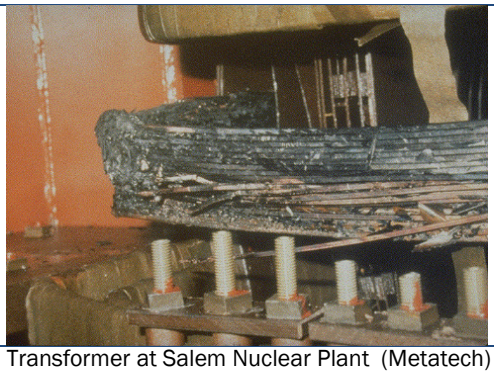
DHS Science and Technology Directorate

Transformers Power Up the Grid

Transformers ensuring transmission of power

The United States has the world's largest high voltage transmission grid (the long haul delivery system used to transport power from generation stations to the distribution network) at over 80,000 miles of transmission lines at 345kV and above. Extra High Voltage (EHV) transformers, 345kV and above, are critical components of our nation's backbone transmission grid – an estimated 90 percent of electricity passes through an EHV transformer.

EHV transformers are subject to many challenges, including: lengthy procurement periods, transportation constraints due to their size, limited U.S. manufacturing capability, and prolonged installation times. Additionally, the majority of the installed fleet of transformers is approaching the end of their design lives of 35 years, further increasing their vulnerability to failure. It can take 12-24 months to procure and replace an EHV transformer.



Damaged Transformer at Salem Nuclear Plant (Metatech)

The Department of Homeland Security (DHS) Science and Technology Directorate's (S&T) Recovery Transformer (RecX) is a prototype EHV transformer that will drastically reduce the recovery time associated with EHV transformer outages from several months to less than one week in case of an emergency. Such outages can occur due to man-made circumstances or natural disasters.

New Technology for the Power Grid

DHS S&T has developed a prototype RecX that is easier to transport (weighing approximately 60 tons versus hundreds of tons for traditional transformers) and quicker to install, reducing potential recovery time by more than 75 percent.

In March 2012, the RecX prototype was successfully demonstrated. The transformer was transported from St. Louis, Mo. to Houston, Texas installed, commissioned and energized in the grid in less than a week. The transformer's performance will be monitored to validate the design and operational behavior for a period of one year.

RecX In-Grid Deployment (Paul Wedig)

RecX increases the resiliency of the electrical infrastructure. In addition, RecX also reduces the overall downtime that impacts not only the electric sector but also other critical infrastructures that depend on the electric sector.

RecX Transportation (Paul Wedig)

DHS S&T is committed to identifying and developing technologies to improve the safety, security and resiliency of the nation's power grid.

Homeland Security

Science and Technology

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