



Storm Risk Innovation:

Weather Intelligence
and the Power Grid

An e-book addressing operational
challenges for utilities.

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H
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G
S



- An industry under pressure3
- A costly issue..... 5
- Increasing Weather Volatility..... 6
- Hurricane Ian 7
- Winter Storms Uri and Mara..... 8
- How can we do better? 9
- Introducing predictive damage response..... 11
- The new experience..... 12
- A new interface13
- The results14
- Looking to the future15





An industry under pressure



- An industry under pressure
- How can we do better?
- The new experience

It has become the “new norm:” Storms have become more frequent and more severe. Longer—and sometimes life threatening—blackouts are also on the rise.

Weather-related power outages have **increased 78%** since the early 2000s leaving utility companies under increasing pressure to tackle threats to their operations.

In 2021, the average electricity customer experienced seven hours and 20 minutes without power, with 72% stemming from major weather events including hurricanes, wildfires, and snowstorms, according to the U.S. Energy Information Administration’s **[annual power industry report](#)** released in October 2023.

Further adding to utility challenges:

- Aging infrastructure
- Savvy, technology-driven customers
- Increased regulatory demands





- An industry under pressure
- How can we do better?
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A costly issue

More and more, weather events are wreaking havoc, costing billions in repairs, resources, and down time, leaving both consumers and utilities fumbling in the dark.

Cities across the U.S. are increasingly going dark. A record-breaking blizzard in [Buffalo](#) caused power outages throughout the city in 2022. In 2021, a heat wave led to [power outages](#) in the Pacific Northwest. And on Christmas Eve, record-breaking freezing temperatures caused millions of people in the South to lose power when two regional energy giants, Duke Energy and Tennessee Valley Authority, were forced to issue their first-ever [preventive rolling blackouts](#).

When Winter Storm Uri shut down power for more than 11 million people in Texas for several days in 2021, more eyes were opened to the previously-impossible possibilities of our "new normal."

Innovative Storm Risk technology from DTN gives utilities additional forecast details to help better prepare for storms – decreasing time to restoration, reducing costs, and minimizing impacts on customers.



- An industry under pressure
- How can we do better?
- The new experience

Increasing Weather Volatility

Reports of ever-increasingly strong storms flood our media and news platforms. In all seasons, the blizzards, hurricanes, tornados, and wildfires make the headlines, which are usually accompanied by stories of power outages for millions, affecting homelife, businesses, and safety of all. Let's briefly look at a few recent headlines.



- An industry under pressure
- How can we do better?
- The new experience

Hurricane Ian

In September 2022, [Hurricane Ian](#)—a brutal Category 4 storm—made landfall on Florida’s gulf coast with top winds of 150 mph. As it moved through central Florida Ian caused devastating storm surges, flooding, and left [more than 2.5 million](#) homes and businesses without power.

Florida Power & Light, the largest power utility in the state, released a statement that the destruction caused by [Hurricane Ian](#) would force the company “to rebuild, not restore,” part of its system.

After passing through Florida, Ian passed back into the Atlantic where it re-strengthened before making its final landfall in South Carolina, becoming the third-costliest weather disaster on record (behind Katrina, 2005, and Harvey, 2017, respectively).

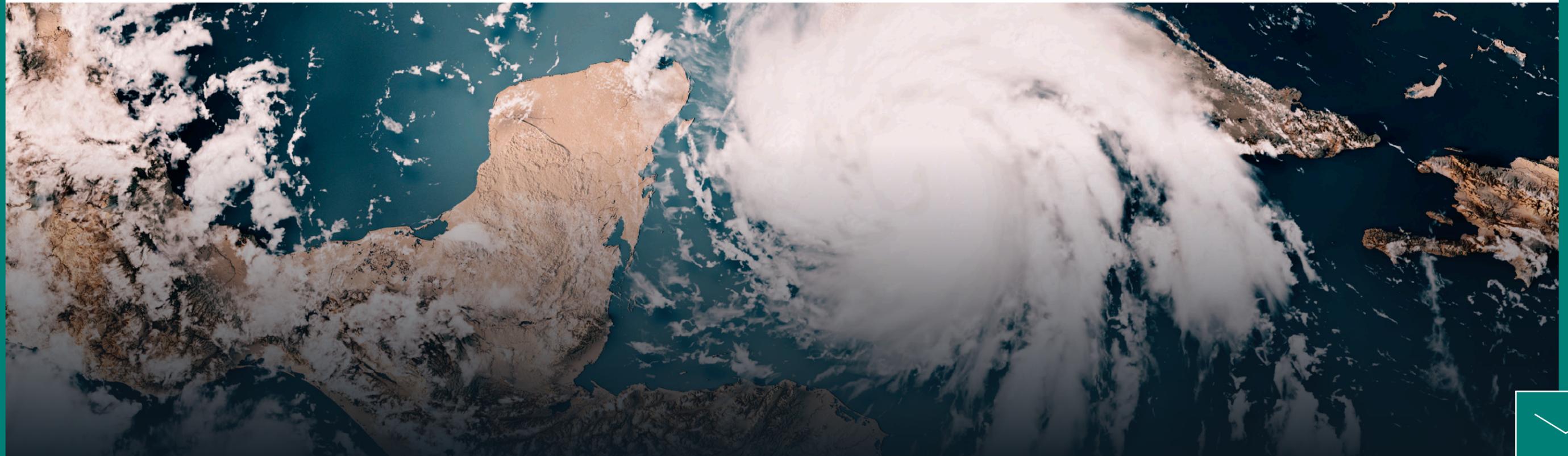
Ian had previously hit Cuba, where it brought down the country's entire electrical grid.

Related, in late August 2021, [Hurricane Ida](#) left 1.2 million customers in Louisiana without power, some for

over two weeks, and it left almost 150,000 customers without power in Mississippi. [U.S. Energy Information Administration - EIA - Independent Statistics and Analysis](#)

Days before Hurricane Ian took landfall, DTN Storm Risk predicted 4.59 million customers would experience power outages—within 7% of the actual (4.29M).

Read [how forecasted outage insights](#) help prepared utilities in advance of Hurricane Ian.



- An industry under pressure
- How can we do better?
- The new experience

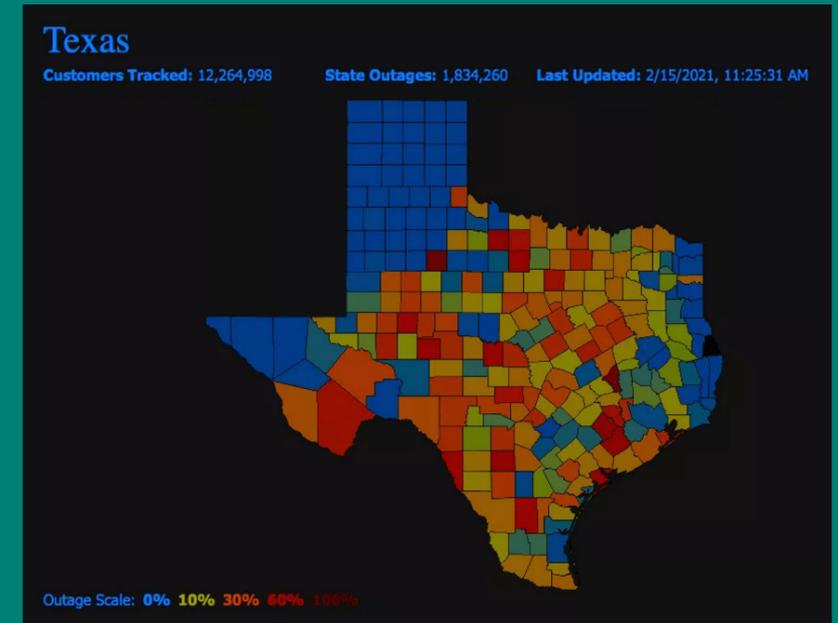
Winter Storms Uri and Mara

In February 2021 a brutal ice and snow event known as Winter Storm Uri hit Texas with bitter cold and ice.

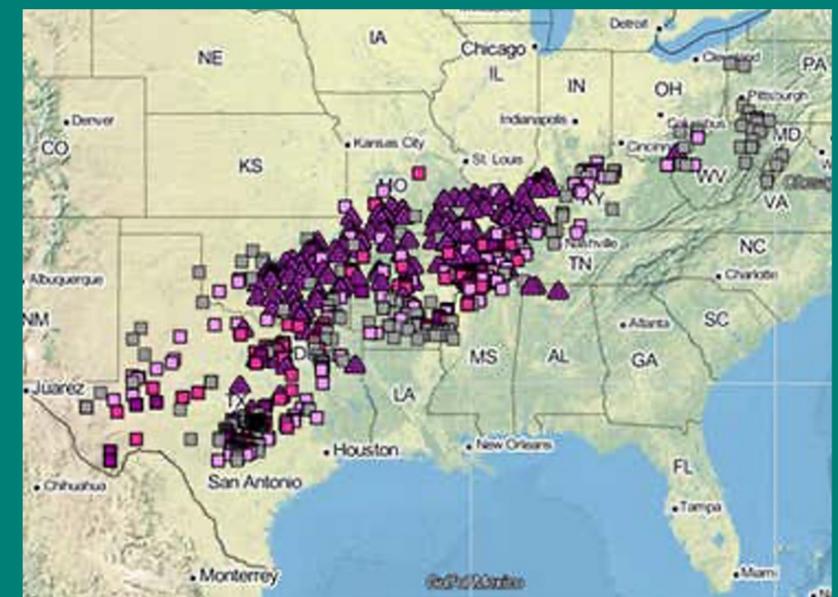
As energy demand soared, ice covered limbs and lines failed leaving nearly **4.5 million customers without power**, along with almost half a million customers in Louisiana and Oklahoma. As the storm moved into the mid-Atlantic region, it knocked out power in West Virginia and Kentucky.

Customers across Texas experienced **widespread electric service outages**, especially within areas managed by ERCOT, a nonprofit corporation that manages the supply and distribution of electric power to 26 million customers in Texas, covering about 75% of the state's territory and 90% of its electric load.

Two years after Uri, another destructive southern ice storm hammered portions of the South in late January and early February of 2023. Similar to Uri, Winter Storm Mara's bitter cold drove demand while ice grimaced roads, damaged trees, and knocked out power to **more than 500,000 customers** from Texas to Tennessee.



This map from February 2021 shows where more than 1.8 million energy customers were left without power as a Winter Storm Uri hit the state. (Source: poweroutage.us)



Sleet reports (triangles) and freezing rain reports (squares) from Winter Storm Mara. (NOAA/NWS)





○ **How can we
do better?**



- An industry under pressure
- How can we do better?
- The new experience

Tackling outages ASAP is the key. The right forecast and storm information allows utility teams to get a head start on estimating the impact of an incoming storm, which can save time and resources during the outage response efforts.

Some questions that can be answered with predictive information are:

- How bad will the asset damage be?
- Where will the damage be most likely?
- What resources and/or materials will be needed?
- What requests for help should be made through mutual assistance?
- How did the forecast change during the event?
- How can I adjust to meet a specific estimated time of restoration goal?
- How can we improve communication between utilities?



- An industry under pressure
- How can we do better?
- The new experience

Introducing predictive damage response

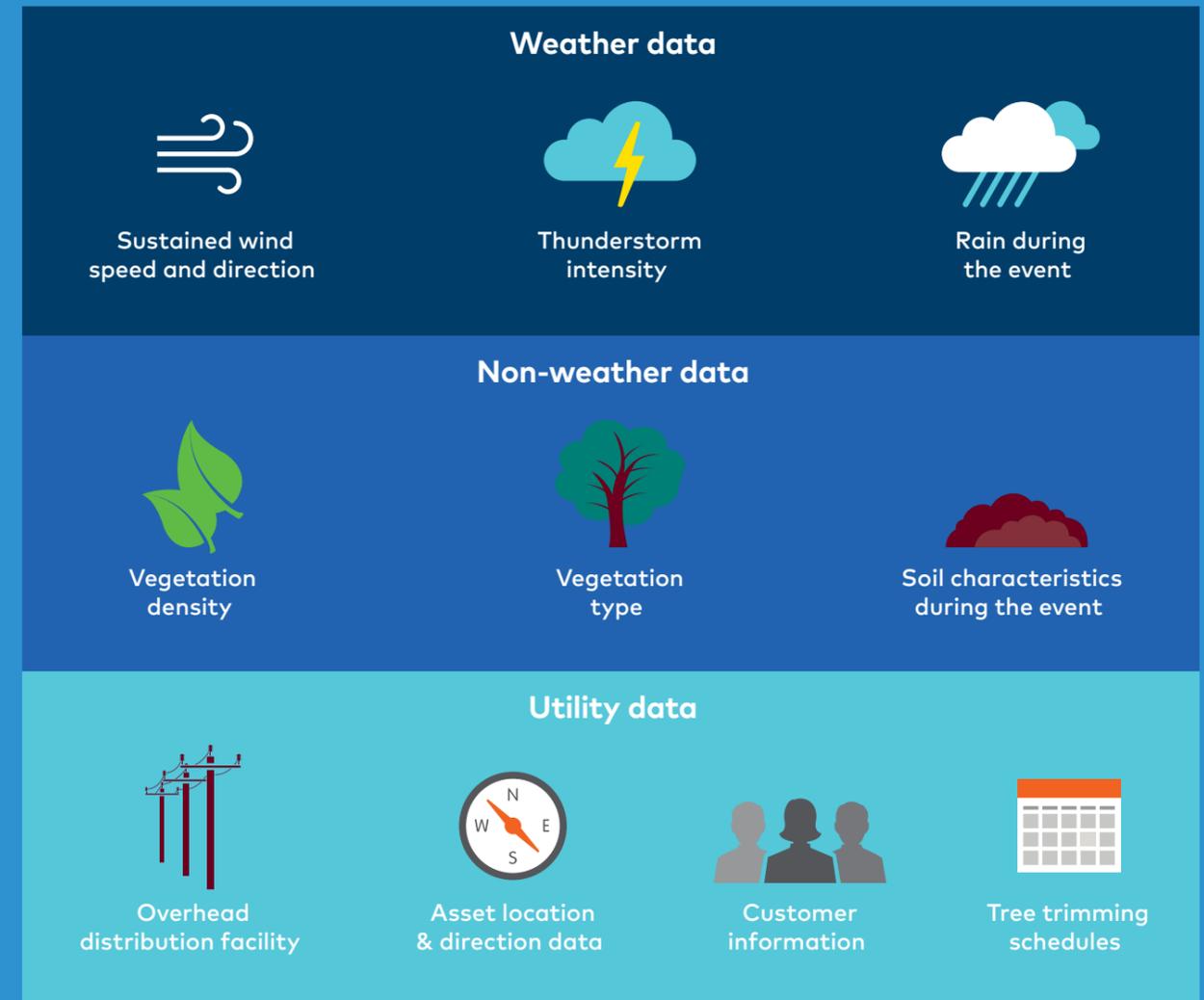
The Storm Risk suite of predictive data products applies a combination of weather parameters such as high winds, lightning, ice accumulation, and more, to determine the strength of incoming storms and the associated risks at various time horizons.

This information, when combined with non-weather data such as vegetation, utility asset records, and other variables, creates an application that predicts and displays severe weather threats as they move through a service territory.

Statistical modelling and predictive analytics help determine the impact of weather on assets at specific geographical locations. Such an application can produce decision points, reports, and predicted impact scenarios for any incoming severe weather event.

Finally, this is translated into impact statistics, such as damage and restoration effort estimates.

Storm Impact Analytics models combine multiple data types.





The new experience





- An industry under pressure
- How can we do better?
- The new experience

A new interface

The advanced Storm Risk solution suite is built on the WeatherSentry® platform from DTN using proprietary forecasts, which can intersect with a utilities own asset data, regionally trained outage prediction models, or weather-related hazard predictions.

With Storm Risk, a utility can map all sections of its service territory likely to be impacted by forecasted severe weather. Such insight can improve the speed of service restoration while reducing associated costs. Further, this information can be used to enhance customer communications.

Any of the Storm Risk solutions can help a utility better prepare for future storms and identify at-risk areas within its service territory, supporting targeted hardening efforts. It also allows utilities to work with multiple scenarios, simulating how different conditions can evolve during a severe weather event.

This can help utilities optimize their response times and restoration strategies.



- An industry under pressure
- How can we do better?
- The new experience

The results

Storm Risk delivers results to help utilities evolve their operations.

Increasing situational awareness throughout a service territory will not only improve the ability to identify at-risk assets, but also populations and vital facilities at-risk, such as mission-critical infrastructure locations, hospitals, and schools.

Crew analytics, including capacity and need, are captured to help support

staging response and scheduling around shifts, making holdovers and on-call decisions more intuitive. Mutual assistance needs will be more easily identified and coordinated earlier.

Working with first responder organizations and community leaders has become the norm, supporting better informed decisions and training opportunities for mutual emergency response scenarios.

Proof and evidence of the situation will be archived for executive and regulatory agencies. Further, a scenario management model will improve ETRs.





Looking to the future

Turning weather forecasts into actionable information to assist asset damage prediction can improve operational efficiencies, as well as short and long-term planning.

Utilities that move beyond simply looking at a weather forecast to predicting the adverse weather's impact and predicting damage from severe weather will evolve operations and customer satisfaction, while optimizing restoration and recovery efforts.

With solutions like Storm Risk, DTN is working with utilities across a broad range of climates to help address the effects of adverse weather.

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