

Provided below is National Grid's comments to the RFI on a national reserve of power transformers.

1. Program Need

Is there a need for a National Power Transformer Reserve? Response - National Grid's belief is that a program may already exist, however, is optional versus mandatory to participate and is more based on failure rates. A National Power Transformer Reserve may be helpful to help in determining current risk and identify weaknesses in the spares policy. We currently participate in the EEI spares program. In NE we currently have one spare 230kV auto for four 230kV autos in service and currently have two spare 345kV autos for twenty three 345kV autos in service. The spare calculation population is based on failure rates only, at this time.

How would such a reserve affect the reliability and resiliency of the North American bulk power system? Response - Reserves would help to reduce the duration of long term outages from many months to many weeks.

Are there alternatives to a power transformer reserve program that can help ensure the reliability, resiliency, and recovery of the bulk power system? Response - Not really, however, studies could be performed in Networks to determine the minimum required number of Bulk Power Transformers that would need to be in-service to maintain system integrity during seasonal and off season loads.

Is there a need for a nationally-maintained inventory of large power transformers? Response - National Grid believes there is a need to prevent mass chaos if an event occurred and the grid was at risk of large regional power outages

2. Power Transformer Criteria

What types and sizes of power transformers should be considered for inclusion in a transformer reserve program versus operational spare capacity? Response - EHV for National Grid system 230kV and above large MVA autos, phase shifters, GSU's and converter transformers.

What are the design considerations for replacement transformers to support the bulk power system? Response - The three major design considerations would be kV, MVA and impedance. Most other items such as size and accessories could be solved utilizing engineering design.

3. Ownership & Economics

What would be an appropriate structure for procuring and inventorying power transformers? Response - The owner of the asset would be responsible to procure and maintain spare or use the EEI STEP program to manage this function with initial funding from the government.

How, and by whom, should a program of this type be administered? Response - EEI has a similar program and could be modified to incorporate this structure.

How would a transformer reserve be funded? Response - The program would be funded by the customers and added to the rate case. Or, if a national reserve is initially funded by the government, then, the utility using the spare could reimburse the government for a new replacement.

4. Technical Considerations

Is it technically feasible to develop a reserve of large power transformers when most are custom engineered? Response - It is technically feasible. For example, many years ago a spare transformer was shipped from Texas to Massachusetts and placed into service.

Is additional research and development (R&D) necessary to develop suitable replacement transformers that can be rapidly deployed from inventory in the event of an emergency? Response - This question would need to be answered after data of KV, MVA and impedance is developed after polling owners of LPT's.

5. Procurement and Management

How should procurement, maintenance and management of the reserve power transformers be conducted? Response - From a procurement point of view: unfortunately US suppliers have limited capacity at this current time due to the few number of manufacturing plants of LPT. We should be certain we have agreements with US allies.

For example, should manufacturers be pre-qualified, and if so, according to what criteria? Response - Most utilities have pre-qualified suppliers.

6. Supply Chain

What are the critical supply chain components for the manufacture and delivery of large power transformers (e.g., electrical steel, copper, silicone, high voltage bushings, etc.)? Response - Typically it would be bushings and LTC's. Currently spare bushing quantities are based on failure rates. We would support having more on hand spare bushings on hand for large scale events.

Are there shortages or other considerations that could necessitate using the Defense Production Act Priority Ratings to ensure sufficient parts are available in a time of need? Are there related skilled workforce issues? Response - The only work skill issue is that we depend on manufacturers from other countries.

7. Manufacturing

Is there adequate manufacturing capacity to support a transformer reserve program? What is the lead time for engineering, manufacture, and delivery of large power transformers? Are there approaches that could help to speed manufacture

and delivery of large power transformers? Response - There should be adequate capacity for Transfer Reserve Program. Current lead time would be between 12-18 months. One method of speeding up delivery is prioritization. We recently had a medium power transformer ordered, designed, manufactured, delivered and placed into service in 90 days. Agreements with suppliers of raw materials and long lead time items with prioritization is beneficial.

8. Transport and Deployment

What specialized transport infrastructure would be necessary to ship large power transformers from manufacturing site to storage locations, and from storage locations to field site in the event of an emergency? What should be the number and location of transformer storage sites? What are feasible delivery times for LPTs that reside in a reserve to an affected site? Response - Road permitting is typically the largest obstacle for transportation of LPT. Infrastructure is in place, however, obtaining delivery plans is what takes the time. Feasible times would be 4 months.

Sites need to be located based on most important need to the system and closeness to rail sites or ease of transportation.

9. Field Engineering and Installation

Are there adequate domestic engineering and installation resources available throughout the United States to install multiple bulk power transformers simultaneously? What additional resources would be necessary? Response - National Grid believes we have sufficient resources.

10. Criteria for Deploying Transformers

What criteria should be used for activating and deploying transformers from the reserve? How would deployment be funded? Response - Deployment is based on importance to the Grid based on utility and ISO guidance. Funded by the utility that needs the LPT.

11. Additional Comments

Are there additional concerns regarding a National Power Transformer Reserve Program that need to be considered? Response - Focus should be on protecting the asset and grid from disruptions and having a LPT reserve or spare based on failure rates and being able to response to larger scale issues.