As utility needs evolve, so do the solutions for solving today’s Power Challenges. Keep the Power Flowing is a series of articles focused on maintaining or improving equipment availability and reliability.

What is the difference between reliability and resiliency? **Reliability** is the ability of a system to “consistently perform” its intended or required function on demand for the required duration. In other words, it is the average performance of a system over time. **Resiliency** is the ability of a system to “withstand and then recover from” failures or events. In other words, how does a system bounce back from a single or multiple disturbance(s). The two are inter-related.

Why is now the time to pay attention to resiliency? There are four reasons:

1. While the annual number of non-weather related outages has remained flat, the number of major outages due to weather has increased ten-fold since the 1980’s. Major storms are increasing both in severity and frequency. According to Deliotte Research, the average number of major weather outages in the 1990’s was 5 to 20 per year, and the average was 50 to 135 per year between 2008 and 2013. More importantly, no one type of storm (fire, flood, tornado, hurricane, super storm) has a monopoly on the impact or cost.

2. FERC recently approved Order 802 submitted by NERC for CIP-014-1 which applies to Critical Infrastructure Protection of the power grid. Under this ruling, utilities and transmission owners must categorize substations and develop a plan for protecting the most critical substations.

A highlight of Order 802’s ruling includes the following aspects:
- Requires owners and operators of Bulk-Power System to perform a risk assessment of their systems to identify critical facilities and critical assets
- Evaluate potential threats to, and vulnerabilities of, those facilities
- Develop and implement a security plan to protect against attacks on those facilities.

While it is not necessary to harden every substation or every asset, transmission owners and operators are required to use systems knowledge, review relevant portions of the grid, and determine critical assets.

3. Regulators have taken note of this change in outages (frequency, duration, response), and have been given the authority to develop new laws and implement fines; and they are using that authority. For example, there have been regulatory changes in NY, MA, and CA specific to outage management. In general, the new regulations revolve around safety and response / preparedness. Transmission owners and operators need to have an outage plan in place and be able to respond quickly when there is an event. Penalties are for missed performance and compliance.

4. Reliability improvement is increasingly required as a component of new rate cases. Failure to implement reliability improvements can result in rejection or rollback of a previously approved case. To support this, a reliability report must be submitted by utilities every year with system wide SAIDI, SAIPI, and CAIDI. All circuits are tracked to identify and target those which have below-average reliability. The report must include corrective actions, or have an explanation if no action is taken for below-average circuits.

Fortunately several options are available to make substations and specific assets more resilient. (This is also known as hardening of the grid.) ABB is able to help utilities with many of these solutions.
- Install opaque or bullet proof perimeter fencing, or build new equipment inside a building to keep out the bad actors. Your first line of defense is to ensure they cannot see through or penetrate the wall outside your substation.
There are numerous reasons for improve grid resiliency. The greatest benefit is having fleet assets more resilient to natural or unexpected events. The payoff is improved reliability, regulatory compliance, and happier customers. Prepare for resiliency changes by planning and budgeting now; leverage your vendors for dynamic product and industry solutions; work across the organization to make improvements (avoid the silo mentality); and remember that NERC compliance is a minimum, as in all you do – aim high for best results.

Scan the above QR code with a cell phone to contact ABB for more information on any of the resiliency solutions discussed in this article, or call 724-696-1300.

Author Profile:

Adam Bujanowski is a marketing communications specialist with ABB High Voltage Service.

For more information please contact:

ABB Inc.
High Voltage Service
100 Distribution Circle
Mount Pleasant, Pennsylvania, USA
Phone: +1 (724) 696-1300
Fax: +1 (724) 696-1379
www.abb.us/hvservice

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