



# Winter Storm Fern After Action Review

Final Report

June 15, 2026

**Bringing Ingenuity to Life.**  
[paconsulting.com](http://paconsulting.com)

**Boston Office**

PA Consulting Group Inc.  
Tower Point, 6<sup>th</sup> Floor  
27-43 Wormwood Street  
Boston  
MA 02210  
USA  
+1 617 225 2700

**[paconsulting.com](http://paconsulting.com)**

**Prepared by: PA Consulting**

**Version: Final**

# Contents

<b>Executive Summary</b>	<b>5</b>
<b>1. Introduction</b>	<b>9</b>
1.1 Report Purpose & Objectives	9
1.2 NES Restoration Curve Analysis	9
<b>2. NES Winter Storm Fern Response</b>	<b>14</b>
2.1 Winter Storm Fern Overview	14
2.2 Summary Event Chronology	17
2.3 Historical NES Storm Comparison	19
2.4 Winter Storm Fern Response	19
<b>3. Findings &amp; Recommendations</b>	<b>29</b>
3.1 Incident Command System	29
3.2 Emergency Preparedness & Response	34
3.3 Estimated Time of Restoration	40
3.4 Damage Prediction	44
3.5 Mutual Assistance	46
3.6 Damage Assessment	52
3.7 Logistics & Supply Chain Management	57
3.8 Grid Reliability and Performance	62
3.9 Vegetation Management	67
3.10 Restoration Management	74
3.11 Safety	79
3.12 Communications	83
3.13 Customer Experience	90
3.14 Call Center / Handling	94
3.15 IT / OT	99
3.16 NES Board Responsibilities	102
3.17 Financial Management & Documentation	105
<b>4. Implementation &amp; Conclusions</b>	<b>111</b>
4.1 Recommendation Implementation Roadmap	111
<b>Glossary</b>	<b>119</b>
<b>Appendix A: Methodology Overview</b>	<b>122</b>

---

Appendix B: Data Request Summaries	123
Appendix C: Interview Summaries	128
Appendix D: List of Supporting Documentation	132

---



# Executive Summary

Winter Storm Fern significantly impacted the Nashville Electric Service (NES) service territory in late January 2026. This ice storm caused extensive infrastructure and vegetation damage across the electric system, resulting in peak outages affecting just under 50% of all NES customers. NES took approximately 12 days to safely restore customers and reported no serious injuries among NES employees, contractors, and mutual assistance crews supporting the restoration and response effort. Additionally, no members of the public were injured as a result of contact with downed or energized electric infrastructure. Although NES ultimately restored service safely and successfully, customers experienced challenges throughout the event that contributed to a predominantly negative overall customer experience.

- Several of NES's outage reporting channels (e.g., dedicated outage-reporting phone line, text messaging platform, and outage map) experienced service disruptions during the storm, preventing customers from reporting their outage or receiving restoration information.
- Estimated times of restoration were not provided during the first week of the event, reducing customers' ability to plan for extended outages and make alternative arrangements.
- Delayed requests for external resources limited NES's ability to rapidly scale its workforce during the first week of the event. The largest wave of outside assistance did not arrive until eight days into the restoration effort.
- Inaccurate restoration notifications reduced customer confidence in outage status updates and communications. Some customers received notifications indicating power had been restored when service remained unavailable for extended periods of time.
- Prolonged sub-freezing temperatures and extended outage durations created challenging conditions for customers, many of whom were without power for multiple days during the coldest period of the event.

NES's restoration effort was impacted by several additional operational and meteorological factors that are explored in detail throughout this report. These factors include evolving forecasts related to both the magnitude and geographic locations of anticipated ice accumulations, extensive vegetation and infrastructure damage, competition for outside resources, and emergency response procedures that were not designed to support a large-scale, prolonged restoration effort. Additionally, NES's emergency response organizational structure and plan lacked clearly defined roles and responsibilities, as well as the processes required to effectively scale during larger major events. The organization demonstrated a reliance on institutional knowledge and tenured employee experience rather than documented procedures, creating risks as those knowledgeable individuals retire or leave the organization.

## Key Findings and Conclusions

- **NES has a strong culture of ownership and service.** Throughout the assessment, PA Consulting Group, Inc. (PA) observed a workforce that is deeply committed to serving customers and restoring power safely. During Winter Storm Fern, employees demonstrated initiative, dedication, and a willingness to assume responsibilities outside of their normal duties. However, the response often relied on individual experience rather than a unified command structure and associated plans.
- **Emergency preparedness capabilities were not sufficiently operationalized.** While NES maintained an emergency response framework, limited evidence was identified that supporting operational procedures, restoration playbooks, role-specific guidance, and preparedness activities had been formally developed, maintained, or routinely exercised.

- **Restoration systems and processes are not designed to support a large number of external resources.** Current restoration processes, outage management system, work management practices, and supporting technologies are not designed to support large numbers of mutual assistance and contractor resources. As a result, several restoration activities relied on manual processes to track, prioritize, and communicate restoration work.
- **Customer information was not prioritized during the early stages of the restoration effort.** Prior to the storm, NES had not historically communicated estimated times of restoration for planned or unplanned events. While NES ultimately developed and published global and ZIP code-based estimated times of restoration approximately seven days into the restoration effort, delayed timing limited their value to customers.
- **Requests for outside assistance were not made early or broadly enough.** NES did not have the forecasting tools, damage prediction capabilities, or decision thresholds to determine the level of external resources required for an event of this scale. PA estimates that earlier arrival of external resources could have reduced the overall restoration duration by approximately two to five days (see Section 3.5, Mutual Assistance).
- **Operational Process and Systems maturity has not kept pace with customer growth.** NES’s customer base has grown steadily over the past decade; however, opportunities remain to mature operational processes and fully operationalize technology capabilities that support emergency response, restoration operations, and customer communications. Winter Storm Fern demonstrated how process gaps (estimated time of restoration) and underutilized technology (manual tracking and prioritization of outages) can hinder restoration effectiveness.

PA recognizes that NES has initiated several improvement efforts since the storm, including the development of the Four Pillars. This report assesses NES’s preparedness and response capabilities as they existed at the time of Winter Storm Fern and does not evaluate or reflect the improvement initiatives NES has undertaken since the event.

### Recommendation Summary

Winter Storm Fern was one of the most significant restoration events in NES’s history and tested the utility’s preparedness, operational capabilities, and customer communications processes. While the dedication of NES personnel ultimately resulted in the safe restoration of all customers, the event identified opportunities to strengthen emergency response procedures, improve restoration scalability, enhance customer communications, and modernize operational practices. The findings and recommendations outlined in this report are intended to support NES’s continued evolution as a growing utility and improve its ability to respond to future large-scale events.

**Table ES-1: Index of Recommendations**

Index ID	Recommendation	Section
ICS-01	Implement a Scalable ICS for Major Events	<a href="#">3.1</a>
ICS-02	Formalize Incident Information Management Processes	<a href="#">3.1</a>
ICS-03	Integrate a Dedicated ETR Coordination Function within the ICS	<a href="#">3.1</a>
ICS-04	Standardize EOC Operating Capabilities	<a href="#">3.1</a>
ERP-01	Rebuild and Operationalize the ERP	<a href="#">3.2</a>
ERP-02	Establish Emergency Preparedness Governance and Program Management	<a href="#">3.2</a>
ERP-03	Develop a Multi-Year Emergency Response Training and Exercise Program	<a href="#">3.2</a>
ETR-01	Establish and Operationalize ETR Development and Communications	<a href="#">3.3</a>

Index ID	Recommendation	Section
<b>ETR-02</b>	Configure and Operationalize OMS ETR Functionality	<a href="#"><u>3.3</u></a>
<b>ETR-03</b>	Establish a Customer-Centric ETR Communications Strategy	<a href="#"><u>3.3</u></a>
<b>DP-01</b>	Develop a Scalable Damage Prediction and Resource Forecasting Model	<a href="#"><u>3.4</u></a>
<b>MA-01</b>	Establish a Proactive Mutual Assistance Mobilization Strategy	<a href="#"><u>3.5</u></a>
<b>MA-02</b>	Expand Mutual Assistance Network Participation and Resource Partnerships	<a href="#"><u>3.5</u></a>
<b>MA-03</b>	Standardize External Resource Integration Processes	<a href="#"><u>3.5</u></a>
<b>MA-04</b>	Integrate Resource Mobilization Planning into Damage Prediction Model	<a href="#"><u>3.5</u></a>
<b>DA-01</b>	Establish Damage Assessment Processes and Information Flows	<a href="#"><u>3.6</u></a>
<b>DA-02</b>	Establish Scalable Damage Assessment Methodologies	<a href="#"><u>3.6</u></a>
<b>DA-03</b>	Expand Damage Assessment Technologies and Situational Awareness Capabilities	<a href="#"><u>3.6</u></a>
<b>LOG-01</b>	Improve External Resource Mobilization and Onboarding	<a href="#"><u>3.7</u></a>
<b>LOG-02</b>	Improve Materials Readiness and Storm Kit Deployment	<a href="#"><u>3.7</u></a>
<b>LOG-03</b>	Enhance Field Logistics and Workforce Support Operations	<a href="#"><u>3.7</u></a>
<b>GRID-01</b>	Develop a System Segmentation Strategy	<a href="#"><u>3.8</u></a>
<b>GRID-02</b>	Develop a System Hardening Plan	<a href="#"><u>3.8</u></a>
<b>VM-01</b>	Evaluate Vegetation Clearance Standards against Industry Leading Practices	<a href="#"><u>3.9</u></a>
<b>VM-02</b>	Implement a Risk-based Vegetation Management Strategy	<a href="#"><u>3.9</u></a>
<b>VM-03</b>	Expand Vegetation Risk Communication and Stakeholder Engagement	<a href="#"><u>3.9</u></a>
<b>VM-04</b>	Implement Vegetation Management Monitoring and Program Evaluation	<a href="#"><u>3.9</u></a>
<b>VM-05</b>	Integrate Vegetation Management into Storm Restoration Operations	<a href="#"><u>3.9</u></a>
<b>VM-06</b>	Evaluate Targeted Strategies for Repetitive Vegetation-Related Outage Areas	<a href="#"><u>3.9</u></a>
<b>VM-07</b>	Evaluate Advanced Vegetation Management Technologies and Practices	<a href="#"><u>3.9</u></a>
<b>RM-01</b>	Increase Restoration Throughput During Large-Scale Events	<a href="#"><u>3.10</u></a>
<b>RM-02</b>	Standardize Resource Deployment and Crew Utilization Processes	<a href="#"><u>3.10</u></a>
<b>RM-03</b>	Improve Restoration Work Management, Dispatch, and Switching Capabilities	<a href="#"><u>3.10</u></a>
<b>SAF-01</b>	Enhance HEC Administration and Clearance Management	<a href="#"><u>3.11</u></a>
<b>SAF-02</b>	Establish Scalable Field Safety Oversight Requirements	<a href="#"><u>3.11</u></a>
<b>SAF-03</b>	Validate Safety-Critical Restoration Processes	<a href="#"><u>3.11</u></a>
<b>COM-01</b>	Establish an Integrated Storm Communications Organization	<a href="#"><u>3.12</u></a>
<b>COM-02</b>	Establish Communications Governance and Decision-Making Processes for Major Events	<a href="#"><u>3.12</u></a>

Index ID	Recommendation	Section
<b>COM-03</b>	Develop and Operationalize a Comprehensive Crisis Communications Strategy	<a href="#">3.12</a>
<b>COM-04</b>	Improve Communications Integration with Restoration Operations	<a href="#">3.12</a>
<b>COM-05</b>	Strengthen Communications Readiness, Training, and Workforce Capabilities	<a href="#">3.12</a>
<b>COM-06</b>	Develop Storm Communications Tools, Templates, and Internal Communications Capabilities	<a href="#">3.12</a>
<b>CX-01</b>	Strengthen Critical Customer and Vulnerable Population Management	<a href="#">3.13</a>
<b>CX-02</b>	Enhance Customer Support During Prolonged Outages	<a href="#">3.13</a>
<b>CX-03</b>	Improve Customer Expectations Management During Major Events	<a href="#">3.13</a>
<b>CX-04</b>	Operationalize Customer Feedback and Customer Intelligence	<a href="#">3.13</a>
<b>CC-01</b>	Improve Call Center Operational Continuity During Major Events	<a href="#">3.14</a>
<b>CC-02</b>	Enhance Call Center Surge Capacity and Overflow Readiness	<a href="#">3.14</a>
<b>CC-03</b>	Improve Restoration Information Distribution to Customer-Facing Personnel	<a href="#">3.14</a>
<b>ITOT-01</b>	Establish Large-Scale System Operating Modes	<a href="#">3.15</a>
<b>ITOT-02</b>	Improve Operational Data Integration and Decision Support Capabilities	<a href="#">3.15</a>
<b>ITOT-03</b>	Enhance Customer Communications Information Technologies	<a href="#">3.15</a>
<b>GOV-01</b>	Enhance Board Oversight of Emergency Preparedness and Major Event Risks	<a href="#">3.16</a>
<b>GOV-02</b>	Clarify Board Roles and Governance Responsibilities During Major Events	<a href="#">3.16</a>
<b>GOV-03</b>	Strengthen Enterprise Risk Management Oversight and Integration	<a href="#">3.16</a>
<b>FIN-01</b>	Establish Increased Spending Thresholds to Enable Emergency Spending	<a href="#">3.17</a>
<b>FIN-02</b>	Establish P-Card Holders within Key Logistics Functions	<a href="#">3.17</a>
<b>FIN-03</b>	Track Rates from Contracted Vendors for Future Cost Tracking and RFP Benchmarking	<a href="#">3.17</a>

## Recommendation Roadmap

PA developed a Recommendation Implementation Roadmap to support prioritization, sequencing, and implementation of the recommendations identified throughout this assessment. The roadmap organizes recommendations into Immediate (0–6 months), Near-Term (6–18 months), and Long-Term (18+ months) implementation horizons based on priority, interdependencies, and the urgency with which improvements are needed to strengthen future emergency response and restoration performance. Recommendations were sequenced to reflect logical implementation dependencies, recognizing that many initiatives build upon foundational capabilities established through earlier recommendations.

# 1. Introduction

# 01

## 1.1 Report Purpose & Objectives

Winter Storm Fern was a winter weather event that impacted the Nashville Electric Service (NES) service territory in late January 2026, bringing ice and prolonged freezing temperatures that caused widespread system outages. At the peak of the event, the storm impacted 231,749 customers (49% of NES's customer base) and required NES 12 days to restore. While Winter Storm Fern (or "Fern") is a media-assigned name and not an official designation, it is used here for clarity.

In March 2026, PA Consulting Group, Inc. (PA) was engaged by Sherrard Roe Voigt & Harbison, PLC and Adams & Reese, L.L.P. to conduct an independent investigation into the preparedness and response activities of NES related to Fern, including the development of an After-Action Review. The review and resulting report are intended to establish a sequence of events prior to and during the restoration process, evaluate where NES practices align with industry standards, and provide actionable recommendations where improvement opportunities exist. Recommendations included in this report are not intended to be an exhaustive inventory of all improvement opportunities. Instead, they represent the highest-impact initiatives identified throughout the assessment based on their potential to strengthen overall system resilience and improve the customer experience during future major weather events.

PA recognizes that NES has initiated several improvement efforts since Fern, including the development of the Four Pillars. However, this report assesses NES's preparedness and response capabilities as they existed at the time of Winter Storm Fern and does not evaluate or reflect the improvement initiatives NES has undertaken since the event.

This After-Action Review was conducted through multiple rounds of data requests, numerous stakeholder interviews, and site visits. The 176 data requests included NES policies, practices, system information, outage data, asset data, and internal and external communications. Stakeholder interviews were held with 60 individuals ranging from leadership to superintendents to lineworkers, mutual assistance organizations, contractors, NES Board Members, and other key stakeholders involved in the response and restoration effort. Additional methodology and supplemental information associated with this assessment are provided in Appendix A. A list of data requests is included in Appendix B, and a list of stakeholder interview participants and their associated interview topics are included in Appendix C.

## 1.2 NES Restoration Curve Analysis

A restoration curve is a powerful tool for measuring a utility's operational resiliency, reflecting both the electric system's readiness to withstand and manage a major storm event and the utility's ability to restore customers efficiently throughout the restoration effort. The curve illustrates how effectively the utility prepares for, responds to, and recovers from widespread outages, providing insight into operational coordination, resource mobilization, and overall restoration performance throughout the event. In this section, the ideal restoration curve is discussed followed by NES's restoration curve for Winter Storm Fern.

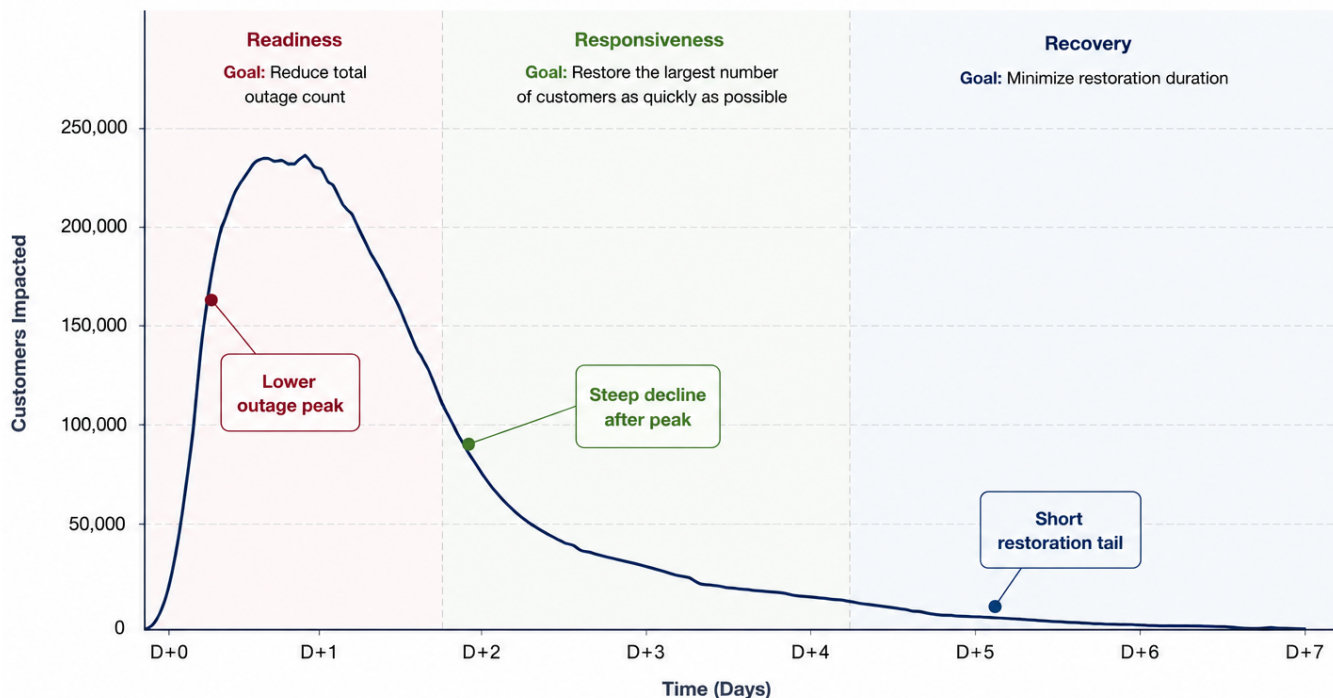
### Restoration Curve Introduction

Restoration curves are divided into three distinct phases: **readiness**, **responsiveness**, and **recovery**. Each phase has a unique starting and ending point that varies depending on the nature, scale, and duration of the restoration effort. Each phase also has a distinct focus and objective within the restoration process, while maintaining the overarching goal of improving customer experience during major storm events.

- The readiness phase focuses on utility preparedness and the overall state of the grid, with the goal of reducing the total number of customer outages experienced during the most severe storm impacts. During this phase, utilities typically restore the largest percentage of impacted customers, with many customers returned to service within the first 12 to 24 hours following a major event. Rapid restoration for this first tranche of customers is often achieved through switching activities and repairs to high-impact transmission, substation, and distribution facilities that sustained minimal, if any, damage, enabling the restoration of service to large numbers of customers with relatively few restoration actions.
- The responsiveness phase focuses on restoration methodology and resource management, with the goal of restoring service to impacted customers as quickly and efficiently as possible. This phase is often referred to as the “frustration zone,” as customers may experience changing Estimated Times of Restoration (ETRs), prolonged outages that may result in food spoilage, and increasing frustration as they observe service being restored to neighboring customers while they remain without power.
- The recovery phase focuses on restoring service to the final percentage of affected customers, with the goal of reducing the overall restoration duration. This phase is known as the “misery zone,” as customers experience prolonged outages that incur food and accommodation expenses and often experience multiple ETR changes as crews work to restore the remaining outages.

Figure 1 illustrates the characteristics of an ideal restoration curve and how utility performance during the readiness, responsiveness, and recovery phases influences the overall restoration trajectory. Utilities strive to minimize the outage peak, accelerate restoration, and reduce the duration of the final restoration tail.

**Figure 1. Ideal Restoration Curve with Phases**



## NES Restoration Curve Evaluation

PA’s approach to evaluating NES’s performance across each phase of the restoration curve, including readiness, responsiveness, and recovery, is described in the subsections that follow.

## Readiness

For the readiness phase, PA evaluated how NES prepared for the impacts of Winter Storm Fern. The readiness timeframe began when NES first became aware of the storm threat and concluded with the deployment of damage assessment resources. Specific activities evaluated include:

- Policies, plans, and procedures that NES follows during major restoration events
- Magnitude of customer outages relative to a utility's total customer base
- Actions taken in accordance with established operational readiness processes and procedures in anticipation of a potential event, including joint planning sessions, exercises, and drills with relevant agencies and stakeholders
- Readiness to support weekend or holiday coverage for all Command Center roles
- Application of lessons learned from prior events
- Development of pre-established customer messages, alerts, communication templates, and omnichannel communication plans
- Coordination with local utilities, government agencies, first responders, and critical customers, including hospitals and other major customers
- Determination of overall restoration resources required, and external resource requests (contractors and mutual assistance)

## Responsiveness

For the responsiveness phase, PA evaluated NES's restoration activities, including restoration strategies, operational decisions, and execution of restoration plans. These activities began with the initial response to restore the system and continued through the restoration of service to the vast majority of affected customer groups. Specific activities evaluated include:

- Emergency restoration strategy and work prioritization (e.g., cut and clear operations, road clearing support, damage assessment)
- Resource management planning, including internal personnel, contractors, logistics, and support resources
- Stakeholder engagement planning, including municipalities, water utilities, telecommunications providers, critical facilities, and life-support customers
- Development and dissemination of customer communications, including public-facing messaging, communication channel utilization, restoration progress updates, and stakeholder communications throughout the event
- Effectiveness and timeliness of ETR updates at the global, regional, local, ticket, and job levels
- Systems and technology utilization, performance, and associated contingencies
- Staffing of call center and stakeholder liaison organizations during event response
- Accuracy and timeliness of resource dispatch and work management throughout the restoration process
- Effectiveness of information flows between operational groups and how information was collected and analyzed to support decision-making, including damage assessments, outage statistics, customer counts, and critical customer impacts
- Effectiveness of system design, grid automation, and communications technology in supporting restoration operations

## Recovery

For the recovery phase, PA evaluated how NES executed the final phase of outage restoration to restore individual customers and complete repairs where necessary to bring all affected customers back into service. Specific activities evaluated include:

- Prioritization of final restoration efforts, allocation of remaining resources, and management of emergent non-storm-related outages
- Areas where the control center and management functions performed effectively, as well as opportunities for improvement
- Continued messaging with all stakeholders until all customers are restored

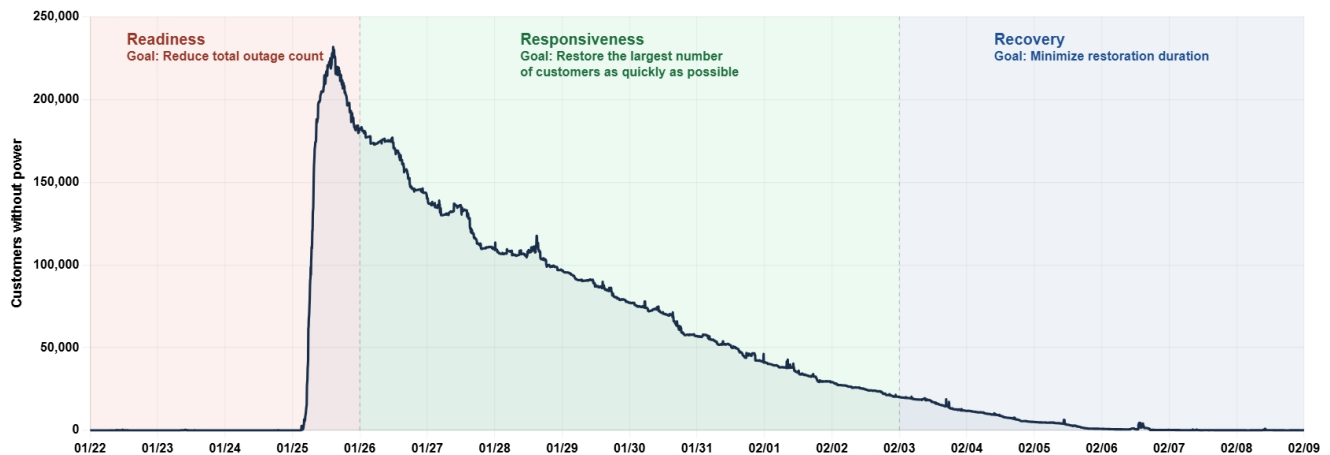
## NES Winter Storm Fern Restoration Curve Analysis

PA analyzed outage records and examined the sequence of events that occurred during Winter Storm Fern to produce the event restoration curve, shown below in Figure 2, and the analysis that follows. As illustrated in this restoration curve, Winter Storm Fern resulted in a peak of approximately 231,749 customers without power, representing 49% of all NES customers. It took NES 12 days after the initial impact to fully restore the system. Following the peak, the restoration curve exhibited a steady but gradual decline in customer outages rather than the sharp reduction commonly observed during many major restoration events.

**Figure 2. NES’s Restoration Curve for Winter Storm Fern with Phases**

### Storm Restoration Phases

The actual Storm Fern restoration curve divided into the three industry-standard phases. Readiness ends at the storm’s peak (January 26); Responsiveness ends at the start of the long tail (February 3); Recovery runs through the remaining cleanup.



### Readiness

The Readiness Phase is the first phase of the restoration process and typically begins when outage counts or customers out of service reach their peak. This phase reflects the overall extent of system damage, the effectiveness of infrastructure investments in reducing outage impacts relative to similar events, and the utility’s ability to rapidly restore customers through remote and field switching operations.

Under typical restoration conditions, utilities are often able to restore a significant percentage of affected customers within the first 12 to 24 hours through switching operations, restoration of transmission and substation facilities, and other high-customer-impact restoration activities. During Fern, however, extensive vegetation damage, broken poles, and access constraints reduced the number of customers that could be restored through switching or other high-impact restoration activities, contributing to a more gradual decline following the outage peak. Given the extensive damage to the NES service territory, the Readiness Phase lasted approximately one day, until Monday, January 26.

### Responsiveness

The Responsiveness Phase is where the bulk of active restoration activities occur. Damage assessment, work package development and distribution, resource deployment, and repair activities are all conducted during this phase. It is typically characterized by a steadily declining outage curve as

larger outages are identified, prioritized, and restored. For Fern, this phase generally occurred between Monday, January 26 and Tuesday, February 3. As restoration progressed, NES achieved 50% restoration approximately 64 hours after the initial storm impact. Outage reductions remained relatively consistent throughout the responsiveness phase, indicating steady restoration progress despite challenging operating conditions. Additionally, early restoration efforts were complicated by lingering storm impacts and sustained cold temperatures, which caused some previously restored areas to experience additional damage and subsequent outages. The distinction between restoration phases was not always clear as NES pursued parallel restoration strategies throughout the event. As a result, activities typically done in the Responsiveness and Recovery phases often occurred simultaneously rather than sequentially.

## Recovery

The Recovery Phase is the final restoration phase and is commonly referred to as the “tail” of the restoration curve. This phase is typically the longest and most challenging portion of the restoration effort from a customer-restored-per-job perspective, as remaining outages are often associated with secondary lines, service wires, and individual customer repairs. As the event transitioned into the recovery phase, the restoration curve began to flatten as crews shifted from restoring large customer blocks to addressing increasingly isolated and labor-intensive repairs. NES achieved approximately 90% restoration by Day 9 and 95% restoration by Day 11, reflecting the significant field reconstruction effort required to restore the final percentage of affected customers. Because NES pursued a parallel restoration strategy during Fern, secondary and service wire repairs occurred concurrently with repairs to the primary distribution system, causing the distinction between the responsiveness and recovery phases to be somewhat blurred. Restoration reached 99% on Friday, February 6, which is generally considered the industry standard threshold for restoration completion.

Overall, the restoration curve reflects a restoration effort driven largely by widespread infrastructure and vegetation damage that required extensive field repairs rather than rapid restoration through switching and other system reconfiguration activities.

## 2. NES Winter Storm Fern Response

# 02

### 2.1 Winter Storm Fern Overview

Ice storms are inherently difficult to forecast, as they depend on a precise combination of meteorological conditions, including sub-freezing surface temperatures, a layer of warmer air aloft, sufficient atmospheric moisture, and a preceding cold air mass to ensure surfaces are adequately primed for ice accumulation.<sup>1</sup> Unlike widespread wind events, the most severe impacts from ice storms are often concentrated within relatively narrow geographic corridors.<sup>2</sup> Although ice storms occur infrequently in Nashville, averaging approximately one event per year with a typical duration of only 3 to 6 hours in a year (0.03% - 0.07% of the year), they are considered high-impact events due to the significant strain that ice accumulation places on electric infrastructure. As little as 0.25 inches of ice accumulation on power lines can add more than 140 pounds of weight, potentially resulting in significant outages.<sup>3</sup> Ice accumulation greater than 0.5 inches, which can add more than 300 pounds of weight, will likely result in extensive outages and impassable road conditions which further complicate potential restoration activities.

NES System Control utilizes forecasts from the National Weather Service (NWS) for situational awareness and to help make operational decisions. On Tuesday, January 20, 2026, six days prior to storm impact, NWS identified the potential for a significant winter storm affecting the Nashville region and began communicating the developing threat through public weather advisories. That same day, the Metro Office of Emergency Management (OEM) began coordinating with NES regarding the potential for a mix of snow and ice across the region. Later that evening, NWS issued an official Winter Storm Watch emphasizing the likelihood of hazardous travel conditions and widespread power outages.

In the days following the Winter Storm Watch, forecasts continued to evolve, with increasing confidence in significant ice accumulation across the Nashville metropolitan area and surrounding portions of Middle Tennessee. Beginning on Wednesday, January 21, forecast models showed the expected storm track gradually shifting north, resulting in the projected zone of highest ice accumulation expanding further into the NES service territory. On Friday, January 23, communications from Metro OEM to NES reflected this evolving forecast, with projected ice accumulation estimates increasing from approximately 0.25 inches to between 0.5 and 0.75 inches. Forecast messaging also emphasized the elevated risk of widespread utility impacts, hazardous travel conditions, and tree-related damage associated with prolonged freezing rain accumulations.<sup>4</sup>

As the storm approached and precipitation began on Saturday January 24, NWS further indicated that the transition from snow to freezing rain would likely reduce overall snowfall totals while increasing the confidence of ice accumulation toward the higher end of the forecasted range.<sup>5</sup> This forecast evolution was operationally significant, as prolonged freezing rain and heavy ice accretion typically present substantially greater risks to overhead electric infrastructure and vegetation than snowfall alone. These conditions were ultimately realized, with ice accumulation across the Nashville area reaching up to 0.75

---

<sup>1</sup> Midwestern Regional Climate Center. (n.d.). Ice storms. Purdue University. [mrcc.purdue.edu/living\\_wx/icestorms](http://mrcc.purdue.edu/living_wx/icestorms)

<sup>2</sup> National Oceanic and Atmospheric Administration. (2024). A meteorological synopsis of ice storms and their societal impacts. U.S. Department of Commerce. [https://repository.library.noaa.gov/view/noaa/54234/noaa\\_54234\\_DS1.pdf](https://repository.library.noaa.gov/view/noaa/54234/noaa_54234_DS1.pdf)

<sup>3</sup> Assuming 795kcmil conductor, 300-foot spans

<sup>4</sup> Nashville Electric Service Winter Storm After Action Review Data Request #14: Winter Storm Fern weather forecasts and damage predictions

<sup>5</sup> NWS area forecast discussion January 24, 2026

inches in many areas. The resulting impacts included widespread power outages, impassable roadways, hazardous travel conditions, and extensive vegetation damage.

The most significant impact of Fern to the Nashville area began during the evening hours of Saturday, January 24, and persisted through Sunday, January 25. The storm brought a destructive combination of snow, sleet, and freezing rain, driven by the interaction of warm, moisture-rich air from the Gulf of Mexico overriding a shallow but persistent arctic air mass at the surface.<sup>6</sup> A period of sustained cold temperatures immediately followed the storm. Daytime highs remained below freezing for two consecutive days, and overnight lows fell into the teens for six of the seven days following the event. These conditions prolonged the impacts of the storm by preventing ice from melting and allowing refreezing, causing additional vegetation and infrastructure damage to occur.

## Ice Accumulation & Restoration Impacts

Ice accumulation presents unique and severe challenges to electric utility restoration operations due to the widespread and simultaneous impacts it can create across both vegetation and electric infrastructure. Specific to Fern, prolonged freezing rain and ice accumulation across the NES service territory resulted in extensive damage to trees, distribution lines, poles, transformers, and other overhead electric equipment. The added weight of accumulated ice, combined with occasional wind gusts and falling tree limbs, created cascading infrastructure failures across the system. NES and local media documented extensive systemwide infrastructure damage, including hundreds of broken poles across the service area, as crews worked through dangerous ice-related conditions.<sup>7,8</sup>

Unlike localized outage events, ice storms often create geographically widespread and difficult-to-access damage conditions that significantly slow restoration activities. Throughout the restoration effort, crews encountered large volumes of fallen trees, hanging limbs, blocked access routes, and debris-covered roadways that required substantial clearing activities before infrastructure repairs could begin. In many locations, vegetation crews and line crews would work in coordinated succession, with vegetation personnel first clearing access and removing hazards before lineworkers could safely assess and repair damaged infrastructure.

Road conditions further complicated restoration operations. Ice-covered and impassable roadways limited mobility for crews, contractor resources, heavy equipment, and material deliveries throughout portions of the restoration event. Sustained sub-freezing temperatures persisted for several days following the storm.<sup>9</sup> These compounding factors extended restoration durations and intensified the operational challenges faced by NES crews and mutual assistance resources.

## Initial Forecasts

NWS first broadcast the risk of a significant winter storm on Tuesday, January 20, approximately six days prior to storm impact, shown in Figure 3. At that time, snow was expected across much of Middle Tennessee, with forecast probabilities for greater than 3 inches of snow ranging from approximately 50–70% and probabilities for greater than 9 inches ranging from approximately 20–50% across the region. The forecast also identified the potential for dangerous travel conditions, power outages, and downed trees and tree branches associated with the event. While freezing rain was initially expected to primarily impact areas further south of Nashville, the NWS also communicated the potential for freezing rain to impact portions of Middle Tennessee.<sup>10</sup>

<sup>6</sup> NWS area forecast discussion January 25, 2026

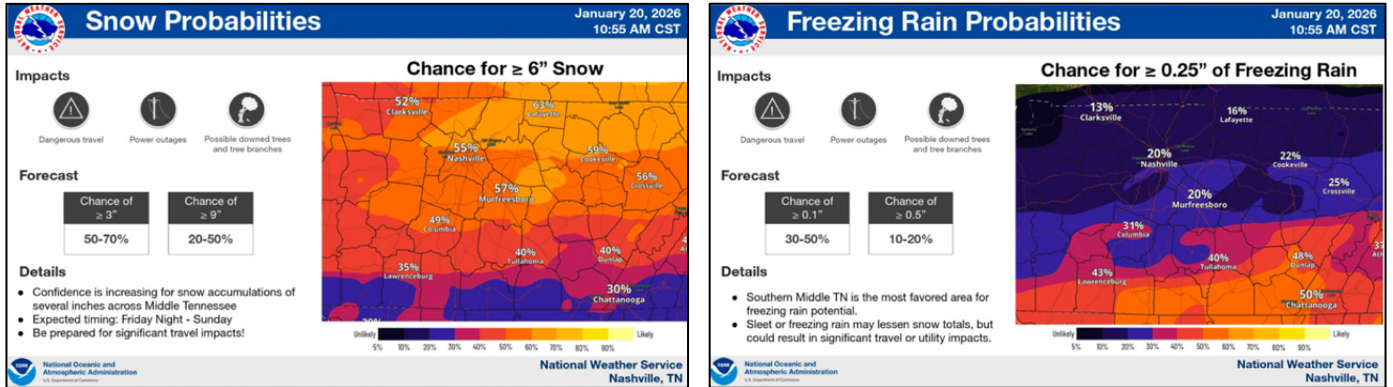
<sup>7</sup> WZTV Fox 17 Nashville. (2026, January 27). Thousands of Bellevue residents still in the dark four days into ice storm. [fox17.com/news/local/thousands-of-bellevue-residents-still-in-the-dark-four-days-into-ice-storm-power-outages-nashville-tennessee](https://fox17.com/news/local/thousands-of-bellevue-residents-still-in-the-dark-four-days-into-ice-storm-power-outages-nashville-tennessee)

<sup>8</sup> WKRN News 2. (2026, January 25). Nashville mayor declares state of emergency amid winter storm (ice snapping limbs/lines; broken poles; circuits out). [www.wkm.com/news/local-news/nashville/nashville-mayor-freddie-oconnell-state-of-emergency-winter-ice-storm](https://www.wkm.com/news/local-news/nashville/nashville-mayor-freddie-oconnell-state-of-emergency-winter-ice-storm)

<sup>9</sup> The Weather Channel. (2026, January 26). Winter Storm Fern Turns Deadly in Louisiana, Outages for Hundreds of Thousands Vulnerable to Ice, Snow. [weather.com/news/weather/news/2026-01-25-live-updates-january-25-winter-storm-fern](https://weather.com/news/weather/news/2026-01-25-live-updates-january-25-winter-storm-fern)

<sup>10</sup> Nashville Electric Service Winter Storm After Action Review Data Request #14: Winter Storm Fern weather forecasts and damage predictions

Figure 3. NWS Forecast as of January 20, 2026 – Snow & Freezing Rain Probabilities



Fern preparedness efforts began on Wednesday, January 21, when NES hosted a preliminary planning meeting in advance of the storm. The developing winter storm system remained positioned over the Southern Plains and Southwest and had not yet reached the Mid-South. The system subsequently moved eastward, impacting Tennessee and the NES service territory in the days that followed.<sup>11</sup>

**Initial Indications of Icing Conditions: January 22 NWS Forecast**

On Thursday, January 22, NWS issued a Winter Storm Warning for the Nashville area, forecasting storm impacts beginning during the overnight hours of Saturday, January 24. Forecast messaging indicated high confidence in a high-impact winter storm event extending through the weekend, while also emphasizing ongoing uncertainty associated with precipitation type, timing, and overall snow and ice accumulations. Forecasts at that time included a 70% probability of freezing rain exceeding 0.25 inches. The projected storm timeline indicated an initial transition from snow to freezing rain and sleet beginning Saturday morning, followed by prolonged freezing rain and mixed precipitation across much of Middle Tennessee through Saturday night before transitioning back to snow on Sunday. The forecasted freezing rain and potential for significant ice accumulation should have served as an early indicator of the elevated risk for widespread damage to overhead electric infrastructure, extensive tree-related impacts, hazardous travel conditions, and the need for significant restoration resources and mutual assistance support.

**Significant Forecasted Ice: January 23 NWS Forecast**

By Friday, January 23, NWS identified Middle Tennessee as one of the regions expected to experience the most significant ice impacts associated with the storm system, with forecast ice accumulations ranging from approximately 0.25 to 0.75 inches across the region and localized areas potentially exceeding 0.5 inches of freezing rain. Forecast messaging emphasized the potential for dangerous travel conditions, widespread power outages, and downed trees and tree branches resulting from prolonged freezing rain accumulations. At the same time, snowfall forecasts for the Nashville metropolitan area generally decreased to approximately 3 to 4 inches as confidence increased that freezing rain and sleet would become the dominant precipitation types.<sup>12</sup>

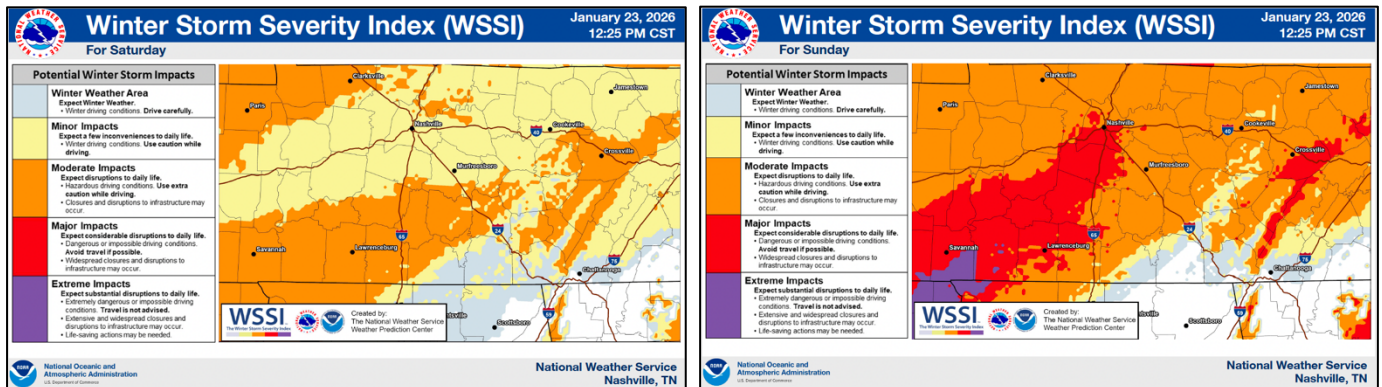
In addition to traditional weather forecasts, NWS utilizes the Winter Storm Severity Index (WSSI), an impact-based forecasting tool designed to communicate the anticipated societal impacts associated with winter weather events. Unlike forecasts that focus primarily on expected snow or ice accumulations, the WSSI evaluates the potential consequences of winter weather on transportation, infrastructure, utilities, and daily activities. The index categorizes expected impacts using a five-level scale consisting of Limited, Minor, Moderate, Major, and Extreme, providing emergency managers,

<sup>11</sup> The Washington Post. (2026, January 21). Major winter storm to spread snow and ice across the U.S. [www.washingtonpost.com/weather/2026/01/21/winter-storm-forecast-snow-ice-travel-impacts](http://www.washingtonpost.com/weather/2026/01/21/winter-storm-forecast-snow-ice-travel-impacts)

<sup>12</sup> Nashville Electric Service Winter Storm After Action Review Data Request #14: Winter Storm Fern weather forecasts and damage predictions

utilities, and other stakeholders with additional situational awareness regarding the potential severity of an approaching winter storm.<sup>13</sup>

Figure 4. NWS Forecast as of January 23, 2026 – Snow & Freezing Rain Probabilities



On Friday, January 23, the WSSI forecast indicated that much of the NES service territory was expected to experience moderate impacts on Saturday, with conditions intensifying by Sunday, as portions of Middle Tennessee were forecast to experience major impacts and widespread disruptions associated with freezing rain and ice accumulation. The forecast highlighted a growing risk of dangerous travel conditions, infrastructure damage, and utility service interruptions across the region.

### Ice Accumulation During Fern

On Saturday, January 24, NWS recorded approximately 0.36 inches of liquid-equivalent precipitation and 1.4 inches of snowfall at the Nashville International Airport. On Sunday, January 25, Nashville set a new daily precipitation record with approximately 1.92 inches of liquid-equivalent precipitation, the majority of which fell as freezing rain and sleet rather than snow.<sup>14</sup> The transition from snow to freezing rain resulted in devastating ice accumulation across the NES service territory. Official reports indicated that Nashville received an average of 0.42 inches of ice, though localized amounts varied significantly.<sup>15</sup> Some areas in and around Davidson County reported up to 0.75 inches of ice.<sup>16</sup> Storm impacts were not uniform across the NES service territory.<sup>17</sup> Post-event reporting and utility updates indicated that the most severe damage was concentrated in portions of southwest Davidson County, primarily within the area served by NES’s West Service Center, while smaller pockets of outages persisted across other areas of the service territory.<sup>18</sup>

## 2.2 Summary Event Chronology

The following timeline provides a structured overview of key events before, during, and after Winter Storm Fern, highlighting NES’s planning activities, storm response actions, and restoration milestones. It captures the progression from initial preparedness efforts through resource mobilization and field operations, to restoration completion and post-storm evaluation, illustrating how response efforts evolved over the course of the event.

<sup>13</sup> National Weather Service. (n.d.). Winter Storm Severity Index (WSSI) overview. National Oceanic and Atmospheric Administration. Retrieved May 31, 2026, from [https://www.weather.gov/ict/WSSI\\_Overview](https://www.weather.gov/ict/WSSI_Overview)

<sup>14</sup> National Weather Service. (2026, January). Preliminary Local Climatological Data (WS Form: F-6) - Nashville, January 2026. [forecast.weather.gov/product.php?site=OHX&issuedby=BNA&product=CF6&format=CI&version=4&glossary=0](https://forecast.weather.gov/product.php?site=OHX&issuedby=BNA&product=CF6&format=CI&version=4&glossary=0)

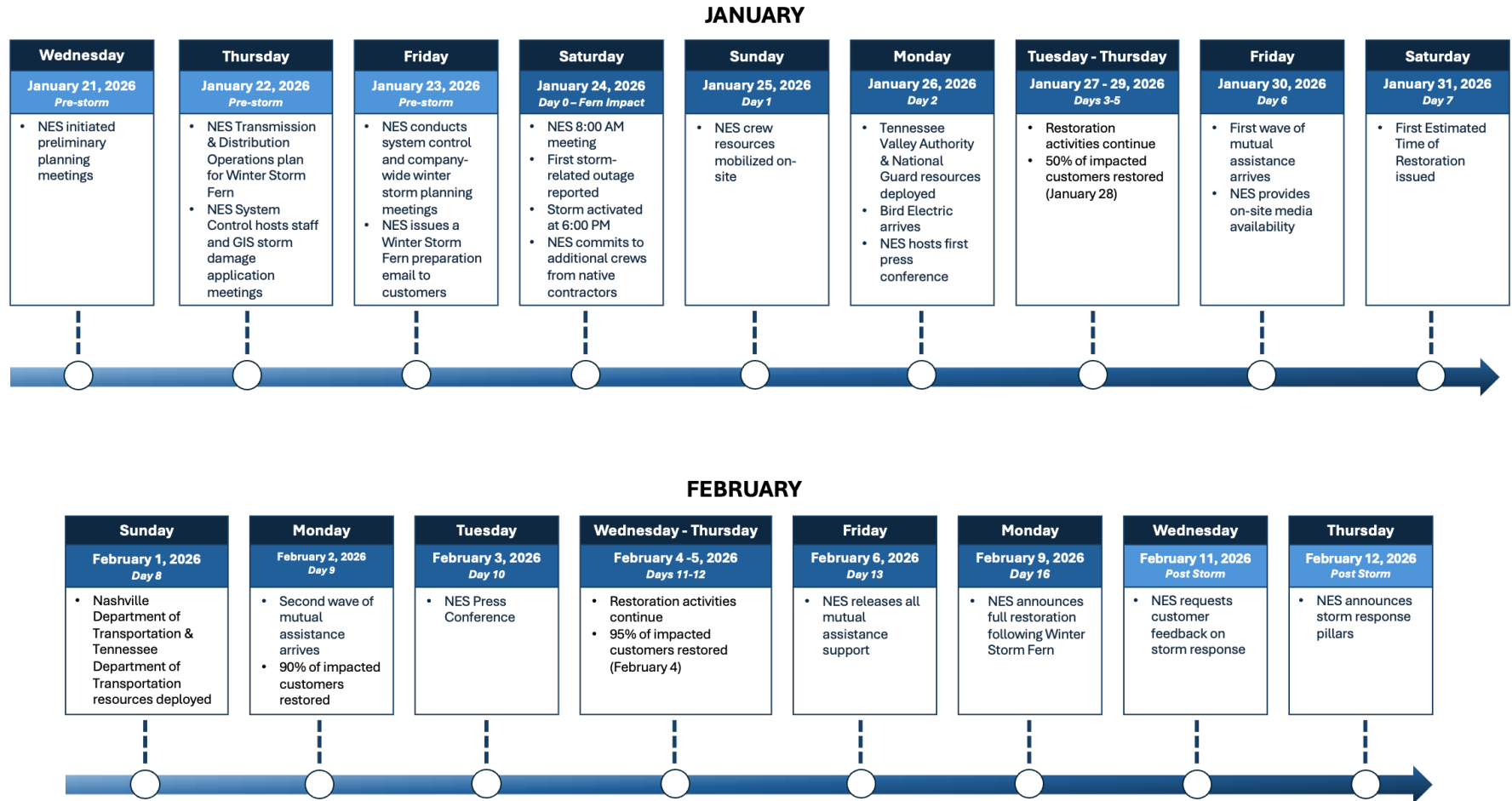
<sup>15</sup> Axios. (2026, January 28). Nashville ice storm: 0.42 inches recorded. [www.axios.com/local/nashville/2026/01/28/nashville-ice-storm-0-42-inches-recorded](https://www.axios.com/local/nashville/2026/01/28/nashville-ice-storm-0-42-inches-recorded)

<sup>16</sup> The Weather Channel. (2026, January 26). Winter Storm Fern Turns Deadly in Louisiana, Outages for Hundreds of Thousands Vulnerable to Ice, Snow. [weather.com/news/weather/news/2026-01-25-live-updates-january-25-winter-storm-fern](https://www.weather.com/news/weather/news/2026-01-25-live-updates-january-25-winter-storm-fern)

<sup>17</sup> National Weather Service / NOAA. (2026). Late January 2026 Winter Event Ice Accumulation & Snowfall Maps (Jan 23–27, 2026). NOAA ArcGIS Dashboard. [noaa.maps.arcgis.com/apps/dashboards/7e01cb15ec0b46b18e53b307cd5d42cd](https://noaa.maps.arcgis.com/apps/dashboards/7e01cb15ec0b46b18e53b307cd5d42cd)

<sup>18</sup> Tennessee Lookout. (2026, January 30). Tennessee governor urges better Nashville Electric Service efforts in winter storm. [tennesseelookout.com/2026/01/30/tennessee-governor-urges-better-nashville-electric-service-efforts-in-winter-storm](https://tennesseelookout.com/2026/01/30/tennessee-governor-urges-better-nashville-electric-service-efforts-in-winter-storm)

Figure 5. Winter Storm Fern Summary Event Chronology



## 2.3 Historical NES Storm Comparison

NES has experienced several infrequent, but major weather events throughout its history, that have caused substantial impacts on the electric system and customer outages across the service territory. These events include ice storms, hurricanes, tornado outbreaks, and derechos. Among NES’s historical major outage events, only one storm resulted in more than 150,000 peak customer outages. Winter Storm Fern exceeded prior historical storm impacts experienced by NES in terms of both peak customer outages and the overall scale, duration, and operational complexity of the restoration effort. In addition to surpassing previous outage totals, Winter Storm Fern created widespread infrastructure damage, severe vegetation impacts, hazardous travel conditions, and prolonged restoration challenges. The following table summarizes major historical weather events experienced by NES, including peak customer outages and overall restoration durations associated with each event.

**Table 1. NES Historical Storm Comparison**

Storm / Event	Peak Customers Out	Restoration Duration
<b>January Ice Storm (1951)<sup>19</sup></b>	~16,000 households (area wide)	More than 1 week
<b>December Ice Storm (1990)<sup>20</sup></b>	80,000	16,000 hours of repairs
<b>February Ice Storm (1994)<sup>21</sup></b>	150,000	10 days
<b>May Flood (2010)<sup>22</sup></b>	43,677	8+ days
<b>June Storm (2019)<sup>23</sup></b>	48,028	3 days
<b>March Tornado Outbreak (2020)<sup>24</sup></b>	50,124	10 days
<b>May Derecho (2020)<sup>25</sup></b>	150,193	7 days
<b>December Storm (2021)<sup>26</sup></b>	91,043	4 days
<b>March Storm/Tornado Outbreak (2023)<sup>27</sup></b>	116,907	6 days
<b>Winter Storm Fern (2026)</b>	231,749	12 days

## 2.4 Winter Storm Fern Response

NES began actively monitoring Winter Storm Fern on Wednesday, January 21, as forecast confidence increased regarding the potential for significant winter weather across Middle Tennessee. On Thursday, January 22, the same day as when NWS issued the forecast with significant chance of ice in the service territory, NES contacted two native contractors MasTec, Inc. (MasTec) and Davis H. Elliot Company, Inc. (DHEC) to discuss potential support requirements while continuing to monitor storm

<sup>19</sup> National Weather Service. (n.d.). The Nashville ice storm of 1951. National Oceanic and Atmospheric Administration. <https://www.weather.gov/ohx/1951icestorm>

<sup>20</sup> Powering Nashville for 85 Years

<sup>21</sup> WKRN News 2. (n.d.). Remembering the crippling ice storm of 1994. <https://digital-release.wkrm.com/news/local-news/remembering-the-crippling-ice-storm-of-1994/>

<sup>22</sup> Nashville Electric Service, supplemental data provided during the NES After Action Review

<sup>23</sup> ibid

<sup>24</sup> ibid

<sup>25</sup> ibid

<sup>26</sup> ibid

<sup>27</sup> ibid

development. At that time, NES had not developed an estimated resource requirement or target crew count to support restoration needs.

Preparedness activities leading up to the storm included recurring coordination meetings involving senior leadership and operational personnel focused on resource availability, material needs, field conditions, mutual assistance, customer communications, and requests for support through the Tennessee Emergency Management Agency (TEMA) and Metro OEM. Formal NES storm coordination meetings began on Friday, January 23, followed by one meeting on Saturday, January 24, before transitioning to twice-daily operational briefings beginning Sunday, January 25, generally occurring at 8:00 AM and 4:00 PM CT. Meetings were conducted both in-person within a designated “war room” environment and virtually through Microsoft Teams. NES also implemented workforce preparedness activities intended to support operational continuity during severe weather conditions, including allowing personnel to take vehicles, materials, and equipment home in advance of the storm. Additional fleet winterization measures were implemented, including installation of tire chains, ensuring vehicles were fully fueled, and preparing fleet assets for hazardous roadway and severe winter weather conditions.

As freezing rain and ice accumulation forecasts became more severe than initially anticipated, NES transitioned from a monitoring posture to a full-scale storm response effort by Sunday, January 25. Beginning Tuesday, January 27, NES significantly expanded outreach efforts to non-native contractors to support ongoing restoration activities as outage impacts remained extensive across the service territory.<sup>28</sup> Resource requests and onboarding activities continued throughout the restoration effort, with NES coordinating the integration of hundreds of additional line and support crews to assist with restoration operations. NES also increased coordination with regional public power associations to secure additional assistance.

NES’s restoration approach evolved into a multi-faceted response effort driven largely by field conditions and accessibility constraints. Unlike typical restoration events where System Control personnel can primarily direct restoration sequencing based on system conditions and outage prioritization, widespread vegetation damage, inaccessible roadways, and ongoing storm impacts heavily influenced which restoration activities could safely proceed. Coordination with the Tennessee Department of Transportation (TDOT) and the Nashville Department of Transportation (NDOT) began early in the event to support roadway clearing activities and improve access to priority restoration locations identified by NES. Restoration operations were further complicated by continued infrastructure damage occurring after initial outages and assessments, including additional tree failures caused by prolonged freezing temperatures, accumulated ice weight, and increasing wind conditions. Priority customers, including critical facilities, also experienced additional interruptions throughout the event as conditions continued to deteriorate.

Immediately following the impact of Fern, once conditions were deemed safe, NES initiated damage assessment activities on Monday, January 26. Damage assessment information was entered into NES’s damage collector system and used to support both material requisitions for restoration work and evaluations of the resources required to restore the system. However, feedback from field crews indicated that the system was not consistently utilized for these purposes during the early days of restoration. Early on, restoration crews had to conduct their own assessment of damage and develop the required repair materials. In addition, the continuing nature of the storm further complicated damage assessment efforts, as infrastructure that had already been assessed often experienced additional damage before initial restoration activities could be completed.

As restoration activities continued throughout the week, requested contractor and mutual assistance resources began arriving onto the NES system. NES utilized five retired personnel beginning Tuesday, January 27, primarily in supervisory roles. Bird Electric supported contractor and mutual assistance coordination activities across System Control and field operations. Mutual assistance resources arrived in two primary deployment waves, with the first wave beginning work on Saturday, January 31, and the second on Monday, February 2. Tennessee Valley Authority (TVA) personnel and the Tennessee National Guard (TNG), coordinated through TEMA, arrived on site beginning Monday, January 26. TVA

---

<sup>28</sup> Nashville Electric Service Data Request #58: Contractor and mutual aid mobilization and demobilization timeline

and TNG resources supported logistics, transportation, material movement, debris removal, and vegetation clearing activities.

As restoration efforts progressed into Wednesday, January 28 (Day 4) and customer expectations continued to exceed restoration progress, NES expanded its use of external resources beyond traditional restoration and logistical support functions. Recognizing the need for specialized expertise, NES sought assistance from utility personnel with experience in ETR development and restoration modeling. DTE Energy (DTE) personnel arrived on Thursday, January 29, to support the development of ETRs utilizing DTE's restoration modeling capabilities, helping NES establish the processes and analytical framework necessary to develop and communicate ETRs during the event.

Although NES did not formally activate the Emergency System Restoration Plan per the Emergency Response Plan, personnel generally understood where to report and how restoration coordination activities would occur during the event. System operations personnel primarily led operational meetings throughout the restoration effort, including review of system status, operational checklists, and resource coordination activities. NES's key account managers also maintained direct coordination with more than 67 priority customers, including nursing homes and water treatment facilities, throughout the event.<sup>29</sup>

NES utilized the Donelson Service Center, North Service Center, and West Service Center as primary staging locations during Fern restoration activities. The loading facilities at each service center were configured to efficiently transfer materials from warehouse operations directly onto NES and external restoration vehicles, supporting rapid material distribution throughout the restoration effort. In addition to these established service center locations, NES coordinated the use of several external staging sites to support restoration operations, resource coordination, crew mobilization, and related logistical activities throughout the event. These locations included the Opry Mills Mall, the State of Tennessee Health Services Administrative Complex, WeGo Transit property adjacent to the North Service Center, and the vacant Centennial Yards lot adjacent to the West Service Center.

During Winter Storm Fern, NES maintained customer communications through recurring social media updates, which provided customers with general information, safety messaging, and emergency services information throughout the event. Customer communication challenges emerged early as outage reporting channels experienced operational issues. Beginning Sunday morning, January 25, customers experienced issues with the dedicated outage phone line, associated Interactive Voice Response (IVR) system, outage map, and text messaging platforms, limiting customer reporting capabilities during the early stages of the storm. Customers were able to report outages through NES's myAccount platform, which remained operational throughout the restoration effort. In addition, some customers received inaccurate restoration notifications indicating power had been restored when outages remained active. Customer frustration was further compounded by the absence of any ETRs during the first week after initial storm impact.

Mutual assistance and contractor crews remained on the NES system through the completion of restoration activities on Friday, February 6. Demobilization activities primarily occurred during the final two days of the restoration effort and focused on the release of crews, return of materials, and transition back to normal operations. NES established flow-through demobilization lanes near the North, West, and Donelson Service Centers to support the efficient return of unused materials and equipment while minimizing traffic congestion and preventing backups onto public roadways. Materials were returned to service centers and other designated locations for sorting, counting, and redistribution activities, which continued for approximately one and a half weeks following restoration. Materials were not issued or tracked by individual truck number during the restoration effort; therefore, NES did not maintain a truck-level inventory of returned materials during demobilization. Materials returned in usable condition were redistributed for future operational use, while some requisitioned materials remained unused due to field crews reusing existing infrastructure components that remained serviceable.

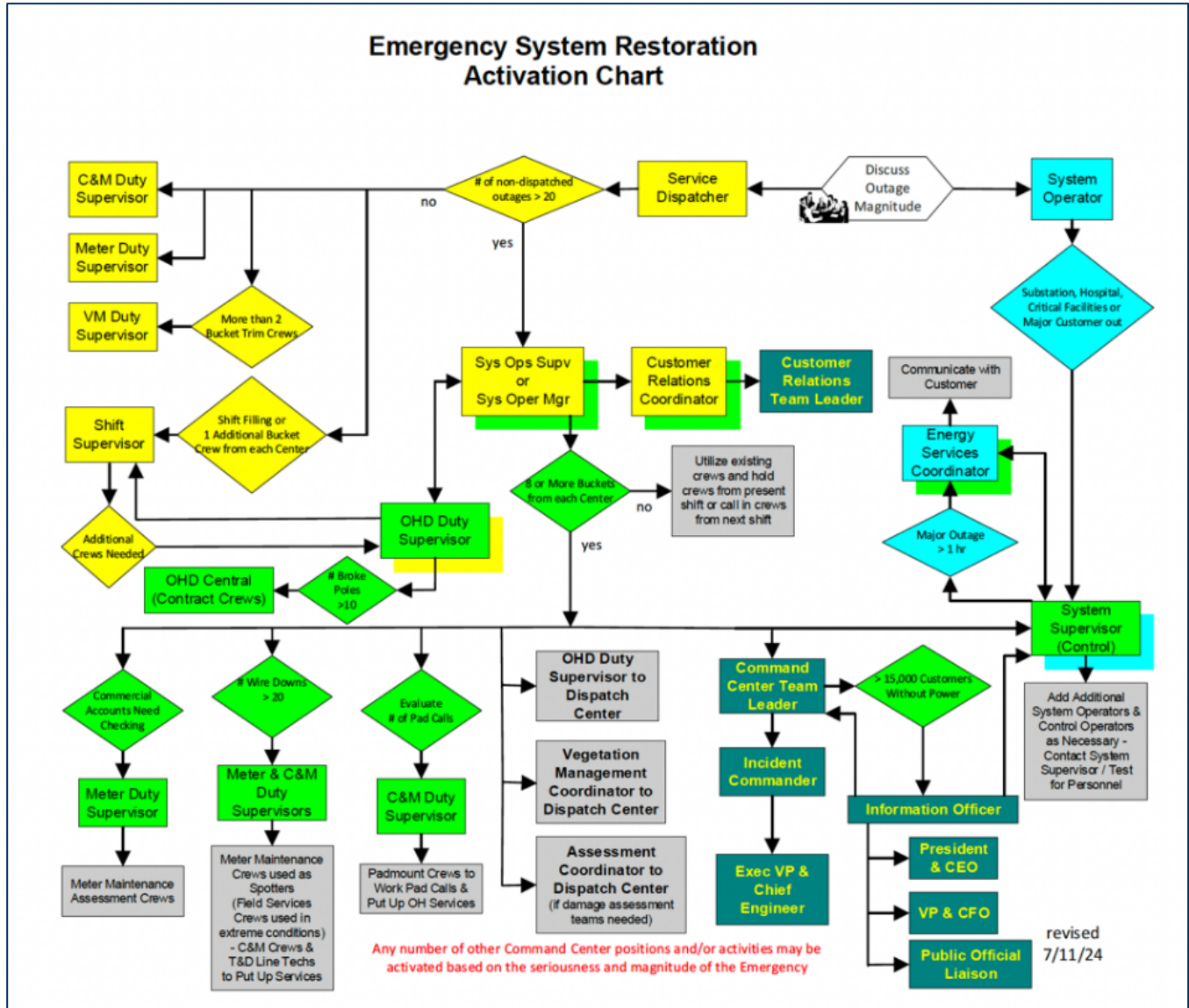
---

<sup>29</sup> Nashville Electric Service Winter Storm After Action Review Stakeholder Interview with T. Richman, Manager – Energy Services

### Storm Plan Activation

Under NES’s Emergency Response Plan (ERP), activation may occur in response to a variety of emergency conditions, including natural disasters, predicted load shedding events, loss of transmission or distribution facilities, emergency load curtailment events, or civil disturbances and disasters. When qualifying conditions exist, the Command Center Team Leader, identified through the weekly Command Duty Roster maintained by Power Systems Operations, is responsible for notifying the designated Incident Commander.<sup>30</sup> The Incident Commander then notifies the President & Chief Executive Officer (CEO) or Executive Vice President & Chief Engineer to assess the event and determine which portions (e.g., communications) of the ERP should be activated.<sup>31</sup>

Figure 6. NES Emergency Activation Chart



If warranted, the Crisis Management Team (CMT) performs an initial assessment of the event and may formally declare a system emergency. In the absence of executive leadership, the Incident Commander has authority to make the declaration. Once activated, Service Dispatch initiates personnel notifications using the Activation Chart and associated call lists maintained within the Command Duty Roster process. Under the ERP storm classification structure, Winter Storm Fern was classified as a Class V –

<sup>30</sup> Nashville Electric Service Winter Storm After Action Review Data Request #2: NES Emergency Preparedness Plan as of January 1, 2026

<sup>31</sup> ibid

Major Disturbance event, defined as an event involving greater than 50,000 customers without power and estimated restoration durations exceeding five days.<sup>32</sup>

## Customer Experience

Customer experience has become an increasingly important focus area for utilities across the United States as customer expectations have evolved in response to significant advancements in communications, transparency, and service responsiveness across industries. During Fern, a gap emerged between customer expectations for outage and restoration communications and the information they were ultimately provided. Early customer-facing challenges, including difficulties reporting outages and limited information regarding restoration progress, likely shaped the customer perception. Customer experiences within the first few days of a major outage event can have a lasting impression on how customers perceive the overall restoration response.

Prior to Fern's arrival, NES provided customers with a variety of winter storm preparedness messages and safety communications including guidance on severe winter weather preparation, generator safety, outage reporting procedures, downed power line safety, food safety considerations, and customer responsibilities related to electric service equipment (e.g., customer masthead responsibility).<sup>33</sup> NES also utilized its website to communicate storm preparedness information and restoration-related updates through prominent homepage banners. Once the storm began, NES provided frequent outage and restoration updates across its social media platforms.

As customer outages surged beginning Sunday, January 25, several of NES's outage reporting channels experienced system failures and capacity constraints, preventing customers from reporting their service interruption. NES customers can report service interruptions through several channels, including the outage map, a primary customer service phone line and associated IVR managed by Genesys (615-736-6900), a dedicated outage reporting phone line and associated IVR managed by Convey (615-234-0000), a two-way text messaging platform managed by Convey (637797 / NESPWR), and myAccount, NES's online customer portal.

Beginning at approximately 6:30 AM CT on Sunday, January 25, NES experienced capacity issues with the Convey dedicated outage reporting phone line and associated IVR system. By 11:30 AM CT the same day, NES replaced the standard IVR with a new message routing customers to use the two-way texting platform to report outages. At approximately 3:30 PM CT, inbound calls to the dedicated outage line were rerouted to a high-volume call handling platform where customers were able to report their outages.

The two-way text messaging platform managed by Convey encountered three separate service interruptions during the first four days of storm restoration as customer traffic exceeded platform capacity. The outages resulted in approximately 8 hours and 40 minutes of cumulative downtime. The platform was unavailable from 2:00 PM to 4:30 PM CT on Sunday, January 25, from 9:00 PM to 11:00 PM CT on Tuesday, January 27, and from 12:20 PM to 4:30 PM CT on Wednesday, January 28. The NES outage map reported its first error at approximately 9:00 AM CT on Sunday, January 25 and within an hour, NES provided a message on their website acknowledging the system was experiencing issues. At approximately 12:00 PM CT on January 25, NES disabled outage reporting functionality through the outage map; however, customers remained able to view outage information through the platform.<sup>34</sup> Technical issues affecting outage reporting functionality required additional remediation and testing before customers could once again submit outage reports through the platform.<sup>35</sup> As a result, outage reporting through the outage map remained unavailable throughout the remainder of the restoration effort.<sup>36</sup> To help mitigate customer impacts, NES displayed a banner notification on the outage map informing customers that outage reporting functionality was unavailable and provided

<sup>32</sup> Nashville Electric Service. (2024, November). Emergency Response Plan (ERP) [Internal company document]

<sup>33</sup> Nashville Electric Service Winter Storm After Action Review Data Request #33: Storm-related social media posts and public comments

<sup>34</sup> Nashville Electric Service Winter Storm After Action Review Data Request #97: List of outage reporting system interruption windows by reporting channel

<sup>35</sup> Nashville Electric Service Winter Storm After Action Review Data Request #175: Outage map reporting capability disruption dates and times

<sup>36</sup> Nashville Electric Service Winter Storm After Action Review Data Request #162: Outage map restoration date and time after January 25 unavailability

instructions to report outages through the two-way texting platform.<sup>37</sup> The primary customer service line and associated IVR system managed by Genesys, along with the myAccount platform, remained available and fully functional throughout the restoration effort. However, customers were unable to report outages through the IVR system on the customer service line and instead required assistance from a customer service representative to submit an outage report, placing additional demand on call center resources during the event.

There were reports on January 25 that some customers were experiencing issues reporting outages via the outage map. PA's analysis of a sample of logged error messages indicated that over 80% of the error messages sent were around validation steps, which is a required step to report outage via NES outage map.<sup>38</sup> The decision to disable outage reporting functionality through the outage map reduced the number of available outage reporting channels during a period of elevated customer demand. With the two-way text messaging platform and the dedicated outage reporting line and associated IVR system experiencing multiple service interruptions, customers were largely limited to reporting outages through customer service representatives, reducing the availability of self-service outage reporting options.

The outage map also provides limited customer-facing functionality compared to peer utilities. For example, Austin Energy, a public power utility serving approximately 550,000 customers, provides customers with estimated restoration times, outage causes, crew status, restoration progress updates, and customer-specific outage status through address lookup functionality.<sup>39</sup> By comparison, the NES outage map primarily displays the general location of outages and does not currently provide customer-specific outage status, estimated restoration times, outage causes, crew status information, or restoration progress updates. As a result, customers seeking information regarding the status of their outage have limited self-service options and may be more likely to contact the utility directly for updates during major outage events.

The absence of ETRs during the first week of the restoration effort further limited customer visibility into restoration progress and expected service restoration timelines. Without restoration estimates, customers had limited information regarding when power might be restored and were unable to effectively plan for extended outages, including decisions related to food preservation, temporary accommodations, work schedules, or other personal needs.

NES utilized an automated Restoration Notification service that upon outage restoration will send an automated text message to inform the customer that their power has been restored. During the first few days of Winter Storm Fern, there were reports of customers who received text messages from NES indicating that power had been restored at their residences / premises, when in fact power had not been restored. NES stopped all Restoration Notifications to prevent additional, inaccurate restoration messages from being sent.<sup>40</sup>

This over-notification of customers likely resulted from the extensive outages Fern caused, and how the Outage Management System (OMS) tries to group outage reports into overall outage incidents. Grouping of outages is done by all OMS systems industry-wide and can cause System Operators to over report restored customers in cases of extensive system damage. Automation of sending restoration notices can be very helpful during blue-sky conditions where damage to electrical system is low. NES requested its vendor to stop sending the automated restoration messages on the morning of Wednesday, January 28 to prevent further, inaccurate restoration notifications from being sent to customers.<sup>41</sup> The Restore Notifications were finally fully stopped on January 30. These inaccurate notifications contributed to customer frustration and complicated efforts to communicate restoration

---

<sup>37</sup> Nashville Electric Service Winter Storm After Action Review Data Request #176: Outage map banner language beginning January 25, 2026

<sup>38</sup> Nashville Electric Service Winter Storm After Action Review Data Request #97: List of outage reporting system interruption windows by reporting channel

<sup>39</sup> Austin Energy. (n.d.). Austin Energy outage map. <https://outagemap.austinenergy.com/>

<sup>40</sup> Nashville Electric Service Winter Storm After Action Review Data Request #177: Timing of automated restoration notification suspension

<sup>41</sup> *ibid*

progress during the event. These instances of inaccurate or unavailable information to customers helped to anchor generally negative customer sentiments.

## Mutual Assistance & Resource Planning

During Fern, NES utilized a combination of existing contractor relationships, third-party resource coordination support, and mutual assistance outreach to secure external resources. Initial contractor mobilization activities during the early stages of the event were coordinated directly by NES Central Operations utilizing native contractors, including DHEC and MasTec. As restoration requirements expanded beyond existing contractor capabilities, NES utilized Bird Electric as a system aggregator to support the coordination and onboarding of external resources for which NES did not maintain an existing contractual relationship. Onboarding activities were conducted for crews who have not previously worked on the NES system, during which NES work practices, safety requirements, and other logistical considerations were reviewed.

Bird Electric supported contractor coordination, crew onboarding, and resource integration activities throughout the event beginning on Monday, January 26. Multiple NES personnel coordinated directly with Bird Electric leadership regarding contractor availability, mobilization activities, and prioritization of outreach efforts. Bird Electric leveraged regional awareness of contractor staging locations and resource positioning ahead of the storm to prioritize contractor outreach and accelerate resource mobilization timelines.<sup>42</sup>

Beginning Tuesday, January 27 and Wednesday, January 28, NES significantly expanded outreach efforts to external contractors and mutual assistance organizations not traditionally utilized on the NES system. Initial outreach efforts included direct coordination with contractors including GMB Powerline Services, Service Electric Co., and Power Pros on Tuesday, January 27, with associated contracts executed and initial mobilization activities occurring the next day. Additional outreach efforts on Wednesday, January 28 included requests to Huntsville Utilities for mutual assistance support.<sup>43</sup>

As restoration activities continued and outage impacts remained extensive throughout the week, NES further expanded resource requests on Saturday, January 31, through outreach to Quanta Services, Upper Cumberland Utility Services, Valley Power Services, CPS Energy, Austin Energy, and Middle Tennessee Electric. By Sunday, February 1, NES was positioned to onboard approximately 476 additional crews, with an additional approximately 100 crews anticipated to arrive between Monday, February 2, and Tuesday, February 3.<sup>44</sup> NES subsequently increased coordination with the Tennessee Municipal Electric Power Association (TMEPA) and Tennessee Valley Public Power Association (TVPPA) to request additional assistance from local power companies as restoration activities across neighboring systems concluded.

Throughout restoration effort, NES continued increasing resource staffing levels and integrating additional external resources onto the system. Total restoration resources increased from approximately 637 personnel on Sunday, January 25 to a peak of approximately 3,318 personnel on Wednesday, February 4. Resource growth included increases in lineworkers, vegetation management personnel, engineering and damage assessment staff, transportation support, forestry resources, and external agency support personnel, as shown in Figure 7.<sup>45</sup>

---

<sup>42</sup> Nashville Electric Service Winter Storm After Action Review Data Request #12: Winter Storm Fern internal lessons learned and after-action reports as of March 13, 2026

<sup>43</sup> Nashville Electric Service Winter Storm After Action Review Data Request #58: Contractor and mutual aid mobilization and demobilization timeline

<sup>44</sup> Nashville Electric Service Winter Storm After Action Review Data Request #20: Daily NES, contractor, and mutual aid staffing levels

<sup>45</sup> ibid

Figure 7. Winter Storm Fern Daily Resource Count

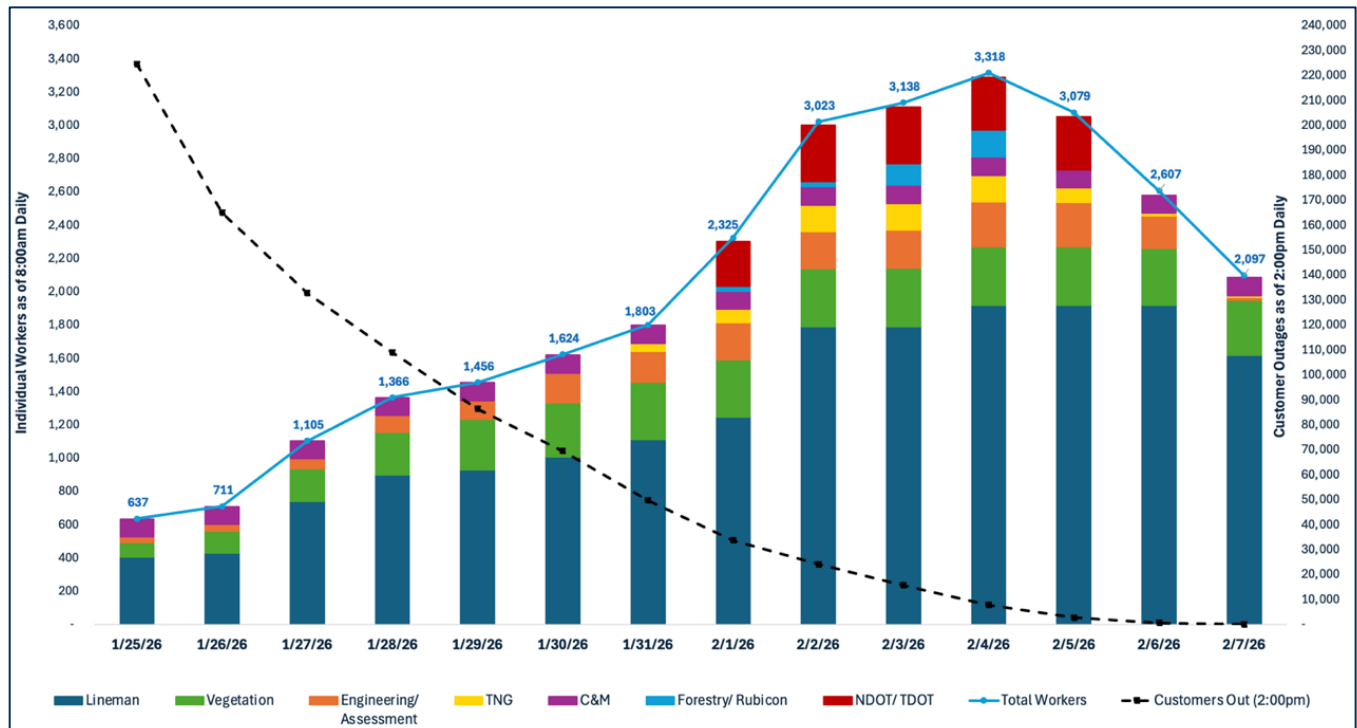


Figure 7 also demonstrates that restoration resource levels continued increasing after customer outage counts had already begun significantly declining. This reflects the timing associated with broader external resource requests and onboarding activities during the event, resulting in peak resource levels occurring later in the restoration effort after a significant portion of customers had already been restored. This observation highlights the tradeoff utilities face between the cost and uncertainty associated with prematurely committing to resource mobilization (risk of overcommitting resources for storm that fails to materialize) and the operational benefits of securing assistance early. In this case, NES did not secure sufficient resources early in the process, and crews were only made available after the threat of significant damage had abated at the utilities that did secure crews early. Utilities must balance the risk and cost of mobilizing external resources for storm impacts that may not materialize against the risk that delaying resource requests to gain additional forecast confidence may limit the availability of assistance when it is needed most. While forecasts initially carried uncertainty, the northward shift of the forecasted ice accumulation corridor increased the potential for significant impacts within the NES service territory.

### Stakeholder Coordination

Due to evolving weather forecasts associated with Fern, NES Government Relations and Corporate Communications initiated pre-storm stakeholder coordination activities on Thursday, January 22, through the distribution of preparedness communications to government stakeholders outlining anticipated storm impacts, outage reporting resources, communication expectations, and key liaison contact information. On Friday, January 23, NES Executive Leadership, Government Relations, and Corporate Communications participated in a Metro-wide interdepartmental coordination call to align external communications strategies and coordinate public messaging in advance of anticipated storm impacts.

Beginning Friday, January 23, and continuing through Tuesday, February 10, NES staffed representatives at the Metro Emergency Operations Center (EOC) on a 24-hour basis to provide operational updates regarding restoration activities and support interagency coordination efforts. Additionally, beginning Friday, January 30, NES provided representation at TEMA EOC, where NES

personnel participated in twice-daily operational briefings. According to NES, Winter Storm Fern marked the first event in which TEMA specifically requested NES representation.<sup>46</sup>

Throughout the restoration effort, NES maintained ongoing engagement with elected officials and government stakeholders through recurring government distribution list updates, live webinars, and dedicated liaison support via phone, text, and email. Beginning with pre-storm communications on Thursday, January 22, NES distributed restoration updates throughout the event, with communication frequency increasing substantially as customer outages escalated. Stakeholder communications peaked on Sunday, January 25, and Monday, January 26, during which NES distributed approximately 10 and 7 updates, respectively, while customer outages increased from approximately 100,000 to more than 230,000 customers. As restoration activities progressed and outage counts declined, communication frequency gradually decreased through Friday, February 6.<sup>47</sup>

Government Relations additionally hosted live stakeholder webinars on Friday, January 30, Sunday, February 1, and Wednesday, February 4, to provide restoration briefings, facilitate stakeholder questions, and support ongoing situational awareness and coordination activities throughout the event. NES leadership participated in each session, and Government Relations distributed supporting FAQ documentation following the webinars to address recurring stakeholder inquiries and operational updates.

## Health and Safety Management

Restoration activities throughout the event were influenced by hazardous winter weather conditions, including impassable roads, ice accumulation, fallen trees and limbs, and limited site accessibility due to debris. While there were several minor injuries (e.g., slips, trips), there were no serious injuries during the entire restoration effort, which is a significant achievement.

Safety considerations associated with these conditions impacted the timing and sequencing of certain restoration activities across the system. During the onboarding process, NES conducted safety briefings for contractors that were new to the NES system and collected formal signoffs following completion of the training. NES utilized safety requirements and protective equipment standards that were more stringent than some external contractor practices, including the use of ASTM Class 3<sup>48</sup> gloves. Contractors without the required protective equipment were provided with materials by NES as needed, and crews were not permitted to perform work on NES equipment without the appropriate safety materials in place. Any safety issues (e.g., trips, vehicle incidents) were reported to the NES safety organization. Safety issues were also discussed during the daily safety briefings (covering both NES and external personnel).

## Information Coordination & Record Keeping

PA observed the absence of a formalized information documentation and coordination structure throughout the restoration effort. Operational information was primarily communicated through twice-daily situational report meetings, after which participating personnel disseminated information to their respective audiences, including field crews, customers, government stakeholders, contractors, and external partners. While this approach facilitated the sharing of information across functional groups, it relied heavily on informal communication pathways and individual interpretation of restoration updates. The absence of a standardized information coordination process increased the potential for inconsistent messaging, delays in information dissemination, and misalignment between operational activities and external communications throughout the restoration effort.

NES maintained some documentation throughout the restoration effort through twice-daily situational reporting processes that included a combination of spreadsheets, emails, handwritten notes, and distributed updates related to outage impacts, restoration progress, resource levels, and key operational activities. Restoration progress was tracked using a living spreadsheet rather than its OMS

---

<sup>46</sup> Nashville Electric Service Winter Storm After Action Review Data Request #55: Major event local government and municipality communication process

<sup>47</sup> *ibid*

<sup>48</sup> American Society for Testing and Materials (ASTM) International D120

as there were difficulties with scaling resources. While the format and level of formality varied throughout the event, a recurring reporting structure was maintained during the restoration effort. These reports supported ongoing situational awareness and documentation of evolving restoration conditions throughout the event. NES's ERP references the implementation of Incident Action Plans (IAPs) consistent with an incident management structure; however, formal IAPs were not developed during the response. As a result, the response effort lacked a standardized framework for documenting restoration objectives, assignments, organizational structure, resource coordination, and incident priorities. Although the situational reports provided value from a recordkeeping and communication perspective, formal IAPs would have provided a more comprehensive and operationally aligned approach to incident documentation and coordination throughout the restoration effort.

## **Key Strengths and Successful Practices Observed During Winter Storm Fern**

While this assessment primarily focuses on opportunities for improvement, several strengths and effective practices were observed throughout NES's response to Fern. These observations reflect actions, capabilities, and operational approaches that positively supported restoration efforts and, in many cases, helped mitigate the impacts of a highly complex and prolonged event. The following strengths should be considered for continued use and incorporation into future emergency response and restoration activities.

- Despite freezing conditions and extensive system damage, NES's restoration efforts resulted in only 17 minor injuries and no serious injuries to restoration personnel or members of the public.
- NES utilized a parallel restoration strategy in which line crews working on primary distribution facilities and service crews working on secondary and service-level infrastructure were deployed simultaneously, helping accelerate overall restoration activities.
- The loading facilities at the North, West, and Donelson Service Centers supported efficient material staging and distribution, enabling rapid transfer of materials from warehouse operations to both NES and external restoration vehicles.
- As restoration efforts progressed, NES recognized the need for specialized expertise and expanded its use of external resources beyond traditional restoration and logistical support functions. Utility personnel with experience in restoration modeling and ETR development were brought in to support the development of ETR processes and analytical capabilities during the event.
- There was little evidence that either NES or external restoration crews experienced significant delays awaiting work assignments, materials, or other logistical support, indicating resources were generally integrated into restoration operations efficiently upon arrival.
- NES recognized that vegetation-related impacts were a significant contributor to customer outages during Winter Storm Fern and took immediate action following the event to enhance vegetation management standards, including expanded clearances and the elimination of overhanging vegetation conditions.

## 3. Findings & Recommendations

# 03

The following presents PA's findings, observations, and recommendations associated with NES's preparedness, response, and restoration activities during Winter Storm Fern. To provide a structured assessment of utility performance, PA organized NES's overall response into a series of key utility functions. This approach enabled both an individual evaluation of each function and an assessment of how the functions collectively supported the overall response and restoration effort.

Each function includes a findings section summarizing key observations identified through document review, data analysis, and stakeholder interviews. In addition, each function includes a preparedness discussion evaluating the plans, processes, systems, organizational structures, and operational readiness that existed prior to Fern, as well as a performance discussion assessing how NES executed restoration activities, coordination, communications, and decision-making during the event. Based on this assessment, PA developed targeted recommendations intended to strengthen operational readiness, restoration performance, customer experience, organizational coordination, and long-term resiliency.

Collectively, these recommendations are intended to provide NES with an integrated improvement roadmap for enhancing emergency management, restoration operations, outage management, customer communications, and organizational coordination. The recommendations are not intended to represent an exhaustive list of all potential improvement opportunities, but rather the most impactful initiatives identified through the assessment.

### 3.1 Incident Command System

Prior to Fern, NES had established a Command Center structure intended to coordinate restoration activities during major outage events. The Command Center provided a foundation for managing response operations and facilitating coordination across the organization during a complex and prolonged restoration effort. However, the scale and duration of the storm exposed limitations within the existing incident management structure. The prolonged restoration effort, combined with staffing gaps, personnel transitions, and the increasing complexity of response operations, created challenges in maintaining continuity, clear lines of authority, and consistent information flow across the organization. These observations highlight opportunities to further formalize incident management practices, strengthen role clarity and organizational structure, and align emergency response operations with industry-standard Incident Command System principles to improve scalability, coordination, and operational continuity during future large-scale events.

The Federal Emergency Management Agency (FEMA) established the National Incident Management System (NIMS) as the standardized approach to incident management that enables effective command, control, and coordination of emergency response activities through a common organizational framework.<sup>49</sup> A core component of NIMS is the Incident Command System (ICS), which integrates personnel, resources, communications, and procedures to support coordinated decision-making and operational management during complex incidents across multiple agencies, organizations, and jurisdictions.

For utilities, ICS provides a critical framework for organizing emergency response and recovery activities by aligning field operations, planning, logistics, finance and administration, and communications under a unified structure. This enables effective coordination with mutual assistance

---

<sup>49</sup> Federal Emergency Management Agency. (2018, June 25). IS-700.B: An introduction to the National Incident Management System. Emergency Management Institute. <https://training.fema.gov/is/courseoverview.aspx?code=IS-700.b&lang=en>

partners, government agencies, contractors, and other external stakeholders, ensuring efficient resource deployment, improved situational awareness, and consistent communication throughout the restoration process. ICS is a standard utility practice typically documented within ERPs, where organizational structures, roles, responsibilities, reporting relationships, and activation procedures are established and defined.

ICS is designed to be scalable and flexible, allowing utilities to expand or contract the organizational structure based on the size, complexity, and duration of an event. During routine outages, only a limited number of ICS positions may be activated, while major storm events may require full activation of command and general staff functions. Core ICS functions typically include Incident Command, Operations, Planning, Logistics, Finance and Administration, Safety, and Public Information. Together, these functions establish clear lines of authority, defined decision-making responsibilities, standardized communication pathways, and common operating procedures across the organization.

In addition to providing an organizational framework, ICS incorporates standardized processes, reporting structures, and documentation used throughout emergency response and restoration activities. These tools include IAPs, operational briefings, situational reports, resource tracking processes, and status reporting mechanisms that support planning, coordination, and execution. By establishing a common management framework and consistent operating procedures, ICS helps utilities improve coordination, enhance operational efficiency, and effectively manage large-scale restoration events.

Supporting the ICS structure is the EOC, which serves as the central location for incident coordination, information management, resource tracking, and executive coordination during major events. While separate from the field-based ICS organization, the EOC is commonly structured using ICS principles and provides executive oversight, cross-functional coordination, and support services necessary to manage large-scale restoration efforts.

ICS is widely adopted across the utility industry and is considered a foundational element of effective storm response. Its absence or incomplete implementation can significantly hinder coordination, resource management, situational awareness, and decision-making, particularly during large-scale events involving substantial resource deployment, complex restoration activities, and prolonged response operations.

### 3.1.1 Findings

Prior to Winter Storm Fern, NES maintained a documented Command Center structure within its ERP to support emergency response and restoration activities. The ERP identified a primary Command Center location within the System Control facility, designated alternate operating locations, established succession authority, outlined minimum resource requirements, and included an organizational chart identifying response positions within the Command Center.<sup>50</sup> Separate documentation identified the individuals assigned to those Command Center roles, serving a function similar to a command duty roster.

While the ERP established a centralized command structure, it did not fully align with a formal ICS framework. Specifically, the ERP did not define the responsibilities associated with each individual role nor did documentation clearly establish standard ICS and general functions, reporting relationships, operational planning processes, or other key elements typically associated with a NIMS-aligned ICS structure.

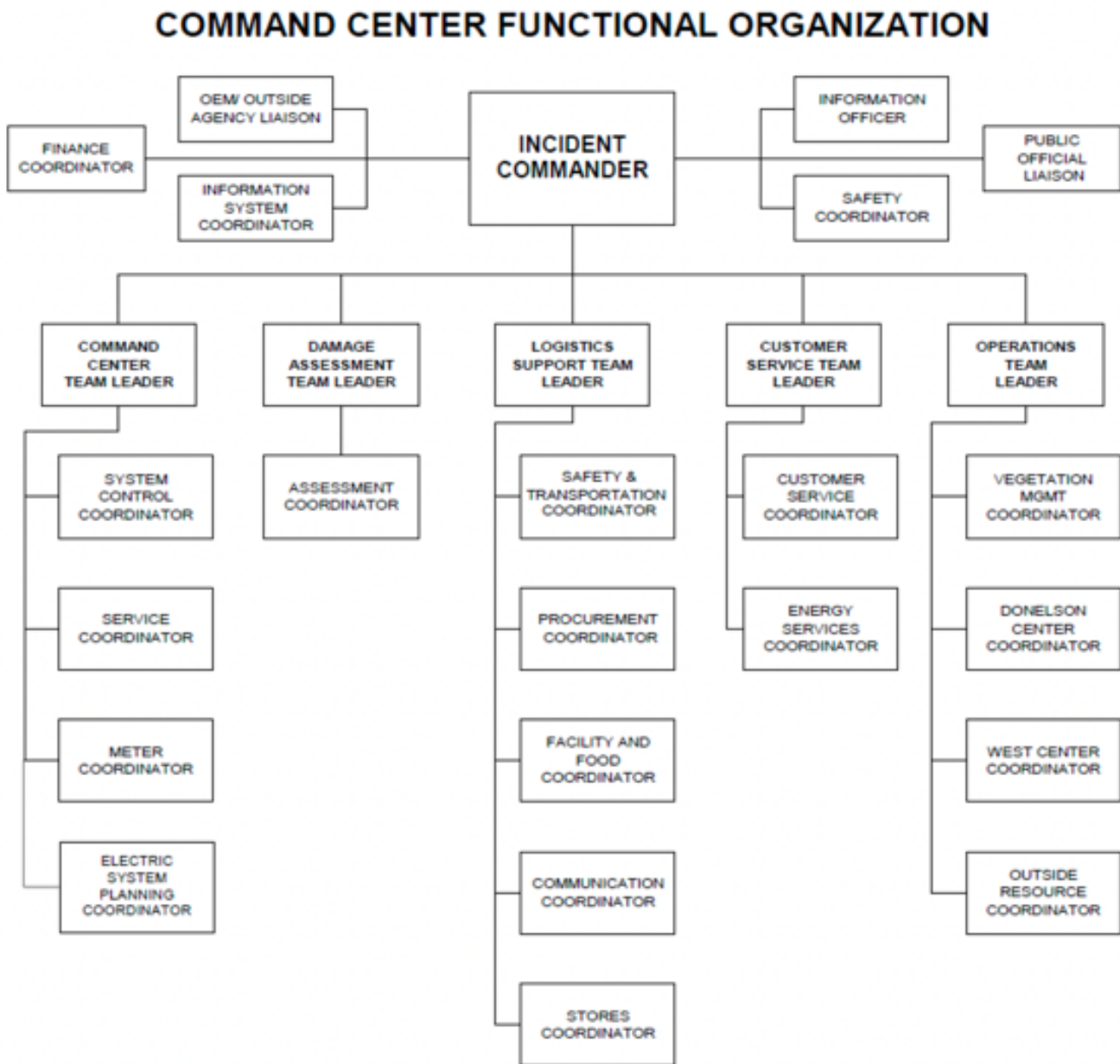
PA determined that the Command Center functioned primarily as a staffing and notification framework rather than a comprehensive incident management structure. Personnel assigned were documented; however, the ERP provided limited guidance regarding how individual positions were expected to coordinate activities, make decisions, manage resources, or execute responsibilities during a large-scale restoration event. Additionally, Command Center positions are currently staffed on a rotating basis, with individuals serving one-week assignments before transitioning to the next designee.

---

<sup>50</sup> Nashville Electric Service Winter Storm After Action Review Data Request #2: NES Emergency Preparedness Plan as of January 1, 2026

Command Center assignments are rotated on a weekly basis, with all designated personnel transitioning concurrently and no formal overlap period. PA did not identify any peer utilities that rotate ICS positions during an active emergency response. While many utilities maintain rotating on-call or standby assignments prior to event activation, personnel assigned to ICS roles typically remain in those positions for the duration of the response to ensure continuity and effectiveness. The 2024 NES ERP contained a Command Center Functional Organization Chart intended to define the Command Center organizational structure, as shown in Figure 8.<sup>51</sup>

Figure 8. NES Command Center Functional Organization



## Preparedness

In preparation for Winter Storm Fern, the Command Center was activated according to the processes detailed in the ERP. Once activated, Command Center personnel began coordinating storm preparedness activities, resource planning efforts, communications, and stakeholder engagement in

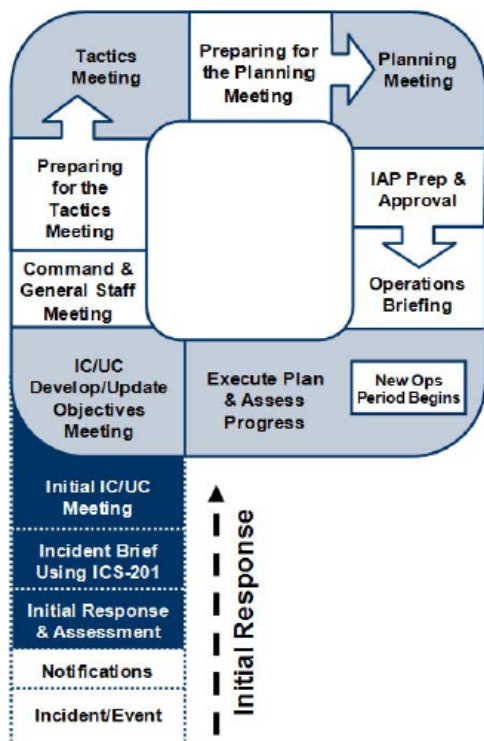
<sup>51</sup> Nashville Electric Service. (2024, November). Emergency Response Plan (ERP) [Internal company document]

advance of storm impact. Beginning on Saturday, January 24, the morning prior to storm impacts, NES initiated daily situational awareness meetings at 8:00 AM and 4:00 PM CT. These meetings took place in the designated Command Center and were led by an electric operations representative rather than the formal Incident Commander (IC), as would typically be expected under a standard Incident Command structure.

Traditionally, an EOC is established with a formal physical layout that positions ICS personnel based on their functional responsibilities and coordination needs. This layout is intended to support efficient communication, rapid decision-making, and real-time coordination during a major event. The presence of all ICS members within the EOC is critical to reducing communication delays, coordinating internal and external resources, and maintaining a centralized source of information throughout storm restoration. During Winter Storm Fern, this formal EOC structure was not established and may have limited communication and situational awareness of restoration efforts.

NES also did not establish a formal Planning Section, aligned with ICS practices, and the “Planning P” was not utilized to guide incident management.<sup>52</sup> IAPs were not developed during the event which potentially limited planning, coordination, and the overall effectiveness of storm response. The absence of formal IAP documentation also limits the ability to retrospectively evaluate decisions, identify lessons learned, and support continuous improvement efforts following a restoration event.

Figure 9. “Planning P” Structure



Lastly, PA observed that NES does not currently have a well-established ERP / ICS exercise program, and conducting tabletop exercises every two years is insufficient to effectively prepare personnel to respond to and recover from emergency events. Based on PA’s industry experience, emergency response proficiency requires recurring practice, and biennial exercises are insufficient to develop and maintain the operational readiness necessary to support effective ICS execution during major events.

**Performance**

NES does not currently operate within a fully defined ICS, and a formal ICS framework should be established and consistently applied in future incidents. Under a standard ICS structure, the IC serves as the central authority, with clear accountability for decision-making and approval of plans, communications, and response actions. To support this structure, roles and responsibilities for each ICS position should be clearly defined, with multiple trained individuals identified for each role to ensure continuity and depth of coverage. During incident response, personnel should be assigned to a single ICS role for the duration of the event to maintain clear accountability and avoid competing priorities.

PA also observed a lack of documentation of daily incident management activities including critical issues discussed, decisions made, and actions assigned during Command Center meetings. Maintaining this information is a fundamental component of effective incident management. The absence of documented discussions, decisions, and assigned actions not only limits continuity and coordination during an event but also reduces the effectiveness of post-storm lessons learned activities and the utility’s ability to apply those lessons during future major events. While there were notes that were taken to document the twice daily meetings, the notes did not cover decision or actions taken.<sup>53</sup>

<sup>52</sup> Federal Emergency Management Agency (FEMA). (n.d.). *Incident action planning process*. U.S. Department of Homeland Security. [https://www.fema.gov/sites/default/files/documents/fema\\_incident-action-planning-process.pdf](https://www.fema.gov/sites/default/files/documents/fema_incident-action-planning-process.pdf)

<sup>53</sup> Nashville Electric Service Winter Storm Fern After Action Review Data Request #88: Winter Storm Fern ERP Assessment List

## 3.1.2 Recommendations

### ICS-01 | Implement a Scalable ICS Structure

Transition the existing Command Center structure to align with the standard FEMA / NIMS Incident Command System principles and/or industry best practices for all events, up to and including Major Events.

#### Implementation Guidance:

- Begin with a simplified ICS organizational structure focused on core operational functions and progressively mature toward a more fully developed standard ICS model over time
  - Develop activation criteria to include all events regardless of size addressing mobilization and demobilization procedures
  - Define operational responsibilities, decision-making authority, and reporting relationships for personnel assigned to ICS positions
  - Assign personnel to a single ICS role for the duration of a major event to promote continuity, accountability, and operational effectiveness
  - Establish communication and coordination pathways between the ICS organization and the CMT
  - Empower the Incident Commander to direct restoration priorities, resource allocation, communications coordination, and incident management activities during major events
  - Observe and participate in peer utility incident management, EOC operations, and major event restoration activities to support ICS maturation and operational development
  - Refine the ICS organizational structure based on operational experience, exercises, activations, and lessons learned from major events
- 

### ICS-02 | Formalize Incident Information Management Processes

Define standardized processes for collecting, validating, escalating, approving, and communicating operational information within and outside the ICS during major events.

#### Implementation Guidance:

- Implement situational reporting and information management activities across the ICS organization and associated groups (e.g., CMT)
  - Define reporting, communication approval, stakeholder coordination, and public messaging responsibilities across the incident management organization
  - Maintain a centralized operational information function that supports situational awareness, incident management, and restoration decision-making
  - Establish communication pathways between field personnel, System Control, executive leadership, government agencies, media representatives, and customer-facing teams
  - Validate information management, situational reporting, and communication coordination capabilities through training, exercises, and major event activations
- 

### ICS-03 | Integrate a Dedicated ETR Coordination Function within the ICS

Establish a dedicated ETR Manager role within the ICS responsible for coordinating ETR development activities across operations, System Control, GIS, communications, and customer service functions.

### Implementation Guidance:

- Establish how restoration estimate information is collected, validated, approved, and communicated across field personnel, operations, planning, communications, and customer-facing functions during major events
  - Support consistent and timely ETR updates through defined information flows, communication pathways, and coordination activities across the ICS organization
  - Integrate ETR development and communication activities into daily incident management, restoration planning, and operational briefings during major events
- 

### ICS-04 | Standardize EOC Operating Capabilities

Establish standardized EOC operating procedures, physical layout requirements, staffing expectations, communication protocols, situational awareness tools, documentation practices, and coordination processes to support effective incident management during major events.

#### Implementation Guidance:

- Maintain primary and alternate EOC facilities that support incident management, restoration coordination, communications, and situational awareness activities during major events
  - Ensure contingency EOC activation locations are equipped with the operational technology, communications systems, and workspace capabilities necessary to support restoration operations
  - Maintain remote EOC operating capabilities that support continuity of operations during facility disruptions, severe weather events, or other conditions that limit access to primary facilities
  - Validate primary, alternate, and remote EOC operating capabilities through exercises, activations, and major event simulations
- 

## 3.2 Emergency Preparedness & Response

For utilities, major event response and restoration activities differ significantly from normal blue-sky operations. Large-scale outage events are not simply managed by applying routine restoration processes with additional resource support. Major events require different organizational structures, operational priorities, restoration strategies, resource management practices, logistics support capabilities, communication approaches, and technology support functions to safely and efficiently restore service. As a result, utilities establish ERPs and support operational documentation to provide the framework, procedures, guidance, and decision-support tools necessary to manage emergency response and restoration activities under abnormal operating conditions.

NES maintained an ERP prior to Winter Storm Fern; however, the document primarily consisted of a high-level framework and lacked the operational detail necessary to effectively guide emergency response and restoration activities. NES's ERP incorporated certain industry-standard concepts, including a version of ICS structure. However, PA found limited evidence of supporting operational processes, restoration playbooks, decision-support tools, role- and task-specific guidance, job aids, checklists, or other documentation necessary to operationalize the ERP (e.g., guidance on external resource request triggers, organizational contacts, specific damage assessment procedures, etc.). As a result, the ERP provided limited practical value during response and restoration activities, and personnel relied heavily on institutional knowledge, individual experience, and informal coordination to manage the event. Opportunities exist to rebuild and operationalize the ERP by establishing scalable response frameworks, formalizing restoration procedures, developing operational playbooks and supporting guidance, and implementing a comprehensive preparedness, training, and exercise program to improve consistency, coordination, and organizational readiness during future events.

Emergency Response Plans outline how utilities approach and recover from abnormal grid conditions (e.g., major outages, cyber events, other disruptions to business continuity). ERPs should establish clear organizational structures, roles, responsibilities, activation processes, and response frameworks and be supported by detailed operational documentation, including procedures, role-specific guides, job aids, checklists, playbooks, and other reference materials used during emergency response and restoration activities. Full-scale events are expected to be “all-hands-on-deck” type scenarios, and all utility employees are expected to contribute to the restoration effort. Utility employees will have at least two storm roles (primary and secondary, and sometimes tertiary) they are expected to carry out during major event responses.

Utilities with mature emergency management programs will routinely conduct reviews of its ERP (typically annually or after a major event) and conduct various types of drills and exercises to test the plans and processes as well as to ensure that the personnel who are tasked with carrying out a storm duty can practice in their roles when activated for storm. These utilities will conduct multi-day exercises designed to challenge key decision-makers and operational processes. For example, Florida Power & Light runs annual full-week storm drills designed to test responses to a simulated storm.<sup>54</sup> These exercises allow personnel to practice their assigned roles and demonstrate familiarity with emergency plans and procedures while testing and validating the ERP and supporting processes. This includes critical process handoffs, such as the translation of damage assessment information into work plans and material requirements, as well as information flows between functional groups, such as the communication of field-estimated restoration times. These exercises also help identify and proactively address process bottlenecks before they occur during an actual event.

Leading utilities increasingly view emergency preparedness as an operational capability rather than a planning exercise. While documented plans remain important, effective emergency response depends on clearly defined processes, trained personnel, established decision-making frameworks, validated restoration procedures, and routine exercises that demonstrate the organization’s ability to execute under realistic operating conditions.<sup>55</sup> Mature emergency management programs focus not only on maintaining emergency response plans, but also on developing the supporting operational guidance, training programs, governance structures, and continuous improvement processes necessary to sustain readiness over time.

### 3.2.1 Findings

The NES ERP contains elements commonly found within utility emergency response plans and is structured so that individual plans or components (e.g., operations, communications, logistics) can be activated independently or in combination based on the nature and severity of the event. However, the ERP lacks the operational detail necessary to effectively guide emergency response and restoration activities. While the ERP identified organizational structures and general responsibilities, it does not clearly define operational processes, decision-making responsibilities, restoration workflows, role-specific expectations, or coordination requirements associated with storm response and restoration activities. Key elements such as checklists, standardized processes, and clear procedural guidance are not defined, leading to a reliance on institutional knowledge of the individuals filling those roles. As a result, the ERP functions more as a high-level reference guide than a practical tool, as observed during Winter Storm Fern.

In addition to lacking operational detail, NES’s ERP also contains limited guidance for managing large-scale and prolonged restoration events. The plan’s highest defined severity category and associated processes apply to events impacting more than 50,000 customers which represents approximately 11% of the total NES customer base; however, Winter Storm Fern resulted in outages impacting over 200,000 customers at its peak. In PA’s experience, the response for a storm with 60,000 customers out is not the same as a storm that has over 200,000 customers out. The NES ERP does not establish

<sup>54</sup> Florida Power & Light (May 2025). 01: Presentation by Florida Power & Light Company. FPSC Hurricane Preparedness Workshop <https://www.floridapsc.com/pscfiles/website-files/PDF/Utilities/Electricgas/HurricanePreparationWorkshops/2025%20-%20May%2013%20,2025/01%20Presentation%20by%20Florida%20Power%20and%20Light%20Company.pdf>

<sup>55</sup> Federal Emergency Management Agency. (n.d.). National preparedness goal. U.S. Department of Homeland Security. Retrieved June 12, 2026, from <https://www.fema.gov/emergency-managers/national-preparedness/goal>

scalable response structures, restoration operating models, activation thresholds, resource escalation procedures, or restoration playbooks capable of supporting events of increasing magnitude and complexity. In PA's professional opinion, the NES ERP's existing processes, coordination structures, and operational assumptions were not scalable to the magnitude and complexity of the restoration effort.

PA reviewed the past five years of NES Enterprise Risk Management (ERM) assessments. NES currently utilizes Baker Tilly to support maintenance of the ERM program, ERP update activities, and related emergency management and risk governance processes. While the specific risks identified within the ERM program are confidential, risks are organized into several high-level categories which are typical to the industry. PA observed that financial risks represent a significantly larger portion of the overall risk portfolio than other risk categories. While financial risks remain important, the Board and NES leadership should periodically reassess the risks identified in the ERM to ensure they capture the current operating environment, incorporate emerging threats facing the utility industry, and maintain an appropriate balance across risk categories. Greater alignment between the ERM program and emergency management activities can also help ensure preparedness, response, recovery, and mitigation efforts remain focused on the utility's most significant enterprise risks.<sup>56</sup>

## Preparedness

The most recent NES ERP exercise occurred in October 2024. The exercise consisted of a tabletop discussion supported by scenario injects and was primarily focused on a cyber security scenario with associated business continuity-related events rather than a weather or storm restoration scenario. When asked during stakeholder interviews, NES interviewees could not recall when a storm-type scenario was part of their biennial tabletop exercise. PA believes the exercise did not fully evaluate operational coordination, ICS execution, EOC functionality, resource management, or large-scale restoration processes associated with a major storm response event. External stakeholders, including government officials, critical customers, and other key external partners, also did not participate in or observe the exercise activities.

According to NES's Internal Audit Protocols for ERM, "Annually, Internal Audit facilitates Enterprise Risk Assessment discussions and compilation of Enterprise Risk Management information on behalf of the President and CEO. Identification of risks and risk responses, ranking of impact and probability of occurrence of the risks, and rating of the quality of risk management are individual vice president's responsibilities, subject to review and approval of the president and CEO. Establishment of risk tolerance is the responsibility of the president and CEO, subject to approval of the Electric Power Board. Oversight of Enterprise Risk Management is a responsibility of the Electric Power Board."<sup>57</sup>

## Performance

The 2024 NES ERP is structured as a collection of individual emergency response plans and supporting documents including the following:

- Corporate Communications ERP
- Emergency System Restoration Plan
- Telecommunications ERP
- Business Continuity Plan
- Emergency Evacuation Plan
- Customer Relations ERP
- Business Operations Contingency Plans (made up of various sub-contingency plans)
- Information Technology Disaster Recovery Plan

---

<sup>56</sup> Nashville Electric Service Winter Storm After Action Review Data Request #160: Recent ERM and risk register presentations and maintenance process

<sup>57</sup> Nashville Electric Service. (No Date). Internal Audit Protocols [Internal company document]

- Influenza Pandemic Plan
- West Service Center Emergency Evacuation Plan<sup>58</sup>

The introduction of the NES ERP indicates that specific guidelines and triggers exist requiring the CMT to assemble, assess the situation, and provide recommendations to the Incident Commander. However, the ERP also states that the CMT is responsible for coordinating NES's overall response to major system incidents, which appears inconsistent with standard emergency management practices. Typically, the CMT is responsible for providing strategic direction, executive decision-making, and organizational support, while the Incident Commander maintains tactical responsibility for managing the operational response to the emergency.

The ERP's Introduction also states that each emergency response plan identifies members of the CMT. This structure differs from common industry practice, where utilities typically maintain a single standalone Crisis Management Plan (CMP) applicable across all emergency scenarios rather than embedding separate CMT structures within multiple individual ERPs.

Review of the individual ERPs indicates that the plans are generally high-level in nature. While emergency response plans often serve as overarching frameworks, limited evidence was identified that supporting procedures, operational playbooks, job aids, checklists, and other documentation necessary to support a structured and repeatable response approach had been formally developed, maintained, or exercised. The plans appear heavily dependent on institutional knowledge and personnel experience, including at the Incident Commander level. The plans contain limited documented procedures, operational workflows, role-specific guidance, decision-support tools, and restoration processes necessary to effectively guide emergency response and restoration activities. Limited supporting documentation, role guidance, or operational procedures were identified that would allow personnel unfamiliar with a role to effectively assume and execute assigned responsibilities during an emergency event.

Consistent with the broader ERP review, the Emergency System Restoration Plan and other supporting ERPs remain limited in operational detail and would benefit from substantial revision and expansion. During stakeholder interviews, NES personnel indicated that storm restoration processes had not been formally mapped. Process mapping activities would support development of more effective emergency response procedures and clarify operational workflows, decision points, and interdependencies during emergency events.

NES personnel also indicated they do not currently utilize common emergency management support tools such as position-specific guides, job aids, checklists, or operational playbooks. Development of these materials would improve role clarity, operational consistency, personnel onboarding, and the ability to execute emergency response activities consistently across personnel and events.

The NES Command Center Functional Organization also does not fully align with a formal ICS structure consistent with the NIMS, which is widely recognized as an industry standard for emergency management and incident coordination within the utility sector. Specifically, the organizational structure does not include a formal Planning Section responsible for development of operational objectives and IAPs for upcoming operational periods. Within ICS structures, the Planning Section typically utilizes the Planning "P" process to support development of coordinated operational objectives, resource planning, and incident management activities.

Additionally, NES's ERPs do not appear to function as an integrated all-hazards emergency management framework. Emergency response plans should be complementary and capable of functioning together during simultaneous or overlapping emergency events. Many utilities have transitioned toward all-hazards emergency management frameworks supported by hazard-specific annexes to establish standardized organizational structures, response processes, and escalation procedures across all emergency scenarios. For example, San Diego Gas & Electric's Emergency Response Plan identified utility specific risks including hazards from electric and gas, as well as

---

<sup>58</sup> Nashville Electric Service. (2024, November). Emergency Response Plan (ERP) [Internal company document]

environmental such as winds and earthquakes.<sup>59</sup> Long Island Power Authority's Emergency Restoration plans contemplate hazards such as storms, spills, floods, wildfires, and critical IT/OT system failures.<sup>60</sup>

NES's emergency management framework should maintain stronger alignment with the organization's ERM program to ensure identified risks, mitigation strategies, preparedness activities, response planning, and recovery procedures are coordinated through a common risk management framework. In addition, the NES Corporate Communications ERP would benefit from significant revision and expansion into a formal Crisis Communications Plan that establishes communications strategies, roles, responsibilities, and procedures applicable across a broad range of emergency and crisis scenarios.

Finally, emergency response plans should include clearly identified plan owners, formal approval signatures from responsible leadership, revision tracking, and documented change histories identifying updates made because of exercises, after-action reviews, or operational events. The assessment also identified limited evidence of a formalized after-action review process or structured corrective action tracking program to capture lessons learned, assign accountability, establish completion timelines, and monitor implementation of identified improvements following exercises or emergency events.

## 3.2.2 Recommendations

### ERP-01 | Rebuild and Operationalize the ERP

Develop a comprehensive, scalable Emergency Response Plan that establishes the operational framework, restoration processes, decision-making structure, and supporting guidance necessary to manage outage events ranging from routine major events to large-scale, prolonged restoration efforts.

#### Implementation Guidance:

- Redesign the ERP to establish the overarching framework for emergency response and restoration activities, including defined roles and responsibilities, reporting relationships, decision authorities, and coordination requirements
- Establish scalable response structures, activation levels, restoration operating modes, and escalation criteria aligned with outage impacts, restoration workload, resource requirements, and event complexity
- Develop restoration playbooks for defined event severity levels that identify anticipated organizational structures, resource requirements, activation actions, operational priorities, and decision points associated with increasingly severe outage events
- Document end-to-end storm response processes, including event monitoring, activation, damage assessment, resource estimation, mutual assistance mobilization, contractor onboarding, logistics support, restoration operations, communications, customer support, ETR development, and demobilization
- Define operational thresholds and decision criteria for requesting external resources, activating mutual assistance agreements, mobilizing contractors, and escalating restoration activities
- Establish workflows that define required inputs, outputs, responsibilities, and coordination requirements across emergency response and restoration functions
- Develop supporting role-specific procedures, job aids, checklists, and decision-support tools, as reference materials for personnel assigned to emergency response and restoration functions
- Incorporate guidance for integrating mutual assistance crews, contractors, government agencies, and external stakeholders into restoration operations

---

<sup>59</sup> San Diego Gas & Electric (March 2024). SDG&E Emergency Restoration Plan. [https://www.sdge.com/sites/default/files/regulatory/Appendix%2020-%20SDGE%20CEADPP\\_PUBLIC.pdf](https://www.sdge.com/sites/default/files/regulatory/Appendix%2020-%20SDGE%20CEADPP_PUBLIC.pdf)

<sup>60</sup> Long Island Power Authority (March 2025). PSEG Long Island 2025 Emergency Restoration Plan. NYS DPC Matter # 24-02465.

## ERP-02 | Establish Emergency Preparedness Governance and Program Management

Establish a formal emergency preparedness function responsible for maintaining emergency response capabilities, governing emergency response documentation, managing corrective actions, and ensuring emergency response and restoration processes remain operationally effective and aligned with industry practices.

### Implementation Guidance:

- Assign ownership and accountability for emergency preparedness, including responsibility for maintaining emergency response plans, restoration procedures, supporting documentation, and preparedness initiatives
- Establish governance processes for reviewing, updating, and maintaining emergency response, restoration, and crisis management documentation
- Develop a corrective action program to document, prioritize, track, and resolve findings identified through emergency events, exercises, audits, after-action reviews, and operational assessments
- Establish formal processes to capture lessons learned and incorporate improvements into plans, procedures, training activities, and operational practices
- Develop preparedness performance measures and reporting mechanisms to evaluate emergency management capabilities, restoration readiness, and program maturity
- Conduct periodic assessments of emergency response capabilities, staffing requirements, organizational readiness, and resource needs
- Coordinate preparedness activities across operational, communications, customer service, logistics, safety, and executive leadership functions
- Maintain a standalone CMP capable of supporting executive decision-making, strategic communications, and enterprise-wide coordination during all-hazards emergencies and business disruptions

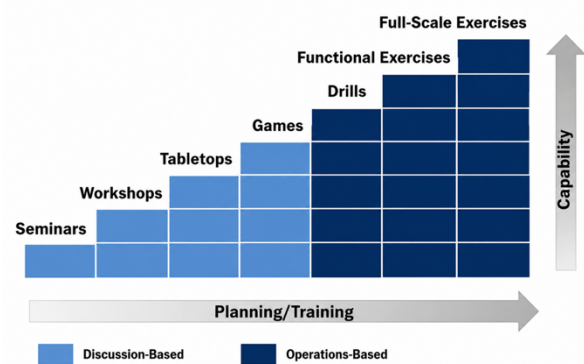
## ERP-03 | Develop a Multi-Year Emergency Response Training and Exercise Program

Implement a structured training and exercise program that develops proficiency within emergency response and restoration functions, validates operational processes, and assesses organizational readiness to manage large-scale outage events.

### Implementation Guidance:

- Provide role-specific training for personnel assigned to ICS positions, emergency response functions, restoration operations, and support functions
- Establish qualification and training requirements for personnel assigned to key emergency response and restoration roles
- Utilize a progressive exercise methodology that advances from discussion-based exercises to functional and full-scale exercises
- Conduct storm-focused exercises that simulate realistic outage response and restoration challenges, including damage assessment, resource mobilization, mutual assistance integration, ETR development, logistics support, communications, customer operations, and executive decision-making

Figure 10. Building Block Approach for Exercises



- Exercise end-to-end restoration workflows involving operational personnel, communications teams, customer service personnel, executive leadership, external partners, mutual assistance organizations, contractors, and government stakeholders as appropriate
- Validate personnel familiarity with operational coordination, communications pathways, information flows, resource management processes, and restoration decision-making activities through exercises
- Capture lessons learned, corrective actions, and improvement opportunities from exercises and integrate findings into plans, procedures, training programs, and preparedness activities
- Engage an independent third-party advisor to support implementation activities, observe exercises and major events, assess performance, and provide ongoing recommendations to help ensure corrective actions are effectively institutionalized

---

### 3.3 Estimated Time of Restoration

Winter Storm Fern demonstrated NES's ability to develop and communicate ETRs during a major outage event. However, the absence of a standardized and repeatable ETR development process, despite existing outage management system capabilities, contributed to delays in calculating and communicating ETRs and limited NES's ability to shape customer expectations during the early stages of the response. The perception that inaccurate ETRs could negatively impact the customer experience also played a significant role in NES not operationalizing ETRs earlier in the restoration effort. Establishing formal ETR governance, integrating ETR development into restoration operations, and promoting the use of ETRs as a tool to shape customer expectations and support customer decision-making would enhance customer communications during future events.

Estimated times of restoration are a critical tool utilized by utilities to establish and shape customer expectations, communicate important safety information, and support operational decision-making throughout the restoration process. Across the utility industry, ETRs are a standard outage management practice and one of the most valuable forms of information provided to customers during major outage events, as they directly influence their decisions related to sheltering, travel, business continuity, and the potential use of backup resources. Timely and accurate ETRs also support public safety by helping customers understand the anticipated duration of outages, reducing unnecessary inquiries, and supporting coordination with local agencies and critical services. Importantly, ETRs do not need to be perfectly accurate to provide meaningful value to customers and support informed decision-making during prolonged outages.

Operationally, ETRs align internal personnel, mutual assistance crews, contractors, leadership, and external stakeholders around a common restoration timeline to support prioritization, resource allocation, operational coordination, and performance tracking. ETRs also support consistent messaging across customer communication channels, leadership briefings, and governmental or regulatory updates. The accuracy and refinement of ETRs are highly dependent on the timeliness and quality of damage assessment information, field reporting, system visibility, and coordination between field crews and control centers. Utilities typically provide two types of ETRs: a global ETR, established early in the restoration process to communicate the anticipated overall restoration horizon, and local ETRs, which are progressively refined and updated as damage assessments and restoration work progresses.

An outage management system serves as the central platform that enables utilities to track outages, manage restoration activities, and generate ETR information. By integrating outage data, damage assessments, crew status, and grid design and connectivity, OMS supports both high-level global ETR calculations and granular local ETR updates, making it a foundational tool for effective outage communication and restoration management.

### 3.3.1 Findings

Prior to Fern, NES did not have processes, governance procedures, or operational practices for the development and communication of ETRs. The lack of ETRs, especially during major outage events, limits NES customers' abilities to make alternative plans in cases of potentially prolonged outages. Although NES's OMS included ETR functionality, ETRs had not been operationalized as part of NES's restoration and customer communication practices prior to Winter Storm Fern. As a result, ETRs had historically not been provided during major unplanned outage events, further demonstrating that NES was not operationally prepared to develop and communicate ETRs prior to Winter Storm Fern. While NES ultimately developed and communicated both global and localized ETRs during the restoration effort, these communications occurred relatively late in the event, limiting its effectiveness during the most critical phases of restoration. Early communication of ETRs would have helped establish customer expectations, reduce uncertainty, and shape the customer experience throughout the duration of the event.

Across the U.S. utilities, regulators recognize the importance of providing customers with accurate and actionable information on outage restoration times. For example, electric utilities in New York are required under New York State regulations (16 NYCRR, Part 105) to annually file their ERPs with the New York Public Service Commission for approval.<sup>61</sup> Further, 16 NYCRR 105.4 requires each utility to describe methods for making, within 24 hours, broadscale preliminary damage assessments, and more detailed damage assessments within 48 hours in order to make a reasonably accurate assessment of system damage and reliable projections of the personnel, equipment, materials and time that will be needed to rapidly and safely achieve service restoration goals in all damaged areas.<sup>62</sup> To be compliant with state regulations, New York utilities provide an ETR within those timeframes during major events.

Per Illinois Administrative Code Title 83, § 411.120, utilities are required to calculate and report an estimated time of restoration for interruptions affecting 10,000 customers or more for outages that last for longer than 3 hours.<sup>63</sup> These requirements underscore the importance of timely ETRs, which plays a critical role in shaping customer expectations and the overall customer experience during major outage restoration events.

ETRs can be system-generated through OMS functionality, developed using damage assessment information, or established through a combination of both approaches. Importantly, ETRs do not need to be 100% accurate to provide customers with useful and actionable information. Even broad restoration estimates can help customers make informed decisions regarding temporary lodging, backup power arrangements, and workforce scheduling, allowing both residential and commercial customers to better prepare for outages of varying duration. NES stakeholder interviews indicated that concerns regarding ETR accuracy have historically influenced NES's approach to communicating restoration estimates. Several interviewees noted a perception that customers will react negatively to inaccurate ETRs or subsequent changes in restoration estimates. While a portion of the customer base may express frustrations when ETRs change or prove inaccurate, industry experience demonstrates that customers generally prefer receiving timely restoration information rather than receiving no information at all. Industry best practice is to proactively shape customer expectations through transparent and frequent communications that establish expectations early in an event and provide customers with actionable information as restoration efforts evolve.<sup>64</sup> The objective is not to provide perfect information but rather reduce uncertainty and help prepare customers for outages of varying durations.

---

<sup>61</sup> New York State Public Service Commission, 16 NYCRR Part 105, Electric Utility Emergency Plans

<sup>62</sup> New York State Public Service Commission, 16 NYCRR § 105.4(b)(7), Content of Electric Emergency Plans

<sup>63</sup> Illinois Commerce Commission, Ill. Admin. Code tit. 83, § 411.120, Notice and Reporting Requirements

<sup>64</sup> Questline Digital. (n.d.). Power outage communication template: Before, during and after. Retrieved June 12, 2026, from <https://www.questline.com/blog/tag/outage-communications/page/2/>

## Preparedness

Prior to Winter Storm Fern, NES had not established operational processes, OMS configurations, or governance procedures necessary to support the development and communication of ETRs, neither during blue-sky conditions nor during major outage events.

The absence of an ETR process highlights a broader organizational challenge associated with the flow of restoration information and customer service during major events. PA interviewed numerous NES personnel to better understand the hesitancy of developing and communicating ETRs for planned and unplanned outage events. Common themes included inconsistent practices regarding the solicitation / collection, documentation, and communication methods of restoration information between System Control and field crews. An example of this could be the utility's preference to avoid overloading communication channels (e.g., radios) during critical response times. Findings from Winter Storm Fern identified some technological gaps including System Control's inability to electronically dispatch work orders to non-native contractors, and mutual assistance crews.

## Performance

While NES does not have an ETR process, as restoration challenges intensified due to prolonged low temperatures and system impacts, the utility recognized the need to develop ETRs and sought external support. During the first few days of the storm, NES entered into a professional services contract with DTE Energy, a Michigan-based investor-owned utility with extensive experience in large-scale storm restoration, outage management, and ETR development. DTE personnel arrived on site on Thursday, January 29, and worked alongside NES to provide analytical support associated with ETR development and restoration modeling needs.

NES ultimately published a global ETR on Saturday, January 31, approximately seven days into restoration activities and seven days after the first customer outage. At that same time, NES also published localized ETRs organized by ZIP code. Once the initial ETRs were established, NES calculated and communicated refined ETR updates each morning and afternoon for the remainder of the restoration effort. During Winter Storm Fern, ZIP code-level ETRs were developed as a rapid means of segmenting ETRs into smaller geographic areas for customer communications. Customers may not have been familiar with what circuit they are served from. NES decided that it was best to give customers an easy way (e.g., ZIP code lookups) to look up their ETRs. NES developed a stop-gap tool that converted ETRs that were provided by circuits (which can span multiple ZIP codes) into ZIP code-based ETRs. For blue-sky (normal operations) periods, industry best practice generally aligns localized ETRs with electric assets and restoration activities (e.g., substation or circuit-level, according to how the system topology is captured in the utility's asset management system) rather than geographic boundaries such as ZIP codes. However, during emergency situations, geographic boundary-based Zip codes can be helpful. Typically, global and regional ETRs are typically done at a township, municipality or county basis.<sup>65</sup> In NES's situation, where a large portion of the service territory is all within Davidson County, ZIP code based regional ETRs may provide more useful information during system emergencies. The look up information that was developed during Fern to translate circuit based ETRs into ZIP code based ETRs will need to be maintained to ensure accurate ETRs can be determined in the future.

## 3.3.2 Recommendations

### ETR-01 | Establish and Operationalize ETR Development and Communications

Develop and utilize ETR processes during normal operations and major events to provide customer-specific ETRs for planned and unplanned outages and global ETRs during major outage events.

---

<sup>65</sup> New York State Electric & Gas and Rochester Gas & Electric (February 2025) NYSEG and RGE Electric Utility Emergency Plan. NYS DPS Docket 24-E-0665

### Implementation Guidance:

- Define ETR development, refinement, update frequency, and communication requirements for major outage events
  - Support ETR development and communications during both large-scale and prolonged restoration events
  - Maintain timely and accurate outage restoration information necessary to support ETR development and updates
  - Align ETR activities with restoration operations, emergency response procedures, and customer communications
  - Train personnel responsible for ETR development, review, approval, and communications through exercises and major event simulations
  - Monitor the timeliness, accuracy, and update frequency of global and localized ETRs during major outage events
  - Benchmark ETR capabilities periodically against industry-leading utility practices and regulatory expectations
- 

## ETR-02 | Configure and Operationalize OMS ETR Functionality

Configure and operationalize OMS ETR functionality to support the development, management, and communication of global and localized ETRs during major outage events.

### Implementation Guidance:

- Incorporate NES-specific restoration performance assumptions and historical restoration data into OMS ETR functionality
  - Integrate OMS ETR functionality with relevant IT and OT systems (e.g., GIS, Advanced Metering Infrastructure, Advanced Distribution Management Systems, damage assessment, workforce management, and outage communication platforms)
  - Maintain continuous visibility of OMS-generated ETRs within System Control and restoration operations
  - Provide customers with feeder-, substation-, and circuit-level ETR information that aligns with restoration practices and outage conditions
  - Enable meter-to-circuit mapping capabilities that allow customers to access circuit-specific ETR information through manual lookup functionality or automated account association
- 

## ETR-03 | Establish a Customer-Centric ETR Communications Strategy

Develop an organizational approach to ETRs that emphasizes shaping customer expectations through timely and actionable restoration information rather than waiting for highly accurate restoration estimates before communicating with customers.

### Implementation Guidance:

- Establish formal ETR communication principles that position ETRs as customer expectation-setting tools rather than restoration commitments
- Define communication thresholds, update frequencies, approval requirements, and acceptable accuracy ranges for ETR communications during major outage events
- Align restoration, customer service, and corporate communications functions around consistent ETR communication practices and customer messaging

- Reinforce ETR communication practices through training, exercises, and major event response activities

### 3.4 Damage Prediction

Prior to Winter Storm Fern, NES did not maintain a formal damage prediction capability and had limited experience utilizing predictive models to estimate outage impacts, damage levels, and resource requirements. As a result, NES lacked a reliable method for estimating resource needs ahead of the storm, limiting its ability to proactively secure outside assistance and contributing to delayed resource requests during the early stages of the event. The storm demonstrated the value of damage prediction capabilities for informing resource requests, restoration planning, and ETR development during major outage events. Through support provided during the restoration effort, NES established a foundational damage prediction framework that can be further refined and integrated into future emergency response and restoration activities.

Based on PA's industry experiences, one of the most important decisions utility Incident Commanders must make prior to an anticipated event is determining the number and type of resources required to support the response and restoration effort. This decision requires balancing the appropriate restoration duration against the number and cost of resources needed to achieve that objective while considering the operational and financial implications. Utilities that request too many resources too early risk incurring significant costs associated with personnel, lodging, meals, transportation, and other support requirements for resources that may ultimately prove unnecessary if storm impacts are less severe than forecasted. Conversely, utilities that delay resource requests until forecast confidence increases may face reduced resource availability, longer restoration durations, and greater customer impacts if widespread damage occurs. Effective resource planning therefore requires utilities to continuously evaluate weather forecasts, anticipated damage, restoration objectives, resource availability, and forecast uncertainty to make informed mobilization decisions before an event occurs.

To support this decision-making process, many U.S. utilities have developed resource estimation models, commonly referred to in the industry as damage prediction models, of varying sophistication to forecast restoration resource requirements for major outage events that exceed the capabilities of internal crews and existing contracted resources. At their core, these models translate anticipated damage levels, often derived from weather forecasts and historical storm performance, into estimated labor hours required to complete restoration activities. These resulting labor estimates are then used to determine the number and types of resources needed to achieve the targeted restoration timeline established by either internal governance or regulatory requirements.

An illustrative governing equation for the model is shown below:

*Total Restoration Duration =*

$$\frac{\text{Total labor required } (\# \text{ of damaged poles } \times \frac{\text{hours}}{\text{pole}} + \# \text{ of downed spans } \times \frac{\text{hours}}{\text{span}} + \dots)}{\text{Restoration rate } (\text{total number of crews } \times \frac{\text{productive hours per day}}{\text{crew}})}$$

More advanced models also account for considerations including the utility's ability to effectively manage foreign crews, recognizing that operational efficiencies begin to decline beyond certain resource thresholds. In addition, the models can account for costs associated with the restoration efforts including materials and labor. The resulting analysis helps decision makers refine the number of resources needed to meet the targeted restoration date. As restoration efforts progress, and the utility continuously updates estimated damage with assessed damage, the model can produce clearer and more granular ETRs.

### 3.4.1 Findings

NES did not have a damage prediction model in place prior to Fern impacting its service territory. As a result, NES did not have a reliable, data-driven methodology for estimating the number and types of resources required to support restoration activities. While resource requirements can be estimated using experience and professional judgment, leading utilities increasingly utilize damage prediction models to forecast anticipated damage levels, restoration labor requirements, and resource needs prior to event impact. For example, Florida Power & Light and Commonwealth Edison both routinely use their damage prediction models to help translate forecasted extent of damage into restoration efforts required, which is in turn used to help determine the resources needed to achieve restoration goals.

#### Preparedness

Historically, NES had not utilized more than 500 outside resources during a large-scale restoration and therefore did not have a reliable, data-driven method for estimating the number of resources needed to recover from Winter Storm Fern. By the time additional resource requests were made, PA assessed that NES was positioned as a passive recipient of available resources rather than an active acquirer, accepting crews only as they were released from other utilities' restoration efforts.

#### Performance

While NES did not have an established capability to model anticipated resource needs, the utility leveraged DTE Energy's experience and restoration analytics expertise during the response. DTE Energy personnel arrived on Thursday, January 29 to support the ETR development using DTE's damage prediction and restoration modeling capabilities. Working collaboratively, DTE and NES developed a basic resource forecasting and ETR modeling framework, which was completed and utilized by Saturday, January 31.

### 3.4.2 Recommendations

#### DP-01 | Develop a Scalable Damage Prediction and Resource Forecasting Model

Develop a scalable forecasting model capable of estimating restoration resource requirements, including labor hours, crew counts, and resource types, based on anticipated damage levels and desired restoration completion timelines.

##### Implementation Guidance:

- Once the foundational model is developed using basic damage inputs, enhance the model to incorporate anticipated or assessed storm-specific damage information, including damaged or destroyed poles, downed wire, damaged spans, and impacted substations
- Integrate historical restoration performance data and estimated labor requirements associated with common restoration activities, including substation repairs, pole replacements, and conductor restoration
- Include labor costs associated with NES crews, contractors, mutual assistance resources, and other restoration personnel to support resource acquisition and mobilization decisions
- Validate and calibrate the model periodically using actual storm damage, restoration performance, labor utilization, and resource deployment data

## 3.5 Mutual Assistance

While NES was ultimately successful in securing and integrating mutual assistance resources, there was a lack of forecasting capabilities and scalable planning processes necessary to accurately estimate resource requirements early in the event. This challenge was compounded by the fact that NES had limited historical experience managing a restoration workforce of this scale, having never previously required more than 500 external restoration resources during an outage event. With approximately 1,900 lineworker resources activated for this event, Fern was the largest restoration effort carried out by NES to date. Opportunities exist to establish scalable mutual assistance planning processes, develop formal resource estimation methodologies, and enhance procedures for integrating and managing mutual assistance resources.

Mutual assistance plays a critical role in electric utility emergency response and restoration operations. During major outage events, utilities often rely on external personnel, equipment, and specialized resources to supplement their internal workforce and accelerate restoration efforts. The ability to accurately estimate resource requirements, mobilize mutual assistance resources, and effectively integrate those resources into restoration operations is essential to achieving a safe, efficient, and timely recovery. As the scale and severity of outages increase, mutual assistance planning becomes increasingly important to ensure that sufficient resources are available to support utility needs. While often associated with utility-to-utility assistance, mutual assistance during major restoration events frequently includes a combination of utility personnel, native contract crews, non-native contract crews, and other external support personnel.

### 3.5.1 Findings

The timing and scale of mutual assistance crew mobilization had a clear impact on the progression of the restoration curve. To better understand the impact of the number and timing of resources on NES's restoration performance, PA used a restoration model to determine potential outcomes. This allowed for an exploration of how various levers (e.g., mobilization of resources, outage complexity, restoration progress, and demobilization of resources) can influence restoration outcomes. Modifying the levers may have varying impacts on the overall restoration timeline. For example, the arrival of several hundred additional resources earlier in the event, when outage counts were at their highest, would likely have significantly greater impact on restoration timelines than the same number of resources arriving towards the tail end of the response, when outage counts are lower.

Generally, when additional crews are available early in the restoration effort, particularly during the initial Responsiveness Phase, they provide capacity that can be applied not only to outages requiring restoration on that day, but also to work that would otherwise occur later in the event. This effectively pulls restoration activity forward, resulting in a steeper decline in the restoration curve, fewer customers experiencing prolonged outages, and a shorter overall restoration duration. Conversely, delays in crew mobilization constrain restoration progress during the period when outage counts are highest, creating a backlog of unresolved work that must be addressed in subsequent days. As a result, the restoration curve flattens and extends, increasing both restoration timelines and customer impacts.

PA explored various scenarios involving different external resource ramp-up rates and total restoration workforce levels to assess how change in resource availability and mobilization timing could influence hypothetical restoration curves. Figures 11 and 12 present model outputs from hypothetical restoration scenarios that illustrate the impact of resource mobilization on the timing of the overall restoration duration. The analysis demonstrates that the earlier mobilization of 600 resources can shorten the overall restoration duration by as much as three days.

Scenario 1 (shown in Figure 11) models all 600 resources arriving on Day 3 of the restoration effort, while Scenario 2 (shown in Figure 12) models all 600 resources arriving on Day 5. The earlier deployment of resources in Scenario 1 results in achieving 95% restoration approximately 3 days earlier. The deployment of resources in Scenario 2 results in achieving 95% restoration approximately 1.3 days earlier. Compared to Scenario 2, Scenario 1 reduces the overall restoration duration by approximately 1.7 days.

Figure 11. Arrival of 600 Additional Resources on Day 3 (Scenario 1)

**Restoration Curves**

Red = actual (ST2605). Dark blue = Restoration Model. Bold dashed lines = 95% restored; light dotted lines = 90% restored. The 90% line sits before the slow tail, so it moves more with crews.

<p>STORM ENDED</p> <p><b>3.0 days earlier</b></p> <p>vs the actual storm</p>	<p>CUSTOMER-HOURS SAVED</p> <p><b>6.22M</b></p> <p>fewer customer-hours without power</p>
<p><b>Restoration Model:</b> storm ended 3.0 days earlier · 6,216,022 customer-hours saved.</p>	

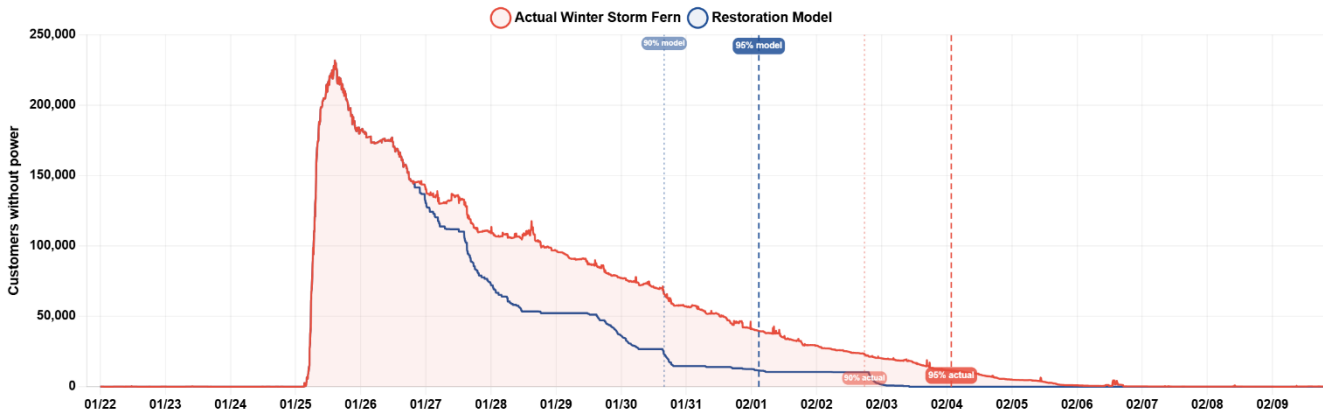
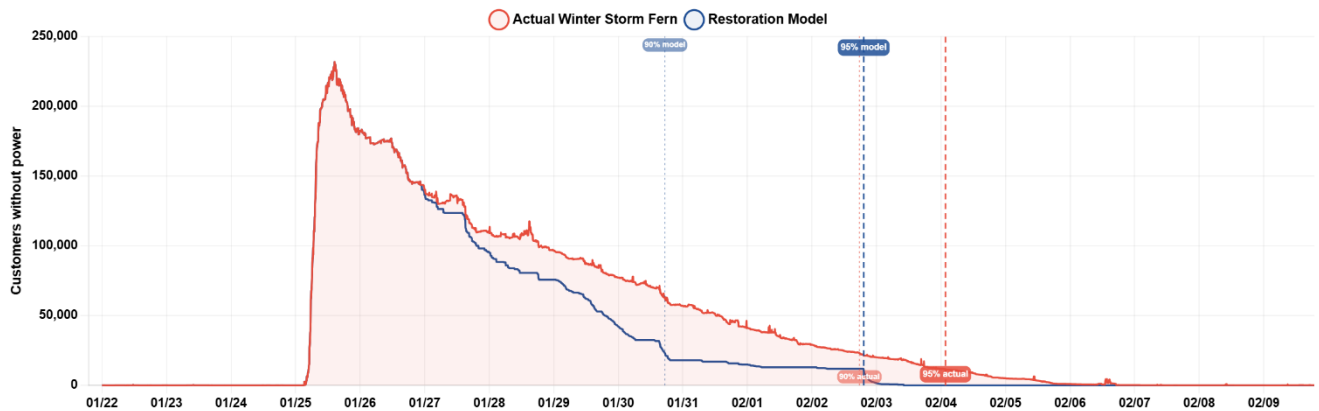


Figure 12. Arrival of 600 Additional Resources on Day 5 (Scenario 2)

**Restoration Curves**

Red = actual (ST2605). Dark blue = Restoration Model. Bold dashed lines = 95% restored; light dotted lines = 90% restored. The 90% line sits before the slow tail, so it moves more with crews.

<p>STORM ENDED</p> <p><b>1.3 days earlier</b></p> <p>vs the actual storm</p>	<p>CUSTOMER-HOURS SAVED</p> <p><b>4.70M</b></p> <p>fewer customer-hours without power</p>
<p><b>Restoration Model:</b> storm ended 1.3 days earlier · 4,697,320 customer-hours saved.</p>	



The model also demonstrates that the timing of crew mobilization has a greater impact on restoration performance than the total number of crews deployed over the course of the response. Early in the restoration effort, when outage volumes are highest, each additional crew contributes meaningfully to accelerating restoration. As restoration progresses and outage counts decline, daily restoration capacity eventually reaches a point of diminishing returns. For example, one crew excavating a hole for a replacement pole is often just as productive as multiple crews attempting to excavate the same hole simultaneously.

Demobilization follows a similar principle. Maintaining high crew levels late into the event provides limited additional benefit once restoration transitions to smaller, more localized, and complex repairs. At

this stage, restoration work is often constrained by access limitations, damage complexity, or work sequencing requirements rather than workforce size. As a result, the benefit of additional crews diminishes significantly during the final stages of restoration.

Overall, PA’s analysis demonstrates that the timing of additional resources has a greater impact on restoration duration than the number of additional resources. Earlier mobilization of external resources improves restoration performance by accelerating restoration progress, reducing backlog, and shortening the duration of the response event. Conversely, delayed mobilization, or the concentration of crews in later stages of the response effort, leads to extended customer restoration times in addition to underutilized resources towards the end of the response effort.

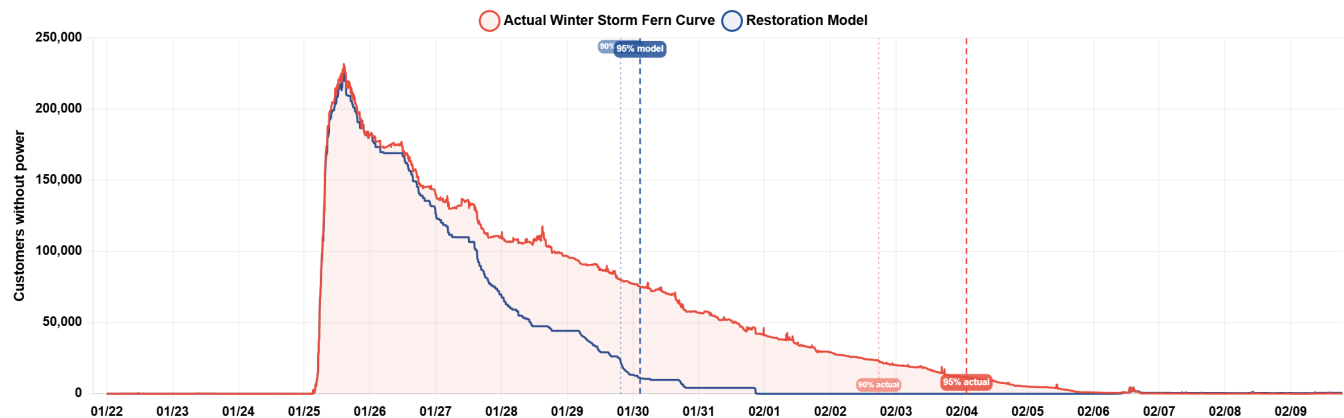
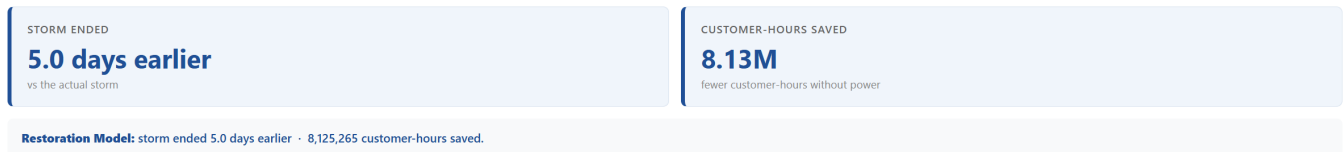
Given the prolonged freezing conditions in the early days of the restoration event, mobilizing additional resources would likely have had a limited impact on reducing overall restoration duration. Days 1 and 2 were characterized by continued ice accumulation and falling limbs, including instances where previously restored portions of the system experienced additional outages and required rework (see Section 3.11.1). The most impactful period for additional resource deployment likely began on Day 3, when daytime temperatures rose above freezing, and restoration work became more effective and sustainable.

PA also developed a scenario based on PA’s industry experience to illustrate a theoretical best case restoration outcome. Assuming ideal conditions including perfect knowledge of system damage, no constraints on the availability of external resources, and optimal prioritization and execution of work, the model indicates that it may have been possible to restore 95% of affected customers by Thursday, January 29, six days earlier than the actual 95% restoration milestone achieved on Wednesday, February 4, as shown in Figure 13.

**Figure 13. Hypothetical Restoration Curve Under Ideal Conditions**

**Restoration Curves**

Red = Actual Winter Storm Fern Curve. Dark blue = Restoration Model. Bold dashed lines = 95% restored; light dotted lines = 90% restored.



Integration of external resources into NES’s operational technology environment was limited during the restoration effort. Mutual assistance and contract crews were generally unable to directly access or utilize NES’s outage management, work management, and field technology systems, requiring the use of alternative processes for work assignment, status reporting, and restoration tracking. As the number of external resources increased, the manual processes required additional coordination between System Control and field crews. Limited system access also reduces the ability to provide real-time visibility into work progress, resource status, and restoration activities across the service territory. Greater integration of external resources into outage management and field technology systems could

further improve dispatch efficiency, situational awareness, and overall restoration coordination during future large-scale events.

## Preparedness

Prior to Winter Storm Fern, NES historically relied primarily on its internal workforce and native contractors to respond to storm events and rarely required large-scale external assistance. Interviews with stakeholders indicated that the organization has a strong culture of ownership and pride in its ability to restore service using internal resources, having successfully responded to both routine storm events and several significant outages without extensive reliance on mutual assistance or non-native contract resources.

While this approach had proven effective during previous events, NES did not maintain a formal damage prediction model or resource forecasting capability that could be used to estimate restoration workforce requirements based on forecasted storm impacts. As a result, resource acquisition decisions were largely informed by experience, institutional knowledge, and evolving damage assessments rather than quantitative forecasting tools.

At the same time, the number of customers served by NES has continued to grow. NES now serves one of the larger customer bases among public power utilities. Across the U.S., as customer expectations have evolved, customers increasingly expect utilities to provide timely restoration information, accurate ETRs, and rapid service restoration during major outage events. These factors have increased the importance of scalable restoration strategies capable of supporting large-scale and prolonged restoration efforts.

As forecasts evolved and the potential impacts of Winter Storm Fern became more apparent, NES initiated discussions regarding the acquisition of additional restoration resources. However, the decision to pursue large-scale mutual assistance and external contractor support was not made until the storm had begun impacting the service territory. By that time, many utilities across the region had already secured available contract and mutual assistance resources in anticipation of the event. As a result, NES faced challenges obtaining external resources on its preferred timeline and was unable to scale its restoration workforce as quickly as utilities that had secured resources earlier.

## Performance

PA analyzed resource data provided by NES to evaluate the timing, composition, and deployment of restoration resources throughout the storm response.<sup>66</sup> NES utilized resources from nearly 30 different organizations to support restoration efforts throughout the Winter Storm Fern response including native contractors, non-native contractors, mutual assistance utilities, and external state support organizations. The process for obtaining and mobilizing these resources varied by type. Native contractors were existing contractors already performing work on the NES system and could be mobilized immediately by the utility. Non-native contractors were secured through existing industry relationships, contractor networks, and resource aggregators, with minimal time required between resource commitment and contractual execution. Mutual assistance utility personnel were requested through established mutual assistance networks (e.g., TMEPA, TVPPA) and coordinated among participating utilities based on resource availability and system impacts. External state resources (e.g., TNG, TDOT, NDOT) were coordinated through state emergency management processes and deployed to support specific restoration and logistical functions. As a result, NES relies on a combination of public power mutual assistance organizations, contractor networks, and other external partnerships to obtain supplemental resources during a major restoration.<sup>67</sup>

Resource mobilization occurred in a phased manner throughout the event. Initial restoration activities were performed by NES personnel and native contractors. These crews were quickly supplemented by the additional personnel from those same native contractor companies who were not regularly assigned to the NES system. As the extent of the damage became clearer and the need for additional resources increased, NES engaged resource aggregators to identify and mobilize additional contract restoration

---

<sup>66</sup> Nashville Electric Service Winter Storm After Action Report Data Request #20: Daily NES, contractor, and mutual aid staffing levels

<sup>67</sup> Nashville Electric Service Winter Storm After Action Report Data Request #18: Mutual assistance contracts and agreements

resources from both within and outside the local area. As resource requirements continued to increase, NES coordinated with state agencies to obtain external support resources capable of assisting with logistical, transportation, and restoration-related activities. NES subsequently expanded its restoration workforce through established mutual assistance networks, obtaining additional line, service, supervisory, and support personnel from participating utilities. At peak workforce deployment, the restoration workforce consisted of approximately 15% NES personnel, 30% native contractors, 30% non-native contractors, 15% mutual assistance, and 10% other support resources (e.g., TNG, TDOT, NDOT, retired NES personnel, etc.).<sup>68</sup> Contractors performing work on the NES system are subjected to established safety, commercial, and contractual qualification requirements prior to deployment, which helps ensure resource quality and safety but also requires advance coordination when acquiring external resources.

NES initiated its first request for external resources on Thursday, January 22, following forecast updates indicating the potential for significant ice accumulations across portions of its service territory. At that time, NES contacted its two native contractors, MasTec and DHEC, to request additional resources beyond those already assigned to the NES system. However, neither contractor was immediately able to provide additional personnel as available resources had already been committed to supporting restoration efforts at other utilities impacted by the storm. Once the storm arrived on Sunday, January 25, NES adopted an “all hands-on deck” approach and began aggressively pursuing additional restoration resources through contractors, resource aggregators, mutual assistance organizations, and state support agencies. Specifically, NES engaged Bird Electric to support the acquisition and coordination of external resources, leveraging the company as a resource aggregator. While some non-native DHEC and MasTec resources were able to arrive relatively quickly, the overwhelming majority of resources were unable to support NES until several days into the restoration effort as they too were committed to other impacted utilities. External resources arrived and began supporting restoration activities in two primary waves. The first wave arrived on Saturday, January 31, and consisted primarily of non-native contractors. The second wave arrived on Monday, February 2, and was composed largely of mutual assistance utility personnel. The delayed arrival of these resources limited NES’s ability to support the most resource-intensive stages of the restoration and reflects the challenges the utility faced securing external resources after many had already been committed to other impacted utilities across the region.

Although the timing of external resource arrivals limited their ability to support the earliest stages of restoration, NES was effective in targeting resource requests to align with the evolving needs of the restoration effort. For the mutual assistance wave, approximately 60% of requested personnel consisted of lineworkers, while the remaining 40% consisted of service personnel focused on resolving customer-level outages and secondary system issues. This resource mix supported NES’s parallel restoration strategy and helped accelerate restoration activities as the event progressed. Additionally, there was little evidence that either NES or external restoration crews experienced significant delays awaiting work assignments, materials, or other logistical support, indicating resources were generally integrated into restoration operations efficiently upon arrival.

NES also demonstrated flexibility in utilizing non-traditional resources. The Tennessee National Guard was initially deployed to support damage assessment activities by providing transportation and field support personnel and was later utilized to assemble crew storm kits, allowing utility personnel to remain focused on restoration activities. TDOT and NDOT supported road clearing efforts. Additionally, the onboarding and integration of mutual assistance and contractor personnel was generally effective, with incoming resources receiving safety briefings, training, and work assignments shortly after arriving on site.<sup>69</sup>

---

<sup>68</sup> Nashville Electric Service Winter Storm After Action Report Data Request #58: Contractor and mutual aid mobilization and demobilization timeline

<sup>69</sup> Nashville Electric Service Winter Storm After Action Report Data Request #45: Mutual assistance onboarding, roster, and safety documentation

## 3.5.2 Recommendations

### **MA-01 | Establish a Proactive Mutual Assistance Mobilization Strategy**

Develop a structured process for evaluating, requesting, and securing mutual assistance resources that balances forecast uncertainty, resource availability, and cost considerations while reducing the risk of delayed resource acquisition during major events.

#### **Implementation Guidance:**

- Utilize predefined decision criteria and forecast triggers to initiate mutual assistance requests based on anticipated storm impacts, expected damage, and estimated resource requirements
  - Utilize weather forecasts, damage prediction outputs, and restoration modeling to support mutual assistance planning and resource request decisions
  - Utilize a phased resource mobilization approach that secures resources early while maintaining flexibility to adjust resource levels as forecast confidence evolves
  - Exercise mutual assistance mobilization and resource acquisition processes under varying storm scenarios to validate decision-making, timing, and resource deployment assumptions
- 

### **MA-02 | Expand Mutual Assistance Network Participation and Resource Partnerships**

Increase access to external restoration resources by expanding participation in mutual assistance networks and strengthening relationships with utilities, contractors, and resource providers capable of supporting large-scale restoration efforts.

#### **Implementation Guidance:**

- Expand participation in additional mutual assistance organizations, regional utility associations, and resource-sharing programs
  - Strengthen relationships with investor-owned utilities and their contractors to improve access to restoration resources during widespread events
  - Maintain relationships with utilities, contractors, and resource providers outside of NES's traditional mutual assistance network
  - Maintain current mutual assistance agreements, contact information, and resource availability data to support rapid resource acquisition during major events
  - Engage mutual assistance partners in restoration planning activities, storm readiness efforts, and major event exercises
- 

### **MA-03 | Standardize External Resource Integration Processes**

Enhance standardized processes for the onboarding, management, and integration of external resources to improve operational efficiency, safety, and consistency during major restoration events.

#### **Implementation Guidance:**

- Standardize resource arrival, check-in, credential verification, staging, lodging, meals, transportation, and demobilization activities for external resources
- Provide external personnel with safety requirements, operational expectations, restoration priorities, and local system information upon arrival
- Utilize OMS / Computer-Aided Distribution Operations System (CADOPS), mapping applications, communication platforms, and other operational technologies to support the integration and management of external resources

- Validate bird-dog staffing requirements, supervisory span-of-control assumptions, resource tracking capabilities, and external resource management processes through large-scale restoration exercises
  - Support consistent execution of restoration activities across internal and external crews through standardized operational guidance, restoration practices, and work management processes
  - Integrate external resources into restoration operations, training activities, and major event exercises
- 

## **MA-04 | Integrate Resource Mobilization Planning into Damage Prediction Model**

Utilize damage prediction and resource forecasting outputs to determine mutual assistance and contractor resource requirements, support resource acquisition decisions, and establish restoration targets prior to storm impacts.

### **Implementation Guidance:**

- Apply resource estimates developed through DP-01 to support mutual assistance requests, contractor mobilization, restoration planning, and resource acquisition decisions
  - Establish resource mobilization thresholds that translate forecasted damage, estimated restoration labor hours, and anticipated resource shortfalls into crew requests by resource type
  - Apply staffing factors and resource planning assumptions to determine mutual assistance, contractor, vegetation management, and support resource requirements
  - Refine staffing factors, planning assumptions, and mobilization thresholds by comparing forecasted resource requirements to actual resource utilization following major events
- 

## **3.6 Damage Assessment**

NES maintains an established damage assessment process that supports its event-based restoration strategy and provides the foundation for restoration planning, materials management, and resource deployment activities. Winter Storm Fern demonstrated that the existing process was generally effective once restoration operations stabilized; however, the scale of the event, widespread access constraints, and large influx of restoration resources reduced the effectiveness of traditional incident-based damage assessment activities during the early stages of the response. Opportunities exist to further enhance damage assessment capabilities through improved information management processes, scalable assessment strategies, and the integration of advanced technologies that improve situational awareness and support restoration planning during large-scale events.

Damage assessment is a critical component of major event restoration operations. Following a significant storm, utilities typically conduct damage assessments to identify damaged infrastructure, establish restoration priorities, estimate resource requirements, and determine the materials necessary to complete repairs. Damage assessment activities are generally performed ahead of restoration crews and are intended to identify site hazards, document damaged equipment, and develop work packages that support restoration planning and execution. Information collected during the assessment process is commonly used to support situational awareness, generate material requisitions, develop resource estimates, support resource mobilization decisions, develop ETRs, and improve overall restoration efficiency. As outage impacts increase in size and complexity, effective damage assessment becomes increasingly important to supporting restoration planning, resource allocation, and restoration execution.

### 3.6.1 Findings

During Winter Storm Fern, initial damage assessment and restoration activities were constrained by ice accumulation, hazardous road conditions, and continuing system damage following the storm impact. Situational awareness of system damage was limited during the early stages of the event due to access constraints, as road conditions restricted movement and limited the types of vehicles that could safely access affected areas. In addition, damage continued to occur after the initial storm as prolonged freezing temperatures and subsequent wind conditions caused additional trees, limbs, and infrastructure to fail. As a result, damage assessment activities were assessing a system condition that continued to evolve during the first several days of the event.

During the first few days of the restoration effort, damage assessors had difficulty reaching assigned assessment areas due to access issues. Roadways and vegetation clearances were noted as the primary factors preventing damage assessment activities. Some assessors were unable to access assigned circuits until Tuesday, January 27 or Wednesday, January 28 following storm impacts. As a result, damage assessors were not always sufficiently ahead of repair crews, and repair crews often needed to conduct their own assessments for safety, access, and materials planning purposes, resulting in potentially duplicative effort during the early stages of restoration. In addition, due to assessment coordination and access challenges, some line crews were dispatched ahead of assessment crews. In these cases, line crews would arrive at their assigned job locations, conduct road and vegetation clearance activities as required, and perform their own assessments, including identifying safety concerns and compiling materials lists.<sup>70</sup>

During the early stages of restoration, there is evidence that damage assessment reports were not utilized to the same extent as they were later in the event. Damage assessment and restoration planning activities were also complicated by limitations in available outage data. Partial restorations created challenges in accurately tracking outage status within the OMS, as portions of circuits could be restored while other customers remained without service. In addition, Advanced Metering Infrastructure (AMI) data used to support restoration verification, and situational awareness was not always reliable, as mass meter pings were inconsistent and meters reporting zero load did not always indicate an active outage condition. As restoration activities progressed, access conditions improved, and damage assessment operations became more effective, damage assessment information and materials lists were generally available at least a day ahead of restoration assignments, indicating the restoration workflow had stabilized and the intended damage assessment process had become established.

Based on PA's experience, the existing damage assessment process and supporting technology were not designed to support large-scale deployments of external assessment resources. Damage assessment activities relied on specialized knowledge, internally developed applications, and established workflows that were familiar to NES personnel but could not be readily utilized by external contractors and other assessment resources. As a result, some incoming resources required additional coordination, oversight, and support from NES personnel, limiting the scalability of the overall damage assessment process during the early stages of the event.

Fern demonstrated that traditional incident-based damage assessment processes become increasingly challenged during large-scale events characterized by widespread damage, significant access constraints, and large numbers of incoming restoration resources.

#### Preparedness

Effectively, NES only has one type of damage assessment regardless of the severity and breadth of damage on the system, where leading utilities will have two different types of assessments, trading off speed of information flow and granularity of system damage.<sup>71</sup> Utilities such as Florida Power & Light and Consolidated Edison will utilize a rapid assessment where damage is assessed at a feeder level

<sup>70</sup> Crews were equipped with chainsaws and were able to safely remove small limbs and trees. Where they could not safely remove vegetation, additional vegetation clearance crews were called in for assistance.

<sup>71</sup> American Public Power Association (June 2018) Restoration Best Practices Guidebook. [https://www.publicpower.org/system/files/documents/Restoration\\_Best\\_Practices\\_Guidebook\\_2018.pdf](https://www.publicpower.org/system/files/documents/Restoration_Best_Practices_Guidebook_2018.pdf)

(e.g. total number of poles down and total spans of wires that are broken) and communicated back to the planning group.<sup>72</sup> This helps to develop a quick, high-level view of the type and extent of system damage and is not meant to be detailed to the point where materials lists can be generated for every location assessed. Detailed assessments of repair materials needed is done at a later time under this type of operations.

NES relies heavily on institutional knowledge and maintains limited documentation related to damage assessment processes, workflows, and information flows. NES does, however, have a field mobile damage assessment application which was designed to capture damage and generate an inventory list required to repair. NES ERP Section II contains activation guidelines, while roles and responsibilities are outlined in ERP Section III. Damage assessment crews are called for in Class IV (estimated 3 to 5-day restorations) and Class V (estimated 5+ day restorations) storms.<sup>73</sup> The ERP does not dictate the timing of when to send damage assessment crews, nor does it specifically define how damage assessment information is to be utilized by Command Center personnel. The NES Service Restoration Plan calls for a “thorough but timely” assessment of damage prior to restoration activities. However, stakeholder interviews were generally consistent in describing how damage assessment activities were expected to be conducted.

The sequence of events for typical restoration efforts is to establish the damage done to the system, assess what pieces of equipment and hardware need to be repaired or replaced, and prioritize the areas to be restored. The NES damage assessment process of sending out assessor crews ahead of restoration forces is intended to produce materials lists of damaged equipment to help facilitate the restoration process.<sup>74</sup> This is in line with NES’s event-based restoration strategy. The damage assessment is conducted using a proprietary application that assessors use to document damaged equipment, which ultimately generates a list of hazards on the job site (e.g., number of damaged / destroyed poles, presence of limbs or downed wires), as well as an inventory of all infrastructure that needs to be replaced (e.g., poles, crossarms, insulators, transformers, etc.). The inventory is subsequently used to generate material requisition lists for the work package for the repair crews. The work packages (maps, indications of damaged assets, work orders) are then distributed electronically via PragmaCAD (PCAD) to the NES crews, mutual assistance crews, and supporting contractors via the tablet assigned to their “bird dogs.”<sup>75</sup> During major events, Engineering personnel serving as Assessment Coordinators are supplemented by engineering contractors and other external resources as needed to expand assessment capacity.

Damage assessment personnel are primarily drawn from the Engineering organization and serve in the role of Assessment Coordinators during storm restoration activities. Under normal operating conditions, assessors work in established pairs and rotate through damage assessment assignments on a recurring basis, providing familiarity with assessment processes, system infrastructure, and restoration support activities. For anticipated storm events, preparedness activities include fueling assessment vehicles, installing tire chains where necessary, and ensuring personnel have access to laptops and other equipment required to support restoration operations.

## Performance

NES followed this process during Fern. Assessment teams consisted of engineers (NES and contractor personnel) and individuals familiar with electric system components (e.g., poles, crossarms transformers, insulators) were utilized in this effort. Damage assessment information was used to generate material requisitions and support restoration work package development. This practice aligns well with the strict inventory controls NES utilizes at its warehouses. This normal flow of damage assessment to materials list to requisition typically took place ahead of the restoration crews being assigned the job. The crew would get their work assignments (which included the information from the assessment, both in terms of damage and more critically, the materials requisition forms) in the

<sup>72</sup> Consolidated Edison Company of New York (Feb 2025) Electric Emergency Response Plan. NYS DPS Docket 24-E-0665

<sup>73</sup> Nashville Electric Service. (2024, November). Emergency Response Plan (ERP) [Internal company document]

<sup>74</sup> Damage Assessment crews consisted of two full-time employees – one driver and one assessor

<sup>75</sup> Bird dog is an industry term for a crew guide. It is a NES employee assigned to guide external crews, provide local system knowledge, facilitate work assignments, and serve as the primary point of coordination between NES and visiting restoration resources.

morning, grab materials (either located at the service centers, yards or Opry Mills staging locations), and proceed to the job site to start restoration work.

Damage assessment activities were initially performed by NES engineers and engineering contractors. On Sunday, January 25, NES initiated outreach to engineering firms to obtain additional damage assessment resources. Assessors were activated beginning Monday morning, January 26, with all assessors reporting to support damage assessment activities. At the onset of the event, a number of NES assessors were reassigned from traditional assessment activities to support incoming non-native assessment resources, serving as field leads and coordinators to facilitate integration into restoration operations. As additional assessment and restoration resources arrived, engineering personnel increasingly transitioned from performing damage assessment activities to serving as crew guides, bird dogs, and field supervisors for incoming mutual assistance and contractor crews.

NES also coordinated with external organizations to expand damage assessment capabilities during the event. TVA, TEMA, and TNG provided support to damage assessment operations. Fern represented the first time NES utilized TNG resources to support damage assessment operations. Beginning around Days 4 and 5 of the restoration effort, TVA and TNG personnel were utilized primarily as drivers and logistical support personnel for damage assessment teams, allowing assessment personnel to focus on damage identification and documentation activities. Starting on January 29 (Day 5), National Guard personnel were utilized as drivers for damage assessment teams, increasing the number of active assessment crews and accelerating assessment activities. National Guard personnel also supported material distribution activities throughout the restoration effort. This created additional assessment crews to handle more damage assessment jobs. Interview participants noted that visibility from the passenger-side and rear areas of National Guard Humvees was more limited than from vehicles traditionally used for assessment activities.

Several days into the event, NES also explored the use of aerial assessment capabilities, including drone and Light Detection and Ranging (LiDAR) resources, to support damage assessment activities and improve situational awareness.

In addition to supporting damage assessment activities, National Guard personnel assisted with roadway clearing operations and materials handling activities throughout the restoration effort. NES also coordinated closely with the TDOT and NDOT to prioritize roadway clearing activities in areas affecting restoration operations. NES identified priority locations requiring access, and roadway clearing activities were coordinated to support both restoration and damage assessment efforts. Damage assessment activities were assigned and prioritized at the circuit level consistent with the broader restoration prioritization methodology utilized during the event. Despite these efforts, access constraints remained a challenge throughout much of the first week of restoration.

As restoration activities progressed and access conditions improved, damage assessment operations became increasingly effective and aligned more closely with the intended restoration workflow. Interview participants noted a strong organizational focus on accelerating the collection and processing of damage assessment information to support restoration planning and ETR development. Damage assessment information was entered into the Damage Collector application, where material requisitions could be generated and materials prepared for restoration activities. However, interview information suggests this capability was not consistently utilized by field crews during the early stages of the restoration effort. Approximately 80% of damage assessment activities had been completed when NES released its first global ETR on Day 7 of the restoration effort. By this point, damage assessment activities were occurring sufficiently ahead of restoration crews to support the intended assessment-to-materials-to-restoration workflow. As damage assessment requirements diminished and restoration activities transitioned into later stages, many engineering personnel were reassigned to other restoration support functions. Friday, February 6, represented the final day that many engineering personnel were utilized in bird-dogging and field support roles for external restoration crews.

## 3.6.2 Recommendations

### DA-01 | Establish Damage Assessment Processes and Information Flows

Develop and document damage assessment workflows, information flows, and decision-support processes associated with damage assessment activities during major events.

#### Implementation Guidance:

- Utilize Damage Assessment as a Planning Section function responsible for developing situational awareness and supporting restoration planning activities
  - Activate and deploy damage assessment resources based on anticipated damage levels, restoration objectives, and restoration strategies
  - Utilize damage assessment information to support restoration prioritization, resource deployment, materials management, ETR development, and restoration planning activities
  - Establish information flows that support the collection, validation, analysis, and dissemination of damage assessment information throughout the restoration effort
  - Incorporate damage assessment activities into emergency response training, exercises, and restoration operation
- 

### DA-02 | Establish Scalable Damage Assessment Methodologies

Develop scalable damage threshold triggers and guidance on which methodologies to use when supporting both incident-based and area-based restoration strategies during major events.

#### Implementation Guidance:

- Utilize rapid, preliminary, and detailed damage assessment approaches based on damage severity, restoration objectives, resource availability, and operational needs
  - Conduct rapid assessments to identify heavily impacted areas, critical infrastructure impacts, access constraints, and restoration priorities during large-scale events
  - Transition from rapid assessments to detailed materials-based assessments as access conditions improve and restoration operations mature
  - Utilize damage assessment information to support restoration prioritization, resource deployment, mutual assistance mobilization, materials management, restoration planning, and ETR development
  - Align damage assessment activities with the restoration strategy being utilized, including event-based, area-based, and circuit sweep restoration approaches
- 

### DA-03 | Expand Damage Assessment Technologies and Situational Awareness Capabilities

Expand damage assessment technologies and data sources that improve damage identification, situational awareness, and assessment efficiency during major events.

#### Implementation Guidance:

- Utilize aerial assessment capabilities, drone technologies, LiDAR, remote sensing platforms, and advanced analytics to accelerate damage identification and improve situational awareness during major events
- Integrate AMI, Supervisory Control and Data Acquisition (SCADA), intelligent field devices, outage management systems, and other operational technologies into damage assessment and restoration planning activities

- Expand the use of technology-enabled damage assessment techniques to rapidly identify heavily impacted areas, access constraints, damaged infrastructure, and restoration priorities
  - Ensure damage assessment applications, mobile devices, communications systems, and supporting technology infrastructure can support large-scale deployments of both internal and external assessment resources
  - Improve the integration of damage assessment technologies and data sources into restoration planning, resource mobilization, materials management, and ETR development activities
- 

## 3.7 Logistics & Supply Chain Management

NES did not have contracts in place with many of the vendors which were utilized during the storm response effort. As a result, NES had to swiftly identify, contract with, and onboard dozens of contractors, including line, vegetation, and mutual assistance crews during Fern's restoration period. NES's logistics functions spanning from procurement to providing meals and lodging to ensuring adequate inventory levels of materials performed effectively and generally aligned with NES's level of planning. However, PA finds NES's level of logistics planning and preparedness to be inadequate for large storms.

Proactive logistics and supply chain management preparedness underpins a utility's ability to efficiently and successfully complete response and restoration activities following a storm event. Logistics planning ensures that a utility has existing contracts in place with various types of vendors spanning from external crews and contractors to hotel and lodging providers and meal service providers. In many instances, utilities already have contracts in place with these entities for blue-sky operations or historical storm restorations that include storm response provisions. Supply chain management ensures sufficient materials and equipment are on hand to effectively and quickly respond and provide restoration activities and may require procuring additional materials in anticipation of a storm. Further, a robust logistics and supply chain management identifies sufficient staging sites required to respond to storms of size and includes clear functions for providing lodging and meals to internal and external resources as appropriate.

### 3.7.1 Findings

Ahead of Fern, NES had multiple contracts in place for firms providing engineering services and line work services. The two existing contracts for line work services with MasTec and DHEC were executed in June 2024, expire in June 2027, and resulted from of a competitive procurement process for line work providers.<sup>76</sup> Both contracts are for transmission and distribution construction services as well as emergency services, including storm response and restoration work. As a requirement of the procurement through which the MasTec and DHEC contracts were secured, contractors were required to provide a secure storage yard that could be utilized for staging crews and materials. In compliance with this requirement, MasTec and DHEC each have an individual staging yard which were utilized for staging native and non-native MasTec and DHEC crews for the storm's response effort.

Throughout the storm restoration and response period, NES identified additional resourcing needs and worked quickly to onboard new resources, including line crews, vegetation management crews, mutual assistance crews, consulting services, and other external services. Table 2 summarizes the types and amounts of vendors onboarded and contracts executed during the storm response effort.<sup>77</sup>

---

<sup>76</sup> Nashville Electric Service Winter Storm After Action Review Data Request #44: MasTec and DHEC contracts

<sup>77</sup> Nashville Electric Service Winter Storm After Action Review Data Request #84: List of contracts negotiated as part of the storm response

**Table 2: Summary of Contracts Executed for Winter Storm Response Effort**

<b>Service Provided</b>	<b>Vendors Onboarded</b>
<b>Line Work</b>	<b>8</b>
<b>Vegetation Management</b>	<b>2</b>
<b>Mutual Assistance</b>	<b>28</b>
<b>Field Superintendent (Prior Retirees)</b>	<b>5</b>
<b>Storm Restoration Services</b>	<b>1</b>
<b>Communications Consulting</b>	<b>2</b>
<b>Strategic &amp; Other Consulting Services</b>	<b>2</b>
<b>Storm Advisory Service</b>	<b>1</b>
<b>PMO Activation &amp; Execution Management</b>	<b>1</b>
<b>Triple Bottom Line Analysis</b>	<b>1</b>
<b>LiDAR Collection</b>	<b>2</b>
<b>Government Relations Consulting</b>	<b>1</b>
<b>Emergency Management &amp; Incident Command Efforts Consulting &amp; Training Services</b>	<b>1</b>
<b>Consulting Services in Connection with the Development of Incident Command System</b>	<b>1</b>
<b>Storm Recovery Pillars PMO Establishment and Support</b>	<b>2</b>

PA appreciates that many of the vendors and contracts supporting the restoration effort were mobilized and executed during the event, and in many cases were established through normal contractual mechanisms and procurement processes. NES established an internal function during the storm response period responsible for developing standard contract templates, identifying and vetting vendors, negotiating contract provisions as appropriate, and executing contracts to support restoration operations. Stakeholder interviews indicated that, in many cases, contracts were executed in a matter of hours which is much faster than the typical procurement timeline. Although PA finds that NES’s logistics and procurement functions could be further enhanced to improve preparedness for future storms, PA commends NES for its ability to quickly procure additional vendors and services during the storm response period.

In addition to the two individual staging sites run by MasTec and DHEC, NES utilized its three service centers as staging sites. Staging sites are a critical and necessary component of an effective storm response effort, as it enables the utility to provide equipment, storm kits, meals, and other necessary resources to crews, ultimately decreasing mobilization delays. The strategic number and location of staging sites within a utility’s service territory can further reduce delays in the storm restoration process. NES deployed pre-staged storm kits to crews through staging sites, with each storm kit equipped with resources for one crew truck. However, as NES only had 15 storm kits prepared to support the scale of the restoration effort, NES required assistance from TNG to support the distribution of materials and inventory to restoration crews. Over approximately a week and a half, approximately 180 storm kits were built and distributed in addition to the 15 already prepared.<sup>78</sup>

NES maintains pole storage yards adjacent to each of its three service centers, providing access to wooden poles used during routine operations and storm restoration activities. In addition, NES has four steel pole storage yards throughout its service territory. NES stakeholder interviews stated that IT support capacity was maxed out during Fern, requiring manual inventory queries to be run by warehouse personnel to produce timely pole inventory reports.

<sup>78</sup> Interview with G. Bolinger. Materials Management Supervisor

During a storm, staging sites can serve as distribution points for meals, water, and other hydration supplies for supporting NES crews, native crews, mutual assistance crews, and other off-system crews. Ahead of Fern, NES personnel purchased food, hydration supplies, and snacks for engineers, System Control personnel and field crews. In addition, meals were purchased and prepared onsite for System Control personnel in the days immediately following Fern until the onsite cafeteria reopened. Once open, the cafeteria served as an additional source of meals for NES personnel. Food for personnel assigned to NES service centers, which also served as staging sites, was provided through restaurants with which NES had pre-existing relationships, although formal contracts were not in place. However, due to the volume of meals required during the restoration effort, no single vendor was able to meet demand, requiring NES to coordinate with multiple restaurants to provide sufficient meal support for restoration personnel.

Once external support crews were confirmed, NES helped secure local hotel rooms to support the storm recovery effort; however, NES did not proactively reserve or block out hotel rooms for either NES employees or external crews in advance of the event.<sup>79</sup> NES maintains existing relationships with several local hotels through employee discount arrangements and provided hotel booking and reimbursement guidance through its Hotel Reimbursement Use Guidance policy. Stakeholder interviews indicated that all NES employees were eligible to book a hotel through the discount program and receive reimbursement for Fern. For mutual assistance crews, NES generally booked rooms as double occupancy and completed these bookings using NES p-cards. However, NES did not have pre-existing contracts in place with the hotels for which NES booked hotel rooms for mutual assistance crews. In addition, NES did not utilize a logistics provider to support lodging and broader logistics coordination activities during the restoration effort.<sup>80</sup>

## Preparedness

NES demonstrated a lack of maturity and overall preparedness for Winter Storm Fern as it relates to the logistics and supply chain components that are necessary for an effective and efficient storm restoration response. Although NES was able to implement 58 contracts in response to the Fern response effort, many of these contracts could have been established prior to the event or incorporated into existing vendor agreements through storm response provisions, reducing the need for extensive contracting activities during restoration operations.<sup>81</sup>

Furthermore, NES did not have a sufficient amount of pre-packed and ready to go storm kits for a storm that was the size and magnitude of Winter Storm Fern. The initial supply of 15 storm kits was effectively sufficient to supply 15 bucket trucks with commonly used consumable materials needed for restoration. This ultimately required NES to obtain assistance from the National Guard to help distribute resources and materials. Had NES prepared more storm kits in advance of Fern, the National Guard and other resources may have been available to support other response and recovery activities throughout the community. In addition, PA notes that NES did not run out of poles or other critical materials and equipment during the storm restoration. NES utilized approximately one third of the poles it keeps within its inventory for routine replacement and installation activities.

Although NES provided meals for crews and NES personnel and arranged lodging for mutual assistance crews, NES's approach demonstrated limited advance planning and preparedness for a storm of the magnitude of Fern. While storm restoration events can be a period of uncertainty and evolving conditions, providing logistics related to lodging and meals can be a relatively straightforward process with proper planning. Relying on local restaurants and businesses, which may have also lost power as a result of the storm, introduces an unnecessary level of complexity to the logistics process. NES can greatly increase their level of preparedness related to logistics by identifying and executing contracts with dining and lodging coordination providers. For example, dining providers can mobilize and provide onsite meals, hydration, and snacks to crews at staging sites. Further, to the extent that a staging site does not provide the proper facilities, which may be applicable for non-service center

---

<sup>79</sup> Nashville Electric Service Winter Storm After Action Review Data Request #87: Overview of contractor lodging arrangements and hotel/logistics contracts

<sup>80</sup> *ibid*

<sup>81</sup> Nashville Electric Service Winter Storm After Action Review Data Request #84: List of contracts negotiated as part of the storm response

staging sites, a dining vendor can deploy a temporary dining facility for internal and external crews to utilize.

The direct impact of lodging availability, hotel locations, and lodging coordination practices on restoration efficiency is difficult to quantify; however, lodging and logistical support can significantly influence the overall experience of mutual assistance and external restoration personnel, which may affect a utility's ability to attract and retain support resources during future events. NES only booked rooms for mutual assistance crews and only did so as crews were confirmed. NES did not block out hotel rooms in advance for NES personnel, mutual assistance crews, or other external crews. Given the forecasted impacts and anticipated travel challenges associated with Fern, proactive lodging arrangements for essential NES personnel would have helped ensure key personnel remained available to support continuous operations and reduced the need for travel during deteriorating weather conditions. NES can further increase its preparedness and reduce uncertainty by blocking hotel rooms in advance of a storm's anticipated impact. While reserving hotel rooms in advance introduces the risk of unused reservations and associated costs, that risk should be balanced against forecasted impacts, anticipated staffing requirements, and the operational benefits of securing lodging before local availability becomes constrained. Further, NES may benefit from utilizing a lodging coordination provider, as the number of rooms necessary for internal and external crews can be significant during large-scale restoration events. This was identified previously in at least one post storm review in 2021, but no actions have been taken.<sup>82</sup>

## Performance

As noted previously, NES had to contract with and onboard a significant amount of the vendors who provided services throughout the storm restoration period for Fern. Not having these contracts and related storm provisions in place in advance of the storm ultimately impacted NES's ability to quickly deploy resources for the storm restoration. In addition, NES's logistics personnel appear to have performed their roles adequately and in line with their plans and duties. Despite the need to rapidly procure and onboard a large number of vendors during the event, logistics personnel were able to support restoration operations and evolving resource needs throughout the response.

As described previously in this Section (Section 3.7), NES had adequate materials for critical equipment and components, including poles. Material and pole inventory levels did not appear to impact NES's overall performance or ability to restore customers. Further, PA observed that NES's loading facilities in the North, West, and Donelson Service Centers are set up well to transfer materials quickly and efficiently onto bucket trucks (NES and non-NES). The facilities allow trucks to back into a loading bay that is connected to either side of the warehousing facility, streamlining the material flow from warehouse to bucket trucks. Interview participants indicated that the facility layouts supported efficient material loading and distribution operations throughout the restoration effort.

## 3.7.2 Recommendations

### LOG-01 | Improve External Resource Mobilization and Onboarding

Update operational processes that enable external restoration resources to be requested, onboarded, staged, and deployed rapidly during major outage events.

#### Implementation Guidance:

- Maintain access to line, vegetation management, damage assessment, logistics, and restoration support resources sufficient to support large-scale restoration operations
- Reduce the time required to request, onboard, stage, and deploy external restoration resources during major outage events
- Explore potential external crew holding sites just outside of NES service territory as potential locations to hold external restoration crews for pre-mobilization purposes

<sup>82</sup> December 2021 Post Storm Items [internal company document]

- Deploy incoming resources in alignment with restoration priorities, work locations, and available supervision to maximize restoration productivity
  - Clearly establish resource support responsibilities for contractors and vendors, including transportation, staging, meals, lodging, and workforce support activities
  - Periodically validate the utility's ability to mobilize, onboard, integrate, and deploy large numbers of external resources during large-scale restoration events
- 

## **LOG-02 | Improve Materials Readiness and Storm Kit Deployment**

Better forecast storm kit and other material inventory levels to enable increased warehousing of material as to help minimize potential material shortages or efforts related to ad hoc material distribution.

### **Implementation Guidance:**

- Maintain storm kit inventories sufficient to support large-scale restoration scenarios and anticipated restoration resource levels
  - Maintain inventories of poles, transformers, conductor, hardware, and other critical restoration materials required to support large-scale restoration operations
  - Pre-stage storm kits, restoration materials, and equipment in advance of forecasted events to support rapid deployment of restoration resources
  - Improve material tracking and inventory visibility to support restoration planning, work package development, resource deployment, and material replenishment activities
  - Demonstrate the ability to distribute storm kits and restoration materials at a rate sufficient to support large-scale restoration operations without creating material-related bottlenecks
- 

## **LOG-03 | Enhance Field Logistics and Workforce Support Operations**

Develop scalable logistics support capabilities to support internal personnel, mutual assistance crews, contractors, and other external restoration resources during major outage events.

### **Implementation Guidance:**

- Provide meals, hydration, and workforce support services at service centers and staging locations capable of supporting large-scale restoration workforces
  - Secure and manage lodging accommodations for internal personnel, mutual assistance crews, contractors, and other external resources
  - Scale workforce support operations in alignment with restoration resource levels and operational tempo
  - Operate staging locations capable of supporting resource check-in, material distribution, workforce support, and restoration coordination activities
  - Leverage third-party logistics resources to support field operations when internal logistics capabilities become constrained
-

### 3.8 Grid Reliability and Performance

NES’s electrical infrastructure was generally in good condition prior to Winter Storm Fern. NES’s reliability performance was at or above the median performance when compared to similarly sized utilities across the investor-owned, public power, and cooperatives, although NES’s reliability performance lagged large public power utilities. In addition to its vegetation management program, NES maintains dedicated capital programs focused on asset replacement, distribution reliability, distribution automation, and smart grid technologies.<sup>83</sup> Funding for these programs has increased by approximately 50% between fiscal year (FY) 2020 and FY 2025 and represented roughly 20% to 30% of NES’s annual capital budget.<sup>84,85,86</sup> Actual expenditures followed a similar trend over the same period, indicating that NES has continued to invest in maintaining and improving distribution system reliability rather than deferring infrastructure investments.

The NES system is generally reliable, although performance varies across individual reliability metrics when compared to peer utilities. On average, NES customers experience more outage events annually than customers served by both large public power utilities and similarly sized utilities across the municipal, investor-owned, and cooperative sectors. However, while NES customers experience more total outage minutes than customers of large public power utilities, they experience fewer outage minutes than customers served by similarly sized utilities. Average restoration times are generally comparable to both peer groups, indicating that NES restores outages at a rate consistent with industry norms.

#### 3.8.1 Findings

Figure 14 shows that NES has maintained a sustained commitment to reliability-related investments over the past six fiscal years. Both budgeted and actual expenditures generally increased between FY 2020 and FY 2025, with reliability-related spending growing from approximately \$20 million to more than \$30 million annually. While actual expenditures fluctuated from year to year, spending generally tracked planned budgets and demonstrated continued investment in asset replacement, distribution reliability, automation, and grid modernization initiatives. This trend indicates that NES has consistently allocated significant capital resources toward maintaining and improving distribution system reliability.

**Figure 14. NES Reliability Spends (FY 2020 to FY 2025)**



<sup>83</sup> Capital Budget Accounts 729, 731, 732, 733, and 739.

<sup>84</sup> Nashville Electric Service Winter Storm After Action Review Data Request #149: Reliability maintenance program descriptions, budgets, and progress over ten years

<sup>85</sup> Nashville Electric Service Winter Storm After Action Review Data Request #150: New customer growth project descriptions, budgets, and progress over ten years

<sup>86</sup> Nashville Electric Service Winter Storm After Action Review Data Request #159: Description of distribution automation and reliability initiative

NES began investing in Distribution Automation as a dedicated capital program in FY 2020. As of the writing of this report, NES has deployed 24 automated distribution switches, 209 reclosers, and 65 TripSaver devices to support faster fault isolation and automated service restoration.

Distribution Automation has been a significant area of utility investment for more than 15 years and is widely recognized as a key strategy for improving reliability and reducing customer outage impacts. One common industry metric used to assess the maturity and coverage of a distribution automation program is the average number of customers located behind an automated protective device, such as a recloser, automated switch, or another SCADA-controllable device. Industry-leading utilities actively seek to minimize customers behind an automated protective device to limit the number of customers affected by individual outage events. For example, Orange and Rockland Utility's goal is no more than 250 customers behind a protective device.<sup>87</sup> More broadly, the typical range of customers behind a protective device is between 500 to 700. On highly automated or "saturated" systems, outage impacts are typically limited to approximately 500 to 700 customers per event, improving overall system reliability and reducing customer outage durations.

NES is in the early stages of its Distribution Automation deployment and is estimated to currently have approximately 1,500 customers located behind an automated protective device.

## Preparedness

Electric system reliability is commonly measured using three industry-standard reliability indices: System Average Interruption Frequency Index (SAIFI), System Average Interruption Duration Index (SAIDI), and Customer Average Interruption Duration Index (CAIDI). These metrics are typically evaluated on a "blue-sky" basis, meaning they reflect utility performance during normal operating conditions and exclude major storm events and other qualifying extraordinary events. Blue-sky reliability provides insight into the performance of the utility's infrastructure, operating practices, maintenance programs, and routine restoration processes under day-to-day conditions.

SAIFI measures how frequently the average customer experiences a sustained outage over the course of a year. SAIDI measures the total duration of outages experienced by the average customer during the year. CAIDI measures the average duration of each outage experienced by affected customers. For all three metrics, lower values indicate better reliability performance. Together, SAIFI, SAIDI, and CAIDI provide a high-level view of overall system reliability and restoration effectiveness.

During major storm events, utilities often activate emergency response procedures and operate under conditions that differ significantly from normal operations. As a result, outage frequency and duration can increase substantially. Events meeting defined regulatory and industry criteria may be classified as Major Event Days (MEDs) or other excludable events and are typically removed from blue-sky reliability calculations to allow for more meaningful comparisons of routine system performance.

Storm CAIDI is a related metric used to evaluate restoration performance during excludable events. Similar to CAIDI, Storm CAIDI measures the average duration of outages experienced by affected customers; however, it is calculated only for qualifying storm or major event conditions. Because restoration activities during major events are often more complex and resource-intensive, Storm CAIDI is typically higher than blue-sky CAIDI.

## Panel Selection

No two utilities are exactly alike. However, there are panel companies that have similar characteristics (e.g., ownership model, customer size, geography, operating voltages, etc.) that can be used to create meaningful relative comparisons to understand how NES performs vs. their peers. Two such panels are assembled here for comparison purposes – NES vs. Large Public Power Utilities, and NES vs. Similarly Sized Utilities. Large Public Power Utilities include 21 utilities that are members of the Large Public

---

<sup>87</sup> New York State Energy Research and Development Authority, prepared by Industrial Economics, Inc. (December 2025) NYSERDA Smart Grid Evaluation Case Study: Orange & Rockland Grid Modernization Investments"

Power Council and have publicly reported their reliability performances.<sup>88</sup> These companies are all publicly owned and operated utilities and have similar operating models and challenges as NES. The second panel on Similar Sized Utilities comprises 59 utilities in the U.S. that serve between 300,000 and 600,000 customers. For reference NES serves approximately 472,930 customers.

Reliability performance data (SAIFI, SAIDI, CAIDI) were sourced from data that is reported to the Energy Information Administration (EIA).<sup>89</sup> Storm CAIDI was calculated from the reported reliability performance data. Note, as of the writing of this report, 2024 is the last year that data is available.

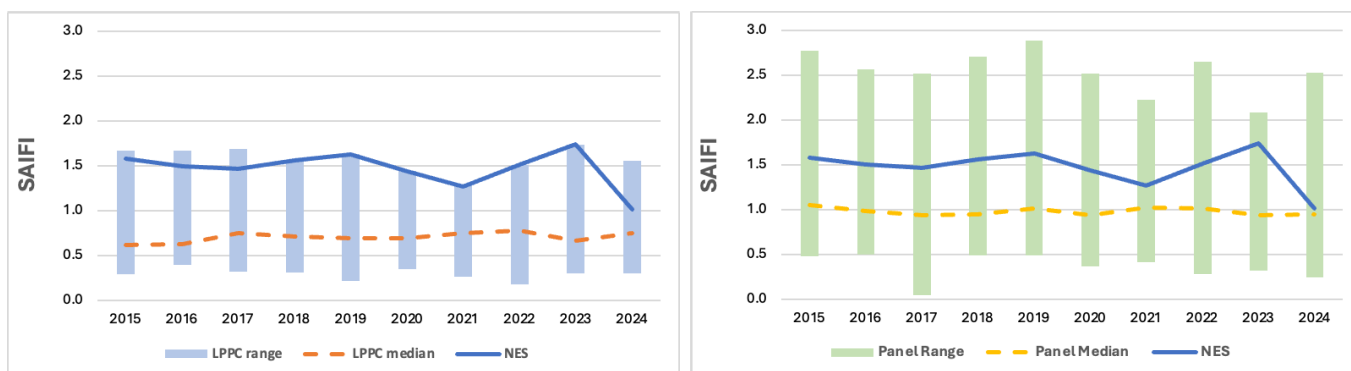
## Blue-Sky Response Performance

### Blue-Sky Performance SAIFI: NES customers experience more outages compared to peers

NES's SAIFI performance has improved from 2015 to 2024, and NES's 2024 SAIFI is approximately 30% better than its 2015 SAIFI. Large public power panel's SAIFI performance has worsened from 2015 to 2024, and SAIFI performance of the similarly sized utilities panel remains unchanged from 2015 to 2024.

Overall, NES has higher SAIFI (worse) than those of other large public power entities, as seen in Figure 15. This indicates that the NES System is on the less reliable side of the large public power panel. When compared to similarly sized utilities, NES's SAIFI performance is slightly worse than the median performance of this panel.

**Figure 15. NES SAIFI vs. Large Public Power Utilities & Similarly Sized Utilities (MEDs excluded)**



### Blue-Sky Performance SAIDI: NES customers experience somewhat longer outages durations compared to peers

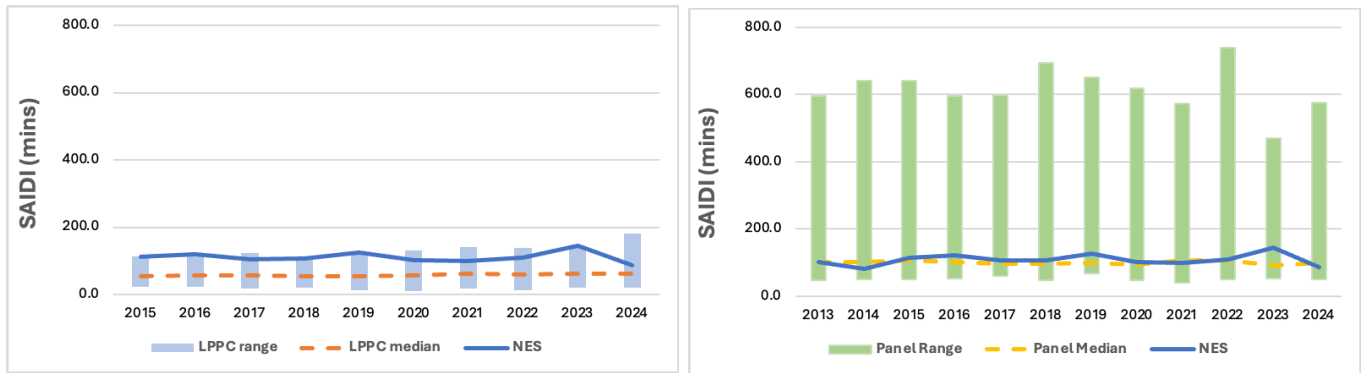
NES SAIDI performance has improved from 2015 to 2024, and NES's 2024 SAIDI is approximately 20% better (approximately 25 minutes) than its 2015 SAIDI. Large public power panel's SAIDI performance has worsened from 2015 to 2024 (approximately 20% decline, or approximately 12 additional minutes), and SAIDI performance of the similarly sized utilities panel has slightly worsened from 2015 to 2024 (approximately 7% decline or approximately 7 additional minutes).

NES has higher SAIDI (worse) than those of other large public power entities, as seen in Figure 16. This indicates that the NES System is on the less reliable side of the large public power panel. When compared to similarly sized utilities, NES's SAIDI performance is on par with, if not better than the performance of the median of the similar sized utility panel.

<sup>88</sup> These include: Austin Energy, Chelan County PUD #1, Clark Public Utilities, Colorado Springs Utilities, Grand River Dam Authority, Imperial Irrigation District, Jacksonville Electric Authority, Lincoln Electric System, Long Island Power Authority, Los Angeles Department of Water and Power, Nebraska Public Power District, Omaha Public Power District, Orlando Utilities Commission, Grant PUD, Sacramento Municipal Utility District, Salt River Project, CPS Energy, Seattle City Light, Snohomish County PUD #1, Santee Cooper, and Tacoma Public Utilities.

<sup>89</sup> EIA Form 861 data, 2015 – 2024.

**Figure 16. NES SAIDI vs. Large Public Power Utilities & Similarly Sized Utilities (MEDs excluded)**

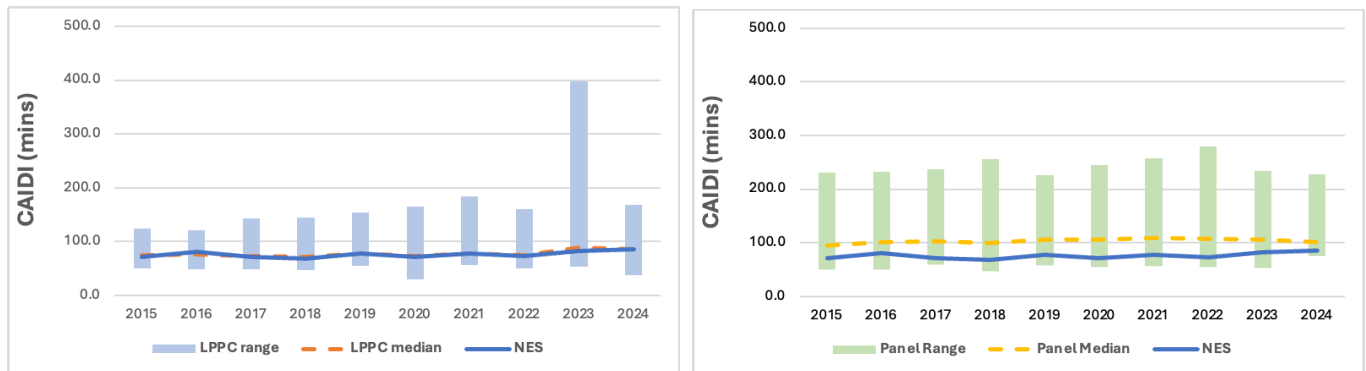


**Blue-Sky Performance CAIDI: NES restores power just as fast, if not faster than peers**

NES CAIDI performance has slightly eroded from 2015 to 2024; NES’s 2024 CAIDI is approximately 20% worse (approximately 14 minutes longer) than its 2015 CAIDI. Large public power panel’s CAIDI performance also has slightly worsened from 2015 to 2024 (approximately 14% decline, or approximately 11 additional minutes), and CAIDI performance of the similarly sized utilities panel also slightly worsened from 2015 to 2024 (approximately 6% decline, or approximately 6 additional minutes).

NES’s CAIDI is comparable, if not better than those of other large public power entities, as seen in Figure 17. NES’s CAIDI performance better (lower) than the median of the similar sized utility panel.

**Figure 17. NES CAIDI vs. Large Public Power Utilities & Similarly Sized Utilities (MEDs excluded)**



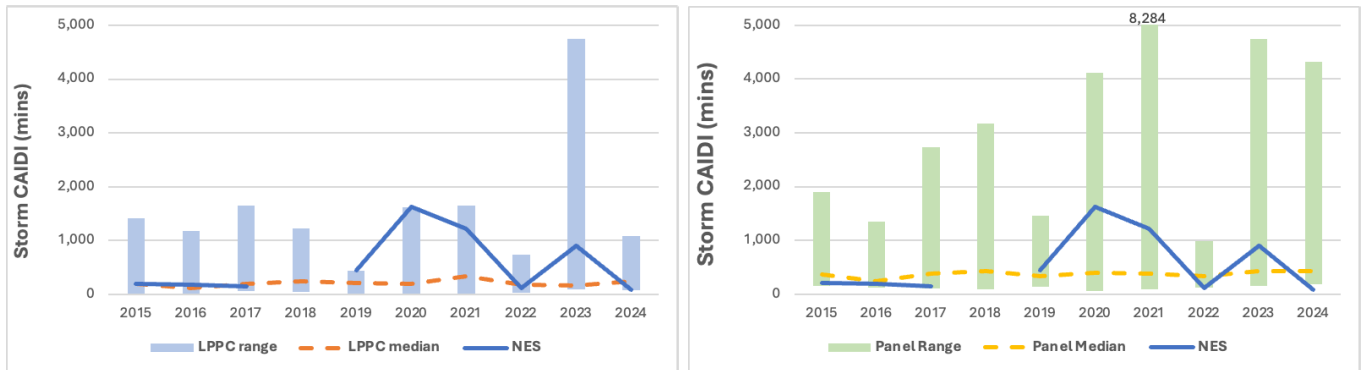
**Major Event Response Performance**

**Storm CAIDI: NES restores power just as fast, if not faster than peers, unless there are major storms**

Storm CAIDI measures how utilities restore power during those extra-ordinary days that are typically excluded for normal performance metrics. This is a telling metric in that it looks at how the utility is able to recover during very challenging conditions. There are many drivers for higher storm CAIDI performances, e.g., extent of damage, number of crews mobilized, ability to scale and manage resources. Note, in the rare case that a utility did not have any excludable events in a particular year, its storm CAIDI metric for that year would be undefined.

Aside from 2020, 2021 and 2023, NES’s Storm CAIDI performance is at or below the medians of both the large public power (see Figure 18) and similar sized utility panels.

**Figure 18. NES Storm CAIDI vs. Large Public Power Utilities & Similarly Sized Utilities<sup>90</sup>**



In 2020, 2021, and 2023 NES experienced three major events, which drove NES’s storm CAIDI above normal levels. Each of these events would have been classified as a Class V, Major Disturbance under the NES ERP. These events do also indicate that NES is well prepared for blue-sky and minor storm operations, and there are opportunities for improvement for scaling response to address major events.

**Table 3: NES Major Events (2019 – 2024)<sup>91</sup>**

Storm ID	Time	Total Customers Out	Max Crews working	Duration
ST2008 (Tornado)	March 2020	61,974	22	9.7 days
ST2009 (Derecho)	May 2020	195,607	32	7.3 days
ST2304	March 2023	215,056	46	6.5 days

### 3.8.2 Recommendations

#### GRID-01 | Develop a System Segmentation Strategy

Determine a target for average number of customers behind a protective device. Continue to deploy communicating automated distribution devices (e.g., distribution automated switches, reclosers, TripSavers, etc.) to meet that target.

##### Implementation Guidance:

- Develop targets for number of customers behind each protective device, and identify problematic areas to prioritize deployment
- Standardize distribution automation system designs and protection studies to enable faster design / construction / commissioning of these devices

#### GRID-02 | Develop a System Hardening Plan

Develop a long-term plan to address the risks faced by NES (physical and other). These plans may include hardening of transmission systems (lines and subs), distribution systems (poles, conductors), sensors and analytics (to measure and assess risks).

<sup>90</sup> Note: In 2018 NES did not have any excludable events, therefore the 2018 NES Storm CAIDI is undefined. This appears as a gap in the NES Storm CAIDI line.

<sup>91</sup> Note: Table 3 presents total customer outage counts, which represent the cumulative number of customer interruptions experienced during each event. In contrast, Table 1 presents peak customer outages, which represent the maximum number of customers without service at a single point in time during each event.

**Implementation Guidance:**

- Identify key risks (weather driven, physical and electrical single points of failures, etc.) present on system. For each of the risks, develop a playbook of mitigation options to address
- Conduct cost / benefit assessments of each of mitigation options, and develop a long-term business case for system hardening

---

## 3.9 Vegetation Management

NES maintains an established Vegetation Management (VM) program supported by defined standards, contractor resources, and formal program documentation. The program has continued to evolve through recurring updates to vegetation management practices, standards, and annual work planning process. Winter Storm Fern demonstrated that vegetation remains one of the most significant contributors to outage impacts during severe weather events, particularly during prolonged ice storms that exceeded normal operating conditions. Opportunities exist to further enhance the VM program through risk-based prioritization, targeted resiliency investments, and continued integration of vegetation management considerations into broader system reliability and storm hardening strategies.

Vegetation management is one of the most critical proactive maintenance activities a utility can undertake to reduce the impact of major events. A robust VM program plays a vital role in improving system reliability, minimizing outage risk, and strengthening overall resiliency. Effective VM not only reduces the likelihood of vegetation-related outages but also supports safe restoration operations and limits the extent and duration of customer impacts during storm events.

Industry best practices for a comprehensive VM program typically include cycle- or risk-based trimming, routine inspections, contractor oversight and auditing, tree replacement initiatives, and customer engagement programs focused on vegetation awareness and risk reduction. Industry-leading utilities commonly maintain vegetation management trimming cycles ranging from three to five years, with specific cycle length depending on vegetation growth exposure, storm risk, and geographic conditions.<sup>92</sup>

More advanced utilities enhance these programs through risk-based prioritization strategies, focusing inspection and trimming efforts on circuits with elevated outage risk, historical reliability concerns, critical customer infrastructure, or the potential for significant system impact. Under a risk-based trimming approach, utilities typically establish targets to inspect and trim a certain percentage of their overall distribution circuits annually.

### 3.9.1 Findings

Throughout Winter Storm Fern, vegetation-related impacts served as both the primary driver of customer outages and a significant operational challenge during restoration activities. Fallen trees and broken limbs associated with ice accumulation and winter weather conditions caused widespread damage to overhead electric infrastructure while also obstructing access to damaged equipment in affected areas. However, capturing the exact number of outages directly attributable to vegetation damage during a major storm is inherently difficult, as outage cause coding during restoration activities is often aligned to the equipment or repair action required to restore service rather than the initiating cause of the damage. For example, an outage caused by a tree falling into electric infrastructure may ultimately be coded as a damaged crossarm, broken pole, or downed conductor to support the appropriate restoration response and material allocation.

PA observed that NES's service territory covers roughly 700 square miles and consists of an estimated 20-30% dense urban areas, 55-65% suburban areas, and 15-20% rural areas, each of which present unique vegetation management challenges. Based on customer density mapping, a large portion of

---

<sup>92</sup> U.S. Department of Energy. (2024). Vegetation management resilience investment guide. U.S. Department of Energy. [https://www.energy.gov/sites/default/files/2024-11/111524\\_Vegetation\\_Management.pdf](https://www.energy.gov/sites/default/files/2024-11/111524_Vegetation_Management.pdf)

NES customers are concentrated within suburban portions of the service territory, where extensive overhead infrastructure, mature tree canopy, and dense vegetation present significant vegetation management and restoration challenges. NES also serves a substantial customer population within the dense urban core, where distribution infrastructure is more heavily undergrounded and generally experiences fewer traditional vegetation-related reliability issues. Smaller portions of the customer base reside within more rural areas of the system, where circuits are typically longer, more geographically dispersed, and often more difficult to access during restoration activities.

NES published their latest Utility Vegetation Management Manual in April 2026. Prior to this update, the most recent version of the manual had been published in January 2025. The manual, which is updated annually, outlines NES's policies and guidance related to VM operations, planning and auditing, documentation requirements, and integrated VM practices. Regularly updating a formal vegetation management manual aligned with defined policies, procedures, and operational expectations is considered an industry best practice and helps support consistency across both internal and contractor crews.<sup>93</sup>

Several key observations were identified regarding NES's VM program, including declining trimming throughput prior to Winter Storm Fern, potential scalability limitations during large-scale restoration events, and evolving approaches to managing vegetation-related reliability risk. NES provided historical VM program data for the previous five fiscal years, including planned and completed circuit miles, annual budgets and expenditures, contractor performance information, and other program planning of performance metrics. Analysis of the available data suggests NES's vegetation management program experienced declining trimming throughput prior to Winter Storm Fern. Between FY 2020 and FY 2025, targeted trimming circuit miles decreased approximately 32%, while completed trimming circuit miles decreased approximately 52%, despite continued growth of the electric distribution system and ongoing exposure of the predominantly overhead distribution system to vegetation-related reliability risks. These trends suggest increasing vegetation-related exposure and a growing backlog of unmet vegetation management work. NES characterizes its VM program as operating on an approximate four-year trimming cycle; however, historical trimming throughput suggests the effective cycle length is closer to five years.<sup>94</sup>

NES appears to have recognized certain operational and programmatic risks through adjustments to contract structures, budgeting approaches, and annual trimming targets. However, declining completed trimming activity, increasing carryover work, and continued dependence on overhead infrastructure suggest future vegetation-related reliability risks may not have been fully mitigated prior to Winter Storm Fern. Additionally, the available information does not clearly demonstrate whether long-term vegetation exposure and storm-related risks were formally quantified or integrated into broader resiliency planning efforts.

NES conducts quarterly evaluations for contracted vegetation management vendors through a vendor oversight function that was recently brought in-house. PA requested historical evaluation records to assess performance trends over time; however, complete historical evaluation records were not available.<sup>95,96</sup>

## Preparedness

Prior to Winter Storm Fern, NES clearance standards defined minimum requirements for both distribution and transmission infrastructure, including overhang, bottom, side, and through clearances. For distribution voltages ranging from 4kV to 23.9kV, NES required a minimum lateral clearance of up to 10 feet from conductors, while transmission facilities operating at 69kV and above prohibit any overhang conditions. Additionally, under designated "Uber Over 15+" work tasks, NES requires the

<sup>93</sup> Nashville Electric Service Winter Storm After Action Review Data Request #156: April 2026 Utility Vegetation Management Manual and update cadence

<sup>94</sup> Nashville Electric Service Winter Storm After Action Review Data Request #113: Five-year vegetation trim mileage totals and goals

<sup>95</sup> Nashville Electric Service Winter Storm After Action Review Data Request #50: Existing vegetation management program overview

<sup>96</sup> Nashville Electric Service Winter Storm After Action Review Data Request #157: Vegetation management contractor quarterly review documentation

removal of all stems within the prescribed trim zone as well as all overhang above primary facilities. Clearance standards also define minimum vertical requirements below energized facilities. Distribution infrastructure requires a minimum of 6 feet of clearance below the system neutral, with additional species-specific requirements outlined within the utility vegetation management manual. Transmission infrastructure requires a minimum clearance of 15 feet below the bottom conductor. Side and through clearances for distribution facilities are also governed by species-specific standards based on vegetation growth characteristics, while transmission infrastructure requires a minimum horizontal clearance of 15 feet from conductors.<sup>97</sup>

In addition to traditional cycle-based vegetation management activities, NES's vegetation management program includes targeted trimming of substation circuits, investigation and mitigation of vegetation-related reliability issues associated with frequent outages, customer-requested trimming related to dead, diseased, or damaged trees, vegetation management support for maintenance and new business construction activities, a tree replanting program, and customer complaint resolution processes. NES also maintains a Right Tree, Right Place program intended to promote the planting of compatible tree species in appropriate locations to reduce future conflicts between vegetation and electric infrastructure.<sup>98</sup>

PA analyzed NES's historical vegetation management performance to identify trends and evaluate the optimal balance of vegetation management activities. Vegetation management activities generally occur across two categories: proactive trimming (planned) and reactive trimming (unplanned, storm-related, capital expenditure-related, and customer or on-demand response activities).

Since FY 2020, NES's planned vegetation management budget and annual target circuit miles scheduled for trimming have fluctuated. Between FY 2020 and FY 2025, annual target circuit miles decreased from 1,427 miles to 971 miles, representing an approximate 32% reduction in planned annual trimming activity. During the same period, actual completed vegetation management activity also declined despite continued growth of the NES electric distribution system. Total system circuit mileage increased from approximately 5,898 miles in FY 2020 to approximately 6,025 miles in FY 2025, driven primarily by expansion of the underground distribution system.<sup>99</sup> However, overhead distribution infrastructure continued to represent most of the electric system and therefore remained exposed to vegetation-related reliability risks.

Actual completed trimming activity decreased from 1,427 completed circuit miles in FY 2020 to 684 completed circuit miles in FY 2025, representing an approximate 52% reduction in annual trimming production over the five-year period. During this same period, budgeted planned cycle costs increased from approximately \$7.6 million in FY 2020 to approximately \$13.8 million in FY 2025, representing an approximate 82% increase. Budgeted unplanned trimming costs and other vegetation management-related costs also increased by approximately 30% and 32%, respectively, during the review period. As a result, both planned and completed vegetation management activity declined during a period in which the overall electric distribution system and associated vegetation management expenditures generally increased.

NES achieved greater than 80% completion of its annual vegetation management trimming targets in three of the past six fiscal years, including achieving 100% completion in FY 2020. However, annual completion performance fluctuated throughout the review period, with completion rates decreasing to 75% in FY 2021, 78% in FY 2022, 95% in FY 2023, 84% in FY 2024, and 70% in FY 2025.<sup>100</sup> NES generally targets approximately 1,100 circuit miles annually; however, annual targets vary based on prior year performance and the inclusion of carryover work associated with uncompleted circuit miles from prior years. Although some operational efficiencies may exist to improve annual completion rates, variability in annual vegetation management performance is also influenced by the complexity and characteristics of the individual circuits scheduled for trimming. Circuit miles are not equivalent in scope or level of effort, as some circuits may traverse densely vegetated areas, contain difficult terrain or

<sup>97</sup> Nashville Electric Service. (2025, January). Utility Vegetation Management Manual [Internal company document]

<sup>98</sup> Nashville Electric Service Winter Storm After Action Review Data Request #50: Existing vegetation management program overview

<sup>99</sup> Nashville Electric Service Winter Storm After Action Review Data Request #113: Five-year vegetation trim mileage totals and goals

<sup>100</sup> *ibid*

accessibility limitations, or require substantially greater trimming, coordination, and restoration activities than others. As a result, annual completion percentages alone may not fully reflect the operational complexity associated with the vegetation management program.

One component of the vegetation management budget that decreased significantly during this period was the administrative fee associated with activities such as vendor transition, contract administration, and program oversight. In FY 2025, NES rebid its vegetation management contract structure to a per-mile completed payment model rather than a fixed administrative fee arrangement. NES also transitioned post-auditing services in house, contributing to an approximate 79% reduction in budgeted administrative costs between FY 2024 and FY 2025.<sup>101</sup>

Cost variance trends also demonstrate a shift in vegetation management program execution over time. Earlier years reflected significant budget overruns, including approximately \$5.0 million in FY 2020 and approximately \$4.7 million in FY 2023, indicating actual expenditures exceeded planned budgets.<sup>102</sup> In contrast, FY 2024 and FY 2025 reflected substantial positive budget variances, suggesting planned funding levels exceeded actual expenditures by approximately \$6.0 million and \$6.2 million, respectively. While reductions in administrative costs contributed to these variances, the positive budget variances in FY 2024 and FY 2025 may also indicate deferred or unexecuted vegetation management work, which can contribute to increased long-term vegetation exposure and system reliability risk if sustained over multiple years.

Overall, the data suggests NES experienced variability in vegetation management planning and execution during a period of continued system growth. While NES implemented modifications to its vegetation management contracting and oversight approach and maintained relatively strong completion performance in several years, declining completed trimming volumes and increasing carryover work may have contributed to increased vegetation exposure across portions of the overhead distribution system entering Winter Storm Fern.

**Table 4. NES Vegetation Management Historical Annual Targets & Spends**

Line No.	Tree Trimming Targets & Spend	2020	2021	2022	2023	2024	2025	5-Year Variance
A	NES Overhead Circuit Miles	4,951	4,948	4,943	4,935	4,928	4,923	-28
B	NES Underground Circuit Miles	947	980	1,023	1,043	1,077	1,102	155
C	NES Total Circuit Miles (lines A+B)	5,898	5,928	5,966	5,978	6,005	6,025	127
D	Annual Trimming Target Circuit Miles	1,427	1,400	1,300	1,100	1,000	971	-32%
E	Annual Trimming Actual Circuit Miles	1,427	1,050	1,015	1,041	838	684	-52%
F	Percentage of Target Complete (lines E/D*%)	100%	75%	78%	95%	84%	70%	
G	Budgeted Planned Cycle Cost	\$ 7,599,250	\$13,950,000	\$11,758,617	\$11,900,000	\$13,812,500	\$13,812,500	82%
H	Budgeted Planned Admin Cost	\$1,330,000	\$1,330,000	\$1,330,000	\$2,130,000	\$2,389,000	\$505,891	-62%
I	Budgeted Unplanned Trimming	\$1,300,000	\$2,500,000	\$1,300,000	\$1,337,482	\$1,685,000	\$1,685,000	30%
J	Budgeted Other Costs	\$2,070,000	\$1,410,168	\$1,185,000	\$1,198,000	\$1,948,113	\$2,725,194	32%
K	Budgeted Herbicide	-	-	-	-	-	\$1,800,000	
L	Annual Actual Combined Cost	\$17,299,000	\$18,534,000	\$17,649,000	\$21,280,000	\$13,882,000	\$14,298,000	-17.35%
M	Cost Variance (Budget – Actual) (lines L-(G+H+I+J+K))	(\$4,999,750)	\$656,168	(\$2,075,383)	(\$4,714,518)	\$5,952,613	\$6,230,585	

<sup>101</sup> Nashville Electric Service Winter Storm After Action Review Data Request #113: Five-year vegetation trim mileage totals and goals

<sup>102</sup> *ibid*

At the end of December, NES had completed 587 circuit miles of planned tree trimming, representing approximately 43% of the annual target (1,342 circuit miles), despite approximately 50% of the fiscal year having elapsed.<sup>103,104,105</sup>

## Performance

Winter Storm Fern caused significant vegetation damage due to heavy ice accumulation and prolonged freezing temperatures that persisted in the days following the storm. This resulted in widespread limb breakage, downed trees, and vegetation-related impacts to overhead distribution infrastructure across portions of the NES service territory. The combination of accumulated ice loading and extended freezing conditions increased both the severity and duration of vegetation-related restoration challenges throughout the event.

At the time of Fern, NES maintained existing vegetation management contracts with three primary vendors supporting routine utility operations: ABC Professional Tree Services Inc., which primarily supported tree trimming activities; Edko Inc., which provided herbicide application services; and Wright Tree Service Inc., which primarily supported ground maintenance activities associated with vegetation management operations. In addition to routine vegetation management activities, NES also maintained storm restoration-related vegetation management contracts with ABC Professional Tree Services Inc. and Lewis Tree Service Inc. ABC Professional Tree Services Inc. has supported NES since July 1, 2024.

NES implemented a modified vegetation management response strategy during Winter Storm Fern due to the widespread nature and severity of vegetation-related damage across the service territory. Unlike typical restoration events, vegetation management crews worked directly alongside line crews to support a triage-based approach focused on clearing access to damaged infrastructure and enabling restoration activities. This approach proved beneficial during the initial days of the event when vegetation obstruction was most severe, though its operational value diminished as restoration activities progressed and vegetation-related work decreased.

Vegetation management crew assignments were coordinated daily through regional superintendents, who distributed available arborist and vegetation resources across operational areas rather than utilizing a centralized storm coordination structure for deployment management. Most vegetation management activities during the event were focused on clearing access paths to lines, equipment, and work areas necessary for restoration operations.

Due to the extent of vegetation-related damage involving trees and limbs in contact with electrical infrastructure, vegetation management activities were closely coordinated with line operations to ensure work was performed safely on de-energized lines. Line crews were responsible for confirming and testing that affected lines were de-energized before vegetation crews began cutting and clearing activities. This coordination process was necessary to ensure the safety of vegetation management personnel, as crews could not independently determine whether lines were safe to approach or cut around. NES worked to complete field assessments as quickly as possible to identify required restoration actions, de-energize impacted infrastructure, and position vegetation management crews to begin work immediately once areas were confirmed safe for access.

Within the first several days of the event, NES coordinated with existing vegetation management contractors to significantly expand available resources. Lewis Tree Service, a previous NES contractor, arrived on-site on Monday, January 26, while ABC Professional Tree Services also supplemented operations with outsourced crews from other regions. Vegetation management resources increased to approximately four times normal staffing levels, expanding from a typical operating range of approximately 30 to 35 crews to approximately 115 to 120 crews during the event. Crews generally consisted of three personnel supported by lift trucks, bucket trucks, or split truck configurations. According to NES, sufficient vegetation management resource capability was maintained throughout

---

<sup>103</sup> Nashville Electric Service Winter Storm After Action Review Data Request #113: Five-year vegetation trim mileage totals and goals

<sup>104</sup> NES Board Meeting - May 2026

<sup>105</sup> NES Fiscal Year is July 1 through June 30

the restoration effort. Onboarding requirements for incoming vegetation management crews were reportedly minimal, with personnel already familiar with the NES system serving in supervisory and oversight roles for supplemental crews.

Due to the scale of debris and access constraints, NES also coordinated tree clearance activities with the NDOT and TDOT on an as-needed basis, which was not identified as a typical operational practice during routine restoration events.

## 3.9.2 Recommendations

### **VM-01 | Evaluate Vegetation Clearance Standards against Industry Leading Practices**

NES recognized that vegetation-related impacts were a significant contributor to customer outages during Winter Storm Fern and took immediate action following the event to strengthen its vegetation management program. As part of these efforts, NES expanded vegetation clearance requirements around overhead electric infrastructure, including increasing clearances adjacent to poles and power line corridors to approximately 15 feet with no overhang conditions permitted and maintaining approximately 10 feet of clearance below conductors within the power space. NES also communicated that certain trees unable to be safely maintained within required clearances may require removal and that limited planned outages may occasionally be necessary to safely complete vegetation management activities. These changes align with industry best practices and represent a proactive step toward strengthening long-term system resiliency and reducing vegetation-related outage risk.

#### **Implementation Guidance:**

- Conduct periodic benchmarking assessments of peer utilities and leading vegetation management programs to validate vegetation management standards and identify opportunities for refinement based on vegetation management cycle lengths, clearance requirements, overhang allowances, system characteristics, vegetation conditions, reliability performance, and customer expectations.

---

### **VM-02 | Implement a Risk-based Vegetation Management Strategy**

Implement a risk-based vegetation management planning process that supplements cycle-based trimming activities by prioritizing inspection and trimming work based on vegetation exposure, historical outage performance, customer impact, circuit criticality, and storm-related risk.

#### **Implementation Guidance:**

- Incorporate outage history, vegetation inspection results, LiDAR data (where available), GIS data, and reliability performance metrics into annual vegetation management planning and circuit prioritization activities
- Utilize restoration performance data, including restoration curve and customer outage duration information, to identify circuits associated with prolonged restoration timelines and elevated customer impact during major events
- Utilize vegetation risk indices and circuit ranking methodologies to quantify vegetation exposure, outage risk, customer impact, and infrastructure criticality
- Utilize vegetation management and outage analytics to identify recurring vegetation-related outage locations, high-risk spans, and targeted mitigation opportunities

---

### **VM-03 | Expand Vegetation Risk Communication and Stakeholder Engagement**

Expand stakeholder engagement and customer outreach efforts to improve awareness of vegetation-related reliability risks, vegetation management activities, and long-term vegetation resiliency objectives.

### Implementation Guidance:

- Utilize outage, restoration, and vegetation management data to identify areas with elevated vegetation-related reliability risk and support targeted stakeholder engagement activities
  - Promote the Right Tree, Right Place program to reduce future vegetation conflicts with electric infrastructure
  - Target outreach efforts toward municipalities, community stakeholders, and customers located in high-risk vegetation areas or scheduled vegetation management work zones
  - Communicate vegetation-related outage causes, vegetation management activities, and the relationship between vegetation management and system reliability to customers and stakeholders
- 

## VM-04 | Implement Vegetation Management Monitoring and Program Evaluation

Develop performance measures and recurring evaluation processes to assess vegetation management effectiveness, support program adjustments, and inform long-term planning decisions.

### Implementation Guidance:

- Monitor planned versus completed trimming volumes, trim cycle adherence, vegetation-related reliability performance, repeat outage locations, contractor productivity, and storm response outcomes
  - Utilize program performance results, reliability data, and vegetation risk information to adjust work planning priorities and resource allocation
  - Reassess trim cycles, clearance standards, and vegetation management practices based on reliability performance, vegetation growth characteristics, and storm-related lessons learned
  - Align long-term vegetation management objectives with system reliability, resiliency, and storm hardening priorities
- 

## VM-05 | Integrate Vegetation Management into Storm Restoration Operations

Develop operational procedures for coordinating, deploying, and utilizing vegetation management resources during major restoration events.

### Implementation Guidance:

- Integrate vegetation management resources into damage assessment, access clearing, and restoration activities during major events
  - Utilize vegetation management personnel to identify, communicate, and mitigate vegetation-related access constraints and field safety hazards during restoration operations
  - Coordinate vegetation management and electric operations resources to support restoration priorities, field access requirements, and restoration objectives
  - Deploy vegetation management resources in alignment with restoration workload, damage severity, and operational priorities
  - Incorporate vegetation management resources into restoration training, exercises, and major event response activities
-

## VM-06 | Evaluate Targeted Strategies for Repetitive Vegetation-Related Outage Areas

Evaluate targeted infrastructure and vegetation management mitigation strategies for circuits and assets experiencing repetitive vegetation-related outages, elevated vegetation exposure, or prolonged restoration impacts.

### Implementation Guidance:

- Utilize outage history, vegetation-related reliability data, restoration performance data, and GIS analysis to identify circuits, spans, and assets with elevated vegetation-related risk
  - Implement mitigation strategies including enhanced vegetation management, covered conductor, selective undergrounding, sectionalizing, and other targeted hardening measures based on identified risk drivers
  - Prioritize mitigation investments based on outage frequency, customer impact, restoration complexity, vegetation exposure, and cost-effectiveness
  - Reassess high-risk circuits and vegetation corridors periodically to support capital planning, storm hardening, and vegetation management prioritization
- 

## VM-07 | Evaluate Advanced Vegetation Management Technologies and Practices

Evaluate emerging technologies, data sources, and industry practices that support vegetation risk identification, work planning, inspection activities, and system resiliency objectives.

### Implementation Guidance:

- Utilize advanced vegetation management technologies and data sources to support vegetation inspection, risk identification, work planning, and program performance assessment
  - Utilize LiDAR, aerial imagery, remote sensing technologies, and GIS-based analytics to identify vegetation exposure risks and support circuit prioritization activities
  - Incorporate vegetation risk data and analytics into annual work planning, circuit prioritization, and vegetation management decision-making activities
  - Maintain awareness of emerging vegetation management technologies, industry practices, and lessons learned from major storm events through engagement with peer utilities, industry organizations, and technology providers
- 

## 3.10 Restoration Management

NES's restoration strategy and operational execution were generally effective and aligned with industry-standard restoration practices. NES successfully restored a large number of customers under challenging conditions while employing restoration approaches, such as parallel primary and secondary restoration activities, that helped accelerate overall recovery. However, Winter Storm Fern demonstrated that restoration processes built around centralized prioritization, dispatch, switching coordination, and work management become increasingly constrained as outage volumes, restoration workload, and resource levels increase. Opportunities exist to enhance restoration scalability by increasing restoration throughput, improving work management and dispatch capabilities, reducing switching and communication bottlenecks, and strengthening the integration and utilization of internal and external restoration resources. These improvements would enable NES to more effectively manage large numbers of concurrent restoration activities while maintaining operational visibility, prioritization discipline, and restoration efficiency during large-scale events.

Restoration management encompasses the processes, systems, and decision-making activities used to coordinate outage restoration efforts during major events. Industry-standard restoration practices are

designed to restore service to the greatest number of customers in the shortest amount of time while maintaining worker and public safety.<sup>106</sup> Restoration activities are typically prioritized by restoring transmission facilities, substations, and major distribution feeders before progressing to laterals, taps, and individual customer outages. Effective restoration management requires the integration of damage assessment, restoration prioritization, resource allocation, switching operations, logistics coordination, and customer communications. As outage events increase in size and complexity, utilities often transition from highly centralized restoration models to more decentralized approaches that enable parallel decision-making, improve operational scalability, and reduce restoration bottlenecks.<sup>107</sup> Thresholds for when to decentralize depends on outage job counts, crew staffing levels, extent of damage, and logistical constraints.

### 3.10.1 Findings

NES's restoration strategy generally aligned with industry-standard restoration practices and was effective for the types of outage events historically experienced within its service territory. The restoration approach focused on restoring the greatest number of customers (and as informed by priority customers) as quickly as possible through centralized restoration planning, prioritization, dispatch, and switching coordination. While this approach is appropriate for the seasonal storms and restoration events typically experienced by NES, Winter Storm Fern demonstrated that restoration management processes designed around a centralized operating model become increasingly challenged as outage size, resource levels, and restoration complexity increase.

As restoration activities expanded, centralized work management processes, including restoration prioritization, work package development and distribution, dispatch, switching authority, and restoration coordination, created operational bottlenecks that limited the amount of work that could be accomplished concurrently. Reliance on a single radio channel early in the restoration and the continued use of centralized switching operations contributed to delays in field coordination and job completion. While these processes remained manageable during smaller restoration efforts, the scale of Winter Storm Fern exposed limitations in their ability to support a large number of concurrent restoration resources operating across the system.

The restoration prioritization process also relied heavily on manual review and coordination of outage information. System Control utilized available outage data, customer outage counts, and identified critical and priority customers to establish restoration priorities, which were then communicated to service centers for execution. While effective for typical restoration events, Winter Storm Fern demonstrated the operational challenges associated with manually prioritizing and reprioritizing restoration activities across a large number of outages, restoration resources, and customer priorities. In addition, the existing priority customer framework may not fully capture all customer types with elevated community impacts, potentially limiting visibility into certain facilities that may warrant additional consideration during major restoration events.

Winter Storm Fern also highlighted opportunities to further formalize restoration scaling processes associated with large-scale events. Decisions regarding when and how to reassign NES personnel as crew guides or bird dogs and integrate large numbers of external resources were generally made at the discretion of individual service areas. While there was little evidence that mutual assistance crews or contractors experienced significant delays awaiting work assignments, additional guidance, planning, training, and exercises could improve the speed and consistency with which external resources are integrated into restoration operations. Resource levels also appeared to remain elevated into the later stages of restoration, suggesting opportunities to further refine resource forecasting, mobilization, and demobilization processes for extended restoration events.

<sup>106</sup> American Public Power Association. (2018, June). Restoration best practices guidebook. [https://www.publicpower.org/system/files/documents/Restoration\\_Best\\_Practices\\_Guidebook\\_2018.pdf](https://www.publicpower.org/system/files/documents/Restoration_Best_Practices_Guidebook_2018.pdf)

<sup>107</sup> Association of Edison Illuminating Companies (AEIC) Storm Team, April 2025. Best Practices for Storm Preparation and Response

## Preparedness

NES's centralized outage restoration approach is generally adequate for the typical types of restoration events historically experienced within its service territory. In its ERP, the most severe storm classification applies to events impacting more than 50,000 customers, which is approximately four to five times smaller than the number of customers impacted during Winter Storm Fern. NES had established restoration processes, organizational structures, and prioritization methodologies designed to support centralized restoration management; however, PA did not identify evidence that restoration processes had been specifically evaluated or adapted for scenarios impacting nearly half of the customer base. Utilities facing large-scale outage events often supplement centralized restoration models with decentralized decision-making structures that allow restoration planning, prioritization, and coordination activities to occur concurrently across multiple operating areas.

Restoration priorities were established through a manual review process that incorporated customer outage counts, critical and priority customer information, and operational considerations. Under normal operating conditions, restoration activities follow a standard utility restoration sequence beginning with transmission and substation facilities, followed by main feeders and circuit backbones, laterals and taps, and ultimately individual services and single-customer outages. Restoration prioritization and work assignment decisions were coordinated through System Control and subsequently communicated to the service centers responsible for executing restoration activities.

## Performance

NES largely followed its Emergency Response Procedures to effect Fern restoration. On a regular cadence, System Operations compiled a spreadsheet using the latest available outage data, focusing on the highest customer-count outages, and coordinated with the Energy Services group to identify affected priority customers. Priority customers were subsequently identified in a separate column within the spreadsheet.<sup>108</sup> Outage restoration priorities largely in accordance with the order as identified in the Emergency Response Procedures sorting by largest number of impacted customers, accounting for critical customers (P1 to P3).<sup>109</sup> This spreadsheet was compiled by System Controls, then distributed to each of the major restoration centers (North Service Area, West Service Area, and Donelson Service Areas) typically around 4:00 AM CT daily. Restoration progress was tracked throughout the day, and the remaining outages were re-prioritized the following day and redistributed to the centers for the next operational period.

During the initial stages of restoration, emphasis was placed on restoring transmission facilities, substations, main feeders, and circuit backbones while simultaneously assigning vegetation management resources to support access and restoration activities. The restoration prioritization spreadsheet functioned as a living restoration management tool throughout the event; however, it represented periodic snapshots of system conditions rather than a real-time operational view. As restoration progressed, priorities were reevaluated daily based on completed work, updated outage information, and remaining customer impacts. Although restoration priorities were established by System Control, service areas retained the ability to adjust work execution based on local conditions, resource availability, and field observations.

Although restoration priorities were centrally established, field personnel retained discretion in how work was executed. Field observations indicated that crews occasionally completed nearby lower-priority work when it could be accomplished quickly and efficiently without adversely affecting higher-priority restoration activities. As a result, field-level decision making occurred alongside the centralized restoration prioritization process.

NES utilized a parallel restoration strategy in which line crews working on primary distribution facilities and service crews working on secondary and service-level infrastructure were dispatched

<sup>108</sup> Priority customers as defined as: Priority 1 (P1): customers that are water / wastewater / hospital facilities, Priority 2 (P2): customers that are critical communications equipment, nursing homes with life support / advanced care facilities, Priority 3 (P3): customers that are nursing homes without life support / advanced care facilities.

<sup>109</sup> Restoration order is major substations, transmission lines / distribution lines, then minor substations, then minor distribution lines, then priority customers and individual customers, and other considerations.

simultaneously. This approach differs from the more traditional restoration model in which service restoration activities occur primarily after restoration of the primary distribution system has been completed. NES also considered varying crew capabilities and qualifications when assigning restoration work, matching restoration activities to the capabilities of available crews to maximize overall productivity throughout the event.

As crews completed their assigned jobs, they (or their bird dogs) provided status updates and returned any hold orders to the System Control. This communication was also conducted via a single radio channel during the first few days of restoration. During this time, crews recalled delays of up to 20 minutes between when a job was ready for energization and when they were able to communicate with System Control to return the hold orders and energize the lines. This is one of the most common bottlenecks faced by utilities during large-scale operations—the reliance on one centralized group to handle all switching order development and lock-out/tag-out processes. System operators and dispatchers are often unable to develop switching plans and coordinate lock-out/tag-out activities fast enough when large numbers of crews are working concurrently on the system. Throughout the event, switching authority remained centralized within System Control. While this approach supported operational safety and consistency, it also contributed to restoration bottlenecks as the number of active restoration crews and switching activities increased.

Once received, the various centers would begin planning work activities for the next operational period (damage assessment and restoration) and prepare work packages prior to crews reporting at 6:00 AM. The centers used their discretion to dispatch jobs according to the prioritization established by System Control. The centers also had discretion to bundle certain lower-priority jobs with higher-priority work to minimize travel, setup, and breakdown times. This approach provided operational flexibility at the service center level and allowed restoration work to be adapted to local conditions and resource availability. However, restoration priorities were ultimately refined within each service area rather than managed through a single enterprise-wide restoration work queue.

One commendable action that NES took during Winter Storm Fern restoration was how it utilized service crews. Instead of waiting until the tail end of the restoration period to start dispatching smaller customer-count outages and secondary/service restoration jobs, NES dispatched crews who were not qualified to work on primary distribution voltages to work on the secondary system and service-level outages in parallel with primary restoration activities. The parallel nature of restoration on the primary and secondary systems helped accelerate overall restoration and reduced the amount of lower-customer-count work remaining during the later stages of the event. There were some challenges with how outages on primary lines and secondary/service outage jobs were dispatched (electronic dispatch via CADOPS and/or PCAD for primary outage jobs versus paper spreadsheet dispatch for secondary/service outage jobs); however, the overall approach helped shorten the restoration period.

### 3.10.2 Recommendations

#### **RM-01 | Increase Restoration Throughput During Large-Scale Events**

Modify restoration coordination processes to increase the volume of restoration work that can be planned, assigned, switched, dispatched, and completed concurrently during large-scale outage events.

##### **Implementation Guidance:**

- Utilize event-based, circuit sweep, or hybrid restoration approaches based on damage density, restoration workload, and resource availability
- Distribute restoration planning, dispatch, and switching activities across multiple operating areas during large-scale outage events
- Establish operational thresholds that trigger the transition from normal restoration operations to large-event restoration operations
- Increase the number of restoration jobs that can be planned, assigned, dispatched, and completed concurrently during major events

- Validate restoration throughput capabilities through functional and full-scale exercises focused on work assignment, dispatch, switching coordination, and field execution activities
- 
- 

## **RM-02 | Standardize Resource Deployment and Crew Utilization Processes**

Standardize how restoration resources are deployed, supervised, assigned work, and integrated into restoration operations during major events.

### **Implementation Guidance:**

- Utilize crew guides, bird dogs, field supervisors, and restoration support personnel in alignment with restoration workload, resource levels, and operational requirements
  - Maintain supervisory staffing levels sufficient to support varying levels of mutual assistance crews, contractors, and external restoration resources
  - Assign restoration work based on crew qualifications, capabilities, resource availability, and supervisory capacity
  - Integrate service crews, vegetation management crews, contractors, and mutual assistance resources into daily restoration operations and work assignment activities
  - Adjust restoration resource levels throughout the event lifecycle to align with restoration workload and remaining work activities
- 
- 

## **RM-03 | Improve Restoration Work Management, Dispatch, and Switching Capabilities**

Improve restoration work management, dispatch, switching coordination, and field communications processes to reduce operational bottlenecks during major events.

### **Implementation Guidance:**

- Establish a common restoration work queue and prioritization process that maintains enterprise-wide visibility into restoration priorities while allowing service areas flexibility to adapt work assignments based on local conditions
  - Utilize OMS, CADOPS, PCAD, and related operational systems as the primary tools for restoration prioritization, work assignment, and restoration status tracking
  - Eliminate spreadsheet-based and paper-based restoration management processes where system functionality can support the same activities
  - Configure restoration systems to support the assignment and tracking of external crews, crew guides, bird dogs, and restoration support personnel
  - Standardize dispatch processes for primary, secondary, and service restoration activities
  - Establish dedicated radio channels for each restoration operating area during major events
  - Evaluate opportunities to distribute switching order development, switching coordination, and dispatch activities during large-scale restoration events
  - Resolve system, licensing, mobile device, and connectivity limitations that constrain restoration operations during large-scale events
- 
-

## 3.11 Safety

NES demonstrated strong safety performance throughout Fern despite hazardous weather conditions, widespread infrastructure damage, challenging field conditions, and the deployment of a large contractor and mutual assistance workforce. Maintaining safe restoration operations under these conditions is a significant accomplishment and reflects the strength of NES's safety culture, safety programs, and operational discipline. At the same time, Fern highlighted the importance of scalable safety oversight, contractor integration processes, and public safety measures capable of supporting large-scale restoration activities involving substantial resource deployments and prolonged response operations.

During major outage and restoration events, the safety organization plays a critical role in protecting employees, contractors, mutual assistance personnel, and the public. As storms damage electrical infrastructure and create hazardous working conditions, safety personnel implement safety protocols, conduct risk assessments, monitor field conditions, and provide oversight to help ensure restoration activities are performed safely and in accordance with established requirements. Safety personnel also support contractor onboarding, communicate lessons learned, coordinate public safety activities, and provide guidance to field crews operating in dynamic and often hazardous environments. By maintaining a strong focus on safety throughout the restoration process, utilities can support efficient restoration efforts while minimizing risk to responders and the communities they serve.

### 3.11.1 Findings

NES's safety program performed effectively throughout Fern despite hazardous weather conditions, widespread system damage, and the deployment of a large contractor and mutual assistance workforce. No Serious Injury or Fatality (SIF) events were reported among NES personnel, contractors, or mutual assistance crews, and no known incidents involving members of the public coming into contact with energized conductors were identified during the restoration effort. A total of 17 minor injuries, primarily slips, trips, and falls, and 13 minor vehicle incidents were reported during restoration activities.<sup>110</sup>

The event demonstrated the effectiveness of NES's safety culture, Hazardous Energy Control (HEC) program, contractor onboarding processes, and safety governance practices. NES successfully onboarded and deployed a significant number of non-native crews while maintaining established safety requirements and controls. Operational questions regarding the implementation of recent HEC revisions were addressed through established safety review processes and temporary guidance issued during the event, allowing restoration activities to continue while maintaining appropriate safety controls.

While overall safety performance was strong, Fern highlighted the challenges associated with scaling field safety oversight during large restoration events. Limited dedicated safety personnel reduced the amount of field safety coverage available relative to the size of the restoration workforce. In addition, widespread system damage, recurring infrastructure failures, hazardous road conditions, and delays in Tennessee 811 (underground asset location, or "call before you dig" service) response activities created additional safety and operational challenges that required ongoing management throughout the restoration effort.

### Preparedness

Prior to Fern, NES maintained an established safety program supported by formal procedures, contractor onboarding processes, field safety oversight, and its HEC program. The HEC program serves as the primary framework governing electrical safety activities across the organization and is designed to comply with OSHA 29 CFR 1910.269.<sup>111</sup> Originally implemented in 2017, the HEC program

<sup>110</sup> Nashville Electric Service Winter Storm After Action Review Data Request #147: Contractor and mutual aid safety incidents during Winter Storm Fern

<sup>111</sup> Occupational Safety and Health Administration. (2024). Electric power generation, transmission, and distribution (29 C.F.R. § 1910.269). U.S. Department of Labor. <https://www.ecfr.gov/current/title-29/subtitle-B/chapter-XVII/part-1910/subpart-R/section-1910.269>

has undergone several revisions over time, with the version in effect during Fern last updated in 2025. The program governed electrical safety, clearance management, isolation practices, and employee protection activities throughout the restoration effort.

NES maintained a lean safety organization responsible for supporting both day-to-day operations and major event response activities. Safety personnel were supplemented by contractor and mutual assistance safety resources during storm response; however, the limited number of dedicated field safety personnel reduced the amount of direct safety oversight available relative to the size of the restoration workforce.

Fern also presented unique safety challenges associated with widespread icing on electrical infrastructure, equipment, and roadways. To support safe restoration operations under these conditions, all NES bucket trucks and heavy equipment were equipped with snow chains during the early stages of the event, and contractors and mutual assistance crews utilized snow chains where appropriate. These preparations helped mitigate transportation and access risks associated with deteriorated road conditions during the restoration period.

## Performance

Fern created challenging and dynamic field conditions throughout the restoration effort. In addition to widespread infrastructure damage, crews encountered recurring damage as additional conductors, poles, and vegetation failed following initial repairs. There were reports of power lines coming down immediately after restoration work had been completed, particularly in western portions of the service territory, requiring crews to revisit locations and perform additional repairs. Figure 19 illustrates the type and severity of damage crews continued to encounter throughout the restoration effort.<sup>112</sup> These conditions increased operational risk, complicated restoration sequencing, and reinforced the need for continuous situational awareness and adherence to established safety practices.

Early in the restoration effort, NES identified the ability to safely onboard and deploy contractor and mutual assistance personnel as a key factor influencing restoration progress. HEC requirements and NES safety practices were incorporated into onboarding activities for crews that had not previously worked on the NES system. As the event progressed, NES significantly reduced the time required to onboard non-NES resources, enabling contractor and mutual assistance personnel to be deployed more quickly while maintaining established safety requirements and controls. This allowed additional outside resources to actively contribute to restoration activities as resource requirements increased. As restoration activities expanded, NES continued to evaluate crew qualifications and capabilities to ensure personnel were assigned work consistent with their training, experience, and operational limitations. This was particularly important given the diverse mix of responding organizations, as not all crews were qualified or willing to perform all restoration activities. For example, Austin Energy crews requested assignment to de-energized portions of the system, reinforcing the importance of understanding crew capabilities and matching resources to appropriate work assignments during large-scale restoration events.<sup>113</sup>

The scale of system damage and the volume of outside resources deployed also created challenges associated with clearance management. Revisions to the HEC program issued on November 4, 2025, permitted qualified non-native crews to hold clearances under defined conditions; however, during

Figure 19: Davidson Feeder F9



<sup>112</sup> Nashville Electric Service Winter Storm After Action Review Data Request #93: Copies of Davidson F9 feeder damage photos and videos

<sup>113</sup> PA Interview with Austin Energy, April 3, 2026

interviews conducted as part of this assessment, some personnel questioned the appropriateness of allowing non-native crews to exercise this authority during a large-scale restoration event. As restoration activities expanded and the need to safely deploy additional resources increased, NES addressed these concerns through its established safety governance process. On Tuesday, January 27, NES issued a Safety Alert titled “ST2605 (Winter Storm Fern) Temporary Process: Public Safeguarding During Widespread System Damage.”<sup>114</sup> The alert established temporary procedures to support restoration activities requiring the energization of main circuits while isolating damaged taps and was applicable only for the duration of the emergency restoration effort. The issuance of the alert provided additional operational clarity regarding the application of HEC requirements during storm restoration activities and enabled restoration work to continue while maintaining appropriate safety controls.

NES did not utilize wire guards (e.g., personnel standing by locations to prevent members of the public from coming into contact with energized conductors) during Winter Storm Fern restoration. When inquired about the use of wire guards, the concept was initially considered; however, due to the extent of system damage, it was not implemented because of the resources required to secure all instances of downed wire. It was noted that fire and police personnel were, at times, performing similar public safety functions.<sup>115</sup>

Icy conditions also affected supporting restoration activities. Following the storm, response times for 811 locate requests were delayed as mark-out personnel and vendors experienced difficulty accessing locations. These delays created challenges for restoration activities requiring underground utility verification and excavation support. To address the issue, NES legal sent letters to the appropriate authorities to facilitate restoration activities and encourage timely deployment of 811 personnel and vendors under emergency conditions.<sup>116</sup> While ultimately resolved, the delays represented an additional operational constraint during the early stages of restoration.

Safety incidents from prior days were communicated during morning field meetings, indicating that incidents and lessons learned were communicated on a daily basis. While dedicated field safety personnel were limited, the absence of serious incidents during the restoration effort indicates that crews were generally operating safely. Additional safety personnel may have provided incremental oversight and assurance.

Several safety-related incidents were reported during the restoration effort, including 17 minor injuries, primarily slips, trips, and falls associated with icy conditions, and 13 minor vehicle incidents.<sup>117</sup> An electrical workmanship incident also occurred when a contractor lineman failed to install one of the required suspension insulators on a high-voltage conductor during restoration activities.<sup>118</sup> As restoration timelines extended and customer frustration increased, threats and hostile interactions directed toward NES employees, contractors, and mutual assistance personnel were also reported. Despite these challenges, no SIF events were reported during the restoration effort, and no reported incidents involving members of the public coming into contact with energized conductors were identified.

### 3.11.2 Recommendations

#### **SAF-01 | Continued Enhancement of HEC Administration and Clearance Management**

Continue to evaluate and refine HEC requirements, clearance management processes, and emergency restoration provisions to ensure the program effectively supports large-scale contractor and mutual assistance deployments while maintaining appropriate safety controls.

<sup>114</sup> Nashville Electric Service Winter Storm After Action Review Data Request #70: Wire-down event response and wire-watching process

<sup>115</sup> Nashville Electric Service Winter Storm After Action Review Data Request #145: Proposed HEC emergency rule modification intent

<sup>116</sup> Nashville Electric Service Winter Storm After Action Review Data Request #63: Underground facility locate stoppage and resumption communications

<sup>117</sup> Nashville Electric Service Winter Storm After Action Review Data Request #147: Contractor and mutual aid safety incidents during Winter Storm Fern

<sup>118</sup> *ibid*

### Implementation Guidance:

- Review lessons learned from Fern regarding the use of qualified non-native crews holding clearances and identify opportunities to improve clarity, consistency, and operational understanding of HEC requirements
  - Evaluate clearance management processes under large-scale restoration conditions to ensure they support efficient deployment of outside resources without compromising safety
  - Assess the application of Section 1.7 of the HEC and establish clear criteria, authorities, documentation requirements, and communication protocols for modifying or suspending portions of the HEC during emergency restoration activities
  - Periodically review HEC requirements and associated job aids to ensure they remain aligned with evolving restoration practices, workforce models, and industry leading practices
- 

## SAF-02 | Establish Scalable Field Safety Oversight Requirements

Evaluate field safety oversight requirements to ensure sufficient safety resources are available to support large restoration workforces, widespread damage conditions, and extended restoration operations.

### Implementation Guidance:

- Assess field safety staffing requirements based on restoration workforce size, geographic distribution, and operational complexity
  - Identify potential sources of field safety inspectors, and establish contracting vehicles for external safety inspectors if insufficient NES resources are available
  - Define safety resource activation triggers and staffing thresholds for contractor and mutual assistance deployments
  - Develop field safety coverage plans for major events that address oversight of clearance activities, contractor operations, staging areas, and high-risk restoration work
  - Establish processes for monitoring field safety coverage during major events and adjusting staffing levels as restoration activities expand or contract
- 

## SAF-03 | Validate Safety-Critical Restoration Processes

Continue to strengthen safety performance by validating safety-critical restoration processes through exercises, event reviews, and lessons learned activities.

### Implementation Guidance:

- Incorporate high-consequence safety scenarios into future restoration exercises, including electrical contacts/electrocutions, clearance violations, serious injuries, fatalities, severe vehicle accidents, etc.
- Exercise procedures associated with HEC modification, suspension, and temporary restoration processes under realistic storm conditions, including scenarios requiring consideration of Section 1.7 of the HEC and the suspension of selected HEC requirements to support emergency restoration activities while maintaining appropriate safety controls
- Validate safety notification, escalation, investigation, and communications procedures involving operations, safety, communications, executive leadership, and external agencies
- Evaluate contractor and mutual assistance integration processes during exercises, including onboarding, qualification verification, clearance management, and field supervision activities

- Utilize lessons learned from exercises and major events to update HEC requirements, restoration procedures, safety practices, and training programs

---

## 3.12 Communications

Fern exposed limitations in NES's communications capabilities, governance, and integration with response operations, resulting in a largely reactive communications posture during a major event. Communications personnel did not consistently have direct access to reliable operational information, and communications often operated in parallel with operations rather than as an integrated function. Roles, responsibilities, approval pathways, and coordination processes were not always clearly defined or consistently applied, contributing to delayed and inconsistent messaging. These challenges increased customer inquiries across multiple channels and added demands on operational personnel already supporting restoration activities. Collectively, these observations highlight opportunities to strengthen communications governance, improve access to operational information, and establish a more coordinated communications capability during future major events.

Utility customers expect timely, transparent, and actionable communications before, during, and after major outage events. Industry-leading utilities establish communications as an integrated component of emergency response operations, with clearly defined leadership roles, direct access to operational information, and established processes for coordinating messaging across operational, customer service, government relations, and executive functions.<sup>119</sup> Communications personnel are typically embedded within the incident management structure and supported by standardized approval processes, communication plans, stakeholder engagement strategies, and customer communication platforms designed to operate under large-scale outage conditions. Effective communications programs help establish customer expectations, maintain public confidence, support stakeholder engagement, and provide customers with actionable information throughout the restoration process.<sup>120</sup>

### 3.12.1 Findings

Communications during Fern was constrained by the absence of a defined operating model that integrated communications activities with restoration operations. While communications plans, approval processes, and external support arrangements existed, communications activities were not supported by clearly established reporting relationships, information management processes, or decision-making structures capable of operating at the scale and pace required during a prolonged restoration event. As restoration activities expanded, communications personnel frequently relied on manual coordination and informal information-sharing mechanisms to obtain information needed to support customer, stakeholder, media, and government communications.

These limitations became increasingly evident as restoration activities expanded and information requirements increased across customers, media representatives, elected officials, employees, regulators, and other stakeholders. Communications personnel were required to support multiple audiences simultaneously while adapting to rapidly changing restoration conditions and evolving operational priorities. Existing communications processes were not designed to efficiently manage the volume, complexity, and speed of information exchange required during a prolonged restoration effort, creating challenges in maintaining message consistency, communication timeliness, and alignment between operational activities and customer-facing communications. Information communicated externally was not always timely, complete, or reflective of current restoration conditions, resulting in situations where customers and stakeholders relied on outdated information or received limited visibility into restoration activities. As a result, NES was increasingly challenged to maintain control of the restoration narrative. Rumors, assumptions, and unverified information regarding restoration progress, mutual assistance acquisition, resource deployment, and restoration priorities circulated among

---

<sup>119</sup> "Customer Engagement for the Future," Omaha Public Power District, September 16, 2025.

<sup>120</sup> "Becoming Frictionless – our Transformation Journey to Outage Improvement and More" APS, June 15, 2023

customers, media outlets, and other stakeholders, reducing confidence in official communications and increasing reliance of alternate information sources.

As customer demand for information increased, NES devoted significant effort to communications activities across multiple channels. However, communications capabilities were not sufficiently integrated with restoration planning, operational reporting, and restoration status development processes to consistently provide customers and stakeholders with timely, accurate, and actionable information. This contributed to increased information requests, greater reliance on alternate stakeholder communication channels, and additional demands on operational personnel supporting restoration activities.

## Preparedness

Prior to Fern, NES maintained several elements of a communications framework intended to support major event response activities, including crisis communications plans, communication flows, approval processes, stakeholder communication procedures, media engagement activities, and relationships with external communications partners. Corporate Communications, Government Relations, executive leadership, and external communications resources were all expected to support communications activities during major events.

Despite the existence of these elements, communications roles, responsibilities, and coordination mechanisms had not been fully operationalized prior to Fern. Communications leadership, decision-making authority, reporting relationships, and coordination mechanisms were not clearly defined within a scalable incident management structure. While communications plans referenced crisis communications teams and approval workflows, there was limited evidence that these processes had been fully operationalized, exercised, or validated under conditions representative of a prolonged large-scale restoration event. Internal correspondence issued on Thursday, January 22 acknowledged that portions of the crisis communications plan had not been fully updated and that certain personnel were unfamiliar with their assigned responsibilities, indicating that communications roles and expectations had not been fully socialized prior to storm impact.

NES and its external communications partner (Finn Partners) began pre-storm coordination activities on Tuesday, January 20 and Wednesday, January 21, including storm preparation calls, operational update meetings, media outreach planning, social media monitoring, and message development. As the storm progressed, additional communications support (Benchmark Communications, BHA Strategy) were brought on to assist. However, the roles and responsibilities of supporting organizations, including Finn Partners, Benchmark Communications, and BHA Strategy, were not formally documented within a defined communications organization and instead evolved throughout the event. Similarly, coordination between Corporate Communications and Government Relations relied primarily on established working relationships rather than a formally integrated communications structure with shared governance, decision-making authority, and synchronized communications processes.

Communications personnel had limited opportunities to participate in training, exercises, or simulations focused on major outage response communications. Pre-approved communications templates and ready-to-deploy messaging libraries were limited, requiring significant message development, review, and approval activities during the event. In addition, communications personnel did not have established processes for obtaining real-time operational information needed to support restoration communications, increasing dependence on manual coordination with operational personnel during a major event.

While planning documents identified communication objectives, target audiences, communication channels, and recommended communication cadences, pre-storm communications activities did not consistently reflect those expectations. NES initiated outreach beginning on Wednesday, January 21, including a media release, social media activity, and limited media engagement; however, communications were not sustained consistently as forecast confidence increased. No media releases were issued on Thursday, January 22 or Friday, January 23, despite increasing storm risk and an approaching weekend impact. Communication cadence, channel utilization, and stakeholder outreach varied throughout the pre-storm period. These observations indicate that communication objectives and

cadence expectations had not been fully translated into an operational communications strategy supported by defined message priorities, communication triggers, escalation pathways, and execution requirements.

Internal communications preparedness was limited and not sufficiently structured. Although planning materials referenced employee communications and identified channels for internal updates, there was no consistent pre-storm briefing cadence or formal mechanism to ensure employees were aligned on messaging, roles, responsibilities, and expectations. This gap is evidenced by the timing of initial internal communications, with the first systemwide employee message not issued until the evening of January 25, after significant outages had already occurred, suggesting that internal alignment mechanisms had not been fully established or activated prior to storm impact.

## Performance

Communications activity during Fern was substantial. NES and its communications partners supported media relations, stakeholder communications, social media engagement, website updates, customer communications, employee communications, and government relations activities throughout the restoration effort. Between Saturday, January 24 and Thursday, February 5, NES issued approximately 63 media advisories, conducted more than 30 media interviews, and participated in seven press conferences.<sup>121</sup> Social media reach was significant, with Facebook generating more than 22 million views and approximately 1.5 million page visits, X (formerly Twitter) generating approximately 7 million impressions and more than 650,000 engagements, and Instagram generating more than 5 million impressions.<sup>122</sup> Despite this level of activity, communications effectiveness was constrained by limitations in organizational structure, information management, communications governance, and integration with restoration operations.

Communications activities were not consistently executed through a unified organizational structure. Corporate Communications, Government Relations, operational personnel, executive leadership, external communications partners, and customer-facing teams all played active roles in communications throughout the event. However, communications leadership, decision-making authority, and coordination responsibilities were not always clearly defined, resulting in parallel workstreams, inconsistent messaging, and fragmented execution. Finn Partners provided support throughout the event and transitioned to on-site support beginning on Wednesday, January 28. An additional communications support resource was also engaged that same day and subsequently integrated into the communications effort on Monday, February 2. While these resources provided valuable surge support, their integration further highlighted the absence of a clearly defined communications organizational structure, decision-making framework, and escalation processes.

Communications personnel did not have direct access to many of the operational systems and restoration information sources needed to support real-time communications, including outage management information, restoration status information, and ETR development activities. Information was frequently obtained through verbal updates, spreadsheets, manually developed reports, and direct coordination with operational personnel. As restoration conditions evolved, this approach limited situational awareness and reduced the ability to rapidly convert operational developments into customer-facing information. These challenges were particularly significant given customer demand for restoration information. Website traffic increased from approximately 33,000 visits on Saturday, January 24 to nearly 687,000 visits on Sunday, January 25 and remained above 200,000 visits per day through January 31.<sup>123</sup> Similarly, the outage map received more than 11 million views during the event, including more than 2.4 million views on Sunday, January 25 alone.<sup>124</sup> Despite this demand, communications personnel did not consistently have direct visibility into the restoration information customers were seeking.

<sup>121</sup> Nashville Electric Service Winter Storm After Action Review Data Request #28: Interviews or press briefings conducted by NES leadership

<sup>122</sup> Nashville Electric Service Winter Storm After Action Review Data Request #31: Social media engagement metrics

<sup>123</sup> Nashville Electric Service Winter Storm After Action Review Data Request #21: Daily inbound customer inquiry volumes by channel

<sup>124</sup> *ibid*

Communications governance processes also struggled to scale with the pace and complexity of the event. A significant volume of communications content was developed throughout the restoration effort; however, approval processes frequently introduced delays and inconsistencies in message dissemination. For example, on Saturday, January 31, seven of eight drafted media advisories were not approved, and on Sunday, February 1, none of four drafted advisories were approved. These patterns indicate increasing friction within the communications approval process at a time when timely information dissemination was critical. Communications cadence also evolved throughout the restoration effort. NES initially provided hourly updates but transitioned to a reduced update schedule on Friday, January 30 despite continued high customer demand for information and ongoing uncertainty regarding restoration timelines. While intended to improve information quality and manage communications workloads, the change contributed to customer frustration and increased demand for information through alternate channels.

Government Relations became a significant supplemental communications channel during the event, maintaining direct engagement with elected officials, government agencies, and community stakeholders. Government Distribution List outreach increased substantially as restoration activities progressed, including one pre-storm communication on Thursday, January 22, two communications on Saturday, January 24, ten communications on Sunday, January 25, and seven communications on Monday, January 26, followed by continued updates throughout the restoration period. NES also maintained continuous representation at the Metro EOC from Friday, January 23 through Tuesday, February 10, participated in TEMA briefings beginning Friday, January 30, conducted webinars for elected officials on Friday, January 30, Sunday, February 1, and Wednesday, February 4, and processed more than 5,000 stakeholder inquiries through email, phone, and text.<sup>125</sup> While these efforts helped address stakeholder information needs, they also reflected increasing demand for information that was not always being satisfied through primary communications channels.

Social media served as a primary customer engagement channel throughout the event and generated substantial customer interaction. However, engagement levels were not consistently maintained throughout the restoration effort. During periods of peak demand, customer responses and direct engagement activities were reduced or ceased altogether. On Thursday, January 29, senior NES leadership directed communications personnel to significantly reduce direct social media engagement activities.<sup>126</sup> While intended to manage communications workloads and focus resources on message development and dissemination, this decision reduced opportunities to address customer concerns, correct misinformation, and reinforce key restoration messages during a period of heightened customer frustration and uncertainty.

Internal communications activities also lagged restoration operations. The first systemwide employee communication was not issued until the evening of Sunday, January 25, after significant outages had already occurred and external communications activities were already underway. As a result, employees were not consistently aligned on messaging, priorities, and escalation pathways during the early stages of the response, increasing reliance on informal information-sharing mechanisms across the organization.

Customer sentiment remained overwhelmingly negative throughout much of the restoration effort, with approximately 38% negative sentiment compared to only 4% positive sentiment.<sup>127</sup> Customers frequently cited inconsistent information, limited restoration visibility, and a lack of acknowledgment of customer hardship during prolonged outages and extreme cold conditions. Communications activities were not consistently aligned with restoration planning, restoration status development, and customer information requirements, limiting the utility's ability to provide timely, accurate, empathetic, and actionable information throughout the event.

---

<sup>125</sup> Nashville Electric Service Winter Storm After Action Review Data Request #55: Major event local government and municipality communication process

<sup>126</sup> Nashville Electric Service Winter Storm After Action Review Data Request #123: Records of directive to pause social media response

<sup>127</sup> Nashville Electric Service Winter Storm After Action Review Data Request #30: Social media monitoring and sentiment analysis reports

## 3.12.2 Recommendations

### **COM-01 | Establish an Integrated Storm Communications Organization**

Establish a unified storm communications organization with clearly defined leadership, roles, responsibilities, and coordination mechanisms capable of supporting large-scale restoration events.

#### **Implementation Guidance:**

- Designate a Public Information Officer (PIO) within the Incident Command System to support storm communications strategy, coordination, and execution
  - Define communications leadership, reporting relationships, decision-making authority, and escalation pathways for major events
  - Develop a scalable communications staffing model that identifies core positions, surge staffing requirements, backup coverage, and activation triggers based on event severity and customer impacts
  - Clearly define the roles and responsibilities of Corporate Communications, Government Relations, executive leadership, customer-facing teams, and operational personnel during major events
  - Establish formal ways of working between Communications and Government Relations, including shared messaging, coordinated releases, and integrated stakeholder engagement processes
  - Define the role of external communications partners, including advisory, execution, surge support, and escalation responsibilities, and integrate those resources into the communications organization before major events occur
  - Benchmark communications staffing, organizational structure, and storm communications capabilities against peer utilities with mature communications programs
- 

### **COM-02 | Establish Communications Governance and Decision-Making Processes for Major Events**

Develop streamlined governance structures and approval processes that support timely, coordinated communications during rapidly evolving restoration events.

#### **Implementation Guidance:**

- Establish a storm-specific communications governance model defining responsibility for drafting, reviewing, approving, and disseminating communications across all channels
  - Define approval workflows and service-level expectations for routine, high-priority, and sensitive communications
  - Establish escalation procedures for communications requiring legal, regulatory, political, or executive review
  - Clearly define decision rights and approval authority for operational updates, ETR communications, media statements, social media content, stakeholder communications, and executive messaging
  - Establish policies governing customer engagement through social media, including response expectations, escalation procedures, and criteria for modifying or suspending engagement activities during major events
  - Periodically evaluate communications governance performance following exercises and major events and incorporate lessons learned into future processes
- 
-

## COM-03 | Develop and Operationalize a Comprehensive Crisis Communications Strategy

Develop a comprehensive crisis communications strategy that establishes communications objectives, messaging principles, communication triggers, stakeholder engagement requirements, and customer communication expectations throughout all phases of a major event.

### Implementation Guidance:

- Establish communications principles emphasizing transparency, consistency, empathy, credibility, and proactive expectation management
  - Develop a structured message architecture built around a limited number of core messages for each operational period
  - Define communication objectives, communication triggers, minimum communication cadence requirements, and audience-specific messaging requirements throughout preparedness, response, and restoration phases
  - Establish channel-specific communication protocols defining ownership, purpose, timing, and target audiences for each communication platform
  - Incorporate sentiment monitoring, misinformation management, and narrative tracking processes into storm communications activities
  - Develop dedicated communication strategies for elected officials, government agencies, community stakeholders, and other key stakeholder groups
  - Establish a formal community outreach and message amplification network utilizing trusted community organizations, civic groups, and other local partners to expand communications reach during major events
- 

## COM-04 | Improve Communications Integration with Restoration Operations

Integrate communications personnel, processes, and information requirements directly into restoration operations to improve situational awareness and support timely customer communications.

### Implementation Guidance:

- Embed communications personnel within operational briefings, planning meetings, and restoration coordination activities during major events
  - Establish direct access to outage management information, restoration status information, ETR development activities, and other operational information needed to support customer communications
  - Define communications information requirements and establish standardized operational reporting products that support customer-facing communications
  - Integrate communications personnel into ETR development, restoration planning, and restoration prioritization discussions
  - Develop operational dashboards and information-sharing processes that provide communications personnel with timely access to validated restoration information
  - Establish dedicated communications support within Planning or Situation Unit functions responsible for translating operational information into customer-facing messaging
- 
-

## **COM-05 | Strengthen Communications Readiness, Training, and Workforce Capabilities**

Establish a formal communications readiness program that develops the competencies, skills, and capabilities necessary to support large-scale restoration events.

### **Implementation Guidance:**

- Define competency requirements for all storm communications positions, including crisis communications, media relations, social media management, stakeholder engagement, and utility restoration knowledge
  - Use competency requirements to support hiring, workforce planning, contractor management, and succession planning activities
  - Conduct recurring communications-specific training focused on crisis communications, media engagement, customer communications, and stakeholder management
  - Integrate communications personnel into ERP exercises, ICS exercises, and major event simulations
  - Provide media training to executives, operational leaders, spokespersons, and other personnel who may interact with the public during major events
  - Track corrective actions from exercises and incorporate lessons learned into communications plans, staffing models, governance processes, and training programs
- 

## **COM-06 | Develop Storm Communications Tools, Templates, and Internal Communications Capabilities**

Develop the tools, templates, and internal communications capabilities necessary to support rapid, consistent, and scalable communications during major events.

### **Implementation Guidance:**

- Develop and maintain a library of pre-approved communications templates for preparedness messaging, outage updates, ETR communications, media releases, stakeholder briefings, employee communications, and social media content
  - Design communications templates to allow rapid insertion of event-specific information without requiring extensive drafting or review
  - Develop standardized messaging directing customers and stakeholders to authoritative information sources, including outage maps, websites, customer alerts, and contact centers
  - Establish a structured internal communications program that includes employee briefing materials, leadership updates, communications cadence requirements, and escalation procedures
  - Ensure employees receive timely access to validated information, key messages, and customer response guidance during major events
  - Incorporate internal communications requirements into communications plans, exercises, and post-event reviews
-

## 3.13 Customer Experience

Customer experience during major outage events reflects the extent to which customers can successfully report outages, access reliable information, understand restoration progress, and obtain assistance throughout the restoration effort. While communications, outage management, and call center operations each contribute to customer experience, customers ultimately evaluate their experience based on the utility's ability to provide timely, accurate, and actionable information while minimizing uncertainty during prolonged outages. Effective customer experience programs also recognize the differing needs of customer populations, including critical and medically vulnerable customers, and incorporate customer feedback and sentiment into response activities to help manage expectations, identify emerging issues, and support informed decision-making throughout the event.

### 3.13.1 Findings

Customer experience during Winter Storm Fern varied significantly depending on outage duration, customer circumstances, and the channels customers used to interact with NES. Customer interactions with NES during Fern included: reporting outages, obtaining restoration information, receiving updates regarding restoration progress, and seeking assistance throughout the event. The assessment identified opportunities to improve customer access to restoration information, strengthen the resiliency of outage reporting and customer service channels, and enhance support for critical and vulnerable customer populations during large-scale outage events.

One of the most significant customer experience challenges during Winter Storm Fern was limited visibility into restoration progress. During the most critical phases of the event, customers had little ability to understand where they were in the restoration process or when service was expected to be restored. ETRs were not publicly available until approximately Day 7 of the restoration effort, and customers frequently expressed a desire for more localized information regarding restoration activities, including whether crews had been assigned, the status of repairs in their area, and expected restoration timelines. In addition, limited customer engagement through social media channels reduced customers' ability to obtain timely, accurate, and actionable information throughout the event. As outage durations increased, the lack of restoration visibility became a significant source of customer frustration and uncertainty.

The event also highlighted the importance of maintaining reliable outage reporting and customer service channels during periods of extreme demand. As outages expanded across the service territory, customers increasingly relied on outage reporting systems, the outage phone line, the website, text messaging platforms, IVR systems, and customer service representatives to report outages and obtain information. Several customer-facing systems experienced service disruptions, outages, or capacity constraints during periods of peak demand, limiting customers' ability to report outages, verify outage status, and obtain assistance when they needed it most. While NES maintained multiple customer contact channels, the event demonstrated the need for resilient and scalable customer-facing systems capable of supporting the demands associated with a prolonged large-scale outage event.

Winter Storm Fern also highlighted challenges associated with identifying, supporting, and communicating with critical and vulnerable customer populations during widespread outages. While NES maintained a formal Critical Referral Program and established escalation processes, the program relied heavily on customer enrollment and did not provide comprehensive visibility into all vulnerable customers across the service territory. During widespread outages, restoration priorities were appropriately driven by system restoration requirements. In addition, stakeholder interviews and escalation records indicate that some critical customer cases were identified through elected officials, agencies, or external stakeholders rather than through existing operational processes. These observations highlight opportunities to improve situational awareness, communication, and support mechanisms for vulnerable populations during future large-scale outage events.

### Preparedness

Prior to Winter Storm Fern, NES maintained multiple customer-facing systems and processes intended to support outage reporting, customer communications, and customer assistance during outage events.

Customers could report outages through the dedicated outage reporting phone line, text messaging platform, and myAccount portal, while restoration information was available through the outage map and other communication channels. NES also routinely utilized pre-storm communications to provide customers with preparedness information, safety guidance, and instructions for reporting outages and obtaining storm-related information.

Although customers had access to multiple information channels, NES had not historically provided ETRs during major outage events. As a result, the utility had not established the operational processes, governance framework, technology configurations, or communication protocols necessary to develop and communicate restoration estimates during a large-scale outage event. Similarly, while the outage map provided customers with visibility into outage locations and outage status, it was not designed to provide detailed restoration information or localized restoration progress updates during a prolonged major restoration effort.

Customer reporting and assistance capabilities were supported through a combination of customer service personnel, outage reporting systems, and customer contact technologies. Prior to Fern, NES operated a hybrid staffing model consisting of approximately 80 in-house customer service representatives supplemented by two overflow call center vendors capable of providing an additional 45 representatives during periods of elevated call volume. Customer service operations were supported by dedicated outage reporting and customer service phone lines, IVR capabilities, customer information systems, text messaging services, web-based reporting tools, and remote work arrangements. While these capabilities were sufficient to support routine operations and smaller outage events, they had not been fully tested under the sustained customer demand, extended outage durations, and elevated information needs associated with a large-scale restoration event affecting nearly half of the customer base.

NES also maintained processes intended to identify and support critical customers through its Critical Referral Program. The program was designed to track customers who self-reported their reliance on electrically powered life-sustaining medical devices through a customer enrollment and physician verification process. As the program relied on customer's self-identification, it did not provide a comprehensive view of all vulnerable customers within the service territory and could not track vulnerable customers who did not report or those that were not able to get physician verifications. In addition, as documented within the Critical Referral Program, priority restoration status primarily applied to isolated outages and did not supersede system restoration priorities during widespread outage events. Consequently, while a formal process existed to identify certain medically vulnerable customers, the program provided limited operational visibility and support capabilities during large-scale restoration events.

NES also utilized pre-storm communications to encourage customer preparedness, including messaging directed toward vulnerable populations. Prior to the storm, customers were advised to prepare for extended outages by maintaining adequate supplies of medications, making contingency plans for power-dependent medical equipment, identifying alternate heating locations, and checking on family members, neighbors, and other potentially vulnerable individuals. These communications reflected a preparedness approach focused on customer self-sufficiency and community support during prolonged outage conditions.

## **Performance**

Customer experience during Winter Storm Fern was significantly influenced by customers' ability to obtain information regarding restoration progress, report outages and receive assistance, and understand how vulnerable populations were being supported throughout the event.

Access to restoration information became a significant challenge as outage durations increased. During the most critical phases of the restoration effort, customers had limited visibility into restoration progress and frequently expressed a desire for more localized information regarding restoration activities occurring within their communities. Customers sought information regarding whether crews had been assigned, the status of repairs in their area, and when service was expected to be restored. Challenges associated with the outage map and limited engagement with customers through social

media channels further contributed to customer uncertainty and frustration. As a result, many customers perceived that limited information was being provided during a period when demand for restoration updates was at its highest.

Customers also experienced challenges reporting outages and obtaining assistance during portions of the event. As outages expanded across the service territory, customer demand increased significantly across outage reporting, customer service, and information channels. Several customer-facing systems experienced service disruptions, outages, or capacity constraints during periods of peak demand, limiting customers' ability to report outages, verify outage status, and obtain information. While alternative reporting and communication channels remained available throughout much of the event, these disruptions reduced customer confidence in the availability and reliability of customer-facing services during a period of widespread outages.

Winter Storm Fern also highlighted challenges associated with supporting critical and vulnerable customer populations during prolonged outage conditions. Critical Referral Program participants experienced outage durations ranging from minutes to multiple days, including documented cases extending from January 25 through February 4. Consistent with established restoration practices, restoration priorities during widespread outages were driven primarily by system restoration considerations rather than individual customer circumstances. Stakeholder interviews, customer comments, and escalation records indicate that some vulnerable customer situations were identified through elected officials, agencies, and external stakeholders rather than through existing operational processes. These observations demonstrate the challenges utilities face in maintaining situational awareness of vulnerable populations during large-scale outage events and coordinating support when outages affect a significant portion of the customer base.

Customer sentiment remained overwhelmingly negative throughout much of the restoration effort. Social media monitoring, customer feedback, stakeholder inquiries, and escalation records indicate that customer concerns were largely centered on the availability of restoration information, the ability to report outages and obtain assistance, and the impacts prolonged outages were having on households and communities. While restoration progress improved over time, customer concerns regarding information access and restoration visibility persisted throughout much of the event and contributed to a predominantly negative customer experience.

### 3.13.2 Recommendations

#### **CX-01 | Strengthen Critical Customer and Vulnerable Population Management**

Enhance the identification, visibility, and support of critical customers and other vulnerable populations before, during, and after major outage events.

##### **Implementation Guidance:**

- Strengthen enrollment, validation, and maintenance processes for the Critical Referral Program to improve data quality and participation
- Improve visibility of critical customer information within outage management, customer service, and emergency response processes
- Establish procedures for identifying and tracking vulnerable customer populations that may not be captured through existing critical customer programs
- Develop escalation pathways and coordination procedures for high-risk customer situations identified through customer service, elected officials, community partners, or external agencies
- Integrate critical customer and vulnerable population information into emergency response planning, situational awareness products, and operational decision-support processes during major events
- Strengthen coordination with community partners, local agencies, and external support organizations (e.g., public health, social services) to establish clear roles and pre-defined support pathways for vulnerable populations

## **CX-02 | Enhance Customer Support During Prolonged Outages**

Develop a structured approach for supporting customers during extended outage events, including maintaining access to outage reporting, customer service, and restoration information.

### **Implementation Guidance:**

- Establish contingency procedures for customer support when outage reporting, customer service, or customer information systems experience outages or degraded performance
  - Conduct periodic capacity assessments and stress testing of customer-facing systems to validate performance during major outage events
  - Develop redundant customer reporting and information channels to reduce the impact of individual system failures
  - Define performance expectations and monitoring requirements for outage reporting, customer service, and customer information systems during major events
  - Establish customer-facing guidance that clearly communicates available reporting methods, support options, and information sources during extended outages
  - Incorporate customer support system performance into storm exercises, after-action reviews, and readiness assessments
- 
- 

## **CX-03 | Improve Customer Expectations Management During Major Events**

Develop a structured customer expectations management strategy that provides customers with realistic, actionable, and consistent information throughout the event lifecycle.

### **Implementation Guidance:**

- Operationalize ETR development, governance, and communication processes to support the timely release of restoration information during major events
  - Enhance outage map functionality and restoration visibility tools to provide customers with more localized information regarding outage status, restoration progress, and expected restoration activities
  - Clearly communicate restoration priorities, restoration sequencing, and factors influencing restoration timelines during major events
  - Develop customer education materials explaining restoration processes, outage reporting expectations, and restoration priorities before major events occur
  - Establish service-level expectations and staffing strategies for customer engagement through social media and digital communication channels during major events
  - Incorporate customer expectation management objectives into storm communications planning, training, and exercises
- 
- 

## **CX-04 | Operationalize Customer Feedback and Customer Intelligence**

Establish formal processes for collecting, analyzing, and utilizing customer feedback and sentiment information during major outage events.

### Implementation Guidance:

- Define processes for monitoring customer feedback across customer service interactions, stakeholder inquiries, social media activity, elected official escalations, and other customer-facing channels
- Establish thresholds and escalation criteria for recurring customer concerns, emerging risks, and significant shifts in customer sentiment
- Integrate customer feedback, complaint trends, stakeholder inquiries, and escalation data into operational and communications briefings during major events
- Develop processes to identify recurring customer information gaps and service issues through customer interactions and feedback channels
- Utilize customer intelligence to inform communications priorities, restoration messaging, customer support activities, and vulnerable customer outreach efforts
- Develop reporting products that provide leadership with visibility into customer concerns, customer sentiment, and emerging customer issues throughout the event

---

## 3.14 Call Center / Handling

Maintaining customer service operations throughout Winter Storm Fern required a significant effort from customer service representatives, overflow resources, and supporting personnel. Despite elevated call volumes and extended restoration durations, NES remained available to support customers throughout the event. The scale and duration of the event exposed opportunities to improve call center scalability, overflow resource readiness, restoration information coordination, and customer-facing communications to better support future large-scale restoration efforts.

During major outage events, the call center serves as a critical interface between the utility and its customers. In addition to supporting outage reporting and customer inquiries, call center personnel play an important role in communicating restoration information, estimated restoration timelines, and other outage-related updates. For many customers, the call center serves as one of the primary sources of information during a restoration effort, particularly when outages are prolonged or widespread. Effective call center operations help manage customer expectations, reduce uncertainty, and provide customers with timely and actionable information needed to make informed decisions during an outage. The quality, consistency, and timeliness of customer communications can significantly influence the overall customer experience and public perception of the utility's response.

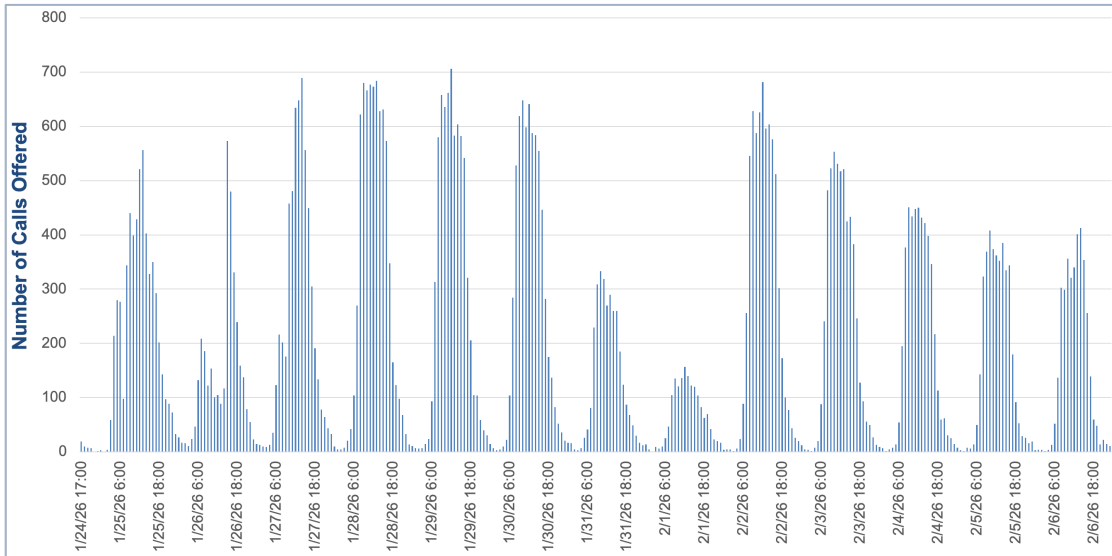
### 3.14.1 Findings

NES's call center experienced extreme demand during Winter Storm Fern that resulted in significant call volumes, extended wait times, and reduced service levels. As referenced in Section 2, NES maintains two separate customer service phone lines. The first, referred to as the "mail line," supports traditional utility customer service functions such as billing, start/stop service requests, payments, service requests, and outage reporting. The second is a dedicated outage reporting line that allows customers to report outages and obtain outage-related information. Although customers can call either number based on their specific need, requests to speak to an agent on either of the two lines are ultimately routed to the same call center and supported by the same customer service organization.

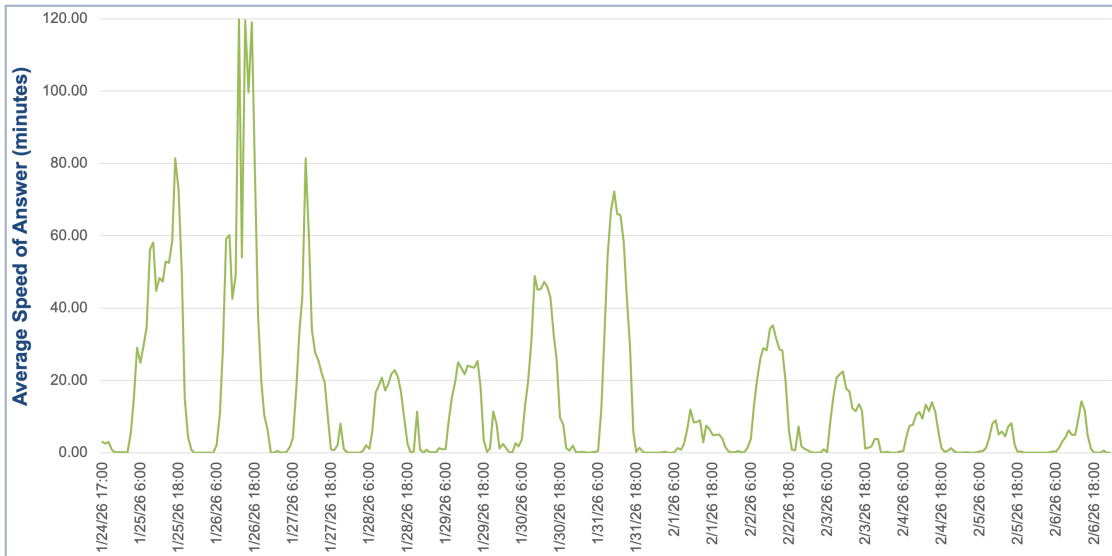
The call center is supported by approximately 80 in-house NES customer service representatives and two off-site overflow call centers that provide an additional 45 customer service representatives during periods of elevated call volume. During Winter Storm Fern, all 125 available customer service representatives were actively supporting call center operations, and an additional 12 billing specialists were reassigned to assist with elevated call volume. Stakeholder interviews indicated that the two overflow call centers experienced performance challenges under the sustained high call volumes.

PA analyzed hourly call center performance data throughout Winter Storm Fern to assess call center operations. The NES call center received approximately 63,766 incoming calls during the 12-day restoration event. Call volume initially peaked around noon on Sunday, January 25 with more than 550 calls received within a single hour. A similar peak occurred around 3:00 PM CT on Monday, January 26. Beginning Tuesday, January 27, incoming call volumes increased significantly, averaging 600 per hour between 8:00 AM and 4:00 PM CT each day. The only exceptions were Saturday, January 31, and Sunday, February 1, when call volumes temporarily declined. Other key call center performance metrics including average speed of answer, average wait time, average handle time, and abandonment rate, generally followed the same trend, which is consistent with expected call center performance under periods of elevated demand. The following charts present hourly calls offered to the call center, average speed of answer, and call abandonment rate during Winter Storm Fern. Each chart is aligned to the same timeline and displayed in Nashville local time, enabling direct comparison of call center performance throughout the event.<sup>128</sup>

**Figure 20. Hourly Call Volume During Winter Storm Fern**

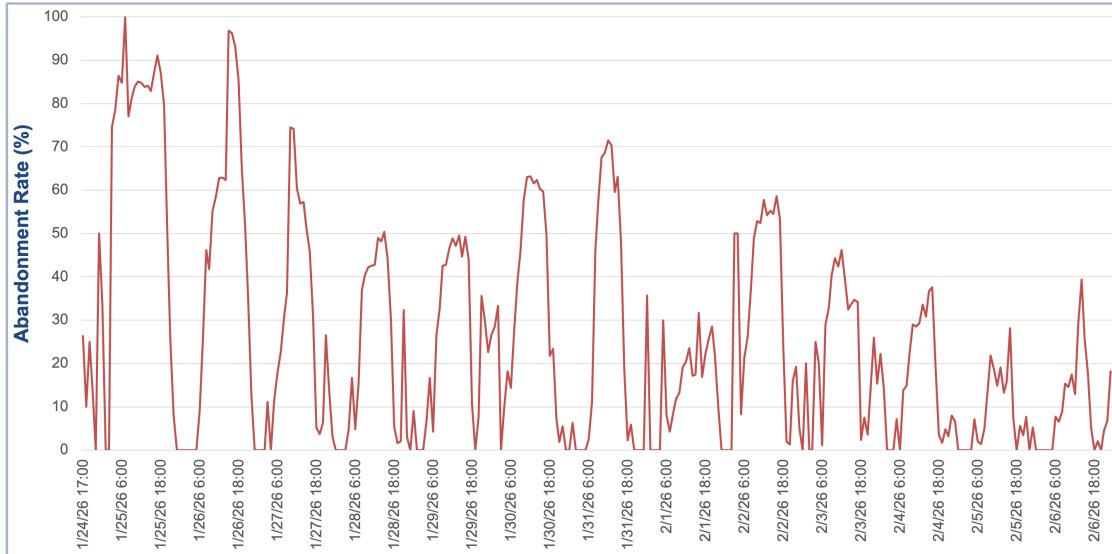


**Figure 21. Average Speed of Answer During Winter Storm Fern**



<sup>128</sup> Nashville Electric Service Winter Storm After Action Review Data Request #35: Call center performance during Winter Storm Fern

**Figure 22. Abandonment Rate During Winter Storm Fern**



Despite capacity constraints on the dedicated outage reporting phone line that resulted in customer busy signals, customers remained able to report outages. In these instances, the vendor supporting the outage reporting line, Convey, manually transmitted outage information to the NES call center, where customer service representatives manually entered the outages into OMS.

**Preparedness**

Prior to Winter Storm Fern, the NES call center operated under a hybrid staffing model, with customer service representatives supporting operations from both NES office locations and remote work environments. Personnel that supported the call center from remote locations were required to maintain minimum technology and connectivity requirements to support call center operations. On Sunday, January 25, all available customer service representatives were mobilized to support the significant increase in call volume; however, some personnel were unable to work remotely due to power and internet service disruptions, while others experienced transportation challenges associated with downed trees, debris, and hazardous roadway conditions that limited their ability to report to NES facilities. This indicates that call center staffing resilience during severe weather events relied in part on individual employee actions and circumstances, creating potential vulnerabilities in workforce availability during major outages.

Winter Storm Fern represented a level of customer demand and call center activity that NES had not previously experienced. Prior to the storm, call center staffing models, overflow support arrangements, customer service processes, and supporting technologies had been developed around routine operations and smaller-scale outage events. As a result, customer service representatives, supervisors, and overflow vendors had limited experience operating under the sustained call volumes, extended outage durations, and heightened customer information needs associated with a prolonged, large-scale restoration event. While NES maintained established call center operations and overflow support capabilities, these processes had not been fully tested or scaled for an event of this magnitude.

**Performance**

Throughout the restoration effort associated with Winter Storm Fern, approximately 137 call center representatives supported customer service operations.<sup>129</sup> These resources were distributed across multiple functions, including front-end customer support, back-office operations, escalations, and intent-specific activities. As a result, not all personnel were dedicated to answering customer calls, with

<sup>129</sup> Nashville Electric Service Winter Storm After Action Review Data Request #35: Call center performance during Winter Storm Fern

approximately 80 representatives available on average each day to support inbound call handling activities.<sup>130</sup>

Customer call volumes remained elevated throughout the restoration effort, ranging from approximately 1,600 to more than 7,100 offered calls per day. On Sunday January 25, the call center received 5,636 offered calls while only 19 customer service representatives were available to answer inbound calls, resulting in approximately 297 calls offered per representative and a 65% abandonment rate.<sup>131</sup> NES rapidly expanded inbound call handling staffing the following day, increasing the number of representatives available to answer customer calls from 19 to 76. Staffing levels continued to increase over the following several days and generally remained above 90 representatives throughout much of the restoration effort.<sup>132</sup> As staffing levels increased, abandonment rates generally declined (despite continued elevated call volumes), decreasing from 65% on January 25 to between 15% and 33% during much of the remaining restoration period. Customers who successfully reached a customer service representative waited an average of approximately 13 minutes and 39 seconds before their call was answered.<sup>133</sup>

These metrics indicate that the call center experienced sustained demand levels that exceeded available call handling capacity during peak periods. As queue times increased, a significant number of customers elected to abandon the queue before reaching a representative. NES responded by rapidly increasing call center staffing; however, elevated call volumes continued to create customer service challenges throughout much of the restoration effort. While customers remained able to contact NES and receive support, extended wait times likely contributed to customer frustration and increased abandonment rates during the most demanding periods of this restoration effort. As customer-facing ETRs were not communicated until seven days into the restoration effort, customers seeking updated information may have relied on the call center as one of the primary sources of outage status and restoration updates. While repeat-caller activity was not analyzed as part of this assessment, the absence of ETR information and limited availability of self-service outage information likely contributed to sustained call demand throughout the event.

Stakeholder interviews indicated the call center personnel primarily relied on hourly email updates to obtain information regarding outage conditions, restoration progress, and customer messaging during the storm. Each update reflected the latest available information and frequently superseded information contained in previous emails. No formalized process or centralized communication pathway existed to manage customer-facing information or ensure consistent dissemination across the organization. Due to this, customer service representatives may not have consistently operated from the same information set, increasing the potential for inconsistent customer communications during the restoration effort.

## 3.14.2 Recommendations

### CC-01 | Improve Call Center Operational Continuity During Major Events

Establish operational procedures and staffing models that enable the call center to maintain customer support operations during severe weather events, large-scale outages, and prolonged restoration efforts.

#### Implementation Guidance:

- Maintain staffing models that align expected call volumes, staffing levels, supervisory coverage, and surge staffing requirements with varying outage scenarios
- Maintain remote call handling capabilities that allow customer service operations to continue during severe weather events, facility access restrictions, or workforce disruptions

<sup>130</sup> Nashville Electric Service Winter Storm After Action Review Data Request #172: Daily customer service staffing during Winter Storm Fern restoration

<sup>131</sup> Nashville Electric Service Winter Storm After Action Review Data Request #35: Call center performance during Winter Storm Fern

<sup>132</sup> Nashville Electric Service Winter Storm After Action Review Data Request #172: Daily customer service staffing during Winter Storm Fern restoration

<sup>133</sup> Nashville Electric Service Winter Storm After Action Review Data Request #35: Call center performance during Winter Storm Fern

- Provide lodging, transportation, and workforce support capabilities for customer service personnel supporting extended restoration events
  - Maintain cross-trained internal staffing resources capable of supporting outage-related customer inquiries during major events
  - Periodically validate the ability to scale customer service staffing, activate remote operations, and sustain customer support functions during large-scale outage events
- 

## **CC-02 | Enhance Call Center Surge Capacity and Overflow Readiness**

Standardize the onboarding, training, performance management, and operational integration of overflow and external call handling resources used during major outage events.

### **Implementation Guidance:**

- Ensure overflow and external call handling personnel can effectively support outage-related customer inquiries, restoration communications, and customer escalations during major events
  - Reduce the time required to activate, integrate, and utilize overflow call handling resources during large-scale outage events
  - Maintain overflow call handling resources capable of supporting customer service operations at outage volumes consistent with major restoration events
  - Monitor call handling quality, restoration messaging consistency, escalation effectiveness, and customer experience outcomes across internal and external call handling resources
  - Establish performance expectations for call response times, customer interactions, escalation handling, and restoration communications during major events
  - Periodically validate the readiness of overflow call handling resources through outage-focused drills, simulations, and operational exercises
- 

## **CC-03 | Improve Restoration Information Distribution to Customer-Facing Personnel**

Establish operational processes that provide customer-facing personnel with timely, accurate, and actionable restoration information throughout major outage events.

### **Implementation Guidance:**

- Provide customer service personnel with timely, accurate, and consistent restoration information throughout major outage events
  - Establish a single operational source for restoration status, ETRs, outage impacts, restoration priorities, and customer messaging
  - Deliver routine operational updates to customer service personnel that reflect current restoration conditions and customer-facing messaging
  - Integrate restoration status, ETR information, outage impacts, and restoration priorities into customer-facing systems and tools to improve customer interactions and reduce manual information sharing
  - Improve coordination between customer service, communications, System Control, and restoration operations to support consistent customer messaging and escalation management
  - Reduce the time required to obtain operational support, field verification, and restoration information for complex customer inquiries
-

## 3.15 IT / OT

NES's core Information Technology (IT) and Operational Technology (OT) systems generally remained operational throughout Winter Storm Fern and supported restoration activities across outage management, dispatch, customer communications, GIS, and metering functions. However, the event demonstrated that many systems, interfaces, workflows, and supporting business processes were configured primarily around normal operating conditions and routine outage restoration activities rather than the outage volumes, restoration resource levels, and customer communication demands experienced during Winter Storm Fern. Primary distribution restoration activities were generally managed through established electronic dispatch processes, while portions of secondary and service restoration activities were coordinated through manual processes and paper-based workflows. As restoration activities expanded, personnel increasingly adopted alternate operating procedures and manual workarounds to accommodate conditions that exceeded normal operating assumptions (e.g., spreadsheet used to track and prioritize outages). While these workarounds enabled restoration efforts to continue, they highlighted opportunities to better align system capabilities with large-scale restoration operations.

Industry-leading utilities increasingly rely on integrated IT and OT environments to support outage management, restoration operations, customer communications, and situational awareness during major events<sup>134</sup>. These utilities typically establish emergency operating modes for critical systems, reduce reliance on manual processes wherever practical, and ensure that operational data can be readily accessed and shared across business functions. As outage events increase in size and complexity, utilities also focus on improving system integration, operational dashboards, restoration management tools, and customer communication platforms to support large-scale restoration activities. Effective IT and OT capabilities enable utilities to scale restoration operations, improve operational visibility, support timely decision-making and provide more accurate and actionable information to customers during major outage events.<sup>135</sup>

### 3.15.1 Findings

NES's core IT and OT systems generally remained operational throughout Winter Storm Fern and supported restoration activities across outage management, dispatch, customer communications, GIS, and metering functions. However, the event demonstrated that many systems, interfaces, workflows, and supporting business processes were configured primarily for normal operating conditions and routine outage restoration activities rather than the outage volumes, restoration resource levels, and customer communication demands experienced during Fern.

Fern also exposed opportunities to improve system integration, data accessibility, and the operational use of existing technology capabilities. Several restoration, customer communication, and operational decision-making processes relied on manual intervention, specialized knowledge, or alternate operating procedures to compensate for technology limitations. Existing capabilities associated with outage management, customer communications, restoration visibility, and AMI functionality were not always leveraged to their full operational potential during the event, increasing reliance on manual processes and reducing operational efficiency during large-scale restoration activities.

#### Preparedness

Prior to Winter Storm Fern, NES maintained a suite of IT and OT systems that supported outage management, system operations, customer communications, restoration activities, and metering functions. Key operational systems include OMS, SCADA system, GIS, mobile dispatch platform, AMI network, IVR platform, and various customer information and operational support systems. These

<sup>134</sup> Omaha Public Power District (June 2025). "Technology upgrades on the horizon." <https://oppdthewire.com/technology-upgrades-on-the-horizon/>

<sup>135</sup> U.S. Department of Energy (August 2023). "Obstacles and Opportunities for Information and Operational Technology Modernization by Regulated Utilities" U.S. Department of Energy <https://www.energy.gov/sites/default/files/2024-10/EXEC-2023-000998%20-%20Report%20to%20Congress%20on%20Obstacles%20and%20Opportunities%20for%20IT-OT%20Modernization%20by%20Regulated%20Utilities.pdf>

systems were routinely used to support day-to-day utility operations, outage response activities, customer communications, and restoration efforts.

Several operational processes relied on integrations and data exchanges between systems. These integrations were generally designed to support normal business operations and routine outage activities through scheduled synchronization and update cycles. Outage information, customer information, GIS data, AMI data, restoration activities, and customer communications were supported through a combination of automated system interfaces, scheduled data transfers, and manual business processes. Certain operational functions, including inventory visibility, reporting, and specialized operational analysis, also relied on custom queries and subject matter expertise to support business operations. Before Fern, OMS ETR functionality had not been configured to reflect NES-specific restoration practices or operational requirements. Existing restoration management processes therefore relied on a combination of system functionality and manual operational workflows to support outage prioritization, work assignment, restoration tracking, and customer communications.

The AMI network was available to support outage verification, meter communications, and restoration validation activities. Customer outage reporting and communications were supported through the IVR platform, customer service representatives, and related customer communication systems. Collectively, these systems provided the technological foundation supporting outage response and restoration operations prior to Winter Storm Fern.

## Performance

Several restoration management processes were supported outside of the utility's core operational systems during Winter Storm Fern. Restoration prioritization was managed through a manually maintained spreadsheet that was updated and redistributed throughout the restoration effort. While the spreadsheet provided a mechanism for tracking restoration priorities and coordinating work activities, it represented periodic snapshots of system conditions rather than a real-time operational view. Portions of secondary and service restoration work were also coordinated through manual processes and paper-based workflows rather than through the same electronic systems used to support primary restoration activities. These processes provided the flexibility needed to support restoration operations but required additional manual coordination and administrative effort as restoration activities expanded.

Operational personnel also relied heavily on specialized data extraction and analysis throughout the event. Custom Structured Query Language (SQL) queries and manually generated reports were used to support inventory visibility, outage analysis, restoration planning, and operational decision-making. Several interview participants noted the importance of specific subject matter experts with knowledge of the AMI, GIS, and supporting operational systems, highlighting the potential existence of "key-personnel" risks.<sup>136</sup> Inventory availability and material status information were not always readily accessible through existing operational systems, requiring manual queries and additional support activities to support restoration planning, work package development, and material management functions during the event.

Customer communications systems experienced several challenges during the event. High customer call volumes, outage reporting demands, and limitations within certain customer communication systems required operational adjustments and workarounds to maintain customer support capabilities. Customer service representatives assisted with the manual entry of outage-related information into operational systems, and alternate processes were implemented when certain automated customer communication capabilities became constrained. These actions allowed customer communications to continue but increased reliance on manual processes and personnel.

Winter Storm Fern also exposed limitations associated with the use of AMI and related communication technologies during major restoration events. Collector outages and communications network challenges reduced the effectiveness of meter pinging, restoration verification, and last-gasp notification capabilities. As a result, AMI data could not always be leveraged to its full operational

---

<sup>136</sup> Key-personnel risk here is defined as significant degradations in performance or slowdowns in processes should the key-individuals become unavailable.

potential during restoration activities. These limitations contributed to situations where customer restoration notifications did not always align with actual restoration status, particularly in areas where communications with meters could not be reliably established.

Although the OMS contained ETR functionality, it had not been configured to reflect NES restoration practices and was therefore not utilized during the event. As restoration progressed, ETRs were developed through alternate processes and ultimately communicated using ZIP code-based estimates. While this approach provided customers with restoration information that had not historically been available during major outage events, ZIP code-based estimates did not align directly with the underlying network topology and required significant manual effort to develop and maintain throughout the restoration effort.

Collectively, Winter Storm Fern demonstrated that NES's core IT and OT systems remained available and provided important operational support throughout the restoration effort. At the same time, the event highlighted opportunities to improve system scalability, integration, data accessibility, and the operational use of existing technology capabilities to better support large-scale restoration activities.

### 3.15.2 Recommendations

#### **ITOT-01 | Establish Large-Scale System Operating Modes**

Modify system configurations, workflows, and supporting business processes to better support large-scale outage restoration operations.

##### **Implementation Guidance:**

- Define large-event operating modes for outage management, restoration, customer communications, inventory management, and field operations systems
- Establish procedures governing system configurations, data refresh frequencies, reporting requirements, and system interfaces during major events
- Define operational triggers for transitioning systems and business processes from normal operations to large-event operations based on outage levels, restoration resource deployments, and customer impacts
- Evaluate system performance and scalability under major event conditions, including elevated outage volumes, restoration resource deployments, and customer communication demand
- Validate large-event operating procedures, system configurations, and decision-support capabilities through exercises, simulations, and major event reviews

#### **ITOT-02 | Improve Operational Data Integration and Decision Support Capabilities**

Improve the accessibility, integration, and operational use of information required to support restoration planning, resource management, customer communications, and operational decision-making.

##### **Implementation Guidance:**

- Improve integration and data sharing between outage management, GIS, AMI, customer information, inventory management, restoration management, and customer communication systems
- Reduce reliance on manual workarounds, including custom queries, spreadsheets, supplemental databases, and other offline tracking processes used to support restoration operations
- Develop operational dashboards and reporting tools that provide real-time visibility into outages, restoration progress, resource deployments, inventory status, and customer impacts
- Improve access to operational, customer, and inventory information needed to support restoration planning, field execution, customer communications, and incident management activities

- Establish emergency response support models, escalation procedures, and service-level expectations for IT and OT personnel supporting restoration operations
- 

### ITOT-03 | Enhance Customer Communications Information Technologies

Improve the utilization and operational effectiveness of technologies supporting outage reporting, restoration communications, outage verification, and customer information delivery.

#### Implementation Guidance:

- Configure and operationalize OMS ETR capabilities to support restoration planning, ETR development, and customer communications during major events
  - Integrate OMS, AMI, customer information, and customer communication systems to improve restoration visibility and information consistency across customer-facing channels
  - Improve the use of AMI capabilities to support outage verification, restoration validation, and restoration status monitoring throughout the restoration lifecycle
  - Establish performance monitoring and support procedures for AMI communications infrastructure and other technologies critical to outage management and restoration operations
  - Validate outage reporting, restoration communications, outage verification, and customer notification capabilities through system testing, exercises, and major event reviews
  - Enhance customer-facing restoration information to provide more localized, accurate, and actionable information regarding outage status and restoration progress
- 

## 3.16 NES Board Responsibilities

Winter Storm Fern highlighted opportunities to strengthen the connection between governance oversight, enterprise risk management, and emergency preparedness activities. While the Board maintained visibility into major outage risks and remained actively engaged throughout the restoration effort, opportunities exist to improve Board awareness of preparedness capabilities, clarify governance roles during major events, and enhance visibility into the effectiveness of risk mitigation measures intended to reduce major outage and restoration risks. These improvements would better position the Board to provide strategic oversight while preserving operational authority within NES leadership during future large-scale restoration events.

The Electric Power Board (“Board”) was established by the Metro Charter, which authorizes the Board to “purchase, construct, lease, or otherwise acquire, and to maintain, improve, operate and regulate” the electric system serving the City of Nashville. In practice, the Board fulfills this responsibility through governance oversight, while the day-to-day operation and management of the utility are carried out by the President and CEO and NES staff.<sup>137</sup> The Board is comprised of appointed members representing various professional backgrounds, and industries. The Board is responsible for providing strategic guidance and governance oversight to support the NES leadership team and is charged with selecting the President and CEO, who oversees the day-to-day operations of the utility.

The Board meets monthly to receive operational updates, discuss strategic and policy matters, and approve budgets, resolutions, and other items requiring Board action. From a governance perspective, the Board is not expected, nor should it, exert direct control over the day-to-day operations of NES. Rather, its role is to ensure that the utility’s overall strategies, policies, objectives, and risk management

---

<sup>137</sup> Metropolitan Government of Nashville and Davidson County, Tennessee, Charter § 11.301

practices are established and effectively implemented. To support this responsibility, the Board maintains an enterprise-wide risk register (ERM), which is reviewed and updated annually.<sup>138</sup>

### 3.16.1 Findings

Board visibility into preparedness and restoration readiness activities was limited. While the Board was aware of the major outage risks facing NES and reviewed those risks through the ERM process, Board visibility into the effectiveness of the mitigation measures intended to address those risks was more limited. Winter Storm Fern demonstrated that awareness of enterprise risks alone is insufficient without a corresponding understanding of the plans, capabilities, exercises, corrective actions, and preparedness activities intended to reduce those risks. Opportunities exist to strengthen Board oversight of emergency preparedness, restoration readiness, and major outage response capabilities while maintaining an appropriate separation between governance and operations.

Board roles and responsibilities during major outage events were not clearly defined. Throughout Winter Storm Fern, Board members remained actively engaged and sought opportunities to support restoration efforts through customer engagement, industry outreach, and direct interaction with utility leadership. While these efforts were well-intentioned and often beneficial, the absence of clearly defined governance roles, communication pathways, and expectations during major events created opportunities for overlap between governance activities and operational response efforts. Major outage events require clear coordination mechanisms that allow the Board to fulfill its oversight responsibilities while preserving operational authority within the incident management structure.

Based on PA's industry experience, the ERM process did not provide sufficient visibility into the status and effectiveness of risk mitigation activities associated with major outage preparedness and restoration. Although major outage risks were identified within the ERM, there was limited visibility into whether the mitigation measures intended to address those risks—including preparedness planning, exercise programs, restoration readiness initiatives, and resiliency efforts—were sufficiently developed and effective. Opportunities exist to strengthen the linkage between enterprise risk management activities and the operational programs responsible for reducing identified risks, thereby providing the Board with a more complete understanding of organizational preparedness and restoration capabilities.

#### Preparedness

NES maintains an enterprise-wide risk register that identifies and evaluates risks facing the organization, including risks associated with major outage events such as Winter Storm Fern. Due to the sensitive nature of these discussions, detailed Board deliberations related to risk management are not publicly available, which is consistent with common utility industry practice. The Board reviews the ERM on a recurring basis as part of its governance responsibilities.

The Board was aware that NES maintained an ERP and other emergency preparedness activities intended to support storm response and restoration operations. Responsibility for the development, maintenance, exercising, and execution of these plans resides with NES management and staff. Consistent with its governance role, the Board was generally not involved in operational exercises or emergency response planning activities.

Prior to Winter Storm Fern, Board members engaged with NES leadership regarding storm preparations, including resource availability, readiness activities, and anticipated storm impacts. Interview participants indicated that major catastrophic winter storms were generally viewed as low-frequency events and that existing emergency response plans were considered sufficient to address anticipated outage scenarios.

As discussed throughout this report, NES relies significantly on institutional knowledge to support emergency response and restoration activities. Many of the preparedness capabilities, operational practices, and restoration processes utilized by NES have historically been maintained through personnel experience and organizational knowledge in addition to formal plans and procedures. From a

<sup>138</sup> Nashville Electric Service Winter Storm After Action Review Data Request #160: Recent ERM and risk register presentations and maintenance process

governance perspective, the Board’s visibility into these activities was primarily obtained through information provided by utility leadership as part of normal oversight activities.

## Performance

In the days immediately following Winter Storm Fern, NES leadership provided regular updates to the Board regarding restoration progress and responded to Board questions and concerns.<sup>139</sup> Board members remained actively engaged throughout the restoration effort and sought opportunities to support NES as the event escalated. Several Board members expressed concerns regarding the availability of restoration resources and leveraged their personal and professional industry networks to identify and facilitate additional external support. These outreach efforts resulted in the involvement of industry personnel who provided assistance in areas such as ETR development, restoration planning, resource classification, and resource prioritization. While these efforts ultimately benefited the restoration effort, they were not always fully visible to senior operational leadership when initiated. As a result, opportunities existed for gaps in situational awareness and strategic alignment regarding the use of external support resources during the response.

As customer frustration increased regarding outage information and restoration communications, Board members began receiving direct inquiries from customers and other stakeholders. Initially, these inquiries were referred to NES personnel; however, as the event progressed, some Board members took a more active role in communicating customer concerns and information requests to NES leadership. In this capacity, Board members served as an informal conduit between customers and the utility. While this helped elevate customer concerns and provided leadership with additional awareness of customer sentiment, it also generated additional information requests and communication demands during an already resource-constrained restoration effort.

Throughout the event, the Board remained engaged and focused on supporting restoration efforts while balancing its governance responsibilities. Winter Storm Fern demonstrated the challenges that can arise when governance, customer expectations, and restoration operations intersect during a prolonged major outage event. The event also highlighted the importance of maintaining clear communication pathways, defined coordination mechanisms, and appropriate visibility between governance and operational leadership during large-scale restoration efforts.

## 3.16.2 Recommendations

### GOV-01 | Enhance Board Oversight of Emergency Preparedness and Major Event Risks

Strengthen Board oversight of emergency preparedness, major outage restoration risks, and associated mitigation measures to improve governance visibility into NES’s ability to prepare for, respond to, and recover from large-scale events.

#### Implementation Guidance:

- Review major outage restoration risks, preparedness capabilities, and resiliency initiatives as part of recurring ERM discussions to ensure NES leadership is addressing all risks
- Maintain visibility into the status of emergency preparedness plans, corrective actions, readiness initiatives, ERP/ICS exercise results, and storm hardening efforts associated with major outage risks
- Evaluate preparedness assumptions associated with high-impact, low-frequency events, including anticipated damage levels, restoration durations, resource requirements, and customer impacts
- Review the adequacy of mitigation measures intended to address identified preparedness and restoration risks

---

<sup>139</sup> Nashville Electric Service Winter Storm After Action Review Stakeholder Interview: T. Broyles-Aplin, President & Chief Executive Officer, and B. Baker, EVP Chief Operations & Innovation Officer

## GOV-02 | Clarify Board Roles and Governance Responsibilities During Major Events

Clearly define the role of the Board during major outage events to maintain effective governance oversight while preserving operational authority and incident management responsibilities within NES leadership.

### Implementation Guidance:

- Clearly define Board responsibilities (what Board should and should not be involved in), and communication pathways during major outage events
  - Establish communication protocols that provide Board members with timely situational awareness while maintaining compliance with applicable sunshine and public meeting requirements
  - Establish communication pathways for addressing customer concerns, stakeholder inquiries, and external support opportunities to utility leadership
  - Preserve clear separation between governance oversight responsibilities and operational decision-making authority during restoration activities
  - Review Board performance, communication effectiveness, and governance coordination following major events and incorporate lessons learned into future preparedness activities and response efforts
- 

## GOV-03 | Strengthen Enterprise Risk Management Oversight and Integration

Enhance the ERM process to provide greater visibility into major outage risks, mitigation measures, preparedness capabilities, and resilience initiatives, ensuring that significant operational risks receive appropriate governance oversight.

### Implementation Guidance:

- Ensure major outage restoration, emergency response, severe weather, and grid resiliency risks are clearly and appropriately represented within the ERM
  - Document the mitigation measures associated with major outage risks, including emergency response plans, exercise programs, restoration readiness initiatives, mutual assistance capabilities, storm hardening programs, and corrective action plans
  - Establish risk indicators and reporting mechanisms that provide visibility into the status and effectiveness of mitigation measures
  - Periodically review major outage risks, mitigation activities, preparedness capabilities, and resilience initiatives through the ERM process
  - Evaluate whether mitigation measures remain aligned with the magnitude of identified risks and the Board's risk tolerance
  - Review significant findings, lessons learned, and corrective actions resulting from major events, exercises, and preparedness assessments through the ERM process
- 

## 3.17 Financial Management & Documentation

NES followed its blue-sky approach to invoice processing as well as reimbursement and p-card oversight for Fern and instituted some modifications to enable the emergency response activities. Modifications included instituting a team focused on storm response invoice review as well as increased thresholds for some p-card holders to enable the purchase of lodging and other expenses. NES's processes were defined with proper controls and oversight; however, the lack of scale assumed inherently in its processes demonstrates a lack of planning and preparedness for storm events and the associated response. NES had limited pre-existing contracts and was required to establish many

contracts and rates during the storm, and through which contractor rates for line crews were significantly greater than those observed in pre-established contracts. Finally, NES implemented a temporary increase in its spending authority for emergency expenditures which enabled NES to fund restoration efforts which had already occurred.

Industry leading utilities typically have mature emergency response planning implemented which enables a structured and proactive approach to financial planning and management. The processes utilized by these utilities reflect a defined process for enabling purchases and utilization of services across the organization, and associated invoice processing, for storms or emergencies of any size. Further, leading utilities define and uphold spending thresholds and policies, including for the use of external vendors as well as for the reimbursement of utility employees. Finally, these utilities employ systematic processes for intaking, reviewing, approving, and paying invoices.

### 3.17.1 Findings

Prior to Winter Storm Fern and during normal blue-sky operations, NES maintains a structured approach for ensuring financial management of purchased services and materials, from procurement through to invoicing review, approval, and payment. Typically, contractors are first procured through a sole source or competitive bid Request for Proposal (RFP). The resulting contract and purchase order establishes service rates for different employee classifications (e.g. foreman, journey linemen, apprentices, equipment operators, etc.) and equipment classifications (e.g., different sized bucket trucks, digger derrick trucks, etc.). As highlighted in Section 3.7, MasTec and DHEC were the only contractors for which NES had pre-established contracts and associated rates.

PA reviewed the rates by employee and equipment classification, as established in the contracts for MasTec and DHEC, which resulted from a competitive RFP. PA also reviewed the rates for contractors that were established during the storm response period.<sup>140</sup> PA compared the rates for contractors which were established during the storm response period to the rates established through competitive procurement (e.g., MasTec and DHEC) and found the rates to be significantly greater than the emergency response labor rates specified in the pre-established contracts for MasTec and DHEC.<sup>141</sup> For example, on average the General Foreman labor rate for contracts established during the storm response period were approximately 80% greater than those established prior to Winter Storm Fern. Similarly, the average Journey Lineman labor rates were over 70% greater and the Lineman Apprentice rates were approximately 60% greater when comparing the newly established contracted rates to those which were pre-established. Equipment rates, including for bucket trucks and digger derricks were similarly observed to be increased when comparing contracts established during the storm-response period to pre-established rates.

The RFP and therefore the resulting contract(s) sits with a business owner within NES throughout the process, with the procurement and treasury functions leading their respective processes. When contractors invoice NES, the invoice is matched to the purchase order, and the business owner validates the invoice. NES's invoice approval authority is governed by a tiered, two-signature process within the end user or business owner's department. For both services and materials, the tiered signature process has different approval thresholds depending on the invoice size, as outlined below:

- up to \$5,000 requires a supervisor and employee;
- up to \$10,000 requires a manager;
- up to \$25,000 requires a Vice President; and
- amounts above \$25,000 require executive approval.

<sup>140</sup> Nashville Electric Service Winter Storm After Action Review Data Request #83: Please provide a copy of all contracts for all contractors and mutual assistance crews that were utilized during the storm response

<sup>141</sup> PA compared the "Emergency Response Labor Rates Out-of-Town Crews" from the pre-established MasTec and DHEC contracts to the Double Time rates for the contractors whose contracts were established during the Winter Storm Fern response period. Although the naming of some employee classifications was not identical between contracts, PA utilized the same roles for this comparison. Additionally, PA used the lowest rate listed for the Lineman Apprentice role when multiple classifications and associated rates for this role were presented in a contract.

Once approved by the end user, an additional control check is performed. During this stage, NES may raise questions to the vendor if the invoice appears inconsistent with the purchase order, with existing inventory, or with prior procurements. In addition, the invoice is validated against the purchase order to ensure the purchase order is valid and has sufficient funds remaining. PA notes that the responsibility to review individual invoice line items sits with the business owner of the respective purchase order. The business owner is therefore responsible for verifying the invoice's accuracy, including submitted rates and charges and ensuring it is consistent with the pre-established rates under the existing contract and purchase order. Once the invoice receives approval from the appropriate people, as outlined in the list above, and has passed the control review phase, the invoice is forwarded to the accounting and accounts payable team. PA notes this process for identifying and procuring vendors, establishing and documenting pre-established rates, and reviewing, approving, and paying invoices is generally in line with practices established and in use by other power utilities in the U.S.

As NES only had two pre-established contracts for contractors, no pre-established contracts for a dining and meals provider, and no pre-established contract for a lodging coordinator, new contracts for services that NES utilized were rapidly established during the storm response effort as outlined in Section 3.7. As a result, in many instances, NES was necessarily establishing rates during the contracting process and using the resulting contracts during its invoice review and approval process later.

Further, as mutual assistance crews were primarily requested through the American Public Power Association, pre-established rates were not stated in the resulting mutual aid agreement between NES and the respective responding mutual assistance entities. Instead, the mutual aid agreements included language establishing and defining charges that would be invoiced by the responding entity to NES. Through this language, the mutual aid agreements established guidance for labor force, equipment, transportation, and meals and lodging charges. Specifically, the mutual aid agreements outlined that charges in these categories would be in accordance with the responding mutual assistance entity's standard practices, and be charged at reasonable and customary rates, with meals and lodging charges reflecting reasonable and actual costs incurred.<sup>142</sup>

In addition to the large procurement effort during the storm, NES's procurement and invoicing process for Winter Storm Fern differed from blue-sky operations in that NES received and needed to process a large volume of invoices and NES personnel reimbursement requests following the storm. NES processed approximately 1,600 invoices following Winter Storm Fern.<sup>143</sup> The NES personal reimbursement process and p-card approval and controls process is further outlined below in this section. Due to the large number of invoices received following Winter Storm Fern, NES utilized a process which was streamlined as compared to its normal blue-sky operations process for approving and paying invoices. To process the invoices received following the storm, NES utilized a team comprised of accounting staff, including staff focused on controls and compliance functions, to coordinate the review of storm related invoices. This team also worked with the applicable business owner(s) to verify the invoices prior to approval. This approach helped provide an additional layer of oversight in invoice approval.

Outside of costs incurred via purchase orders and associated invoices, NES also incurred costs for other categories, like meals and lodging. These costs primarily occurred through limited personnel with p-cards or directly by employees. Expenses incurred directly by NES employees were submitted for reimbursement following Winter Storm Fern. For these expenses, NES applied a reimbursement and approval process which was aligned with its cost control practices as these expenses were required to undergo appropriate review and approval prior to payment. In addition, NES had established approval thresholds based upon rank. NES's reimbursement policy allows for reimbursement of such expenses provided they are deemed reasonable and supported by proper documentation and approvals. Detailed receipts are required, particularly for meal expenses, to ensure compliance with policy requirements. Further, expenses were reviewed for appropriateness to ensure alignment with expense and

---

<sup>142</sup> Nashville Electric Service Winter Storm After Action Review Data Request #83: Please provide a copy of all contracts for all contractors and mutual assistance crews that were utilized during the storm response

<sup>143</sup> Nashville Electric Service Winter Storm After Action Review Stakeholder Interview: B. Covington, Finance Coordinator

reimbursement policies, for example, charges for alcohol would not be reimbursable and would be rejected, whereas reasonable meal expenses incurred during storm response activities are permissible. NES's employee reimbursement process relied on documented justification, adherence to approval thresholds, and management oversight to ensure that non-purchase order expenses are valid, reasonable, and compliant with internal policies.

As noted above and in Section 3.7, some expenses were incurred through p-cards including for the purchase of snacks and hydration in preparation for Winter Storm Fern. NES's procurement group is responsible for administering and monitoring the utility's p-card program. NES limits the total number of p-card holders with approximately 10 p-cards assigned within the procurement department and a few additional p-cards sitting in other departments. The spending limits for p-cards are defined by role with procurement buyers having a transaction limit of \$2,500 per transaction and supervisors having a transaction limit of \$5,000. More senior personnel have limits of up to \$20,000 during normal blue-sky operations. However, during the response for Winter Storm Fern, the p-card limits for senior personnel were temporarily increased to \$100,000 to help facilitate hotel accommodations and other expenses as appropriate.

Personnel with p-card usage was subject to both pre- and post-spend controls. NES's procurement group reviewed p-card transactions to verify that expenditures were associated with appropriate business owners and that required approvals were obtained. Additionally, PA understands that p-card holders were required to submit monthly reports to their managers detailing all transactions. These reports were required to include supporting documentation and a requisition document that was approved within the business owner's department, requiring both employee and supervisor signatures. Overall, NES's p-card approval and oversight process included defined spending limits, centralized oversight by procurement, and management review to ensure that p-card usage was appropriate and documented.

As described in this section as well as Section 3.7, NES procured and utilized a significant number of resources to complete its restoration efforts in response to Winter Storm Fern. During blue-sky operations, purchase orders between \$50,000 and \$250,000 are reported to the NES's Board monthly, while any expenditures exceeding \$250,000 require direct Board approval. PA appreciates that although these limits can be sufficient in procuring materials and some services during blue-sky operations, they were not necessarily sufficient in procuring and onboarding the services necessary to efficiently complete restoration activities.

In the event of an emergency or natural disaster, NES bylaws enable the President and CEO, along with the Executive Vice President, to jointly make emergency expenditures up to \$500,000 each. Although this limit is more than the limit imposed during blue-sky operations, this level was insufficient to support the Winter Storm Fern response. As such, NES sought and received approval to increase the emergency spending authority of the President and Chief Executive Officer, along with the Executive Vice President to \$5 million per transaction. The Board approved this increase on February 9, 2026, and did so only for contracts which were pre-existing, authorized, and for work already completed during the Winter Storm Fern restoration efforts. This increased limit for emergency expenditures enabled NES to pay vendors which allowed NES to maintain a continuity of services during the storm, including for contractors.

## Preparedness

Although NES has established processes for procuring, contracting with, and paying vendors during blue-sky operations, these processes are not structured to support large-scale storm response efforts. NES's existing emergency expenditure threshold of \$500,000 for the President and Chief Executive Officer, along with the Executive Vice President, underscores this lack of preparedness as any storm of size would necessitate a spending level greater than \$500,000.

Further, as highlighted in this section as well as Section 3.7, NES did not have a sufficient number of contractors procured with established contracted and rates in advance of the storm which required the rapid procurement and onboarding of vendors. PA appreciates this did not result in NES agreeing to significantly increased storm rates for resources and equipment. However, NES's effort in identifying,

procuring, and reconciling rates during and after the storm could have been minimized had NES had sufficient contracts and associated controls in place for large scale storm response events.

## Performance

As outlined throughout this section and Section 3.7, NES can improve its logistics and financial planning considerably to reflect potential storm scenarios and thereby improve its performance. Although NES exhibited a lack of preparedness in associated financial management planning, PA finds that it does not appear to have impacted NES's ability to complete storm restoration activities in a timely manner. For example, the emergency expenditure threshold of \$500,000 outline above demonstrates a lack of preparedness but did not impact NES's ability to restore customers as work was completed, with the threshold later increased to ensure payment of vendors. Further, invoicing, payment, and reimbursement activities primarily occurred following the storm restoration period and therefore could not directly impact NES's storm restoration performance.

### 3.17.2 Recommendations

#### **FIN-01 | Establish Increased Spending Thresholds to Enable Emergency Spending**

Develop language to update NES's bylaws as appropriate to reflect an increased emergency expenditure threshold for the future storm events.

##### **Implementation Guidance:**

- Review transaction amounts incurred by NES for Winter Storm Fern restoration activities and establish a baseline view of a potential reasonable threshold for future emergency expenditures
  - Benchmark the proposed emergency expenditure threshold identified above against average emergency spending levels and/or thresholds employed by other utilities
  - Draft appropriate language and update NES's bylaws to reflect the increased emergency expenditure threshold
- 

#### **FIN-02 | Establish P-Card Holders within Key Logistics Functions**

Review p-card holders in comparison against key storm and associated logistics roles to ensure necessary personnel have a p-card with the appropriate spending limit. Doing so will help limit costs being incurred directly by NES personnel and help streamline the logistics and response process.

##### **Implementation Guidance:**

- In accordance with NES's emergency response planning and associated logistics planning, identify key personnel who may need access to a p-card during emergency and storm response events. To the extent these personnel do not have a p-card, assign a p-card as appropriate
  - To the extent spending and oversight guidelines do not exist for the ranks or roles of NES employees identified in the step above, establish appropriate controls and guidelines
- 

#### **FIN-03 | Track Rates from Contracted Vendors for Future Cost Tracking and RFP Benchmarking**

Utilizing rates established through the Winter Storm Fern response, NES has the opportunity to formally track these rates to help inform future cost tracking and to serve as a data point in NES's future procurement of vendors to help ensure labor rates for storm response decreases in the future (in alignment with recommendations in Section 3.7).

### Implementation Guidance:

- Formally document and track rates from vendors contracted through the Winter Storm Fern response
- For future storms, to the extent necessary and appropriate, utilize this tracker tool to track costs incurred. This assumes contracts established through the Winter Storm Fern response will still be in effect with vendors and/or will have been formalized as a result of recommendations in Section 3.7 and including but not limited to through future competitive RFPs for additional services.
- To the extent NES launches competitive RFPs in the future to procure contractors and establish contracted rates, NES should look to benchmark against rates observed through the Winter Storm Fern response. Doing so will help ensure NES does not implement future contracts with vendors with increased pricing and instead should see double time and emergency rates decrease in future contracts as established through future competitive RFPs

## 4. Implementation & Conclusions

# 04

### 4.1 Recommendation Implementation Roadmap

The recommendations presented throughout this report are intended to function as an integrated improvement program rather than a series of independent initiatives. While each recommendation addresses a specific finding, many recommendations are interrelated and collectively support improvements across emergency management, restoration operations, outage management, customer communications, organizational coordination, and system resiliency. As a result, successful implementation will require a coordinated and phased approach that balances operational priorities, organizational capacity, resource availability, and implementation timelines.

To support implementation planning, PA developed a Recommendation Implementation Roadmap that synthesizes findings and recommendations across all assessment areas into a structured improvement program. The roadmap translates individual recommendations into a sequenced plan of work consisting of Immediate (0–6 months), Near-Term (6–18 months), and Long-Term (18+ months) initiatives. Roadmap placement was determined based on recommendation priority, interdependencies, and the urgency with which improvements are needed to strengthen future emergency response and restoration performance. The roadmap is intended to communicate both implementation timing and sequencing, recognizing that recommendations within the same implementation horizon may still be dependent upon completion of activities identified earlier in the roadmap.

In addition to establishing implementation timing, the roadmap identifies recommended ownership, key dependencies, and sequencing considerations to support coordinated execution across the organization. The roadmap should be viewed as a planning and prioritization tool that enables NES to manage implementation as an integrated portfolio of improvement initiatives while maintaining flexibility to adjust timing, sequencing, and resource allocation as organizational priorities evolve.

#### 4.1.1 Roadmap Implementation Considerations

Given the scope, complexity, and interdependencies associated with the recommendations contained in this report, PA recommends that NES establish a dedicated implementation management function responsible for overseeing, coordinating, and driving execution of the Recommendation Implementation Roadmap. While individual recommendations should remain owned by the appropriate business units, successful implementation will require centralized coordination, governance, reporting, and accountability to ensure initiatives remain aligned, adequately resourced, and on schedule.

The implementation management function should serve as the central coordinating body responsible for translating recommendations into detailed action plans, establishing implementation priorities, identifying process interdependencies, monitoring progress, facilitating issue resolution, and providing routine status reporting to executive leadership and the Board. This function should also be responsible for maintaining the implementation roadmap, coordinating activities across organizational boundaries, and ensuring improvements are implemented in a consistent and integrated manner.

As part of implementation planning, each recommendation should be translated into specific, measurable, achievable, relevant, and time-bound (SMART) action items with clearly defined deliverables, ownership, success criteria, implementation milestones, and target completion dates. Recommendations should be decomposed into manageable workstreams and projects that can be tracked and measured throughout implementation.

NES should establish a formal implementation governance framework that includes executive sponsorship, designated recommendation owners, routine progress reviews, and structured escalation

pathways for addressing schedule delays, resource constraints, implementation risks, and cross-functional issues. Governance activities should include periodic reviews with senior leadership to evaluate implementation status, confirm organizational priorities, resolve barriers to execution, and adjust implementation sequencing as necessary.

Finally, implementation management function should also establish and maintain a formal tracking and reporting framework capable of monitoring recommendation status, milestone completion, implementation risks, budget impacts, dependencies, and realized benefits. Performance dashboards and executive reporting should be developed to provide visibility into implementation progress and support leadership decision-making. Recommendations should be tracked through completion, validated against defined success criteria, and formally closed only after implementation objectives have been achieved.

## 4.1.2 Recommendation Improvement Themes

The assessment identified numerous findings and recommendations spanning emergency management, restoration operations, customer communications, logistics, mutual assistance, vegetation management, and system resiliency. While each recommendation addresses a specific opportunity for improvement, PA identified four recurring themes that collectively represent the most critical areas for strengthening NES's emergency response and restoration capabilities. These themes are highly interconnected and establish the foundation upon which many other recommendations depend.

### **Incident Command System**

A scalable and consistently applied ICS provides the organizational framework necessary to manage emergency events. Winter Storm Fern highlighted opportunities to strengthen incident management processes, formalize roles and responsibilities, improve information management, and establish standardized coordination mechanisms across operational and support functions. Implementation of a formal ICS structure serves as a foundational capability that supports emergency response, restoration operations, communications, logistics, customer service, and executive decision-making.

### **Emergency Response Planning and Preparedness**

The assessment found that NES's existing emergency response framework lacked the operational processes, supporting documentation, training, and preparedness activities necessary to support a large-scale restoration effort. While personnel successfully adapted during the event, many response activities relied heavily on institutional knowledge and individual experience. Strengthening emergency preparedness capabilities through enhanced planning, operational procedures, role-specific guidance, training, exercises, and continuous improvement activities will improve organizational readiness and scalability during future events.

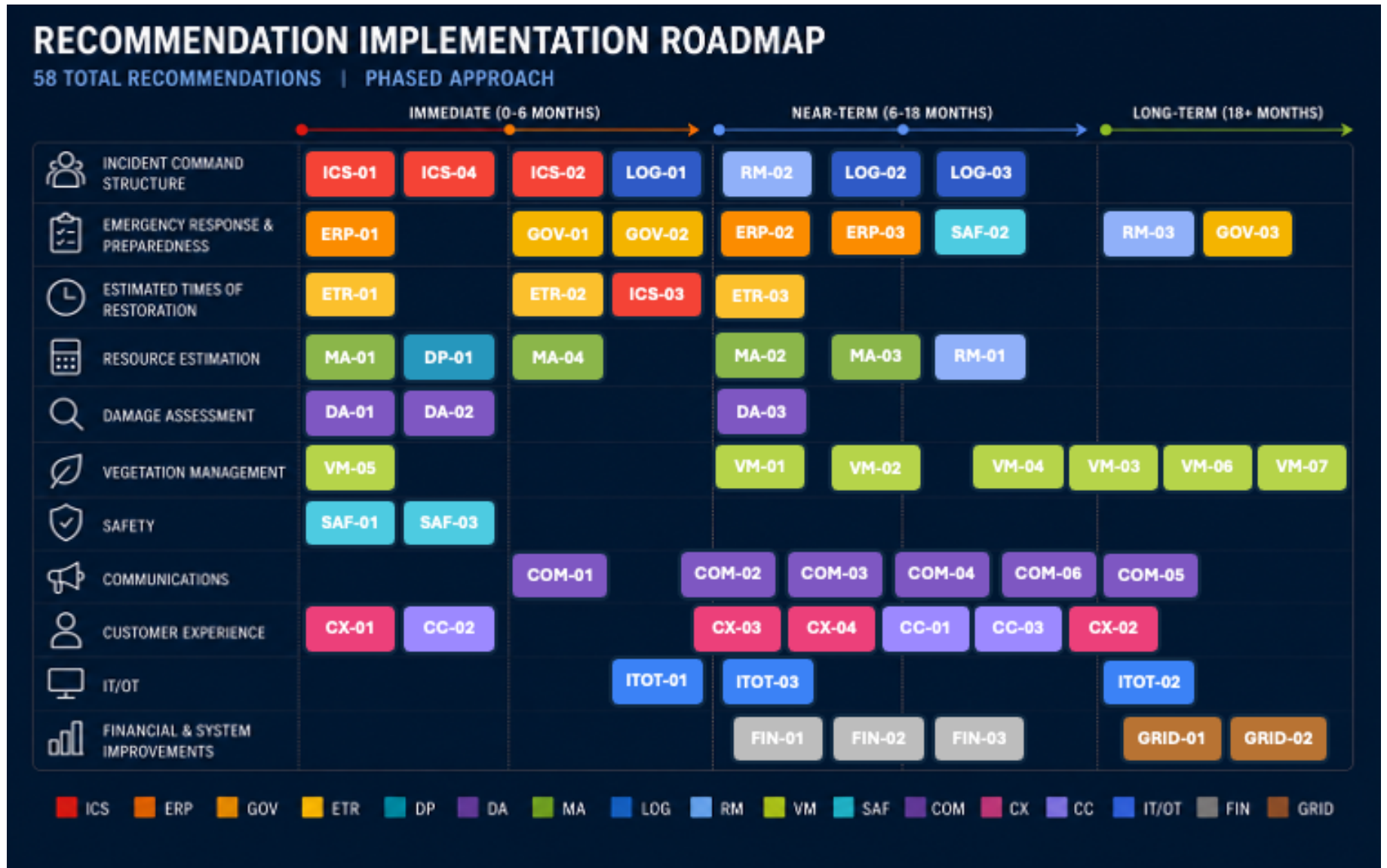
### **Estimated Restoration Times and Customer Communications**

The ability to develop, maintain, and communicate restoration information is a critical component of modern utility restoration operations. Fern demonstrated the importance of providing customers with timely, accurate restoration information during prolonged outage events. Improvements related to ETR development and restoration communications represent some of the most visible opportunities to enhance customer experience and maintain public confidence during future events.

### **Resource Forecasting and Mobilization**

The assessment identified resource forecasting and mobilization as one of the most significant operational challenges encountered during Fern. NES lacked the forecasting capabilities, decision-support tools, and operational thresholds necessary to accurately estimate restoration resource requirements and proactively secure assistance at the scale required by the event. Strengthening damage assessment, resource forecasting, mutual assistance planning, and resource mobilization processes will improve restoration planning, support earlier acquisition of external resources, and enhance the utility's ability to manage future large-scale restoration efforts.

Figure 23. Recommendation Implementation Roadmap



### 4.1.3 Recommendation Ownership

Successful implementation of the recommendations contained within this report will require clear ownership and accountability across the organization. To support implementation planning, PA identified recommended functional owners for each recommendation based on the nature of the work, organizational responsibilities, and the capabilities required to lead implementation efforts. While many recommendations will require cross-functional coordination and support from multiple business units, the ownership assignments presented below are intended to identify the primary function responsible for driving implementation and ensuring successful completion.

#### Emergency Preparedness

Emergency Preparedness should serve as the lead function for recommendations related to emergency management governance, incident command, emergency response planning, training, exercises, and ETR development. These recommendations collectively establish the organizational framework, processes, and capabilities necessary to prepare for, manage, and coordinate major emergency and restoration events.

**Table 5. Recommendations Assigned to Emergency Preparedness**

Index ID	Recommendation
ICS-01	Implement a Scalable ICS for Major Events
ICS-02	Formalize Incident Information Management Processes
ICS-03	Integrate a Dedicated ETR Coordination Function within the ICS
ICS-04	Standardize EOC Operating Capabilities
ERP-01	Rebuild and Operationalize the ERP
ERP-02	Establish Emergency Preparedness Governance and Program Management
ERP-03	Develop a Multi-Year Emergency Response Training and Exercise Program
ETR-01	Establish and Operationalize ETR Development and Communications
ETR-02	Configure and Operationalize OMS ETR Functionality
ETR-03	Establish a Customer-Centric ETR Communications Strategy

#### System Operations

System Operations should lead recommendations associated with damage assessment, resource forecasting, mutual assistance planning, restoration management, and resource deployment. These capabilities directly support restoration strategy development, operational decision-making, and execution of large-scale restoration activities.

**Table 6. Recommendations Assigned to System Operations**

Index ID	Recommendation
DP-01	Develop a Scalable Damage Prediction and Resource Forecasting Model
MA-01	Establish a Proactive Mutual Assistance Mobilization Strategy
MA-02	Expand Mutual Assistance Network Participation and Resource Partnerships
MA-03	Standardize External Resource Integration Processes

Index ID	Recommendation
MA-04	Integrate Resource Mobilization Planning into Damage Prediction Model
DA-01	Establish Damage Assessment Processes and Information Flows
DA-02	Establish Scalable Damage Assessment Methodologies
DA-03	Expand Damage Assessment Technologies and Situational Awareness Capabilities
RM-01	Increase Restoration Throughput During Large-Scale Events
RM-02	Standardize Resource Deployment and Crew Utilization Processes
RM-03	Improve Restoration Work Management, Dispatch, and Switching Capabilities

### Logistics & Planning

Logistics and Planning should lead recommendations related to external resource onboarding, materials readiness, workforce support, staging, and field logistics operations. Effective logistics capabilities are essential for supporting large-scale restoration efforts and sustaining field operations during prolonged events.

**Table 7. Recommendations Assigned to Logistics and Planning**

Index ID	Recommendation
LOG-01	Improve External Resource Mobilization and Onboarding
LOG-02	Improve Materials Readiness and Storm Kit Deployment
LOG-03	Enhance Field Logistics and Workforce Support Operations

### Engineering & Design

Engineering and Design should lead recommendations associated with system segmentation, system hardening, and other long-term infrastructure resiliency initiatives. These recommendations focus on improving system performance and reducing the impacts of future outage events.

**Table 8. Recommendations Assigned to Engineering & Design**

Index ID	Recommendation
GRID-01	Develop a System Segmentation Strategy
GRID-02	Develop a System Hardening Plan

### Vegetation Management

Vegetation Management should lead recommendations related to vegetation planning, risk mitigation, program evaluation, stakeholder engagement, and integration with restoration operations. These recommendations support both day-to-day reliability and long-term resiliency objectives.

**Table 9. Recommendations Assigned to Vegetation Management**

Index ID	Recommendation
VM-01	Evaluate Vegetation Clearance Standards against Industry Leading Practices
VM-02	Implement a Risk-based Vegetation Management Strategy

Index ID	Recommendation
VM-03	Expand Vegetation Risk Communication and Stakeholder Engagement
VM-04	Implement Vegetation Management Monitoring and Program Evaluation
VM-05	Integrate Vegetation Management into Storm Restoration Operations
VM-06	Evaluate Targeted Strategies for Repetitive Vegetation-Related Outage Areas
VM-07	Evaluate Advanced Vegetation Management Technologies and Practices

### Safety

Safety should lead recommendations associated with clearance management, field safety oversight, and validation of safety-critical restoration processes. These recommendations are intended to strengthen worker safety and ensure safe execution of restoration activities under both routine and emergency operating conditions.

Table 10. Recommendations Assigned to Safety

Index ID	Recommendation
SAF-01	Enhance HEC Administration and Clearance Management
SAF-02	Establish Scalable Field Safety Oversight Requirements
SAF-03	Validate Safety-Critical Restoration Processes

### Corporate Communications

Corporate Communications should lead recommendations related to storm communications governance, crisis communications, communications readiness, and development of communications tools and processes. These recommendations support consistent, timely, and coordinated communications during emergency events.

Table 11. Recommendations Assigned to Corporate Communications

Index ID	Recommendation
COM-01	Establish an Integrated Storm Communications Organization
COM-02	Establish Communications Governance and Decision-Making Processes for Major Events
COM-03	Develop and Operationalize a Comprehensive Crisis Communications Strategy
COM-04	Improve Communications Integration with Restoration Operations
COM-05	Strengthen Communications Readiness, Training, and Workforce Capabilities
COM-06	Develop Storm Communications Tools, Templates, and Internal Communications Capabilities

### Customer Relations

Customer Relations should lead recommendations associated with customer support, vulnerable customer management, customer expectations, customer feedback, and call center operations. These recommendations are intended to improve customer service and customer engagement before, during, and after major outage events.

**Table 12. Recommendations Assigned to Customer Relations**

Index ID	Recommendation
<b>CX-01</b>	Strengthen Critical Customer and Vulnerable Population Management
<b>CX-02</b>	Enhance Customer Support During Prolonged Outages
<b>CX-03</b>	Improve Customer Expectations Management During Major Events
<b>CX-04</b>	Operationalize Customer Feedback and Customer Intelligence
<b>CC-01</b>	Improve Call Center Operational Continuity During Major Events
<b>CC-02</b>	Enhance Call Center Surge Capacity and Overflow Readiness
<b>CC-03</b>	Improve Restoration Information Distribution to Customer-Facing Personnel

### IT/OT & Enterprise Applications

IT/OT should lead recommendations related to operational technologies, data integration, decision support capabilities, OMS functionality, and customer communications technologies. These recommendations support the systems and tools required to enable effective emergency response, restoration management, and customer communications.

**Table 13. Recommendations Assigned to IT/OT and Enterprise Applications**

Index ID	Recommendation
<b>ITOT-01</b>	Establish Large-Scale System Operating Modes
<b>ITOT-02</b>	Improve Operational Data Integration and Decision Support Capabilities
<b>ITOT-03</b>	Enhance Customer Communications Information Technologies

### Executive Leadership

Executive Leadership should lead recommendations associated with Board governance, emergency preparedness oversight, and organizational accountability. These recommendations establish the leadership structures necessary to guide implementation efforts and sustain long-term improvement.

**Table 14. Recommendations Assigned to Executive Leadership**

Index ID	Recommendation
<b>GOV-01</b>	Enhance Board Oversight of Emergency Preparedness and Major Event Risks
<b>GOV-02</b>	Clarify Board Roles and Governance Responsibilities During Major Events
<b>GOV-03</b>	Strengthen Enterprise Risk Management Oversight and Integration
<b>FIN-01</b>	Establish Increased Spending Thresholds to Enable Emergency Spending
<b>FIN-02</b>	Establish P-Card Holders within Key Logistics Functions
<b>FIN-03</b>	Track Rates from Contracted Vendors for Future Cost Tracking and RFP Benchmarking

## 4.1.4 Conclusions

Winter Storm Fern was the largest restoration event in NES's history. The storm caused widespread and prolonged outages across the service territory, created significant restoration challenges, and required an organizational response that exceeded the scale of NES's existing emergency response, restoration, and customer support processes. Despite these challenges, NES personnel demonstrated an extraordinary commitment to serving customers, restoring power safely, and supporting one another throughout the event. The dedication, adaptability, and professionalism displayed by employees at all levels of the organization were consistently evident throughout this assessment and played a significant role in the successful restoration of service.

Fern exposed limitations in NES's emergency management, restoration, communications, customer service, and operational support capabilities. While the organization was ultimately successful in restoring service, the response frequently relied on institutional knowledge, individual initiative, informal coordination, and the experience of key personnel rather than documented processes, established governance structures, scalable technologies, and practiced emergency response procedures. Many of the challenges identified throughout this report were not the result of isolated process failures, but rather reflected organizational capabilities that had not matured at the same pace as the growth, complexity, and expectations associated with a utility of NES's size.

Importantly, the findings and recommendations contained within this report should not be viewed solely through the lens of Winter Storm Fern. The recommendations are intended to strengthen NES's ability to respond to a broad range of emergency and restoration scenarios, ranging from routine storm events to large-scale, prolonged outages and other operational disruptions. Many of the recommended improvements support day-to-day operational effectiveness, organizational coordination, customer communications, decision-making, and resiliency independent of any specific hazard.

Implementation of the recommendations will require sustained leadership commitment, organizational ownership, and investment over multiple years. However, the assessment also identified numerous strengths upon which NES can build, including a highly dedicated workforce, strong technical capabilities, a culture of service, and leadership support for continuous improvement. By leveraging these strengths and implementing the recommendations outlined in this report, NES has an opportunity to significantly enhance its emergency preparedness, restoration capabilities, customer experience, and overall organizational resilience while positioning itself to meet the evolving expectations of the customers and communities it serves.

# Glossary

<b>AMI</b>	Advanced Metering Infrastructure	<b>NES</b>	Nashville Electric Service
<b>CAIDI</b>	Customer Average Interruption Duration Index	<b>NIMS</b>	National Incident Management System
<b>CADOPS</b>	Computer-Aided Distribution Operations System	<b>NWS</b>	National Weather Service
<b>CEO</b>	Chief Executive Officer	<b>OEM</b>	Office of Emergency Management
<b>CMP</b>	Crisis Management Plan	<b>OMS</b>	Outage Management System
<b>CMT</b>	Crisis Management Team	<b>OSHA</b>	Occupational Safety and Health Administration
<b>DHEC</b>	Davis H. Elliot Company	<b>OT</b>	Operational Technology
<b>DTE</b>	DTE Energy	<b>PA</b>	PA Consulting Group, Inc.
<b>EIA</b>	Energy Information Administration	<b>PCAD</b>	PragmaCAD
<b>EOC</b>	Emergency Operations Center	<b>PIO</b>	Public Information Officer
<b>ERM</b>	Enterprise Risk Management	<b>PUD</b>	Public Utilities District
<b>ERP</b>	Emergency Response Plan	<b>RFP</b>	Request for Proposals
<b>ETR</b>	Estimated Time of Restoration	<b>SAIDI</b>	System Average Interruption Duration Index
<b>FEMA</b>	Federal Emergency Management Agency	<b>SAIFI</b>	System Average Interruption Frequency Index
<b>FY</b>	Fiscal Year	<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>GIS</b>	Geographic Information System	<b>SIF</b>	Serious Injury or Fatality
<b>HEC</b>	Hazardous Energy Control	<b>SQL</b>	Structured Query Language
<b>IAP</b>	Incident Action Plan	<b>TDOT</b>	Tennessee Department of Transportation
<b>IC</b>	Incident Commander	<b>TEMA</b>	Tennessee Emergency Management Agency
<b>ICS</b>	Incident Command System	<b>TMEPA</b>	Tennessee Municipal Electric Power Association
<b>IT</b>	Information Technology	<b>TNG</b>	Tennessee National Guard
<b>IVR</b>	Interactive Voice Response	<b>TVA</b>	Tennessee Valley Authority
<b>LiDAR</b>	Light Detection and Ranging	<b>TVPPA</b>	Tennessee Valley Public Power Association
<b>MED</b>	Major Event Day	<b>VM</b>	Vegetation Management
<b>NDOT</b>	Nashville Department of Transportation	<b>WSSI</b>	Winter Storm Severity Index

# Figures

Figure 1. Ideal Restoration Curve with Phases.....	10
Figure 2. NES’s Restoration Curve for Winter Storm Fern with Phases.....	12
Figure 3. NWS Forecast as of January 20, 2026 – Snow & Freezing Rain Probabilities .....	16
Figure 4. NWS Forecast as of January 23, 2026 – Snow & Freezing Rain Probabilities .....	17
Figure 5. Winter Storm Fern Summary Event Chronology .....	18
Figure 6. NES Emergency Activation Chart.....	22
Figure 7. Winter Storm Fern Daily Resource Count .....	26
Figure 8. NES Command Center Functional Organization .....	31
Figure 9. “Planning P” Structure .....	32
Figure 10. Building Block Approach for Exercises .....	39
Figure 11. Arrival of 600 Additional Resources on Day 3 (Scenario 1).....	47
Figure 12. Arrival of 600 Additional Resources on Day 5 (Scenario 2).....	47
Figure 13. Hypothetical Restoration Curve Under Ideal Conditions .....	48
Figure 14. NES Reliability Spends (FY 2020 to FY 2025) .....	62
Figure 15. NES SAIFI vs. Large Public Power Utilities &.....	64
Figure 16. NES SAIDI vs. Large Public Power Utilities & .....	65
Figure 17. NES CAIDI vs. Large Public Power Utilities & .....	65
Figure 18. NES Storm CAIDI vs. Large Public Power Utilities & .....	66
Figure 19: Davidson Feeder F9 .....	80
Figure 20. Hourly Call Volume During Winter Storm Fern .....	95
Figure 21. Average Speed of Answer During Winter Storm Fern .....	95
Figure 22. Abandonment Rate During Winter Storm Fern.....	96
Figure 23. Recommendation Implementation Roadmap .....	113

# Tables

Table ES-1: Index of Recommendations .....	6
Table 1. NES Historical Storm Comparison.....	19
Table 2: Summary of Contracts Executed for Winter Storm Response Effort .....	58
Table 3: NES Major Events (2019 – 2024) .....	66
Table 4. NES Vegetation Management Historical Annual Targets & Spends.....	70
Table 5. Recommendations Assigned to Emergency Preparedness.....	114
Table 6. Recommendations Assigned to System Operations.....	114
Table 7. Recommendations Assigned to Logistics and Planning .....	115
Table 8. Recommendations Assigned to Engineering & Design .....	115
Table 9. Recommendations Assigned to Vegetation Management .....	115
Table 10. Recommendations Assigned to Safety .....	116

Table 11. Recommendations Assigned to Corporate Communications .....	116
Table 12. Recommendations Assigned to Customer Relations.....	117
Table 13. Recommendations Assigned to IT/OT and Enterprise Applications .....	117
Table 14. Recommendations Assigned to Executive Leadership.....	117

## Appendix A: Methodology Overview

PA conducted the after-action review using a multi-faceted assessment approach designed to evaluate NES's preparedness, response, restoration, and recovery activities associated with Winter Storm Fern. The assessment was performed through three primary activities: (1) iterative data collection and document review, (2) stakeholder interviews and workshops, and (3) independent analysis and benchmarking against industry practices.

PA issued multiple rounds of data requests to NES throughout the assessment process to obtain operational data, emergency response plans, procedures, restoration documentation, communications records, outage and restoration metrics, staffing information, contractor and mutual assistance records, and other supporting materials. Information requests were refined throughout the assessment as additional findings, questions, and areas of inquiry emerged. A summary of data requests utilized during the assessment is provided in Appendix B.

PA also conducted numerous in-person and virtual interviews with NES leadership, operational personnel, support staff, Board members, contractors, mutual assistance personnel, and subject matter experts involved in the response and restoration effort. These discussions were used to understand decision-making processes, operational challenges, organizational roles and responsibilities, restoration activities, and lessons learned from the event. Follow-up interviews and working sessions were conducted as necessary to validate information and further investigate specific observations identified during the assessment. Summaries of stakeholder interviews conducted as part of the assessment are provided in Appendix C.

In parallel, PA performed an independent evaluation of NES's emergency management, restoration, communications, customer service, vegetation management, mutual assistance, logistics, governance, and operational practices. Assessment activities included reviews of emergency response documentation, operational processes, organizational structures, restoration performance, and supporting technologies, as well as benchmarking against industry standards, leading utility practices, and PA's experience supporting utilities across North America.

Where possible, PA sought to validate observations through multiple sources of information. Findings were developed using a combination of document reviews, operational data analysis, stakeholder interviews, direct observations, and industry benchmarking. This approach allowed PA to triangulate information from multiple perspectives, identify areas of consistency and divergence, and develop findings and recommendations supported by both qualitative and quantitative evidence.

PA used its proprietary outage restoration modeling to model hypothetical restoration curves. The model uses NES's Winter Storm Fern outage data, including start, stop, and restoration durations, as well as restoration resources counts as inputs.

## Appendix B: Data Request Summaries

ID	Area	Report Reference Description
1	NES Background	NES service area profile and system characteristics
2	Emergency Prep. & ICS	NES Emergency Preparedness Plan as of January 1, 2026
3	Emergency Prep. & ICS	Winter Storm Fern storm response organization chart and role biographies
4	NES Background	NES organization chart and authorized staffing levels by department
5	NES Background	Operational technology systems and vendors used during Winter Storm Fern
6	Logistics & Supply Chain	NES yards, work locations, and warehouse facilities
7	Logistics & Supply Chain	Staging site agreements in effect as of January 1, 2026
8	Emergency Prep. & ICS	Pre-storm customer communications and press releases for Winter Storm Fern
9	NES Background	NES vehicle fleet count by vehicle type
10	Timeline	Winter Storm Fern emergency center opening date and time
11	Storm Response & Coord.	Daily customer MWh send-out from January 22 to February 6, 2026
12	Comms + Cust. Exp.	Winter Storm Fern internal lessons learned and after-action reports as of March 13, 2026
13	Veg. Mgmt.	Vegetation management internal audit report
14	Timeline	Winter Storm Fern weather forecasts and damage predictions
15	Other	Public information request response materials
16	Emergency Prep. & ICS	Internal and external storm plan activation messages
17	Storm Response & Coord.	Winter Storm Fern daily IAPs and storm response summary reports
18	Emergency Prep. & ICS	Mutual assistance contracts and agreements
19	Storm Response & Coord.	OMS extracts for Winter Storm Fern
20	Emergency Prep. & ICS	Daily NES, contractor, and mutual aid staffing levels
21	Comms + Cust. Exp.	Daily inbound customer inquiry volumes by channel
22	Comms + Cust. Exp.	Customer communications during Winter Storm Fern
23	Comms + Cust. Exp.	Major Event crisis communication plans and protocols
24	Comms + Cust. Exp.	Storm response communications roles and responsibilities
25	Comms + Cust. Exp.	Storm response communications approval workflows
26	Comms + Cust. Exp.	Social media channels used during storm response
27	Comms + Cust. Exp.	Customer complaint categories and escalation records
28	Comms + Cust. Exp.	Interviews and press briefings conducted by NES leadership
29	Comms + Cust. Exp.	Internal communications and leadership briefings to NES employees
30	Comms + Cust. Exp.	Social media monitoring and sentiment analysis reports
31	Comms + Cust. Exp.	Social media engagement metrics
32	Comms + Cust. Exp.	Storm-related digital channel analytics
33	Comms + Cust. Exp.	Storm-related social media posts and public comments
34	Comms + Cust. Exp.	Media inquiries and NES responses
35	Comms + Cust. Exp.	Call center performance during Winter Storm Fern
36	Emergency Prep. & ICS	ICS and emergency management software records
37	Emergency Prep. & ICS	Winter Storm Fern activation and preparation checklists

ID	Area	Report Reference Description
38	Emergency Prep. & ICS	Emergency Operations Center use and layout
39	Emergency Prep. & ICS	ERP training, exercise, and storm role activation requirements
40	Emergency Prep. & ICS	Prior storm after-action reports and corrective action tracking
41	Emergency Prep. & ICS	Damage Assessment Application documentation and Winter Storm Fern reports
42	Financial Mgmt.	Winter Storm Fern contracts subject to the \$5 million transaction cap
43	Internal reports & docs.	List of historical major event outage, crew, and duration metrics
44	Logistics & Supply Chain	MasTec and DHEC contracts
45	Mutual Aid	Mutual assistance onboarding, roster, and safety documentation
46	NES Background	Road clearance process and city/county coordination
47	Other	External SharePoint for Winter Storm Fern AAR
48	Stakeholder Coord.	Sample external stakeholder communications during Winter Storm Fern
49	Storm Response & Coord.	Estimated Time of Restoration processes and guidelines
50	Veg. Mgmt.	Existing vegetation management program overview
51	Veg. Mgmt.	Vegetation management contracts for normal operations and storm work
52	Veg. Mgmt.	Long-Term Vegetation Management Plan published in June 2025
53	Veg. Mgmt.	Vegetation management dashboards and reporting tools
54	Veg. Mgmt.	Most recent Utility Vegetation Management Manual
55	Comms + Cust. Exp.	Major event local government and municipality communication process
56	Emergency Prep. & ICS	ERP updates and redlines based on lessons learned since 2024
57	NES Background	NES pole design and ice loading standards
58	Storm Response & Coord.	Contractor and mutual aid mobilization and demobilization timeline
59	Emergency Prep. & ICS	Daily ICS meeting minutes for Winter Storm Fern
60	Comms + Cust. Exp.	Customer feedback and survey results during and after Winter Storm Fern
61	Logistics & Supply Chain	Daily pole issuances by type and size during Winter Storm Fern
62	Logistics & Supply Chain	Daily distribution transformer issuances by size during Winter Storm Fern
63	Storm Response & Coord.	Underground facility locate stoppage and resumption communications
64	Board	ERP exercise outcomes and lessons learned related communications to the Board
65	Emergency Prep. & ICS	Command Center role responsibilities, policies, checklists, and training materials
66	Emergency Prep. & ICS	Crisis Management Team and Command Center coordination process
67	Other	List of all restoration and emergency preparedness conferences and industry wide exercises (e.g., GridEx) NES attended in past decade
68	NES Background	Rear-lot primary and secondary line mileage and concentration areas
69	Other	Tree-failure outage summary for the circuits that were a part of the LiDAR pilot program
70	Storm Response & Coord.	Wire-down event response and wire-watching process
71	Emergency Prep. & ICS	Critical customer classifications, counts, and Winter Storm Fern impacts
72	Comms + Cust. Exp.	Outage text messaging issues during Winter Storm Fern
73	NES Background	Pole maintenance program process design
74	Storm Response & Coord.	All public, employee, contractor, and mutual aid safety incidents during Winter Storm Fern
75	Comms + Cust. Exp.	IVR trees as well as any changes made during Winter Storm Fern

ID	Area	Report Reference Description
76	Storm Response & Coord.	GIS outage and restoration playback video
77	Skipped / not used	DR# 77 was skipped over in preparation of data requests; DR 77 not used
78	NES Background	Critical customer generator tracking and summary counts
79	Storm Response & Coord.	Initial ETR development and communications timing, update cadence, and responsible groups
80	Storm Response & Coord.	School reopening and outage restoration timing
81	Storm Response & Coord.	Process owners of the ERP document
82	Comms + Cust. Exp.	Existing Winter Storm Fern telecom capacity issue root cause analysis
83	Financial Mgmt.	Copies of all contracts for all contractors and mutual assistance crews that were utilized during the storm response.
84	Financial Mgmt.	List of contracts negotiated as part of the storm response
85	Financial Mgmt.	Copies of the invoices received to date for each of the contractors utilized.
86	Logistics & Supply Chain	Copies of the contract and/or invoice for materials purchased for the storm response, including poles.
87	Logistics & Supply Chain	Overview of contractor lodging arrangements and hotel/logistics contracts
88	Emergency Prep. & ICS	Winter Storm Fern ERP Assessment List
89	Emergency Prep. & ICS	ERP storm procedures, process flows, job aids, and checklists
90	Storm Response & Coord.	Electric transmission and distribution system operating documentation
91	Storm Response & Coord.	Total wire-down calls and incidents during Winter Storm Fern
92	Storm Response & Coord.	System Controls daily restoration prioritization sheets
93	Storm Response & Coord.	Copies of Davidson F9 feeder damage photos and videos
94	Storm Response & Coord.	Illustrative system damage photos and videos from internal NES Teams channel
95	NES Background	Critical referral customer verification form
96	Storm Response & Coord.	Copy of BHA contract and scope of services
97	Storm Response & Coord.	List of outage reporting system interruption windows by reporting channel
98	Storm Response & Coord.	Copy of Mile Post contract and scope of services
99	Storm Response & Coord.	"Ghost restoration message" volume for Winter Storm Fern
100	Storm Response & Coord.	Call center end-of-call feedback summary
101	Storm Response & Coord.	Copy of Finn Partners contract and scope of services documentation
102	Logistics & Supply Chain	List of mutual assistance invoices by entity and largest invoice support
103	Logistics & Supply Chain	Copies of food vendor contracts during Winter Storm Fern, with indication if they were pre negotiated or existing
104	Logistics & Supply Chain	Copy of standard contracted drafted at beginning of Winter Storm Fern response
105	Storm Response & Coord.	AMI Collector and concentrator outage counts during Winter Storm Fern
106	NES Background	HEC rules documentation
107	NES Background	Substation names, voltage levels, and feeder assignments
108	NES Background	NES network connectivity model for substations and field devices
109	NES Background	SCADA log abbreviation data dictionary
110	Logistics & Supply Chain	Specific mutual aid contractor arrival times and headcounts for Tullahoma Utilities Authority, Sparta Electric System, Hartselle Utilities, PES Energize, Brownsville Energy Authority, Lewisburg Electrical System
111	Logistics & Supply Chain	Specific mutual aid contractor arrival times and headcounts for MLGW, Paducah Power System, and City of Alcoa

ID	Area	Report Reference Description
112	Veg. Mgmt.	Monthly totals of customer letter sent by Vegetation Management for the past 5 years
113	Veg. Mgmt.	Five-year vegetation trim mileage totals and goals
114	Storm Response & Coord.	Minute-level outage statistics for Winter Storm Fern
115	Storm Response & Coord.	Full CADOPS trouble report export
116	Storm Response & Coord.	Filtered SCADA event log for key restoration events
117	Storm Response & Coord.	Individual meter-level AMI historical data and timeout fields
118	Comms + Cust. Exp.	Finn introductory statement during interview
119	Comms + Cust. Exp.	Finn customer sentiment reports provided to NES
120	Comms + Cust. Exp.	Comprehensive Winter Storm Fern communications timeline
121	Comms + Cust. Exp.	Reactive Communications Plan used during Winter Storm Fern
122	Comms + Cust. Exp.	Pre-storm NES - Finn meeting dates, agendas, and outputs
123	Comms + Cust. Exp.	Records of directive to pause social media responses
124	Comms + Cust. Exp.	Finn recommendation email regarding communications strategy change (Tues, Day 3)
125	Comms + Cust. Exp.	Examples of recommendations from Finn that were not implemented
126	Comms + Cust. Exp.	Media outreach records
127	Comms + Cust. Exp.	All outbound communications by date and channel
128	Comms + Cust. Exp.	Supporting materials from internal strategy session on Saturday prior to the storm
129	Comms + Cust. Exp.	Draft and approved message examples
130	Comms + Cust. Exp.	Original and final CEO communication examples
131	Comms + Cust. Exp.	Talking points and briefing documents
132	Comms + Cust. Exp.	Finn, Benchmark, and NES communications role documentation
133	Comms + Cust. Exp.	Alternative communications strategies proposed or used
134	Comms + Cust. Exp.	Storm-period Employee Assistance Program communications
135	Comms + Cust. Exp.	All-employee Employee Assistance Program communication
136	Comms + Cust. Exp.	NES Today Employee Assistance Program reminder posts
137	Comms + Cust. Exp.	Employee Assistance Program utilization reporting
138	Comms + Cust. Exp.	Quarterly EAP utilization reports before and after Winter Storm Fern
139	Comms + Cust. Exp.	Aggregated post-storm EAP usage data
140	Comms + Cust. Exp.	Storm response and ICS training records
141	Comms + Cust. Exp.	Storm plan and ICS training materials, rosters, and completion records
142	Comms + Cust. Exp.	Storm and ICS training ownership and system of record
143	NES Background	Documentation on storm response training records and training development ownership
144	Emergency Prep. & ICS	Business contingency plans for critical systems and facilities
145	Storm Response & Coord.	Proposed HEC emergency rule modification intent
146	Storm Response & Coord.	ZIP code ETR spreadsheets and models
147	Storm Response & Coord.	Contractor and mutual aid safety incidents during Winter Storm Fern
148	Storm Response & Coord.	Copies of modified Hold Tag and Lockout Tag procedures used during Winter Storm Fern

ID	Area	Report Reference Description
149	Other	Reliability maintenance program descriptions, budgets, and progress over ten years
150	Other	New customer growth project descriptions, budgets, and progress over ten years
151	NES Background	Customer density map or urban, suburban, and rural customer estimates
152	Veg. Mgmt.	Overhead and underground circuit mile breakdown
153	Veg. Mgmt.	Actual vegetation management cost breakdown
154	NES Background	Recloser, sectionalizing switch, and smart grid device counts
155	Veg. Mgmt.	Vegetation management vendor rebid and start date
156	Veg. Mgmt.	April 2026 Utility Vegetation Management Manual and update cadence
157	Veg. Mgmt.	Vegetation management contractor quarterly review documentation
158	Veg. Mgmt.	Annual vegetation management budget methodology
159	Other	Description of distribution automation and reliability initiative
160	Internal reports & docs.	Recent ERM and risk register presentations and maintenance process
161	Internal reports & docs.	KPI definitions, historical results, targets, and performance thresholds
162	Storm Response & Coord.	Outage map restoration date and time after January 25 unavailability
163	NES Background	Hitachi OMS acquisition and implementation timing
164	Storm Response & Coord.	Secondary and service restoration start timing
165	NES Background	ERM Internal Audit Protocols document
166	NES Background	Planned outage ETR practices and recent changes
167	Comms + Cust. Exp.	Outage reporting process during Convey phone line interruptions
168	Comms + Cust. Exp.	Convey and Genesys OMS interface architecture
169	Comms + Cust. Exp.	Main customer service IVR call flow
170	Comms + Cust. Exp.	IVR ETR data source and Winter Storm Fern usage
171	Comms + Cust. Exp.	Testing dates for outage reporting channels
172	Comms + Cust. Exp.	Daily customer service staffing during Winter Storm Fern restoration
173	Comms + Cust. Exp.	Customer service staffing by job function
174	Storm Response & Coord.	Clarify if there were any interruptions to NES outage map as well as what constitutes an interruption.
175	Storm Response & Coord.	Outage map reporting capability disruption dates and times
176	Storm Response & Coord.	Outage map banner language beginning January 25, 2026
177	Storm Response & Coord.	Timing of automated restoration notification suspension

# Appendix C: Interview Summaries

Name	NES Position	Topics of Discussion
T. Broyles-Aplin	President & CEO	Storm planning, pre-mobilization, forecasting inputs, resource scaling considerations, communications staffing, contractor coordination, National Guard coordination, damage assessment processes, crew tracking, ETR communication, command cadence, grid hardening, vegetation strategy, LiDAR programs, FEMA documentation, improvement initiatives
D. Frankenberg	CFO	Financial controls, storm kit preparation, materials planning, procurement processes, materials distribution, warehouse operations, contractor onboarding, billing systems, FEMA compliance, reconciliation processes, invoicing, inventory replenishment, financial reporting
B. Baker	EVP – Operations and Innovation Officer	Forecast monitoring, crew staging decisions, resource requests, communications preparation, incident command, crew coordination, onboarding resources, communication messaging, accessibility planning, switching planning, customer messaging, restoration planning
B. Montgomery	Customer Insights Manager	Staging site identification, contractor planning, material stockpiling, staging expansion, contractor deployment, material distribution logistics, coordination across centers, demobilization logistics, material return processes, staging strategy evaluation
A. Cochran	Procurement Manager	
B. Heck	VP T&D Operations	
N. Black	Vegetation Management Supervisor	Vegetation management planning cycles, vendor contracts, staffing levels, scaling vegetation crews, line crew pairing, access creation, coordination with DOT, trimming activities, vegetation clearance standards
B. Whitlock	Operations Manager	Resource planning, shift structuring, outage monitoring, outage prioritization, coordination of crews, safety considerations, communication with system control, restoration sequencing, resource reallocation
L. Smith	Chief Legal Officer & General Counsel	Legal and regulatory responsibilities, ERP ownership, history and exercises, Enterprise Risk Management program overview, contracting during Winter Storm Fern, government relations and public official engagement
T. Holliday	Chief People Officer	ERP structure, command roster, OEM coordination, TEMA coordination, logistics (food, hotels, safety, facilities), EOC coordination, resource prioritization, assessment deployment, union engagement, reporting, interagency coordination
B. Heck	VP T&D Operations	
D. Johnson	VP Engineering	
R. Womble	Chief Information Officer	IT system preparation, monitoring tools, device deployment, system performance monitoring, outage systems, call center systems, capacity management, system updates
K. Phelps	Operations Manager	Storm planning, prioritization planning, dispatch management, coordination between control and field crews, outage prioritization, restoration tracking, resource coordination
A. Carroll	Attorney	Government relations coordination, public official communications, constituent issue management, escalation of critical customer concerns, outage information requests, ETR limitations, messaging coordination
K. Pohlman	Sustainability Manager	Crisis communications planning, messaging development, social media management, media coordination, internal communications, coordination with external communications partners, communications across NES functional groups, communications governance and processes
A. Johnson	Customer Applications Senior Manager	Outage reporting channels, IVR and texting platforms, outage map and system performance, outage intake processes, call volumes and customer behavior, customer notifications, mobile app capabilities, ETRs, customer service integration into storm operations, customer-facing system governance

Name	NES Position	Topics of Discussion
T. Richman	Manager – Energy Services	Key account processes, critical customer identification, outage tracking, coordination with agencies, stakeholder communication, sitrep reporting, restoration coordination
D. Moultrie	Engineering Manger	Damage assessment processes, FieldMaps tools, staffing coordination, field assessments, material identification, engineering coordination, follow-up inspections, validation of repairs
S. Pullens	Customer Relations Manager	Customer service structure, call center setup, outage reporting channels, call volumes, overflow call centers, customer communication, billing adjustments, sentiment tracking, reporting issues
J. Reed	Quality Control Supervisor	Fleet preparation, equipment checks, parts inventory, staffing schedules, vehicle support, maintenance, repairs, allocation across centers, fleet tracking
G. Bolinger	Materials Management Supervisor	Inventory management, storm kit development, warehouse staffing, material distribution, requisition processes, contractor coordination, material tracking, inventory reconciliation
L. Leech	Engineering Manager	System planning, resilience investments, monitoring tools, AMI integration, sensors, infrastructure planning, system observation
B. Covington	Accounting Supervisor	Financial controls, procurement approvals, invoice processing, contract validation, reconciliation, documentation
L. Roeder	System Supervisor	Control room staffing, system preparation, dispatch coordination, outage prioritization, communication with crews, reporting, outage verification
J. Streisel	Energy Services Supervisor	Agency coordination, interagency communication, road clearance coordination, safety notifications, reporting, coordination with external agencies
T. Greene	Safety Supervisor Coordinator	Safety protocols, PPE preparation, contractor onboarding, safety briefings, field oversight, incident tracking, documentation, and HEC
R. Woodward	Line Supervisor	Crew assignment, restoration tasks, coordination with crews, field execution, vegetation coordination, outage work
J. Adams	Employee Training & Development Manager	Training programs, policies, accommodations, employee support, hotel coordination, communication with employees
K. Willis	Senior Work Management Specialist	Training programs, policies, accommodations, employee support, hotel coordination, communication with employees
P. Johnson	Lead Utility Worker	Food provisioning planning, supply procurement, coordination of meals, p-card use
B. Moore	IT Manager, Applications Team	Outage systems, IVR systems, customer platforms, system monitoring, vendor coordination, outage reporting tools
W. Pratt	Revenue Support Supervisor	Field logistics, material movement, coordination with crews, service support, outage handling
M. Shamsuddin	Engineering Supervisor	Role of assessment coordinator during Winter Storm Fern response, and damage assessment activities
P. Harkins	Engineer	AMI data availability, outage event analysis, and storm response coordination
C. Remington	Engineer III, System Control	SCADA event analysis, breaker operations, switching activity, outage response actions, and substation versus field device data
L. Collison	Customer Relations Supervisor	Call center operations, escalation processes, call volumes and levels, customer interactions, customer emotional and de-escalation practices, customer inquiries and expectations, overflow and out-of-state call centers, call center staffing, call center technologies/systems, employee workload, employee working conditions and logistics
E. Overton	Customer Application Supervisor	C2M system performance, training, and capabilities

Name	NES Position	Topics of Discussion
<b>C. Daniels</b>	Facilities Supervisor	Storm logistics support, food and meal coordination, facility access, preparedness gaps, as well as Fern performance perceptions and experiences
<b>D. Wheeler</b>	Field Superintendent	Dispatch processes, workforce coordination, restoration work, contractor coordination, prioritization, material access, system rebuilding, outage coordination
<b>J. Dixon</b>	Field Superintendent	Experiences as field superintendent during Winter Storm Fern, including operational challenges faced, working with NES and mutual assistance / contractors during processes, logistics concerns, and safety performances.
<b>R. Jennings</b>	Field Superintendent	Experiences as field superintendent during Winter Storm Fern, including operational challenges faced, working with NES and mutual assistance / contractors during processes, logistics concerns, and safety performances.
<b>M. Settlemire</b>	Field Superintendent	Experiences as field superintendent during Winter Storm Fern, including operational challenges faced, ETR practices, working with NES and mutual assistance / contractors during processes, logistics concerns, and safety performances.
<b>B. Lillard</b>	Procurement Supervisor	Blue-sky vs. storm response procurement processes, material procurement, emergency expenditure threshold increase, invoice review and approval process, p-card overview, accelerated vendor sourcing, and spend controls.
<b>W. Pistole</b>	Field Superintendent	Experiences as field superintendent during Winter Storm Fern, including crew supervisors, work management, demobilization, working with NES and mutual assistance / contractors during processes.
<b>H. Lively</b>	Engineering Supervisor	Damage assessment coordination, prioritization, FieldMaps usage, resource pairing, evolving field strategies, and access challenges
<b>T. Greenhalgh</b>	Customer Business Solutions Manager	IT systems reliability issues, IVR shutdown, manual meter monitoring, network limitations, and communications breakdown during storm
<b>S. Clark</b>	Operations Manager	Contractor integration, field supervision, resource coordination, restoration work management, circuit restoration strategies, material availability, demobilization activities
<b>J. Ramsey</b>	Engineer II - Operations	OT system interfaces and interactions. Role during Winter Storm Fern. Data flows around outage grouping and notifications
<b>D. Anne Davis</b>	Power Board Chair	Governance, roles and responsibilities of NES board, as well as Fern performance perceptions and experiences
<b>C. Santos</b>	Power Board Vice Chair	Governance, roles and responsibilities of NES board, as well as Fern performance perceptions and experiences
<b>C. Harris</b>	Power Board Member	Governance, roles and responsibilities of NES board, as well as Fern performance perceptions and experiences
<b>R. McCabe</b>	Power Board Member	Governance, roles and responsibilities of NES board, as well as Fern performance perceptions and experiences
<b>I. Prunty</b>	Power Board Member	Governance, roles and responsibilities of NES board, as well as Fern performance perceptions and experiences
<b>Finn Partners</b>	Communications Contractor	Crisis communications strategy, pre-storm communications planning, communications cadence and updates, media relations, social media management, messaging development, approval processes, communication channels, communications governance, coordination with NES leadership and communications teams
<b>L. Arnold (BHA)</b>	Outside SME	BHA's role during Winter Storm Fern response, as well as perspectives on the communications activities
<b>H. Krebs (DTE)</b>	Outside SME	Assistance provided during Winter Storm Fern around ETR processes and calculations
<b>B. Craig (DTE)</b>	Outside SME	Assistance provided during Winter Storm Fern around ETR processes and calculations

Name	NES Position	Topics of Discussion
<b>J. Lindquist (Austin Energy)</b>	Outside crew foreman	Mutual assistance crew experience during Winter Storm Fern restoration in Nashville, including requests, restoration work, safety, logistics and demobilization processes
<b>M. Knapper (Service Electric)</b>	Outside crew foreman	Contractor experience during Winter Storm Fern restoration in Nashville, including requests, restoration work, logistics and demobilization processes
<b>J. Eaves (MasTec)</b>	Outside crew foreman	Contractor preparation, logistics planning, field repairs, coordination with NES, material usage, transportation, demobilization
<b>B. Roper (MasTec)</b>	Outside crew foreman	Resource mobilization, staging, contractor deployment, lodging arrangements, material coordination, logistics management, demobilization
<b>B. Sarrett (DHEC)</b>	Outside crew foreman	Resource staging, pre-deployment coordination, contractor coordination, resource allocation, demobilization

## Appendix D: List of Supporting Documentation

- NES – Powering Nashville for 85 Years
- AEIC – Best Practices for Storm Preparation and Response
- Con Edison - 2025 Electric Emergency Response Plan
- FPL – May 2025 Hurricane Preparedness Workshop Presentation to Florida Public Service Commission
- OPPD – Customer Engagement for the Future Strategic Initiative update
- OPPD – Customer Experience and Engagement Approach
- NYSEG and RG&E – Emergency Response Plan
- SDG&E – SDG&E Emergency and Disaster Preparedness Plan
- DOE – Vegetation management resilience investment guide
- DOE – Obstacles and Opportunities for Information and Operational Technology Modernization by Regulated Utilities



Boston Office  
PA Consulting Group Inc.  
Tower Point, 6<sup>th</sup> Floor  
27-43 Wormwood St  
Boston, MA 02210  
+1 617 225 2700

This report has been prepared by PA Consulting Group on the basis of information supplied by the client, third parties (if appropriate) and that which is available in the public domain. No representation or warranty is given as to the achievability or reasonableness of future projections or the assumptions underlying them, targets, valuations, opinions, prospects or returns, if any, which have not been independently verified. Except where otherwise indicated, the report speaks as at the date indicated within the report.

[paconsulting.com](https://paconsulting.com)

All rights reserved

© PA Knowledge Limited 2026

This report is confidential to the organization named herein and may not be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical or otherwise, without the prior written permission of PA Consulting Group. In the event that you receive this document in error, you should return it to PA Consulting Group, PA Consulting Group Inc., Tower Point, 6<sup>th</sup> Floor, 27-43 Wormwood St, Boston, MA 02210, USA. PA Consulting Group accepts no liability whatsoever should an unauthorized recipient of this report act on its contents.

## About PA.

We believe in the power of ingenuity to build a positive human future.

As strategies, technologies, and innovation collide, we create opportunity from complexity.

Our diverse teams of experts combine innovative thinking and breakthrough technologies to progress further, faster. Our clients adapt and transform, and together we achieve enduring results.

We are about 4,000 strategists, innovators, designers, consultants, digital experts, scientists, engineers, and technologists. And we have deep expertise in consumer and manufacturing, defense and security, energy and utilities, financial services, government and public services, health and life sciences, and transport.

Our teams operate globally from offices across the US, UK, Ireland, Nordics, and Netherlands.

## PA. Bringing Ingenuity to Life.

---

Discover more at [paconsulting.com](https://paconsulting.com) and connect with PA on [LinkedIn](#) and [X](#).