东南亚和中东氧化铝&电解铝项目现状及展望

Current Status and Prospects of Alumina Refinery and Smelter Projects in Southeast Asia and the Middle East

—区域新格局、产业新机遇

-New Regional Landscape, Emerging Industrial Opportunities

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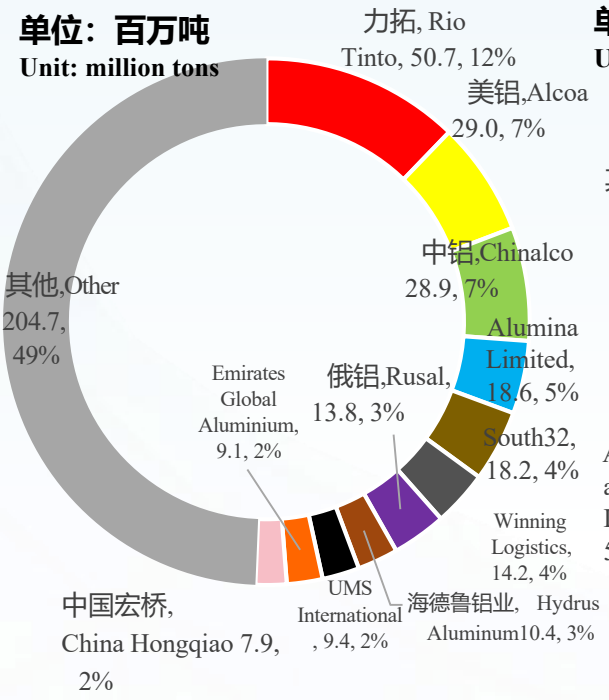
全球铝产业格局
Global Aluminum Industry Landscape

1.1 全球铝产业链各环节集中度：氧化铝>铝土矿>电解铝>铝材

Concentration of each link in the global aluminum industry chain: Alumina > Bauxite > Electrolytic Aluminum > Aluminum Products

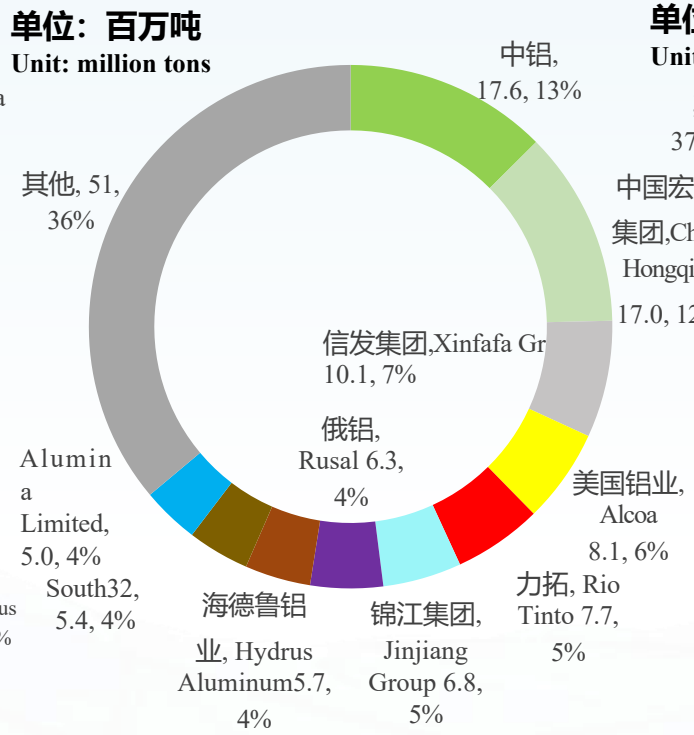
全球铝土矿主要企业市场份额（产量维度）

Global bauxite market share of major enterprises (by production volume)



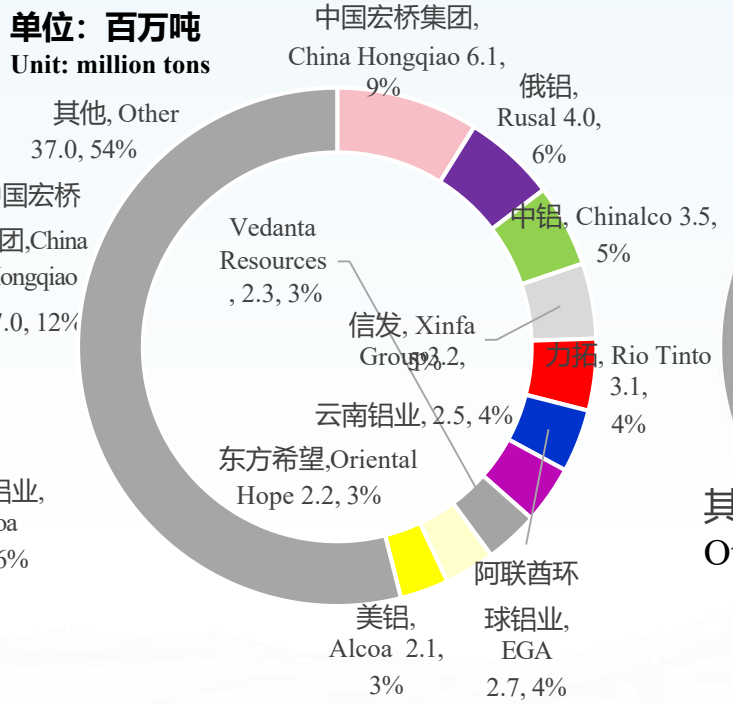
全球氧化铝主要企业市场份额（产量维度）

Global alumina market share of major enterprises (by production volume)



全球电解铝主要企业市场份额（产量维度）

Global electrolytic aluminum market share of major enterprises (by production volume)

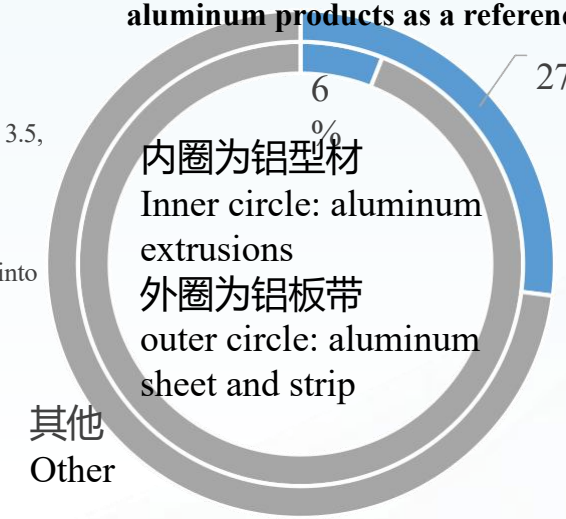


全球铝材主要企业市场份额（产能维度）

Global aluminum products market share of major enterprises (by production volume)

以中国铝材集中度作为参考

Using the concentration of China's aluminum products as a reference



1.2 全球铝头部企业产业链布局一览
Global Leading Aluminum Enterprises: Industrial Chain Layout Overview

公司名称	主要产品	资源	能源	下游加工业务	战略动向
Company Name	Main products	Resource	Energy	Downstream Processing business	Strategic Moves
力拓（Rio Tinto）	铝土矿/氧化铝/铝合金锭	铝土矿，氧化铝，电解铝100%自有	约55%电解铝产能拥有水电资源	业务链条到铝合金锭，无下游铝加工材业务	①收购铜矿，锂矿资源 ②加速脱碳
Rio Tinto（Rio Tinto）	Bauxite/Oxide Aluminum/Aluminum Alloy Ingots	Bauxite, alumina, electrolytic aluminum – 100% self-owned	Approximately 55% of electrolytic aluminum production capacity utilizes hydropower resources.	The business chain extends to aluminum alloy ingots, with no downstream aluminum processing products involved.	① Acquisition of copper and lithium ore resources ② Accelerate decarbonization
美国铝业（ALCOA）	铝土矿/氧化铝/电解铝	100%一体化	约25%电解铝产能有自备电厂（煤电）	美铝主体中，无下游铝加工材业务	①脱碳 ②推动停产的电解铝产能复产
Aluminum Corporation of America（ALCOA）	Bauxite/Oxide Aluminum/Electrolytic Aluminum	100% integrated	Approximately 25% of electrolytic aluminum production capacity is powered by self-owned power plants (coal-fired).	Within ALCOA core operations, there is no downstream aluminum processing business.	① Decarbonization ② Restore production to suspended electrolytic aluminum capacity
俄罗斯铝业（Rusal，0486.HK）	氧化铝/电解铝/铝铸件/铝箔/铝包装/铝轮毂	100%一体化	约90%电解铝产能拥有水电资源	有铝箔、铝轮毂等业务；铝加工材占铝锭比例不足10%	①脱碳，创新惰性阳极技术 ②铺设中国下游渠道
Russian Aluminum Industry（Rusal，0486.HK）	Alumina/electrolytic aluminum/aluminum castings/aluminum foil/aluminum packaging/aluminum wheels	100% integrated	Approximately 90% of electrolytic aluminum production capacity utilizes hydropower resources.	The company engages in businesses such as aluminum foil and aluminum wheels; the proportion of processed aluminum products to aluminum ingots is less than 10%.	① Decarbonization: Innovation in Inert Anode Technology ② Establish downstream channels for China
中国宏桥（1378.HK）	氧化铝/电解铝初级产品（铝合金）/铝合金加工产品	100%一体化	59%电力自给率	10%的铝合金继续向下延伸至加工材	①往云南转移产能 ②重视轻量化材料市场、造车
China Hongqiao（1378.HK）	Alumina/electrolytic aluminum primary products (aluminum alloys)/ Aluminum alloy processed products	100% integrated	A self-sufficiency rate of 59% in electricity production	The 10% aluminum alloy continues to extend downward. Processing Material	① Transfer production capacity to Yunnan ② Focus on the lightweight materials market and automotive manufacturing

1.2 全球铝头部企业产业链布局一览

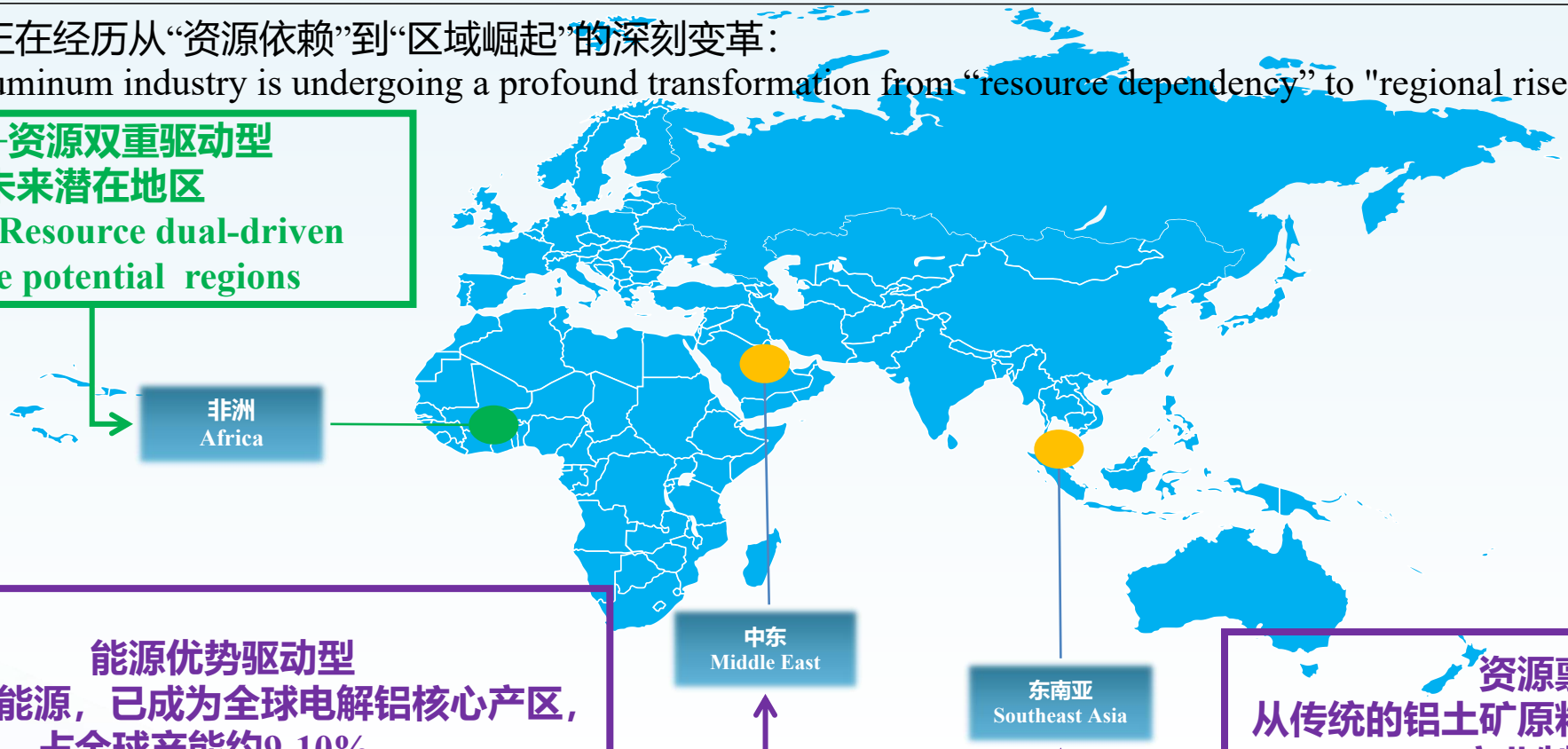
Global Leading Aluminum Enterprises: Industrial Chain Layout Overview

公司名称	主要产品	资源	能源	下游加工业务	战略动向
Company Name	Main products	Resource	Energy	Downstream Processing business	Strategic Moves
南山铝业 (600219.SH)	合金锭/铝材（工业型材，建筑型材，汽车铝板，航空铝板，动力电池箔）氧化铝/电解铝	氧化铝100%一体化，电解铝自有；无铝土矿资源	100%电力自有率	持续加大对高端材料的研发（航空材料）高端产品的销量占公司铝产品总销量的12.66%	①扩建印尼氧化铝：三期200万吨。 ②将建设25万吨/年电解铝厂，计划到2025年生产铝锭40万吨/年。 ③下游高附加值加工项目： 2021年10月投产高性能高端铝箔生产线项目 ④扩建汽车板20万吨，达到40万吨
Nanshan Aluminum Industry (600219.SH)	Alloy ingots/aluminum products (industrial profiles, architectural profiles, automotive aluminum sheets, aviation aluminum sheets, power battery foil); alumina/electrolytic aluminum	100% integrated alumina production; self-owned electrolytic aluminum facilities. Aluminum-free bauxite resources	100% self-sufficiency in electricity supply	The company continues to intensify R&D efforts in high-end materials (particularly aviation materials), with sales of premium products accounting for 12.66% of its total aluminum product sales.	① Expansion of Indonesian alumina production: Phase III with a capacity of 2 00,000 tons. ② A 250,000-ton-per-year electrolytic aluminum plant will be constructed, with a planned annual production of 400,000 tons of aluminum ingots by 2025. ③ Downstream high-value-added processing project: High-performance premium aluminum foil production line project commissioned in October 2021 ④ Expand automotive sheet production capacity by 200,000 tons, reaching a total of 400,000 tons
中国铝业 (601600.SH)	铝土矿/氧化铝/电解铝/铝材	铝土矿一体化率 < 100% 氧化铝、电解铝一体化率 > 100%	29%水电，风电+光伏占16%	中铝瑞闽、中铝高端制造等铝水比例高	①低碳绿色技术研发 ②积极布局海外铜、铝矿产资源
CHALCO (601600.SH)	Bauxite/Oxide Aluminum/Electrolytic Aluminum/Aluminum Products	The integration rate of bauxite is <100%. The integration rate of alumina and electrolytic aluminum exceeds 100%.	29% from hydropower; wind power and photovoltaics account for 16%.	Chinalco Ruimin, Chinalco High-end Manufacturing, etc. High aluminum-to-water ratio	① Development of low-carbon, green technologies ② Actively develop overseas copper and aluminum mineral resources

1.3 东南亚与中东——两大区域定位
Southeast Asia and the Middle East – Positioning of the Two Regions

全球铝产业正在经历从“资源依赖”到“区域崛起”的深刻变革：
The global aluminum industry is undergoing a profound transformation from “resource dependency” to "regional rise".

能源+资源双重驱动型
未来潜在地区
Energy + Resource dual-driven
–Future potential regions



能源优势驱动型
依托廉价能源，已成为全球电解铝核心产区，占全球产能约9-10%。
Energy-driven – Relying on low-cost energy, the Middle East has become a core region for electrolytic aluminum production, accounting for approximately 9-10% of global capacity.

资源禀赋驱动型
从传统的铝土矿原料供应地，向一体化的铝产业制造基地转型
Resource-driven – Southeast Asia is shifting from a traditional supplier of bauxite raw materials to an integrated aluminum manufacturing hub.

1.4 产业转移的核心驱动力
Core Drivers of Industrial Transfer

供给端驱动 Supply-side driver

2015年4月20日起实行的《部分产能严重过剩行业产能置换实施办法》将国内电解铝合规产能设定在4500万吨，政策红线具有长期性和刚性，仅可能在颠覆性低碳技术成熟后才存在适度放开的可能，国内铝企出海寻求增长成为必然选择。The "Implementation Measures for Capacity Replacement in Some Industries with Severe Overcapacity" (implemented on April 20, 2015) set the domestic compliant capacity for electrolytic aluminum at 45 million tons. The policy red line is long-term and rigid, with the possibility of moderate relaxation only after disruptive low-carbon technologies mature. Going global to seek growth has become an inevitable choice for domestic aluminum enterprises.

成本端驱动 Cost-side driver

海外低成本能源（中东）与资源富集地（东南亚）正在重塑全球铝业成本曲线。

Low-cost energy overseas (Middle East) and resource-rich regions (Southeast Asia) are reshaping the global aluminum industry cost curve.

需求端驱动 Demand-side driver

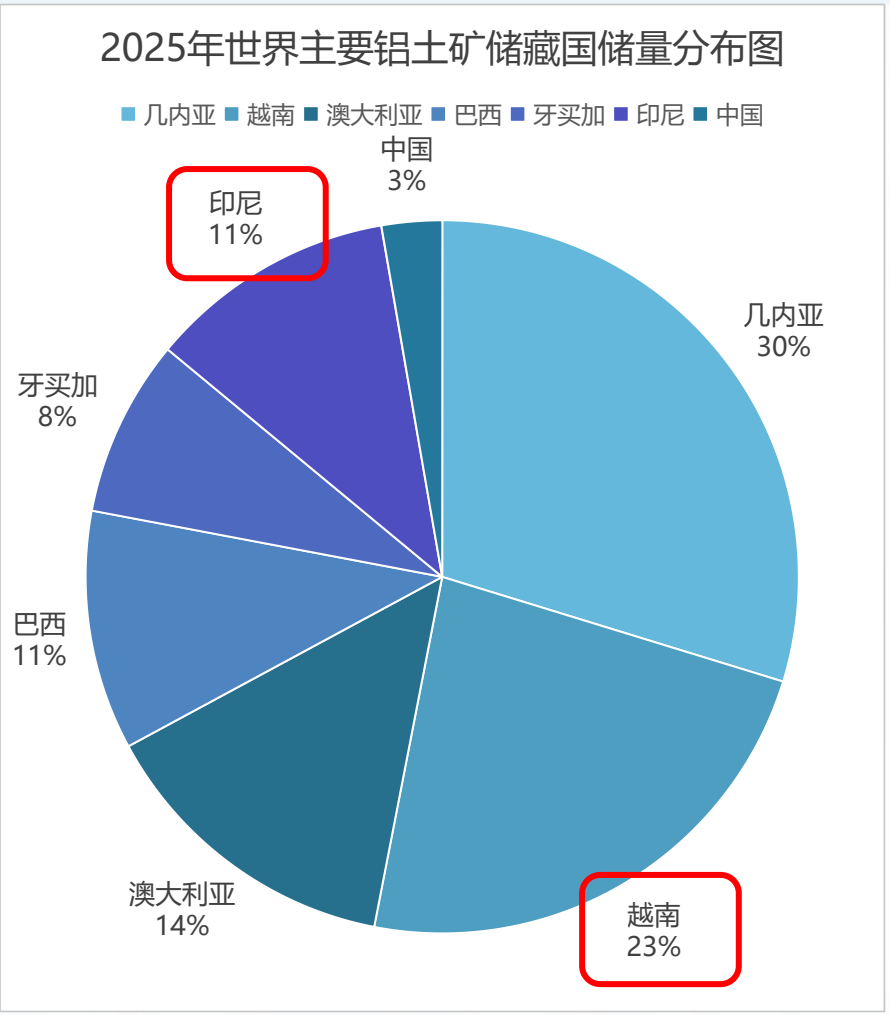
据中金公司预测，海外新兴经济体发展及新能源、储能、IDC等新兴需求支撑铝需求进入新增长周期，预计2025-2030年全球铝需求复合年均增长率（CAGR）为2.3%。

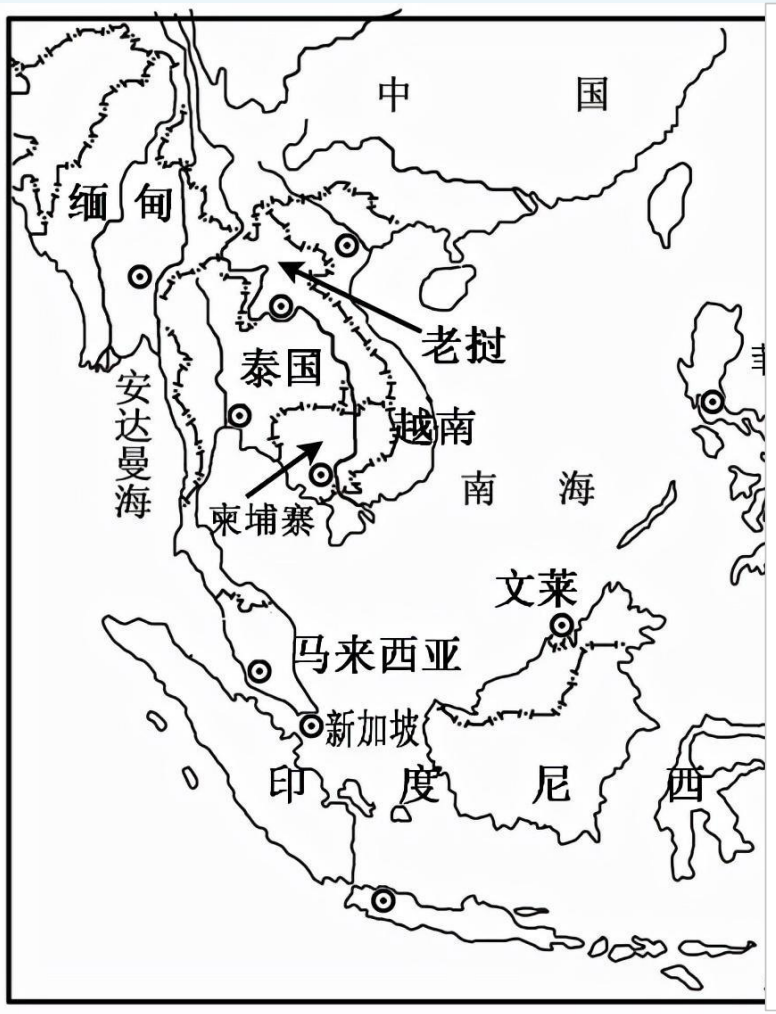
According to CICCs forecast, the growth of overseas emerging economies and rising demand in sectors such as new energy, energy storage, and IDC are driving aluminum demand into a new growth cycle. The global aluminum demand is projected to achieve a compound annual growth rate (CAGR) of 2.3% between 2025 and 2030.

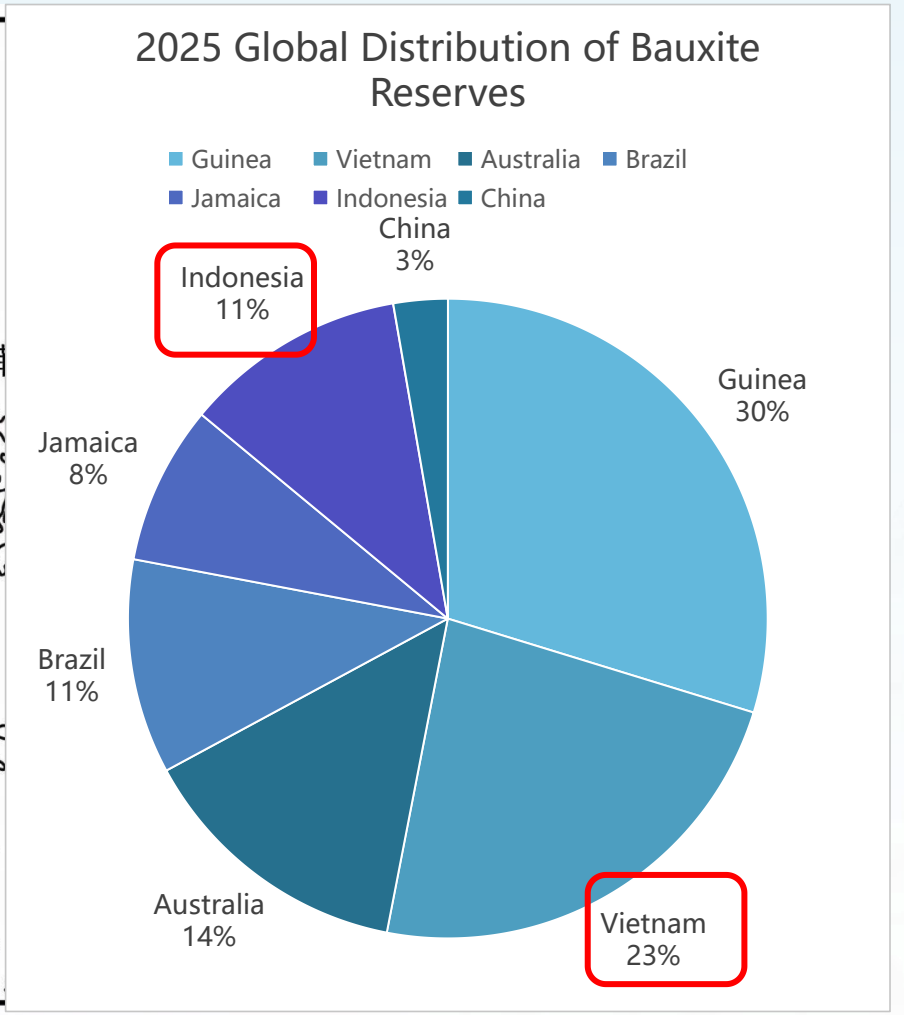
东南亚铝工业崛起-氧化铝篇
Rise of Southeast Asian Aluminum Industry – Alumina Section

2.1 东南亚-全球铝产业链的新型制造基地

Southeast Asia – A New Manufacturing Hub for the Global Aluminum Industry Chain







2.1 东南亚-全球铝产业链的新型制造基地

Southeast Asia – A New Manufacturing Hub for the Global Aluminum Industry Chain

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资源禀赋

东南亚铝土矿储量近200亿吨，占全球约30%，与几内亚、澳大利亚并列为三大供应基地。

区位优势

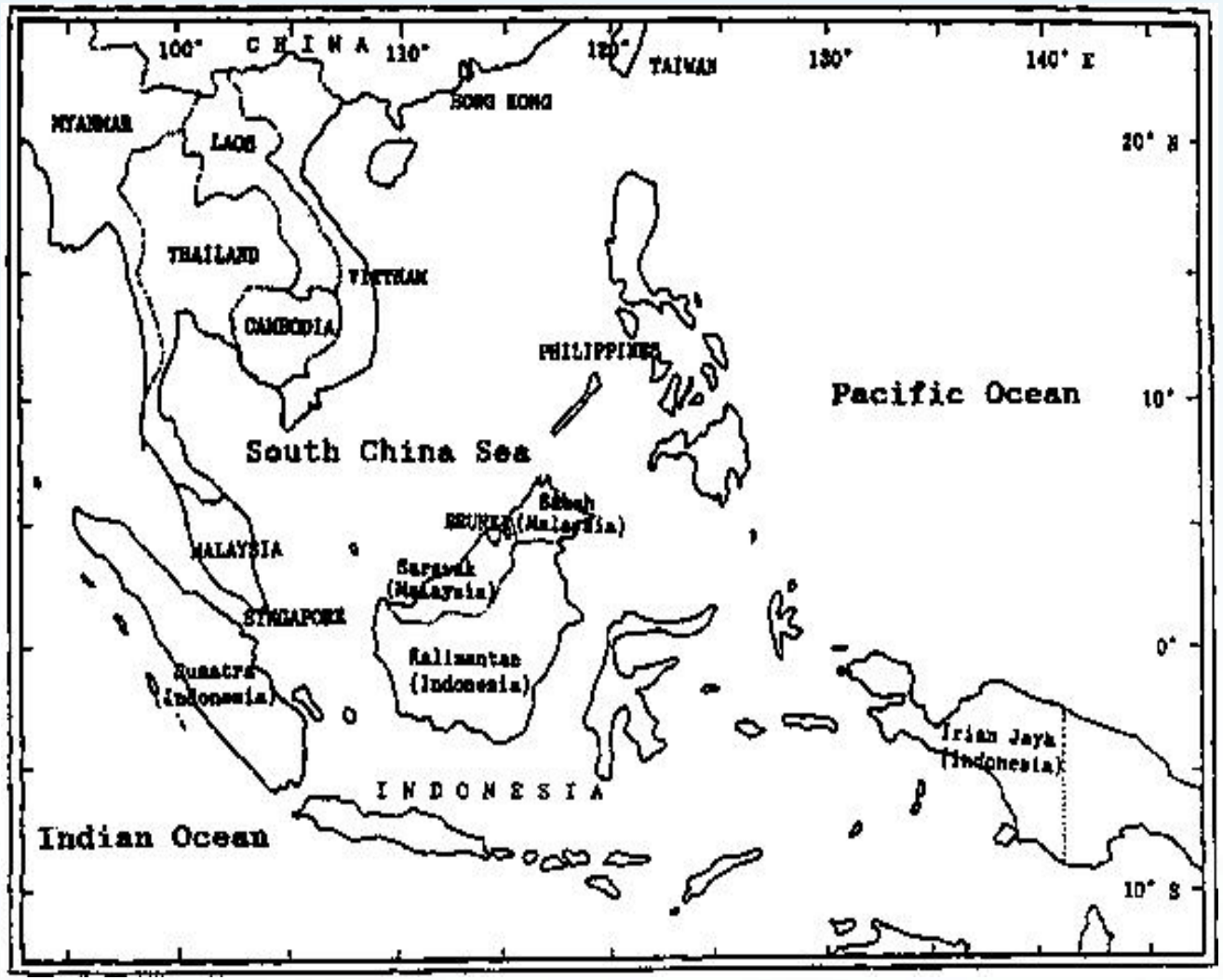
扼守马六甲海峡，海运至中国仅7-10天，较几内亚缩短近3/4。

人口红利

超6.5亿人，平均年龄约30岁，劳动力成本仅为中国的40%。

政策牵引

印尼持续推行“下游化”国策，倒逼产业链本土化，吸引投资。



Resource Endowment

Southeast Asia holds nearly 20 billion tons of bauxite reserves, accounting for approximately 30% of the global total. It stands alongside Guinea and Australia as one of the three major supply bases.

Location Advantage

Controlling the Strait of Malacca, sea transport to China takes only 7-10 days, which is nearly 3/4 shorter than the voyage from Guinea.

Demographic Dividend

With a population exceeding 650 million and an average age of around 30, its labor costs are only 40% of those in China.

Policy Guidance

Indonesia continues to implement its "downstream-oriented" national policy, compelling the localization of industrial chains and attracting investments.

2.2 印尼氧化铝——产能爆发式增长
Indonesian Alumina — Explosive Capacity Growth

印尼正成为全球氧化铝产能增长的核心引擎和成本洼地，其爆发式增长将深刻影响全球供需与贸易流。

Indonesia is becoming the core engine of global alumina capacity growth and a cost depression. Its explosive growth will profoundly impact global supply, demand, and trade flows.

- 现状：2025年底印尼氧化铝总产能830万吨/年，成为全球氧化铝供应增长的核心引擎；
- Current Status: By the end of 2025, Indonesia's total alumina production capacity is expected to reach 8.3 million tons per year, making it the core engine driving the growth of global alumina supply.
- 未来：预计随着Inalum、齐力铝业、哈利达集团等项目陆续建设投产，印尼氧化铝产能将由830万吨/年增至2330万吨/年，对应CAGR 35.9%，年均增量达260万吨
- Future Outlook: With projects such as Inalum, Press Metal, and Harita Group entering construction and production successively, Indonesia's alumina production capacity is expected to increase from 8.3 million tons/year to 23.3 million tons/year, corresponding to a Compound Annual Growth Rate (CAGR) of 35.9%, with an average annual increment of 2.6 million tons.

2.2 印尼氧化铝——BAI氧化铝项目
Indonesian Alumina — BAI Alumina Refinery Project

SAMI

印尼BAI冶金级氧化铝项目 （一期）

业主：PT Borneo Alumina Indonesia (PT BAI)，由 PT Indonesia Asahan Aluminum 和 PT Antam Tbk 合资组成

项目地点：印度尼西亚西加里曼丹省曼帕瓦

产能：年产100万吨冶金级氧化铝，配套自备热电厂、煤气站、赤泥堆场及公用设施

铝土矿：三水铝石型，产自印尼

工艺：拜耳法

项目管理承包方：Progesys（总部位于加拿大）/B.V.（总部位于美国）；Jaya CM（总部位于印尼）

项目模式：中铝国际工程股份有限公司（CHALIECO）承担的 EPC 总承包（固定总价交钥匙工程）

状态：已于 2024 年 12 月投产（执行周期约 36 个月）

Indonesia BAI SGAR Alumina Project (Phase I)

Owner: PT Borneo Alumina Indonesia (PT BAI), a joint venture formed by PT Indonesia Asahan Aluminum and PT Antam Tbk

Project location: Manpawa, West Kalimantan Province, Indonesia

Production capacity: Annual output of 1 million tons of SGAR Alumina, supported by an in-house thermal power plant, gas station, red mud storage facility, and public utilities.

Bauxite: gibbsite type, from Indonesia

Process: Bayer process

PMC: Progesys (headquartered in Canada) / B.V. (headquartered in the USA); Jaya CM (headquartered in Indonesia)

Project mode: EPC lump-sum turnkey contract undertaken by CHALIECO

Status: Commissioned in December 2024 (execution period approx. 36 months)

2.2 印尼氧化铝——BAI氧化铝项目
Indonesian Alumina — BAI Alumina Refinery Project

印尼BAI冶金级氧化铝项目 （二期）

产能：年产100万吨冶金级氧化铝，配套自备热电厂、煤气站、赤泥堆场及公用设施

项目管理承包方：Danantara Indonesia & Rekind & PUPUK Indonesia Holding Company

状态：银行级可研收尾

Indonesia BAI SGAR Alumina Project (Phase II)

Production capacity: Annual output of 1 million tons of metallurgical-grade alumina, supported by an in-house thermal power plant, gas station, red mud storage facility, and public utilities.

PMC: Danantara Indonesia & Rekind & PUPUK Indonesia Holding Company

Status: Bank feasibility study final stage

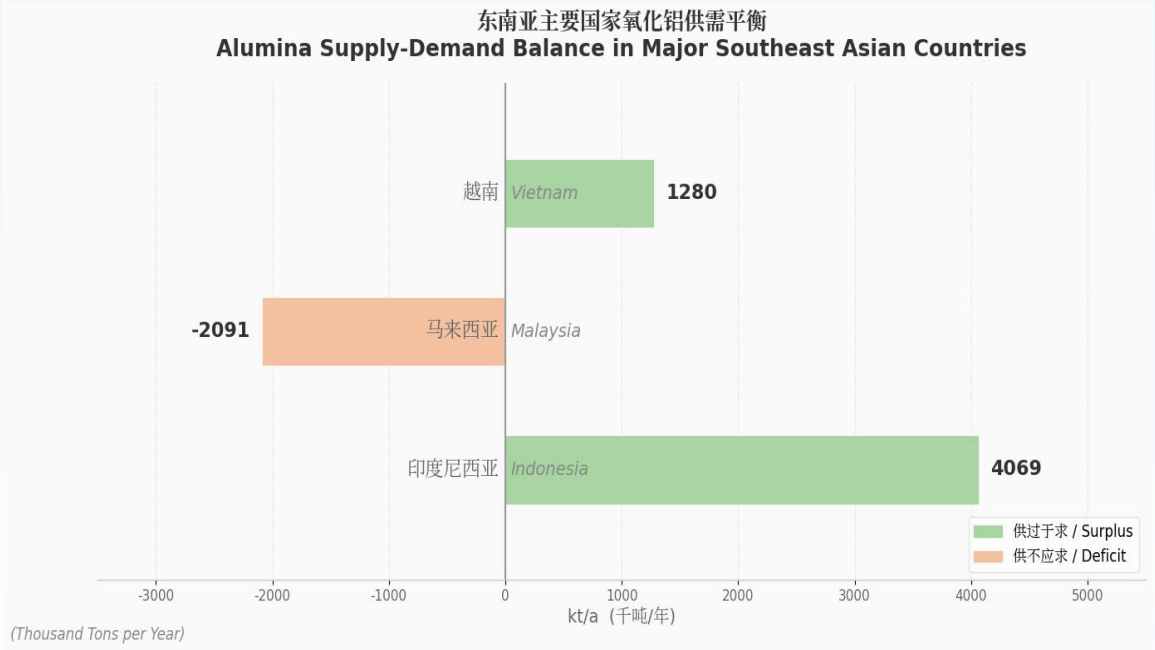
东南亚铝工业崛起-电解铝篇
Rise of Southeast Asian Aluminum Industry – Electrolytic Aluminum Section

3.1 东南亚电解铝——从资源到金属的跃迁
Southeast Asia Electrolytic Aluminum – From Resources to Metal

SAMI

2025年东南亚氧化铝供需平衡 2025 Southeast Asia Alumina Supply and Demand Balance

序号SN	项目名称 Item	印尼 Indonesia	越南 Vietnam	马来西亚 Malaysia
1	氧化铝 Alumina			
1.1	产能 Capacity	8,300	1,300	
1.2	产量 Production	5,616	1,280	
2	原铝 Primary Aluminum			
2.1	产能 Capacity	800		1,080
2.2	产量 Production	806		1,080
2.3	消费量 Consumption	1,547		2,091
3	氧化铝供需平衡 Alumina Supply & Demand Balance	4,069	1,280	-2,091



- 2026年东南亚原铝产量预计增至270万吨。
- Southeast Asia's primary aluminum production is expected to increase to 2.70 million tonnes in 2026.
- 2026年新增78万吨原铝产量，其中70.5万吨来自印尼。
- Additional 780,000 tonnes of primary aluminum output in 2026, of which 705,000 tonnes will come from Indonesia.
- **东南亚正迅速从氧化铝向电解铝产业链延伸，形成一体化制造基地。**
- **Southeast Asia is rapidly extending its industry chain from alumina to electrolytic aluminum, forming an integrated manufacturing base.**

3.3 越南——东南亚电解铝新力量

Vietnam – A New Force in Southeast Asian Electrolytic Aluminum

多农省铝电解厂项目

Dak Nong Aluminum Electrolysis Plant Project

投资方： Tran Hong Quan 冶金公司

Investor: Tran Hong Quan Metallurgical Company

总投资额： 约 18,423.64 亿越南盾（约合 7.4-7.5 亿美元*）

Total investment: Approximately 1,842.364 billion VND (approx. 750 million USD)

项目定位： 采用先进技术的大型现代化电解铝生产基地，旨在提升越南本土铝材加工能力，减少对进口铝锭的依赖。

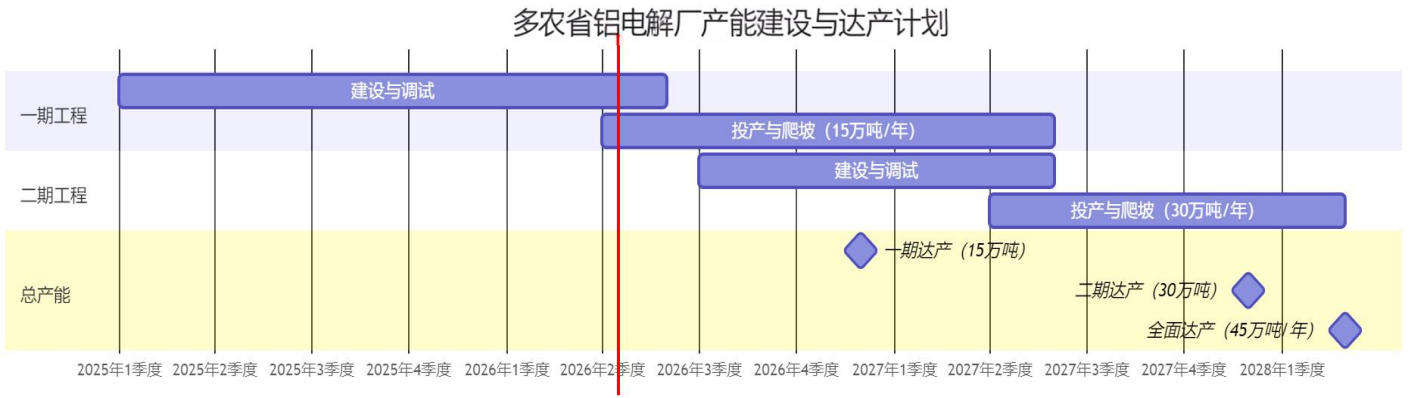
Project positioning: A large-scale, modern electrolytic aluminum production base utilizing advanced technology, aimed at enhancing Vietnam's domestic aluminum processing capacity and reducing dependence on imported aluminum ingots.

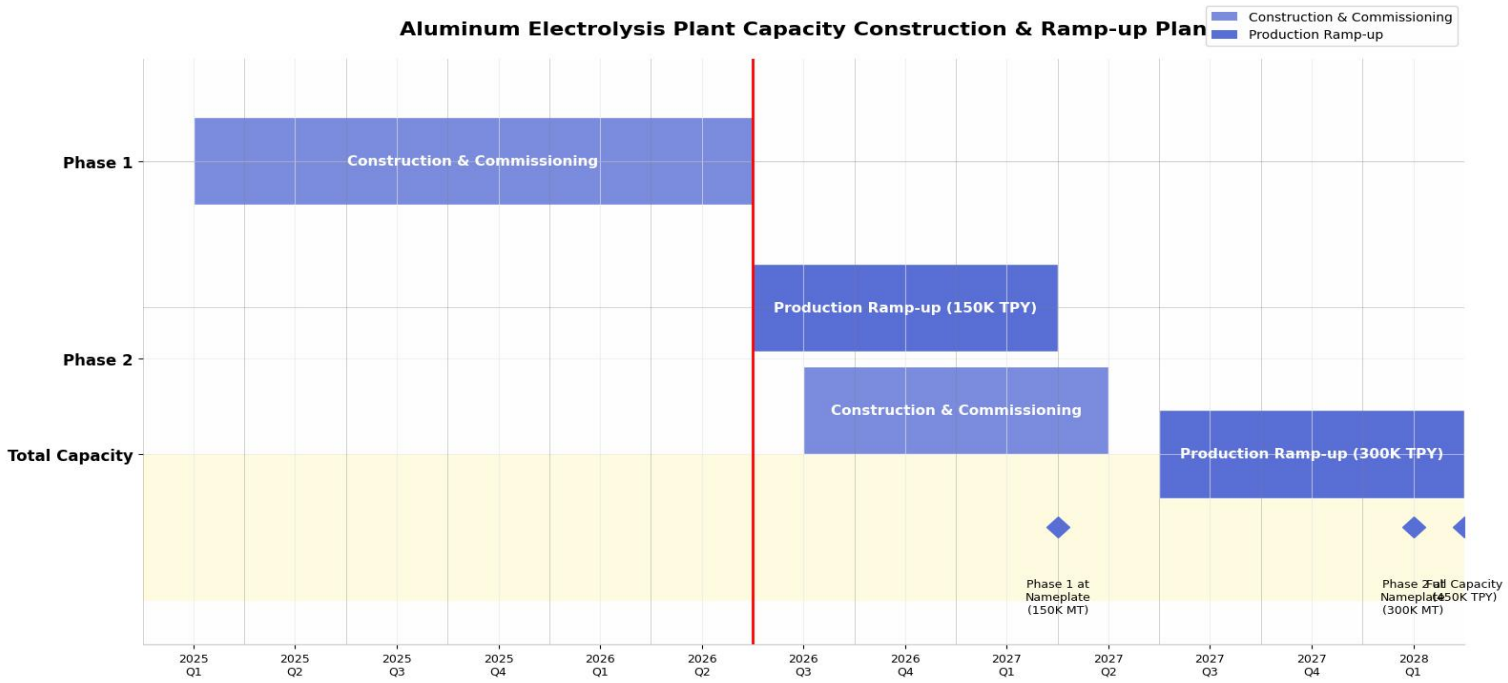
厂址：越南多农省（Dak Nong）——中部高原地区，临近铝土矿资源

Location: Dak Nong Province, Vietnam – Central Highlands region, close to bauxite resources.

2026年预计产量： 7.5 万吨（按半年产量折算，Q2投产）

Expected production in 2026: 75,000 tons (based on half-year production, with commissioning in Q2)





3.3 越南——东南亚电解铝新力量

Vietnam – A New Force in Southeast Asian Electrolytic Aluminum

资源就近

多农省拥有丰富的铝土矿资源，配套建设氧化铝厂的可能性较大，原料供应有保障

规模跃升

从15万吨起步，两年内跃升至45万吨，产能增长200%，体现快速扩张战略

填补空白

该项目将显著提升越南在全球电解铝市场的地位

Resource proximity

Dak Nong Province has abundant bauxite resources. There is a high possibility of building a supporting alumina refinery, ensuring raw material supply.

Scale leap

Starting from 150,000 tons, the capacity jumps to 450,000 tons within two years – a 200% increase, reflecting a rapid expansion strategy.

Filling a gap

This project will significantly enhance Vietnam's position in the global electrolytic aluminum market.

3.4 马来西亚——存量龙头
Malaysia – The Existing Capacity Leader in the Market

SAMI

齐力铝业
Press Metal Aluminium

资本市场地位：马来西亚证券交易所主板上市公司 (KLSE: PMETAL)，东南亚唯一的综合性大型原铝生产商。

Capital Market Status: A listed company on Bursa Malaysia (KLSE: PMETAL), it is the only large-scale integrated primary aluminum producer in Southeast Asia.

产能规模：拥有每年108万吨的电解铝冶炼能力，产能规模在全球范围内名列前茅。

Production capacity: 1.08 million tonnes per year of electrolytic aluminum smelting capacity, ranking among the top globally.

产业链完整性：业务垂直整合，从氧化铝进口、电解铝生产到下游合金加工，具备强大的成本控制与市场应变能力。

Industrial chain integration: Vertically integrated operations, from alumina import and electrolytic aluminum production to downstream alloy processing, enabling strong cost control and market adaptability.

产能规模
108万吨/年冶炼产能，东南亚第一

财务稳健
信用评级AA1，运营利润率持续提升

纵向延伸
向上游氧化铝精炼厂延伸，向下游挤压产品拓展

Production Capacity
1.08 million tpy smelting capacity, largest in Southeast Asia

Financial Stability
Credit rating AA1, consistently improving operating profit margin

Vertical Integration
Extending upstream into alumina refining and downstream into extrusion products

3.6 东南亚电解铝面临的挑战
Challenges Facing Electrolytic Aluminum in Southeast Asia

电力瓶颈
Power bottlenecks

煤电自备电厂占主导，Captive coal-fired power plants dominate

可再生能源推进缓慢，Slow progress in renewable energy adoption

电网稳定性不足

Insufficient grid stability

投资成本高
High investment costs

印尼电解铝投资回报处于有限水平，资本开支高于中国

- Return on investment for electrolytic aluminum projects in Indonesia remains modest
- Capital expenditure is higher than in China

环保与本地化要求
Environmental and localisation requirements

印尼对中资项目的环保标准和本地化用工要求日益严格

Indonesia imposes increasingly strict environmental standards on Chinese-funded projects and Stringent local labour content requirements

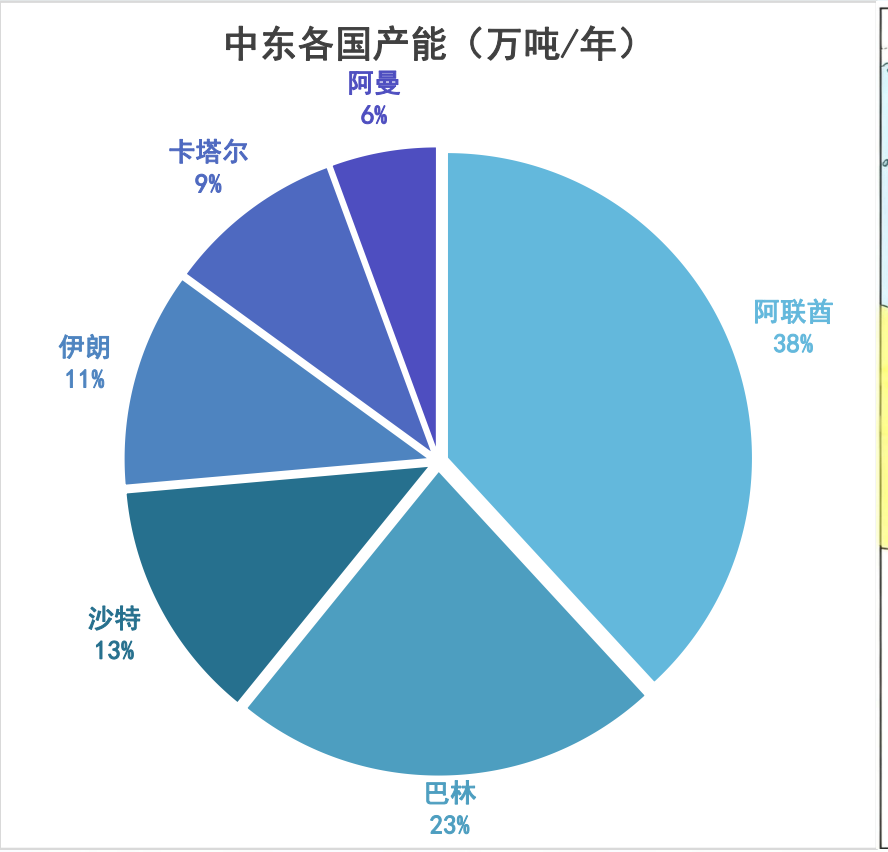
中东铝产业-挑战与变局
Middle East Aluminum Industry – Challenges and Transformation

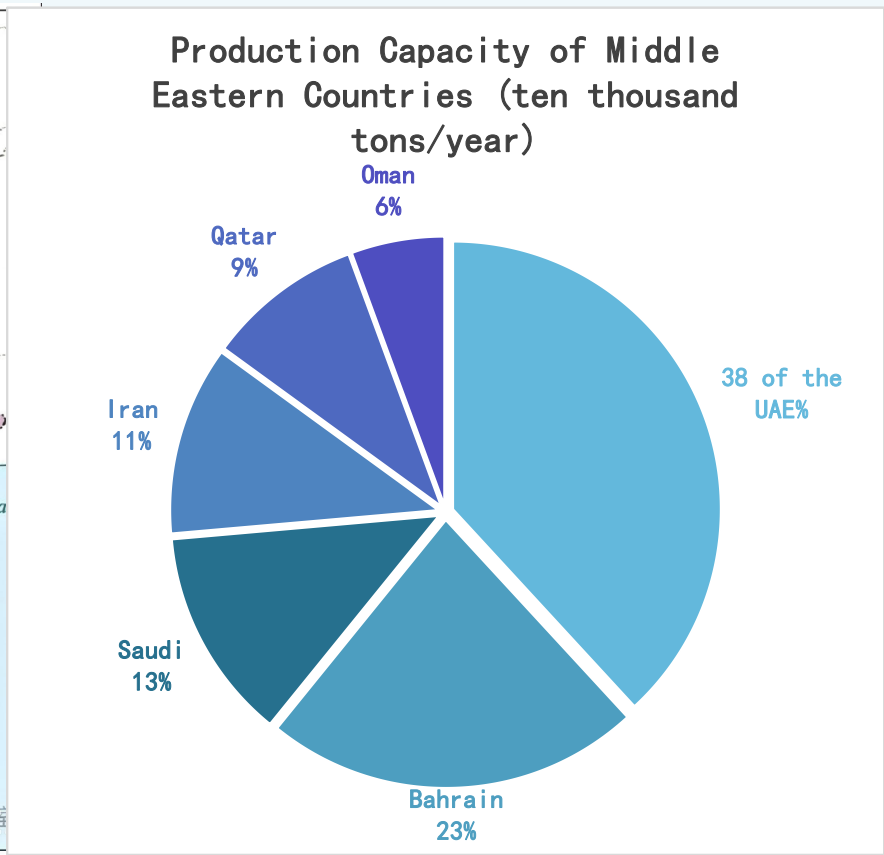
4.1 中东——全球电解铝核心产区之一

Middle East – One of the worlds core aluminum electrolysis production regions

依托廉价能源成为全球成本最低的区域

Leveraging low-cost energy to become the world's lowest-cost region





4.1 中东——全球电解铝核心产区之一

Middle East – One of the worlds core aluminum electrolysis production regions

六国建成产能

约700万吨/年

实际产量

约680-700万吨/年

全球产量占比

约9%-10%

主要国家

伊朗、阿联酋、沙特、巴林、卡塔尔、阿曼

Combined operational capacity across the six countries

Approximately 7 million tons per year

Actual Capacity

Approximately 6.8 to 7 million tons per year

Proportion of global production

Approximately 9%-10%

Major Countries

Iran, United Arab Emirates, Saudi Arabia, Bahrain, Qatar, Oman

4.2 中东核心铝企——伊朗+阿联酋+沙特

Key aluminum producers in the Middle East – Iran + UAE + Saudi Arabia

IRAN JAJARM	
产能 Capacity	25万吨 250kt/a
位置 Location	伊朗东北部的 Khorasan省 的佳加姆地区 The Jajam region in Khorasan Province, northeastern Iran

Al Taweelah	
产能 Capacity	240万吨 2,400kt/a
位置 Location	阿布扎比哈利法经济区的工厂，厂区位于迪拜和阿布扎比之间，坐落在波斯湾沿岸的哈利法经济区 The factory in the Abu Dhabi Khalifa Economic Zone is located between Dubai and Abu Dhabi, situated along the Persian Gulf coast within the Khalifa Economic Zone.

Ma’aden Aluminum Company Mine and Refinery	
产能 Capacity	180万吨 1,800kt/a
位置 Location	Ras Al-Khair工业区，位于沙特祖贝尔工业区西北90公里处 The Ras Al-Khair Industrial Zone is located 90 kilometers northwest of the Zubail Industrial Zone in Saudi Arabia.

4.2 中东核心铝企——阿联酋环球铝业+巴林铝业

Key aluminum producers in the Middle East – UAE Global Aluminum + Bahrain Aluminum

伊朗	
南方铝业 Southern Aluminum Industry	24.37万吨
伊朗铝业 Iran Aluminum Company	17.51万吨
阿尔玛赫迪铝业 Almahadi Aluminum Industry	15.25万吨
伊朗氧化铝公司 Iran Alumina Company	3.32万吨

中东最大铝生产商：阿联酋环球铝业（EGA）	
The largest aluminum producer in the Middle East: United Arab Emirates Global Aluminum Corporation (EGA)	
产能 Capacity	270万吨
主要厂区 Main factory area	1. 杰贝阿里铝冶炼厂（Jebel Ali Smelter） 2. 阿尔塔维拉铝冶炼厂（Al Taweelah Smelter）160万吨

全球最大单体铝冶炼厂：巴林铝业	
The worlds largest single aluminum smelter: Aluminium Bahrain B.S.C.the abbreviated form of a name Alba）	
2025年产能， Production 2025	162.3万吨
主要厂区	巴林王国南部铝业城
Main factory area	Alba Industrial City, in the southern part of the Kingdom of Bahrain

4.3 失衡的中东铝产业链：产能与原料的巨大鸿沟

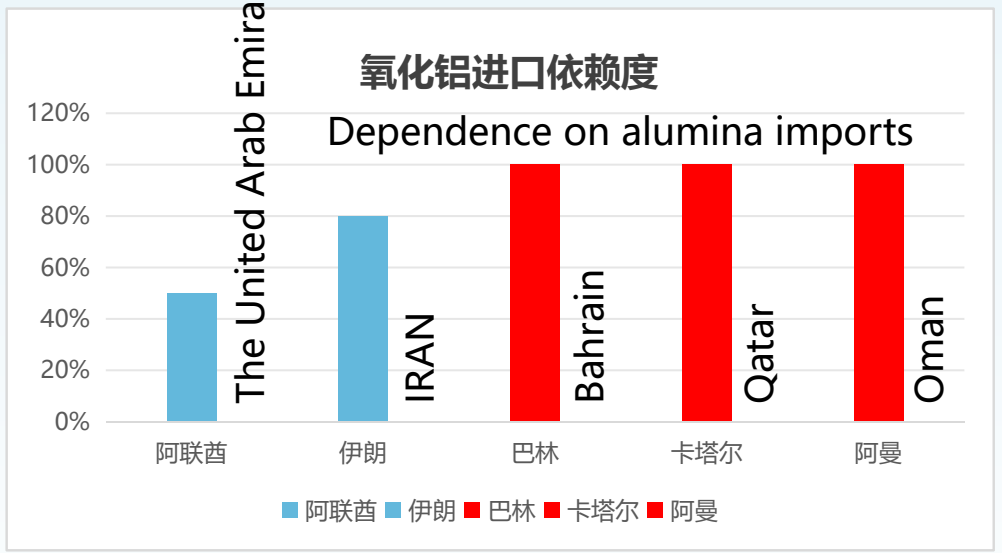
The Imbalanced Middle Eastern Aluminum Industry Chain: A Significant Gap Between Production Capacity and Raw Materials

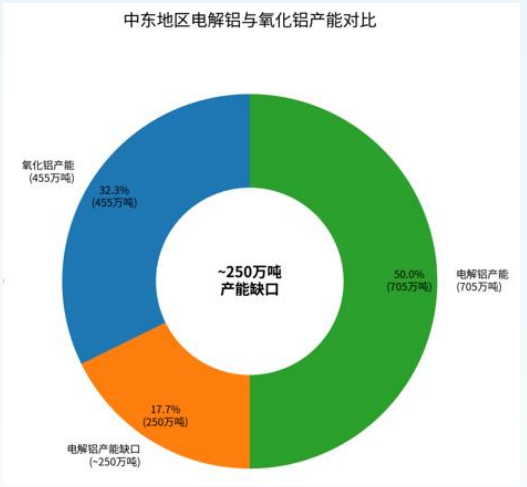
电解铝产量约680-700万吨/年，占全球9.2%；氧化铝产量449.2万吨/年，仅占全球9%-10%，自给率仅34%

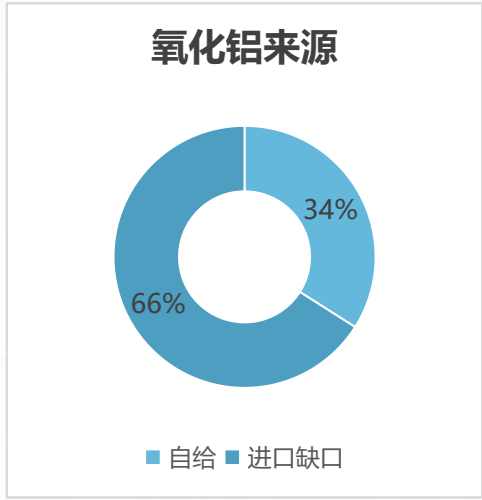
The annual production of electrolytic aluminum is approximately 6.8–7 million tons, accounting for 9.2% of the global total; alumina production stands at 4.492 million tons per year, representing only 9–10% of the global output, with a self-sufficiency rate of merely 34%.

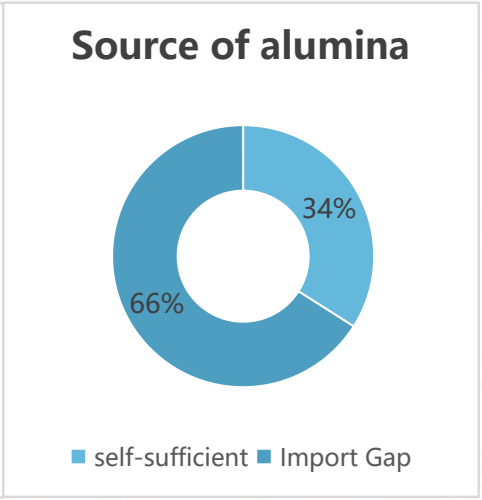
伊朗电解铝产量63.6万吨，氧化铝23.4万吨，对外依存度超80%；阿联酋年进口约280万吨；巴林、卡塔尔、阿曼三国更是100%依赖外部供应。

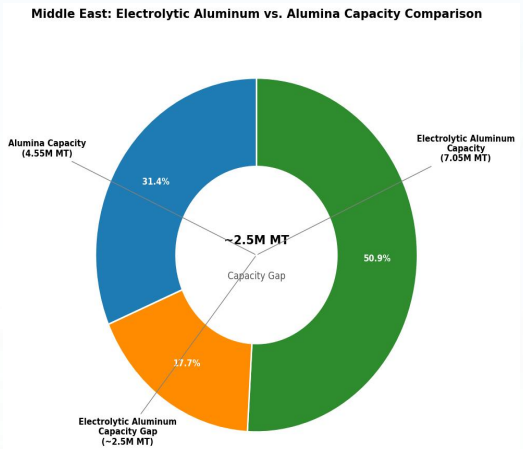
Irans electrolytic aluminum production reached 636,000 tons, with alumina output at 234,000 tons, exhibiting an external dependence rate exceeding 80%; the United Arab Emirates imports approximately 2.8 million tons annually; while Bahrain, Qatar, and Oman rely entirely on external supplies (100%).









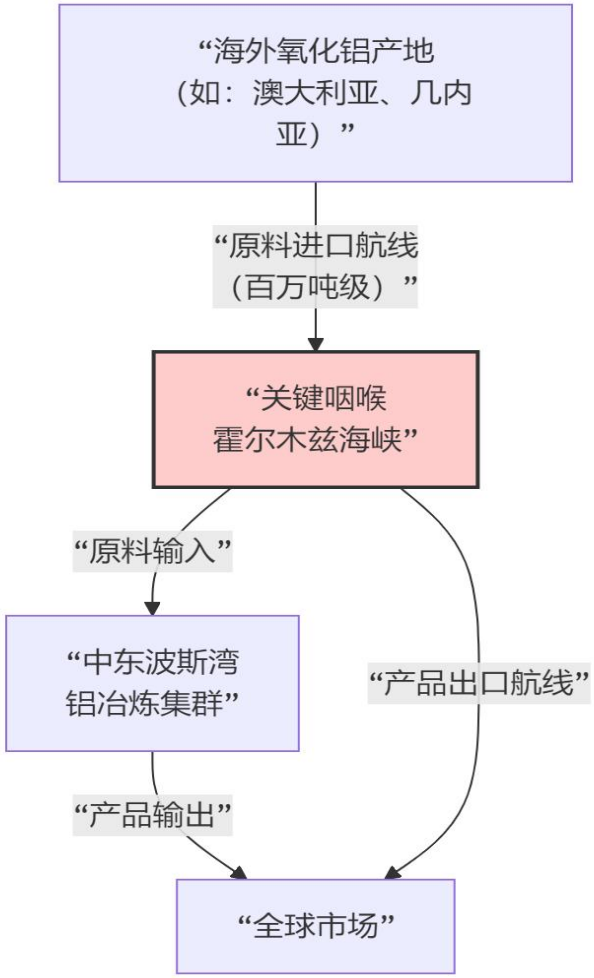


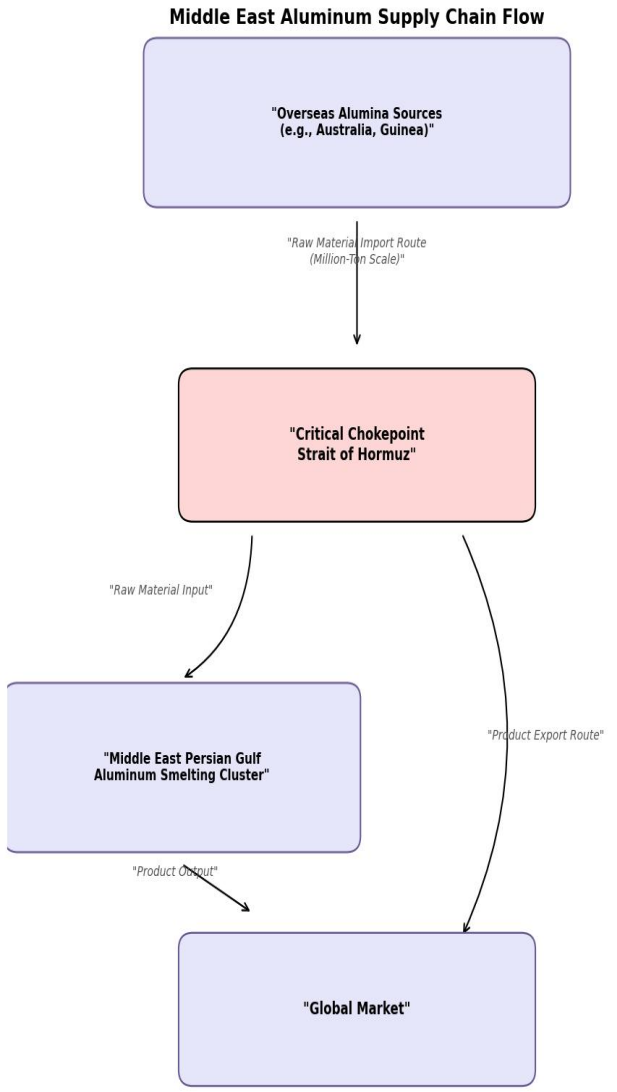
4.3 失衡的中东铝产业链：产能与原料的巨大鸿沟

The Imbalanced Middle Eastern Aluminum Industry Chain: A Significant Gap Between Production Capacity and Raw Materials

氧化铝进口与电解铝出口的“唯一通道”：霍尔木兹海峡

The "Sole Channel" for Aluminum Oxide Imports and Aluminum Oxide Exports: The Strait of Hormuz



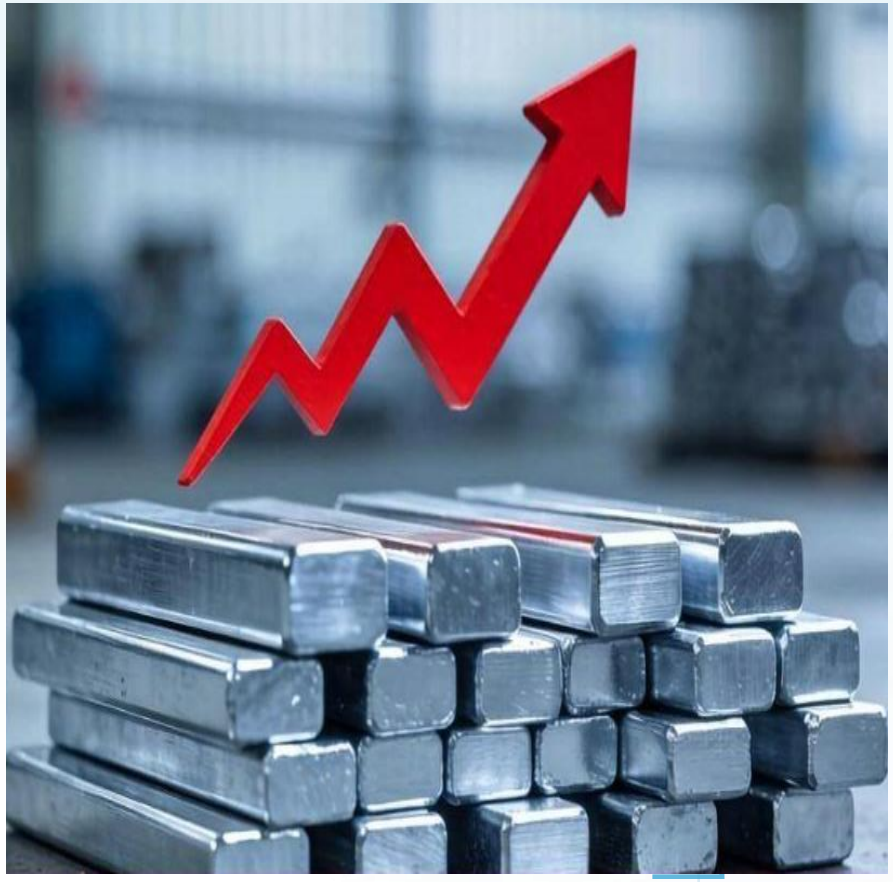


4.4 地缘冲突——对全球铝市场的冲击
Geopolitical Conflicts – Impact on the Global Aluminum Market

01

铝价飙升 Aluminum Price Surge

- 全球电解铝缺口将推动铝价不断挑战历史新高；
- The global electrolytic aluminum deficit will push aluminum prices to continually challenge historical highs.
- LME铝价一度达到3690美元/吨，创4年新高
- LME aluminum prices once reached $3,690/ton, hitting a 4-year high..



02

缺口持久 Persistent Deficit

预计2026年全球铝市场缺口扩大至90-150万吨，受影响产能恢复需12个月以上

The global aluminum market deficit is expected to widen to 0.9–1.5 million tons in 2026.

Recovery of affected capacity will take more than 12 months.

03

长缺难补 Long- lasting Deficit Hard to Fill

中东六国2025年产量680-700万吨，未来或陆续受影响

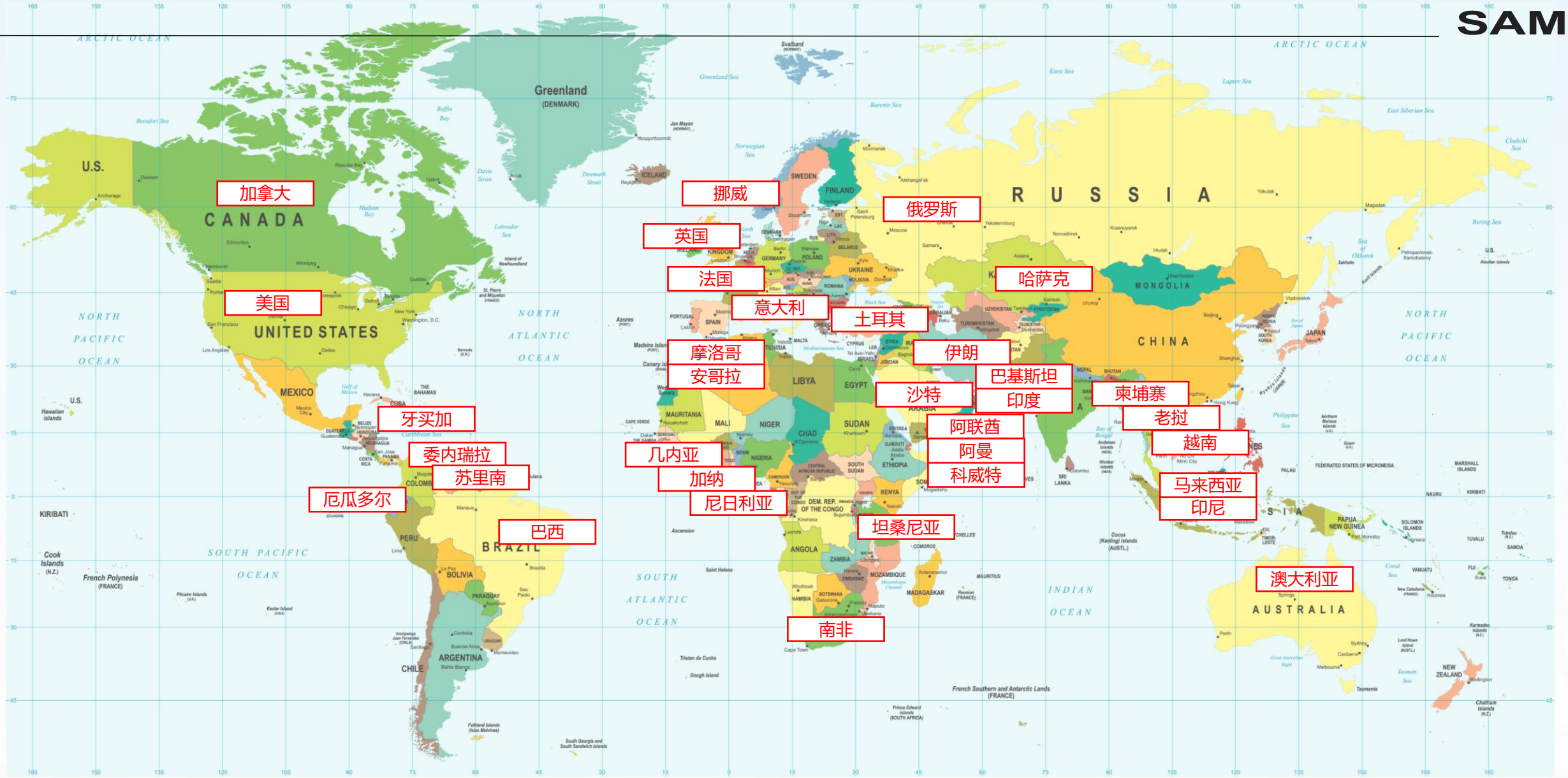
The six Middle Eastern countries produced 6.8–7.0 million tons in 2025, and may be gradually affected in the future.

对全球铝市场的冲击 Impact on the Global Aluminum Market

工艺装备支撑铝产业高质量发展

Process & Equipment Supporting High-Quality Development of the Aluminum Industry

5.5 遍布全球的客户信任
Global Customer Trust



总结与展望
Summary and Outlook

6.1 核心结论
Key Conclusion

铝价中枢上移 The central level of aluminum prices has risen

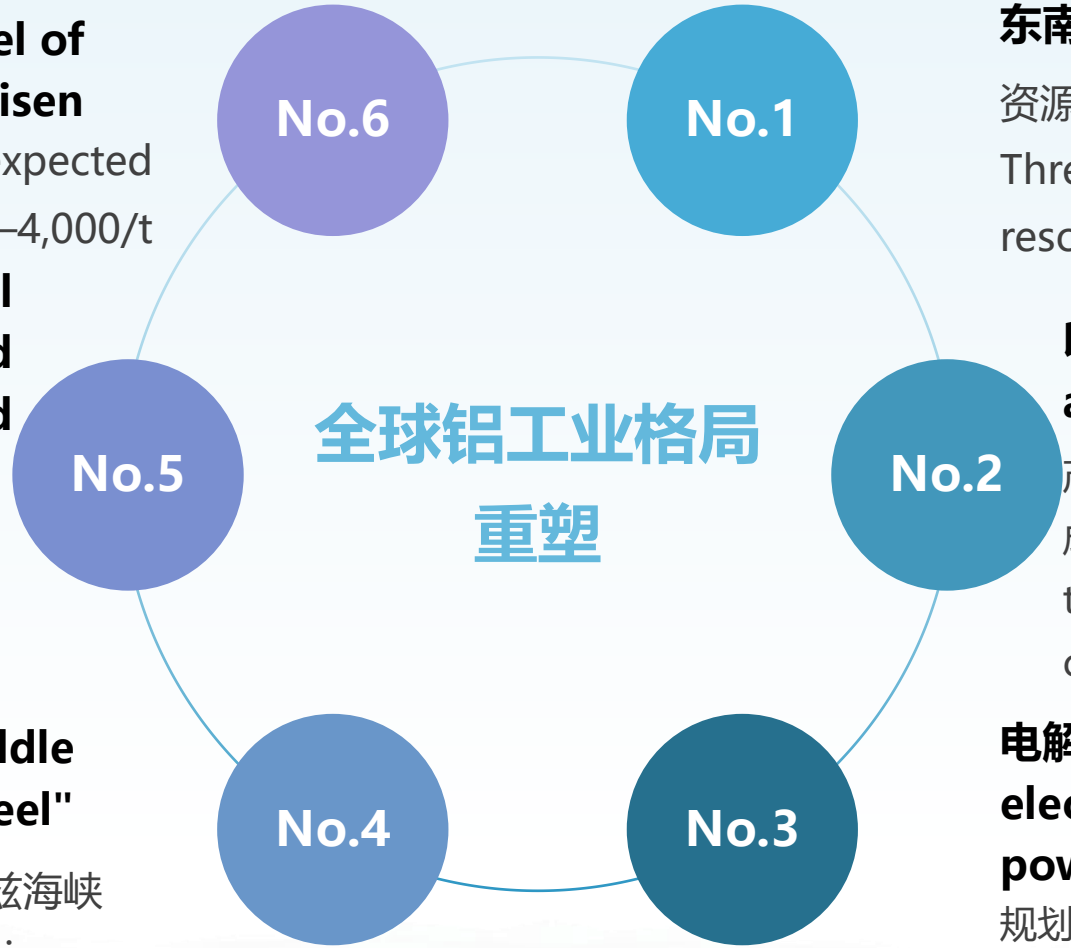
LME有望突破3500-4000美元/吨 LME expected to break through USD 3,500–4,000/t

全球供需实质性收紧 Substantial tightening of global supply and demand

缺口80-190万吨，供给增速降至1.4% Supply-demand gap of 0.8-1.9 million tons; Supply growth rate dropped to 1.4%.

中东“阿喀琉斯之踵” Middle East's "Achilles' Heel"

氧化铝自给率仅34%，霍尔木兹海峡唯一通道 Alumina self-sufficiency rate is only 34%; Hormuz Strait is the sole passage.



东南亚崛起 Rise of Southeast Asia

资源+人口+政策，三大引擎驱动 Three engines driving growth: resources, population, and policies

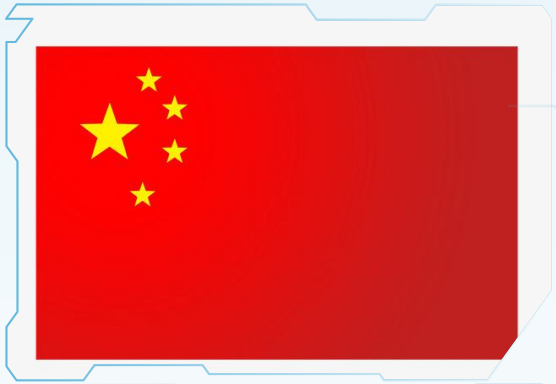
印尼氧化铝爆发 Indonesia’s alumina explosion

产能：830万 → 2330万吨，深刻改变全球成本曲线 Capacity: 8.3 → 23.3 million tonnes, profoundly reshaping the global cost curve

电解铝加速·电力瓶颈 Accelerated electrolytic aluminum construction vs. power bottleneck

规划940万吨，实际仅153万吨；电力建设滞后5年 Planned capacity 9.4 million tonnes, actual only 1.53 million tonnes; power infrastructure lags by 5 years

6.2 启示与展望——三条道路，三种未来
Insights & Outlook — Three Paths, Three Futures



01 中国铝企
Chinese Aluminum Enterprises

其核心战略在于将“出海”从产品输出升级为产能与标准输出，以进行全球布局，但必须审慎应对资源获取与本地化发展之间的平衡难题。

Its core strategy lies in upgrading "going global" from product export to capacity and standard export for worldwide expantion. However, it must prudently address the balance challenge between resource acquisition and localized development.

02 东南亚
Southeast Asia

其核心机遇在于把握产业跃迁的窗口期，利用自身优势承接产能并构建区域产业链，但成功的关键在于能否有效突破电力、基建与环保等发展瓶颈。

Its core opportunity lies in seizing the window of industrial transition, leveraging its own advantages to undertake capacity and build a regional industry chain. The key to success is whether it can effectively break through bottlenecks in power, infrastructure, and environmental protection.

03 中东
The Middle East

其核心任务是在后冲突时代进行供应链重构，通过向下游高附加值制造延伸和全球布局资源来巩固优势，并最终实现从能源依赖到技术与供应链安全的根本转型。

Its core task is to restructure supply chains in the post-conflict era, consolidate advantages by extending into high-value-added downstream manufacturing and globally deploying resources, and ultimately achieve a fundamental transformation from energy dependence to technology and supply chain security.

6.3 以设计赋能变革，以专业驱动未来

Empowering Change through Engineering, Driving the Future with Expertise

技术创新
Technological Innovation

质量升级
Quality Upgrade

数智驱动
Digital & Intelligent Drive

绿色发展
Green Development

成本把控
Cost Control

标准引领
Standard Leadership

SY165

- 孤网技术 Isolated Grid Technology
- 超细液滴脱硫技术 Ultra-fine Droplet Desulfurization Technology
- 。。。。。。

SY600

- 柔性生产技术 Flexible Production Technology
- 。。。。。。

轻金属

Light Metals

- 《轻金属》1964年创刊 First published in 1964
- 国内外公开发行、国家级科技期刊(月刊) Issuance: Published monthly and distributed both domestically and internationally.
- 沈阳铝镁设计研究院有限公司院主办 Publisher: SAMI
- 中国有色金属工业协会主管 Administrator: China Nonferrous Metals Industry Association.
- 主要栏目:综述·热点、轻金属冶金、数字化·智能化、新能源与双碳、轻合金材料。Key Sections: Review & Hot Topics, Light Metal Metallurgy, Digitalization & Intelligent Manufacturing, New Energy & Dual Carbon Goals, Light Alloy Materials.
- 有色金属领域高质量科技期刊 Classified as a High-Quality Scientific Journal in the non-ferrous metals field.
- 先后入选中文核心、CA、JST、CJFD等 Indexed in major databases including Chinese Core Journals, CA (Chemical Abstracts), JST (Japan Science and Technology Agency), and CJFD (China Journal Full-text Database).
- 入选中国科技期刊卓越行动计划集群化试点项目Selected as a cluster pilot project of the Excellence Action Plan for Chinese Scientific Journals
- 国际标准连续出版物号ISSN 1002-1752 ISSN: 1002-1752
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SAMI is eager to collaborate with industry peers for a brighter future.