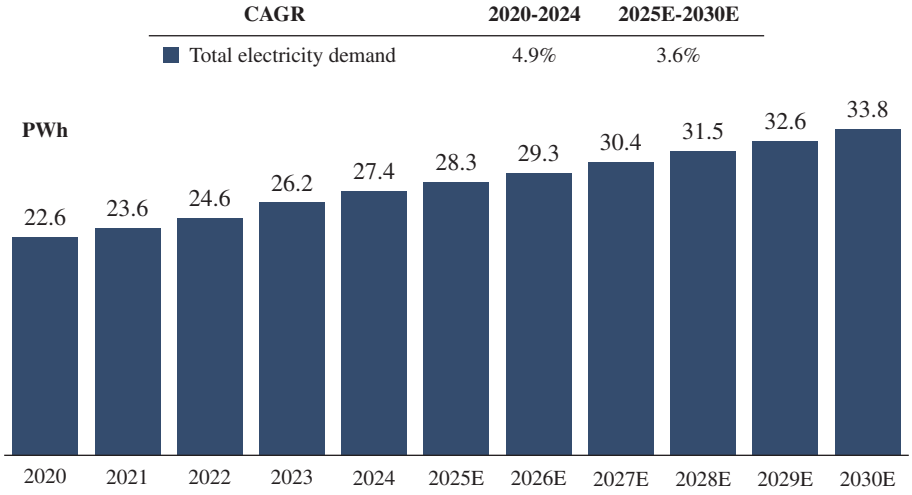
The information and statistics set out in this section and other sections of this document were extracted from the Frost & Sullivan Report, which was commissioned by the Company, and from various official government publications and available resources from public market research. The Company engaged Frost & Sullivan to prepare the Frost & Sullivan Report in connection with the [**REDACTED**]. *The information from official government sources has not been independently verified by any of the Joint Sponsors,* [**REDACTED**]*, the* [**REDACTED**]*, the* [**REDACTED**]*, the* [**REDACTED**]*, any of their respective directors and advisers, or any other persons or parties involved in the* [**REDACTED**] *(other than Frost & Sullivan), and no representation is given as to its accuracy.*

Electricity is indispensable infrastructure that underpins modern economies and daily life. It enables essential public services such as hospitals, water and wastewater treatment, public safety and emergency response, and supports the continuity of manufacturing, transportation, commercial operations and household activities. It is also the foundation for the digital economy, including telecommunications networks, cloud computing and data centers, where even brief supply disruptions can lead to safety risks, operational downtime and material economic losses. Against this backdrop, growth of global demand for electricity is increasingly outpacing the speed at which grids can be reinforced and upgraded to maintain stable and compliant power delivery.

Electricity demand has continued to increase, supported by structural electrification across transportation, buildings and industrial processes, and by the higher penetration of electricity-intensive infrastructure such as AIDCs. At the same time, the ongoing integration of renewable generation is lifting requirements for grid reinforcement and reliable power delivery, resulting in ongoing investments across power networks.

The chart below sets out global electricity demand from 2020 to 2030.

Global Electricity Demand, 2020-2030E



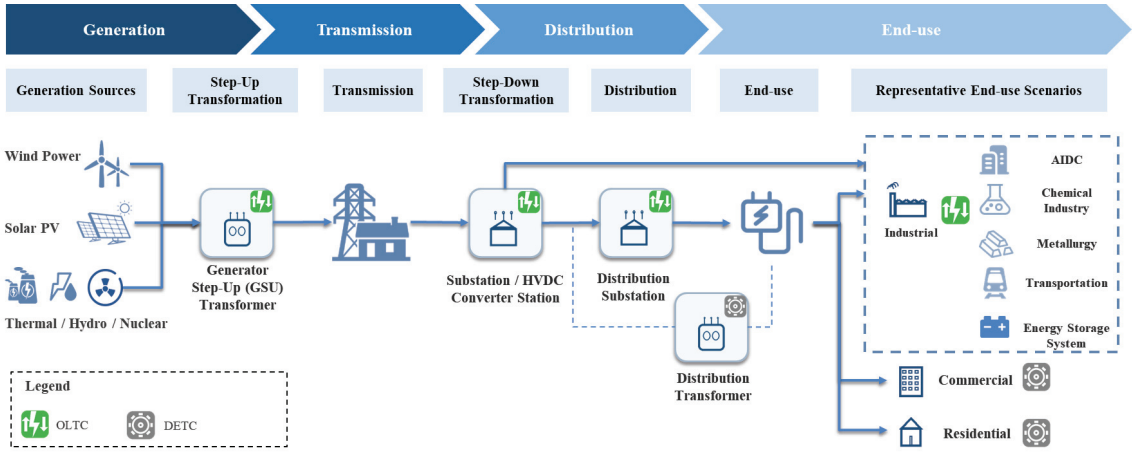
Source: International Energy Agency, World Bank, Frost & Sullivan analysis

The acceleration of electrification, proliferation of renewable energy build-outs and growing data centers loads are driving continuous increase in global electricity consumption while also amplifying system variability. Since 2020, renewable energy installed capacity has increased by approximately 59%, and AIDC IT power load has risen by approximately 44% over the same period, heightening requirements for grid reinforcement, system stability and power quality.

To fulfill the heightened requirements, there have been continued investments in transmission and distribution equipment, particularly transformers. Transformers are core equipment for power transmission and distribution. Tap changers are a critical part of transfomers, serving as the only mechanically dynamic major component to regulate voltage under fluctuating load conditions. Without effective tap changing and voltage regulation, grid voltage instability would exacerbate the risk of equipment failures and outages. This underpins the structure demand for tap-changers, having them as a indispensable part of reliable and compliant grid operation.

The chart below illustrates the principal application scenarios of tap-changers across the power system value chain.

Application of Tap-Changers Across Power System



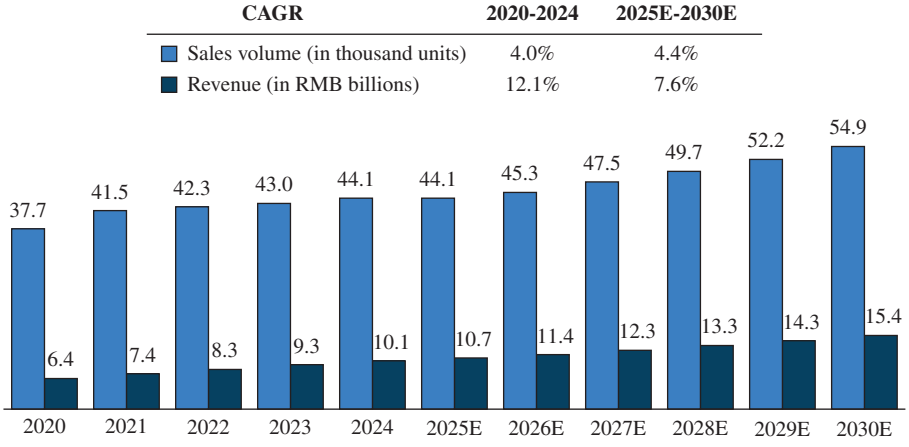
Source: Frost & Sullivan analysis

GLOBAL TAP-CHANGER MARKET OVERVIEW

Global demand for tap-changers has continued to grow on a relatively stable basis, supported by sustained grid investment and transformer fleet expansion, together with recurring replacement demand as installed equipment reaches end of service life. In addition, ongoing upgrading in technology and application mix, including rising penetration of on-load and vacuum solutions and increasing deployment in higher voltage class and HVDC applications, has supported revenue growth ahead of shipment growth.

The chart below sets out the global tap-changer market size, in terms of sales volume and revenue, for the years from 2020 to 2030.

Global Tap-Changer Market Size, by Sales Volume and Revenue, 2020-2030E



Source: Listed companies' public filings, companies' websites, Frost & Sullivan analysis

Global Tap-changer Market Size Breakdown by Regions

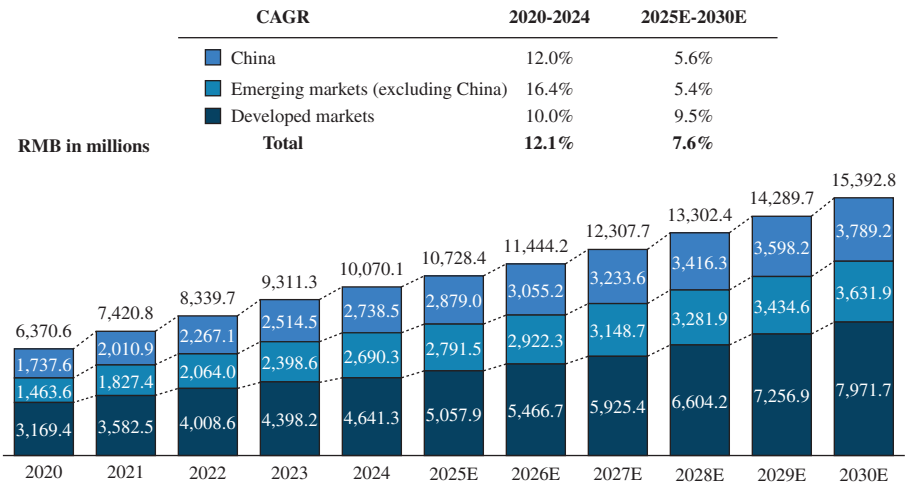
The global tap-changer market has a clear regional split. Developed markets are largely replacement led and tend to upgrade toward higher voltage classes, wider adoption of vacuum solutions and broader use of online monitoring and digitalized operation and maintenance. Emerging markets are largely expansion led, focusing on new substations and distribution build out, with increasing configuration of on load voltage regulation in new projects. Together, new installations and replacement demand provide a diversified source of global revenue.

In China, demand is supported by renewable integration and cross regional transmission expansion, with HVDC and UHV projects driving higher voltage class applications and broader adoption of vacuum OLTCs. Distribution side on load voltage regulation and online monitoring are also increasing. The China market reached RMB2,738.5 million in 2024 and is projected to reach RMB3,789.2 million by 2030.

Major developed markets remain replacement led, supported by aging assets and tighter compliance and testing requirements. Aggregate developed markets reached RMB4,641.3 million in 2024 and are projected to reach RMB7,971.7 million by 2030.

Emerging markets (excluding China) are primarily driven by greenfield grid build-out and capacity expansion to improve electrification coverage, enhance transmission and distribution capability, and address load growth driven by urbanization and industrialization. This growth is accompanied by the accelerating adoption of vacuum solutions and the expansion of service and spare parts networks. The aggregate market size for emerging markets reached RMB2,791.5 million in 2024 and is projected to grow to RMB3,631.9 million by 2030.

Global Tap-Changer Market Size, by Revenue and by Regions, 2020-2030E



Source: Listed companies' public filings, companies' websites, Frost & Sullivan analysis

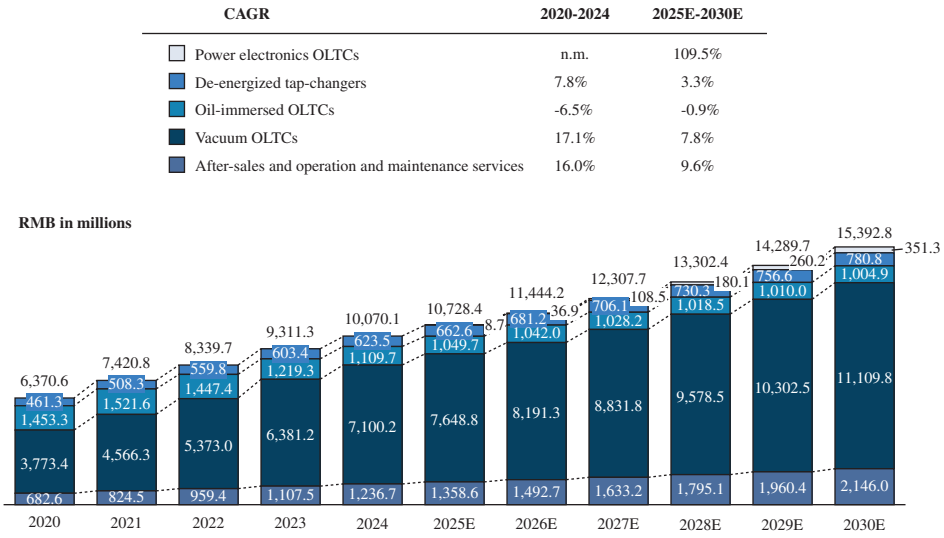
Global Tap-changer Market Size Breakdown by Product Types

Vacuum OLTCs quench the switching arc within sealed vacuum interrupters, reducing reliance on insulating oil, extending maintenance intervals and improving service availability. As a result, vacuum solutions have become the mainstream choice in new-build projects across generation, transmission and distribution, particularly in higher voltage class and HVDC applications.

In terms of revenue, the global vacuum OLTC market increased from RMB3,773.4 million in 2020 to RMB7,100.2 million in 2024, and is projected to reach RMB11,109.8 million by 2030. By 2030, vacuum products are expected to account for approximately 89.1% of the OLTC segment by revenue.

Oil immersed OLTCs require more stringent oil condition management and shorter maintenance intervals, resulting in higher downtime-related costs in many applications. Demand continues to contract due to substitution by vacuum solutions, with usage increasingly concentrated in replacement and compatibility-constrained applications.

Global Tap-Changer Market Size, by Revenue and by Product Categories, 2020-2030E



Source: Listed companies' public filings, companies' websites, Frost & Sullivan analysis

As grid operating conditions become more volatile, demand for on load voltage regulation without interrupting supply is increasing, fostering OLTC penetration. Penetration in new installations increased to approximately 72% in 2024 and is expected to reach approximately 75% by 2030, while the share within the installed base is expected to rise from approximately 65% to approximately 70%, with OLTCs increasingly becoming a choice by default in the configuration of power networks, converter transformers, and mission-critical end-use scenarios.

Within OLTC technology pathways, vacuum OLTCs represent the clearest direction. Vacuum interrupters reduce reliance on oil, extend maintenance intervals and improve service availability, supporting better life cycle economics, particularly in higher voltage class, HVDC and critical load applications. Vacuum solutions accounted for approximately 71% of new installations in 2024 and are expected to reach approximately 85% by 2030. Within the installed base, penetration is expected to increase from approximately 35% to approximately 50%, primarily through replacement during scheduled overhaul windows.

Oil immersed OLTCs are shifting from mainstream new install choice to installed base upgrade demand. While they retain cost and compatibility advantages, they are disadvantaged in maintenance intervals, oil management and downtime costs, supporting substitution by vacuum solutions during maintenance cycles. Their share of new installations is expected to decline from approximately 29% in 2024 to approximately 13% by 2030, while their share in the installed base is expected to decrease from approximately 65% to approximately 49%, with demand increasingly concentrated in end-of-life replacement and selected compatibility constrained scenarios.

Power electronic OLTCs remain at an early stage and are oriented toward highly dynamic nodes requiring fast and programmable regulation and digital coordination, such as renewable interconnection points, source grid load storage projects and higher requirement industrial users. Adoption is expected to remain limited in the near term and to account for approximately 2% of new installations by 2030, with expansion dependent on further validation, cost reduction and interface standardization.

Growth Drivers and Development Trends

- **Rising demand for voltage regulation amid grid modernization and shifting load profiles.** The integration of renewables and interconnected grids, alongside concentrated loads from AIDCs and EV charging, has made voltage regulation an operational necessity. As these requirements extend into distribution networks and end-users, tap-changer installation rates are climbing, especially for transformers of 35kV and above.

- **Digitalization and end-of-feeder voltage management in distribution networks.** As loads grow more dispersed with pronounced peaks, and distributed PV and EV charging increase intermittency, distribution grids are experiencing more frequent voltage fluctuations. This is driving the broader adoption of on-load regulation at key nodes, enabling faster corrections, lower power losses, and condition-based maintenance.

- **Scale deployment of higher-voltage and HVDC projects are increasing performance requirements and raising average per-unit value.** Supplier selection is increasingly driven by proven track record at higher voltage class, including completion of relevant type and special tests and in-service references, supporting revenue growth that is expected to outpace volume growth over time.

- **The market is predominantly driven by mainstream vacuum solutions, with power electronic solutions providing incremental growth.** Favored for their low maintenance and high reliability, vacuum technologies lead both new installment and upgrades. Traditional oil-immersed alternatives are now largely limited to cost-sensitive or compatibility-constrained cases. Concurrently, power electronic solutions are gaining traction in digitalized industrial settings, though wider market penetration depends on ongoing cost reductions and technical validation.

- **Grid investment recovery and regional divergence support incremental demand, while business models extend toward services and data.** Demand is supported by refurbishment-led cycles in developed markets and expansion-led cycles in emerging markets, which partially offsets regional volatility. As the installed base grows, revenue is shifting toward overhaul, spare parts and after-sale services, supported by online monitoring and predictive maintenance, increasing recurring and data-enabled value creation and reinforcing entry barriers.

Entry Barriers and Key Success Factors

- **Stringent vendor qualification, high switching costs and outage risk.** Tap-changers account for approximately 5% to 25% of a transformer's cost, yet historically are associated with approximately 25% to 30% of transformer failures, making reliability a primary procurement criterion. The market is concentrated, with only a limited number of leading global suppliers, and customers typically prioritize supplier brand and reputation, proven project references, and validated product quality and service capability. Entry into qualified vendor lists generally requires extensive validation, including endurance testing of up to 300,000 switching operations over up to 12 months. Supplier replacement may also trigger system-level recertification and require planned outage windows and on-site integration, while quality issues can result in return-to-factory or major rework with substantial logistics and lifting costs. Accordingly, customers generally prioritize outage risk, operation and maintenance cost, and long-term availability over price, reinforcing incumbent relationships and high barriers to entry.

- **Strict system compatibility and integration complexity.** Tap-changers are engineered as an integral part of the transformer and must match the transformer's mechanical envelope, winding and tapping design, insulation and oil system configuration, and control/protection interfaces across different OEM platforms. Switching suppliers typically requires transformer-level redesign and revalidation, including interface changes and on-site commissioning support. Given the risk of retesting, rework and schedule disruption, customers generally favor established solutions with proven compatibility and in-service references to minimize execution and operational risks.

- **Multi-disciplinary R&D capability.** Tap-changers integrate materials and insulation, mechanical transmission, electrical switching and process and cleanliness control, where the core challenge is system integration and manufacturing consistency. The same model is expected to deliver stable performance across different configurations and operating conditions. This typically requires an end-to-end capability covering design and simulation, machining and surface treatment, molding and encapsulation, testing and quality traceability.

- **Complex supply chains and dedicated production lines.** Production typically involves a long supply chain with comprehensive manufacturing and outsourced processes across metallurgy, precision machining, insulation and sealing components. Certain key materials may be procured in small batches, limiting new entrants' pricing leverage and delivery stability. Dedicated molds and tooling require substantial investment and yields generally improve only through multiple iterations, forming natural scale barriers.

- **Full life-cycle services and customization capability.** Tap-changers are often customized by voltage class, load characteristics and grid connection specifications, requiring accumulated engineering know-how to support configuration and delivery. After commissioning, maintenance cycles can exceed 20 years, requiring spare parts assurance, periodic overhaul, local responsiveness and online diagnostics. Leading players typically benefit from decades of product platform and service network build out that is difficult to replicate quickly.

COMPETITIVE LANDSCAPE ANALYSIS

The global tap-changer market is characterized by high barriers to entry, which has resulted in market share concentration among a small number of leading players. According to Frost & Sullivan, in terms of revenue from the tap-changer business in 2024, we ranked second globally in terms of revenue, with a market share of 17.9%. The three largest global players collectively accounted for approximately 82.5% of the market, reflecting a high degree of industry concentration. In addition, the Company is the only China-based participant among the top three globally.

Ranking	Company	Headquarter	Revenue of Tap-changer Business	Market Share
			(RMB in millions)	*(%)*
1	Company A	Germany	5,052.4	50.2%
2	The Company	China	1,798.9	17.9%
3	Company B	Switzerland	1,448.2	14.4%
	Top 3 combined			**82.5%**

Source: Listed companies' public filings, companies' websites, Frost & Sullivan analysis

Note: Company A: Established in 1891 and headquartered in Regensburg, Germany, a private company engaged in the R&D and manufacture of transformer tap-changers and related monitoring solutions.

Company B: Incorporated in 2020 and headquartered in Zurich, Switzerland, a private company and a subsidiary of a Japanese diversified industrial group; its transformer components and tap-changer business traces back over a century, with key operations based in Sweden.

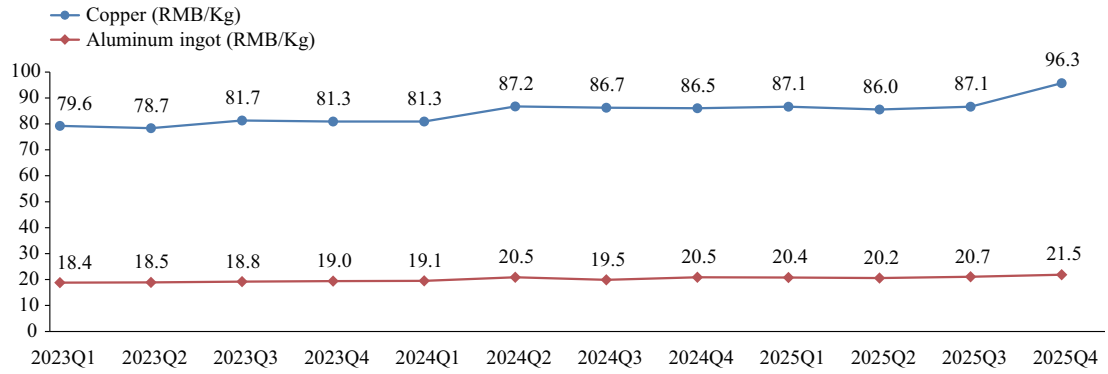
Competition among leading players has evolved from standalone product performance to integrated service capabilities and a proven track record in large-scale, high-profile projects. As the industry advances toward higher voltage classes, such as UHV and HVDC projects, customers increasingly prioritize end-to-end solutions. This encompasses efficient testing, scaled delivery, in-service commissioning, and comprehensive after-sales operations and maintenance support. Consequently, market share expansion is now primarily driven by a supplier's accumulated track record in high-profile benchmark projects and their ability to provide reliable, full life-cycle services.

In parallel, utility customers and transformer OEMs are moving from single sourcing toward dual or multi sourcing to enhance supply chain security and reduce execution risk. New suppliers, prior to eventual participation as dual-source tenders, typically need to progress from vendor list admission to pilot deployment. Procurement wallet share increase is expected only after sustaining satisfactory in-service performance over maintenance cycles with traceable operating data serving as support.

RAW MATERIALS PRICE ANALYSIS

Copper and aluminum ingot are key raw materials for tap-changers and may influence manufacturing costs. From the first quarter of 2023 to the fourth quarter of 2025, copper and aluminum ingot prices were broadly stable with a gradual upward trend from 2025. Manufacturers typically mitigate raw material price risks through sourcing diversification, procurement planning and, where appropriate, contractual arrangements and product mix optimization.

The chart below sets out the historical price movements of copper and aluminum ingot from the first quarter of 2023 to the fourth quarter of 2025.



Source: NBS, Frost & Sullivan analysis

SOURCE OF INFORMATION

This section contains information extracted from the Frost & Sullivan Report prepared by Frost & Sullivan independently, which is commissioned by us in connection with the [**REDACTED**]. We expect to pay Frost & Sullivan a total of RMB680,000 for the Frost & Sullivan Report and our use of the report. Frost & Sullivan is a consulting company which provides industry consulting services, commercial due diligence and strategic consulting services for a variety of industries. We are of the view that the payment of such fee does not impair the fairness of the conclusions drawn in the Frost & Sullivan Report. We have extracted certain information from the Frost & Sullivan Report in this section, as well as in the sections headed "Summary," "Risk Factors," "Business," "Financial Information" and elsewhere in this document to provide our potential [**REDACTED**] with a more comprehensive presentation of the industry in which we operate.