# DRˣ for System Resiliency & Storm Hardening Effectiveness

## COMMON CHALLENGES

- Companies often aren't sure what metrics to use to measure resiliency and storm hardening effectiveness
- Even with existing data sources, many companies struggle to determine how to use their internal data, ideally combined with external benchmarks, to calculate, model and compare resiliency in a robust, defensible manner
- Given changing regulatory expectations, leading companies are looking for support from third party experts and/or other utilities in helping justify current performance and/or hardening investments, via data-driven resiliency reports and plans.

## ABOUT DRˣ – DISTRIBUTION RELIABILITY EXCELLENCE

Our solution helps executives, managers, and reliability engineers to manage key metrics and essential data. The **System Resiliency & Storm Hardening Effectiveness Modules** utilize the latest modeling techniques along with detailed historical outage and weather data to determine where to invest for a resilient, storm-hardened system as well as prove that historical investments were prudent, effective, and added company and customer value.

## WHY UMS GROUP

We pride ourselves on being a strategic partner - external experts / consultants with broad industry experience in helping utilities adapt and drive sustainable change and performance gains across their business. Besides 30+ years bringing best practices and pragmatic insights to the utility industry, data scientists in our analytics & tool dev center use machine learning / AI to embed that operating expertise into advanced decision support tools that eliminate 70-80% of analyst work required to get answers.

## EXPECTATIONS ARE RISING

Customer, Regulator and other key stakeholder expectations for system resiliency are rising in the face of climate change, particularly in the following areas:

- Measurement and Reporting of System Resiliency
- Measuring the Severity and Impact of Climate Change
- Demonstrating Storm Hardening Effectiveness
- Substantiating Cost-Effectiveness of Storm Hardening Investments

## UMS GROUP CAN HELP YOU MEET THEM

By combining subject matter expertise, deep consulting skills and world class software, UMS Group is uniquely positioned to help companies meet and exceed expectations in these areas.

### Measure, Report & Promote System Resiliency

***Grid Resilience***

- Storm Vulnerability
- Vegetation Clearance
- Grid Self-Healing
- Lateral Undergrounding
- URD Hardening
- Storm Hardening Investment Levels

***Process Resilience***

- Inspection and Repair Protocol and Compliance
- Preparedness Plans and Staff Training
- Mutual Assistance Group Participation
- Mobile Transformer and Substation Availability
- Strategic Spares for T&D

### Measure Severity + Impact of Climate Change

Generate data supported evidence of Climate Change impact on grid reliability. Revise reliability targets as previously excluded storms begin "sneaking" through below MED thresholds. Potentially support relief requests for additional veg management spending on certain circuits.

### Demonstrate Storm Hardening Effectiveness

Prove greater resiliency in terms of reduced # of outages and shorter restoration times due to grid modernization investments and predictive analyses/proactive planning in the face of approaching weather events (wind, etc.).

### Substantiate Storm Hardening Value

Prove storm hardening investment prudency and cost effectiveness by using your data to quantify savings due to system resiliency (fewer outages, shorter restoration, etc.).

# DRˣ for System Resiliency & Storm Hardening Effectiveness

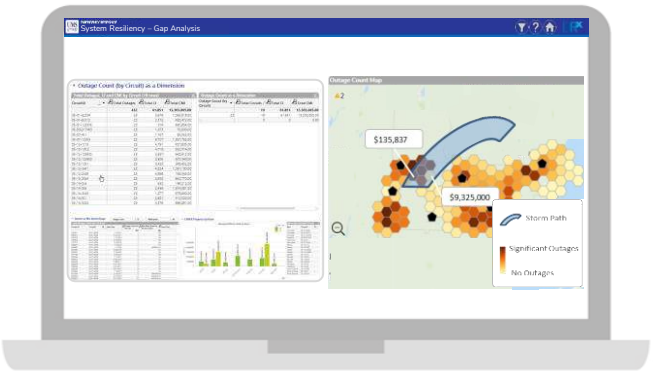
The **DRˣ System Resiliency & Storm Hardening** modules support a wide range of resiliency and hardening activities - from gap identification and vulnerability assessment to cost/benefit analyses, pinpointing where to invest and with which solutions, also determining if those expenditures were effective and achieved anticipated hardening results.

1

1st step - **identify gaps in asset performance or increases in programmatic spending required**. Pre-defined analyses can highlight storm performance drivers such as danger tree outages, deficiencies in reclosers, fuse savers, lightning arresters, etc.

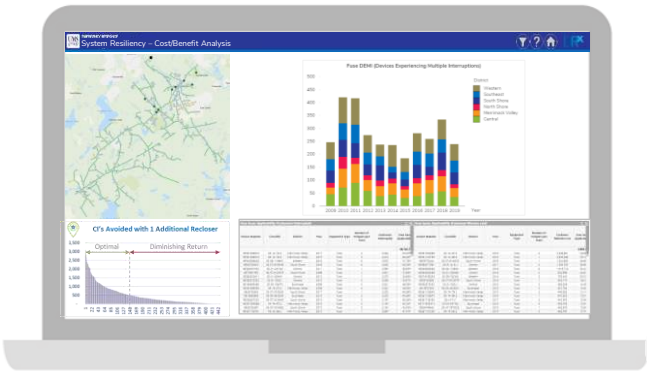

2

Next - **identify areas of storm resiliency and storm vulnerability.** On storm days, DRˣ tracks weather severity against number of outages, thereby defining circuits as a function of age, outage experience, & ongoing investment levels, as well as vulnerability or resilience to weather conditions (e.g. wind speed/direction).




3

Once gaps and vulnerabilities are identified, DRˣ performs **cost/benefit analyses to determine optimum system hardening investments** – i.e., "best bang for the buck". See sample recloser and fuse saver analyses below.

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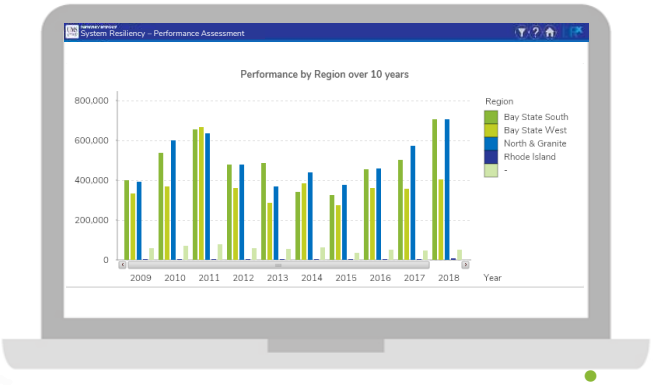
After gaps are identified and cost/benefit analyses performed to channel investment, the final step is to **determine if past expenditures were effective – i.e. did they improve system resiliency?** DRˣ enables visualization of performance vs. investment by region over time.




Ultimately, correlate performance trends vs. capital spent to demonstrate how effectively hardening expenditures are driving performance improvement. Use baseline degradation to determine "outages saved" and reliability impact by hardening investments.

***"DRˣ allowed us to quantify the impact of resiliency / storm hardening investments on our distribution system. We are now able to target the specific investments that deliver the greatest long-term customer value."***

*– Director T&D Asset Strategy, Mid-sized west coast electric utility*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