May 5, 2023

Submitted via RFI-3021@NETL.DOE.GOV

RE: Request for Information on Innovative Advanced Transformers [DE-FOA-0003021]

To Whom It May Concern:

The National Rural Electric Cooperative Association (NRECA) respectfully submits the following comments to the U.S. Department of Energy (DOE) in response to its Request for Information on Innovative Advanced Transformers (DE-FOA-0003021).

NRECA is the national trade association representing nearly 900 local electric cooperatives and other rural electric utilities. America's electric cooperatives are owned by the people that they serve and comprise a unique sector of the electric industry. From growing regions to remote farming communities, electric cooperatives power 1 in 8 Americans and serve as engines of economic development for 42 million Americans across 56 percent of the nation's landscape.

Electric cooperatives operate at cost and without a profit incentive. NRECA's member cooperatives include 63 generation and transmission (G&T) cooperatives and 832 distribution cooperatives. The G&Ts generate and transmit power to distribution cooperatives that provide it to the end of line co-op consumer-members. Collectively, cooperative G&Ts generate and transmit power to nearly 80 percent of the distribution cooperatives in the nation. The remaining distribution cooperatives receive power directly from other generation sources within the electric utility sector. Both distribution and G&T cooperatives share an obligation to serve their members by providing safe, reliable, and affordable electric service.

Our members are some of the primary consumers of distribution transformers and large power transformers and the persisting supply chain challenges they are facing to procure these vital types of equipment are impacting NRECA members' ability to provide affordable, reliable electric service to millions of Americans. We urge DOE to take actions that can help immediately increase the availability of transformers and to approach research, development and deployment (RD&D) efforts on innovative transformer design with priority placed on finding cost-effective solutions that will not jeopardize electric reliability.

The current manufacturing base serving electric utilities is struggling to meet demand and DOE's NOPR on the energy conservation standards for distribution transformers exacerbates this ongoing crisis. Electric cooperatives are facing unprecedented challenges securing equipment and material to provide reliable electric service to their consumer-members. All segments of the utility sector have been sounding the alarm for more than a year about the supply chain constraints around multiple types of equipment they require to keep the lights on, with distribution transformers being the most acute challenge. It now takes more than a year on average for utilities to receive distribution transformers,

compared with 60 days just a couple of years ago. Some domestic transformer manufacturers have stopped taking orders altogether. We expect the backlog to continue to increase absent U.S. government support as utilities invest in grid resilience and modernization projects and federal and state policies drive more electrification.

We urge DOE to review NRECA's prior comments about the challenges facing the supply chain for distribution transformers and large power transformers critical to our members. We raise many of the same issues in responding to this RFI. See, for example:

- Response to the Request for Information on Defense Production Act, submitted jointly with American Public Power Association and Edison Electric Institute, on November 30, 2022; and,
- Comments on the Energy Conservation Program: Energy Conservation Standards for Distribution Transformers [EERE-2019-BT-STD-0018], submitted on March 27, 2023.

To reiterate, DOE's top priority should be finding ways to support the ability of domestic distribution transformer manufacturers to increase production immediately and to sustain that output over the long term as electrification of the U.S. economy grows. DOE should also take actions that would support bringing manufacturing capacity for large power transformers back to the United States. We appreciate DOE's ongoing engagement on distribution and large power transformers and specifically address the following questions posed in this RFI below.

11. Past supply chain assessments have identified concerns related to the availability of materials and/or components. In your experience, what are the highest priority distribution transformer supply chain gaps within the transformer manufacturing industry?

In the short term, it is our understanding from conversations with U.S. manufacturers that labor and material acquisition are the greatest barriers to increasing output of distribution transformers. High employee turnover and lack of available, eligible workers near manufacturing facilities make it difficult for U.S. manufacturers to immediately respond to increased demand for domestically manufactured transformers from utilities. Constrained access to domestically produced grain-oriented electrical steel (GOES), a material necessary to produce transformers, poses a significant material acquisition challenge. There is currently only one domestic producer of GOES and it is unclear whether this supplier will stay in the market should DOE proceed with its proposed efficiency standards. Although supplies of GOES are limited now, manufacturers will require more material to meet the increased demand for transformers as electrification continues. That need for sufficient material continues to grow as competing technologies that utilize the same materials are also growing. The present situation in which there is just one U.S. producer of GOES represents a serious national security risk.

DOE's NOPR to raise the efficiency standards for distribution transformers such that most current production would need to shift to using amorphous steel would make the situation regarding domestic GOES availability even more precarious. Rather than helping to diversify supply, the NOPR is counterproductive as it would deter further domestic investment in GOES production because only amorphous steel cores would be able to meet the new energy conservation standard proposed by DOE. Ultimately, DOE's NOPR will not foster competition and is instead likely to create a new monopoly supplier while simultaneously driving the existing GOES supplier out of the market. This is likely to create a ripple effect of halting further investment in the domestic production of GOES for distribution transformers under consideration or announced by other steel producers. It is a natural result that the

lone existing producer, and others considering investment in GOES, will pause any decisions on increasing GOES production until DOE issues a final rule setting the efficiency standards – and this is all playing out when the industry needs more GOES today.

Forcing the industry to move to amorphous steel core transformers will require several changes to utility operations and impose significant burden in terms of cost and redesign of other equipment. Electric cooperatives will face significant challenges that the DOE NOPR fails to adequately account for, and if DOE incorporates all of these potential issues, its analysis would show that the standard proposed in the NOPR is not economically justified. The increased weight and size of amorphous steel core transformers, in addition to other factors, means that significant changes to utility operations need to be addressed, all of which represent increased costs. DOE should support pilot programs with utilities to gain more operating experience and provide opportunities for utilities to participate in research at the national labs to address these concerns. Finally, we urge DOE to consider more long-term research as to whether the amorphous steel cores maintain their improved no load losses over time.

13. Are there distribution transformer materials and/or components that would be crucial for establishing a robust domestic distribution transformer manufacturing base that would not typically be procured domestically, and any potential barriers to domestic procurement, such as lack of availability or cost?

The limited domestic availability of GOES is a constraint to distribution transformer manufacturers' ability to ramp up production to meet utility demand. Further, significantly increased prices for GOES will be passed on to the utilities purchasing the transformers. Ultimately these increased costs will be paid by American consumers through increased electric bills.

Given the precarious situation that electric utilities face today in procuring distribution transformers, DOE's NOPR to raise the efficiency standards for distribution transformers sends the wrong message and exact opposite signal that existing steel producers and transformer manufacturers need right now to further invest in the production capability we need to address the current shortage and meet the increasing demand for electrification that comes with electric vehicle charging, heat pumps and other carbon reduction initiatives. One of the potential solutions identified in the last several months is to send a clear signal to the steel producers – for example through subsidies or purchase commitments – that there is and will remain a strong and growing demand for GOES. However, DOE's NOPR does the exact opposite and instead pushes the transformer market to move almost entirely away from GOES. Contrary to DOE's assertions, the NOPR will not expand the market for distribution transformers because most of the current production using traditional GOES will not be able to meet the proposed new energy conservation standard.

27. Past supply chain assessments have identified concerns related to the availability of materials and/or components. In your experience, what are the highest priority power transformer supply chain gaps within the transformer manufacturing industry?

There is a significant risk to grid reliability and national security in that there are no domestic manufacturers of large power transformers. This problem has been known for quite some time and is well-documented in studies conducted by the U.S. government. We urge DOE to revisit the drivers for the outsourcing of large power transformer manufacturing to overseas markets and consider ways to

entice manufacturers back to the United States.[1] Tools like loan guarantees and purchase guarantees can provide manufacturers with the certainty they need to invest in increased capacity.

29. Are there power transformer materials and/or components that would be crucial for establishing a robust domestic power transformer manufacturing base that would not typically be procured domestically, and any potential barriers to domestic procurement, such as lack of availability or cost?

The current limited domestic supply of GOES poses a significant barrier to onshoring large power transformer manufacturing and DOE's NOPR on the energy conservation standards for distribution transformers would make this an even higher hurdle to overcome. Large power transformers (LPTs) use GOES and cannot use amorphous steel cores, and it has already been identified as another national security risk that the U.S. receives its LPTs and their components from overseas. DOE's NOPR is likely to result in the lone domestic supplier of GOES leaving the market, rather than growing their supply or increasing the number of domestic suppliers. Thus, DOE's NOPR is a barrier to bringing back domestic manufacturing capacity for LPTs used for electric utility transmission services.

Conclusion

DOE's top priority should be finding ways to support domestic distribution transformer manufacturers to increase production immediately and to sustain that output over the long term as electrification of the U.S. economy grows as well as bring back large power manufacturing to the United States. Investments being driven by the Infrastructure Investment and Jobs Act, Inflation Reduction Act, other electrification initiatives and increased spending on resilience all demonstrate that demand for these transformers is growing and will remain elevated for the foreseeable future. We need to be expanding the market for transformers rather than constricting it by driving traditional GOES distribution transformers out of the market. DOE's NOPR will further constrict supplies and create new barriers to onshoring large power transformer manufacturing.

Thank you for considering our comments in response to this RFI. Please contact Stephanie Crawford at stephanie.crawford@nreca.coop or 571-623-4049 if you have any questions about our comments.

Sincerely,

Stephanie Crawford

Stephanie Crawford
Regulatory Affairs Director
National Rural Electric Cooperative Association

[1] See the U.S. Department of Commerce report on "The Effect of Imports of Transformers and Transformer Components on the National Security" (October 15, 2020), available at: https://www.bis.doc.gov/index.php/documents/section-232-investigations/2790-redacted-goes-report-20210723-ab-redacted/file