

Strategic Marketing Approach of Indonesia Aluminium Mineral Industry: Upstream and Downstream Analysis

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Abstract - The research aimed to determine the causes of imports by analyzing the upstream and downstream sides of the existing aluminium industrial chain. The research applied a descriptive-exploratory approach by collecting secondary data from credible sources. Interviews and focus group discussions with appropriate experts were also conducted to obtain supporting data. Research shows that aluminium imports will continue both in the short and long term. It is due to the upstream supply, especially in aluminium smelters, which cannot keep up with the increasing demand. Even though the market opportunity, especially in the automotive, construction, and power cable segments, is enormous and continues to grow, if there is not enough supply, the deficit of aluminium metal will continue to occur. It takes encouragement from the Government's political will to provide ease of electricity sources, increase production capacity and technology, change the mindset from relying on traders solely towards the mindset of the industrialist.

Keywords: strategic marketing, aluminium industry, supply-demand, energy, upstream-downstream

I. INTRODUCTION

The alumina industry is part of the aluminium industry. In the first stages of the industry, aluminium is bauxite mining, which supports alumina for raw materials. Furthermore, alumina refining is an intermediate industry to produce alumina, generally used as a raw material for aluminium smelters. The final stage is aluminium smelting. The aluminium industry is the largest non-ferrous metal industry in the world economy. Aluminium is the second most widely used metal globally after steel and the third most abundant element on earth (after oxygen and silicon).

According to statistical data from The International Aluminium Institute (IAI), the world's total primary aluminium production in 2019 reached 63,7 million tons. Meanwhile, the economic value of the world's primary aluminium industry in 2019 was around US\$ 114,9 billion (using the 2019 average aluminium price of around US\$ 1.804 per tonne).

Alumina is also called aluminium oxide, a chemical compound consisting of aluminium and oxygen molecules (Al_2O_3). Alumina is generally in the form of a white powder similar to table salt or granulated sugar (USGS, 2021). It is an intermediate product derived from bauxite through a combination of the Bayer process and calcination. To produce one tonne of alumina, it is consuming approximately 2,5 to 4 tons of bauxite. The aluminium industry consumes almost 90% in bauxite mining, whereas the remainder is used for abrasive products, cement, ceramics, flux metallurgy, refractories (products heat resistant), and other products. The potential of Indonesia's bauxite is not too enormous compared to the world, but its natural resources are still sufficient to meet national and international needs regional demand. It is estimated that 4% of the world's bauxite reserves or rank sixth countries with the largest bauxite deposits after Guinea, Australia, Vietnam, Brazil, and Jamaica. Thus, Indonesia has significant potential bauxite and has indeed exploited its existence for many years. Bauxite found in Indonesia is of the Gibbsite type, containing alumina, quartz, and activated silica. Sources Indonesia's national bauxite are in the Riau Islands, Bangka Belitung, West Kalimantan, South Sulawesi, Central Maluku, and Papua (Ministry of Trade of the Republic of Indonesia, 2017).

Based on the Geological Agency of the Ministry of Energy and Mineral Resources (2019), it is estimated that the bauxite ore owned by Indonesia as of December 2020 reached 5,5 billion tons

(resources), and reserves ore amounted to 2,96 billion tons (estimated reserves). Bauxite is processed into alumina and furtherly processed into aluminium in the downstream mineral industry, such as the automotive industry, building construction industry, household appliances industry, and others. Processing bauxite to aluminium ingots (semi-finished materials) can enter the upstream mineral industry. In Indonesia, the downstream aluminium minerals industry has far preceded the development of the upstream mineral industry. It started with the first aluminium metal ingots production by PT Indonesia Asahan Aluminium (Inalum) in 1976.

In general, there are two types of alumina products depending on their subsequent use. First, Smelter Grade Alumina (SGA) refers to the alumina used as raw material for aluminium smelters to produce aluminium metal. SGA is also commonly known as Metallurgical Grade Alumina. About 92-96% of the world's total alumina production is SGA. Second, Chemical Grade Alumina (CGA) refers to alumina used in various applications except for aluminium metal. CGA is also referred to as Non-Metallurgical Grade Alumina (NMGA). CGA's share of world alumina production is around 4-8% (Putra, 2020).

Currently, the condition of the Indonesian aluminium industry is on a high level of demand and is met mainly by imports. However, when viewed from bauxite ore reserves as aluminium, the raw material is substantial. Therefore, the research aims to map the industry and provide a strategic management plan of bauxite minerals with a strategic marketing approach.

Cravens and Piercy (2013) state that strategic marketing consists of analysis, strategy development, and activities to build the vision about the organization's market, selecting market strategy goals, and positioning strategies to match the desired value by customers in every market. Strategic marketing is a market-driven strategy development process. Varadarajan (2010) states that the realm of strategic marketing is the study of organizational, inter-organizational, and environmental phenomena. They are related to (1) organizational behavior in the marketplace in their interactions with consumers, customers, competitors, and other external parties, constituents, in the context of creation, communication, and delivery of products that offer value to customers in exchange for organization, and (2) management responsibilities related to scope limits, participation marketing function in the organization.

In contrast, marketing strategy focuses on constructs related to brand and branding strategies, distribution and channel strategies, and pricing strategies. Strategic marketing is also closely related to resource-advantage theory (Hunt, 2010), where excellence in company resources is the basis of competitive excellence. In the research, mineral resources are at fault, one of the advantages of Indonesia's resources. In this context, the country that is owning these resources is analogous to a company. Therefore, the Indonesian state can behave and have a

perspective as a company.

The existence of bauxite mineral resources which not all countries have, makes the resource-based theory (RBT) approach relevant. Wernerfelt (1984) explains the enterprise resource-based view (RBV) of how firms achieve competitive advantage and economic rent through ownership and management of assets, capabilities, knowledge, and similar internal resources. Resource-based theory complements the more outward-looking theory of competitive advantage, especially Porter's Five Forces (2008), to analyze industry structure.

Kozlenkova, Samaha, and Palmatier (2014) mention that the use of resource-based theory (RBT) in research is rapidly increasing, demonstrating its importance as a framework for explaining and predicting the competitive advantage and performance outcomes of an organization's company. In the perspective of market-based resources, using the VRIO framework (Value-Rarity-Inimitability-Organization) is a possible thing to create SCA (Sustainable Competitive Advantage) (Srivastava, Shervani, & Fahey, 1998; Srivastava, Fahey, & Christensen, 2001). For example, the framework approach can explain how bauxite and aluminium commodities become resources in organizations such as the Indonesian state, which has enormous size and is rare.

Butts (1993), in the definition issued by the Strategic Studies Institute US Army War College, states that strategic minerals are metal minerals that are important for the economic sector and defense of industrialized countries. Resource dependence creates vulnerability and potential political instability. If a country produces enough minerals industry and petroleum to meet its own economic needs, it will be economically independent and manage its destiny. Otherwise, then a country becomes independent in mineral production. Mineral's policy strategy has traditionally been full of controversy and is essential for a country's economic strength and military.

Simandl, Akam, and Paradis (2015) remind about consistency in the use of the term "critical" and "strategic" that can lead to misunderstandings, miscommunication, and potentially misrepresentation. It is "critical" if the mineral or material poses a risk to the economy, as well as risks to supply. The word "strategic" refers to an economically essential mineral or material.

Randive and Jawadand (2019) also think that strategic minerals are vital for the economic regeneration and national security of a country. Figure 1 describes the position of minerals or materials in critical and strategic positions in Europe (the Commission Europe). For example, high rare earth element becomes critical and strategic considering the high supply risk and significance economically. While nickel becomes a mineral or strategic material because it is economically essential, although not constrained by supply risk.

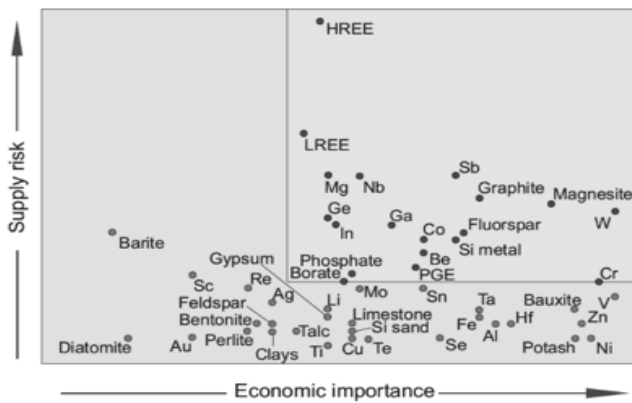


Figure 1 Minerals or Strategic-Critical Materials (Simandl et al., 2015)

II. METHODS

The research applies a descriptive-exploratory approach, namely by taking secondary data from trusted sources and conducting interviews and focus group discussions with appropriate experts. Secondary data and the results of interviews and focus group discussion (FGD) are processed to obtain research conclusions.

III. RESULTS AND DISCUSSIONS

The structure of Indonesia's aluminium industry has been integrated from upstream to downstream. Currently, the industry structure is relatively complete, starting from bauxite ore as raw material, the basis for making aluminium. The process of processing bauxite ore into alumina in CGA and SGA forms, processing alumina into aluminium as an intermediate product already exists, and the downstream aluminium industry are much more developed than the upstream industry. Figure 2 shows the current aluminium industrial structure in Indonesia.

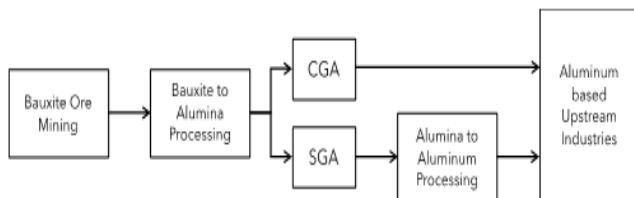


Figure 2 Aluminium Industry Structure

The mining industry to alumina processing can be grouped into the upstream industry aluminium. Based on the Ministry of Energy and Mineral Resources data, the major bauxite mining companies are PT Aneka Tambang (Antam) Tbk (state-owned enterprise) and PT Well Harvest Winning (WHW). The enactment of the Minister of Energy and Mineral Resources No. 1 of 2014 states that companies must

increase the added value of mining minerals. The development era of mining ore processing (smelter) begins. As a result of this regulation, the company started to build a smelter and process mineral ore mines to fulfil those regulations. For bauxite ore processing, the progress of the construction can be seen in PT Indonesia Chemical Alumina (ICA), which produces CGA with a capacity of 300.000 tons per year but had to stop in 2018. The production of CGA is only around 100.000 tons per year.

As for CGA, a company that has jumped into producing this product is Antam through PT Borneo Alumina Indonesia (a subsidiary of Antam) with a production capacity of 500.000 tons per year with a target installed capacity of 1 million tons of alumina per year and PT WHW with a capacity of 1 million tons per year, with a target in 2021 to reach 3 million tons per year. The intermediate product is in the form of processing alumina into aluminium, currently only done by PT Indonesia Asahan Aluminium (Inalum), also SoE, with a capacity of 280.000 tons per year. In 2023, Inalum will plan an additional capacity to 500.000 tons per year. Based on technical calculations, a comparison of the need for bauxite alumina: aluminium is 4 : 2 : 1, meaning that to produce 1 kg of aluminium, it takes 2 kg of alumina and 4 kg of bauxite (World Bank, 1981). Based on the assumption, the position of the structure of the Indonesian aluminium industry based on the resources it has, can be seen in Table 1.

Table 1 Potential Gap Assumption of Aluminium Supply Chain Structure

	Bauxite (Ore)	Alumina	Aluminium
Production (2019)	16.592.187		
Production Ratio	4	2	1
SGA Production Assumption (50%)	8.296.094	4.148.047	2.074.023
Actual Product		1.000.000	250.000
Potential Gap (Kg)		3.148.047	1.824.023

Australia, the largest bauxite producing country, in 2019 also produced 101 million tons of bauxite and exported 43 million tons (43%), and the rest was converted into alumina (57%) (Australian Aluminium Council, 2020). With the same comparison, the potential of Indonesia converting bauxite into alumina is assumed only 50%, then the potential of alumina production will reach 4,1 million tons. However, the actual one that is currently producing is alumina only

PT WHW amounted to 1 million tons. Thus, there is a potential gap for alumina of 3,1 million tons. For aluminium production, Indonesia, which Inalum only produces is 250 thousand tons, then the calculation of the potential gap is around 1,8 million tons (see Table 1). The demand for aluminium metal in Indonesia is based on in-depth interviews with several industry players indicating that aluminium production from Inalum is not sufficient for their downstream industrial production needs.

Downstream aluminium industries such as aluminium processing into casting products, a product profile (extrusion), and sheet products still rely on import aluminium ingots. As seen in Table 2, the needs of the downstream aluminium industry by type industry in 2019/2020 are estimated to be close to 1 million tons (“Industri otomotif bakal serap”, 2020). If contracted by about 20% at the pandemic time, the demand would be around 800.000 tons. This figure is still far from the national aluminium production, resulting in a gap of almost 550-750 thousand tons. This gap is filled by imported aluminium, such as some international brands that are entering Indonesia namely EGA (Emirate Global Aluminium), Hydro, Rio Tinto, Alcoa, UC Russal (Russia), Alba (Bahrain), Hindalco (India), Pressmetal (Malaysia), Qatalum (Qatar). In other words, dependence on imported aluminium materials is still high, although bauxite ore reserves are enormous.

Table 2 Aluminium Upstream Industry's Demand 2019/2020

No.	Industries	Al-Demand (ton-approx)
1	Extrusion	300
2	Plate, Sheet, Foil	200
3	Automotive	350
4	Wire & Cables	150
Total		1.000

Source: “Industri otomotif bakal serap” (2020)

The downstream industry demand for aluminium will continue to increase in line with the demand for aluminium metal. Aluminium is an alternative metal to replace iron or steel due to its lightweight but almost the same strength. This lightness is needed by the automotive industry running on its electric vehicles and public transport vehicles (trains, buses, airplanes) and the building construction industry. In the Industrial National Metals Roadmap, the Ministry of Industry predicts that demand will exceed 1 million tons per year since 2018, as seen in Figure 3 (Harjanto, 2022). The roadmap also states that dependence on imports will continue if Indonesia no longer builds aluminium smelters like Inalum. Although it needs improvement again due to the COVID-19 pandemic, which made the demand decrease (see Table 2), demand will always increase.

The top ten countries as Indonesian aluminium export markets are the United States (USD 48,46 million), Vietnam (USD 6,36 million), Philippines (USD 6,08 million), Malaysia (USD 5,87 million), Republic of Korea (USD 5,09 million), Japan (USD 4,01 million), Australia (USD 3,87 million), Singapore (USD 3,14 million), Thailand (USD 3,03 million), and Belgium (USD 2,50 million). Related aluminium products and their derivatives from Indonesia which received the highest demand in the international market are: 1) non-alloy aluminium plates, sheets and strips rectangle (including square), more than 0,2 mm thick (HS 760611); 2) stem aluminium alloys, rods and profiles, other of hollow profiles (HS 760429); 3) aluminium alloy, unforged (HS 760120); 4) aluminium barrels, drums, cans, boxes and the like plain, unfitted container, with a capacity of no more than 300 litres, 79.30 Gal. (HS 761290); 5) countertop, kitchen or other household goods, parts of aluminium (excluding pot scrubs and scouring or polishing pads, gloves and similar cans) (HS 761519); 6) aluminium alloy tubes and pipes (HS 760820); 7) aluminium door, windows and frames and thresholds for doors (HS 761010); 8) aluminium wire of non-alloyed aluminium, with maximum cross-section dimensions: more from 7 mm (HS 760511);

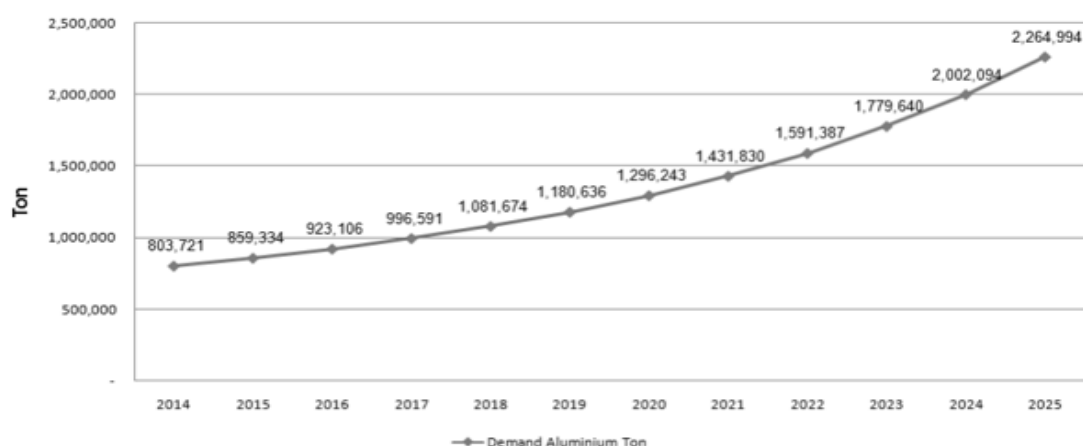


Figure 3 Projected National Aluminium Demand 2014-2025
Source: Ministry of Industry (2013)

9) aluminium foil, not more than 0,2 mm thickness, unsupported, rolled but not further worked (HS 760711); and 10) aluminium waste and scrap (HS 760200). Especially for aluminium foil since its use in society is quite extensive as a substitute for plastic materials for food packaging. Moreover, the price is relatively lower compared to tinfoil. The aluminium foil also has comparative characteristics other things such as light, strong or not easily torn, heat-resistant, airtight, and not contains a magnet to be separated from the can during the recycling process (Ministry of Trade the Republic of Indonesia, 2017).

The bauxite-alumina-aluminium chain looks like it has been connected, but inside a more detailed analysis, it turns out that there are still many gaps that occur. However, considering the Minister of Energy and Mineral Resources No. 17 of 2020, which gives a deadline ban on exporting metal mineral ores until June 2023, it is inevitable that the ore bauxite will be processed entirely into alumina or aluminium.

Figure 4 shows the current and future positions of alumina and aluminium commodities. Although alumina is still imported for aluminium production, considering a large amount of alumina production, in the future, this alumina position will reverse from importer to exporter. It is possible given the growth of new alumina and aluminium plant in the world. Therefore, such industrial phenomena are interesting to study further from a strategic marketing perspective. In strategic marketing, positioning a product becomes very important to be a successful business in the future. In the global market, aluminium demand is predicted to grow until 2035, especially in the Asian and South American markets. Based on forecasts by CRU, the market world at least 54 smelters with a capacity of 750,000 tons per year (Ministry of Indonesian Trade 2017). Furthermore, Humphreys (2018) predicts that China will double-digit demand growth because of industrialization.

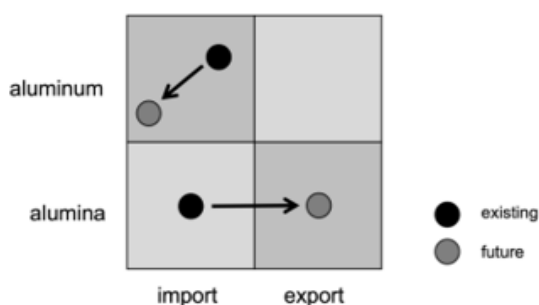


Figure 4 Current and Future Position of the Aluminium Upstream Industry

With the abundance of bauxite ore, it is inevitable that alumina production is also expected to increase and exceed its absorption capacity in aluminium processing plants. The advantages of this production which is the basis that Indonesian alumina products will begin to be exported. China market and

Asia (Malaysia) is the main target considering the need for this country is very large. In 2019, China produced 39.795.000 tons (Apralex, 2020), which requires alumina amounting to 79 million tons. In Sabah, Malaysia, one smelter is estimated to produce 1 million tons of aluminium, which requires 2 million tons of alumina. Therefore, Indonesia's alumina business has a definite position and target market.

Indonesia's aluminium production relies solely on Inalum. Based on public exposure by Sinaga (2014), the addition of Inalum's production capacity to 500.000 tons per year, causing the domestic supply of aluminium to increase. Even though this addition has not yet had a significant impact on the demand for aluminium domestically, the only changes that occur are reducing aluminium imports in the industry downstream. The analysis of Indonesia's aluminium type of aluminium used produced, each downstream industry requires a different aluminium product type, as seen in Table 3, downstream industry also found several constraints in the development of aluminium products.

Table 3 Aluminium Products and Types

No.	Industries	Al Series Type	Form
1	Extrusion	6xxx series	Billet
2	Plate, Sheet, Foil	1xxx, 2xxx series	Slab
3	Automotive	A356	Ingot
4	Wire & Cables	1xxx series	Billet/Bar

Based on the principle of product excellence in the strategic marketing concept, aluminium producers such as Inalum must also continue to make improvements. Although the product market share aluminium for the automotive industry segment is quite large (Table 2), the largest share is still controlled by the world's sizeable automotive industry (principals or brand owner), which has a complex supply network to replace. Therefore, if it is an aluminium ingot manufacturer for automotive, it may be with a target market of automotive companies that make components for the after-market, such as car or motorcycle wheels outside of principles. For aluminium needs in the downstream industry, externally, the industry is driven by the development of the world of transportation, which requires casting products and structural products.

Table 4 is the STP (Segmentation-Targeting-Positioning) for the Downstream Aluminium Industry, an essential stage in strategic marketing. The four downstream industry groups from this analysis, the analysis results have a different STP by looking at the current conditions that exist. For example, the Extrusion Industry currently produces a lot for the construction and home appliance markets ladder. In the future, the segmentation must change into a value-added product higher. Consequently, the

type of aluminium also changes. With a product like that, targeting has also shifted to supporting the transportation sector, especially public transportation. The selected positioning is, of course, an extrusion product that has high added value.

The plate, sheet, and foil industries are almost the same today as the wire and cable industry, and considering that the current STP is correct, in the future by looking at the existing market share. Therefore, the STP in the future will remain with the current condition (*status quo*). Whereas for industrial foundry (casting) for the automotive, despite the large market (see Table 2), it is pseudo-markets, most of which are an impenetrable network of principals. Therefore, STP needs to change. The change became its segmentation on the type of foundry product other. Targeting is directed to become an after-market product casting company to offset imported products so that the product positioning for the casting industry is low price aluminium ingot.

Through the approach and modification of Simandl (2015), the critical-strategic position of the industry Indonesia Aluminium is shown in Figure 5. Bauxite is a very strategic mineral because it is economically crucial. The state's income from the export of bauxite minerals is an essential ample, and abundant supply.

On the other hand, alumina is a critical and strategic mineral because the supply is sufficient but not yet fully used for the national aluminium industry.

Meanwhile, aluminium is a critical and strategic material because its supply is risky and sourced from

imports and is economically significant because it drives industry manufacturing in Indonesia. With a strategic marketing approach, the Indonesian state, by analogy, behaves like a company organization with its bauxite mineral resources. Therefore, it can be concluded that the existing bauxite wealth has an important position. For the aluminium industry, with the policy that from 2023 Indonesia will no longer export bauxite ore in raw form, there will be a higher amount of alumina production than domestic demand. Thus, alumina must be exported mainly with the target China and smelters in the ASEAN Region (Malaysia). However, in the scenario, the Government will set up a new aluminium plant equivalent to Inalum.

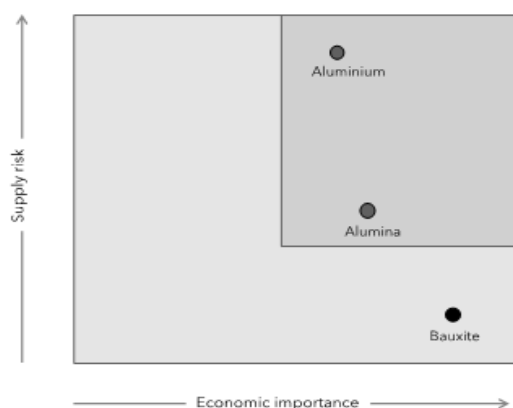


Figure 5 Critical-Strategic Position of Indonesian Bauxite, Alumina, and Aluminium (modification from Simandl)

Table 4 STP for Downstream Aluminium Industry

No.	Industries	Al series	Form	External Factors (Existing Condition)	Segmentation	Targeting	Positioning	Main Strategic Direction
1	Extrusion	6xxx	Billet	mostly imported and secondary aluminium is also big market too	high-quality product with new Al series, i.e., 5xxx, 7xxx	transportation sector	value-added products, the transportation sector	new products on the type of Al series based
2	Plate, Sheet, Foil	1xxx, 2xxx	Slab	almost 100% imported, especially for pharmaceutical packaging products	status quo	status quo	pharmaceutical and food packaging	import substitution
3	Automotive	A356	Ingot	the highest demand is still for principals casting plan products, robust supply chain line according to principals	non-automotive principals casting products	after-market automotive parts and other casting companies	low price ingot	newmarket
4	Wire & Cables	1xxx	Billet/ Bar	market dependent on government projects (national electric company)	status quo	status quo	status quo	import substitution

Meanwhile, as an aluminium producer for the downstream industry, the strategically-held aluminium treatment will differ depending on the downstream industry. For the plates industry, sheet, foil, wire, and cable, import substitution strategy by maintaining current condition with the respective STP is the most appropriate strategic direction. At the same time, the extrusion industry changes its strategy from supporting the home appliance industry to products with higher added value, such as to support the public transportation industry and with a niche product that is thinking about the type of aluminium different. It also applies in the automotive industry by not relying on supplies to the principal's automotive industry into non-principals automotive components and looking for new markets for aluminium casting.

IV. CONCLUSIONS

Aluminium is one of the environmentally friendly commodities that have bright prospects in the future. In addition, it is related to the problem of scarcity of wood due to heating problems. Globally, aluminium can also substitute wood for use in furniture production, windows, doors, and other building materials. Therefore, many experts argue that aluminium is an essential metal that humans need. In the implementation, aluminium can also make sophisticated products, like food packaging, medicine packaging, electronic equipment, transportation equipment (Prosser, Johnson, & Saptaji, 2017).

Therefore, Indonesia Aluminium Industry has to be evaluated and reorganized. The importance of bauxite-alumina-aluminium products economically and positionally critically because of the supply risk being required in the future. With its wealth of resources, aluminium is an industry in which Indonesia is natural has been active for a long time, starting from mining bauxite ore, refining the ore into alumina, and then smelting alumina to produce primary metal aluminium. However, the mining industry needs a lot to learn and develop processing techniques and examine aspects of strategic marketing to become a leading industry both domestically and play a role to be competitive in the market export. It becomes crucial, especially if there is overproduction in the domestic market in Indonesia in the next few years. Therefore, various stakeholders, ranging from regulators and operators, need to share their perceptions to develop this industry to be efficient and productive to achieve the competitiveness of this commodity in the global market.

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