

# Electricity Advisory Committee

## MEMORANDUM

**TO: Honorable Steven Chu, Secretary  
Honorable Patricia Hoffman, Assistant Secretary for Electricity Delivery  
and Energy Reliability**

**FROM: Electricity Advisory Committee  
Richard Cowart, Chair**

**DATE: October 28, 2011**

**RE: Recommendations on U. S. Grid Security**

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### Introduction

The US economy and life as we know it are becoming much more dependent on electricity and it is a fundamental responsibility of government to ensure our national security. Certainly, 100% security cannot be guaranteed or afforded, but the grid can be hardened in smart ways over time as the electric industry replaces aging assets and deploys new assets. As we have built national security into the interstate highway system over time, we should do the same for the grid. Short, aggressive time lines are not recommended so as not to unduly burden consumers.

The electric industry has performed admirably to restore the grid for hurricanes and other natural phenomena. The grid has shown remarkable resilience for these phenomena and other wide spread events over the years. However, further work is needed to better understand potential steps for addressing wide spread high impact, low frequency (HILF) events, such as high altitude electromagnetic pulses (EMP). We acknowledge that several initiatives are underway by NERC, EPRI and others to address geomagnetic disturbances (GMD), coordinated terrorist attacks, and cyber attacks. However, DOE is in the best position to broaden and complement these efforts that can yield the development of R&D, guidance, and best practices to harden the grid for national security in coordination with other agencies, such as DOD and DHS.

The DOE Electricity Advisory Committee (EAC) specifically cites one of the most aggressive initiatives being NERC's Critical Infrastructure Strategic Roadmap developed by the Electricity Sub-Sector Coordinating Council and approved by the NERC Board of Trustees in November 2010. The goals of the NERC effort are:



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- 1) Enhance situational awareness within the electricity sub-sector and with government through robust, timely, reliable, and secure information exchange.
- 2) Use sound risk management principles to enhance physical and cyber measures that improve preparedness, security, and resilience.
- 3) Conduct comprehensive emergency, disaster, and business continuity planning. Conduct training and large-scale exercises involving electricity industry and government entities to enhance reliability and coordinated emergency response.
- 4) Clearly define critical infrastructure protection roles and responsibilities.
- 5) Enhance understanding of key interdependencies and collaborate with other critical infrastructure sectors to address them, and incorporate that knowledge in planning and operations.
- 6) Strengthen public and government regulatory agency confidence in the sub-sector's ability to manage risk and implement effective security, reliability and recovery efforts.

Several task forces are underway as part of this effort, including: 1) Geomagnetic Disturbance Task Force, 2) Severe Impact Resilience Task Force, 3) Cyber Attack Task Force, and 4) Spare Equipment Database Task Force.

### **Electricity Advisory Committee Recommendations**

The EAC recommends that the DOE take a more active, complementary role in NERC's efforts. Specifically, the DOE has outstanding resources that can be tapped (e.g., the national Labs) and more direct liaison with DOD and DHS to do the following:

#### **1. Determine Specific Grid Vulnerabilities to HILF Events and Cyber Attacks**

The electricity industry is diligently working to determine grid vulnerabilities to GMD and cyber attacks. DOE can complement this effort to develop modeling and testing in support of grid component hardening guidance/best practices and identification of critical component sparing gaps. In addition, DOE in coordination with DOD and DHS can develop a risk-based approach to grid hardening that balances cost to the consumer with the need for grid security.

#### **2. Development of Grid Component Hardening Guidance/Best practices**

Based on the above modeling, testing and risk-based assessments, the DOE should work with the electricity industry via the cited NERC efforts and manufacturers to develop grid component hardening guidance/best practices. These guidance/best practices should extend to components at generating stations and critical loads. These guidance/best practices should be applied as assets are replaced in natural order as they reach end of life. It is assumed that a risk-based approach will not result in aggressive time lines or material cost premiums. The DOE EAC believes

that a reasonable approach to grid hardening as assets are replaced will be as effective as similar programs such as the guidance/best practices applied to achieve energy efficiency.

### **3. Determine Specific Gaps in Sparing Critical Components**

The electricity industry via EEI, NERC and other actors has taken a reasonable approach to sparing large, long lead-time transformers. Based on the risk-based assessment cited above by DOE in coordination with DOD and DHS, there may be gaps in sparing these and other critical components. The DOE EAC recommends that DOE complement industry efforts to determine these gaps and to develop a reasonable implementation plan balancing cost to the consumer with grid security.

These three recommendations were unanimously approved by the Electricity Advisory Committee at its meeting on October 20, 2011.