

## Strategic Positioning of Taiwan’s Heavy Electrical Industry Amid Geopolitical Energy Security Risks

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Global economic landscapes are increasingly defined by heightened geopolitical risks and supply chain restructuring, placing energy security and industrial resilience at the center of national competitiveness. The U.S. has prioritized “reshoring” and “energy independence,” utilizing policies such as the *CHIPS and Science Act* and the *Infrastructure Investment and Jobs Act* to drive the return of semiconductor and electric vehicle (EV) manufacturing. Following his return to office in 2025, President Trump established the National Energy Dominance Council to advance these goals through tax and financing incentives, accelerating power transmission and distribution projects to ensure industrial energy security.

The rapid expansion of AI and high-performance computing (HPC) has further intensified the energy debate. Driven by both policy and industrial demand, U.S. electricity consumption is surging. The Electric Power Research Institute (EPRI) forecasts that power demand from AI and data centers could grow tenfold by 2030. However, the U.S. grid is suffering from severe aging; approximately 70% of high-voltage transmission lines have been in service for over 25 years, and domestic transformer production remains insufficient. By 2025, supply shortages for power and distribution transformers are projected to hit 30% and 10%, respectively, with roughly 80% and 50% of demand relying on imports. This highlights an urgent need for grid modernization and international supply chain cooperation.

Against this backdrop, Taiwan’s heavy electrical industry has emerged as a pivotal player in the global energy transition, backed by technical expertise and manufacturing resilience. Taiwanese firms have long-standing capabilities in power electronics, metal processing, and insulation materials. Their ability to provide highly customized solutions—from components to system integration—allows them to meet diverse U.S. specifications and safety standards. Furthermore, through extensive experience serving Taiwan Power Co. (Taipower) and international utilities, Taiwanese products consistently outperform Southeast Asian and Chinese competitors in quality and stability. On the policy side, the Ministry of Economic Affairs (MOEA) and the

Industrial Technology Research Institute (ITRI) continue to spearhead R&D in smart grids, virtual power plants, and low-noise eco-friendly transformers.

These R&D investments are reflected in export data. In 2024, Taiwan’s exports of transformers and related heavy electrical equipment to the U.S. reached \$1.56 billion, accounting for nearly 50% of the category’s total exports—a near doubling since 2020. As of October 2025, exports to the U.S. climbed further to \$1.77 billion, representing 53.8% of the total and marking a record high.

To navigate “Buy America” policy pressures, Taiwanese manufacturers are shifting from an export-led model toward local supply chain integration. While keeping core R&D in Taiwan, firms are establishing assembly, maintenance, and testing centers in North America and securing long-term supply agreements with local utilities to shorten lead times. Some players have successfully entered the AI data center, EV, and energy storage markets, evolving from equipment suppliers into integrated energy system partners by providing high-efficiency transformers and smart energy management solutions.

Geopolitical reconfiguration and AI-driven energy needs are reshaping global industrial chains. The U.S. grid upgrade and energy investment boom have created massive market demand, positioning Taiwan as a critical partner in North America’s energy transition. By continuing to integrate AI, smart grids, and green manufacturing, Taiwan can solidify its standing in global high-tech infrastructure, achieving the strategic goal of “security as competitiveness.”