

DR^x for Network Weather Vulnerability and Emergency Response

COMMON CHALLENGES

- Utilities have been trying for years to harness weather and reliability data to predict outages and damage levels for storm preparation. Results using average weather data and simple outage statistics, even at the circuit level, are inadequate for the level of accuracy needed for solid predictions and improved response times.
- Most companies plan conservatively, incurring higher costs, and then react post-storm to identified damage sites, rather than mobilizing crews and materials to the right locations pre-storm.

ABOUT DR^x – DISTRIBUTION RELIABILITY EXCELLENCE

Our solution helps executives, managers, and reliability engineers to manage key metrics and essential data. **The Emergency Response Module** utilizes the latest modeling techniques along with detailed historical and real-time outage and weather data to predict outage locations and severity, allowing companies to mobilize crews and materials to safe locations ahead of the storm, saving time and money and reducing restoration times (CAIDI).

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. Data scientists in our analytics & tool dev center use machine learning / AI to embed our strong operating expertise into advanced decision support tools that eliminate 70-80% of the analyst work required to get answers.



KEY STAKEHOLDER BENEFITS

Field Operations



Predict outage locations along with resource and material requirements to position crews in safe areas close to where storm damage is expected to occur, rather than waiting until the storm clears to assess damage locations and materials needed.

Customers



Integrate predictive weather analytics with your customer website/portal to alert customers in advance of potential storm impacts, e.g. show fast moving storms, where to expect outages to occur, and expected restoration times (prior to an event).

Asset Management



Identify optimum storm hardening investments based on asset characteristics/weaknesses, current asset condition, Veg Trim cycle, and consequential vulnerability to weather related outages.

ACCURATE PREDICTIONS WITH DETAILED DATA

Triangulate Weather Data



Refine weather data to identify conditions when each outage began - mining 10+ years of data from multiple weather stations and triangulating for localized wind direction, speed, gusts, temp, precipitation, etc.

Impact of Specific Outage Causes vs. Weather



Look at 10+ years of outage data in terms of very specific cause codes in combination with weather data to document system response to various storm events / parameters at a circuit and segment level.

Include Asset Age and Characteristic Analysis



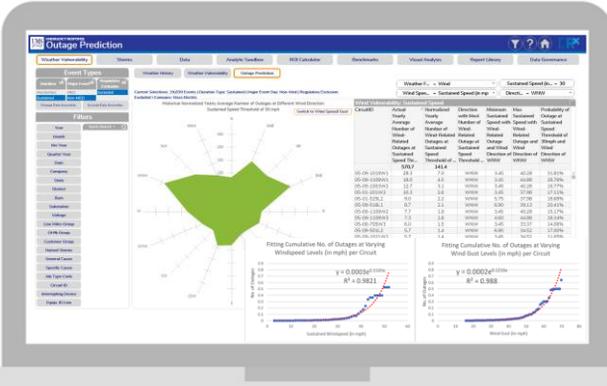
Define asset characteristics that are more susceptible to weather as a function of differentiating asset characteristics (e.g., pole type, size, age, and condition, and host/guest loading.)

Utilize Machine Learning

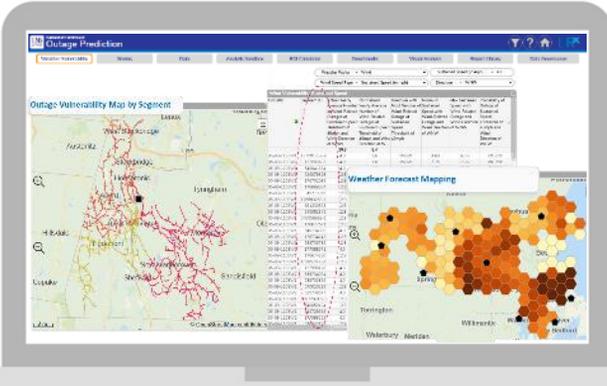


Apply advanced statistical modeling and machine learning to retrain/ automatically update the underlying algorithms as new data becomes available.

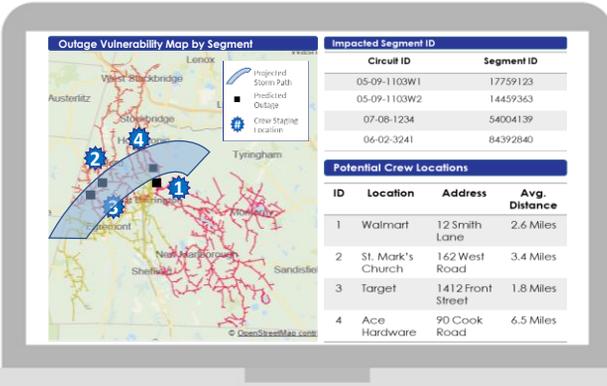
DR^x for Weather Vulnerability and Emergency Response



Predict outages based on wind speed / direction; utilizing advanced statistical and machine learning techniques



Forecast storm impacts at the segment level including highly vulnerable areas



Position crews ahead of time in safe locations with necessary materials

The DR^x Emergency Response Module provides the capability to:

- Reduce overtime costs and eliminate unnecessary truck rolls by forecasting the likely number and location of outage events on each circuit and **pre-mobilizing crews and materials** to safe locations nearby.
- Leverage your favorite source for **real time weather projections** with automated damage model simulations based on those projections. Automatically generate alerts based on projected outages and locations.
- Reduce CAIDI and SAIDI for the majority of smaller storms experienced each year.
- Model danger tree caused storm failure probability as a function of tree age, species, growth and weather conditions (wind speed, direction, prior period rainfall, etc.) and effects on adjacent line segments/ circuits.



Real Life Application: Know how bad the storm is going to be.

Prior to a fast-moving storm our DR^x Emergency Response Module can quickly recalculate predicted outage impacts and resourcing needs:

Projected Storm Impacts		
	Modeled Circuit Outages (on xyz circuits)	8
	Modeled Circuit Outage Likelihood	79%
	Modeled Prob. Adj. Customers Out	17,500
	Estimated Additional Scattered Outages* <small>(*due to unexpected circumstances, e.g. danger trees)</small>	1-3
	Estimated Additional Customers Out	5,000
TOTAL PREDICTED CUSTOMERS OUT		22,500
	Projected Crews Needed <small>(mobilizing locations will also be identified)</small>	<i>(safe)</i> 17
	Number of Depots/Service Centers Impacted	3

This can be delivered as a storm prep report directly out of DR^x for crews and potentially to share with affected municipalities, regulators, etc. to demonstrate competence and robust preparation. Benefits span community outreach, regulatory relationships, system operations and local crew management.

Recent client tests have suggested DR^x can **predict with up to 80% accuracy** which circuits are likely to experience an outage as a result of a particular storm with incoming wind speed and direction data.

“UMS Group’s DR^x platform helped advance our efforts to accurately predict outage damage locations/sites from incoming weather. That was a key enabler of securing field organization buy-in for changes to our storm preparation process. The UMS team was very knowledgeable and easy to work with.”
– Senior Manager Asset Analytics, Large southern electric utility

www.umsgroup.com
DRx@umsgroup.com
+1 (973)335-3555

