June 4, 2025

Eric Longnecker
Deputy Assistant Secretary for Technology Security
Office of Strategic Industries and Economic Security
U.S. Department of Commerce
1401 Constitution Avenue, NW
Washington, DC 20230

VIA REGULATIONS.GOV

Docket No. BIS-2025-0023

PUBLIC DOCUMENT

Dear Deputy Assistant Secretary Longnecker:

The undersigned organizations representing a broad coalition of electrical manufacturers, electrical contractors, electrical distributors, homebuilders, and electric utilities write to express concerns regarding certain industry inclusion requests for Section 232 tariffs on steel and aluminum to be applied to electrical transformers and their components. Section 232 tariffs on transformers and transformer components would hamper U.S. energy security, restrict U.S. manufacturing growth, and run counter to the Trump Administration's AI innovation and national security objectives.

I. Application of Section 232 tariffs on transformers and transformer components would exacerbate existing grid infrastructure shortages.

The U.S. faces continued shortages of transformers, which are essential for electricity transmission and distribution. These shortages are driven, in part, by increased demand from electrification trends, extreme weather events, grid modernization needs[1], and new electrical large loads, such as data centers and greenfield manufacturing.[2]

Only about 20% of transformer demand can be met by the domestic supply chain, according to Wood Mackenzie.[3] Amid significant and ongoing demand pressures and supply constraints, lead times for transformers continue to rise. Customers report delays of 115 to 130 weeks for certain distribution transformers, whereas lead times for large transformers—both substation power transformers and generator step-up (GSU) transformers—have ballooned to 120 to 210 weeks.[4] For most transformer types, domestic manufacturers already face backlogs due to labor shortages and material constraints. At the same time, transformer prices have risen 70% to 100% since January 2020 because of inflation for raw materials. Prices for grain-oriented electrical steel (GOES), though

[1] The National Renewable Energy Laboratory estimates that about 55% of in-service distribution transformer units are older than 33 years and approaching their end of life. Nat'l Renewable Energy Lab., Distribution Transformer Planning and Investment Needs for a High-Electrification Future, NREL/TP-6A40-92076 (May 2024), https://www.nrel.gov/docs/fy25osti/92076.pdf.

[2] The National Renewable Energy Laboratory estimates that distribution transformer capacity might need to increase 160% to 260% by 2050 compared with 2021 levels to meet demand. Nat'l Renewable Energy Lab., Major Drivers of Long-Term Distribution Transformer Demand, NREL/TP-6A40-87653 (Dec. 2023), https://www.nrel.gov/docs/fy24osti/87653.pdf.

[3] Wood Mackenzie, Power Transformers: Supply Shortage and High Lead Times – Market Dynamics and Supply Chain Update (Apr. 2024) (on file with author).

[4] *Id.*

significantly volatile, have almost doubled since the pandemic, while copper prices surged upwards of 40%.[5]

NEMA and the National Infrastructure Advisory Council (NIAC) have documented widespread transformer shortages; key contributing factors include:

- Limited availability of GOES, both domestically and globally;
- A shortage of skilled labor for manufacturing and assembly;
- Fragmented or monopolized sourcing for essential inputs.

NIAC's 2024 report called the transformer shortage a "clear, strategic risk to grid reliability" and warned of "insufficient contingency inventory to respond to disasters or cyber events."[6]

Adding tariffs to critical components like cores and laminations would further restrict supply, increase prices, and prolong already-stretched lead times—undermining efforts to secure resilient, reliable electricity infrastructure.

Further, lead times for transformers would increase; utilities and developers would likely delay or phase transformer procurement to manage budgets which, in turn, would further stretch project timelines and final product delivery schedules. Compounded transformer shortages and delays would impede U.S. economic growth and innovation.

II. Longer lead times for transformers would hinder U.S. energy system growth, resulting in higher energy costs and less grid capacity.

Transformers are indispensable to the operation, expansion, and security of the U.S. electric grid. They serve as the backbone of power transmission and distribution, stepping voltage up or down to ensure safe and efficient delivery of electricity. There are several key categories of transformers, each critical to different parts of the grid:

- **Distribution Transformers:** These are the most common and are used to deliver electricity from substations to end users. They are typically pole-mounted or pad-mounted and serve residential, commercial, and light industrial loads.
- **Medium Power Transformers (MPTs):** Typically rated between 2.5 MVA and 100 MVA, MPTs are used in substation applications and industrial facilities.
- **Large Power Transformers (LPTs):** Rated above 100 MVA, LPTs are essential for high-voltage transmission networks. They are custom-engineered, capital-intensive, and have lead times that often exceed two years.
- **GSU Transformers:** These connect power plants to the transmission grid and are critical for bringing new generation capacity online.

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[5] Sonal Patel, The Transformer Crisis: An Industry on the Brink, POWER MAG. (Apr. 1, 2024), https://www.powermag.com/the-transformer-crisis-an-industry-on-the-brink/.

[6] Nat'l Infrastructure Advisory Council, Addressing the Critical Shortage of Power Transformers to Ensure Reliability of the U.S. Grid (July 2024), https://www.cisa.gov/sites/default/files/2024-09/NIAC_Addressing%20the%20Critical%20Shortage%20of%20Power%20Transformers%20to%20Ensure%20Reliability%20of%20the%20U.S.%20Grid_Report_06112024_508c_pdf_0.pdf.

- **Autotransformers and Specialty Units:** Used in high-voltage transmission and industrial applications, these units are often custom-built and sourced internationally due to limited domestic production.

Prolonged lead times for these products and increased supply chain volatility for their components would have several cascading effects. For example, lead times for transformers, particularly LPTs and MPTs, are already a significant obstacle for utilities' grid expansion and modernization goals. Further delays in these projects would limit the grid's ability to support new industrial and commercial loads, including greenfield manufacturing. Industrial and commercial customers would also face longer wait times for grid interconnection, resulting in project delays and increased costs for developers. These impacts could undermine efforts to reshore strategically important industries, like semiconductor fabs, advanced manufacturing hubs, and data centers.

Second, utilities facing longer lead times and higher transformer costs may delay infrastructure upgrades or pass costs on to consumers. This would disproportionately impact rural communities, which require higher concentrations of the products and where grid upgrades are already underfunded.

Third, Section 232 tariffs on transformers would hinder grid resilience and security around the country. Delays in transformer availability directly impede the ability of utilities to connect new generation sources, upgrade aging infrastructure, and respond to emergencies. The Department of Energy (DOE) has previously reported in its *2024 Large Power Transformer Resilience Report to Congress* that extended replacement lead times present significant challenges to grid reliability and resilience, particularly in the face of physical attacks, natural disasters, and surging demand.[7]

III. Additional transformer shortages would delay data center buildout and impede the Trump Administration's AI innovation objectives.

The buildout of AI and data center infrastructure has emerged as a critical U.S. economic and national security priority. Importantly, AI data centers require robust and reliable electrical infrastructure, including transformers, to operate at scale. Transformer shortages already delay construction timelines for new data centers, with data center operators reporting delays in equipment procurement as a primary bottleneck. The above-mentioned McKinsey study found that lead times for medium voltage transformers for data centers rose from 4-6 months in 2019 to 18-24 months in 2023.[8]

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[7] U.S. Dep't of Energy, Large Power Transformer Resilience Report to Congress (July 10, 2024), https://www.energy.gov/sites/default/files/2024-10/EXEC-2022-001242%20-%20Large%20Power%20Transformer%20Resilience%20Report%20signed%20by%20Secretary%20Granholm%20on%207-10-24.pdf.

[8] Alastair Green et al., How Data Centers and the Energy Sector Can Sate AI's Hunger for Power, MCKINSEY & CO. (Apr. 2024), https://www.mckinsey.com/industries/private-capital/our-insights/how-data-centers-and-the-energy-sector-can-sate-ais-hunger-for-power.

Section 232 tariffs would intensify these challenges by further constraining transformer supply and increasing costs. Additional delays in transformer delivery could stall the deployment of AI, undermining U.S. leadership in this critical technology domain.

IV. Transformer Components Are Precision-Engineered Products, Not Raw Steel Derivatives.

Efforts to classify laminated and wound/stacked cores as derivative steel products are inaccurate. These components are highly engineered and custom-manufactured to meet specific end-use technical and regulatory specifications.

As NEMA noted in previous comments to DOE, transformers are constructed to detailed specifications—they are highly customized, hand-assembled products with complex engineering requirements and long production cycles[9]. Cores and laminations undergo multi-step processing—including slitting, annealing, insulation coating, stacking/winding, and precision cutting—not resembling raw steel or basic derivatives.

Applying tariffs under the guise of protecting upstream steel production would penalize downstream U.S. transformer manufacturing that is already strained and critically important to national security.

V. The U.S. Cannot Meet GOES Demand Domestically.

As noted a DOE 2023 electric grid supply chain assessment, there is only one domestic GOES producer whose capacity does not meet market demand, particularly for transformer product-types needing high-efficiency and specialty grades.[10] The report found:

- U.S. GOES production capacity was underutilized and narrowly focused;
- Many advanced transformer designs require steel grades not produced domestically;
- The U.S. transformer industry relies on imports for GOES-based cores and laminations.

Exclusive reliance on a single domestic supplier for GOES or GOES-based components—especially by imposing tariffs—would create brittle supply chains, increase costs, and introduce a single point of failure for critical infrastructure.

VI. USMCA Compliant Imports from Mexico and Canada Are Vital to the U.S. Electrical Transformer and Component Supply Chain.

Mexico and Canada are USMCA partners that play an important role in the U.S. electrical transformer and component supply chain. Neither Mexico nor Canada has melting or rolling capacity for GOES; they are processors of semi-finished products.

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[9] National Electrical Manufacturers Association and The GridWise Alliance, Request for Information: Defense Production Act. (Nov. 2022), https://www.nema.org/docs/default-source/advocacy-document-library/nema-gridwise-comments-doe-dpa-rfi-11.30.22.pdf?sfvrsn=2969fc7b_4

[10] https://www.energy.gov/sites/default/files/2024-12/Electric%2520Grid%2520Supply%2520Chain%2520Report%2520-%2520Final%5B1%5D.pdf

The *2021 GOES Supply Chain Assessment* emphasized that "North American integration is essential" to meet the transformer and core needs of the U.S. energy grid. Restricting legitimate imports from USMCA partners would violate the spirit of the agreement, disrupt supply chains, and risk retaliatory trade actions.

Notably, during the first Trump Administration, the United States explicitly chose not to impose Section 232 tariffs on transformer laminations and cores imported from Mexico made with non-North American GOES. This decision followed a bilateral agreement in which Mexico implemented a robust export monitoring regime. The administration recognized the importance of these imports to the reliability of the U.S. electric grid and the shared interests of North American energy security.

VII. Instead of Section 232 tariffs, the federal government should consider opportunities to support domestic manufacturing of transformers.

In June 2024, NIAC issued a report examining U.S. transformer supply chain challenges and provided a series of policy recommendations for the federal government to address them.[11] At the top of the list was the following:

> "*Craft Federal policies and designate funding targeted at increasing domestic capacity, such as tax credits, grants, accelerated depreciation, funding for new apprentice or training programs, and other incentives*."

NEMA strongly supports new incentives for transformer domestic capacity, including the bipartisan *Credit Incentives for Resilient Critical Utility Infrastructure and Transformers (CIRCUIT) Act*, introduced by U.S. Senators Jerry Moran (R-Kan.) and Catherine Cortez Masto (D-Nev.). This legislation would expand the Advanced Manufacturing Production Credit (45X) to include distribution transformers. This type of policy support is badly needed to help mitigate supply chain issues that distribution transformers have faced while encouraging continued on-shoring and domestic production.

Conclusion.

The undersigned organizations urge the Department to reject inclusion requests that extend Section 232 tariffs to imported transformers and their components. Such measures would significantly disrupt already strained supply chains, delay critical infrastructure and industrial projects, and increase costs for utilities, manufacturers, and consumers alike. At a time when the U.S. is striving to strengthen its energy infrastructure, reshore advanced manufacturing, and lead in emerging technologies like artificial intelligence, imposing additional barriers to transformer availability would be counterproductive and detrimental to national interests.

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[11] Nat'l Infrastructure Advisory Council, Addressing the Critical Shortage of Power Transformers to Ensure Reliability of the U.S. Grid (July 2024), https://www.cisa.gov/sites/default/files/2024-09/NIAC_Addressing%20the%20Critical%20Shortage%20of%20Power%20Transformers%20to%20Ensure%20Reliability%20of%20the%20U.S.%20Grid_Report_06112024_508c_pdf_0.pdf.

We appreciate your attention to this matter and welcome the opportunity to provide further information or engage in dialogue with the Department as it evaluates these requests.

National Electrical Manufacturers Association

National Electrical Contractors Association

National Association of Electrical Distributors

Leading Builders of America

GridWise Alliance