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Chairman Westerman, Ranking Member Huffman, Subcommittee Chairman Stauber, Ranking Member Ansari, and Members of the Committee — thank you for the opportunity to testify today.

I'm Debra Phillips, President and CEO of the National Electrical Manufacturers Association, also known as NEMA. We represent more than 300 companies that manufacture essential electrical equipment.

Our industry contributes roughly 1% of U.S. GDP, directly employs 580,000 people in every state, supports more than 2.2 million American jobs, and produces the technologies that generate, transmit, distribute, and control electricity. NEMA members make it possible to power our homes, hospitals, factories, data centers, transportation systems, and other critical infrastructure.

We are the manufacturers building the physical backbone of the modern energy system. And copper is foundational to virtually every product we make.

There is no energy system without copper. And we are going to need significantly more of it to meet the demand that is growing at an unprecedented rate.

To meet this need, our members are expanding their U.S. manufacturing capacity to build more of these products right here at home. Since 2018, our members have invested nearly $200 billion in U.S. manufacturing, with $100 billion more on the way. But to be successful at that scale, we must have access to reliable, affordable supplies of copper.

Rising Demand for Electricity

Against that backdrop, the United States is entering a new era of electricity demand growth.

According to NEMA's recently published study focused on the U.S. electricity demand outlook – distinct from the S&P study which looks at demand globally – we expect demand to rise by approximately 55% by 2050. We expect data center electricity demand alone to increase by roughly 300% between now and 2035 in the United States. We project that electrified transportation will be the major driver post-2035.

Electrification of buildings and industry as well as advanced manufacturing are also significant drivers of new demand.

This is no longer a distant, theoretical scenario.

Meeting this era of electricity demand will require a major buildout of physical infrastructure — and the equipment our members make: transformers, switchgear, wire and cable, motors and drives, industrial automation, EVs and EV charging equipment, lighting solutions, and advanced grid technologies.

The Importance of Copper

Copper runs through that entire system. It's embedded across the infrastructure that moves energy—from extraction to production to the grid, and from the grid to homes and factories, and to power new sources of electricity demand like data centers and EV chargers.

From the wellhead to the grid, and from the data center to the EV charger, copper is the common denominator. Its conductivity and durability characteristics are fundamental to grid reliability and efficiency, and ready access to a reliable supply of copper directly affects affordability for American consumers.

Where Copper Shows Up in the Real Economy

Copper is not an abstract input. It is embedded in the equipment that makes electrification possible.

It is in the transformers that step voltage up and down across the grid, the wire and cable that carry electricity over long distances and into homes and businesses, the motors and drives that power industrial processes, and the switchgear and control systems that keep everything operating safely and reliably.

For example, copper wire and cable products typically contain 30% to >90% copper by weight, depending on the type; copper-heavy single-conductor wire can be almost entirely copper by weight. Switchgear and switchboard assemblies typically contain roughly 10 to 30% copper by weight, whereas copper-wound transformers typically contain roughly 5% to 25% copper by weight. Electric vehicle charging units typically contain roughly 6% to 7% copper by weight. These are just a few examples of critical copper-containing electroindustry products that make modern life possible.

Copper is also foundational to emerging sources of demand. Data centers rely on copper-intensive power distribution systems to operate at scale. Electric vehicle charging infrastructure depends on copper for conductivity and durability. And across buildings and factories, copper is integral to the systems that enable efficiency, automation, connectivity and electrification.

Why Copper Matters in This Moment

Meeting projected demand growth will require deploying this equipment at unprecedented speed and scale.

That means manufacturing more transformers, installing more transmission and distribution infrastructure, and building out the electrical backbone in all types of buildings, advanced manufacturing, and transportation systems.

Copper is central to all of it. Without sufficient and reliable supply, the pace at which this infrastructure can be built and brought online will be constrained.

What's at Stake if Supply Falls Short

If copper supply is constrained, the impacts will be felt across the energy system. Project timelines can be delayed, infrastructure buildouts can slow, and the deployment of critical technologies can be deferred.

For manufacturers, that means challenges in producing the equipment needed to meet demand. For the broader economy, it means potential bottlenecks in the systems that support energy reliability, industrial growth, and technological leadership.

Copper shortages would also create a national security risk. The same electrical infrastructure that supports commercial growth also powers military installations, defense manufacturing, secure communications, advanced computing, and the emerging technologies that shape military readiness. Copper is key to the grid equipment, power systems, motors, controls, and data infrastructure that support these capabilities. If supply chains for copper and copper-intensive electrical equipment are constrained, the impact could affect the resilience, readiness, and the technological edge of the United States.

Future supply shortfalls would likely exacerbate existing grid infrastructure shortages. For example, the U.S. faces continued shortages of transformers and switchgear, 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 large energy grid loads, such as data centers and greenfield manufacturing.[2]

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[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.

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 at times to 120 to 210 weeks.[3] For most transformer types, domestic manufacturers already face backlogs due to labor shortages and material constraints.

The transformer example illustrates the importance of reliable, resilient electrical supply chains in meeting modern needs. Similarly, access to reliable, affordable copper supply is fundamental to whether the United States can meet our growing energy system demands.

Recycling and Stewardship

As a valuable resource, expanding stewardship, reclamation and reprocessing of copper is an important part of the solution. Copper is highly recyclable, and today roughly one-third of U.S. demand is met through recycled material.

NEMA's wire and cable manufacturers take scrap copper created in their manufacturing process and use it as a raw material, some using up to 20% scrap in certain products. And they are actively looking at expanded ways to bring external recycled copper content into their processes. This can be a challenge because the purity of copper inputs, which can vary greatly in recycled content, is vital to the end wire and cable product and its conductive properties.

Though an important part of optimizing copper supply, recycling alone cannot meet the scale of demand we face.

Where Washington Can Help

NEMA supports recent actions taken to expand U.S. access to critical minerals, including copper, which are critical to the new energy economy. First, we support Secretary Burgum and the Department of the Interior's U.S. Geological Survey's decision in 2025 to add copper to the USGS's list of critical minerals. This was an important step in recognizing the crucial role copper plays in our energy future.

NEMA likewise supports other efforts to grow the domestic supply of critical minerals like copper – such as Subcommittee Chairman Stauber's Critical Mineral Dominance Act, which codifies several Administration efforts to expand mineral production. Other legislation such as the Critical Mineral Consistency Act would codify efforts to reduce regulatory confusion and further domestic availability of critical minerals.

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

In addition to these copper- and critical mineral-specific actions, there are a number of other actions policymakers can take to bolster domestic manufacturing and to help meet historic demand for electricity.

NEMA supports permitting reform – including transmission – to reduce timelines for grid, manufacturing and other critical infrastructure development and expansion, while assuring environmental protections. NEMA supports Chairman Westerman's SPEED Act and its focus on streamlining permitting and accelerating responsible domestic mineral production. Speed matters, because demand is accelerating right now.

Further, Members in both chambers have put forward thoughtful proposals which will help build capacity on the grid in the near term through the deployment of grid-enhancing technologies, including advanced conductors to improve efficiency and operation of the grid we have today. Legislation such as the High Capacity Grid Act and the REWIRE Act will help deploy technologies to rapidly expand our ability to provide energy where it is needed most.

Electrical manufacturers also need trade policies that balance the need to grow domestic raw materials with the immediate imperatives of grid, manufacturing and data center build outs. Some essential electrical inputs are not available domestically, and NEMA has put forward a targeted, time-limited tariff incentive holiday to provide time for these inputs to move, while maintaining pace and affordability of power, grid and manufacturing build outs.

Congress can also reinforce domestic manufacturing and supply chain transparency by recognizing industry-led tools that support domestic content, including Build America, Buy America implementation. NEMA has developed a Make It American™ program that provides a standardized, third-party process for identifying facilities and products that meet domestic content requirements. Incorporating this approach by reference in federal policy would give project developers, manufacturers, and agencies greater clarity and certainty while accelerating deployment of infrastructure projects that rely on American-made components.

Finally, building our future energy system will require a skilled workforce trained in high-demand fields such as manufacturing, electrical installation, robotics, AI, and industrial automation. While the electroindustry directly supports 580,000 jobs today, we experience critical shortages in areas like transformer manufacturing. NEMA endorses the bipartisan Veterans Energy Transition (VET) Act, and other measures to bring more skilled labor to our growing energy industry.

Conclusion

Clearly, copper is not just another commodity. It is a strategic material needed to meet rising electricity demand.

Electricity demand is rising. The technology exists to meet it. Manufacturers are investing. But the materials must be there. And our supply chains must be resilient for the future.

We urge Congress to work with manufacturers, miners, and processors to strengthen domestic copper supply chains, accelerate responsible production, processing and recycling, and ensure we have the materials needed to build at the scale this moment demands.

We also urge Congress to take action to facilitate investments in domestic manufacturing, to provide long-term permitting certainty, a trade environment that supports robust energy infrastructure, and to help us build a skilled workforce for the future.

Because if the United States wants to lead in energy — we must build. And to build, we need copper. Thank you. I look forward to your questions.