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DRAMIAN SCIARO
DIRECTOR OF OPERATIONS
RESOURCES INTERACTION, AT CON EDISON

LEON BUKHMAN
PROJECT MANAGER, AT CON EDISON

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POST

Preparing for the Inevitable: How Utilities Can Keep the Power on Despite Strengthening Storms



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PHIL SCHADE, P.E. 🌐223

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As temperatures and sea levels rise, storms strengthen. This leads to dangerous storm surges, increased rainfall rates, and greater wind speeds, which can result in more infrastructure damage. For electric utilities, the strengthening of storms makes it difficult to anticipate the level of response that will be needed to bring power back to impacted areas. But there are ways for utilities and electric system operators to mitigate the amount of damage caused by storms and, as a result, potentially lessen the number of customers who lose power. There is additional motivation for utilities to do so due to recently passed legislation that provides significant federal funding for exactly these purposes. By proactively hardening their distribution system and investing in additional reliability methods to keep the power on, even when distribution is impacted, utilities can decrease their outage frequency and allow for power restoration to occur more efficiently.

One of the most destructive and dangerous threats posed by hurricanes is storm surge. In coastal areas, when ocean levels rise due to the low pressure and winds that a storm brings, water can come rushing inland at higher levels than a typical high tide would produce. If utility companies' equipment isn't above this flood line, there can be significant damage and impact to customer service. Though storm surge has always been a concern in areas prone to hurricanes, this threat has worsened in many coastal areas as sea levels continue to rise and the rate of significant storm events increases. Even if utility companies had originally planned for this threat when installing their equipment, it most likely needs to be reevaluated to prepare for future flooding.

Another concern regarding flooding is increased rainfall, which impacts inland areas in addition to coastal areas. Storms are shattering state records for rainfall and areas that previously were not prone to flooding, due to their distance from a large body of water, are now facing this threat. This may mean that substations and related systems may need to be raised to a greater elevation.

But flooding isn't the only threat that needs to be addressed by utility companies. Greater impacts are often caused by downed trees, lines, and poles. This is caused by greater wind speeds and falling trees and branches, which have a major impact on utility infrastructure. Techniques for hardening the system against high wind events exist. These include replacing overhead systems with underground construction, replacement of aging poles, installing taller poles, replacing aging electric lines, reducing cross-arm width, and aggressively trimming nearby trees.

These methods are effective in preventing outages, but outages cannot be avoided entirely. That's why adding sectionalizing switches into utility companies' storm hardening plans is also advisable. When utility companies use sectionalizing switches, they limit the number of customers impacted by an outage. These switches isolate sections on an electric circuit when a fault occurs, allowing utility companies to direct their efforts to where the failure is located. This saves time and prevents additional customers from losing power, resulting in improved restoration time.

Another power delivery method that can help with system reliability is the application of battery energy storage. Though many have heard of generators which restore power temporarily, battery systems can be used in a similar way, without the need for fossil fuel. Batteries are a short-term solution, as they have a limited output duration before requiring recharge. However, as the nation further shifts to clean energy technologies like wind and solar, both of which are intermittent power generation sources, the need for energy storage will be critical to support continuous power delivery. Battery energy storage systems will need to be part of the local infrastructure and be available to supply electricity when intermittent systems are not actively generating power.

Strengthening storms is a reality for many areas of the country. In response, many local utilities and electric system operators have already implemented some of these storm hardening and reliability methods and the results have been significant. By focusing on vulnerable circuits, major improvements in reliability have been realized.

Given the potential for system reliability improvement, and with federal support for these types of infrastructure projects, many utilities and system operators have begun implementing related programs. Whether funded by federal dollars, or by the rate payer, working with a firm experienced with storm hardening programs and energy storage systems can help to reduce implementation costs. The end result will be a more efficient electric delivery system and a better customer experience.

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