November 30, 2022

U.S. Department of Energy
1000 Independence Ave., SW
Washington, DC 20585

RE: Request for Information: Defense Production Act

Submitted via: dpaenergy@hq.doe.gov

To whom it may concern:

The National Electrical Manufacturers Association (NEMA) and The GridWise Alliance (GridWise) are please to submit these comments jointly in response to the Department of Energy's (DOE) request for information (RFI) on the Defense Production Act (DPA).

NEMA is the leading U.S. trade group representing nearly 325 electrical equipment manufacturers which make safe, reliable, and efficient products and systems, including companies which produce grid components and distribution transformers. Collectively, our members provide around 370,000 American manufacturing jobs in more than 6,100 facilities, labor and capacity that is essential for the successful transition to an electrified and cleaner U.S. economy.

GridWise leads a diverse membership of electricity industry stakeholders focused on accelerating innovation that delivers a secure, reliable, and affordable grid to support decarbonization of the U.S. economy. Founded in 2003, GridWise is unique in its focus on the electric grid's broader ecosystem, advocating the value of integrating technologies that modernize and transform the grid. We drive impactful change through our diverse membership of utilities, manufacturers, and researchers united in a common belief that the electric grid is the critical enabling infrastructure of a decarbonized economy.

Our comments below provide DOE with recommendations on how best DPA tools can be implemented to achieve practical outcomes and help increase domestic capacity as intended by the Presidential Determination. Additionally, these comments provide substantial background in order to provide needed context for these recommendations. NEMA and GridWise stand ready to be a resource and partner with the DOE as it implements guidance around funding this policy.

Sincerely,

Spencer Pederson
Vice President, Public Affairs
National Electrical Manufacturers Association

Karen Wayland
Chief Executive Officer
The GridWise Alliance

On June 6, 2022, a Presidential Determination was issued, using authorities granted under the Defense Production Act of 1950, as amended, which would prioritize and "expand the domestic production capability for transformers and electric power grid components" in order to "avert an industrial resource or critical technology item shortfall that would severely impair national defense capability.[1]" The DPA determination does not specify or identify any particular type of transformer or grid component which needs to be prioritized. For purposes of providing practical policy recommendations through this RFI, and to be aligned with communications to DOE from utility trade associations[2] on DPA implementation prioritization, the primary focus of these comments will be on the manufacturing needs related to distribution transformers.

However, these comments are not meant to diminish the critical need for additional large power transformers (LPT) (kVA 2,500+) and other grid products essential to a reliable U.S. power supply. DOE is already very aware of the need for more LPTs to help bolster grid security and reliability. In 2017, it published a Report to Congress describing the national importance for greater LPT capacity and more readily available inventory.[3] Through these comments, our intention is to emphasize the equally important role distribution transformers play in providing energy security. The information below seeks to complement DOE's existing understanding of the transformer and grid component markets so that it can apply DPA funding tools in the most comprehensive and effective way.

LPTs are critical in delivering electric power from generation sources to a distribution network. Distribution transformers rather provide the 'last mile' voltage transformation in that network, stepping down the voltage used in distribution lines to the level used by the customer. Their close and direct relation to end-users makes distribution transformers critical to the resilience of a community; without them, a community cannot keep the lights on. The content below will illustrate the pieces and process of transformer production and then offer practical recommendations for DPA resources.

Background

Distribution transformers, also known as medium voltage transformers or service transformers, are custom-designed and essential components of the power grid. Their main function is to alter, or "step down," high voltage current from distribution lines to a voltage level appropriate for a customer, which include residential, industrial, and commercial entities. Manufacturers currently produce numerous alterations of distribution transformers to satisfy the varying levels of electric power needs among entities at any given time. Additionally, given a customer's physical and geographic location, these transformers are constructed to detailed specifications. In short, this critical grid component is similar in function but different in design and application.

In the United States, the features and functionality of most distribution transformers are manufactured in accordance with standards set by the Institute of Electrical and Electronics Engineers, notably standard

[1] https://www.whitehouse.gov/briefing-room/statements-releases/2022/06/06/memorandum-on-presidential-determination-pursuant-to-section-303-of-the-defense-production-act-of-1950-as-amended-on-transformers-and-electric-power-grid-components/

[2] https://www.publicpower.org/periodical/article/groups-urge-doe-prioritize-funding-toward-production-distribution-transformers

[3] https://www.energy.gov/sites/default/files/2017/04/f34/Strategic%20Transformer%20Reserve%20Report%20-%20FINAL.pdf

C57.12.00,[4] the *Standard General Requirements for Liquid-Immersed Distribution Power and Regulating Transformers,* and C57.12.01,[5] the *Standard General Requirements for Dry-Type Distribution and Power Transformers*. Depending on the specifics of a transformer's application and deployment in the field, additional standards will apply; currently, there are close to 100 variations of the C57 series of standards. The level of customization, and thus standard application, means these products are not and should not be considered off-the-shelf commodities. Regardless of the particulars, there are numerous common components, materials, and other characteristics which generally define these products.

There are two main types of distribution transformers:

- *Single-Phase*: A single-phase transformer is a single pair coil wrapped around the core with no complex configuration for windings. This type is less costly due to having low voltage capacity.

    - *Nominal Load Capabilities* – 25, 50, or 100 kVA*;*
    - *Primary Usage* – Residential and rural end-user distribution*;*
    - *Types of installations* – Pole-mounted and pad-mounted (see below).

- *Three-Phase*. A three-phrase transformer is essentially three single-phase transformers interconnected in a sole unit; three pairs of high inductive coils are wrapped around a single core in various configurations. Because they are physically larger and have greater voltage capacity, this type is typically installed in locations near or within public areas, away from residential dwellings[6].

    - *Nominal Load Capabilities* – 150, 750, or 2,500 kVA*;*
    - *Primary Usage* – Commercial and industrial end-user distribution*;*
    - *Type of installation* – Pad-mounted (see below).

Identifying a convenient and suitable area to install a distribution transformer is a constant challenge for electric utilities, particularly in urban areas where space is a premium and safety a top concern. The two types of transformers described above are deployed using two basic methods:

- *Pad-Mounted*: A pad-mounted distribution transformer which is set on concrete slab and contained within a secure cabinet. Single-phase pad-mounted transformers are common in residential areas and are intended for power distribution through underground utility systems, whereas three-phase pad-mounted transformers are found in public areas. Due to their broader exposure to the public, three-phase pad-mounted units are equipped with additional safety and security-by-design features.

- *Pole-Mounted*: Single-phase transformers can be mounted on utility poles, generally made from wood or metal, to service overhead electric cables. Pole-mounts are extremely common due to their low cost, reliability in harsh climates, and flexibility in deployment. Depending on their intended operating environment, components used in these types of transformers can be customized to offer the maximum protection against the elements.

While the design of a distribution transformer is determined ultimately by the customer, there are basic components and materials which go into their construction. Assuming a reliable supply chain, as a general rule, the less unique and complex the design specifications and smaller the size of a transformer,

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[4] https://www.eaton.com/us/en-us/products/medium-voltage-power-distribution-control-systems/transformers/medium-voltage-transformers--fundamentals-of-medium-voltage-tran.html
[5] https://ieeexplore.ieee.org/document/9269795
[6] https://www.electricaltechnology.org/2022/04/difference-between-single-phase-three-phase-transformer.html

the easier and faster it is to produce. Below are non-exhaustive lists of common components and materials use in transformer manufacturing:

- *Common Components*, or the assembled parts which make up a transformer:
    - *Fundamental Components:*
        - **Bushing** – A hollow electrical insulator that allows an electrical conductor to pass safely through a conducting barrier;
        - **Coil** – Also known as a winding, a coil serving as a conductor typically made of a low resistance material such as aluminum or copper;
        - **Core** – Made of magnetically permeable material like grain-oriented electric steel (GOES), it is a static element that transmits power from one source to another through electromagnetic induction;
        - **Insulating Fluid** – Mineral or vegetable oil used to insulate and dissipate heat from the core and coil;
        - **Metal Enclosure** – A carbon-based or stainless-steel tank containing the core, coil, and insulating fluid under pressure and air terminal chambers.

    - *Other Common Components*:
        - **Fluid Level Indicator** – A device that gives a visual alarm of the insulating fluid contained in a metal enclosure;
        - **Pressboard** – A form of insulation used due to its high chemical purity, mechanical strength, and optimum insulating fluid impregnability;
        - **Pressure Relief Device** – A safety device which serves as the last line of defense against a serious electrical fault;
        - **Relays –** Various devices designed for the safe operation of the unit, including thermal overload and breather unit relays;
        - **Radiator** – Used to help cool insulating fluid through natural air or forced air flow;
        - **Winding Temperature Indicator** – A monitoring and safety device consisting of a sensor bulb placed in an insulating fluid-filled pocket within metal enclosure's cover. In practice, if the fluid's temperature increases to a certain level, the transformer will be disconnected from service.

- *Common Materials*, or the raw materials and elements needed to produce assembled components or for the functionality of transformers:
    - **Aluminum** – Used to create coil windings;
    - **Copper** – Used to create coil windings;
    - **Ester Fluid** – A biodegradable dielectric insulating fluid made from a formulation which includes vegetable oil and seed oil. Generally, both are a less-flammable fluid;
    - **Mineral Oil** – Mineral-based oil, including naphthenic mineral-oil or a synthetic, commonly used as an insulating fluid and cooling agent;
    - **Grain Oriented Electric Steel (GOES)** – Silicon composed iron with grains oriented to deliver high permeability and low iron loss. GOES is necessary for the creation of a core;
    - **Structural Steel** – A type of carbon-based steel used in the construction of pressboards and other components.

The Problem: Transformer Order Cycle Duration

The goal of the DPA determination is to help expand domestic manufacturing capabilities for transformers and grid components. For this policy to be effective, it is important to not just identify the components and materials that go into transformer construction, but also to focus on the corresponding production variables that affect product output, namely human capital, supply chain considerations, and customer education. The confluence of these many production factors creates challenges for production to be scaled up quickly. However, reducing a transformer's production order cycle, or timeline, is more likely to achieve policy goals in the short and medium terms using DPA tools.

Table 1 below illustrates a typical order cycle for a distribution transformer. An order cycle begins once a customer's purchase order is received by a manufacturer. The estimated lead times for each stage of an order are mean averages, based on NEMA member feedback:

Estimated Transformer Order Cycle, in 2022	
New Design Creation	*2 months*
Customer Approval of New Design	*1 month*
Material procurement	*3 months*
Capacity (facility/labor)	*6+ months*
Manufacturing Process	*2 months*
Shipment	*1 months*
Commission / Installation	*1 month*
Total:	*16+ months*

(Table 1)

- *Human Capital*. According to Power Technology Research, distribution transformers are sold in excess of one million every year in the United States.[7] It is estimated that by 2027 demand will more than double as legacy units are replaced and the economy becomes increasingly more electrified.[8] In 2022, manufacturing capacity and supply output is not keeping up with this growing demand, due in part to the operating principles and processes of transformer production. For example, creating a transformer coil is a highly skilled hands-on task; the complexity of the winding depends on the voltage specifications required by the customer. While industrial automation can produce some common components to scale, most fundamental components can only be assembled through intense and specialize manual labor.

  In addition to transformer technician labor, electrical engineering experts are required in order to design transformers to mandated efficiency standards and other design specifications directed by a customer or electric utility. At present, the American education system does not graduate enough qualified technicians and other skilled labor to meet production needs. Courses in welding, coil winding, and transformer testing are not available at the high school level; and strong competition for graduates with degrees in power electronics, electrical design, and quality assurance has led to an enduring labor shortfall among manufacturers.

  Without an adequate and skilled labor force coming into the market, the order cycle for transformers is expected to continue lengthening. Consider the following: all new distribution transformers must be designed to electrical and mechanical specifications, which can take at least 2 months. An electrical design alone can be hundreds of hours, while mechanical design can take between 1,000 to 2,000 hours. As transformer orders continue to be submitted and demand grows, these time estimates will expand further without a sudden influx of skilled labor to meet them.

[7] https://powertechresearch.com/the-u-s-distribution-transformer-market-continues-to-be-replacement-driven/
[8] https://www.osti.gov/servlets/purl/1871501

- *Supply Chain Considerations*. Sourcing components and materials necessary for transformer production has become increasingly more difficult due to COVID-19, geopolitical tensions, constantly rising competition resulting from domestic electrification demand, and the decades-old reconfiguration of manufacturing across the globe, among other reasons. Many of the United States' domestic production and refining capabilities used have been moved offshore, and many remaining manufacturing facilities have either closed or been repurposed. For example, there is only a single large-scale producer of GOES remaining in the United States.[9] Bushings are generally produced out of porcelain for a transformer's external insulator, but the porcelain is no longer manufactured in North America.

  Furthermore, fierce competition for materials by other market sectors seeking to deliver the benefits of electrification and decarbonization is also straining supply. This includes the electric vehicle market, which relies on GOES to meet efficiency standards in electric motors. Manufacturers of energy efficient household appliance motors, power tools, fans, and lawn and garden equipment also are increasing demand for materials.[10] These additional demand pressures on limited supplies further increase the cost of material acquisition and prolong the order cycle of transformer manufactures (see Table 1).

  Current policy initiatives are being implemented with hopes of revamping domestic manufacturing. The Build America Buy America and other domestic labor-enhancement provisions contained within the Infrastructure Investment and Jobs Act are positive steps to redevelop a robust manufacturing sector. However, more immediate steps are needed to shorten and harden supply chains which contain the components and materials necessary for transformers production, including visa reform to lure skilled labor and nearshoring or friend-shoring production facilities. Transformer order cycle timelines cannot be curbed or reduced reasonably unless timely action is taken in these areas.

- *Customer Education*. All transformer types are designed to unique specifications which take into account a whole list of criteria, from geographic location, weather patterns, intended usage, to budgets and available resources. Purchase orders require an extreme attention to detail as well as a high-level understanding of technical knowledge. Lack of information or clarity are a primary cause in bidding delays and add to deliver wait times. NEMA has developed guidelines for utilities and other potential customers to use in drafting comprehensive purchasing specifications.[11] In a majority of cases, these guidelines will help reduce the transformer order cycle timeline and allow these products to be installed more quickly. This could be extremely beneficial in the immediate aftermath of a disaster affecting the grid.

- *Additional Consideration*. The DPA determination identifies both transformers and electric power grid components as necessary to the national defense. Transformers play a critical role in bolstering a power market's grid resiliency and reliability; however, low voltage grid technologies necessary for 'last mile' deliver of electricity are of equal importance. Grid technologies and products, such as metering infrastructure and hardware (i.e. nuts and bolts) are needed to transfer electric power effectively and safely from a distribution transformer to a home or critical infrastructure, such as a hospital or grocery store. Without these downstream products, the benefits of increased transformer production cannot be realized.

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[9] https://www.bis.doc.gov/index.php/documents/section-232-investigations/2790-redacted-goes-report-20210723-ab-redacted/file
[10] https://www.horizontechnology.biz/blog/electrical-steel-shortage-solutions-laminated-motor-cores
[11] https://www.nema.org/transformers-toolkit/customer-education

DPA Recommendations

A policy goal of the DPA is to make domestic manufacturing of transformers and grid components resilient and capable of transitioning the nation to a clean energy consuming and electrified economy. By bolstering domestic production, the DPA seeks to reduce many of the uncertainties which currently abound throughout the supply chain and slow the power sector's ability to recover from natural and man-made disasters. NEMA and GridWise members stand ready to play their part in ensuring that this Presidential Determination can be fulfilled and make America's grid stronger and more secure.

The DPA offers DOE certain financial tools to implement the determination: purchasing authority; the ability to secure purchase commitments; the ability to grant financial assistance; and to make subsidy payments. To help DOE maximize the leverage of these DPA tools, pending appropriations from Congress, we encourage DOE to consider the short, medium, and long-term recommendations below. Some of these suggestions may include policy changes which will require authorization from Congress; however, they are included here to provide important context and may further benefit DPA objectives.

- *Short-Term*.
    - **Workforce Development, Recruitment, and Retention**. Transformer manufacturing requires a specialized and labor-intensive skillset. Domestic access to and skills development of transformer technician talent is extremely limited; incentives are needed immediately to entice eligible workers to pursue this career path. Using the DPA tool of financial assistance, DOE could:
        - **Provide funding to states, community colleges or vocational schools, on a regional basis, to expand existing workforce development and training programs, or establish such programs.**
        - **Provide direct funding to transformer manufacturers to be used to increase their exposure and profile at recruitment events and venues, including job fairs.**
        - **Provide funding to states or local governments to create incentives to attract eligible workers to relocate to regions or areas where current manufacturing facilities exist.**

          A sample template is West Virginia's "Ascend" offer, which provides up to $12,000 in living and recreational incentives to individuals who move to selected municipalities and work remotely.[12] The intention of this program is to reinvigorate regions which have been affected by economic downturn and dwindling populations. Similar programs could be established and tailored to attract transformer technician talent to regions where manufacturing facilities currently exist but are lacking employees.
        - **Provide direct financial assistance to transformer manufacturers to help cover expenses related to visa-waiver applications and other foreign worker programs to bring transformer technicians into the workforce more quickly.**

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[12] https://ascendwv.com/financial-incentives/

- *Medium-Term*.
    - **Increase availability of GOES and other materials necessary for the construction of transformer components by creating incentives to quickly expand domestic processing capabilities and capacity while granting conditional waivers form 232 Tariff requirements**.

    - **Provide market confidence and assurance to both utilities and manufacturers by either delaying or not aggressively pursuing energy efficiency requirements in distribution transformers, especially for those intended for 'emergency use.'**

    In its report, *Draft Guidance on Implementing Section 1006 of the Energy Act of 2020* released in April 2022, a few months prior to the DPA declaration, the DOE noted that it was considering requiring a receipt from a third-party scrap company in order for eligible entities to qualify for a rebate.[13] The purpose of this requirement is to ensure that legacy or energy inefficient distribution transformers are decommissioned completely, thereby helping advance decarbonization policy objectives.

    In its comments to this draft report, NEMA noted that such a requirement could have unintended consequences. Requiring a third-party scrap receipt in order to claim the rebate could take functional legacy and inefficient equipment out of service sooner. Given the manufacturing lead-time process highlighted in Table 1, taking such equipment out of service before a modern replacement is ready to be installed could reduce grid resiliency and increase consumer costs. For utilities providing service to disadvantaged communities, this could create a disincentive to invest in cleaner technology out of concern of further negatively impacting end-users. This could further exacerbate the equity gap between these communities and more advantaged ones.

    NEMA suggested that instead of a making a scrap receipt a pre-condition to a rebate, that such a receipt be required to be produced within a certain timeframe upon the awarding of a rebate. This window of time should account for the manufacturing order cycle. However, with the Presidential Declaration now in effect, NEMA strongly encourages DOE to amend its draft guidance to incorporate DPA objectives.

    This could include **using DPA tools, particularly subsidy payments, to encourage entities eligible for a rebate to store, for a specified length of time, rather than scrap decommissioned but functioning distribution transformers. These stored transformers could then only be used as a stopgap during times of declared emergencies in order to provide short-term resilience to the grid. To encourage participation, the subsidy amount would be equal to or greater than the established rebate amount. Additional DPA tools, such as financial assistance and purchasing, could be used to help utilities procure warehousing for inventory of these components, cataloguing, and other related technical assistance**.

    By using DPA tools to complement the rebate program, it would incentivize manufacturers and utilities to continue pursuing the decarbonization goals of the Energy Act of 2020 while

[13] https://www.energy.gov/sites/default/files/2022-04/Draft%20Guidance%20Distribution%20Transformers%20EA2020_4-20-22.pdf

concurrently seeking to address the distribution transformer shortage the DPA declaration is attempting to bridge.

- **Provide greater incentives to manufacturers to expand transformer capacity through the Section 48C Manufacturers' Tax Credit, and other clean energy manufacturing credits.**

  The Inflation Reduction Act was enacted on August 16, 2022 and expanded the scope of qualified investments eligible for credits within Section 48C to qualifying advanced energy project sponsors. The law also gave the Secretary of Treasury until February 12, 2023 the authority to "establish a program to consider and award certifications" for such investments.[14] With the DPA declaration now in effect, **NEMA and GridWise strongly encourage the DOE to collaborate with the Secretary of Treasury to prioritize the certification of any DPA investments in the new program, particularly those within 48C(c)(1)(iii), electric grid modernization equipment or components.** These components should include most or all of the fundamental and common components used in transformer construction, listed above in the 'Background' section of these comments. Prioritizing these investments will complement the spirit of the declaration and help advance more quickly national and energy security policy goals.

- *Long Term*.
  - **Establishment of a Strategic Transformer Component Reserve**.

    Transformers are all comprised of common components and similar raw materials. DPA tools could be used to incentivize customers/electric utilities and manufacturers to cooperate in order to identify and build out a national component reserve. A reserve housing identified components and materials could help shorten the 'materials procurement' timeline of an order cycle (see Table 1).

    Customers/electric utilities play a direct role in the creation of a component reserve; they will know best the specifications required for transformers in their operating region, information which manufacturers need in order to construct these products. Given that electric utilities provide service in myriad environments nationwide and operate under local codes and mandates, these basic component needs may vary state-by-state, region-by-region. Therefore, any reserve must compile components and materials that are applicable to those customers within a given market.

    FERC recognizes ten electric power markets operating within the United States,[15] namely:

    - California (CAISO)
    - Midcontinent (MISO)
    - New England (ISO-NE)
    - New York (NYISO)
    - Northwest
    - PJM Interconnection
    - Southeast
    - Southwest

[14] https://www.democrats.senate.gov/imo/media/doc/inflation_reduction_act_of_2022.pdf
[15] https://www.ferc.gov/electric-power-markets

- Southwest Power Pool
- Texas (ERCOT)

NEMA and GridWise propose that customers/electric utilities, in collaboration with manufacturers, within each of these power markets establish a Component Reserve Task Force to ascertain which components and materials are generally used within that market. Each task force would identify appropriate reserve amounts needed for each item, identify where in the market area a reserve location or locations should be established (at least one in each market), and what criteria needs to be met in order to access the reserve.

A combination of DPA tools would be needed to administer this recommendation, including financial assistance for the administration of each task force, purchase commitments to acquire from manufacturers the identified components and materials which would go into each reserve, and purchasing to acquire warehousing for inventory.

It is worth noting that the concept of transformer component reserve is not a novel one and has been considered by government agencies in the past to reduce energy sector risk. In 2014, the Department of Homeland Security released a report entitled *Considerations for a Power Transformer Emergency Spare Strategy for the Electric Utility Industry*.[16] **Using real-world examples and proof-of-concept models, the report recommended the creation of an emergency spare transformer program which would include the identification and stockpiling of components and materials for manufacturers to access in order to quickly assemble transformers. This idea is very similar to our recommendation here**. Furthermore, this report emphasized the need to simplify the specification requirements in transformer design so that spares could be manufactured and placed into service by utilities at a faster rate. This concept is echoed by our recommendation immediately below to establish a 'emergency-use' transformers.

- **Creation of an 'Emergency-Use' Transformer Reserve**

As noted above, transformer manufacturing is a labor-heavy and highly specialized process with the end-product being designed and constructed to fit unique customer specifications. Due to this high-level of customization, it is challenging and expensive to produce both distribution and LPT transformers wholesale which could be used interchangeably between utilities and throughout various electric power markets. This lack of standardization has led to an aversion to the creation of a national reserve of fully assembled transformers. Customers/electric utilities do not want to inventory products that cannot be placed into service due to interoperability issues, and manufacturers do not want to reduce their production capacity to supply products that the market does not need.

NEMA and GridWise feel there is an opportunity for DPA tools to help incentivize the creation of a special 'emergency-use' transformer market, consisting of both distribution and LPT products. The goal would be to identify several common specifications for each transformer type based on factors such as insulation type, kVA, and mounting application. Once identified, these specifications can be applied to create a unit which can be implemented

[16] https://www.dhs.gov/sites/default/files/publications/RecX%20-%20Emergency%20Spare%20Transformer%20Strategy-508.pdf

universally throughout electric power markets and be used interchangeably between utilities. As the unofficial name implies, an ‘emergency-use’ transformer would be allowed to be installed during declared emergency situations to act as a stopgap. This emergency-use product would be designed purposefully to provide a solution to the policy goals of hardened grid resilience and increased national security. Regarding ‘emergency-use’ distribution transformers, these products would not be intended to serve as a long-term solution which could undermine energy efficiency policy goals.

We encourage the use of DPA tools to create an Emergency-Use Transformer Task Force within DOE to bring together manufacturers, customers/electric utilities, and other entities to identify the various elements needed in order to create a market-acceptable product. This would include the development of manufacturing and product implementation guidance (see recommendation below). Once established, other DPA tools could then be used to acquire these products to fill reserve quotas.

However, **NEMA and GridWise stress that if a transformer reserve of any type is established that government procurement of transformers only be done in close collaboration with both the electroindustry and utility sector. Procurement in order to fill a reserve could take available and much needed capacity out of the market to sit on the sideline. This would exacerbate the current shortage and undercut the intent of this policy**. Collaboration between industry and government would be needed to create the correct incentives, whether they be financial or policy-driven, to reach the best results.

- **Standardization of ‘Emergency-Use’ Transformer Manufacturing and Implementation Guidance.**

  To help accelerate the implementation of aforementioned ‘emergency-use’ transformers, DPA tools should ensure that manufacturing standards are created for such products, along with guidance documents to complement their quick and safe installation. Standardization is critical to the scalability of transformers and to achieving the policy goals of the DPA determination.