

Legal Statement

The purpose of the information in this presentation is to guide ICA programs and provide members with information to make independent business decisions.

The content and projections in this presentation are based on primary and secondary research sources.

Antitrust Guidelines

ANTITRUST GUIDELINES FOR COPPER INDUSTRY TRADE ASSOCIATION MEETINGS

The following guidelines with respect to compliance with antitrust laws of the United States, Japan and European Community¹ are intended to govern the conduct of participants in copper industry trade association meetings, both at the meeting itself and in informal discussions before or after the formal meeting.

Price. Competitors should not discuss future prices (including terms of sale) of their products. There is no blanket prohibition against the mention of or reference to current or past prices but limits must be observed. Such references or mentions should occur only when necessary in connection with the development of association programs. For example, reference to a particular price level in comparing the cost of a copper product to a competing product is permitted. Whenever possible, such references should be discussed in advance with legal counsel.

Competitive Information. Competitors should not discuss the market share of a particular copper producer or copper fabricator's products. Furthermore, nothing should be said at a meeting which could be interpreted as suggesting prearranged market shares for such products or producer production levels. The overall market share of copper products may be discussed with regard to competition with non-copper products and general market acceptance.

New Products. Competitors should not encourage or discourage the introduction of a new product by another competitor or reveal a particular copper company's plans to change the production rate of an existing product or to introduce a new product. No company should disclose to another company whether it is in a position to make or market a new product. New products may be discussed in a technical manner or from the standpoints of competition with non-copper products and general market acceptance. In addition, proposed methods for and results of field and laboratory testing can be considered.

The Role of Legal Counsel. Legal counsel attends association meetings to advise association staff and other meeting attendees regarding the antitrust laws and to see that none of the matters discussed or materials distributed raise even the appearance of antitrust improprieties. During the course of a meeting, if counsel believes that the discussion is turning to a sensitive or inappropriate subject, counsel will express that belief and request that the attendees return the discussion to a less sensitive area.

A paper entitled
"Copper Industry Trade Associations and the Antitrust Laws"
is available upon request.

10/92, 5/93, 10/10

¹ Other foreign competition laws apply to International Copper Association, Ltd. (ICA)'s activities worldwide.

Preliminary Results:
Global Assessment of Aluminum Alloy
Focus on Aluminum Alloy (AA) 8000 Series

Sandy Monahan, Partner

April, 2017



MARTEC

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Study Scope and Methodology

What

AA8000 Series Building Wire & Cable

- Residential
- Commercial
- Industrial

Why

Exploratory Study to Assess Copper Substitution Risk

Where

Global

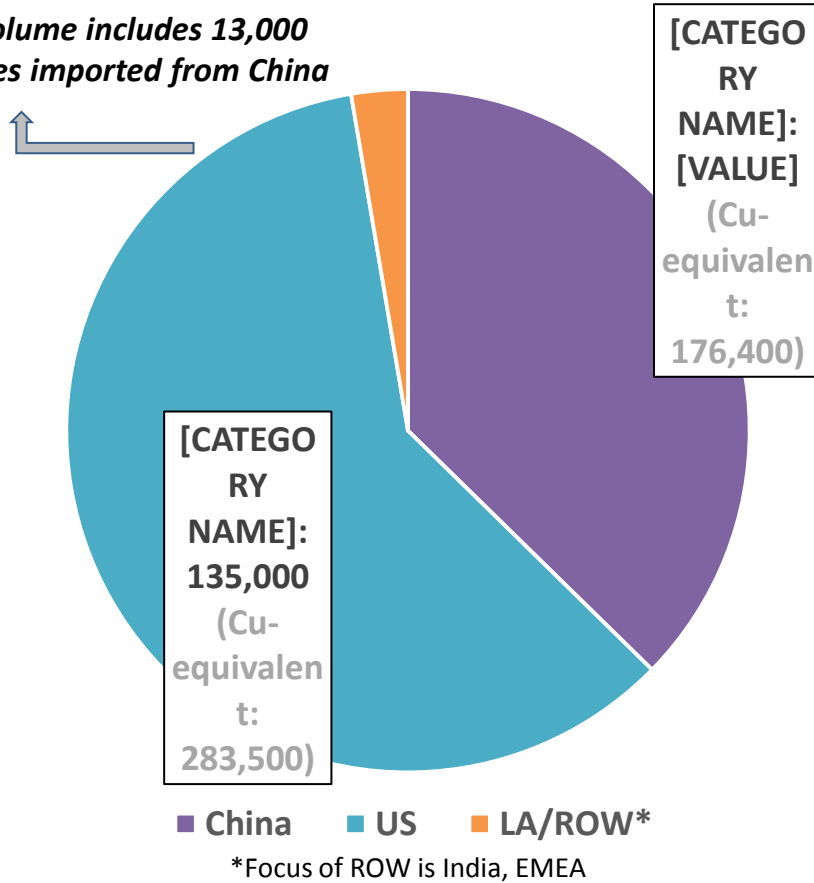
Who

Participants	North America	China	European Union	India ROW	Total
Wire/Cable/Rod Fabricators	11	18	11	7	47
Construction Industry -Electrical Engineers, Contractors, Distributors	15	--	5	--	20
Experts, Regulatory/Standards	6	3	5	7	21
Total	32	21	21	14	88

Global 2016 Volume

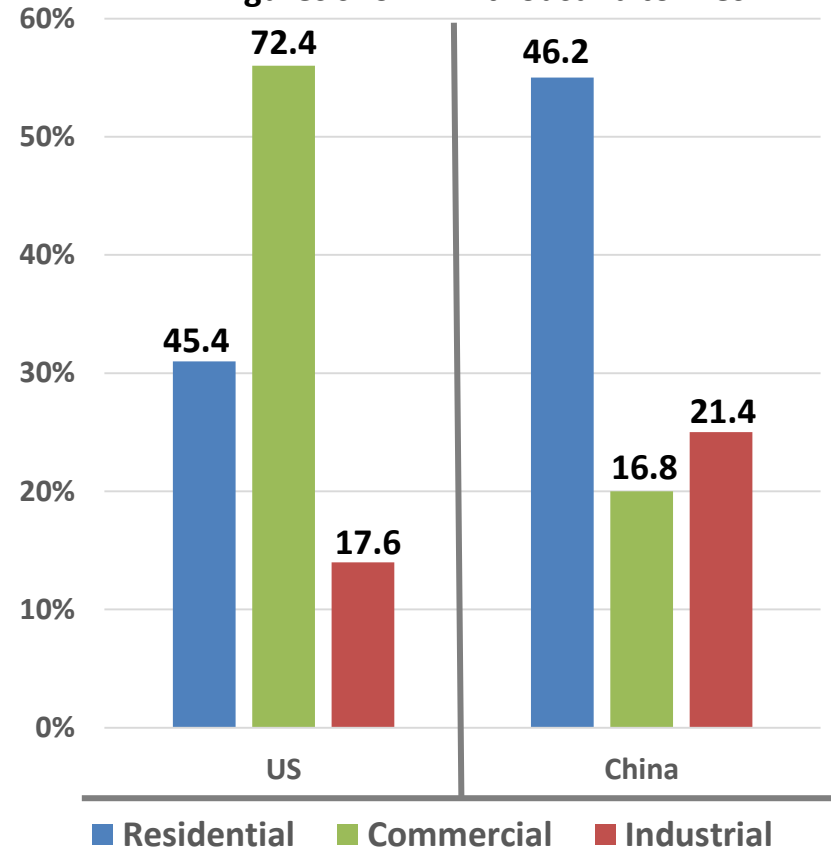
2016 AA8000 Market Size: ~225,000 MT
Copper Equivalent Size: ~472,500 MT

US volume includes 13,000 tonnes imported from China



2016 AA800 Volume Share by Building Sector

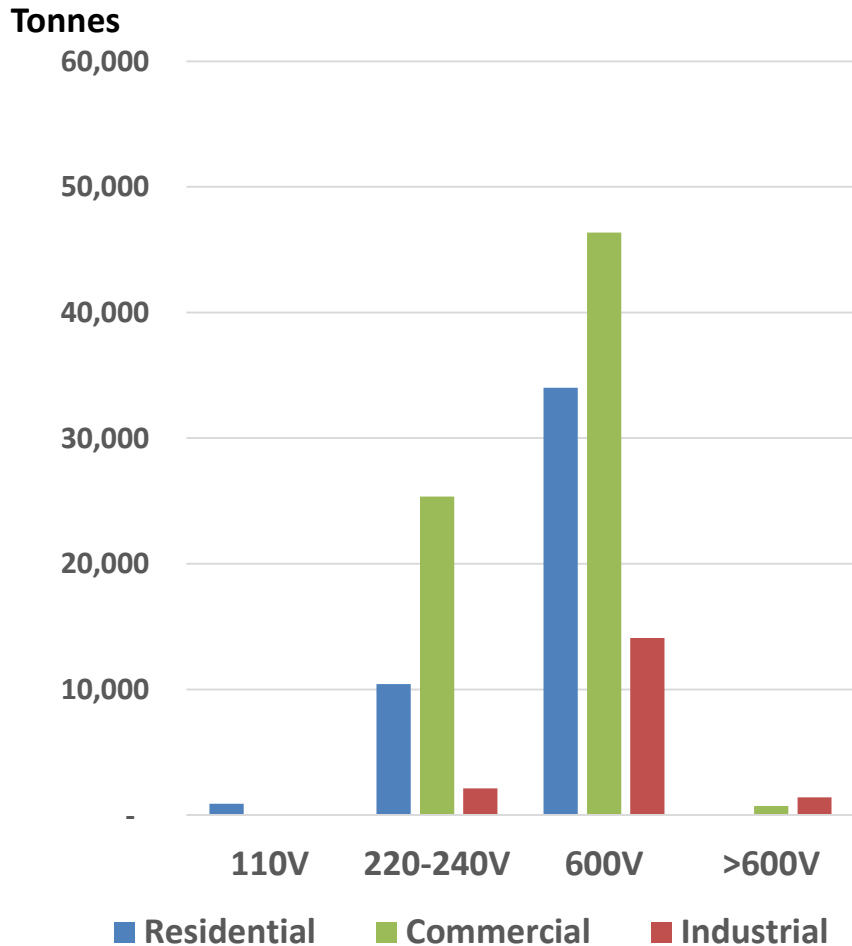
- All figures shown in thousand tonnes -



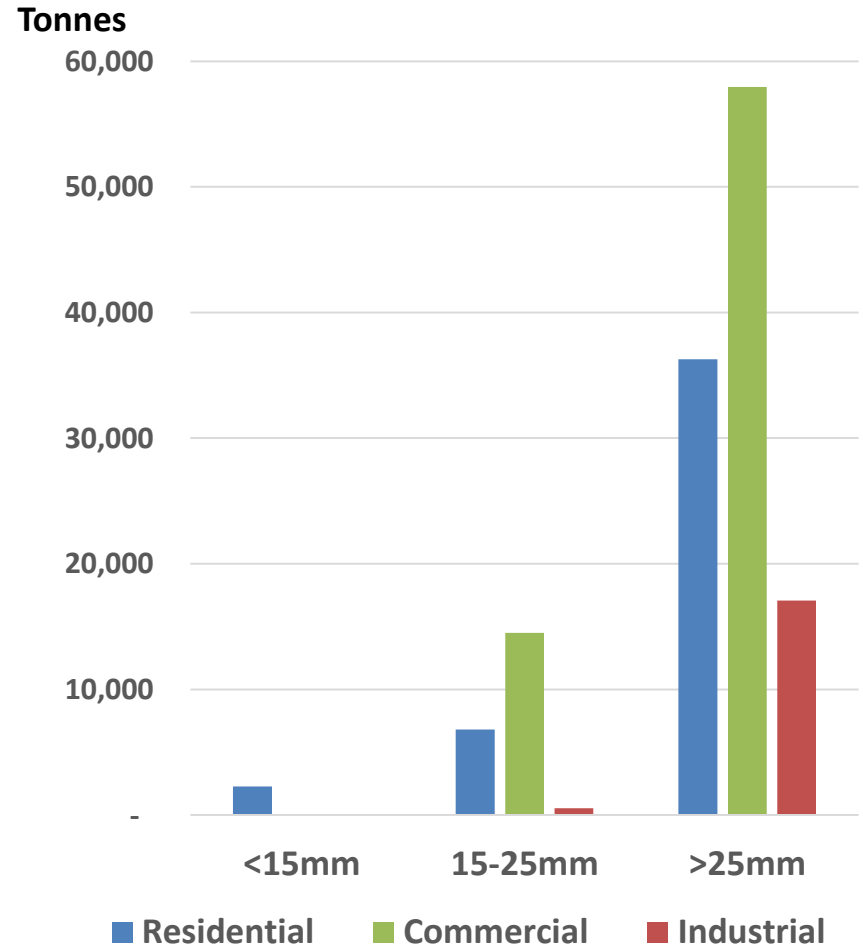
(Note: We use a copper equivalent ratio of 2.1 to 1)

In the US, AA8000 use is concentrated most heavily in 600V wires and wire sizes >25mm². Cost is the overriding driver; weight and size a factor in non-Residential.

US: 2016 AA8000 Volume – 135,000 MT
Share by Voltage

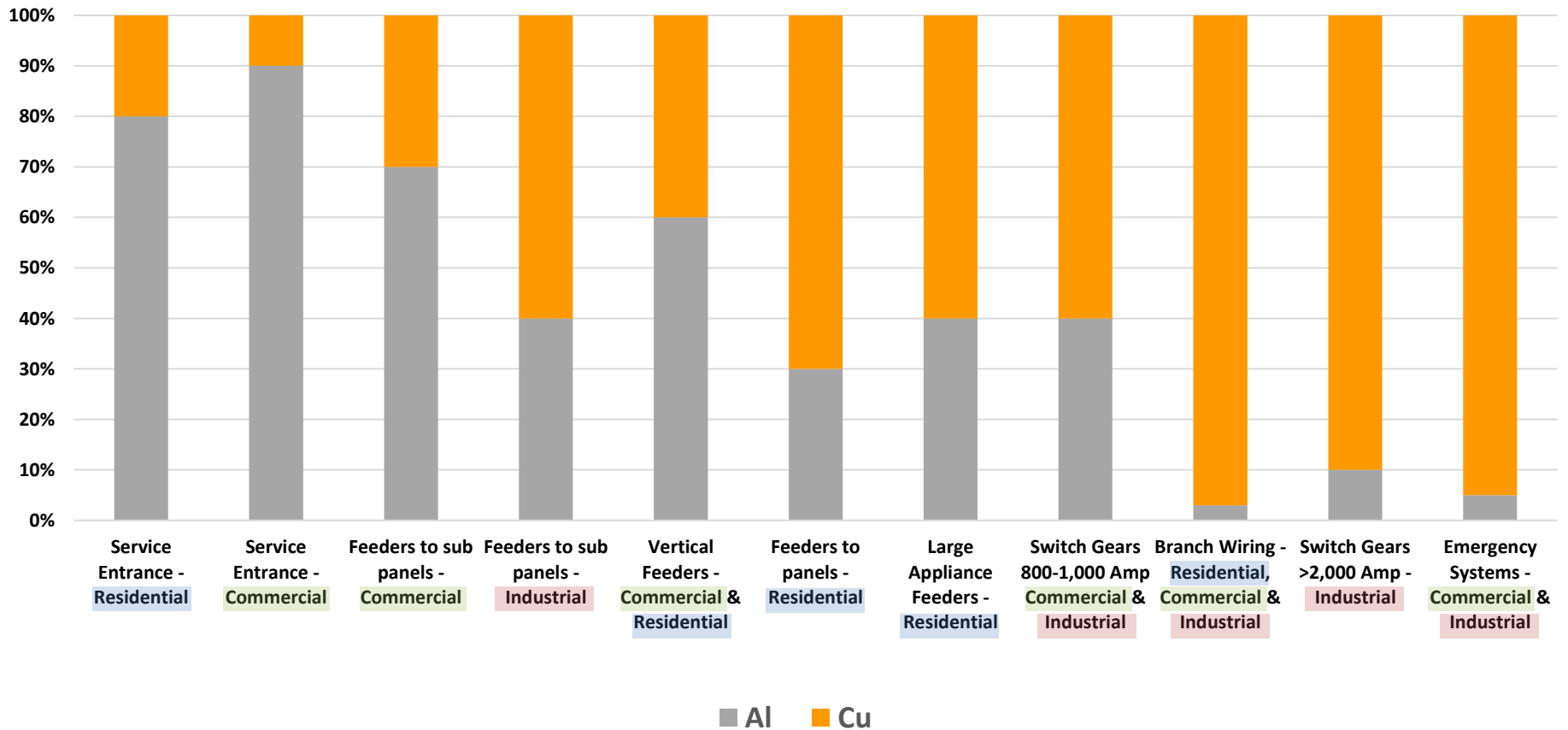


US: 2016 AA8000 Volume – 135,000 MT
Share by Wire Size



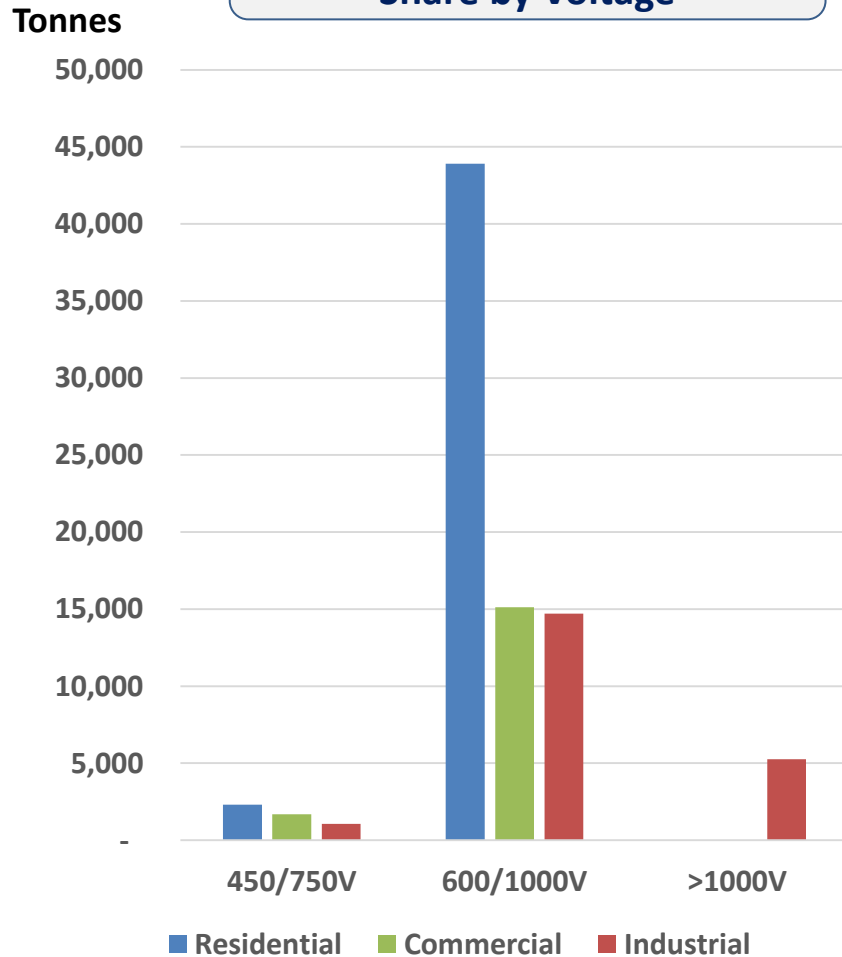
Service entrance and feeders are the most common uses for AA8000 in USA.

2016 US AA8000 Penetration by Application

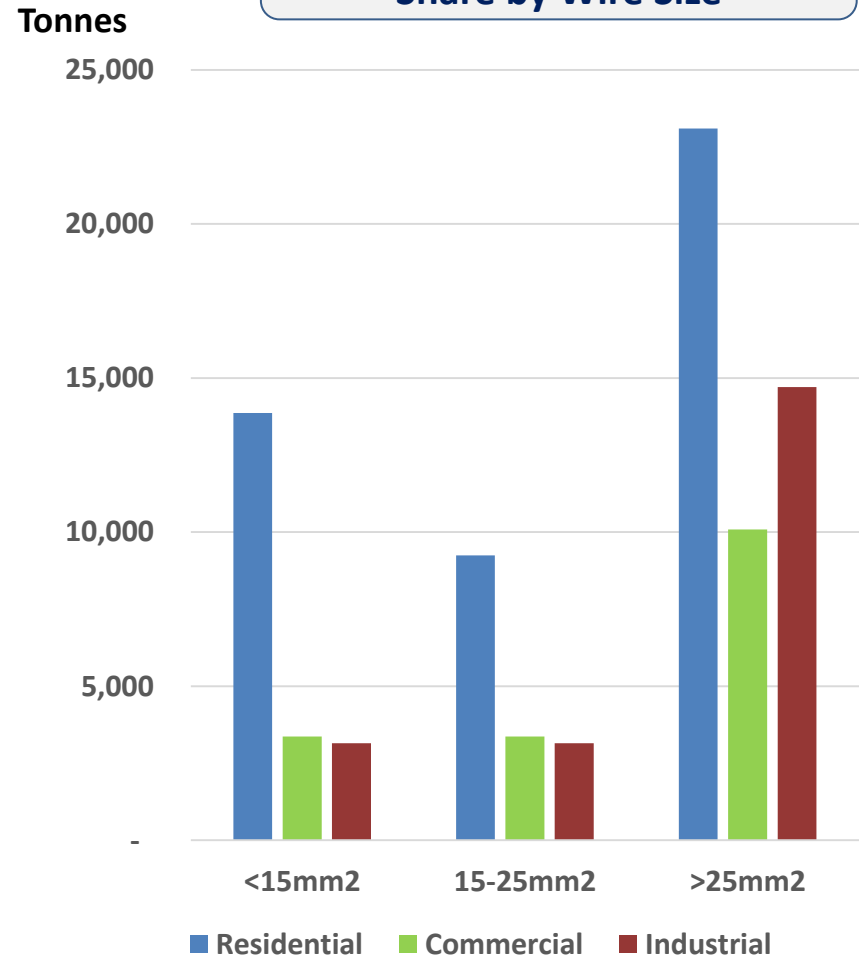


600/1000V and wires >25mm² are the dominant applications for AA8000 in China.

China: 2016 AA8000 Volume Share by Voltage

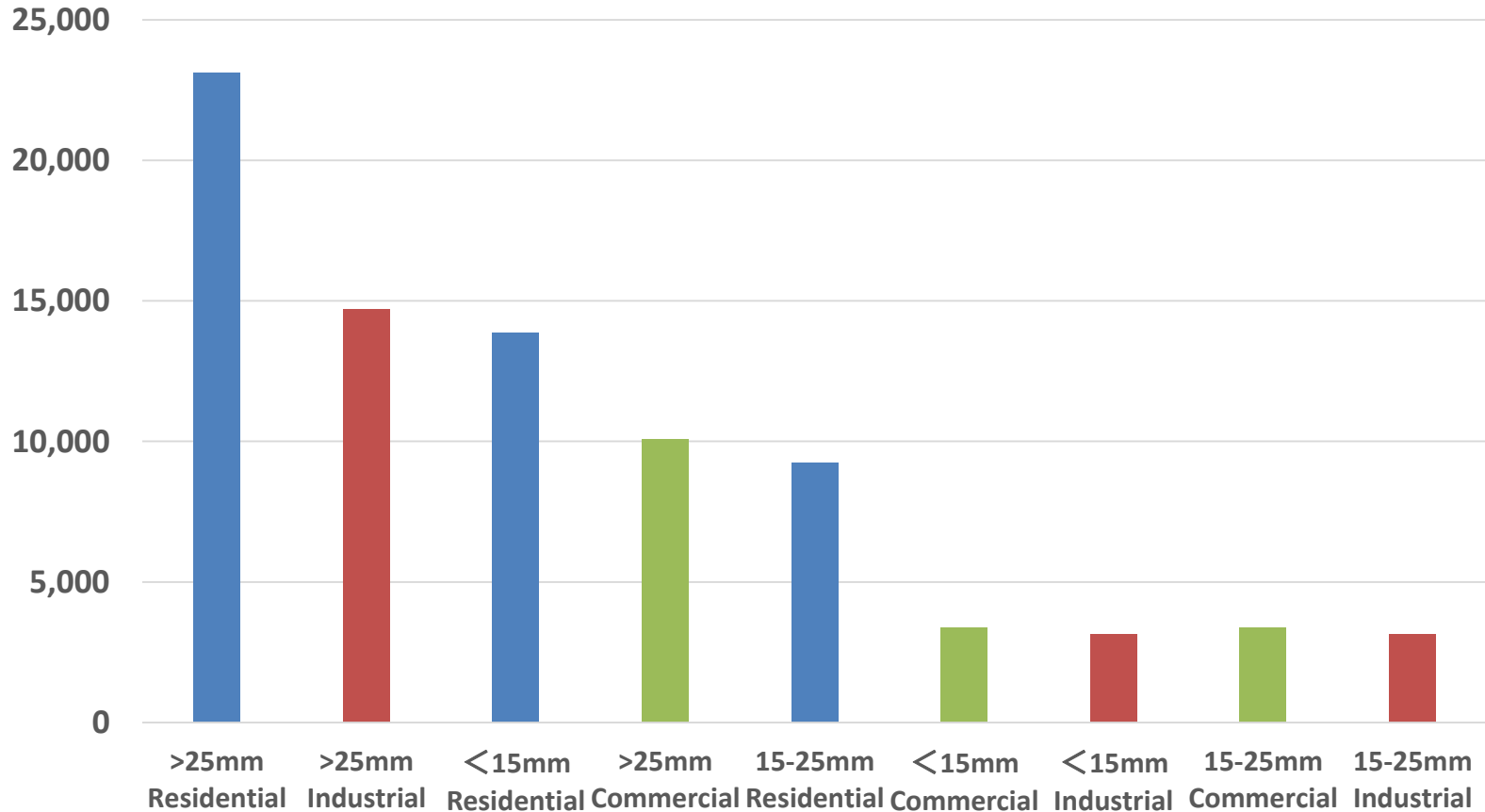


China: 2016 AA8000 Volume Share by Wire Size



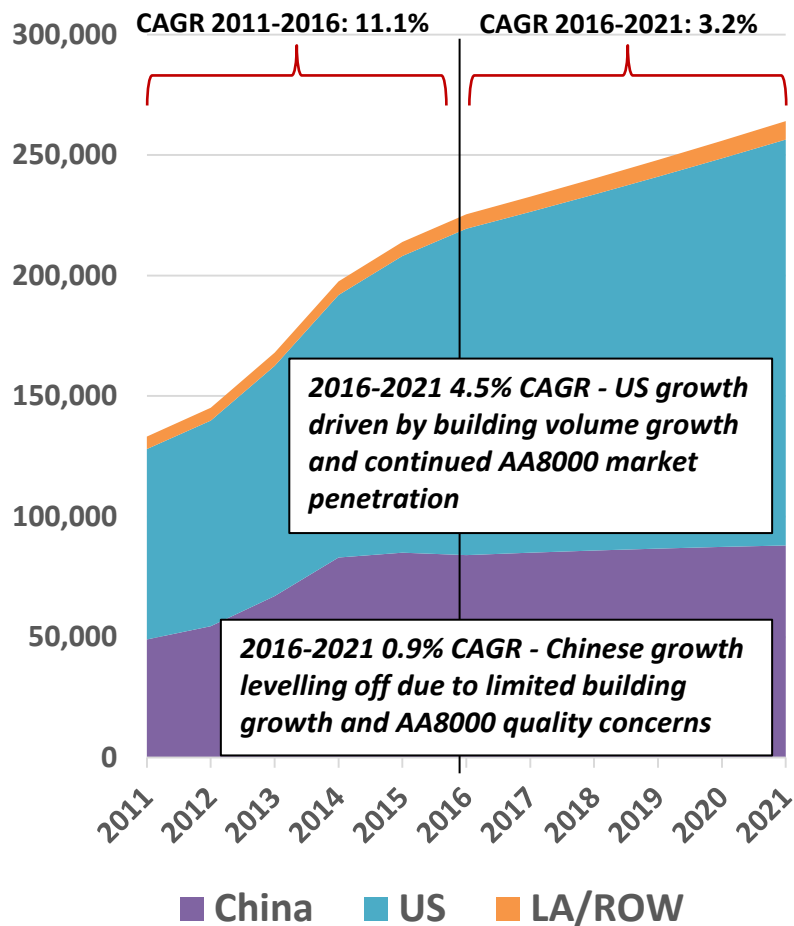
Residential, industrial and commercial wires $>25\text{mm}^2$ represented $\sim 48,000$ tonnes of AA8000 in China in 2016.

2016 China AA8000 – 84,000 MT Use by Wire Size

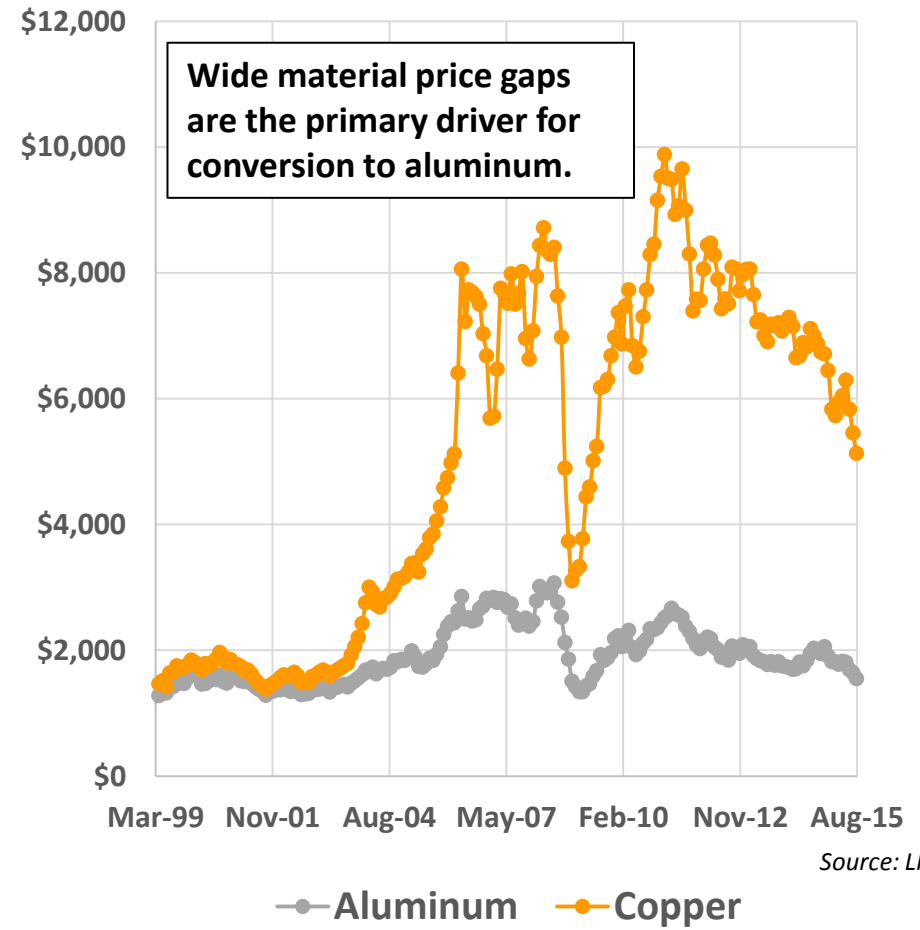


AA8000 growth is projected to slow in both US and China over the next 5 years; 2021 global AA8000 volume projected to be ~265,000 tonnes.

**Global AA8000 Market Size in MT
2011-2021**




Copper vs. Aluminum Commodity Price Index 1999-2015








Source: LME

US will be the primary growth market for AA8000 in the next 5 years.

Global Region	AA8000 Penetration and Growth – Next 5 Years	
	Drivers	Limiters
 <p>US Outlook:</p> 	<ul style="list-style-type: none"> • Favorable Standards (NEC) at larger voltages/sizes • Decreasing average age of Electrical Engineers <ul style="list-style-type: none"> ➤ <i>AI presents no fear/risk</i> • Value Engineering in property development: Electrical Contractor a first 'go-to' • In-house Engineering: e.g., data centers, e-commerce (Amazon) • Consolidated & respected set of fabricators which offer both Cu and Al wire & cable - enabler 	<ul style="list-style-type: none"> • 'Hangover' of AI problems experienced in '60's/'70's- perceptions that Cu is less risky persist outside fabricators, code bodies • Most owner-occupied buildings still heavily favor copper • Some faulty installations still can occur (over/under torque, terminations) • Publicly funded/government projects
 <p>China Outlook:</p> 	<ul style="list-style-type: none"> • Small to Mid size local Developers where cost savings is more critical • Construction in less-wealthy third- and fourth-tier cities, outer suburbs • Favorable regulatory environment <ul style="list-style-type: none"> ➤ <i>No standards on use, just on quality of product (GB/T & NB/T standards)</i> 	<ul style="list-style-type: none"> • Flat/negative construction growth • 'Chaos' effect of unqualified AA8000 • 200+ AA8000 producers; top 10 account for only 30% of the market • Quality & Safety reputation of national developers • Fear of fire safety issues for large densely-occupied buildings • Publicly funded/government projects • Projects in densely-populated areas

EU and ROW expected to show negligible growth for AA8000 in building and construction market.

Global Region	AA8000 Penetration and Growth – Next 5 Years	
	Drivers	Limiters
 EU Outlook: 	<ul style="list-style-type: none"> None significant found 	<ul style="list-style-type: none"> AA8000 adoption severely restricted by various EU, national and local standards (VDE, etc.) Connectors, conduit, circuit breakers, etc. designed for copper only Cable manufacturers found no market interest Cheaper 1370 aluminum used where acceptable Practices, tradition, mindset anchored in copper
 India Outlook: 	<ul style="list-style-type: none"> Aluminum is widely available 	<ul style="list-style-type: none"> National Building Code, National Electrical Code, and Centre Electrical Authority all have copper-only policies 27 of 29 State Electrical Boards allow only copper Cable manufacturers not interested in producing aluminum cable – see no opportunity in near future
Latin America/ROW Outlook: 	<ul style="list-style-type: none"> US acceptance of AA8000 Cost savings Some use found in UAE and Africa 	<ul style="list-style-type: none"> Chile, Brazil, Ecuador, Peru construction standards do not allow aluminum building wire; negative perceptions of aluminum still pervasive in Mexico