



Winter storms

The challenges for utility companies and how to beat them

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Winter Storms

Extreme weather is every utility company's nightmare. As if ensuring energy is delivered efficiently at all times to customers isn't challenging enough, extreme weather events can cause issues extending far beyond the obvious impact of a storm or flood.

The challenges range from power outages and infrastructure break-downs to employee safety and supply chain issues. Getting the right equipment to the right places at the right time is crucial and there can be major financial implications.

Ongoing outages can result in industry fines – and even a jump in utility bills due to increased demand. For example, during Winter Storm Uri in 2021, utility companies in Texas struggled to keep up with the increased demand for electricity and natural gas, leading to widespread power outages and skyrocketing utility bills.

In general, winter weather can cause damage to power lines, transformers, and other equipment, leading to power outages – but when a storm comes and delivers all this in a matter of hours, the challenge is intense. Not only is there the initial physical damage to infrastructure, but snow and ice buildup can make it difficult for utility workers to access damaged equipment and restore power.

The only way to mitigate this impact is to be as prepared as possible.

In this White Paper, we will explore:

- Why winter weather is such a challenge for utility companies
- How different storm types create different challenges
- The changing face of weather data
- How to prepare response plans for weather events ahead of time
- The role of technology in mitigating the impact of winter weather on utility companies

A Storm is Never Just a Storm

It's easy to write off winter storms as having a similar impact. After all, cold is cold – no matter what form it comes in. However, different types of storms present very specific problems to utility companies.

Snow

A great example of this was the Blue Blizzard, in winter 2022. The storm, named for the unique blue tint of the snow due to its high water content, brought 1 to 2 feet of accumulation over four days, with amounts reaching up to 30 inches in some places. The storm, featuring a mix of wintry precipitation, freezing rain, and heavy snow, resulted in more than 35,000 homes and businesses losing power.

The deep snow made it difficult for crews to get close to the poles and infrastructure. Over 70 additional mutual assistance line workers were needed to help restore power.

The storm brought extremely wet and heavy snow – the 3-day liquid equivalent value was 1-4.

A snow storm has the most obvious physical impact of all storm types – build-up of snow can block roads and the weight can even fell trees and damage power lines.

But the challenge didn't end there. The combination of poor road conditions, strong winds, and heavy, wet snow hindered restoration efforts, prolonged power outages and made some recovery plans

hard to execute. The weight of the dense snow caused tree limbs to fall on power lines, resulting in widespread outages. Additionally, the challenging conditions made it difficult for crews to access infrastructure, leading to delays in restoration efforts.

Continuous cold

"Winter Storm Yuri was responsible for over 26 billion in damages; 3 million without power and at least 278 deaths"

While a winter storm without snow might seem easier to manage, the challenge of ongoing cold temperatures should not be underestimated. In 2021, Winter Storm Yuri, with its wave of polar vortex-induced cold, resulted in temperatures plummeting 25 to 50 degrees below normal across the U.S., Canada, and parts of Mexico. Extreme cold events like Yuri are often triggered by disruptions in the polar vortex, leading to a sharp drop in air temperatures over a large area which often persists for days or even weeks. These two elements present particular challenges to utilities; not only is there no respite from the temperatures that inevitably cause problems to supply, but as neighbouring regions are also likely effected, potential partners are unable to help.



Winter Storm Yuri demonstrated perfectly just how challenging extreme cold can be. The storm caused significant strain on the electric grid, leading to power outages, frozen equipment, and infrastructure failures. This in turn led to a shortage of gas, disruptions in gas plants, and a significant impact on renewable energy sources like wind farms.

Texas, in particular, faced a severe crisis, with the power grid teetering on the brink of total collapse. The grid was forced to introduce rolling blackouts to prevent a catastrophic failure.

Ice

Ice storms can be deadly – the challenges are similar to snow but with additional safety concerns.

In late January of 2023, Ice Storm Mara swept through the South Central United States, leaving in its wake a trail of ice and freezing rain. The storm, with its prolonged duration, made a significant impact on the utility grid beyond the initial freeze.

The initial impact of the storm was dramatic - with cities such as Austin, Texas, experiencing record ice accumulations, power outages, and disrupted services. But it was the aftermath of Ice Storm Mara, as utilities attempted to restore power, that really exposed the unique challenges an ice storm can pose.

From power lines coated in ice to transformers struggling under the weight, the restoration effort required not only technical expertise but also raised serious safety concerns for utility workers navigating hazardous conditions. To put this in context, the storm left over 350,000 people without power and prompted the Governor of Texas to declare an official disaster, with damages exceeding \$89 million and tragic fatalities resulting from storm-related car accidents.

While the force of nature will always create challenges, learning lessons from what came before can be a game-changer for utilities wanting to ensure maximum resilience in the face of future extreme weather events.

Ice Storm Mara caused over 563,000 power outages across Oklahoma, Arkansas, Missouri, Illinois and Texas

The Changing Face of Weather Data

Preparing for weather events starts with a weather forecast. But not all weather forecasts are created equal. Think about the last time you tried to organize an outdoor activity with friends – and the number of different predictions everyone's weather apps produced. Industrial weather forecasting is no different – there is no one version of the truth, so if your livelihood depends on weather, it's wise to invest in the best information you can find.

Data analytics-based weather forecasting is the gold-standard of commercial forecasting – and innovations in this area over the past two decades have changed the game for utilities. Improvements in physical understanding of weather fronts, to observations, to accuracy of modelling and interpretation have led to more accurate and consistent forecasts, which are increasingly being translated into actionable information for decision-makers.

Improved data forecasting of winter storms can benefit utility companies in several ways. By having more accurate and timely information about the weather, utility companies can better prepare for and respond to winter storms and more accurately predict their impact. This can help allocate resources more effectively and minimize the impact of outages and other issues.

Be Prepared.

Preparedness and response plans are crucial for utility companies during winter. Utility companies must prepare for winter weather events by developing response plans and ensuring that they have adequate resources and personnel to respond to outages and other issues.

The following checklist gives suggestions of plans and actions to put in place to ensure the best protection possible against all types of winter weather

✓ Invest in weather data

Accurate weather forecasting is a must – and partnering with meteorology experts to stay ahead of weather challenges gives you the best chance of anticipating problems before they happen. Find an accurate forecasting partner that you trust and ensure you monitor continuously for extreme cold events – keeping in mind the impact events in other regions might have on your operations. Use the most detailed source you can – drilling down to street-level granularity will help you accurately assess the specific risks in different regions.

✓ Use outage prediction models

In the lead-up to a storm, knowledge is power. Utility companies can leverage advanced outage prediction models to understand the magnitude and timing of outages. By using a modelling system – like [DTN Storm Risks Analytics](#) – you can mobilize staff and equipment and have everything in place for the best possible outcome.

✓ Analyze previous storms

Analyze the impact of previous storms in your region to predict what may happen in the future. A system that utilizes machine learning can use this information to inform and predict the magnitude and severity of future outages when a storm is on the horizon. This information can help you allocate resources and plan your restoration efforts more effectively, with minimal guesswork.

✓ Early warning systems alert thresholds

While it sounds obvious, forewarned is forearmed – and investing in the best early warning system you can pays dividends in the event of a major storm. Your early warning system needs to be highly customizable – allowing you to create advanced early warning alerts in very specific locations. Set custom thresholds for your own needs and create a risk dashboard that gives you the detailed knowledge you need to understand extreme weather that could impact your infrastructure.

Use this intelligence to mobilize staff and equipment ahead of time. Deploying your resources in strategic locations early can help facilitate quicker restoration of outages.



Invest in grid resiliency

It's vital to invest in the resiliency of your grid ahead of time, specifically with cold weather in mind. With advances in technology and innovation, customer's expectations of fast power restorations are higher than ever before. We live in a fully digital world - no power means no work for most businesses. Your reputation is only as strong as your grid.

Prevention is always better than a cure - prioritizing long-term grid resiliency investments is truly the best way to minimize disruption in the future. Consider deploying underground lines, using stronger materials for infrastructure, and implementing vegetation management programs to reduce the risk of falling trees and branches during storms. Think ahead to what could possibly go wrong, and plan backwards from there.



Plan your emergency response

Robust emergency response plans are essential. This includes fuel supply management, grid resiliency strategies, and clear communication and coordination within the organization. This plan should be thought through step by step and discussed and agreed with all parties involved.

One point often overlooked is public communication. Sharing as much information you can with customers can minimize their anxiety and improve your reputation. In the event of a power outage, nothing is more frustrating than having no information.

Enhance communication strategies to keep the public informed about storm impacts, expected outage durations, and safety precautions. This includes utilizing social media, official websites, and other communication channels to disseminate accurate and timely information.



Training and preparing

Don't just plan; practice. Conducting regular training exercises can help prepare staff for extreme cold events. This ensures a swift and coordinated response when faced with challenging conditions.



Think ahead to mutual assistance planning

Anticipate resource constraints during large-scale events in other areas. No utility company is an island - and severe weather impacting a neighboring region can cause you just as many problems as a direct hit. When extreme weather hits, it helps to have a plan already in place for mutual assistance. Think beyond your immediate location; are you likely to be competing for resources with neighboring utilities? Will events nearby have an indirect impact on your operations?

Monitor weather in regions beyond your own, and establish plans for mutual assistance, resource sharing and coordination well in advance.



Not All Heroes Wear Capes

Technology companies like DTN play a crucial role in mitigating the impact of winter weather on utilities.

DTN Storm Risk provides hyper-accurate forecasts and granular insights for each weather event, allowing utility companies to protect crews on the ground and still deliver superior service to their customers. Combining advanced weather intelligence and machine learning outage predictions, the solution helps utilities make incident command and storm impact decisions more confidently before, during, and after extreme weather events.

DTN also offers expert meteorologists that can consult with customers in real-time around the clock to help them make decisions when the weather is either impacting them or is forecast to do so.

In addition to providing weather forecasts, technology can also help utility companies improve their infrastructure and response plans. Data analytics are delivering new services and savings to customers through utility-led energy efficiency programs that cut customer bills and lower utilities' system costs.

Conclusion

Winter storms will always be a headache for utility companies and nature will always catch you off-guard. But by understanding the unique challenges different types of winter weather present, and mitigating against these, outages and challenges can be minimized. Data and intelligence is king – and solutions like DTN Storm Risk can be the difference between a short outage, and a full scale crisis.

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The DTN logo features the letters "DTN" in a bold, black, sans-serif font. A small degree symbol (°) is positioned to the upper right of the "N". The degree symbol is composed of a blue circle with a green circle inside it.