

# Defining Resiliency

## Delivering on Promises

BY POWER DELIVERY INTELLIGENCE INITIATIVE'S MICHAEL BEEHLER

**H**urricanes, floods, ice storms, and wildfires. They seem to be getting bigger, stronger, and more destructive. Also, they seem to happen more often just as everything is being electrified and net-zero and carbon-free goals are being set. These ambitious goals put increasing demand and visibility on the legacy transmission and distribution electric grid.

The solution is resiliency. Regulators, customers, and investors are told that resiliency is what they need and what can be delivered. But, depending on who you ask, resiliency is defined several different ways. It is sometimes confusing to industry engineers and planners, and it is well beyond what a lay person can reasonably understand.

The IEEE Power Energy Society has several papers on resiliency with abstracts that read: “While the concept of resiliency is not new, its application to the electric grid is not as straightforward due to the lack of a consistent definition of resilience or a mature set of metrics by which resilience or its application can be measured. This report provides an overview of resilience definitions, including its relationship with reliability, the existing frameworks for holistically defining resilience planning and implementation processes, and the

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metrics to evaluate and benchmark resilience.”

A search of the Electric Power Research Institute website finds phrases such as: “Resiliency is a complex, multi-dimensional topic that is difficult to capture in a single metric. Current efforts and analytical frameworks for assessing and measuring resiliency are diverse and lack a unifying perspective – there is no standardized framework for assessment or for evaluating investment options.”

Our industry needs to provide simple, understandable definitions for commonly used terms such as smart grid, smart cities, distributed energy resources, and microgrids. The simple, understandable definition of resiliency is: The ability to withstand a High Impact, Low Probability (HILP) event with little or no customer outages.

Examples of HILP events are wildfires, hurricanes, floods, and ice storms; the very kinds of events that make line crews and first responders the “Heroes

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of the Storms” as featured in the forthcoming book by Public Utilities Fortnightly.

Reliability is measured in minutes. Decades old performance indices like SAIDI, CAIDI, and MAIFI are the standard and, as measured without HILP, the grid is 99.97 percent reliable.

But resiliency is measured by total time of line restoration in days.

Today, there is empirical data that verifies that grid investments are cutting days of recovery time from HILP events. Many utilities have pilots and programs that enhance resiliency with pole hardening, undergrounding, covered conductors, and a wide array of emerging technologies. Strategic undergrounding in particular has been a popular favorite from Dominion in the east to PG&E in the west.

So, resiliency has been defined. It can be measured. A more resilient grid is being built every day. The result will be an electric T&D grid that helps deliver on the promises being made to investors, regulators, and customers. 