Aluminium conference, the world’s largest primary aluminium producer, China Hongqiao Group, announced the relocation of over 2 MTPY of smelting capacity to China’s southern

Yunnan province to take advantage of ‘green’ hydroelectric power, as well as the establishment of the Yunnan Green Aluminium Industrial Park. By relocating this capacity, the company has taken a significant step toward achieving President Xi’s twin carbon goals and has also likely passed its own peak carbon emissions.

Despite the laser-focus on President Xi’s twin carbon goals, CM’s industry discussions in China concluded a growing list of export-orientated aluminium producers is likely to seek independent certification in the future, most likely over the three to five-year horizon, presenting fertile ground for ASI certification uptake. Our China analysis, which included an in-depth and quantitative analysis of its smelting sector, conclude that by 2030, ASI certifications in this sector alone could potentially increase by a factor of eight on an annual production volume basis (over 2020 levels).

1 China Hongqiao Group - “Moving Beyond 2020” presentation to Fastmarkets Aluminium conference, August 2021

Word Cloud Diagram - Responsible Sourcing in China's Aluminium Industry

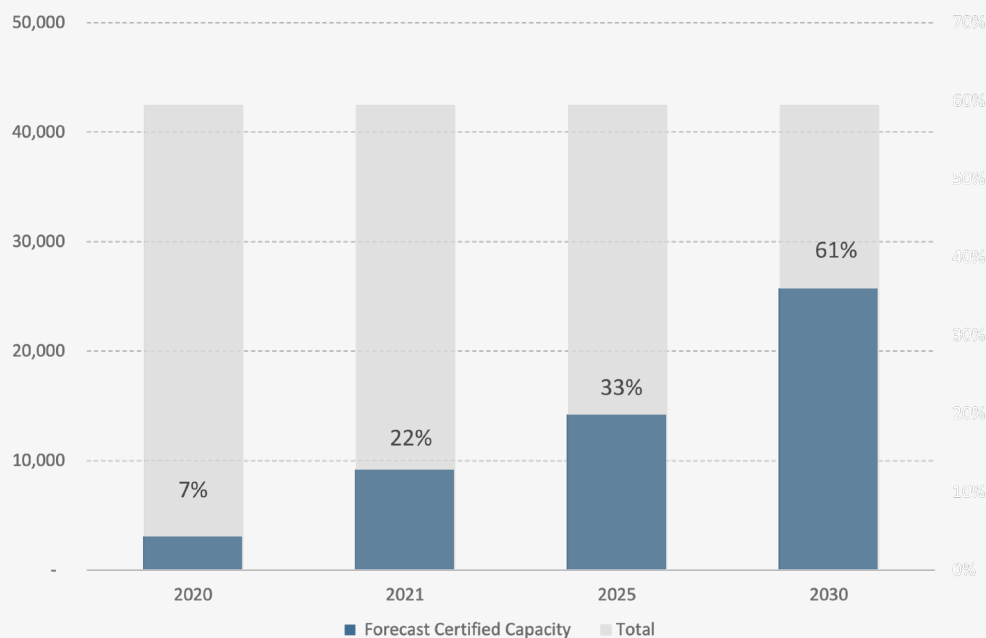
[illegible]

Forecast for China's Primary Aluminium Smelting Capacity Certified Against ASI Performance Standard to 2030' (kt/yr)

Source: CM Group

The chart is a stacked bar graph with the x-axis representing years (2020, 2021, 2025, 2030) and the y-axis representing capacity in MW (0 to 50,000). Each bar is divided into two segments: a dark blue segment at the bottom representing 'Forecast Certified Capacity' and a light gray segment at the top representing 'Total'. The percentage of forecast capacity relative to the total is labeled on each bar: 7% for 2020, 22% for 2021, 33% for 2025, and 61% for 2030. The total capacity remains constant at approximately 42,000 MW across all years.

Year	Forecast Certified Capacity (MW)	Total Capacity (MW)	Forecast as % of Total
2020	~3,000	~42,000	7%
2021	~9,000	~42,000	22%
2025	~14,000	~42,000	33%
2030	~25,600	~42,000	61%



IMPLICATIONS FOR ASI STANDARDS, UPTAKE AND FUTURE FOCUS

- The overwhelming majority of ROW interviewees contacted for this study demonstrated a high level of awareness of ASI performance standards and certification. Further, most recognise (and value) the role of independent, third-party certification in driving positive change in the future and see the ASI as uniquely positioned to play a major role in driving that change.
- China's vast number of aluminium producers and fabricators have a different focus, thus they are typically less informed about responsible sourcing initiatives outside China. This includes ASI certification. However, they demonstrate a willingness to learn and, ideally, participate in the future, particularly organisations already exporting or aspiring to export aluminium products to world markets.
- Many in the industry caution that certification must be aimed at driving positive change along the full value chain, 'from mine to market', rather than focus on specific segments or particular sustainability measures alone. It requires a collaborative, industry-wide, multi-stakeholder approach, based on effective education programs and with clear and unambiguous responsible sourcing terminology, standards and certification procedures at its core. Scope boundaries at each major processing stage are essential.
- There is a strong industry focus on the primary aluminium smelting sector, driven by its highly energy intensive electrolysis production process and resultant high scope 1² and scope 2 carbon emissions. This runs the risk of creating blind spots in certification for other parts of the industry.
- Certification systems must capture all relevant ESG issues, not just those attracting attention from the industry at any given moment, or those pushed by the most vocal groups. They must also address the ESG issues the industry currently considers as intangible, too difficult or less important. Over time, they are unlikely to remain so.
- Certification is viewed as complex and expensive. It is unrealistic to expect, for example, OEMs, construction companies, phone makers, soft drink producers or any other specific industry group to take on the cost burden of certification alone. It requires a holistic, industry-wide, globally focused approach, one with which the ASI is well suited and well-aligned.
- Industry Associations, although seen as potential leaders of global certification initiatives, exist principally to serve members in specific geographic locations, which creates a natural conflict and therefore a limitation to their influence. The ASI is differentiated in this respect, as it is positioned as a global multistakeholder organisation with an established, industry-wide certification focus.
- Variance in certification uptake within and between key market sectors and geographies is likely to remain a feature, given the different influences, understanding and competitive tensions within the sectors themselves and the disproportionate impact of different downstream customer groups on each.
- Responsible sourcing certifications are likely to play an increasingly influential role in capital markets. As they do, opportunities will emerge for the ASI to integrate certification systems into capital allocation and other project due diligence procedures.
- Similarly, global trading houses are acutely aware of the opportunity presented by strong demand growth in 'green' or 'responsibly sourced' metal and are positioning their businesses accordingly. This will undoubtedly lead to the need for greater transparency in sourcing and the assurances accompanying third-party certification.
- Technologies to transfer and assure the veracity of information (on performance, sourcing and other product and process qualities) are moving fast – molecular traceability, blockchain and other emerging technologies offer a glimpse into the future of product documentation. On face value at least, they offer appealing and effective solutions to some of the challenges facing responsible sourcing certification in the future. But there is a need to define, harmonize and have in place systems to ensure that the data and assurances that populate such systems are relevant, usable and verified.

2 Scope 1 and 2 definitions: www.carbontrust.com

Global awareness of climate change, the 'circular economy', biodiversity, sustainability, human rights and the growing importance of ESG policies are, collectively, shining a spotlight on certification in the global aluminium industry. Increasingly influential consumers, outspoken individuals and industry leading lights are all adding to the chorus calling for a more coherent and coordinated industry approach to responsible sourcing.

This investigation provides strong evidence to support the view that the global aluminium industry is poised to significantly increase demand for true 'ASI Aluminium'. Realizing its full potential will require a collective, integrated, industry-wide, responsible sourcing vision for the future based on clear, unambiguous definitions and agreed, industry-wide certification procedures.

The global aluminium industry views the ASI as uniquely positioned to play a lead role in developing that vision and, in doing so, consolidating its position as the industry's premier certification body, broadening its sphere of influence and achieving significantly higher uptake in certifications as a result.

The ASI may well have arrived at the right place, just at the right time.

BACKGROUND

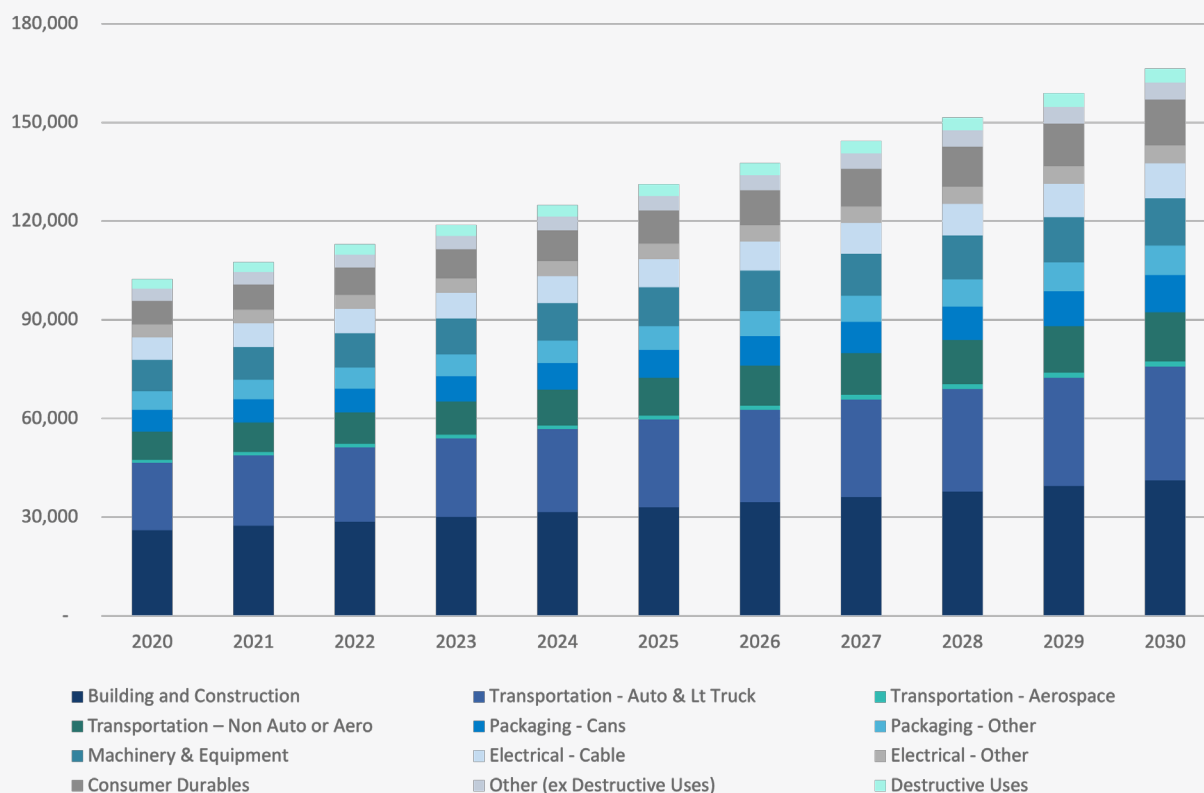
Global aluminium demand is forecast to grow strongly over the next decade and beyond, driven by growth in both existing and emerging markets,

as well as in new applications favouring the unique combination of properties offered by aluminium and its alloys.

FIGURE 5

Forecast Global Aluminium Demand Growth to 2030

Source: IAI



However, the profile of growth is likely to depend on the ability of suppliers to demonstrate that their metal, indeed all their raw materials, have been 'responsibly sourced'.

The objective of this project was to establish the likelihood of a strong link between global aluminium demand growth and the potential for true "ASI aluminium" demand growth, in a global market clearly shifting toward responsibly sourced material.

This project was executed during a period of significant global uncertainty, driven not only by the ongoing COVID-19 pandemic, but also by the release of the IPCC's '6th Assessment Report on Climate Change'. Several interviewees made clear reference to this publication, which had influenced their thinking and their views, particularly around the need for an accelerated timetable for change.

Although uncertainty surrounding the pandemic has mostly pushed out corporate horizons, this and other similar reports have pressed home a profound urgency for change.

The key findings contained in this report were compiled from the more than 75 structured interviews conducted across the global aluminium industry; from smelters and semi-fabricators, through each of the key global market segments and including the major metal forming groups and finished products groups. A combination of anecdotal evidence provided by the interviewees and the results from CM's own quantitative estimates (China) and internal projections have been used.

China was covered extensively, with over 40 interviews conducted, given its supply dominance and growing industry influence.

3 <https://www.ipcc.ch/report/ar6/wg1/>

METHODOLOGY

CM took the approach of dividing the world into two distinct geographic groups, namely China and Rest-Of-World (ROW), reflecting China's disproportionately large aluminium supply and manufacturing base. Data and key findings were assimilated on the basis of each of these two groups.

CM conducted general calling surveys across China, as well as in-depth phone/video interviews with both Chinese and ROW industry participants. As China's aluminium industry is by comparison younger and mostly domestic market orientated, we took a different approach to interviews; Chinese producers mostly servicing its domestic market were questioned about their understanding of the requirements to operate in China and their views about ISO and any other applicable standards, which are typically viewed by Chinese producers as both mandatory and a goal to be 'achieved' rather than a system in which to participate over the longer-term.

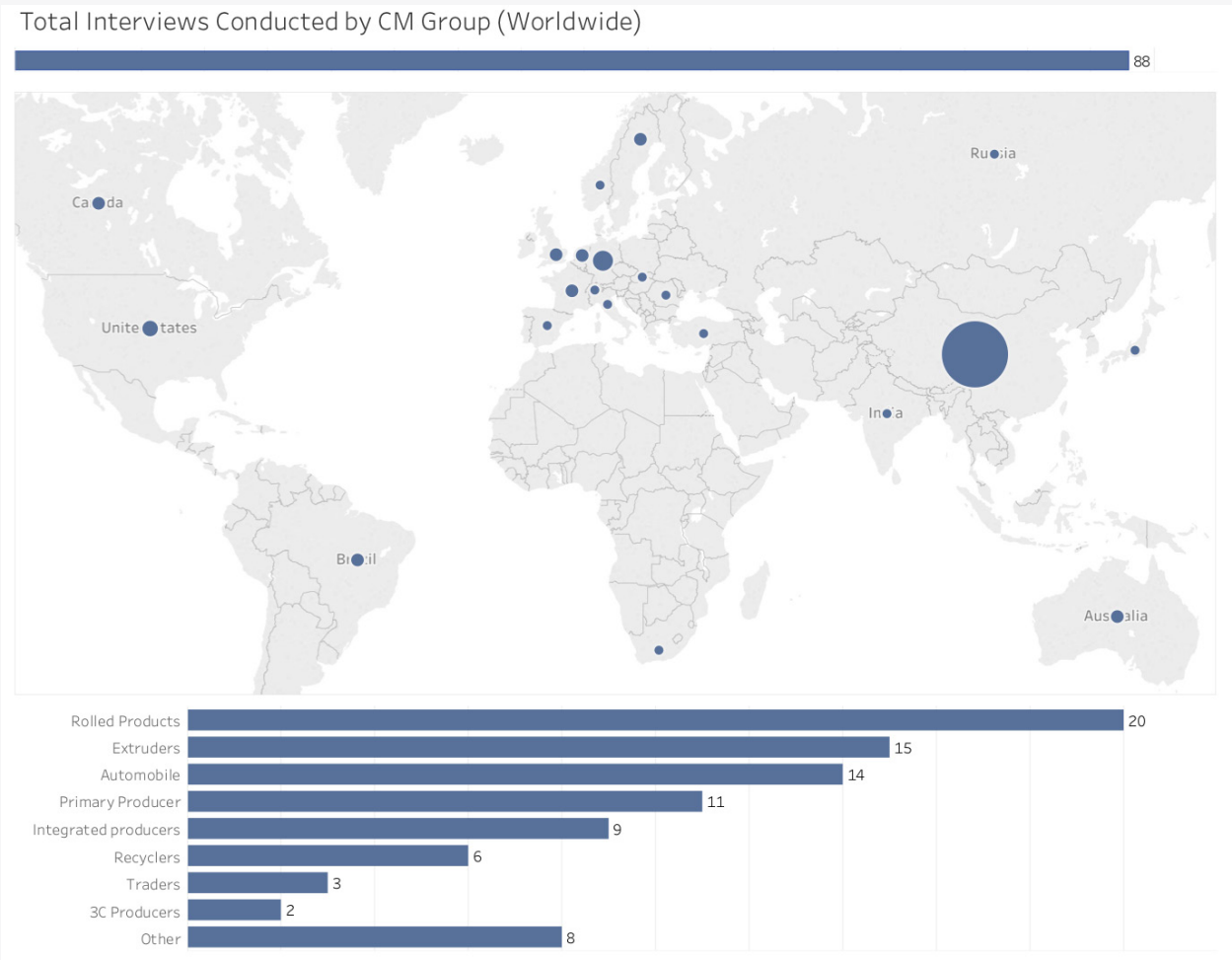
Producers in economies such as the EU and US were approached from a position of being more advanced in their knowledge and typically with a deeper understanding of responsible sourcing and ASI certification. They were asked more open-ended questions, targeting their knowledge of ASI Performance Standards and Chain of Custody (CoC) certification, other similar systems and their understanding of related industry issues, such as responsible sourcing, sustainability and the future for 'green aluminium'. Questioning of this group also explored views on the outlook for certification in the aluminium industry of the future.

ROW interviewees were mostly receptive and engaging, although the nature of the subject matter made it difficult at times for many to detach personal views from corporate or general industry views. The level of engagement typically varied depending the interviewee's position within an organization.

FIGURE 6

Geographical Spread of Interviews and Major Industry Group Coverage

Source: CM Group



Chinese interviewees were typically less receptive and, outside OEMs and other Chinese companies with a strong export focus, were less knowledgeable about responsible sourcing and ASI certification.

In general, it was a pleasing level of receptivity across the industry, with a particular sense of passion shown by several interviewees to whom we are grateful for sharing their views over extended periods.

KEY FINDINGS - ROW

Recognition of ASI's brand is strong across mature aluminium producing and consuming regions and the ASI is accepted as the "dominant" provider of third-party certification for responsibly sourced metal (and precursor raw materials bauxite and alumina). There is generally a high level of acceptance of external ASI certification across the global aluminium industry.

ASI's level of recognition does vary within and between some key global market sectors, with integrated, smelting, packaging and automotive sectors showing the highest levels of recognition and understanding, and small to mid-sized manufacturers and Tier 1 and 2 suppliers to the automotive sector registering lower recognition.

Considering the broader issue of responsible sourcing of materials (outside the ASI), respondents were familiar with several other legislative and voluntary initiatives such as Critical Raw Materials, LME Responsible Sourcing, REACH, IRMA and Conflict Minerals. None is seen as a genuine competitor to ASI certification in the aluminium industry, given the broadness of their approach and the lack of relevant and applicable detail to the aluminium industry.

Many ROW respondents referenced ASI's certification and standards as an 'excellent learning process' and an opportunity to reflect internally and make improvements. Many saw

certification by the ASI as an important step in the journey of responsible sourcing and participation in the circular economy, rather than as a one-off achievement which, once achieved, could be mostly ignored.

However, a divergence of views did emerge amongst respondents relating to the definition of 'responsible sourcing' and, as a result, how the certification process should evolve. Many interpret responsible sourcing as a proxy for carbon dioxide emissions or, as was often the case for US producers, 'sustainable production', by which they meant a carbon footprint. This is evidenced by many companies now publicly disclosing carbon emissions data, along with a reduction target, but little information beyond this in terms of a broader responsible sourcing mandate.

Other, more pro-active organisations make reference to a wider definition of responsible sourcing, which invariably includes references to certification of upstream suppliers, 'line-of-sight' compliance, emerging technologies and specific environmental compliances, such as waste water discharge.

Other major findings from ROW interviewees are presented below, not as an exhaustive list, but as a representative cross section of the diversity of views

ON CERTIFICATION

- Interviewees showed strong agreement that third-party certification has a clear role to play, given the complexity / volume and cost of the work involved. However, many companies are not ready or willing to trace further upstream, as they believe it is not their responsibility to do so.
- Different market sectors take different views of ASI certification; some view it as necessary only to satisfy the requirements of their end customers and/or as an opportunity to differentiate themselves from competitors. Others view certification as a 'licence to supply', in other words an essential requirement to participate in the industry.
- There is growing industry interest in Chain-of-Custody (CoC) certification, particularly within the packaging and automotive sectors, although outside of these sectors, we found interviewees to be less informed. We identified an opportunity for further education about CoC certification amongst these other sectors.
- Although different industry groups display different levels of understanding about responsible sourcing, there is a clear need across the industry for more education and a more consistent approach in the way it is delivered. Targeted education programs could potentially accelerate the rate of certification uptake, especially in market sectors such as electrification and cabling, where the dynamics around market pull appear to be less influential than they are in sectors such as packaging and automotive.

- Some companies are going it alone - doing what they think is necessary to establish their own standards, or establish their own code of conduct, in a market they see as 'de-commodifying', which may cause confusion and replication.
- Most respondents believe it will take three to five years, maybe longer, to see customers / markets / investors favour ASI certified aluminium, as "opinions change quickly, [but] actions follow much slower". Responsibilities to assess suppliers should be a joint and coordinated effort. One certification system will be enough.
- Interviewees closest to ESG corporate policy development have a strong view that the industry must embrace a 'traceability' approach - bauxite residue management, bauxite transport (imports and exports), alumina refining were identified as key issues that must be incorporated under a 'responsible sourcing' mandate. Accessing all these elements is a complex issue, for example management of the specific risks associated with bauxite residue management are hard to compare/benchmark between entities.
- Legal obligations, banking sector regulations, associations regulations, company's own "Code of Conduct" along with other standards such as ISO standards are all seen as a kind of 'licence to operate' in EU, all contain some elements of ESG policies.
- Some see CoC of the entire industrial chain as a kind of panacea. CoC will therefore become more important, especially if the ASI model switches from customer-driven to investor-driven.
- The industry has other options to meet stakeholder expectations to 'go green' apart from acquiring third-party certifications, including greater recycling content, lower CO₂ emissions and targeting perceived industry 'hot spots' along the supply chain, for example bauxite mining in Guinea. Third-party certifications such as ASI should provide the assurance against a set of agreed principles that metal meets the market's evolving expectations. Credibility is crucial in this regard.
- Trading houses bring a unique perspective to certification; most are in constant contact with both buyers and sellers, they operate across many jurisdictions and cover different industries simultaneously. Aluminium traders contacted for this study have already responded to changes in the industry by positioning their businesses to respond to increasing demand for 'green aluminium' and to requirements for ASI certified metal. They see a clear role for third party certification systems, as well as a need for the industry to work as one. This means consolidation of its responsible sourcing obligations from 'miner to market'.

ON DECARBONISATION

- A large cohort of interviewees sees the current climate crisis as the main driver of change in the aluminium industry - "it will only get worse from here".
- Many in the industry view CO₂ footprint as the only genuine measure of substance in responsibly sourced, or sustainably produced, aluminium. This comes from a view that low carbon aluminium (including recycled material) holds the future for the industry. Other ESG issues, for example the displacement of indigenous people by mining operations will, over time, become more significant.
- More than 50% of EU demand for semi-fabricated aluminium products is satisfied by imports, predominantly from China. Imports of primary aluminium into the EU are sourced from a range of countries and regions including Russia and the GCC. These suppliers are all geographically distant and responsible sourcing is therefore less observable today. Ultimately, however, the consumer will bear the sourcing responsibility.
- In general, scrap is considered a more sustainable product and therefore a better source material than primary in terms of carbon footprint. In reality, the global

scrap market is complex and nuanced. Cost and availability are currently the critical purchasing criteria, however, the market is evolving and, as it does, its nuances are likely be considered more carefully. Still a lot of room for improvement in terms of ASI business exposure - maybe in the Chinese market.

- A preference for “green” products is clear. “In Europe one has to align, but also turn it into an opportunity”.

ON SCRAP AND RECYCLING

- The attractiveness of well-sorted scrap as a source of ‘low-carbon feedstock’ into finished aluminium products is almost universally acknowledged and, as such, is a clear focus across the industry. The low-cost recyclability of aluminium is also a powerful message to consumers and a strong selling point for the industry.
- ROW industry commentary around scrap and recycling gravitated quickly to definitions, specifically 1) how to define and account for pre and post-consumer scrap in carbon footprint calculations, and 2) what methodology should be used to calculate final recycled metal content. There are clearly different views about these issues across the industry, which causes confusion, as well as some frustration, particularly in sectors where scrap content plays a critical role in certification.
- Several interviewees held the view that the global aluminium industry runs the risk of damaging its own credibility if scrap and recycled content definitions open the door to misrepresentations, accurate or otherwise, to be made about carbon footprint, especially relative to competitor materials.
- A number of respondents viewed percent scrap content in finished products as the single most important measure of decarbonisation, although this view was biased toward recyclers and finished products producers who typically held the strongest views about scrap content and held strong positions in accessing high quality, well sorted scrap in a world in which availability of such supply is both constrained and unequal.

KEY FINDINGS - CHINA

Representing well over half the world's primary production and fabrication of aluminium, China was a key focus for this study.

With China's dual carbon policy (peak commitment by end-2030 and carbon neutrality by end-2060), Chinese authorities at all levels of government are focusing on the "double control" for energy consumption and pollution emission. Of all the nonferrous metals industries, aluminium producers in China are now facing increasing pressure from the government, associations such as the CNIA, the market (export oriented) and their peers, domestically and globally.

China's national carbon Emissions Trading Scheme (ETS) commenced commercial trading on the platform run by the Shanghai Environment and Energy Exchange (SEEE) during July 2021. Although aluminium smelters have yet to be included in the scheme, the industry takes the view it is highly likely to be included in the near future, perhaps as early as next year. As a precursor, the Province of Fujian commenced a trial carbon emission quota scheme for its aluminium smelters dating back to 2016, the findings from which will be used to support the industry as it enters the scheme.

It is likely that more Chinese smelters will begin to take action over the short-term to cut their carbon emissions as they face the prospect of higher costs.

Although many of the interviewees in China had limited knowledge of the ASI, they are generally of the view that the carbon emissions reduction will be a trend in the future and ASI certification could help. Notably, most of the interviewees expressed a strong view that they will seek certification if they are required to do so by their downstream customers and/or by government policy.

Other key findings from the Chinese interviews are presented below, again, as a representative cross section of responses

- Chinese companies targeting China's domestic market have a clear focus on costs and profitability. Their obligations toward responsible sourcing are viewed through the prism of maintaining lawful operation; they are unlikely to have a clear responsible sourcing policy beyond what is required by the relevant authorities.
- Almost all expressed a willingness to learn about the ASI and responsible sourcing should it be required by either the authorities or by their customers.
- Chinese companies with a clear focus on the export market are typically more educated about the ASI and responsible sourcing. They are more likely to have documented responsible sourcing policies and they recognise the need for certification to serve the international market.
- The presence of multi-national aluminium companies and OEMs in China, such as BMW, VW and Granges, has driven Tier-1 and 2 suppliers toward responsible sourcing and 3rd party certification.
- Chinese producers familiar with ASI and other certification systems tend to view them more as a means to an end (exporting) rather than an on-going process of participation and involvement.
- The government is determined to strengthen its decarbonisation efforts. In May 2021, China's NDRC reiterated the urgency and importance of "Double control of energy consumption work" in all provinces and regions. Producers in provinces with increased indicators of energy consumption during Q1 2021, such as Zhejiang, Guangdong, Guangxi, Yunnan, Qinghai, Ningxia and Xinjiang were forced to curb high energy-intensive industries. Guangxi and Yunnan are relevant given they are provinces where hydro-electric power is used for primary smelting, raising the prospect that they may not provide a consistent, long-term alternative to traditional coal-fired electricity generation for aluminium smelting.
- With primary aluminium capacity in China now capped at 45 MTPY, Chinese producers may seek to build smelters overseas, a strategy encouraged by the government under its "BRI"
- ISO 9001, ISO 14001, China primary supplier CO₂ certificate, ISO almost obligatory- but is considered as a licence to operate that adds no extra value.
- Most Chinese primary Al producers and Al fabricators interviewed had limited knowledge of the ASI and its mission

scheme (Belt and Road Initiative). Any such strategy would need to be consistent with China's pledge not to build any more coal fired power stations abroad.⁴

- Deteriorating domestic bauxite grades and tightening domestic ESG policies may also drive greater Chinese investment in alumina refineries outside China. The responsible sourcing of bauxite to feed these refineries, although not discussed in detail during this assignment, was raised as a potential issue in the sustainable development of the industry.
- Increasing availability of high quality scrap in China through its focus on the 'circular economy' may present an opportunity to significantly increase recycling rates, given typically high end-of-life collection rates, shorter building lifetimes and the potential for greater closed loop recycling systems to be implemented.

⁴ <http://www.scio.gov.cn>

THE OUTLOOK FOR ASI CERTIFICATION IN CHINA

This section provides further commentary around China's current sentiment toward certification from within each of its major product groups.

ALUMINIUM FINISHED PRODUCTS PRODUCERS

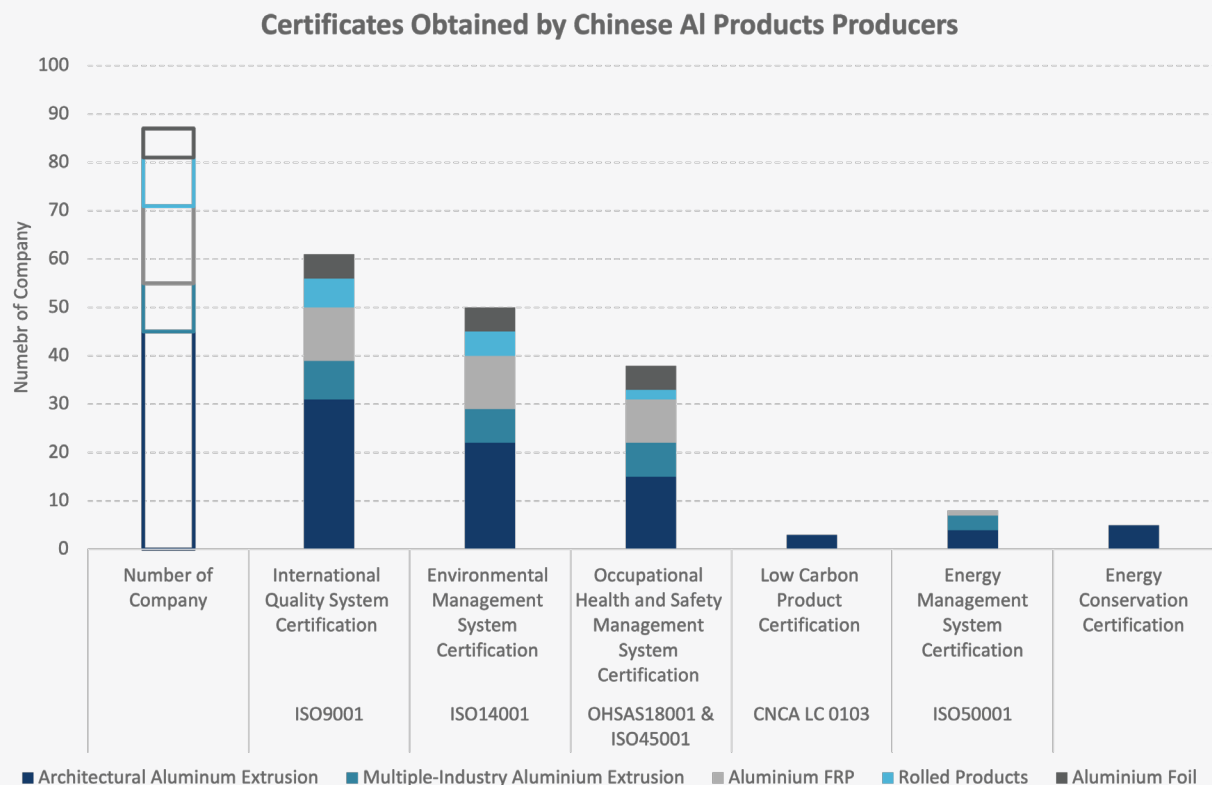
Most of China's domestic market-focused finished products producers had little or no knowledge of the ASI. Their focus is clearly on profitability and downstream buyers' demand, who also saw little need at this point for any third-party international certification.

Their certification focus has been the ISO system, particularly ISO 14001, which is sufficient for them to maintain a licence to operate. That is to say, they would be unlikely to consider signing up to an established international certification system unless it became a requirement by either the government or their downstream customers.

FIGURE 7

Certifications Achieved by Chinese AI Finished Products Producers

Source: CM Group



ARCHITECTURAL ALUMINIUM EXTRUSION

China's architectural aluminium extrusion producers held a similar view toward 3rd party certification as finished products producers. Their clear focus is to do whatever is necessary order to operate within the law, no more. This includes

the government's regulations regarding carbon emissions.

As an industry, extruders servicing China's domestic market have yet to receive any clear requirements from their customers, nor do they

impose any such requirements on their raw materials suppliers.

Most Chinese extruders are certified with ISO 9001 and ISO 14001, which they tend to view more as a box-ticking exercise, rather than an ongoing process of continuous improvement. In general, they do not have any longer-term plans to apply for new certificates and take the view that the ISO

certificates are more a means of satisfying their customers, rather than having any fundamental impact on decarbonisation.

One of China's largest real estate developers shared this sentiment, expressing their concern about the quality of finished extrusions. Beyond this, they have no other procurement requirements.

MULTIPLE-INDUSTRY ALUMINIUM EXTRUSION

Chinese extruders targeting domestic industries other than building and construction, such as transport and machinery, take a more informed approach to responsible sourcing. They are more aware of environmental protection issues, which are typically brought to their attention by their downstream customers.

Producers targeting the export market have much stricter requirements for both quality and 'responsible procurement'. Different industries have industry standards, although all appear to have originated from ISO9000.

For example, in the rail sector, the IRIS (International Railway Industry Standard) is used, while for auto industry, the IATF16949 is used. Export products must comply with the terms and regulations of destination countries, such as the EU as they must compete with their international peers in the global market, leading to more exposure to international standards and certification systems such as the ASI.

ALUMINIUM FLAT ROLLED PRODUCTS

China's domestic aluminium plate producers generally hold a negative view about certification systems that don't have a clear benefit to their business. Plate producers are mainly focused on product quality for now.

Although several of China's larger foil producers are ASI members, many smaller foil producers reported they are yet to seek any specific ASI certification. Again, apart from mandated ISO certification or other requirements demanded by downstream customers, they currently see little value in 3rd party certifications.

So far, China's domestic FRP producers have yet

to receive any specific certification requirements from their customers. Overall, China's domestic FRP producers are considering increasing the use of scrap as the most effective means to reduce the emission of CO₂.

Foreign clients tend to have stricter requirement on responsible sourcing. But what they are doing is to just evaluate with their own way by making on-site inspections. This is an example of entities doing their own thing by setting up their own standards and code of conduct.

ISO 14001 is currently the only environmental certification required and most producers have it.

PRIMARY AND SECONDARY PRODUCERS

China currently has over 100 operating aluminium smelters, concentrated in provinces offering low-cost electricity and located close to end markets. The archetypal Chinese smelter sells into its domestic downstream market and is 'quality certified' (usually ISO) as mandated either by

government requirements or as a requirement by customers. In most cases, certification is viewed by smelter operators as nothing more than an increase to the cost base, with no real tangible benefits to the operations.

Vertically-integrated Chinese smelter operators targeting finished product export markets tend to take a more informed, although somewhat circumspect, view of certification; their level of awareness is significantly higher, they sense the trajectory of the global industry outside China and understand that certification is likely to become an essential requirement - a ticket-to-play - in the global market, rather than simply a regulatory imposition.

The incentive for ASI certification is also a pre-requisite for many of these larger Chinese producers required by their international clients, such as Tetra Pak, Budweiser, CocaCola, Audi and others. It also provides the legitimacy to compete with multi-nationals such as Noveils and Hydro.

Despite this, there remains a strong sense that

the prospect of business competitiveness i.e. an opportunity to differentiate and to compete in international markets, still drives their behaviour.

China's domestic recyclers have a strong focus on cost; it is clearly the most important issue in the procurement process today and drives much of their behaviour. Some international customers, such as the Ford Motor Company, do impose responsible procurement requirements on recyclers, in which case the recyclers must (and do) meet the specific certification requirements.

Our interview feedback suggests most of China's recyclers would be open to ASI certification should their clients require it. Some mentioned they may even receive support from either the government or from industry groups such as the CNIA to become certified.

AUTO ORIGINAL EQUIPMENT MANUFACTURERS (OEMS)

For China's domestic OEMs, decarbonization targets and government incentives are changing consumer behaviour, which is forcing OEMs to rapidly shift to New Electric Vehicles (NEVs). Although other incentives are also in place, such as increases in scrap and recycle content of vehicles, decarbonisation and the significant industry shift to NEVs is consistently stated as the most influential force driving China's domestic auto industry.

They have yet to find any effects on their procurement caused by the implementation of relative certificates as the suppliers generally are large companies that have comprehensive certificates.

Compared with domestic OEMs, foreign OEMs with production facilities based in China typically have a deeper level of knowledge about certification, with several already ASI certified. In many instances the foreign OEMs have also introduced their suppliers to ASI certification, which has been an effective means of educating the industry and increasing certification rates.

Similar to their foreign contemporaries, China's auto producers generally want to see their industry thrive and grow in the circular economy and behave in a responsible way. They see the merits of a third-party certification system, especially as they engage more with the ROW, and are willing to explore the benefits.

AUTO PARTS

ISO certification remains the base requirement for China's Tier-1 and Tier-2 auto suppliers, although those supplying foreign OEMs typically have, or are at least more aware of, ASI certification. Tier-1 and tier-2 suppliers in China have yet to implement such certification requirements further up their supply chains. However, they do have some specific environmental requirements they impose on their suppliers, particularly around water treatment and solid scrap disposal.

Some producers made mention of environmental protection policies and their requirements as parts producers, although they see the requirements (in their current form) as difficult

to implement in reality. Cost of compliance was regularly mentioned as an impediment to greater uptake of any forms of certification.

Parts suppliers currently have no specific requirements on the means of energy generation used for production, because they feel it would be difficult to source 'clean-energy' for raw materials production.

Despite the constraints, China's parts suppliers clearly care about environmental issues as they affect their supply chains, in the context of achieving long-term, sustainable procurement.

3C PRODUCERS

'3C producers' typically refers to companies producing Computers, Communication (devices) and Consumer electronics. Compared with international 3C producers, Chinese 3C producers are less educated about responsible sourcing. Based on our interviews, we believe the ASI could be promoted quickly across these industries

compared with other industries. The leading 3C producers classify their suppliers from Star 1 to Star 5. Each supplier will be asked to achieve relative certifications, and it gets stricter with the level of star increases. So far, they have yet to implement ASI certificates and none of their suppliers have heard about ASI yet.

ELECTRIC WIRE AND CABLE

Producers of electric wire and cable procure aluminium rods. They currently do not have requirements on responsible sourcing, nor did they receive such requirements from their customers, no matter from domestic market or from export markets like Central Asia or Africa.

They will consider joining some third-party certificates only if they have received requirements from their customers.

RECYCLERS

The government has now improved the requirements on scrap recycling, requiring all the scrap producers to have relative certificates.

APPENDIX A - WORD DATA

Key Words	Frequency Statistics	Key Words	Frequency Statistics
ASI	69	Emissions	9
Sustainable	38	Human	9
Supply Chain	32	Hydro Electricity	9
Source	30	Industry	9
Standard	29	Issue	9
Carbon	28	Mine	9
Environmental Protection	28	Performing	9
Responsibly	28	Reduce	9
Green	24	Risk	9
Energy	21	Third Party	9
Cost	20	Environment	8
Strategy	20	Environmental	8
ISO	19	Footprint	8
Raw Material	19	Institution	8
Reduction	19	ISO9001	8
Market	18	Prefer	8
Future	17	Process	8
Governmental Requirement	16	Scrap	8
Upstream	16	Time	8
Certificate	15	Aluminium	7
Impact	15	Basic	7
Recycled	15	Claims	7
Change	14	Focuses	7
Supplier	14	Low Carbon	7
Certified	13	Neutral	7
Client Requirement	13	Order	7
Policy	13	Plan	7
Responsibility	13	Regenerate	7
Climate	12	Thermal Electricity	7
Initiative	12	Area	6
Statement	12	Committed	6
Value	11	European standard	6
Customer	10	ISO14001	6
Emission	10	Member	6
Important	10	Motivation	6
Aware	9	Priority	6
Business	9	Quality	6
Carbon Emission	9	Sales	6

Key Words	Frequency Statistics	Key Words	Frequency Statistics
Schemes	6	Challenge	3
Smelter	6	Clear	3
System	6	Code	3
Access	5	Common	3
Battery	5	Cross	3
China	5	Distinguish	3
Clean	5	Ecological	3
Complex	5	Entire	3
Component	5	Ethics	3
Construction	5	Experience	3
Europe	5	External	3
European	5	Field	3
Global	5	Financial	3
Material	5	Forced	3
Moment	5	Foundation	3
Qualification	5	Implement	3
Report	5	Information	3
Social	5	Investing	3
Special	5	Joint	3
Transparent Approach	5	Manufacture	3
Action	4	Margin	3
Assurance	4	Nanshan	3
Balance	4	New Energy	3
Cast	4	OEM	3
Commodity	4	Ordinary	3
Concept	4	People	3
Consumer	4	Plants	3
Criteria	4	Position	3
Incident	4	Possible	3
Managing system	4	Premium	3
Paris Agreement	4	Problem	3
Pressure	4	Producer	3
Short-term	4	Proportion	3
Stream	4	Public	3
Strict	4	Rating	3
Target	4	Regulatory	3
Ambition	3	Reputation	3
Asked	3	Safety	3
Automobile	3	Share	3
Bosch	3	Standard Requirement	3

Key Words	Frequency Statistics	Key Words	Frequency Statistics
Success	3	Lightweight	2
Targeting	3	Loop	2
Technologies	3	Mainly	2
Wind Power	3	Milestones	2
Activity	2	Mobility	2
Actual	2	Natural	2
Alloy	2	Network	2
Audit	2	Off-season	2
Blockchain	2	Part	2
Building	2	Power network	2
Buying	2	Power plant	2
Capacity	2	Price	2
Cell	2	Primary AI	2
Circular	2	Programmes	2
Coal	2	Purpose	2
Commercial	2	QA	2
Concrete	2	Recognised	2
Consumption	2	Relationships	2
Contribution	2	Rolling	2
Core	2	Secure	2
Countries	2	Services	2
Department	2	Smelting	2
Departments	2	Steel	2
Diligence	2	Structured	2
Economic	2	TBEA	2
Efficient	2	Trade	2
Engine	2	Transformation	2
ETC	2	Understanding	2
Factor	2	Vehicle	2
Foundry	2	Verification	2
Fuel Consumption	2	Visible	2
Functions	2	White body	2
Governance	2	Annual	1
Greenhouse	2	Behaviour	1
House	2	Border	1
Human right	2	Circuit	1
Independent	2	Competitive	1
International	2	Concern	1
Interprets	2	Cornerstone	1
Isolation	2	COVID	1

Key Words	Frequency Statistics	Key Words	Frequency Statistics
Description	1	Overall	1
Downstream	1	Packaging	1
Economy	1	Portal	1
Employees	1	Post	1
Expectations	1	Quantify	1
Facilities	1	Restricted	1
Gain	1	Shifts	1
Germany	1	Society	1
Grades	1	Spain	1
Health	1	Takata	1
Intake	1	Tax	1
Life	1	Traders	1
Margins	1	Trusted	1

APPENDIX B QUESTIONNAIRE TEMPLATE

Pre-work

Establish before the interview whether the company is an ASI member.

Determine the market sector the company operates in to choose the appropriate set of questions.

Interview Introduction

Declare at the beginning that the ASI is CM's client, check whether it is OK to proceed on that basis.

Can disclose that a summary of findings will be published by the ASI and we can send a link to the report/release.

Set the scene - the outlook for AI demand is strong, but there is an increasing emphasis on responsibly sourced, low carbon or 'green' AI. It seems therefore likely that for the AI industry to achieve the forecast growth, producers will need to demonstrate that AI has been responsibly sourced.

Perhaps you might be able to explain how your company currently interprets what 'responsibly sourced' means? (both on terms of substance and the assurances that come with responsible sourcing)

Does your company have an ESG, responsible sourcing and/or product stewardship policy? How does it impact the current operations and marketing, business strategy & procurement functions? Can we obtain a copy?

Awareness of Certification

Are there any third party sustainability performance programmes or standards that you are currently aware of or are using or planning to use? If so, which ones? Do they entail and are you seeking verification against such standards? Do they entail and are you seeking certification within such schemes? Do you plan to make claims about your operations or products, within such schemes? What kind of claims? And for what purpose?

Are you aware of the ASIs Chain of Custody (CoC) and Performance Standard certifications and the differences? Can you tell me anything about them?

(Some members may have been 'conscripted' into joining by their suppliers or customers, meaning they have been 'strong armed' into joining - have they already or do they see things changing positively as a result of their membership?

Body of Interview

The questions below are divided into the key categories, depending on the company to be interviewed.

Smelters

Customers - What is your strategy for meeting demands for responsibly sourced metal from downstream? What are they feeling from their customers? What role will the new LME requirements play?

Regulatory - How are you preparing for the responsible sourcing (checks at the border - CBAM and beyond; REACH type regulation)? Regional markets - evolution of the market and how responding; strategic raw material policies, circular economy policies

OEMs (car makers)

What are your strategies for responsible sourcing of aluminium, and/or other metals? How is this balanced with your [changing] requirements for security of supply of raw materials and protecting margins.

Which criteria/topics are the priorities in these strategies (eg CO₂, recycled content, human rights, other?) Are these priorities addressed in isolation or as a complex of issues?

Are these strategies about managing risk (regulatory, reputational, supply chain), or other motivation (e.g. Increased market share, new market access etc)

How far upstream does your focus / due diligence go (eg smelting, mining?)

Does your company have a CO₂ reduction strategy, what is its scope and what milestones are already defined? Is that strategy public (can we obtain a copy or link?).

Are you aware/member of ASI? Please describe your objective, motivation for joining ASI or not?

Are you aware/member of other single commodity value chain initiatives and/or multi-material cross-sectional schemes? Please describe your objective, motivation for joining these?

Do you see that the suppliers tend to use general standards (like ASI) or are they promoting their individual "company standards"? or other?

Do you see any barriers of access or cost by committing to external standards (such as ASI)?

Do you see CO₂ reduction as the main driver of future common standards? What other sustainability issues are going to be important in future?

FRPs (packaging, batteries, construction)

What are your strategies for responsible sourcing of aluminium, and/or other raw materials? How is this balanced with [changing] requirements for increased circularity, access to the materials (including quality scrap)

Which criteria/topics are the priorities in these strategies (eg CO₂, recycled content, human rights, other?)

Are these priorities addressed in isolation or as a complex of issues?

Are these strategies about managing risk (regulatory, reputational, supply chain), or other motivation (e.g. increased market share, new market access etc)

How is consumer behaviour/regulatory shifts/customer & supplier pressure and/or financial services-linked expectations impacting these strategies?

How far upstream does your focus / due diligence go (eg smelting, mining?)

Does your company have a CO₂ reduction strategy, what is its scope and what milestones are already defined? Is that strategy public (can we obtain a copy or link?).

Are you aware/member of ASI? Please describe your objective, motivation for joining ASI or not?

Are you aware/member of other single commodity value chain initiatives and/or multi-material cross-sectional schemes? Please describe your objective, motivation for joining these?

Do you see increased legislative regulations for certain areas in your business (public procurement, CRM or battery related material).

Do you see any barriers of access or cost by committing to external standards (such as ASI)?

Do you see CO₂ reduction as the main driver of future common standards? What other sustainability issues are going to be important in future?

Building and construction

What are your strategies for responsible sourcing of aluminium, and/or other metals? How are specifiers making decisions about responsible sourcing? How are architects making such decisions? How are systems houses? How are customers and building operators? How is this being captured?

Which criteria/topics are the priorities in these strategies (eg embodied energy, CO₂, recycled content, human rights, other?)

Are these priorities addressed in isolation or as a complex of issues?

Are these strategies about managing risk (regulatory, reputational, supply chain), or other motivation (e.g. increased market share, new market access, green building certification etc)

How far upstream does your focus / due diligence go (eg smelting, mining?)

Does your company have a CO₂ reduction strategy, what is its scope and what milestones are already defined? Is that strategy public (can we obtain a copy or link?).

Are you aware/member of ASI? Please describe your objective, motivation for joining ASI or not?

Are you aware/member of other single commodity value chain initiatives and/or multi-material cross-sectional schemes? Or segment-wide such as LEED? Please describe your objective, motivation for joining these?

Do you see increased legislative regulations for certain areas in your business (public procurement)?

Do you see any barriers of access or cost by committing to external standards (such as ASI)?

Do you see CO₂ reduction as the main driver of future common standards? What other sustainability issues are going to be important in future?

Extruders

What are your strategies for responsible sourcing of aluminium, and/or other metals?

Which criteria/topics are the priorities in these strategies (eg CO₂, recycled content, human rights, other?)

How far upstream does your focus / due diligence go (eg smelting, mining?)

Does your company have a CO₂ reduction strategy and what milestones are already defined? Is that strategy public (can we obtain a copy or link?).

Are you aware/member of ASI? Please describe your objective, motivation for joining ASI or not?

Are you asked by your down-stream/up-stream partners to correspond to any external certification? Who are they or which sector are they mainly from?

Do you see any barriers of access or cost by committing to external standards (such as ASI)?

Do you see CO₂ reduction as the main driver of future common standards? What other sustainability issues are going to be important in future?

Recycling

What are your strategies for responsible sourcing of aluminium, and/or other metals?

Which criteria/topics are the priorities in these strategies (eg CO₂, recycled content, human rights, other?)

Does your company have a CO₂ reduction strategy and what milestones are already defined? Is that strategy public (can we obtain a copy or link?).

Are you aware/member of ASI? Please describe your objective, motivation for joining ASI or not?

Are you asked by your down-stream/up-stream partners to correspond to any external certification? What is the most important standard/certification they currently or are going to have?

Do you see any barriers to access or cost by committing to external standards (such as ASI)?

Do you see CO₂ reduction as the main driver of future common standards? What other sustainability issues are going to be important in future?

(As far as we know, CO₂ is not a big problem for recyclers as they don't (all) need smelting from Aa to Al.)

Key Questions to Answer

Is there a pull (an appetite) for ASI CoC or are they happy enough to achieve performance standards?

The net benefit of certification vs other verification

What is the incentive to go green?

Explore the internal side of the businesses and their motivation.

Mixed commodity standards vs multi-metals basis

These are the questions ASI wants answered (from RFP):

- Is increasing appetite for responsibly sourced metal likely to translate into increasing ASI Certifications and availability of ASI Aluminium in the period 2021-2030?
- Are there likely to be differences per market segment (B&C, transport, packaging, consumer durables) and/or per metal form (castings - primary and secondary, FRP, profiles, cabling etc)?
- Might some market segments prioritise single indicators (e.g. recycled content) over ASI related claims?
- What are some potential implications for ASI with respect to its Standards, uptake by market segments and future focus?



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