

## **Title: How Thunderstorms Produce Major Power Outages: Case Study of the June 10–15, 2026 Midwest Severe Weather Outbreak**

### **Key Takeaways**

- **June 10 & 11 2026 was the largest thunderstorm-forced outage event of 2026:** Nearly 2 million electric customers experienced power interruptions, with concurrent outages approaching 800,000 customers across the US.
- **Illinois and Indiana featured the greatest impacts:** Peak outages reached approximately 304,000 customers in Illinois and 204,000 customers in Indiana, with restoration exceeding 5 days.
- **Bow echo thunderstorms were the primary driver of infrastructure damage:** Several mesoscale convective systems evolved into mature bow echoes capable of producing widespread straight-line winds across hundreds of miles.
- **Storm structure matters as much as storm intensity:** Organized convective lines and bow echoes create significantly larger outage footprints than isolated thunderstorms or tornadoes because damaging winds impact extensive portions of the electric grid.
- **The greatest consequence came from a compounding storm cycle, not a single-day event:** Multiple rounds of severe weather struck the same infrastructure, interrupting restoration efforts and compounding impacts. The event demonstrates how cumulative severe weather impacts can create outage consequences comparable to those of much larger, more widely recognized disasters.

### **1. Overview**

Severe thunderstorms are among the leading causes of electric power interruptions across the United States during the warm season. Damaging straight-line winds are the primary driver of thunderstorm-related outages, while lightning, heavy rainfall, and flash flooding can cause additional impacts either directly to infrastructure or indirectly by hindering restoration efforts. Although major hurricanes and winter storms often produce the largest outage totals and receive the greatest public attention, organized convective storms frequently generate comparable infrastructure impacts across broad regions of the country.

Among severe convective hazards, derechos are particularly feared by utilities because of their ability to produce widespread destructive winds over hundreds of miles. These long-lived thunderstorm systems can create outage footprints rivaling those of tropical cyclones, affecting multiple states simultaneously and generating extensive damage to trees, poles, conductors, and other critical electric infrastructure. As a result, organized convective wind events represent one of the most significant and underappreciated threats to electric grid reliability in the United States.

Between June 10 and June 15, 2026, a series of organized severe thunderstorm complexes swept across the Midwest and Great Lakes, producing the most significant severe weather power outage event of 2026. Nearly two million electric customers experienced outages during the week, while concurrent outages approached 800,000 customers nationwide at peak. The most significant impacts occurred across Illinois and Indiana, where repeated rounds of organized thunderstorms and tornadoes produced widespread impacts. Unlike a single high-profile disaster, this event unfolded over several days as successive convective systems repeatedly affected the same regions.

This event was characterized by upscale growth of thunderstorms into mesoscale convective complexes, some of which evolved into bow echoes during a time of the year that is often associated with storms that may become classified as [derechos](#). Several storm clusters evolved into bow echoes, a convective storm structure known for generating broad swaths of destructive winds that often produce larger aggregate infrastructure impacts than tornadoes. This article provides an outage analysis of the most severely impacted areas and explains why these locations saw the greatest impacts.

## **2. Outage Severity and Meteorological Overview**

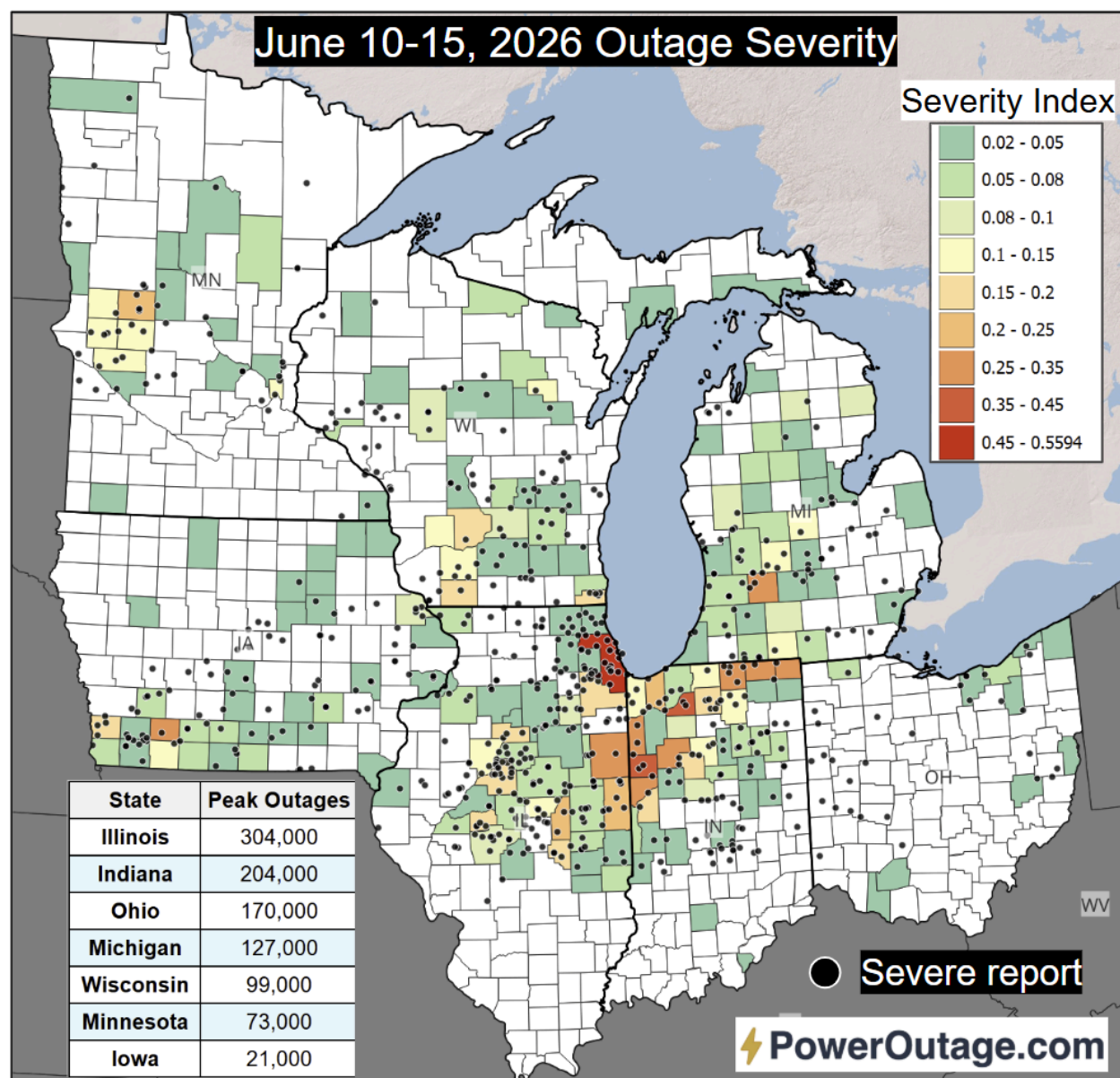
The second week of June 2026 featured a highly favorable environment for organized severe convection across the Midwest. Multiple upper-level disturbances moved across the northern Plains and Upper Midwest while warm, moisture-rich air from the Gulf of Mexico surged northward into Illinois, Indiana, and surrounding states. High instability combined with moderate-to-strong wind shear supported the development of organized mesoscale convective systems capable of producing widespread damaging winds.

The most significant storms occurred on [June 10](#) and [June 11](#), when large thunderstorm complexes developed across Iowa and Illinois before moving eastward into Indiana and portions of Michigan. Several of these systems evolved into mature bow echoes, a particularly destructive form of convective organization known for producing long-duration swaths of damaging straight-line winds.

Outage severity was evaluated at the county level using four equally weighted and event-normalized metrics: peak customers without power, peak percentage of customers without power, accumulated customer outage hours, and average outage duration. This approach captures both the absolute scale of impacts and their relative severity.

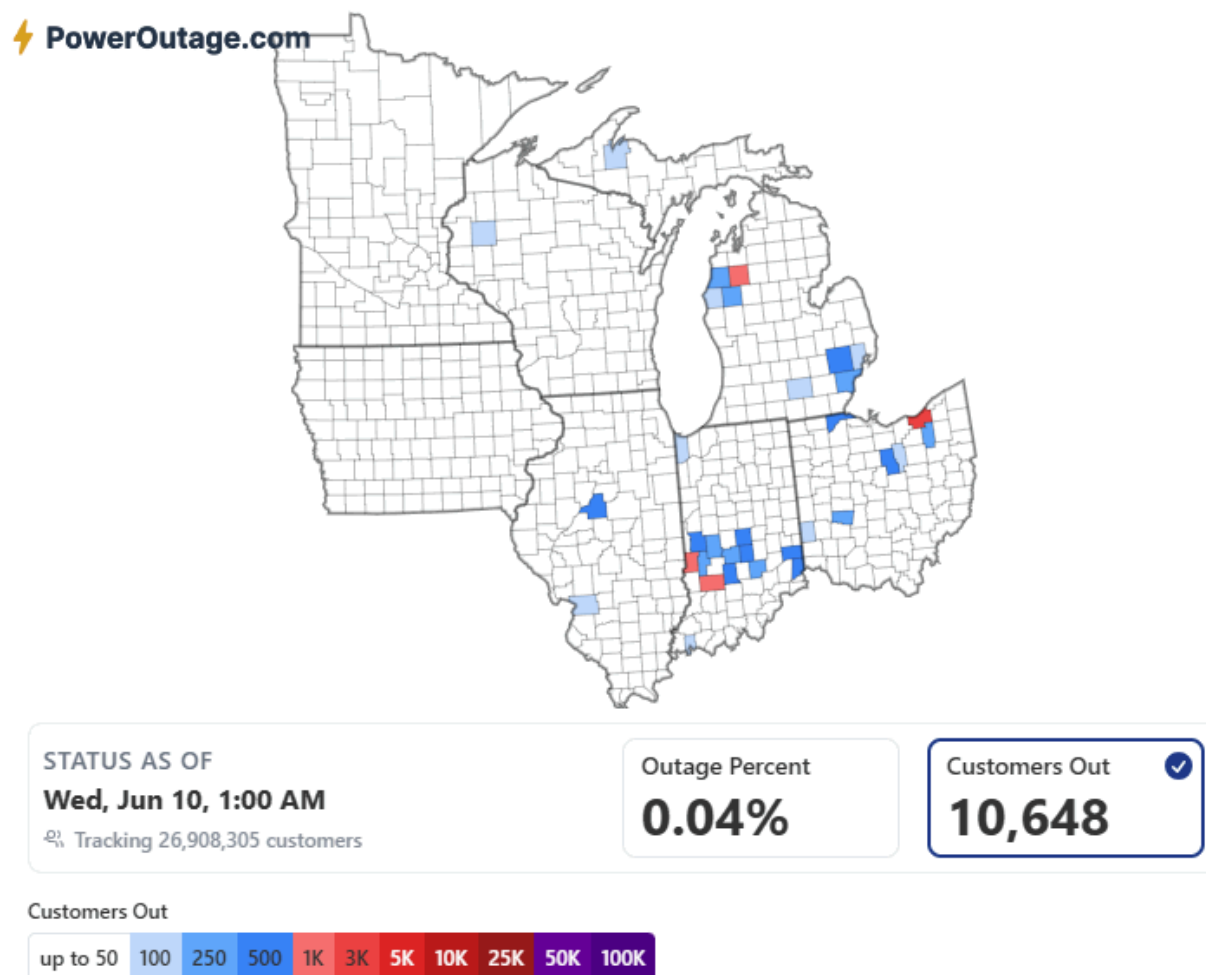
As a result, large population centers such as Cook County, Illinois (Chicago) tend to rank highly because of the sheer number of customers affected and the substantial accumulation of customer outage hours. In contrast, smaller rural counties can also achieve high severity rankings when a large share of customers lose power or when restoration times are prolonged. Several counties in central and northern Indiana, along with portions of central Illinois, exhibited this pattern during the event.

**Figure 1** provides an overview of the outage severity footprint across the Midwest and Great Lakes. A pronounced corridor of impacts extended from northern and central Illinois into northern Indiana, with secondary clusters of elevated severity observed across Wisconsin, Michigan, Minnesota, Iowa, and Ohio. The highest concentration of impacts occurred near the Illinois-Indiana border, where a mature bow echo produced widespread damaging winds and extensive infrastructure disruption. The close correspondence between severe weather reports and elevated outage severity underscores the role of organized convective wind storms as the primary driver of the event's most significant grid impacts.



**Figure 1.** Regional outage severity footprint and severe weather reports during the June 10–15, 2026 Midwest severe weather outbreak. Severe weather reports of high wind or tornado from NOAA SPC filtered reports on June 10 and 11 are superimposed.

Outages were driven by daily thunderstorm activity, peaking later in the day with upscale storm growth over three successive days from June 9, 10, and 11. **Animation 1** illustrates the evolution of outage impacts on June 9 centered in Minnesota, and then two successive rounds on June 10 & 11 across some of the same areas in Illinois, Indiana, and Michigan. The longest restoration was in northern Illinois and northern Indiana with the most severe compounding impacts.



**Animation 1:** Heatmap of total customers without power from June 10-14, 2026 exported from the outage dashboard: <https://poweroutage.us/dashboard> .

### 3. Outage Timing by State

The most significant overall regional outage impacts occurred late on June 11 into early June 12 with the compounding of prior outages not being restored plus the addition of new outages, especially across Illinois, Indiana, and Michigan. Outages increased rapidly peaking late in the day with multiple periods of impacts spread across states (**Figure 2**). Restoration efforts that

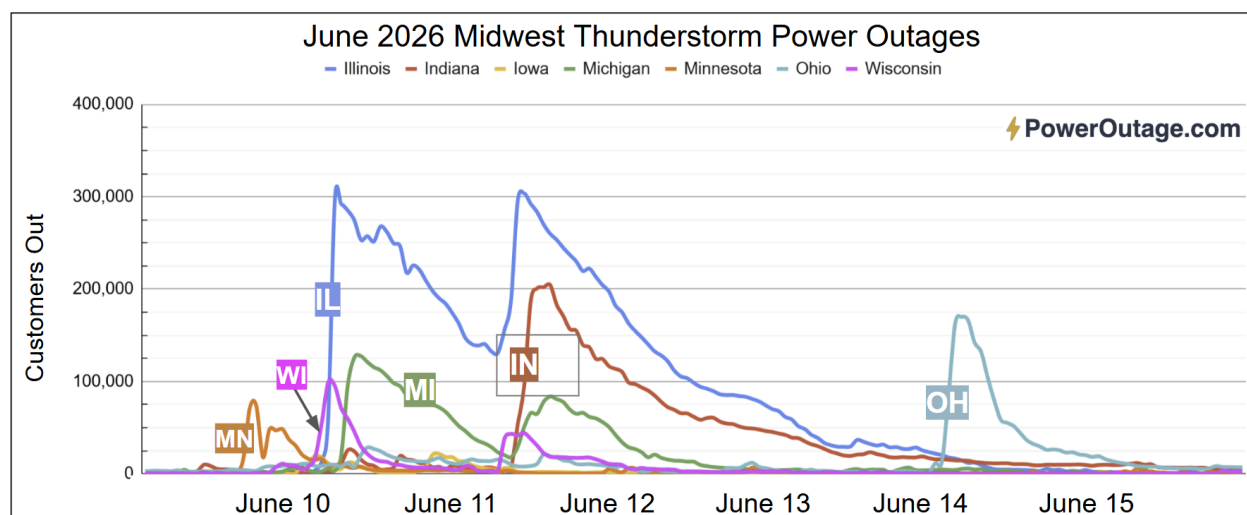
began after the first round of storms were interrupted by subsequent severe weather, extending overall restoration timelines and potentially straining the region's mutual assistance capacity.

**Illinois:** Illinois experienced the largest outage impacts during the event, reaching approximately 304,000 customers. Two major outage peaks occurred during June 10 and June 11 as multiple severe convective systems crossed the state. Following the second peak, restoration efforts required 3-5 days to be restored.

**Indiana:** Indiana experienced peak outages approaching 204,000 customers. The largest outage increase occurred late on June 11 as the mature bow echo crossed northern and central portions of the state.

**Ohio:** Ohio experienced a distinct outage event later in the week, reaching approximately 170,000 customers without power on June 14.

**Michigan, Wisconsin, Minnesota, and Iowa:** Michigan reached approximately 127,000 customers, while Wisconsin peaked near 99,000 customers. Minnesota and Iowa experienced smaller but still significant outage impacts, with peak outages exceeding 73,000 and 21,000 customers respectively.

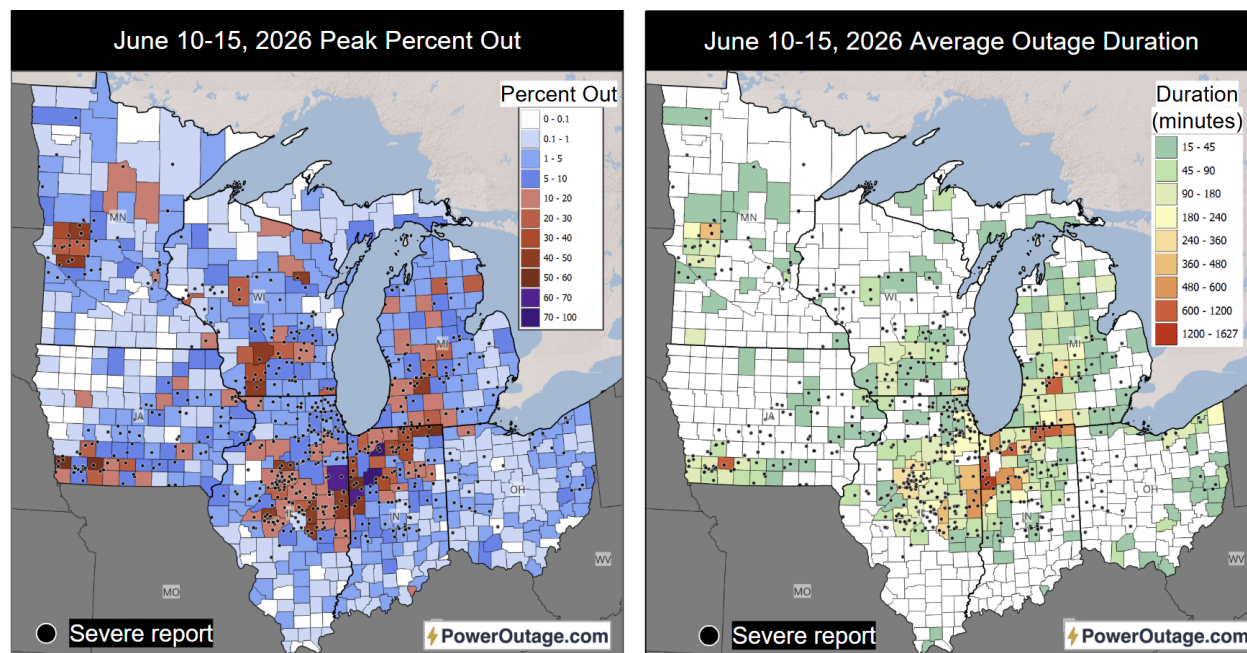


**Figure 2.** Time series of state-aggregated customer outages from June 10-15, 2026.

## 4. Outage Severity Analysis and Restoration

The most severe outage impacts in terms of time to restore power were concentrated across northern Indiana (**Figure 3**, right). Counties in northern Indiana and central Illinois generally experienced the longest outage durations, with average duration of 12-24 hours across some counties and full restoration taking 3-5 days. A strong long-tracked EF3 tornado and bow echo caused the most severe damage across Indiana. Repeated rounds of severe weather further

complicated restoration activities by introducing new outages before existing repairs had been completed, and straining regional workforce capacity.



**Figure 3:** Outage severity factors by county, showing peak percent out (left) and average outage duration (right) by county. Severe weather reports of high wind or tornado from NOAA SPC filtered reports on June 10 and 11 are superimposed.

**County-Level Impacts:** Table 1 ranks the 25 most severely impacted counties during the event. Cook County, Illinois recorded the highest overall severity score with an Outage Severity Index of 0.56. Although only 7.9% of customers were without power at peak, the county's large population base resulted in approximately 190,000 customers out simultaneously and more than 9.2 million customer outage hours.

Several Indiana counties experienced high relative impacts:

- Benton County reached 58% customers out and ranked second overall.
- Starke County reached 82% customers out.
- White County reached 76% customers out.
- LaGrange County reached 42% customers out.
- Elkhart County reached 34% customers out.

These percentages indicate widespread infrastructure damage affecting large portions of electric distribution systems. **Benton County** also recorded the longest average outage duration among the highest-ranked counties at 27.1 hours.



| Rank | County Name | State     | Outage Severity Index | Peak Percent Out | Peak Customers Out | Customer Outage Hours | Average Duration (Hours) |
|------|-------------|-----------|-----------------------|------------------|--------------------|-----------------------|--------------------------|
| 1    | Cook        | Illinois  | 0.56                  | 7.9%             | 190,211            | 9,286,800             | 3.9                      |
| 2    | Benton      | Indiana   | 0.43                  | 58.1%            | 1,286              | 60,018                | 27.1                     |
| 3    | Starke      | Indiana   | 0.40                  | 82.8%            | 6,965              | 129,241               | 15.4                     |
| 4    | White       | Indiana   | 0.33                  | 76.8%            | 6,175              | 78,943                | 9.8                      |
| 5    | LaGrange    | Indiana   | 0.29                  | 42.1%            | 7,127              | 272,002               | 16.1                     |
| 6    | Elkhart     | Indiana   | 0.29                  | 34.4%            | 40,544             | 1,266,882             | 10.7                     |
| 7    | Barry       | Michigan  | 0.28                  | 43.3%            | 14,543             | 441,186               | 13.1                     |
| 8    | Steuben     | Indiana   | 0.28                  | 58.3%            | 8,378              | 151,471               | 9.9                      |
| 9    | Iroquois    | Illinois  | 0.28                  | 63.4%            | 9,697              | 114,963               | 7.5                      |
| 10   | Newton      | Indiana   | 0.25                  | 38.8%            | 2,469              | 88,644                | 13.9                     |
| 11   | Vermilion   | Illinois  | 0.25                  | 43.4%            | 16,396             | 348,265               | 9.2                      |
| 12   | Douglas     | Minnesota | 0.22                  | 46.9%            | 6,299              | 101,671               | 7.6                      |
| 13   | Piatt       | Illinois  | 0.21                  | 45.0%            | 4,144              | 70,772                | 7.7                      |
| 14   | Porter      | Indiana   | 0.20                  | 26.7%            | 17,240             | 596,942               | 9.3                      |
| 15   | Mills       | Iowa      | 0.19                  | 51.4%            | 4,301              | 23,707                | 2.8                      |
| 16   | Fountain    | Indiana   | 0.19                  | 48.6%            | 2,820              | 23,021                | 4.0                      |
| 17   | Menard      | Illinois  | 0.18                  | 49.6%            | 3,209              | 20,908                | 3.2                      |
| 18   | Will        | Illinois  | 0.18                  | 18.1%            | 48,090             | 1,036,990             | 3.9                      |
| 19   | Carroll     | Indiana   | 0.18                  | 30.8%            | 3,221              | 88,927                | 8.4                      |
| 20   | Moultrie    | Illinois  | 0.17                  | 40.3%            | 1,305              | 17,644                | 5.4                      |
| 21   | Marshall    | Indiana   | 0.17                  | 39.5%            | 5,380              | 65,041                | 4.8                      |
| 22   | Marshall    | Illinois  | 0.17                  | 41.9%            | 2,902              | 27,801                | 4.0                      |
| 23   | Lafayette   | Wisconsin | 0.17                  | 48.4%            | 3,321              | 12,009                | 1.7                      |
| 24   | Sauk        | Wisconsin | 0.16                  | 41.6%            | 12,637             | 57,944                | 1.9                      |
| 25   | Tazewell    | Illinois  | 0.16                  | 27.4%            | 17,891             | 324,580               | 5.0                      |

**Table 1:** Top 25 most severe power outage locations by county. Equal weighted using four factors - peak percent out, peak customers out, customer outage hours, and average outage duration.

## 5. Radar Analysis and Outage Correlation

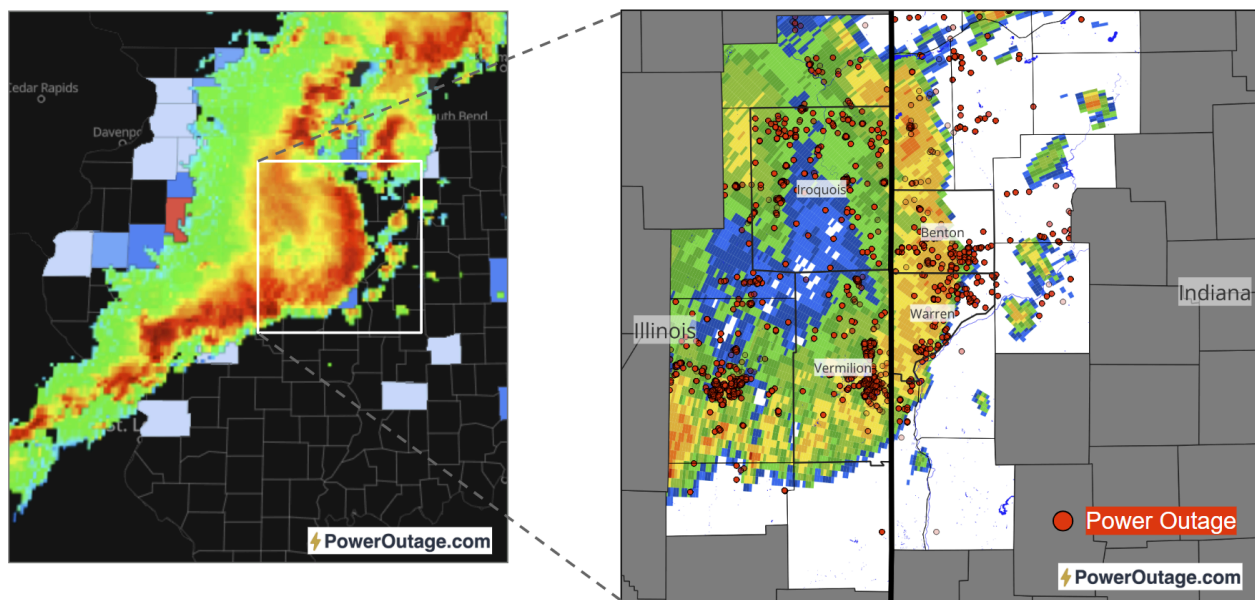
The mature bow echo shown in **Figure 4** illustrates why storm morphology matters when evaluating electric infrastructure risk. A single thunderstorm cell may produce a concentrated damage corridor only a few miles wide, while a mature bow echo can expose dozens of counties to damaging straightline winds. The resulting outage footprint is often larger and operationally more challenging than that associated with individual storms because restoration resources must be distributed across hundreds of miles rather than concentrated within a more localized damage swath. If a bow echo is long-lived and strong enough, it may be classified as a [derecho](#).

[Bow echoes](#) derive their name from their characteristic bow-shaped radar appearance. These systems form when strong rear-inflow jets descend toward the surface and accelerate portions of the convective line forward. The resulting wind field often produces widespread damage

across a broad area. Unlike tornadoes, which create narrow and concentrated damage paths, bow echoes can generate continuous corridors of damaging winds extending hundreds of miles and affecting dozens of counties simultaneously.

The apex or leading forward-pointing edge of the bow shape is typically where the strongest surface winds are located. Benton and Warren Counties in Indiana and Iroquois and Vermilion Counties in Illinois were located near the bow echo leading edge or apex, which moved through around 8:00 PM on June 11 (**Figure 4**). Radar imagery shows a well-developed bowing segment with intense reflectivity cores and a pronounced forward surge indicative of a strong rear-inflow jet. Outage reports occurring within two hours of the storm passage closely align with the most intense portions of the convective system. The close correspondence between radar-observed storm intensity and reported outages demonstrates how organized severe convection translates directly into infrastructure impacts.

**Animation 2** further illustrates this relationship. As the bow echo advanced eastward, outages expanded rapidly along the leading edge of the storm. Rather than isolated outage clusters, the animation shows a broad and nearly continuous corridor of impacts developing across multiple counties. This pattern is characteristic of widespread straight-line wind events and reflects the ability of bow echoes to expose large portions of electric infrastructure to damaging winds simultaneously.



**Figure 4.** Regional Illinois and Indiana view of composite radar reflectivity (left) of mature bow echo and zoomed in around 8:00PM June 11, 2026, with near-synchronous power outage data from [PowerOutage.com](https://www.poweroutage.com) within the prior 2 hours (right).

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**Animation 2:** Radar overview and outage illustration over Illinois and Indiana late on June 11 into early June 12, 2026, exported from the outage dashboard: <https://poweroutage.us/dashboard> .

## 6. Summary

The June 10-15, 2026 Midwest severe weather outbreak provides several important lessons for utilities, regulators, and emergency managers. At the time of publication, this was the most significant thunderstorm-forced outage event across the US, with customer outages peaking over 800,000 and restoration lasting 5 days in the worst hit areas.

**Storm structure matters as much as storm intensity: Bow echoes represent a major grid threat:** The event was driven largely by bow echo thunderstorm systems that produced widespread straight-line wind damage. Although tornadoes often receive greater public attention, bow echoes frequently produce higher aggregate outage impacts because damaging winds affect much broader areas. A single mature bow echo can create a regional damage footprint rivaling that of hurricanes or winter storms.

**The greatest consequence came from a compounding storm cycle, not a single-day event.** The event demonstrates that cumulative impacts can exceed those of individual storms. Repeated rounds of severe weather can weaken infrastructure, delay restoration, and create cascading operational challenges. The largest impacts arose from multiple rounds of organized thunderstorms striking the same region over several days.

**Restoration metrics matter:** Peak outages alone do not capture event severity. Customer outage hours, outage duration, and restoration rates provide important context regarding community impacts and utility response effectiveness.

**Outage data enhances situational awareness:** The strong correlation between radar-observed storm intensity and outage occurrence demonstrates the value of integrating outage monitoring with meteorological analysis. Combined weather and outage intelligence provides a more complete understanding of infrastructure risk and consequences. Electric Utilities and Emergency Management agencies can get access to such enhanced real-time outage information by registering a free account at: <https://poweroutage.us/dashboard> .