

# Increasing On-Shore, On-Hand Supply of Transmission Equipment

## *The Importance of Building a U.S. Strategic Transformer Reserve*

**E**nsuring that the electrical grid is secure is nothing new, but with increased threats and risks like physical assaults, natural disasters, and cyber attacks, the question is not if, but when, a prolonged power outage will disrupt our quality of life, economic well-being, and overall safety.

With these increased threats come more questions. How prepared are we to respond to and recover from a high-impact, low-frequency (HILF) event that causes a large-scale, multi-site impact? How well defined are our plans and how well have we assessed recovery time if affected assets are transformers that require a long lead time and are difficult to transport? And how certain are we that suitable spare assets will be available immediately to aid in the restoration? What happens to our customers if we are not adequately prepared?

### Industry-Based Solution

As an industry, we continue to look at ways to improve resilience and recovery, and rightly so. The industry needs to take the lead in developing comprehensive and cost-effective solutions for grid resilience. If resilience concerns remain unsatisfied by industry action, regulators and government officials may choose to develop their own solutions, resulting in new legislation, Standards, regulations, and other mandates.

While it is not practical to protect or harden the grid across the hundreds of thousands of miles of transmission lines and tens of thousands of substations, one option that has been considered as a way to improve grid resilience is to increase the nation's supply of large power transformers (LPTs).

**Jeff Fleeman, Chief Operating Officer, Grid Assurance**

Jeff Fleeman, Grid Assurance COO, is responsible for the development of the company's inventory, warehousing, and logistics. He is also with American Electric Power, one of the founding members of Grid Assurance.

*Continued on page 12*

*Continued from page 11*

Utilities maintain some operational spares to replace large power equipment that fail due to normal wear and tear, but it is economically prohibitive for every utility to stockpile enough of these expensive pieces of equipment to prepare for their own worst-case scenario. Unless each utility is storing their backups in secure and off-site locations, it is likely that their backup transformers will be damaged by the same HILF event that damaged their in-use equipment.

In 2006, the power sector took a critical first step to address replacement of transformers damaged by terrorist acts. The Edison Electric Institute and several utilities formed the Spare Transformer Equipment Program (STEP). STEP provides participating utilities the right to buy large transformers from other participating utilities, but only after a presidentially declared terrorist emergency.

This was a good first effort, but this option has some shortfalls. Mutual aid provides no increased capacity of critical equipment for the industry. When a catastrophic event occurs:

- the equipment available is on an “if available, as is, and where is” basis;
- utilities may not know the exact specifications of the equipment they may receive and therefore may not know in advance if, or how well, it will interact with their system needs; and
- it is not likely that a transportation strategy to ensure timely delivery of the equipment will be developed.

Some utilities continue to place additional reliance on mutual aid. In today’s world, relying on mutual aid alone is not enough. Mutual aid-based solutions are vulnerable to competing needs and could break down if those who could help either have been hit by a similar event or fear that they will be hit.

The U.S. Department of Energy (DOE) noted in its 2015 Quadrennial Energy Review that STEP alone is not sufficient to address large-scale grid vulnerabilities. The STEP inventory is not big enough to respond to a large, coordinated attack.

There are many factors needed to develop a successful strategic transformer reserve. Each utility has a unique mix of equipment that reliably delivers energy every

day. Procuring LPTs requires an extended lead time. The time between order and delivery can take up to two years.

So, how do you develop a transformer reserve program that works for every utility, make sure it is cost-effective, ensure that equipment is quickly and efficiently delivered when needed, and find the funding to make it happen?

## Upfront Planning

In 2017 the DOE released its *Strategic Transformer Reserve* report,<sup>1</sup> which supports an industry-based approach.

According to Michael Deggendorf, CEO of Grid Assurance, one industry-driven option that provides a solution to many of these questions is Grid Assurance.

“Increasing the security and resilience of the U.S. bulk power grid is a must for our country. Having an adequate supply of on-hand, on-shore access to long-lead-time equipment is the biggest challenge to utilities when recovering from catastrophic events,” Mr. Deggendorf said. “As a 30-plus-year veteran of the electric industry, I felt compelled to advance a solution that provides greater certainty, greater transparency on price, and greater ability to plan to restore service sooner to customers after a catastrophic event.”

Several major utilities agreed and were the initial subscribers to Grid Assurance. American Electric Power, Berkshire Hathaway Energy’s MidAmerican Energy Company, NV Energy, Eversource, FirstEnergy, Kansas City Power & Light, and National Grid signed on as subscribers of Grid Assurance in May of this year. These companies have 31 participating transmission affiliates with facilities in 26 of the 48 lower continental United States.

Grid Assurance works with each utility to identify relevant transmission equipment they will need to confidently and completely recover after a catastrophic event. They then order, store, and maintain that equipment in secure, strategically located warehouses, ensuring the equipment will be ready and in good condition when needed.

<sup>1</sup> <https://www.energy.gov/sites/prod/files/2017/04/f34/Strategic%20Transformer%20Reserve%20Report%20-%20FINAL.pdf>

Cost is another challenge when one looks at creating a transformer reserve. As the industry continues to enhance grid resilience, electric utility commissioners and customers expect the most cost-effective answers.

The Grid Assurance solution divides the cost among many utilities. This shared inventory approach provides savings in purchasing, warehousing, protecting, and maintaining replacement equipment, making it more affordable for each subscriber to have immediate access to on-hand, on-shore large-scale equipment.

When a catastrophic event happens, a transmission owner is focused on returning operations to normal as quickly as possible. Grid Assurance works with each subscriber on logistics plans for equipment delivery before an event occurs. This upfront planning ensures the equipment will be delivered in the timeliest manner following an event. Knowing when critical replacement equipment will arrive provides an added layer of confidence for a utility that they will quickly return power to their customers.

## Restoring Quality of Life

Another challenge is regulatory approval. It's well recognized that utility companies are hesitant to make major investments without some level of regulatory assurance that their "prudently incurred" costs will be recouped in rates.

Grid Assurance has been proactive and received two positive orders from the Federal Energy Regulatory Commission (FERC) that provide regulatory clarity on issues related to prudence, compliance, ratemaking, and affiliate pricing for transmission-owning entities participating in Grid Assurance.

While not FERC regulated, Grid Assurance charges cost-based subscription fees, like FERC-regulated transmission formula rates. These cost-based subscription fees along with the FERC orders will facilitate members' ability to recover their Grid Assurance subscription expenses.

Grid Assurance was formed to answer a need in the electrical industry: to restore the electrical grid more quickly following HILF events by increasing the on-shore, on-hand inventory of critical transmission

equipment. The company helps utilities quickly restore power delivery, helping to protect consumers and communities from the devastating impacts that delays in restoring electricity have on quality of life and the nation's economy.

Customers expect the lights to turn on when they flip the switch even during a catastrophic event. Transmission owners must ask themselves how many days they can afford to be without power.

Each transmission-owning utility needs to act now to prepare for HILF events. This additional layer of available assets increases the on-shore, on-hand supply of large-scale transmission equipment while providing much-needed support of a utility's resilience plans. It deserves careful consideration by transmission owners and regulators, given the growing risks to the grid. ☺



One option to improve grid resilience is to increase the nation's supply of large power transformers that can respond to grid attacks. Photo courtesy of Grid Assurance