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January 4, 2021

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VIA E-MAIL (BOARD.SECRETARY@BPU.NJ.GOV)

Ms. Aida Camacho-Welch
Secretary
NJ Board of Public Utilities
44 South Clinton Street, 9th Floor
P.O. Box 350
Trenton, New Jersey 08625

Re: In the Matter of the Verified Petition of Jersey Central Power & Light Company for Review and Approval of Increases in and Other Adjustments to Its Rates and Charges For Electric Service, and For Approval of Other Proposed Tariff Revisions in Connection Therewith ("2020 Base Rate Filing")
BPU Docket No. ER20020146 Storm Cost Report - Compliance Filing

Dear Secretary Camacho-Welch:

On behalf of Jersey Central Power & Light Company ("***JCP&L***" or "***Company***"), enclosed for filing with the New Jersey Board of Public Utilities ("**Board**"), is JCP&L's Storm Cost Report ("***Storm Cost Report***"). The Storm Cost Report is being filed in compliance with the Board's Order, dated October 28, 2020, in the above-referenced docket, adopting a Stipulation of Settlement ("the "***Stipulation***"). Among other things, as recited by the Board's Order (at p. 8), ¶¶32-34 of the Stipulation requires the Company to undertake a storm cost review and to produce and file a report with the results of such review by January 1, 2021. As required, copies of the Storm Cost Report and the attachments thereto are simultaneously provided to Board Staff and the Division of Rate Counsel ("***Rate Counsel***") together with a copy of this correspondence.

This Storm Cost Report and the attachments are being sent electronically-only consistent with the Board Order dated March 19, 2020 (Docket No. EO20030254) directing that, until further notice, all submissions to the Board or to Rate Counsel, of any kind, be submitted electronically. Accordingly, please note that no paper copies will follow and we would appreciate if the Board Secretary's office would please acknowledge receipt of this letter and the Storm Cost Report.

Thank you for your anticipated courtesy and cooperation.

Sincerely,

COZEN O'CONNOR

By: Michael J. Connolly

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Jersey Central Power & Light Company
Storm Cost Review

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Executive Summary

The 2020 Base Rate Filing settlement agreement[1] required Jersey Central Power & Light Company ("JCP&L" or the "Company") to conduct a review of its storm costs, both events (*i.e.*, small storms, referring to storms that were not identified as major events), to identify opportunities to reduce costs associated with small storms, including conducting a thorough review of its (major event and non-major event) practices. This report covers the period July 1, 2016 through June 30, 2020 and is the result of the Company's review.

The restoration process and practices, as outlined in this report, that have been developed and are followed within the FirstEnergy Corp. ("FirstEnergy" or "FE") holding company system, including by JCP&L, have resulted in more than two dozen recognition awards provided by the Edison Electric Institute ("EEI") for the Company's emergency response assistance provided to other electric utility companies as well as recovery from impacts to the FirstEnergy electric system. Notably, in July 2019, FirstEnergy received EEI's Emergency Recovery Award for safely and efficiently restoring service to nearly 280,000 JCP&L customers following severe thunderstorms.

Against this backdrop, JCP&L's review of the twenty major events, which occurred during the study period, and the eight non-major weather events[2] identified in the settlement agreement, indicate that there are two observable categories of events and ranges for restoration costs per customer for the events in the study period. Storms fall into two categories - 1) events associated with rainstorms[3], and 2) events associated with winter weather (snow/ice) events. As to restoration costs, after calculating the customers-per-trouble-order for each weather event and reviewing the results, JCP&L recognized that when grouping storm events by the type of weather event, specifically by the type of precipitation (rainstorm vs. snow/ice), there was a clustering of the costs-per-customer-restored datapoints. The analysis indicates that rainstorm events tend to cost less than $100 per customer restored, with 15 of 20, or 75%, of the events costing in the range of $34-$99 per customer restored. Snow events generally are more expensive, but usually less than $250 per customer, with 5 of 8, or 63%, of the events costing in the range of $94-$210 per customer restored. The median cost-per-customer-restored for rainstorms was $76, while the median cost-per-customer-restored for snow events was $206.

Furthermore, when comparing the cost-per-customer-restored for 28 major and non-major weather events, there are eight storms that have a cost-per-customer-restored that is outside of the observed ranges for similar "types" of weather events. Of the twenty major storms included in this review, fifteen of these events have a restoration cost per customer that is within the observable range identified in this analysis. Likewise, of the eight non-major storms included in this review, five of these events have a restoration cost per customer that is within the observable range identified in this analysis.

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[1] As approved in the New Jersey Board of Public Utilities ("Board" or "BPU") Order dated October 28, 2020, *I/M/O The Verified Petition of Jersey Central Power & Light Company For Review And Approval of Increases in And Other Adjustments to its Rates And Charges For Electric Service, And For Approval of Other Proposed Tariff Revisions in Connection Therewith ("2020 Base Rate Filing")*, BPU Docket No. ER20020146. Stipulation of Settlement at ¶¶32-34.

[2] The eight storms are identified as follows: JC-002419, JC-002485, JC-002542, JC-002811, JC-002858, JC-002997, JC-003274, and JC-003328.

[3] The term "rainstorm" is used to include all weather events involving rain, wind, and/or lightning (including thunderstorms), exclusive of events that featured snow or ice accumulation.

With respect to the eight storms with a cost-per-customer restored outside of the observed ranges for similar weather events, JCP&L found that they can be placed into two general categories: 1) a circumstance where the actual weather impact deviated significantly from the forecasted impact for the event; and 2) a circumstance where the actual weather event experienced was extraordinary in terms of the level of severity and intensity for the type of storm.

More specifically, during the review period, there were four named storm events that were forecasted to directly and significantly impact JCP&L's service territory, but which subsequently weakened significantly or diverted, resulting in a much lesser impact to JCP&L's distribution system than was planned for and expected. These include Hurricane Hermine, Hurricane Florence, Hurricane Willa and Winter Storm Harper. In each case, JCP&L had made extensive preparations in anticipation of a significant weather impact to its service territory and, in each case, the severity of the expected impact did not materialize. When JCP&L prepares and stages for a significant weather event expected to impact its service territory and the weather event either does not transpire or occurs to a much lesser extent than predicted, the fixed costs for planning for the expected event dominate the cost of the actual non- or low-impact- event and, therefore, skew the cost-per-customer-restored metric. JCP&L has concluded that since such events will always be outliers, as they should be, they do not provide a basis for avoiding or significantly reducing necessary and proper planning and preparation based on the forecasted and presenting circumstances. Nonetheless, the Company has a responsibility to continue to review and adjust its planning and preparation practices to enhance its ability to acquire and stage resources to manage costs while ensuring safe, timely, efficient and effective storm restoration.

In addition, over the JCP&L study period, there were also four weather events that inflicted significantly more damage than typically expected for an event of its type, making them truly extraordinary and properly outside the ranges observed in this review for the cost-per-customer-restored metric. These events include the March 2018 Nor'easters Riley/Quinn and Toby, a Halloween 2019 thunderstorm that spawned an EF1 tornado, and a thunderstorm on May 15, 2018, which is the third most damaging weather event included in this review. These storms reinforce the fact that weather events are unpredictable and cannot readily or easily be described mathematically or analytically in a linear fashion. As discussed herein, JCP&L concluded that these major events are clearly extraordinary and properly represent extremes beyond a normal range.

As a result of its analysis, JCP&L has determined that, for purposes of this review, cost-per-customer-restored is a meaningful metric to facilitate the comparison of the restoration costs for outage events and may be used to identify observable ranges of restoration costs for certain types of weather events. Another calculation, customers-per-trouble-order, as used in this review, was useful, and may be used, as an additional means of quantifying the intensity of the damage, with a lower value indicating a higher severity of damage in the areas affected. The use of such metrics is also consistent with the conclusions of a recent study of weather event impacts on electrical power systems in the United States[4].

In the course of its review, JCP&L also found a work order anomaly, where costs associated with one of the designated non-major storm events (*i.e.*, JC-002419) were inadvertently combined with the costs of an immediately subsequent major event. The anomalous situation, also determined to be an isolated event, is addressed further herein; however, as a result, JCP&L has adjusted the Company's storm cost deferral in the amount of $277,000.[5]

[4] See Stephen A. Shield, Steven M. Quiring, Jordan V. Pino, Ken Buckstaff, *Major impacts of weather events on the electrical power delivery system in the United States*, **Energy**, Volume 218, 2021, 119434, ISSN 0360-5442.

[5] This situation is discussed further in applicable storm summary found in Appendix A.

To be sure, JCP&L's review of its storm practices and processes yielded several potential opportunities to better control and reduce restoration costs. More specifically, JCP&L has identified potential opportunities for cost improvements associated with mutual assistance, staging sites and its after-action review of weather events.

With respect to mutual assistance, JCP&L will examine additional effective ways to utilize existing Outage Management System ("OMS") data, such as the ratio of customers-affected-to-trouble-orders and other variables to potentially produce an enhanced estimate of the quantity of additional resources, if any, needed to respond to a particular event. JCP&L plans to enhance its management of mutual assistance crews that are supporting its restoration effort increasing the field crew guides assigned to foreign crews, which will facilitate crew movements and assist with logistical issues. Lastly, JCP&L plans to develop onboarding and safety training materials that can be completed "virtually" by mutual assistance crews ahead of their arrival, which will reduce the amount of time needed to get the crews working once they arrive.

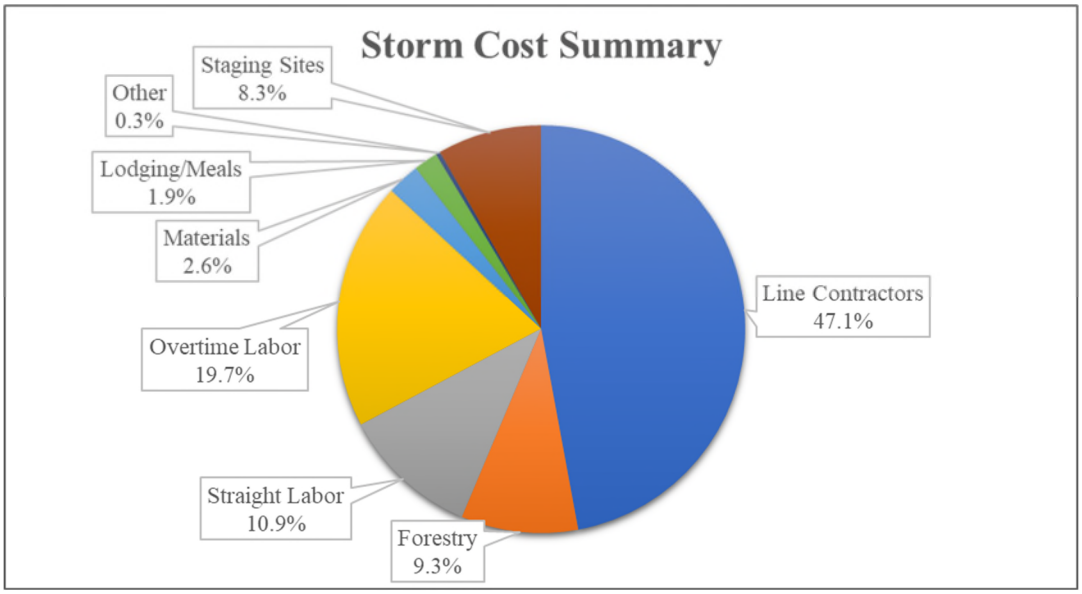
With respect to staging sites, JCP&L will examine the feasibility of a process to scale back the scope of the staging sites in advance of an event's impact until the extent of the required restoration effort is more fully determined. Further, capabilities will be enhanced to rapidly expand services at an existing staging site and/or organize and mobilize at other locations as needed.

Finally, with respect to after-action review, JCP&L will incorporate a specific financial/cost metric as part of its after-action reviews to identify potential opportunities to reduce the costs of future weather events.

Cost Overview

The two charts below provide a summary of the costs and customer outages incurred during each of the study-period storms as well as a summary of the distribution of those costs among standard preparation and restoration activities.

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002419	3/31/2016	84,117	$1,736	$1,149	$1,541	$2,337	$300	$69	($30)	$0	$7,103	$84	22
JC-002474	7/14/2016	216,045	$2,399	$1,509	$3,099	$4,340	$576	$111	$127	$0	$12,161	$56	46
JC-002481	8/12/2016	117,001	$1,427	$564	$1,022	$1,493	$338	$35	$31	$0	$4,910	$42	107
JC-002485	9/3/2016	1,957	$5,261	$1,894	$452	$3,090	$197	$382	$52	$2,988	$14,316	$7,315	24
JC-002542	1/22/2017	45,706	$1,204	$537	$1,101	$1,415	$104	$96	$15	$0	$4,471	$98	31
JC-002553	3/14/2017	23,546	$1,426	$321	$1,123	$1,010	$86	$185	$30	$0	$4,182	$178	79
JC-002615	10/29/2017	55,844	$48	$204	$723	$818	$112	$4	($10)	$0	$1,900	$34	80
JC-002616	3/1/2018	526,413	$88,445	$12,843	$11,074	$23,286	$3,627	$3,731	$671	$12,434	$156,109	$297	19
JC-002712	3/20/2018	70,836	$16,725	$2,126	$2,573	$3,359	$525	$431	$115	$10,323	$36,178	$511	20
JC-002715	5/15/2018	159,049	$13,061	$4,250	$2,782	$5,762	$629	$1,578	$77	$0	$28,139	$177	35
JC-002781	6/29/2018	115,070	$208	$88	$1,119	$2,051	$401	$4	$27	$0	$3,899	$34	102
JC-002782	7/21/2018	114,060	$1,836	$527	$734	$1,447	$218	$43	$22	$0	$4,827	$42	46
JC-002785	8/17/2018	22,701	$484	$197	$192	$823	$85	$19	$9	$0	$1,809	$80	64
JC-002811	9/8/2018	14,813	$11,864	$57	$80	$74	$9	$16	($1)	$2,616	$14,716	$993	269
JC-002858	10/23/2018	60,785	$5,142	$1,322	$438	$2,589	$177	$49	$12	$0	$9,730	$160	55
JC-002861	1/19/2019	28,314	$17,140	$628	$605	$2,154	$789	$436	$102	$2,819	$24,673	$871	77
JC-002862	2/24/2019	110,755	$6,623	$1,213	$2,282	$2,931	$376	$28	$38	$0	$13,492	$122	38
JC-002995	3/3/2019	33,725	$1,055	$142	$838	$1,018	$86	$2	$20	$0	$3,161	$94	41
JC-002997	4/15/2019	46,871	$1,015	$239	$807	$805	$209	$17	($85)	$0	$3,008	$64	79
JC-002999	5/28/2019	54,167	$941	$448	$861	$1,165	$150	$3	$1	$0	$3,568	$66	79
JC-003000	6/29/2019	59,921	$722	$636	$353	$1,108	$186	$1	$14	$0	$3,021	$50	50
JC-003088	7/17/2019	441,034	$13,219	$3,091	$6,719	$11,061	$1,253	$1,396	$330	$6,483	$43,551	$99	70
JC-003134	10/16/2019	65,940	$1,474	$594	$1,034	$1,465	$152	$4	$5	$0	$4,729	$72	56
JC-003141	10/31/2019	59,635	$2,671	$1,400	$1,064	$2,418	$314	$4	$7	$0	$7,880	$132	35
JC-003145	11/27/2019	138,141	$13,476	$3,468	$3,378	$7,059	$467	$34	$46	$0	$27,928	$202	24
JC-003274	12/16/2019	30,361	$2,597	$980	$1,110	$1,556	$132	$62	($53)	$0	$6,384	$210	18
JC-003328	4/13/2020	51,994	$1,292	$749	$1,250	$1,082	$157	$1	$32	$0	$4,564	$88	31
JC-003399	6/3/2020	120,343	$1,306	$1,156	$1,210	$1,954	$177	$5	($13)	$0	$5,796	$48	59
	Total	2,869,144	$214,796	$42,333	$49,565	$89,672	$11,835	$8,747	$1,594	$37,662	$456,205		



The remainder of this report is divided into an overview discussion of the FirstEnergy approach to Emergency Response, setting forth the uniform, coordinated and specialized storm management processes deployed by JCP&L as part of the FirstEnergy holding company system. This is followed by a summary evaluation of the study-period storm costs and the conclusions and recommendations arising as a result of the evaluation. Finally, the detailed explanations of the eight specified non-major storms are set forth in Appendix A, a summary of their associated mutual assistance costs is provided in Appendix B, and the major event reports for each of the five major storms with a cost-per-customer-restored that is outside of the observed ranges for similar “types” of weather events is included in Appendix C.

Emergency Response Plan

To provide context for a review of storm costs, it is necessary to understand the processes and practices associated with JCP&L's storm response and restoration activities. This section of the report outlines and describes the components of FirstEnergy's and JCP&L's Emergency Restoration Plan ("E-Plan"). As discussed later, the E-Plan is consistent with practices followed by utilities and emergency response organizations in North America and is employed by FirstEnergy's ten operating utilities in its five-state service territories.

JCP&L's overall E-Plan is developed and maintained in cooperation with the FirstEnergy Emergency Preparedness Department. The E-Plan outlines the integrated philosophy, practices and architecture for managing emergencies, including storms, that may disrupt electric service to JCP&L's customers. As part of this assessment of JCP&L's storm processes and practices, the key components of the E-Plan are included as part of this review.

JCP&L's E-Plan encompasses all aspects of preparedness, response, and post-event review. The E-Plan and its contents are structured based on widely accepted emergency management standards, utility industry best practices, as well as FirstEnergy system-wide procedures developed through internal continuous improvement initiatives. FirstEnergy, including JCP&L, utilizes the National Incident Management System ("NIMS") emergency management doctrines, structures, concepts, and principles, including the incident command system ("ICS") [6], in its incident management policy.

The E-Plan provides a framework that enables JCP&L to effectively prepare for, and respond to, all manner of emergency events. The E-Plan document is supplemented by the FirstEnergy E-Plan Database, a SharePoint® solution designed to provide real-time and fully updated access to critical information. The database includes, but is not limited to, implementing instructions (such as job aids, phone listings, qualified personnel and equipment lists, vendor and supplier lists, templates, checklists, maps, contact lists for critical customers, law enforcement contacts, city/county/state emergency management agencies, medical facilities, lodging, staging site information, etc.), and other items of a dynamic nature that may be referenced by personnel to assist with implementation of the emergency response processes, functions, and activities, as necessary and appropriate.

In order to maximize the effectiveness of the E-Plan, it has been standardized across the entire FirstEnergy footprint, resulting in a high degree of scalability and flexibility regarding staffing, process efficiencies, and technology utilization.

Emergency Response Organization

The Emergency Response Organization ("ERO"), which is typically composed of JCP&L personnel, is the organization responsible for the preparation and management of restoration responses in New Jersey affecting the JCP&L service territory. In larger-scale restoration events, FirstEnergy support personnel may also participate. The ERO uses the ICS, a component of NIMS, as an incident management system. JCP&L and FirstEnergy, as appropriate, utilize this scalable system to rapidly integrate and organize personnel and resources into a common organizational structure to safely and effectively manage restoration activities at one or more affiliate companies. Note that the ICS is used by all levels of government, Federal, State, and local, as well as by many private-sector and nongovernmental organizations, which allows for

[6] See, the Company's response to BPU-2 from the Board Order, dated January 23, 2013, in BPU Docket No. EO11090543 (the "Irene Order").

ease of integration and coordination between JCP&L and outside entities. Figure 1 provides the benefits of the ERO.

Figure 1. Benefits of ERO

Benefits of Emergency Response Organization	
Structured & Complete Documentation	Structured Command & Management Framework
Enterprise-wide Standardization	Multi-Faceted & Targeted Exercise Program
Full Spectrum Incident Scalability	Peer Utility Collaboration
Incident Adaptability	Multi-Sector Information Sharing
Public & Employee Safety Standards	Process and Technology Development
Robust Internal & External Communication Methods	Standardized After Action Review (AAR) Guidelines and Template
Standardized Command & Management Protocols	Documented Corrective Action/Improvement Planning (CA/IP) mechanism

Emergency Response

The process JCP&L utilizes to prepare for and respond to all emergency events is composed of a series of distinct phases: Preparedness, Alert, Mobilization, Response/Recovery, Demobilization, and Post-Incident Review. Each of these phases has been developed and trained across the Company to allow for timely and efficient activation and execution, and each phase can be scaled as required to address the anticipated or actual scope of an incident. Following are brief descriptions of the processes and steps taken in each phase.

Preparedness

Ongoing preparedness and implementation of best practices and action items are foundational to the success and efficacy of the ERO. All members of the FirstEnergy Utilities ("FEU")[7] organization, as well as other key support groups, are expected to actively participate in both the preparedness and execution of the E-Plan and its associated processes. To facilitate this, JCP&L (and all of FEU) utilizes the ICS as the standardized means of command and control. Over 300 distinct ICS roles have been fully developed, assigned, and trained, with each employee assigned a minimum of a primary and backup role. Appropriate learning management systems have been developed to ensure all necessary roles are available for deployment as needed and training compliance, as well as employee movement, are tracked by automated means. Individual experience levels and qualifications are key factors in the assignment of roles as well as enterprise-wide bench strength considerations for leadership roles such as the Incident Commander and other top-level leadership positions. These positions in the ICS make up the incident management team ("IMT"), which are the roles responsible for setting strategic direction for, and managing, the event.

A fully developed Multi-Year Training and Exercise Program ("MYTEP"), based on Homeland Security Exercise and Evaluation Program ("HSEEP") principles, is utilized to ensure a comprehensive approach to preparedness. Standardized templates, a library of configurable scenarios, and all required exercise objectives are available to assist members of the ERO with preparations at all levels of the organization. Exercise calendars are utilized to ensure all program requirements are met, as well as to communicate across departments and disciplines to foster cross-functional participation and collaboration.

[7] FEU is an internal FirstEnergy organizational grouping, which includes all ten of the FirstEnergy affiliated distribution operating companies, as well as the FirstEnergy Service Company Corporate support function.

Alert

The most common type of event that can have an impact on the electric infrastructure is a weather-related event. As an integral part of the Alert phase, FirstEnergy employs two full-time Meteorologists ("FE Meteorologists") with graduate-level degrees in the fields of Meteorology and Atmospheric Science. FirstEnergy Meteorological Services provides JCP&L with strategic and tactical decision support services from its Meteorological Operations Center on the West Akron Campus, including advanced notice of atmospheric conditions that will cause power disruption such as wind, ice, snow, lightning, severe storms (including thunderstorms), and solar activity; real-time monitoring tools to track ongoing weather events; forensic analysis (*e.g.*, typical frequency of adverse weather events); special studies; training/education; and data interpretation.

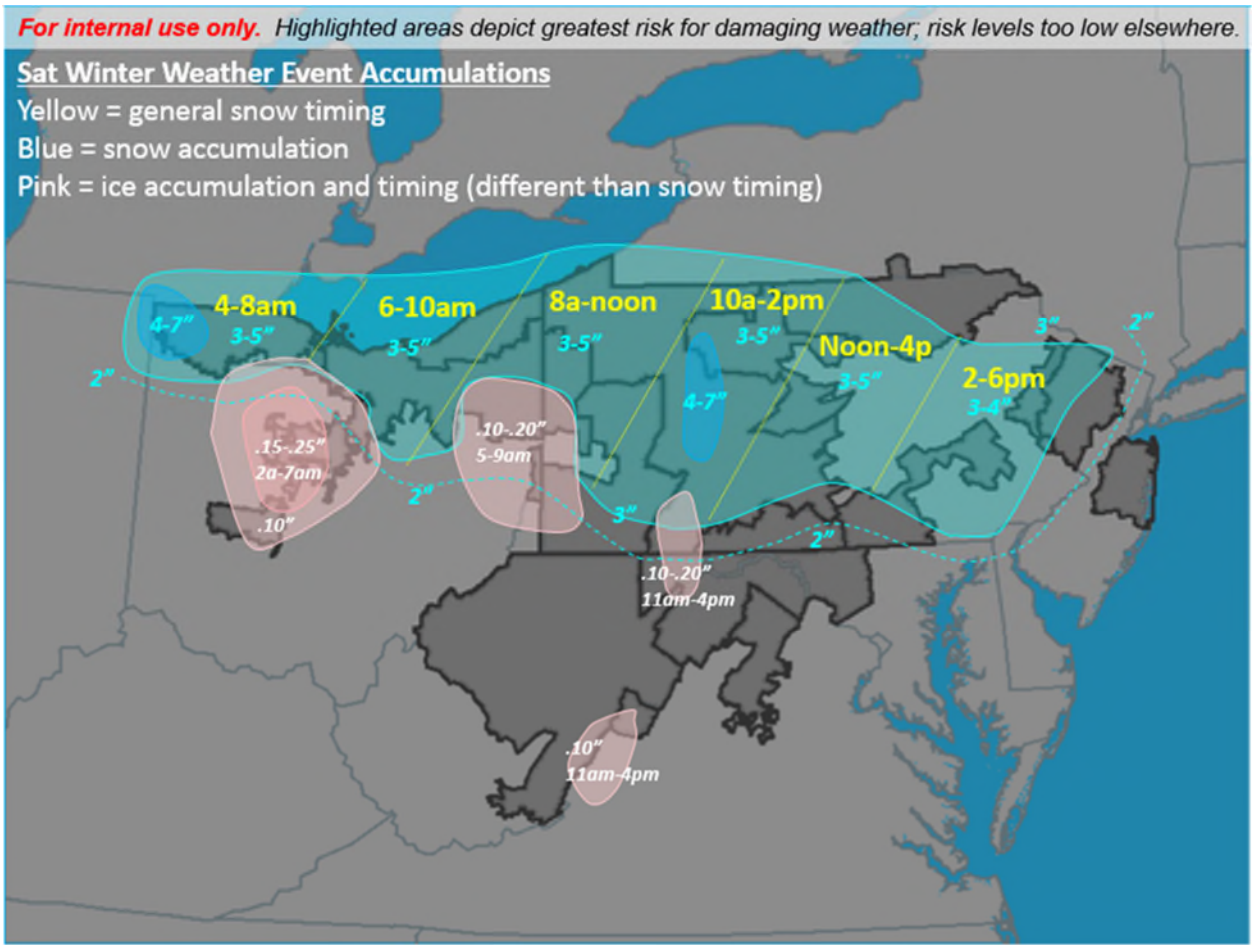
FE Meteorologists' support is available to JCP&L 24/7 to assist with forecast data, interpretation, and support. Through years of research, data analysis, and collaboration with operations personnel, specific alert criteria that may cause an impact to the electric system have been established with the goal of aligning both preparation and response philosophies (as well as actions) (see Figure 2).

Figure 2. Power Disruption Alert Criteria

Power Disruption Alert Criteria
Sustained high winds of 40+ mph and tree foliage present
Ice accumulation of 0.25" or greater on trees, lines, or equipment
Heavy, wet snow 4" or greater (tree foliage or no tree foliage)
Anticipated excessive lightning activity
Long-duration temperature extremes (Polar Vortex and Heat Wave scenarios)
Flooding (safety, access, and UG equipment damage)

The FE Meteorologists monitor conditions forecasted to impact the overall FirstEnergy footprint and the individual service territories of its operating companies, as well as the surrounding geographic region. As warranted, alerts are issued detailing both the timing and anticipated scope, with as much advance notice as possible. These alerts graphically depict the various forecast parameters expected (wind, rain, thunder & lightning, snow, ice, etc.) and include discussions and interpretations of weather data to aid in system-wide and localized decision-making (see Figure 3 below). JCP&L leadership may initiate more detailed discussions with the FE Meteorologists as required to obtain further details, which helps to align local management and to assist with appropriate levels of preparation and mobilization of resources to address the forecast.

Figure 3. Sample FE Weather Alert- The graphic below, when provided, is also accompanied by a general discussion and interpretation of the forecast.



Mobilization

The Mobilization phase of the emergency response includes assessing the alert and identifying both the available and additional resources required to efficiently respond to a restoration event. This includes acquiring both internal and external labor resources, as well as addressing and coordinating the related materials and logistical needs.

Outage Volume Model

The first step is to translate the current weather forecast data into projected damage to the electrical system and the potential resulting outages. This is accomplished through use of the Outage Volume Model ("OVM"). The OVM is an analytical tool that processes the various weather-related inputs and, using statistical methods and algorithms, identifies similar events from a database containing historical weather and reliability data. The OVM then develops a projected range of potential customers affected and damage magnitude down to the district level within JCP&L, based on the outcomes of the historical weather events (Figure 4 below provides an example of the OVM output).

Figure 4. Example OVM Output

RESULTS SUMMARY - WORST IMPACT PERSPECTIVE

DISTRICT	DAYS	CUSTOMERS	ORDERS	DISPATCH	EXCLUDE	FORESTRY	HAZARD	LINE	METER	OTHER	SERVICE	UNIQUE EVENTS	DATE POOL
berkeley	6	8610	347	270	0	22	53	1	0	14	13	15	20040319-20151229
cookstown	0	0	0	0	0	0	0	0	0	0	0	0	-
freehold	0	0	0	0	0	0	0	0	0	0	0	0	-
lakewood	0	0	0	0	0	0	0	0	0	0	0	0	-
longbranch	11	10349	806	405	0	79	206	57	12	8	44	5	20040319-20151229
oldbridge	0	0	0	0	0	0	0	0	0	0	0	0	-
ptpleasant	6	4187	192	157	0	12	38	1	2	14	7	11	20040319-20151229
unionbeach	11	27780	2358	1056	0	251	741	143	26	15	132	6	20040319-20151229
TOTALS	Avg:9 Min:6 Max:11	50926	3703	1888	0	364	1038	202	40	51	196	17	20040319-20151229

RESULTS SUMMARY - TYPICAL (AVERAGE) IMPACT PERSPECTIVE

DISTRICT	DAYS	CUSTOMERS	ORDERS	DISPATCH	EXCLUDE	FORESTRY	HAZARD	LINE	METER	OTHER	SERVICE	UNIQUE EVENTS	DATE POOL
boonton	2	590	36	30	0	3	4	0	0	0	0	2	20040511-20151229
dover	2	594	49	22	0	18	8	0	0	1	1	2	20040511-20151229
flemington	3	28	10	10	0	0	0	0	0	0	0	1	20040511-20151229
newton	2	2002	79	47	0	21	11	0	0	0	1	2	20040511-20151229
summit	0	0	0	0	0	0	0	0	0	0	0	0	-
washington	3	327	13	11	0	0	0	0	0	1	0	3	20040511-20151229
TOTALS	Avg:2 Min:2 Max:3	3539	187	120	0	42	23	0	0	2	2	6	20040511-20151229

The “order” counts are then used to determine a projected event level (see Figure 5 below), which serves to inform the assessment of, and planning for, various resource needs and next steps.

Figure 5. JCP&L Event Level Matrix

JCPL Storm Level Activation				
Level	Duration	Customers Affected	Trouble Cases	Restoration Strategy
I	<36 hours	<40k	<500	RDO
II	1-3 days	20k - 100k	250 -1500	Line Shop
III	3-5 days	80k to 200k	1000 - 15000	Line Shop / Quarantine
IV	5-7 days	100k to 700k	8000 - 25000	Line Shop / Quarantine
V	>7 days	600k to all	>20,000	Quarantine

EVENT LEVEL	ESTIMATED OUTAGE DURATION	EOC ACTIVATION	RESTORATION STRATEGY
1	< 24 hours	**SITUATION MONITORING** • Notify EOC Branch Directors of situation & provide updates • Continued situational awareness • Monitor for potential escalation	**NO Distributed Dispatching** • Identify Incident Commander and support roles as required • Requiring local resources only • Distribution Control Center
2	> 24 hours	**PARTIAL ACTIVATION** **Enhanced Situation Monitoring & Assessment Activities** • Activate & Staff Situation Room • Identify ICS Organization POCs in impacted Regions • Notify EOC Branch Directors of situation, provide updates, and request EOC staffing, as needed • Monitor for potential escalation	**Distributed Dispatching** • Identify additional ICS support roles as required • Requiring local resources only • Line Shop • Hazard organization, as needed • Damage organization, as needed • Forestry organization, as needed • Implement RoD, as needed

EVENT LEVEL	ESTIMATED OUTAGE DURATION	EOC ACTIVATION	RESTORATION STRATEGY
MAJOR EVENT DECLARATION THRESHOLD			
3 **Significant Damage**	> 48 hours	**PARTIAL ACTIVATION** • Activate the EOC • Request appropriate EOC Branch Directors, Support staff, & Representatives to staff EOC • Identify ICS Organization POCs in impacted Regions, establish and maintain ongoing contact	**FE Mutual Assistance** • Commensurate ICS expansion • Resource requests to EOC • Line Shop/Circuit Quarantine • Implement RoD/EOC event management tools • Written IAP and post event AAR
4 **Major Damage**	> 72 hours	**FULL ACTIVATION** • Level 3 activation **+**, • Identify, procure, prioritize, allocate, and track resources • Coordinate executive decision making, establish policy, and set incident priorities • Coordinate internal/external public information, crisis communications, media relations, and regulatory reporting • Maintain analytics throughout the event lifecycle	**RMAG Assistance** • Full ICS implementation • Emergency Circuit Quarantine • Implement Emergency Plans • Engage all safety resources • Open staging sites • Implement hospitality functions • Probable Emergency Declaration by Governor
5 **Catastrophic Damage**	> 96 hours		

It is important to note that model inputs are based on a specific snapshot in time with current available forecast data, and the OVM is run again should new, materially different and applicable meteorological data become available.

Event Impact Estimation Tool

JCP&L utilizes its Event Impact Estimation Tool to convert OVM model-generated order counts to an approximate number of Full-Time Equivalent ("FTE") personnel required for restoration. The type of anticipated storm event drives several decisions regarding the quantity of resources required because the number of hours to restore an outage may differ significantly based on the weather characteristics. For example, the average repair hours per order can be dramatically higher for tropical systems as compared to minor thunderstorms.

Figure 6. Example of JCP&L Event Impact Estimation Tool Output- Please note that "order" counts and Estimated Time of Restoration ("ETR"), as well as the type of event, are user inputs, which are used to drive the man-hour calculation totals.[8]

JCP&L Event Impact Estimation Tool

Region	District	Dispatch Orders	Line Orders	Total Orders	Total Repair Hours	District Multiplier	Adjusted Total Repair Hours	Estimated District ETR (Days)	Estimated FTEs Required
CNJ	BERKELEY	116	116	231	693	0.90	627	4	22
	COOKSTOWN	119	119	237	711	0.82	585	4	21
	FREEHOLD	92	92	183	549	1.01	554	4	20
	LAKEWOOD	84	84	167	501	0.86	429	4	15
	LONG BRANCH	31	31	61	183	1.08	198	4	7
	OLD BRIDGE	51	51	102	306	1.01	310	4	11
	PT PLEASANT	64	64	128	384	0.98	378	4	13
	UNION BEACH	118	118	235	705	1.25	880	4	31
NNJ	BOONTON	492	492	984	2,952	1.30	3,834	4	137
	DOVER	345	345	689	2,067	1.31	2,711	4	97
	FLEMINGTON	342	342	684	2,052	1.44	2,949	4	105
	NEWTON	340	340	679	2,037	1.16	2,362	4	84
	SUMMIT	659	659	1,318	3,954	1.50	5,934	4	212
	WASHINGTON	320	320	639	1,917	1.16	2,231	4	80
						Grand Total	*23,981*		856

Average Repair Hours per Order* 3

User Entry Required
Calculated Field

*User-specified by event type, based on the following guidelines:

Event Type	Average Repair Hours per Order
Lightning	2
Minor Thunderstorms	3
Heat	4
Wind	5
Severe Thunderstorms	6
Wet Snow	8
Ice	10
Tornado	10
Tropical Systems	12

Available Resources

Based on the data provided by the impact estimation tool, JCP&L evaluates existing available internal employee and contractor resources for line, damage assessment, hazard response, forestry, dispatch, and other support organizations to determine what, if any, gaps exist to meet the anticipated impact. The use of internal employee and on-site contractor assistance is the first option reviewed and exhausted for several reasons as detailed in Figure 7.

[8] The average repair hours per order by type of event data is based on FirstEnergy system averages accumulated over time.

Figure 7. Advantages of using internal FE employee and contractor resources

Operational Advantages - Use of Internal Employee and Contractor Resources	
Trained to FE processes and procedures	Versed in FE Safety and switching protocols
Ability to dispatch work directly to FE fleet	Proximity to JCP&L allows quicker arrival
Ability to utilize remote DCC's across FE	Can utilize FE technology and systems in the field
Company pride and sensitivity for FE customers	Most cost-effective option in terms of labor costs
Fewer reconciliation issues	Broad spectrum of available trained personnel

Internal Available Resources

JCP&L maintains a workforce including line workers, substation mechanics, and other physical and support personnel to perform both core and emergency work on its electrical infrastructure. Full utilization of the Company's internal resources initially is a fundamental operating principle, since JCP&L's own employees have the most intimate and detailed knowledge of its electrical system. However, there are circumstances that may impact workforce availability to support a storm restoration effort. Some examples of these situations include scheduled vacation time, or allowing for required rest periods. In 2020, JCP&L's workforce availability has also been impacted by the COVID-19 pandemic and the need for some employees to be under quarantine at certain times.

On-Site Contractor Available Resources

When additional resources are required in addition to JCP&L's available employee workforce levels, JCP&L will request assistance from on-site contractors, that are currently working on JCP&L property. JCP&L will evaluate current contractor workload and assignments and determine to what extent some, or all, of those contractors can be reassigned to restoration work. Current contractual terms provide JCP&L the right of first refusal with these resources and, typically, the contractors cannot leave the property without the Company's consent.

Utilizing on-site contractors provides many advantages. These personnel are already engaged with JCP&L and are familiar with the Company's territory, management, and electrical system. They are also trained in the Company's safety policies as well as its operating procedures, which eliminates the need to conduct onboarding training before they begin to work. Because these contractors are also already on-site, there are also cost savings, as there will be minimal, if any, mobilization and travel costs associated with these resources. As a result, on-site contractors tend to be the most cost-effective resource available after the Company's own internal workforce.

Additional Resource Needs

Once JCP&L determines the man-hours needed for restoration and determines the available complement of its regular employees and the on-site contractors that can be reassigned to restoration, the Company will relay its need for additional resources to the FirstEnergy Emergency Operation Center ("EOC"). The EOC is a FEU organization that is responsible to coordinate all requests for internal FE and external resource assistance, engage additional support organizations to provide a common operating picture throughout the FirstEnergy footprint, and to ensure ongoing situational awareness, resource needs, and the timing thereof. The EOC will then work to obtain the necessary resources starting with FEU employees as well as contractors on-site at or available through other FE affiliated companies. However, some conditions may impact the availability of those resources, such as the extent (*i.e.*, magnitude) and nature of the current

weather forecast and potential impacts to any or all other FirstEnergy companies, as well as travel conditions and the ability of available resources to respond within the requested timeframe.

Some state utility commissions, including the New Jersey Board of Public Utilities ("NJBPU," "BPU" or "Board") and the Pennsylvania Public Utility Commission ("PaPUC"), have strongly recommended or have required that resources not leave the state until all out-of-service customers within their respective states have been restored to service. Generally, the participating mutual assistance utilities agree, for timing and logistics purposes, to reallocate resources in a particular state to another utility within that state, thus meeting the spirit of the recommendation or requirement. However, resources acquired directly by the EOC (*i.e.*, not through an Regional Mutual Assistance Group ("RMAG")) can be reallocated as seen fit to address out-of-service customers of FE affiliate companies in other areas, including other states, before reassignment to another non-affiliated utility.

FirstEnergy Affiliate Companies

Like JCP&L, FE affiliated companies also have physical workforce and support personnel that may bolster the available restoration resources for internal and external mutual assistance purposes. For example, such support can come in the form of line crews, hazard responders, damage assessors, leadership, and other support staff.

External Mutual Assistance

Based on the available internal resources, the EOC will determine when outside (*i.e.*, external mutual assistance) resources will be required to satisfy JCP&L's request for additional resources. The EOC uses a two-pronged approach to obtain the necessary resources: the RMAG process; and direct contractor/vendor partnerships.

Regional Mutual Assistance Groups

The utility industry mutual assistance process is a voluntary framework established to leverage available resources to assist with restoration for incidents of all types. Over the years, several guiding principles documents have been developed to provide a high-level overview of the philosophy of sharing resources, expectations of requesting and responding utilities, invoicing and payment agreements, indemnification guidance, and other necessary protocols.

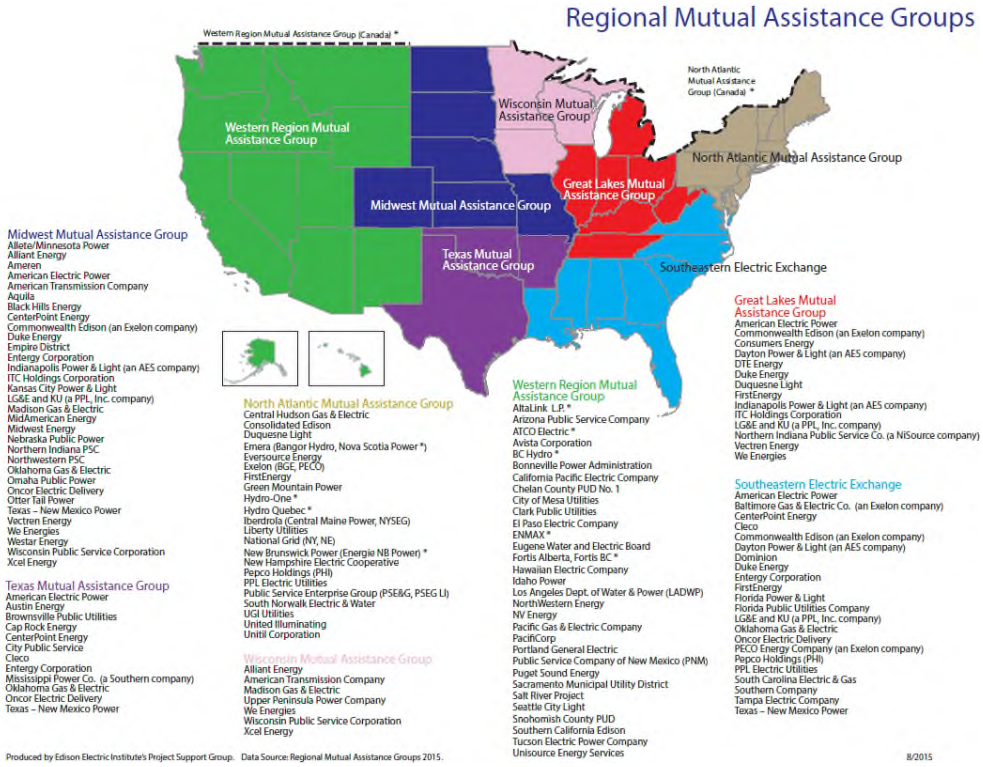
A report produced in 2015 by The National Association of Regulatory Utility Commissioners ("NARUC") and supported by the US Department of Energy ("DOE") entitled *Regional Mutual Assistance Groups: A Primer*, discusses the RMAG process at length.[9] The goal of the process is to showcase the importance and validity of the RMAG process in enhancing grid resiliency and reliability and to show how the process works efficiently to address large-scale emergencies of all types. The full report can be found in Appendix D. The Edison Electric Institute ("EEI") has also developed a high-level expectations framework and agreement utilized by all investor-owned utilities ("IOUs") who participate in the mutual assistance process. All RMAGs have adopted this document and agree to adhere to its principles and intent (see Appendix E).

There are seven RMAGs within the US and Canada (see Figure 9). FE and its operating companies are members of three: Great Lakes Mutual Assistance Group ("GLMA"), North Atlantic Mutual Assistance Group ("NAMAG"), and Southeastern Electric Exchange ("SEE"). Through any, or all, of these

[9] Available at: https://pubs.naruc.org/pub/536E475E-2354-D714-5130-C13478337428

memberships, FE has the means to request resources based on anticipated needs. When the demand for resources of each or all three RMAG's cannot be met, a process exists whereby the other four RMAG's can be invited to participate and offer available resources, thus expanding requests across North America.

Figure 9. RMAG Map of the US and Canada (courtesy of EEI)



The EOC has developed several key Common Operating Guides that detail the required steps to initiate the RMAG process. The Mutual Assistance Checklist (see Appendix F) outlines the general sequence of steps required for requesting or offering support through the RMAGs. Once a request is made, the RMAG leadership creates an event in a centralized tracking software used nationwide known as Resource Allocation Management Program for Utility Personnel (RAMP-UP). The tool tracks resource requests and offers in real-time, allowing members to have informed discussions regarding the deployment of those resources. The tool uses several parameters and statistical algorithms to equitably distribute resources among the requesting utilities and then the offers are matched with the requestor and coordination can begin. Match logs are maintained after every call to ensure transparency and accountability.

Should an event escalate to a level such that multiple states and multiple utilities require assistance, EEI has developed the National Response Event ("NRE") process. It is a process that is run by an executive committee ("NREC") of utility professionals that consult with the CEOs or their designees of all investor-owned utilities to assist all RMAGs with ensuring the maximum level of response and equitable distribution of resources across multiple RMAGs. The NREC follows a fully developed plan known as the NRE Playbook.

JCP&L also participates in the New Jersey Consortium ("NJC"), which is an agreement entered into by all IOUs, Electric Cooperatives, and Municipal Utilities within the state of New Jersey. The NJC agreement

does not supersede the Company's obligations under the mutual assistance process but supports the equitable sharing of response resources within the State to ensure maximum response level efficiency.

Contractor/Vendor Partners

Based on the footprint of the event and likelihood of available resources through the RMAG process, the EOC would simultaneously also begin to contact its contractor/vendor partners to ascertain availability and proximity of resources. It should be noted that due to prevailing wage requirements in NJ, in some cases, JCP&L must pay higher labor rates than negotiated with vendors/contractors for resources during these events. There are currently over ninety (90) line contractors/vendors on the list maintained by FirstEnergy, ensuring all rates, terms and conditions, and insurance certificates are kept up to date in order to expedite deployment. The list can be segmented several ways: geographically, by Company, union or non-union affiliation, cost, etc. Other factors, such as familiarity with the FE system and processes, safety records, and past experiences are also factored into the planning process. Strategic planning with respect to the proximity and timing of resources is a key consideration when acquiring resources.

Generally, electric utility companies communicate with other utilities to keep them informed on the status of their respective restoration efforts. For example, if JCP&L is in contact with a utility in an adjacent state that will be releasing resources the following day or within 48 hours that JCP&L may acquire, JCP&L is less likely to accept resources from the deep South or West, which would require several days travel to reach JCP&L. This reduces travel time up-front, meaning the crews will engage sooner and will also result in a more cost-effective effort due to reduced travel times when returning home.

Material Resource Needs

Staging Sites

When a weather event that may cause significant damage and customer outages is anticipated, it may become necessary to establish one or more staging sites to facilitate the distribution of materials and supplies in an efficient manner. In addition, particularly for more extreme events where few food service and hotel accommodations are available due to power disruptions, staging sites offer bunk trailers, food catering, and other hospitality-related services. The decision to open a staging site is generally based on the number of incoming mutual assistance crews that are expected to participate in a restoration effort. When the number of crews arriving cannot be effectively supported and dispatched from regional line shops, a staging site will typically need to be established. This may be necessary for a level 3 event but will certainly be required for a level 4 or 5 event.

In addition, at certain times of the year, or in certain areas of JCP&L's service territory, hotel capacity is limited or could potentially be impacted by the predicted event, and JCP&L must decide earlier in the process to open staging sites. Although JCP&L has worked with its vendors to maintain equipment within its service area, it still takes approximately 48 hours to make a site fully operational, thus creating a decision point early call, sometimes 2-3 days before event impact. Should an impact occur, these sites are vital to the success of the restoration, providing all operational and logistical amenities required to safely and efficiently sustain a restoration effort when food, fuel, lodging, and laundry infrastructure within the community are compromised or unavailable. JCP&L has several sites pre-selected and ready to use, with fully developed site plans to allow for quick and efficient setup and utilization of a location. Although sometimes an impact does not materialize at all, or impacts are less than projected, this level of preparation,

which was dictated by reasonable analysis of the available data, was still a necessary component of the preparedness stage for the ERO.

Material Lay-down Sites

When a weather event's impact is anticipated to be significant but not so severe as to disrupt most hotels and food service establishments, the Company may opt to establish a scaled-down staging site, also called a material lay-down site. These locations are equipped only to facilitate the distribution of line construction materials such as poles, wire, and transformers to crews participating in the restoration effort. Material lay-down sites also have a reduced cost and shorter mobilization time required for their setup.

Response/Recovery

JCP&L accomplishes safe and efficient restoration through the execution of the established processes outlined in the Emergency Response Plan. The general process for restoration involves the Distribution Control Center ("DCC") using the Outage Management System ("OMS") to prioritize, analyze, and manage outage activity. The Company's initial priority is to mitigate any safety concerns caused by down wire(s) or other damage(s) that poses a risk to the public. The next priority is to restore any transmission, sub-transmission, or substation facilities that may be offline due to weather-related damage. As the high-voltage sources are restored to the distribution facilities, the Company collaborates with local officials to identify and restore critical facilities and works to clear roadways. From there, the main lines of distribution circuits as well as large pockets of customers are restored, followed by smaller laterals and, finally, single customer outages.

Response/recovery is structured as a 24/7 operation. Safety and efficiency of field resources supporting the effort are maximized during daylight and early evening hours. To maximize available field response and repair time, the ICS Planning and Analysis section staffs the evening and overnight hours with ETR and Workplan resources. All work for the succeeding day is then delivered electronically or physically at the start of the shift. This process expedites moving resources from staging areas to the field and improves efficiency and oversight through structured planning.

As the restoration continues, resource needs and allocations are continually monitored to ensure proper staffing levels are maintained. JCP&L works to balance the movement, redeployment, and release of mutual assistance with the costs associated with those resources to achieve safe and timely restoration of electric service to its customers. External resources, unless required for special equipment or capability purposes, are generally slated for earliest release to manage and prudently reduce expenses, as opportunities to do so arise.

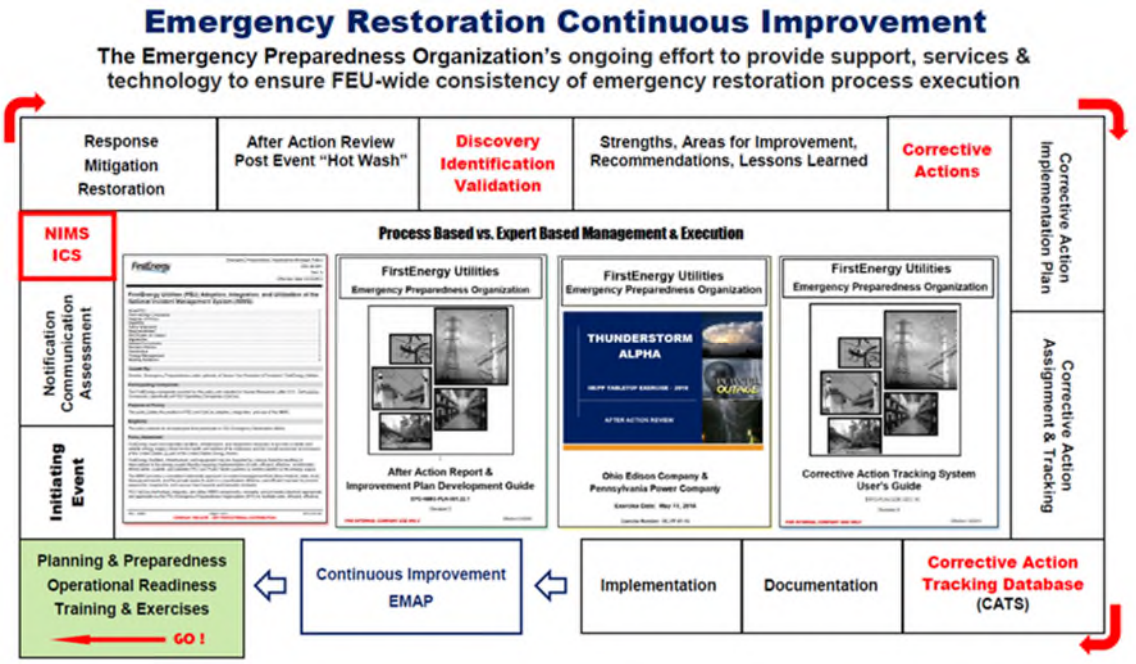
Demobilization

As restoration approaches the final stages, demobilization plans are developed. The demobilization plan is the process that the Company will follow to safely and efficiently release all participating resources and return to normal operations. Typically, JCP&L takes a stepped approach to its release planning, with external resources being released earliest, followed by FEU and FE affiliated companies, and finally JCP&L internal resources. A general consideration for releasing external resources is that they can be made available to other utilities should there be outstanding needs. In addition to assisting other utilities within New Jersey, JCP&L may also be able to reduce its overall mutual assistance costs by eliminating the return travel costs associated with any resources that are accepted elsewhere.

After-Action Review

JCP&L and the EOC will conduct a joint After-Action Review ("AAR") session following storm events categorized as Level 3 or higher. Standardized AAR templates are utilized to guide the discussion. Strengths are highlighted and opportunities for improvement and corrective actions are discussed and documented. The FirstEnergy continuous improvement cycle is illustrated in Figure 11.

Figure 11. The FE continuous improvement cycle



Benchmarking

FirstEnergy's ongoing efforts to analyze and improve restoration efficiency have resulted in over two dozen recognition awards from EEI for its emergency response efforts provided to other electric utility companies as well as recovery from impacts to the FirstEnergy electric system. Notably, FirstEnergy received EEI's *Emergency Recovery Award* for safely and efficiently restoring service to nearly 280,000 JCP&L customers following severe thunderstorms in July 2019. The EEI panel is made up of international industry experts that review all aspects of emergency response around safety, mobilization, restoration effectiveness, process and technology, scope of damage, and customer feedback relative to other submissions.

In addition to EEI, FE also benchmarks restoration performance through its collaboration with other industry organizations. Each year, both EEI and all three RMAGs host a total of seven mutual assistance conferences. FE is an active participant and shares and receives valuable information to be used to improve people, process, and technology utilization. Participation with other industry groups such as the Electric Power Research Institute ("EPRI") and the Association of Edison Illuminating Companies ("AEIC") allows FE to remain informed and help to shape industry best practices in multiple areas. There are also several other organizations and opportunities, such as Federal Emergency Management Agency ("FEMA"), DOE, North American Transmission Forum ("NATF"), and others, that allow FE to leverage best practices and learn from others internal and external to the industry.

Storm Cost Evaluation Summary

As part of this review, JCP&L has analyzed storm-related major events, occurring between July 1, 2016 and June 30, 2020, in addition to the eight events specified in the 2020 Base Rate Filing settlement agreement. An important component of this analysis was to identify an appropriate metric whereby similar events could be compared for purposes of assessing the cost of responding to each of these weather events. While every storm has unique characteristics that affect the nature and severity of damage to the distribution system as well as the magnitude of JCP&L's restoration effort, ultimately, the ratio of "cost per customer restored" was determined to be an appropriate metric for purposes of this evaluation.

However, for this cost-per-customer-restored metric to be used effectively, it is necessary to consider that the nature and severity of damage to the distribution system will have a significant impact on such costs. For instance, a storm with fewer damage locations will likely have a lower cost-per-customer-restored as compared with a storm affecting a wider swath of the Company's service territory and having more damage locations, even if a similar number of customers are affected. A greater amount of restoration work would need to be completed in the latter case (as compared to the former case) to restore a similar number of customers, in turn, leading to a higher cost-per-customer-restored in the latter case. Storms that have similar levels of damage can then be grouped and analyzed based on cost-per-customer-restored.

A metric was also needed to classify or group the weather events based on relative levels of damage. To determine the appropriate groupings, JCP&L divided the number of customers restored by the number of trouble orders reported during each weather event. Generally, when an outage is reported, customers or public safety officers nearby the damaged facilities will report the condition that caused the outage (*e.g.*, a wire down, trees or branches on wires). A trouble order is then generated in JCP&L's outage management system for review and follow-up response. As the level of damage increases in an area, there is a corresponding increase in the number of reported hazards in the area, independent of the number of customers affected by the damage.

Customers-per-trouble-order was thus determined to be an indicator of the combined severity and localization of the damage caused by a weather event, and using this metric provided an additional way to compare the intensity of the damage in the area affected in one storm versus another. A higher customers-per-trouble-order ratio indicates relatively less damage for the number of customers affected, whereas a lower ratio indicates more damage locations with greater severity.

After calculating the customers-per-trouble-order for each weather event and reviewing the results, JCP&L recognized that when grouping storm events by the type of weather event, specifically by the type of precipitation (rainstorm vs. snow/ice), there was a clustering of costs-per-customer-restored datapoints. This aligned with the Company's experience that outages caused by rainstorm events tend to be less costly to restore on a per-customer basis than snow events.[10] This is also consistent with JCP&L's Event Impact Estimation Tool, which indicates that restoring power after snow and ice storms tends to take significantly longer than restoring customers after rainstorms. Not only is this due to the logistical challenges presented by snow-covered terrain (reduced speeds in driving, additional site preparation required, etc.), but also because heavy snow and ice tend to cause more damage to electrical infrastructure than rainstorms due to

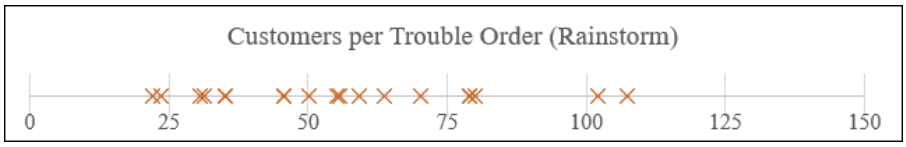
[10] Not only did this finding align with Company experience, it also aligns with some industry-related data that has been studied by third parties. See, for instance, Stephen A. Shield, Steven M. Quiring, Jordan V. Pino, Ken Buckstaff, *Major impacts of weather events on the electrical power delivery system in the United States*, **Energy**, Volume 218, 2021, 119434, ISSN 0360-5442.

the additional weight on trees and wires. In addition to the damage snow and ice cause to electrical infrastructure, there is also damage caused to trees, which, in turn, causes damage to the electrical system.

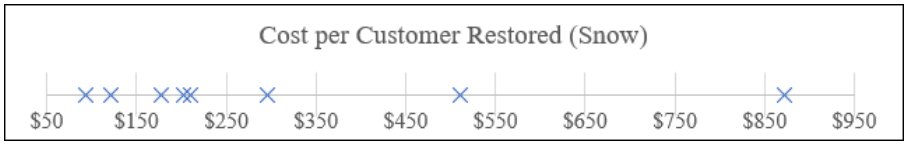
The charts below indicate the weather events associated with rainstorms and snow, respectively, with each event's cost-per-customer-restored and customers-per-trouble-order. The analysis indicates that rainstorm events tend to cost less than $100 per customer restored, with 15 of 20, or 75%, of the events costing in the range of $34-$99 per customer restored. Snow events generally are more expensive, but usually less than $250 per customer, with 5 of 8, or 63%, of the events costing in the range of $94-$210 per customer restored. The median cost-per-customer-restored for rainstorms was $76, while the median cost-per-customer-restored for snow events was $206.[11]

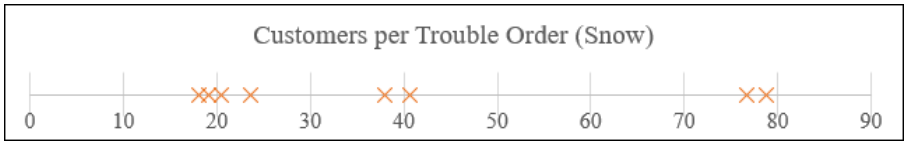
Rainstorm Events					
Storm	Date	Outages	Total ($k)	Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
JC-002419	3/31/2016	84,117	$7,103	$84	22
JC-002474	7/14/2016	216,045	$12,161	$56	46
JC-002481	8/12/2016	117,001	$4,910	$42	107
JC-002485 - Hurricane Hermine	9/3/2016	1,957	$14,316	$7,315	24
JC-002542	1/22/2017	45,706	$4,471	$98	31
JC-002615	10/29/2017	55,844	$1,900	$34	80
JC-002715	5/15/2018	159,049	$28,139	$177	35
JC-002781	6/29/2018	115,070	$3,899	$34	102
JC-002782	7/21/2018	114,060	$4,827	$42	46
JC-002785	8/17/2018	22,701	$1,809	$80	64
JC-002811 - Hurricane Florence	9/8/2018	14,813	$14,716	$993	269
JC-002858 - Hurricane Willa	10/23/2018	60,785	$9,730	$160	55
JC-002997	4/15/2019	46,871	$3,008	$64	79
JC-002999	5/28/2019	54,167	$3,568	$66	79
JC-003000	6/29/2019	59,921	$3,021	$50	50
JC-003088	7/17/2019	441,034	$43,551	$99	70
JC-003134	10/16/2019	65,940	$4,729	$72	56
JC-003141	10/31/2019	59,635	$7,880	$132	35
JC-003328	4/13/2020	51,994	$4,564	$88	31
JC-003399	6/3/2020	120,343	$5,796	$48	59

[11] **See** Ibid. "...The median cost-per-customer-restored is $62 for thunderstorms, while it is $89 for tropical storms, and $105 for winter storms. There is significant variability from event to event and even spatially across a utility service territory for a single event. Often the magnitude of the standard deviation exceeds the median. As shown in our case studies, each storm type presents unique hazards that requires utilities to prepare and respond differently...." (excerpt from Conclusions section at p. 11).



Snow Events					
Storm	Date	Outages	Total ($k)	Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
JC-002553	3/14/2017	23,546	$4,182	$178	79
JC-002616 - Winter Storms Riley/Quinn	3/1/2018	526,413	$156,109	$297	19
JC-002712 - Winter Storm Toby	3/20/2018	70,836	$36,178	$511	20
JC-002861	1/19/2019	28,314	$24,673	$871	77
JC-002862 - Winter Storm Quiana	2/24/2019	110,755	$13,492	$122	38
JC-002995	3/3/2019	33,725	$3,161	$94	41
JC-003145 - Winter Storm Ezekiel	11/27/2019	138,141	$27,928	$202	24
JC-003274	12/16/2019	30,361	$6,384	$210	18





Further review reveals that there are various factors that impact the cost-per-customer-restored. For instance, one of the most significant drivers of a storm's restoration cost is the scope of the damage caused by the event. A storm with more widespread damage will require more time and resources for restoration than an event with lesser damage. However, a severe, localized thunderstorm having a lower customers-per-trouble ratio could have a higher cost-per-customer-restored than a less severe, widespread event even though the latter may affect a greater number of customers. Thus, such differences in weather events make it necessary to consider restoration costs within a range.

As described above, when the predicted amount of damage from an approaching weather system is expected to exceed the capabilities of JCP&L's resources, the Company will proactively seek assistance from mutual assistance resources, including line contractors, to enable prompt restoration of electric service to its out-of-service customers. Particularly, in circumstances where other neighboring or nearby utilities are similarly at risk of being impacted by a weather event, the laws of supply and demand dictate that acquisition of line resources becomes more expensive because local resources are depleted rapidly, and available resources are likely to be located a significant distance from the Company's service territory, making these resources more costly in relative terms. Thus, there are diminishing returns from a cost perspective as additional resources are secured, since the costs of such resources and the time for them to arrive will increase in a non-linear relationship relative to the size and scale of the storm restoration effort.

Not only are there additional costs attributable to the direct labor force, but the requisite, associated maintenance of a larger workforce also increases the costs associated with its support and management.

Examples of these types of indirect costs include management and supervision, material and logistics personnel, lodging, and other hospitality expenses, including staging sites.

Another driver of costs are circumstances where the actual weather impact deviated significantly from the forecasted impact. As previously described in this report, JCP&L makes use of the information provided by FE Meteorologists, including weather briefings and outage volume predictions, to determine the appropriate level of pre-event staging required to repair damage and restore customers promptly and safely. However, weather systems are beyond the control of utilities, and particular weather systems may not evolve as forecasted. Consequently, such weather systems may not be as damaging as had been expected. In these cases, the fixed costs of preparing for the event, including acquisition of mutual assistance line resources, establishing staging sites, etc., cause the cost-per-customer-restored to be higher-to-significantly higher than for events where the forecast was in closer alignment with the event's actual outcome.

As discussed in the beginning of this section, the major and non-major storm events included for the required review were analyzed, grouped and cost ranges were established for the cost-per-customer-restored metric. As would be expected with an analysis of natural weather events, there were outliers where some storm events have a cost-per-customer-restored outside of the observed ranges identified in this analysis. When comparing the cost-per-customer-restored for the 28 major and non-major weather events, there are eight storms that have a cost-per-customer-restored that is outside of the observed ranges for similar "types" of weather events. Explanations of the causes of these deviations from the range of restoration costs for other storms follows below and, as noted earlier, full summaries of the circumstances of each non-major and major event are included in this report for reference in Appendix A and Appendix C, respectively. Note that, of the eight non-major storms included in this review, five of these events have a cost-per-customer-restored within the observable ranges identified in this analysis. Nevertheless, the Company has also included summaries of these five events in Appendix A as well.

Further review of the outlier events was necessary to explain and/or rationalize the restoration costs for these events. The eight storms with a cost-per-customer-restored result outside of the observed ranges for similar weather events can be placed in two general categories: 1) a circumstance where the actual weather impact deviated significantly from the forecasted impact for the event; and 2) a circumstance where the actual weather event was extraordinary with respect to the level of severity and intensity for this type of storm.[12]

Events That Significantly Deviate from the Forecast

Over the period of the JCP&L review, there were four named storm events that were forecasted to directly and significantly impact JCP&L's service territory but which weakened significantly or diverted, resulting in a much lesser impact to JCP&L distribution system than was planned for and expected. These include Hurricane Hermine, Hurricane Florence, Hurricane Willa and Winter Storm Harper. In each case, JCP&L had made extensive preparations in anticipation of a significant weather impact to its service territory and, in each case, the severity of the impact was far less than anticipated. When JCP&L prepares and stages for a significant weather event expected to impact its service territory and the weather event either does not transpire or occurs to a much lesser extent than predicted, the fixed costs for planning for the expected event dominate the cost of the actual non- or lower-than-expected impact- event and, therefore, skew the cost-

[12] This observation also appears consistent with the conclusion of the above cited study as provided in the preceding footnote. Ibid.

per-customer-restored metric, making it relatively meaningless for comparative purposes. JCP&L has concluded that since such events will always be outliers, as they should be, they do not provide a basis for avoiding or significantly reducing necessary and proper planning and preparation based on the forecasted and presenting circumstances. Nonetheless, the Company has a responsibility to continue to review and adjust its planning and preparation practices to enhance its ability to acquire and stage resources to manage costs while ensuring safe, timely, efficient and effective storm restoration. Following are further details of these events.

JC-002485 - 9/3/2016 - Hurricane Hermine

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002485	9/3/2016	1,957	$5,261	$1,894	$452	$3,090	$197	$382	$52	$2,988	$14,316	$7,315	24

In preparation for the approaching Hurricane Hermine, JCP&L activated applicable processes in appropriate measure to respond to a significant storm event. Fortunately, but unpredictably, the hurricane turned east into the Atlantic Ocean in the early morning hours of September 4, 2016. Had Hermine made landfall as originally predicted, the storm would have had significant impact on the Company's infrastructure and equipment.

JCP&L's review of its expenses for this event, including contractor costs and staging sites, indicates that its level of preparation was warranted and consistent with previous weather events that caused significant damage to its facilities. For example, JCP&L mobilized approximately 4,000 line FTEs and 2,500 forestry FTEs over the course of its response to the more recent Tropical Storm Isaias and established six staging sites. In preparation for Hurricane Hermine, which had been predicted to cause damage similar to that which was later caused by Tropical Storm Isaias, approximately 1,000 line FTEs and 500 forestry FTEs were mobilized and four staging sites were established. Had Hurricane Hermine made landfall as was predicted, the Company believes that this level of preparedness would have been appropriate to begin safe and prompt service restoration for its customers.

The total cost of the event was $14.3 million and resulted in outages to about 2,000 customers. Of the total cost, more than $10.5 million was expended for staging sites, hospitality, mutual assistance line and forestry resources to prepare for the storm, even though the hurricane, ultimately, never made landfall in New Jersey. However, based on the information available at the time, JCP&L believes the levels of preparation and staging were reasonable, prudent under all the circumstances, consistent with JCP&L's practices and processes and consistent with the BPU's directives for major storm preparation.

JC-002811 - 9/8/2018 – Hurricane Florence

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002811	9/8/2018	14,813	$11,864	$57	$80	$74	$9	$16	($1)	$2,616	$14,716	$993	269

In preparation for the approaching Hurricane Florence, JCP&L initiated activities in appropriate measure to respond to a significant storm event, similar to its preparations for Hurricane Hermine. After making

landfall over the Carolinas, Hurricane Florence stalled until it eventually passed through the territory on September 18, 2018, with an updated total of 14,813 customers affected by the storm's then remnants.

JCP&L's review of its expenses for this event, including contractor costs and staging sites, indicates that its level of preparation was consistent with its process and preparation for previous weather events that caused significant damage to its facilities. When JCP&L was confident that its customers would not be impacted by Florence, the Company released its contractors and cancelled the mobilization of its staging sites.

The total cost of the event was $14.7 million with $11.9 million expended for line contractors and $2.6 million expended on staging sites to prepare for the storm. Based on the information available at the time, the Company believes the levels of preparation and staging were reasonable, and prudent in view of all the circumstances, consistent with JCP&L's practices and processes and consistent with the BPU's directives for major storm preparation.

JC-002858 - 10/23/2018 – Hurricane Willa

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002858	10/23/2018	60,785	$5,142	$1,322	$438	$2,589	$177	$49	$12	$0	$9,730	$160	55

On October 23, 2018, four days before the expected impact by the remnants of Hurricane Willa, FE Meteorologists forecasted that JCP&L would experience 18 to 24 hours of high winds, with coastal areas predicted to experience winds up to 60 miles per hour in addition to 1 to 3 feet of flooding. Models indicated that there would be a potentially significant impact not only on JCP&L but also other affiliate companies in the FirstEnergy geographic footprint as well as throughout the northeast region of the United States. Subsequently, the expected threat level was reduced on October 25, 2018 by FE Meteorologists, who continued to monitor the event, which began on October 27, 2018.

On October 24, 2018, based on the forecasted size and scope, JCP&L issued a request for mutual assistance. Initially, 489 line contractors were secured to support the restoration effort. When the threat level was reduced on October 25, 2018, 253 of these line contractors were released. Beginning on Saturday, October 27, 2018, JCP&L began to respond to this event with its internal line crews in addition to approximately 50 line contractors. The Company's complement of crews continued working through Sunday, October 28, 2018, to restore all customers.

JCP&L's storm cost for this event was $9.7 million, of which $4.4 million, 46%, was expended for line contractors, the main cost driver. Due to the storm's projected impact across FirstEnergy and the northeast, internal mutual assistance was limited and local line contractor resources were expected to be quickly depleted. JCP&L's decision to secure a large contingent of line contractors ahead of the storm's impact was consistent with its practices. Had the event materialized as initially predicted or even intensified, these line resources would have been critical to JCP&L's ability to restore electric service to its customers quickly and safely. In addition, a minor contributor to costs of this storm was the fact that it occurred on a weekend, which increased the overtime costs of the Company's internal labor force, with $2.4 million expended on internal labor for this event. Based on the information available at the time, the Company believes the levels of preparation and staging were reasonable and prudent in view of all the circumstances, consistent with JCP&L's practices and processes and consistent with the BPU's directives for major storm preparation.

JC-002861 - 1/19/2019 - Winter Storm Harper

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002861	1/19/2019	28,314	$17,140	$628	$605	$2,154	$789	$436	$102	$2,819	$24,673	$871	77

JCP&L began to prepare for the impact of Winter Storm Harper on January 16, 2019 when FirstEnergy initiated its first corporate storm call to bring awareness of the potential impact that the storm could have across the FirstEnergy geographic footprint, including the JCP&L service territory. FE Meteorologists predicted that JCP&L would experience significant precipitation (in the form of snow in the JCP&L Northern Region and as rain in the JCP&L Central Region). Freezing rain and ice accumulation was also anticipated in the JCP&L Northern Region, and gusty winds across the entire service territory between Saturday, January 19, 2019, and Sunday, January 20, 2019, with expected resulting damage that could interrupt electric service to approximately 100,000 customers. In addition to JCP&L, other regional utilities, including FirstEnergy affiliate companies, were expected to be impacted by snow, ice, and winds brought by Winter Storm Harper.

JCP&L made significant preparations ahead of the storm's arrival. Due to the magnitude of the forecasted impact, JCP&L secured approximately 600 line contractors, 200 forestry contractors, 200 hazard responders, and 130 damage assessors. These field resources began to arrive on January 18, 2019. Because of the expected regional impacts from this event, resources had to be secured from locations as distant as Alabama, Florida, and Michigan. In addition to securing mutual assistance, JCP&L also established a staging site at the Livingston Mall to provide lodging, materials, and meals.

FE Meteorologists continued to monitor the storm event and provide updates up to the day of the storm's impact. Fortunately, the forecast became more favorable as the storm approached, and ultimately, Winter Storm Harper impacted JCP&L's customers much less than had been anticipated based on forecasts and modeling, with only 28,314 customers affected during the state of emergency event declared by Governor Murphy.

The total cost of this weather event was $24.7 million, with $16.6 million of the total cost, 67%, being expended for line contractors and $2.8 million of the total cost, 11%, being expended on the staging site. JCP&L's recent experiences with Winter Storms Riley, Quinn, and Toby in March 2018 had underscored the potential for damage that the combination of wind, freezing rain, and heavy, wet snow can bring to the territory. Considering the severe weather threat and consistent with forecasts for this event, the Company believes the levels of preparation and staging were reasonable and prudent in light of all the circumstances, consistent with JCP&L's practices and processes and consistent with the BPU's directives for major storm preparation.

Extraordinary Weather Events

Over the JCP&L study period, there were also four weather events that inflicted significantly more damage than typically expected for an event of its type, making them truly extraordinary and properly outside the ranges observed here for the cost-per-customer-restored metric.

March 2018 was unique and historic from a weather perspective for the northeastern United States with four Nor'easters occurring in the period of one month. Three of these storms, Winter Storms Riley, Quinn and Toby, significantly impacted JCP&L, with the fourth, Winter Storm Skylar, fortunately passing with negligible effect on JCP&L's service territory. The recovery effort required following two of the four

events, Riley and Quinn, was JCP&L's largest since Superstorm Sandy's impact in 2012 and requiring more materials to make repairs than any other storm reviewed for this report. Clearly, because of the intensity and rapid succession of this series of significant winter storm events, the combined cost-per-customer restored of $322 is outside of the norm and are understandably outside the observed range of cost-per-customer-restored for snow events, generally.

The May 15, 2018 event was a quickly organizing line of dangerous, severe thunderstorms bringing wind gusts approaching 70 miles per hour. While the damage was centered in the Northern Region, considering the total amount of equipment replaced, it was the third most damaging weather event reviewed in this analysis. In this respect, only Riley/Quinn and the July 17, 2019 weather event produced more damage. The cost-per-customer-restored was $177.

The October 31, 2019 weather event included significant localized damage when an EF1 tornado touched down in Morris County, in conjunction with this thunderstorm. The National Weather Service determined an EF1 tornado touched down in Harding Township and tore through Chatham Township and Madison before dissipating in Florham Park, winds estimated at 100 mph and covering a discontinuous path of almost 5 miles. Given that this thunderstorm was accompanied by an extreme wind event (including the tornado), the localized damage was more extensive than that produced by a thunderstorm alone, and this resulted in a higher total cost-per-customer-restored of $132 for this event.

These storms reinforce the fact that weather events are, ultimately, unpredictable and cannot readily or easily be described in a linear fashion. Therefore, while comparative analysis is meaningful to some extent, there are clearly limitations at the extremes. Following are further details of these events.

JC-002616 - 3/1/2018 – Riley/Quinn and JC-002712 - 3/20/2018 – Toby

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002616	3/1/2018	526,413	$88,445	$12,843	$11,074	$23,286	$3,627	$3,731	$671	$12,434	$156,109	$297	19
JC-002712	3/20/2018	70,836	$16,725	$2,126	$2,573	$3,359	$525	$431	$115	$10,323	$36,178	$511	20
Total		597,249	$105,170	$14,969	$13,648	$26,645	$4,152	$4,161	$786	$22,756	$192,287		

Riley, Quinn and Toby will be discussed as one event as they were a successive series of devastating Nor'easters that struck JCP&L's service territory, where JCP&L was unable to complete service restoration from one winter storm event before the next winter storm struck.

FE Meteorologists began monitoring the potential for a high-impact storm across the FirstEnergy geographic footprint, including New Jersey, on February 25, 2018. While internal forecasting models regarding Winter Storm Riley were consistent with National Weather Service's forecasts, the storm unexpectedly intensified, and predicted snow totals were being revised upward dramatically even as the event unfolded on March 2, 2018. When the full scope of Riley's impact became known, JCP&L requested mutual assistance through the RMAG process, outside contractors, and FirstEnergy affiliate companies. In addition, JCP&L began planning to establish four staging sites (in addition to three sites for overflow parking). While recovery from Winter Storm Riley was ongoing, Winter Storm Quinn also arrived, and the combined impact of the two snow, ice, and wind events caused extensive damage throughout the JCP&L service territory.

The recovery effort required following Riley and Quinn was JCP&L's largest undertaking since the recovery from Superstorm Sandy's impact in 2012, with the storms causing interruptions to electric service for more than 526,000 customers. There was a significant amount of damage as well, with the storm achieving a customers-per-trouble-order ratio of 19.1, indicating that it was one of the most intensely damaging events in the Company's historical experience, let alone of the storms studied as part of this review. Material issuance records also show that the restoration effort for this event required more material for repair than any other storm reviewed for this report. Indeed, a number of towns in the northwestern portions of the Company's Northern Region reported greater tree-related damage in Riley and Quinn than in Superstorm Sandy.

The damage caused by Riley and Quinn required a significant number of additional line resources for restoring JCP&L's customers. In total, JCP&L secured more than 3,100 line FTEs to assist with the recovery in addition to the Company's 360 internal line FTEs. Due to the storms' widespread impacts throughout the entire Northeast region, there were not many resources available through the RMAG process or from other FirstEnergy affiliate companies, and most resources used by JCP&L came through non-RMAG utility companies and contractors. The total cost for this event was $156.1 million. Of the total cost, $95.1 million, or 61%, was expended for line and forestry contractors and $16.1 million, or 10%, was expended on staging sites and hospitality services. Though the cost-per-customer-restored is higher than most other snow- or ice-caused events, at $297, the overall restoration cost is consistent with the extensive amount of damage inflicted, which required a much larger-scale restoration effort akin to the Company's experience in earlier catastrophic events. Based on its review of its expenses and all the circumstances surrounding this event, JCP&L the Company believes that its costs were reasonable and prudent.

Preparations for Winter Storm Toby began on March 19, 2020 when FE Meteorologists issued advance weather forecasts indicating that the storm would affect the region with heavy, wet snow, ice, and wind, like Winter Storms Riley and Quinn, which had impacted JCP&L just a few weeks prior. The OVM indicated that up to 135,000 customers were likely to experience an outage as a result of the impending weather event. JCP&L requested mutual assistance from the RMAGs and FirstEnergy affiliate companies, ultimately securing 1,515 line FTEs to support JCP&L's restoration effort. In addition, JCP&L activated two staging sites for lodging, materials, and other hospitality needs.

The damage from Winter Storm Toby was less than forecasted, but still relatively intense in the locations affected, specifically the southern part of JCP&L's Central Region. There were 70,836 customers affected during the weather event, with a customers-per-trouble-order ratio of 20.4, similar in intensity of damage to that experienced during Winter Storms Riley and Quinn, except to a smaller expanse of JCP&L's area of the Company's service territory.

The total cost for this event was $36.2 million. Of the total cost, $20.0 million, or 55%, was expended for line and forestry contractors and $10.8 million, or 30%, was expended on staging sites and hospitality services. The main cost drivers for this event were the significant expenses for preparation, including staging sites and the acquisition of significant mutual assistance resources, in anticipation of another service-territory-wide impact. While JCP&L expended $511 in cost-per-customer-restored for this event, the Company believes that its level of preparation was reasonable and prudent based on the information available and all the circumstances.

JC-002715 - 5/15/2018

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002715	5/15/2018	159,049	$13,061	$4,250	$2,782	$5,762	$629	$1,578	$77	$0	$28,139	$177	35

JCP&L began to prepare for this major event beginning on May 15, 2018 when FE Meteorologists significantly increased the risk for severe thunderstorms throughout the Company's service territory, particularly in the JCP&L Northern Region, where wind gusts up to 70 miles per hour or more were possible. The OVM indicated that potentially up to 100,000 customers could have been impacted by the impending weather system. On May 15th, JCP&L requested line resources totaling 500 FTEs to support its restoration effort, and the Company was able to secure line resources totaling 507 FTEs, arriving from May 15th through May 18th. In addition, JCP&L established three material lay-down sites in its Northern Region. As explained elsewhere, material lay-down sites are scaled-down staging sites, which do not have lodging or meal accommodations but are, instead, focused on material deployment to expedite the restoration effort.

The weather event caused significant damage within the JCP&L service territory, causing 159,049 outages, with 149,578 outages in the Northern Region. In addition to the materials issued report, which detailed the large amount of material needed for repairs, the customers-per-trouble-order was 35.2, which indicates an intense amount of damage in the area affected, as compared to other rainstorms.

The total cost for this event was $28.1 million. Of the total cost, $15.4 million, or 55%, was expended for line and forestry contractors and $1.6 million, or 6%, was expended on material lay-down sites and other hospitality needs. Given the magnitude and intensity of the damage experienced in this storm, JCP&L's review of its expenses indicates that its execution of the storm was reasonable and prudent based on the information available and all the presenting circumstances.

JC-003141 - 10/31/2019

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-003141	10/31/2019	59,635	$2,671	$1,400	$1,064	$2,418	$314	$4	$7	$0	$7,880	$132	35

In preparation for the major storm event that began on October 31, 2019, FE Meteorologists issued several reports describing the impending weather threat. The event was forecast to impact both JCP&L regions with high winds, heavy rain, and scattered severe thunderstorms. The weather system ultimately impacted JCP&L significantly with 59,635 customers affected during this major event. During the event, an EF1 tornado touched down in Morris County, and wind speeds with an estimated maximum speed of one hundred miles per hour were recorded in both Northern and Central Regions. In anticipation of additional outages due to the weather event, mutual assistance was requested for the JCP&L Northern Region on October 31, 2019. Line contractors from six companies were provided to assist JCP&L at that time. In addition, JCP&L's Central Region was able to provide line resources in support of the Northern Region on November 1, 2019 after assessing its own outages and resources.

While there was damage throughout JCP&L's service territory, the storm was characterized by the continuous formation of scattered thunderstorms and an EF1 tornado, which produced significant damage in localized areas. The customers-per-trouble-order ratio for this storm was 35.1, indicating that the intensity of the damage was relatively high in the areas that experienced outages as compared with other

rain events. The customers-per-trouble-order ratio for this storm was about the same as another extraordinary rainstorm (JC-002715 - 5/15/2018) discussed above.

JCP&L's storm cost for this event was $7.9 million, of which $3.2 million was expended for line and forestry contractors while the cost for internal labor $2.6 million. Noting that several other FE affiliate companies were also significantly impacted concurrently with JCP&L, the Company's utilization of line contractors and internal mutual assistance was necessary for the prompt restoration of service to its customers. The significant localized damage and widespread impact across FirstEnergy were the main cost drivers for this weather event. JCP&L believes that the restoration cost per customer, albeit outside of the observed range, was reasonable in view of the significant, localized damage from a tornado that resulted from this thunderstorm event.

Notwithstanding its conclusions regarding the above-discussed events, the Company's review does give rise to certain recommendations intended to apply the lessons learned from these experiences towards certain focused modifications, which present some prospect of greater efficiency and/or direct cost savings.

Recommendations

The focus of this analysis was a review of JCP&L's storm costs, both for major events and non-major events, to identify opportunities to reduce costs associated with "small" storms, specifically, the costs associated with eight specific non-major storm events. Through its review, JCP&L has determined that five of the eight non-major storm events have a cost-per-customer-restored that is within the observable range identified in this analysis. Likewise, of the twenty major storms included in this review, fifteen of these events have a cost-per-customer-restored that is within the observable range identified in this analysis.

The remaining eight identified weather events (3 minor and 5 major events) were then the subject of further and more detailed review. For the reasons stated and as discussed in the previous section, JCP&L concluded that these eight storms[13] are properly outside of the observed ranges in this analysis for cost-per-customer-restored for similar types of weather. Nonetheless, JCP&L's review of its storm practices and processes in the context of its experiences has identified several potential opportunities to enhance control and reduce restoration costs. In this regard, JCP&L has identified potential opportunities for cost improvements associated with mutual assistance, staging sites and its after-action review of weather events. These opportunities are discussed below.

Mutual Assistance

The total cost of the eight weather events subject to additional review in this report was $64.3 million, and the largest cost driver was mutual assistance, specifically resources from outside FirstEnergy, with contractor costs totaling approximately $30.1 million, or 47% of the total cost. JCP&L has identified potential opportunities to reduce mutual assistance costs.

First, from this analysis, we have determined that the customers-per-trouble-order may be a useful metric to improve and/or refine resource estimates as the damage footprint of a storm comes into view. JCP&L plans to further explore the usefulness of this metric and to endeavor to identify others that are meaningful to define or characterize a storm event. JCP&L's preliminary thoughts are to utilize the customers-per-trouble-order to quickly estimate the damage footprint of the storm. This ratio will provide quick insight into the extent of damage the electrical system has experienced from the storm and a gauge on potential

[13] That is, as discussed above, five of the twenty major events and three of the eight minor storm events reviewed for this report.

resources required. Of course, this idea will have to be fully analyzed to determine the validity of our initial thoughts.

Acquisition of additional mutual assistance resources is critical to JCP&L's (and any electric utility's) ability to respond and restore electric service to its customers in a timely fashion. Going forward, JCP&L will examine more effective ways to utilize existing OMS and identify other data, such as the ratio of customers-per-trouble-orders and other metrics for opportunities to refine its estimates of additional resources needed to respond, if any.

Second, JCP&L has also identified opportunities that may improve the use and efficiency of certain of the mutual assistance resources that are acquired. JCP&L plans to more actively manage external mutual assistance crews that are supporting the Company's restoration effort with indigenous FE/JCP&L resources. While JCP&L utilizes field crew guides with foreign crews, JCP&L has observed that some utilities utilize field crew guides to a greater extent than JCP&L. For the most part, external mutual assistance crews that do not regularly work within the FE footprint are not trained and registered to perform switching in any of FE's affiliate companies, including JCP&L. Field crew guides are personnel that are trained and qualified to perform switching in FE/JCP&L and can assist with logistical and service territory navigation coordination issues. Going forward, JCP&L will increase its use of field crew guides, which should also increase restoration efficiency. In addition, with the use of a less centralized restoration model, JCP&L plans to dedicate additional staff to tracking and assigning line resources to the district offices and communicating and coordinating with the appropriate with local management.

JCP&L's resource estimates will continue to get better over time. With each major weather event, the OVM model has an increasingly larger universe of data on which to base its predictions. Therefore, the accuracy of the OVM model output should improve with experience.

Finally, when comparing its practices to other utilities, JCP&L noted that some other utilities have developed onboarding and safety trainings that may be completed virtually by crews ahead of their arrival. JCP&L has identified this as a significant improvement over its existing practices and intends to begin implementing this process as soon as the training materials are made available. Virtual onboarding allows crews to arrive prepared to work, which will increase resource efficiency and reduce the costs associated with the logistics of conducting and tracking training for hundreds and sometimes thousands of line resources. In some storms this may eliminate the check-in process and field crew guides can meet the mutual assistance crews and get them more quickly and directly to the job sites.

Staging Sites

The total cost of staging sites in the eight non-major storms to be analyzed in this report above was $5.6 million, or 9% of the total cost. In conducting this review, JCP&L believes that it has identified potential opportunities for cost reductions for setting up and operating staging sites, while still meeting the logistical objectives and overcoming the challenges that their mobilization was intended to meet.

Ahead of a storm's impact, it is difficult to fully anticipate the actual scope of damage and, correspondingly, the total number of mutual assistance resources that will be required to restore customers safely, efficiently and promptly. In advance of significant forecasted weather events where the need for significant mutual assistance is forecasted, JCP&L establishes multiple staging sites with full hospitality services (lodging, meals, etc.) in addition to lay-down areas for materials, refueling stations, and various other amenities. These sites have proven to be a necessary and cost-effective means to provide hospitality services to external resources. However, because of the fixed costs to establish a full-service staging site, when a

weather event does not impact JCP&L or impacts JCP&L to a much lesser extent than forecasted, there are significant costs incurred. JCP&L believes that there is an opportunity to improve its preparation practices for events where there is greater uncertainty regarding the track or impact of a weather event. In this regard, JCP&L will carefully examine the feasibility of a process to scale back the scope of the staging sites in advance of an event's impact until the extent of the required restoration effort is more fully determined. Should full-scale staging sites, including hospitality services, later be determined to be required, JCP&L will develop the capability to rapidly expand services at an existing staging site and/or organize and mobilize at other locations as needed.

JCP&L also believes that there are potential improvements that can be made with hospitality services. When hospitality services are required due to widespread outages across the territory, JCP&L's experience with operating during the COVID-19 pandemic, as well as lessons learned from other utilities during recent mutual assistance events, indicates that food services are not the most efficient and effective way to provide meals to external resources under all circumstances. In many circumstances, grab-and-go food service is preferable. Also, vouchers for meals at commercial establishments are also an alternative. Eliminating food service at the staging sites reduces traffic, improves logistics and potentially reduces food service costs. Food service represents a significant cost for a staging site, especially when a forecasted weather event has a much lesser impact than expected. JCP&L plans to investigate and pilot these potential improvements at its staging sites.

After-Action Review

Generally, JCP&L's post-incident reviews are focused on operational strengths and opportunities for improvement with respect to restoration, logistics, or customer service. However, in addition to discussing these operational concerns, JCP&L will incorporate a specific financial/cost metric as part of its after-action reviews to identify potential opportunities to reduce the costs of future weather events.

JC-002419 - 3/31/2016

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002419	3/31/2016	84,117	$1,736	$1,149	$1,541	$2,337	$300	$69	($30)	$0	$7,103	$84	22

Overview

As indicated in the Executive Summary, during the course of its review, JCP&L found a work order anomaly, where costs associated with this designated minor storm event (*i.e.*, JC-002419) were inadvertently combined with the costs of an immediately subsequent major event, which occurred during the period April 3-April 7, 2016. The work order JC-002419 was established on March 31, 2016 to capture restoration costs associated with weather that began causing outages on March 31. The weather followed a minor storm event on March 27-29, the costs of which had been tracked under a different work order (*i.e.*, JC-002418). As events transpired, the outages from March 31 through April 2, as shown below, were relatively few in number and damage, requiring no mutual assistance or other extraordinary measures. Then, on April 3, 2016 increasing outages related to suddenly significantly worsening weather began to occur resulting in what would become the April 3-April 7 major event experience. In conducting this review, JCP&L determined that rather than closing out work order JC-002419 and creating another work order for the April 3, 2016 developments, costs continued to be captured under the existing work order JC-002419, thus combining some minor event costs with the more significant major event costs. Further review indicates that this was an anomalous, and apparently inadvertent, occurrence.

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002419	3/31/2016 (Minor Event)	12,082	$0	$105	$182	$347	$31	$10	$0	$0	$675	$56	47
JC-002419	3/31/2016 (Major Event)	84,117	$1,736	$1,149	$1,541	$2,337	$300	$69	($30)	$0	$7,103	$84	22
	Total	96,199	$1,736	$1,254	$1,723	$2,684	$332	$78	($30)	$0	$7,778		

As shown in the above chart, after researching the particulars of the outages and costs of restoration, JCP&L determined a number of outages and costs that should have been allocated to the minor event episode from March 31, 2016 -April 2, 2016 ($675,000) and the resulting changes to the parameters of the costs associated with the major event (from $7,778 to $7,103) and the resulting change in the cost-per-customer-restored (from $81 to $56 of the minor storm and $84 for the major event). JCP&L has determined that the resulting impact to the storm cost deferral ($277,000)[1] should be adjusted out of the current storm costs deferral total and has taken steps to effectuate that adjustment.

[1] JCP&L's estimated adjustment to its Storm Cost Deferral related to non-major storm costs for the period March 31, 2016 through April 2, 2016 is $277,000. Because JCP&L did not engage external resources for assistance during this period, JCP&L used internal labor (excluding straight-time labor), forestry expense and meals expense in the estimate, allocating 40% to capital.

In making this discovery and determination, JCP&L though it best to include a discussion of the April 3-April 7, 2016 major event as part of its review since the bulk of the costs associated therewith, presumably, caused JC-002419 to have been selected as one of the small storms designated for review in this report.

In view of the foregoing, then, this storm summary report covers JCP&L's response to a series of thunderstorm episodes, which impacted the JCP&L service territory between April 3, 2016 and April 7, 2016. These thunderstorms produced high wind gusts and heavy rain which downed trees, poles, and wires, damaged equipment, and caused approximately 84,117 JCP&L customers.

Storm Event Forecasting and Preparations

FE Meteorologists issued a weather alert on April 2, 2016 at 11:09 which predicted a new wind episode capable of producing wind gusts of 45 to 55 mph with peak gusts of 65 mph possible, beginning in the very early hours of Sunday, April 3, 2016. The OVM was run for this new wind episode and predicted between 3,300 and 12,600 new outages could occur. JCP&L increased staffing, filling all line shifts and adding fourteen additional forestry crews overnight for a total of eighty-four crews. Additionally, hazard responders were scheduled beginning in the early morning hours of April 3, 2016. As this wind episode moved across the JCP&L service territory, it produced wind gusts of up to 68 mph, up to an additional 0.5 inches of rain in some areas and caused approximately 84,117 outages with the majority in the Northern Region.

Resources and Mutual Assistance

JCP&L utilized both internal and external resources to restore customers affected by this Storm Event. On April 3, 2016, JCP&L secured additional hazard responders from FEU and off-site contractors. Additionally, Northern Region requested mutual assistance from the Central Region, which determined it could provide thirty-one Central Region crews to assist the Northern Region with restoration efforts beginning April 3, 2016. In addition to the 243 JCP&L line employees working to restore customers, JCP&L also had a total of 63 line contractor FTEs (distribution and transmission linemen), 85 hazard responders, 32 public protectors, and 174 forestry FTEs assisting with restoration efforts. Contractor resources were released on April 6, 2016 with JCP&L crews managing the remaining customer outages. In addition to the field resources utilized for restoration, JCP&L required additional support staff from within JCP&L, FEU, and contractors, to effectively and efficiently manage the entire restoration process, which consisted of a total of 1,049 FTEs.

Storm Event Impacts and Restoration

The Storm Event began impacting JCP&L on April 3, 2016, producing heavy rains and strong wind gusts of up to 68 mph. This Storm Event required the issuance[2] of 85 transformers, 66 poles, 114 crossarms and/or braces, and 49,790 feet of wire and cable. In total, approximately 84,117 customers were affected. With the additional resources working alongside JCP&L's crews, those affected customers were restored within 3.4 hours on average. The Emergency Command Center ("ECC") closed on April 5, 2016 at 15:00 with continuing operations turned over to the Company's DCC for the remainder of the restoration. Most of the restoration was completed by April 6, 2016 with crews working to restore isolated outages and follow-up damage repairs through April 7, 2016.

[2] Note that these totals reflect the counts of equipment issued from JCP&L's stores facilities and were not necessarily all installed in the field.

JC-002485 - 9/3/2016

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002485	9/3/2016	1,957	$5,261	$1,894	$452	$3,090	$197	$382	$52	$2,988	$14,316	$7,315	24

Overview

This storm summary report covers the Company's response to Hurricane Hermine, a Category 1 hurricane that was forecasted to impact the JCP&L service territory on September 4, 2016.

Hurricane Hermine made landfall in Florida on in the early morning of September 2, 2016 as a Category 1 hurricane and caused approximately $550 million of economic losses in total in several states along its path. This hurricane produced sustained winds of 80 mph at times and produced heavy rainfall, with a maximum event rainfall level of 22.36 inches between August 31 and September 2 in Tarpon Springs, Florida, and areas of South Carolina and North Carolina receiving up to 14.17 and 10.05 inches respectively, according to the National Hurricane Center ("NHC") Additionally, Hurricane Hermine produced a total of ten tornados in Florida, Georgia, and North Carolina, adding to structural damage and power outages. From September 1, 2016 through the early morning hours of September 4, 2016, hurricane models and weather forecasts showed a high likelihood that the storm would impact JCP&L service territory, producing damaging winds that could down trees, poles, and wire, heavy rains that could cause inland flooding, and 2 to 3 foot storm surge along the coast. In response to those forecasts, JCP&L initiated its Emergency Response Plan to begin preparations for the expected impact. In the early morning of September 4, 2016, the storm path moved east out into the Atlantic Ocean, thus, significantly reducing the storm's impact to the JCP&L service territory.

As discussed herein, the path of Hurricane Hermine, including the downgraded Tropical Storm Hermine, from its landfall on September 2, 2016 through its final move to the Atlantic Ocean, hereby defined for purposes of this summary as the "Storm Event", resulted in significant preparation and mutual assistance activities which are the main contributors to the overall costs of this Storm Event.

Storm Event Forecasting and Preparations

On Thursday, September 1, 2016 at 10:38, FE Meteorologists issued a weather alert for a hurricane in the Gulf of Mexico that was expected to make landfall near the Florida panhandle that evening as a Category 1 hurricane. At that time, weather models predicted the storm would move northeast as a tropical storm and then to the east coast before moving northward toward the mid-Atlantic and Northeastern United States. Within that alert, FE Meteorologists predicted the storm would come near the New Jersey coast early Sunday, September 4, 2016, and produce sustained winds in excess of 40 mph with wind gusts in excess of 60 mph across the state of New Jersey. Additionally, strong winds and heavy rains were forecasted for the greater region including Pennsylvania, West Virginia, and Maryland, in which FEU operating companies are located. This forecast was noted as having low confidence in the hurricane models based on the storm's track thus far and a high-pressure system in the region and would be updated as conditions and information changed.

Also, on Thursday, September 1, 2016, in response to the potential impacts of Hurricane Hermine on the JCP&L service territory, JCP&L initiated the expansion of the ICS and conducted an internal call to discuss those impacts and planning. Based on the forecast, JCP&L planned to open its ECC on Saturday, September 3, 2016. Resources were also discussed on this call. Considering the potential impacts if Hurricane Hermine followed the most likely path at that time and the widespread regional impacts, JCP&L put all

JCP&L employees on notice of the potential event and requested external contractors through both the RMAG and contractor/vendor partnerships, including 500 FTE line resources, 200 hazard responder/damage assessor FTEs, and 600 forestry FTEs. Additionally, staging site vendors were contacted to initiate staging site preparations at four locations in the Central Region: Blue Claws Stadium in Lakewood, Forked River, Great Adventure in Jackson, and Monmouth Park in Oceanport.

On Thursday, September 1, 2016 at 15:12, FE Meteorologists issued a weather update, which further noted the most likely path of Hurricane Hermine as moving up the east coast and impacting New Jersey and the eastern areas of FirstEnergy's service territories. However, the timing of the expected impact was moved up to late Saturday, September 3, 2016, with the impacts lasting through at least early Monday, September 5, 2016. Hurricane models showed multiple potential paths, one of which showed Hurricane Hermine closer to the JCP&L service territory and a more easterly path pushing Hurricane Hermine further out to sea.

On Thursday, September 1, 2016 at 18:00, JCP&L conducted another internal storm call to discuss the latest weather alert and preparations. The OVM at this time predicted a 99% probability of reaching 167,703 customer outages. Staging site preparations continued with four confirmed staging sites across the Central Regions. Due to the widespread nature of the potential impact as well as the uncertainty of the actual path of the hurricane, many of the electric utility companies in the predicted path were requesting external resources. Multiple FEU operating companies were also preparing for impacts and requesting external resources. In total, FEU operating companies requested 2,283 FTE resources to assist in restoration efforts. In addition to external line and forestry resources, JCP&L requested resources from traffic control vendors and helicopter air patrols. Helicopter patrols are used to patrol equipment and lines rapidly and are beneficial for more remote locations and areas experiencing access restrictions due to downed equipment or trees. Additionally, overtime pay was approved at this time for crews to work to put all circuits back to their normal operating configuration[3] by the end of day on Friday, September 2, 2016.

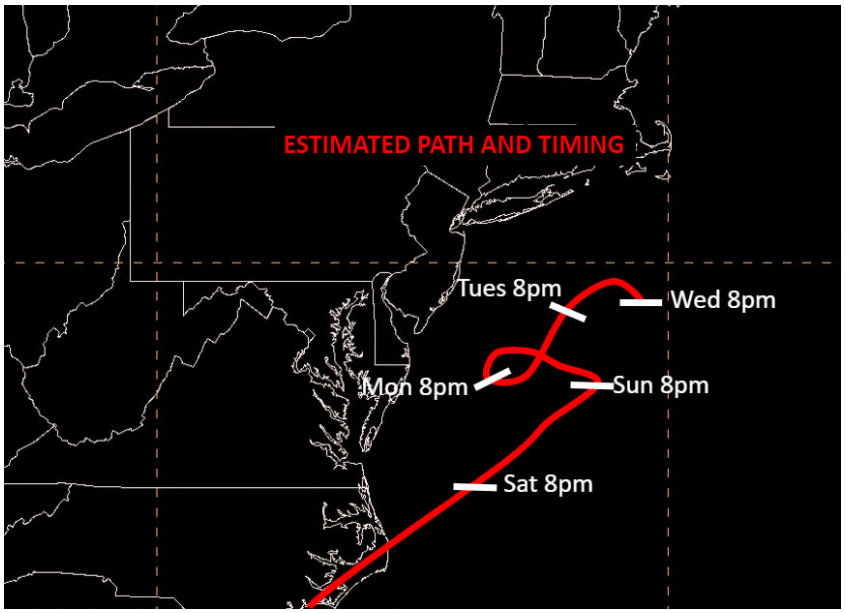
On Friday, September 2, 2016 at 05:30, Hurricane Hermine made landfall near the Florida panhandle. The hurricane produced damaging winds, heavy rains, and flooding and resulted in more than 250,000 power outages to Florida customers, with some of those outages lasting multiple days. The City of Tallahassee stated its electrical system sustained the most damage from a hurricane since 1985. Shortly after making landfall, at 08:00 on September 2, 2016, the storm was downgraded to a tropical storm and was moving toward Georgia. The storm was now expected to stay inland and continue moving towards South Carolina and North Carolina. Forecasts predicted the storm would then move toward the Atlantic Ocean and move north until it stalled approximately 700 miles off the coast of Virginia and New Jersey. According to that path, winds near the New Jersey coastline were predicted to reach 55 to 70 mph which would potentially have a significant impact within the JCP&L service territory.

On Friday, September 2, 2016 at 08:00, JCP&L conducted an internal storm call to discuss the most recent alert and further preparations. JCP&L notified its employees that mandatory 16-hour shifts were scheduled to start on Saturday, September 3, 2016 at 06:00. JCP&L also conducted a call with Mayors and other elected officials focusing primarily on the status of storm preparation efforts and how customers can report outages.

[3] Equipment undergoing maintenance or replacement will be placed back in service where possible prior to a potential Storm Event in order to optimize the system's operating configuration in preparation for the forecasted storm, and in this case, requiring the use of overtime to complete these preparations.

On Friday, September 2, 2016 at 12:00, JCP&L conducted an internal storm call to discuss the most recent alert and preparations. The most recent weather alert update noted that the predicted storm would advance more slowly than in previous alerts, which would delay the arrival of significant weather by 12 to 18 hours, thus arriving Sunday evening, and was still expected to stall a few hundred miles off the east coast of New Jersey on Tuesday and Wednesday. Inland wind gusts of 50 to 60 mph were expected to begin Sunday afternoon into early Tuesday morning. Wind gusts of 65 mph were expected along the coastline during those same times. The EOC was working to secure external resources for all FEU operating companies expected to be impacted. At this time, 2,150 FTEs were secured for JCP&L through the RMAG process as well as contractor/vendor partnerships.

On Friday, September 2, 2016 at 13:39, FE meteorologists issued another weather update which showed the storm track moving farther east off the coast on Sunday before tracking back west toward the New Jersey coast during the day on Monday (see the graphic below). The update also upgraded the potential for very strong wind gusts (upwards of 65 mph) for areas of coastal New Jersey early Monday.



JCP&L held another internal storm call that day at 16:00 to discuss the latest weather alert and storm preparations.

On Saturday, September 3, 2016 at 09:40, FE Meteorologists issued a weather update that noted the hurricane models continued to show uncertainty on the actual path of the storm, however, all models continued to show a significant impact to New Jersey coastline with strong wind gusts of up to 70 mph beginning Monday morning and lasting into Tuesday evening. Additionally, storm surges of 2 to 4 feet beginning Sunday were expected. In preparation of potential flooding along the coast, JCP&L closed flood gates at thirteen substations. Additionally, JCP&L crews performed circuit sweeps[4] and addressed any remaining reliability issues.

On Saturday, September 3, 2016 at 15:27, FE Meteorologists issued a weather update that noted minor changes to the expected wind gusts downgrading from 70 mph to 60 mph along the coastline. The storm

[4] Circuits sweeps denote grid inspections that are executed to determine any current system issues that may result in failure of components that may cause an interruption of service.

was still tracking to move towards New Jersey Monday or Tuesday. JCP&L conducted another internal storm call at 20:00 on Saturday.

On Sunday, September 4, 2016 at 07:00, JCP&L conducted an internal storm call. At this time, the weather forecasts showed the storm continued to pose a threat to the New Jersey coast and the expected impact was tropical storm force winds and a storm surge of 2 to 5 feet. The JCP&L ECC was opened at 06:00 this day.

Also at 07:00, Governor Christie issued a limited State of Emergency for Ocean, Atlantic, and Cape May counties. Of those three counties, only Ocean county falls within JCP&L service territory.

At 09:09, once FE Meteorologists had high confidence in the latest model updates, they issued a weather alert noting the center of the storm was expected to be weaker and further east than previously expected. This update reduced both the western extent of the strongest winds and the magnitude of the strongest gusts. Currently, wind gusts in excess of 40 mph were only expected within 25 miles of the coastline. The total expected rainfall was also reduced, with the possibility of no rain reaching the New Jersey coastline based on the new storm path. A revised OVM model based on the latest information now showed a reduced potential impact of approximately 14,000 outages.

JCPL&L conducted an internal storm call on Sunday, September 4, 2016 at 11:00 to discuss the latest weather alert which significantly decreased the expected impact to the JCP&L service territory and plans to begin demobilization. After considering the latest alert and its available internal resources, JCP&L determined it could begin releasing external resources and deactivate the staging sites to begin demobilizing. External line contractor resources were released at 11:30 that morning and FEU resources were released at 12:00 that morning.

JCP&L conducted the final internal storm call for this event on Sunday, September 4, 2016 at 14:00. The final weather update showed the storm would remain out to sea and reduced the area where wind gusts were expected to reach 40 mph within the JCP&L service territory. JCP&L continued demobilization activities. Central Region's internal distribution and transmission line crews would remain in the current rotation of 16-hour shifts until Tuesday morning, and Northern Region's internal distribution and transmission line crews would demobilize after their currently assigned jobs were completed. External forestry resources that traveled from Massachusetts to the Central Region were released, however, 104 local forestry FTEs were held over to be available through Tuesday morning. Northern Region's external forestry resources were released at the end of their scheduled shifts that day or as their work assignments were completed. Lastly, the ECC was closed at 14:00 with ongoing management of outages transferring back to the Company's DCC.

Resources and Mutual Assistance

As discussed above in the Storm Event Forecasting and Preparations section of this report, in preparation for what was initially expected to be a significant weather event covering a widespread area of the eastern United States, JCP&L requested external resources consistent and commensurate with its Emergency Response Plan and practices, to assist with outage restorations due to impacts of Hurricane Hermine. On September 1, 2016 at 14:00, when the current forecast showed Hurricane Hermie impacting JCP&L's service territory, JCP&L requested 2,088 resources from external contractors and FEU, including 500 line FTEs, 500 hazard responder FTEs, 100 public protector FTEs, 100 damage assessor FTEs, 600 forestry FTEs, 75 transmission line FTEs, 250 service FTEs[5], and 78 other support FTEs. At the time when

[5] A service FTE is one who is exclusively qualified to reconnect low-voltage service drops, generally reattaching downed services to weather-heads or splicing broken service wires.

Hurricane Hermine made landfall in the Florida panhandle, this storm was expected to significantly impact almost the entire east coast of the United States. In these situations, most electric utilities execute their own preparedness plans and request external resources. This situation typically results in more requests for external resources throughout the affected region than available resources. With this somewhat of a competition for regional resources, utilities are pressed to make resource decisions earlier than optimal in the preparation phase. Once all available local resources are acquired, utilities must look for resources located farther from the impacted region, which resources are more costly and less efficient, due to travel time and expense.

JCP&L received FEU resources from Ohio but due to the widespread nature and uncertainty of the path, some FirstEnergy affiliated operating companies in the eastern United States, including Met-Ed, Penelec, Potomac Edison, and Mon Power, were also initiating Emergency Response plans for their service territories and requesting FEU resources. Additionally, state utility commissions, including BPU and the PaPUC have strongly recommended, or have required, that resources within their states not leave the home base state until all out-of-state customers within their respective states have been restored to service. FirstEnergy companies operating in Pennsylvania are required to send available resources to other affected FirstEnergy companies in Pennsylvania to assist in restoration of those customers before sending those resources out of state.

The EOC worked through the RMAG process as well as contractor/vendor partnerships to secure 1,630 external resources to assist with the expected restoration event. In preparation for this Storm Event, four staging sites were set up for the external resources. As soon as the weather forecast indicated with high confidence that the storm would move eastward into the Atlantic Ocean and have much less impact on the JCP&L service territory, JCP&L moved to release the acquired resources and shut down the staging sites.

Storm Event Impacts and Restoration

The storm eventually neared the JCP&L service territory and began affecting customers in the Central Region on September 3 at 02:55. In total, and as a result of the last-minute move eastward into the Atlantic, this Storm Event caused 1,957 customer outages. These outages were addressed by JCP&L crews and were all restored by 23:10 that same day.

JC-002542 - 1/22/2017

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002542	1/22/2017	45,706	$1,204	$537	$1,101	$1,415	$104	$96	$15	$0	$4,471	$98	31

Overview

This storm summary report covers the Company's response to a windstorm, which impacted the JCP&L service territory between January 22, 2017 and January 24, 2017. This windstorm, hereby defined for purposes of this summary as the "Storm Event", produced high wind gusts of 54 mph and heavy rain which downed trees, poles, and wires, damaged equipment, and caused approximately 45,706 JCP&L customer outages.

Storm Event Forecasting and Preparations

On January 22, 2017, FE Meteorologists issued a weather alert for high winds and heavy rain, expected to begin that evening and into the following morning. In response to the potential impacts of this wind event on the JCP&L service territory, JCP&L initiated the expansion of the ICS. On January 23, 2017, JCP&L conducted three internal storm calls beginning at 07:00 to discuss those impacts and preparations. The initial OVM run in the early morning hours of January 23, 2017 predicted less than 10,000 customers may be impacted by this Storm Event. By noon that day, the number of customer outages exceeded the initial OVM prediction.

Resources and Mutual Assistance

In response to the increasing number of outages, JCP&L quickly began increasing the number of resources to respond to the restoration efforts. JCP&L utilized on-site line contractors by reassigning to work restoration. Additionally, JCP&L secured off-site local line contractors to assist as well. In total, 105 line contractors worked along with 577 JCP&L line and trouble workers to restore customers beginning January 23, 2017 through January 24, 2017. JCP&L also received 85 line employees and 143 responders from FEU. The total assisting workforce for this storm event peaked with 1,584 FTEs, which consisted of internal and external line crews, forestry crews, hazard responders, and all other support personnel.

Storm Event Impacts and Restoration

The Storm Event began impacting JCP&L customers on January 22, 2017 and produced heavy rains and strong wind gusts of up to 54 mph. This Storm Event required the issuance[6] of 17 transformers, 23 poles, 40 crossarms and/or braces, and 6,055 feet of wire and cable. In total, approximately 45,706 customers were affected. With the additional resources working alongside JCP&L's crews, those customers affected were restored by January 24, 2017. Those external resources, including contractors and FEU employees, worked through the evening of January 24, 2017. They were then provided the required eight hours rest before being released early the following day to travel back to their home locations.

[6] Note that these totals reflect the counts of equipment issued from JCP&L's stores facilities and were not necessarily installed in the field.

JC-002811 - 9/8/2018

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002811	9/8/2018	14,813	$11,864	$57	$80	$74	$9	$16	($1)	$2,616	$14,716	$993	269

Overview

This storm summary report covers the Company's response to Hurricane Florence, a Category 1 hurricane which was forecasted to impact the JCP&L service territory on September 18, 2018.

Hurricane Florence made landfall in North Caroline on September 14, 2018 as a Category 1 hurricane with sustained winds of 90 mph and heavy rains, uprooting trees and causing extensive power outages in the Carolinas. Due to the slow motion of this storm, heavy rain fell throughout the Carolinas for several days and coupled with a strong storm surge, caused widespread flooding along the North Carolina coast as well as some inland flooding. This hurricane produced heavy rainfall, with a maximum total rainfall of 35.93 inches in Elizabethtown, North Carolina, according to the NHC. After landfall, Hurricane Florence weakened into a post-tropical cyclone over West Virginia on September 17, 2018 and was absorbed by another frontal storm two days later. Additionally, Hurricane Florence produced a total of ten tornadoes in Virginia. Hurricane Florence caused an estimated $24.23 billion in damages, mostly in the Carolinas.

JCP&L began monitoring Hurricane Florence on September 6, 2018. While hurricane models did not predict Hurricane Florence making landfall near New Jersey , the remnants of this hurricane, which would impact New Jersey, were expected to be capable of producing damaging winds that could down trees, poles, and wire, heavy rains that could cause flooding. In response to the forecast, JCP&L initiated its Emergency Response Plan to begin preparations for the expected impact.

As discussed herein, the path of Hurricane Florence, including the downgraded post-tropical cyclone, hereby defined for purposes of this summary as the "Storm Event", resulted in significant preparation and mutual assistance activities which are the main contributors to the overall costs of this Storm Event.

Storm Event Forecasting and Preparations

On September 6, 2018, FE Meteorologists issued a weather alert for Hurricane Florence and the potential impact to the JCP&L service territory beginning on September 18, 2018. At this early stage, JCP&L leadership began briefing BPU Staff with respect to the weather outlook as well as the status of the Company's preparations.

On September 7, updated weather models indicated a potential impact to the East Coast of the United States between Wednesday, September 12 and Friday, September 14, with an impact in the vicinity of North Carolina and Virginia, though there was much uncertainty in the models. Due to the level of uncertainty and a possibility of impacts to New Jersey as well as other FirstEnergy affiliated companies, the EOC began to coordinate efforts to obtain resources for all FEU companies.

Given the probability that Florence could be a widespread regional event, on September 8, 2018, JCP&L requested 1,000 line FTEs. The EOC worked to fulfill JCP&L's request in addition to other FEU requests for resources. The EOC was able to secure approximately 837 contractor line workers for JCP&L on September 8, 2018. This pre-emptive acquisition of resources was necessary to ensure enough resources were available within JCP&L to conduct an effective and efficient restoration. Acquiring these resources

early allowed the Company to secure more local resources which reduced the costs for mutual assistance resources traveling from greater distances.

On September 9, JCP&L began establishing two staging sites. The first site was at Livingston Mall in Livingston, New Jersey. The second site was at Six Flags in Jackson, New Jersey. These staging sites would be used to receive and board the influx of contractor resources.

As JCP&L continued its preparations for the potential impacts from Hurricane Florence, weather models had increasing confidence that Hurricane Florence would make landfall in the Carolinas. However, there remained uncertainty about the storm's path following landfall. On September 10, 2018, weather models predicted a 25 percent chance that the storm would turn northward quickly, impacting coastal states north of North Carolina with wind gusts at tropical storm levels.

On September 11, 2018, FE Meteorologists issued an updated weather alert noting that Hurricane Florence was expected to have little impact in New Jersey. As a result of this updated alert, JCP&L immediately released all contractor resources and started to demobilize the staging sites.

As the remnants of Hurricane Florence reached JCP&L's service territory, 14,813 customers were impacted.

Resources and Mutual Assistance

In preparation for this Storm Event, JCP&L requested additional resources consistent and commensurate with its Emergency Response Plan and practices, to assist with outage restorations. On September 8, 2018, when the current forecast showed this Storm Event impacting JCP&L's service territory, JCP&L requested 1,000 additional line resources. In total, JCP&L was able to secure 837 of these resources.

Storm Event Impacts and Restoration

The Storm Event began impacting JCP&L customers September 18, 2018 with rain and wind gusts of up to 25 mph. This Storm Event resulted in approximately 14,813 customer outages. JCP&L was able to quickly restore those customers by 22:57 on September 18, 2018

JC-002858 - 10/23/2018

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002858	10/23/2018	60,785	$5,142	$1,322	$438	$2,589	$177	$49	$12	$0	$9,730	$160	55

Overview

This storm summary report covers the Company's response to a nor'easter which impacted the JCP&L service territory beginning in the late evening of Friday, October 26, 2018. This nor'easter, hereby defined for purposes of this summary as the "Storm Event", produced high wind gusts and heavy rain that downed trees, poles, and wires, damaged equipment, and caused approximately 41,245 JCP&L customer outages.

Storm Event Forecasting and Preparations

On October 24, 2018, FE Meteorologists issued a weather forecast for a possible wind and rain event in the JCP&L service territory beginning late October 26, 2018 lasting through October 27, 2018. At that time, weather models suggested remnants of Hurricane Willa, which made landfall over southwestern Mexico on October 20, 2018, would strengthen along the Gulf Coast and then move north along the east coast. The remnants were not expected to redevelop into a hurricane but rather something closer to a nor'easter without snow. This Storm Event was expected to produce wind gusts of 50 to 55 mph along the coast and 40 to 50 mph inland beginning in the late evening of Friday, October 26, 2018. Flooding and/or a coastal surge of 1 to 3 feet, and up to 2 inches of rain was also expected to begin early Saturday, October 27, 2018.

On October 24, 2018, in response to the potential impacts of this Storm Event on the JCP&L service territory, JCP&L also initiated the expansion of the ICS and conducted an internal call at 17:00 to discuss those impacts and preparations. The OVM indicated that approximately 44,000 customers would be impacted with most of those customers near the coastal areas. Resources were also discussed on this call. Considering the potential impacts of this Storm Event, JCP&L notified its employees of the potential event and that crews would begin 16-hour shifts starting at 07:00 on October 27, 2018 until restoration was complete. Additionally, JCP&L requested 650 line contractor FTEs, 300 forestry contractor FTEs, 100 damage assessor FTEs, and 100 hazard responder FTEs to assist with the restoration.

On October 25, 2018 at 08:52, FE Meteorologists issued a weather update that indicated the weather system was now expected to spend more time over land and less time over the ocean and would therefore have less time to strengthen as it moved north towards New Jersey. As a result of this update, expected coastal wind gusts were lowered from 50 to 55 mph to 40 to 50 mph, however, the coastal flooding and surge, inland wind gusts, and rain levels remained unchanged. At that time, JCP&L decreased its request for resources from 650 line contractors to 300 and from 300 forestry contractors to 150 and, therefore, released 253 line contractors traveling to JCP&L from Michigan.

On October 25, 2018, JCP&L also conducted an internal storm call to discuss the latest weather update and its preparations. JCP&L continued working to secure additional resources from FEU companies and contractors, and reserved hotel lodging for those resources, which were expected to begin arriving on October 26, 2018.

On October 26, 2018, with the weather forecast for JCP&L's service territory unchanged, JCP&L conducted an internal storm call at 13:30 to discuss its preparations for the Storm Event. At the time of the call, JCP&L had secured between 250 and 300 line FTEs and 150 forestry FTEs from either FEU companies

or off-site contractors and the majority of those resources were en route to or had arrived in JCP&L service territory.

On October 27, 2018, JCP&L fully activated its ECC at 07:00 to coordinate the restoration efforts.

Resources and Mutual Assistance

As discussed above in the Storm Event Forecasting and Preparations section of this report, in preparation for this Storm Event, JCP&L requested additional resources consistent and commensurate with its Emergency Response Plan and practices, to assist with outage restorations. On October 24, 2018, when the current forecast showed this Storm Event impacting JCP&L's service territory, JCP&L requested 1,150 resources from external contractors and FEU. In total, JCP&L was able to secure 1,383 of these resources. In total, 2,446 employees and contractors, including support personnel, contributed to the restoration efforts.

Storm Event Impacts and Restoration

The Storm Event began impacting JCP&L customers late October 26, 2018 with strong wind gusts of up to 62 mph along the coastline and up to 49 mph inland. These winds lasted into the afternoon of October 27, 2018. This Storm Event required the issuance[7] of 26 transformers, 10 poles, 22 crossarms and/or braces and 11,913 feet of wire and cable. In total, approximately 41,245 customers were affected. With the additional resources working alongside JCP&L's crews, all customers were restored by October 28, 2018 at 12:37. The ECC closed on October 27, 2018 at 17:00 with continuing operations turned over to the Company's DCC for the remainder of the restoration.

[7] Note that these totals reflect the counts of equipment issued from JCP&L's stores facilities and were not necessarily all installed in the field.

JC-002997 - 4/15/2019

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-002997	4/15/2019	46,871	$1,015	$239	$807	$805	$209	$17	($85)	$0	$3,008	$64	79

Overview

This storm summary report covers the Company's response to thunderstorms, which impacted the JCP&L service territory beginning on April 15, 2019. These thunderstorms, hereby defined for purposes of this summary as the "Storm Event", produced high wind gusts of 58 mph and heavy rain that downed trees, poles, and wires, damaged equipment, and caused approximately 47,000 JCP&L customer outages.

Storm Event Forecasting and Preparations

On Saturday, April 13, 2019 at 15:59, FE Meteorologists issued a weather alert for a storm system that was expected to impact the JCP&L service territory beginning in the very early hours on April 14, 2019 and lasting through the following evening of April 15, 2019. This storm system was expected to form in a line or small line segments as they moved west to east and capable of producing damaging wind gusts of 50 mph or more. On Sunday, April 15, 2019, FE Meteorologists issued a weather update that forecasted a new line of thunderstorms expected to impact the JCP&L service territory starting Monday, April 15 at approximately 13:00 and lasting through that evening. This new line of thunderstorms was expected to produce wind gusts of 40 to 45 mph with isolated wind gusts of 50 mph or more. The OVM run on April 14 predicted up to 24,000 customers could be impacted from the first line of thunderstorms with an additional 12,800 customers impacted from the second line of storms. By Sunday evening, the weather alert was updated again to increase the expected wind gusts during the first line of thunderstorms to 55 to 60 mph.

In response to the potential impacts of this wind event on the JCP&L service territory, JCP&L initiated the expansion of the ICS. On April 15, 2019 at 06:30, JCP&L activated its ECC and conducted three internal storm calls beginning at 06:30 to discuss the impacts of the thunderstorms and its response to outages. The Northern Region deployed twenty-one JCP&L line workers and ten on-site line contractors to Central Region at 07:00 that morning to assist with restoration as the majority of affected customers were in the Central Region.

Resources and Mutual Assistance

Based on forecasts and the OVM, JCP&L determined that internal resources would be sufficient for restoration without requesting mutual assistance. However, JCP&L notified all on-site contractors that they would be held on-site to assist with restoration if needed. After closely monitoring the forecast, Northern Region determined it had sufficient resources to address its outages and to provide assistance to Central Region. Beginning at 07:00 on April 15, 2019, Northern Region deployed 21 line workers to assist Central Region with restoration. Including the ten on-site line contractors moved from Northern to Central Region, a total of 52 on-site line contractors assisted with the restoration.

Storm Event Impacts and Restoration

The Storm Event began impacting JCP&L customers on in the early morning hours on April 15, 2019, producing heavy rains and strong wind gusts of up to 58 mph. This Storm Event required the

issuance[8] of 37 transformers, 128 crossarms and/or braces, and 38,177 feet of wire and cable. In total, approximately 47,000 customers were affected. The majority of customers were restored within the same day with some isolated cases extending into April 17, 2019 when the last customer was restored at 16:00. The ECC closed on April 15, 2016 at 17:00 with continuing operations turned over to the Company's DCC for the remainder of the restoration.

[8] Note that these totals reflect the counts of equipment issued from JCP&L's stores facilities and were not necessarily all installed in the field.

JC-003274 - 12/16/2019

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-003274	12/16/2019	30,361	$2,597	$980	$1,110	$1,556	$132	$62	($53)	$0	$6,384	$210	18

Overview

This storm summary report covers the Company's response to a winter storm that impacted the JCP&L service territory between December 16, 2019 and December 18, 2019. This winter storm, hereby defined for purposes of this summary as the "Storm Event", produced snow and ice mix with wind gusts of 43 mph, which downed trees, poles, and wires, damaged equipment, and caused approximately 27,000 JCP&L customer outages.

Storm Event Forecasting and Preparations

On Monday, December 16, FE Meteorologists issued a weather alert for snow and ice to impact the JCP&L service territory beginning that evening through the following morning. Approximately 0.2 to 0.3 inches of ice was forecasted, primarily affecting Northern New Jersey.

In response to the potential impacts of this Storm Event, JCP&L initiated the expansion of the ICS and activated its ECC. Beginning at 11:00 that day, JCP&L conducted internal storm calls to discuss the potential impacts of the Storm Event and preparations. The initial OVM run predicted over 12,000 customers may be impacted by this Storm Event.

The Storm Event began to impact JCP&L customers in the early afternoon on December 16, 2019 and continued through December 18, 2019.

Resources and Mutual Assistance

Based on forecasts and the OVM, JCP&L determined that internal resources were sufficient for restoration without requesting mutual assistance. However, JCP&L notified all on-site contractors that they would be held on-site to assist with restoration if needed. After closely monitoring the forecast, Central Region determined it had sufficient resources to address its outages and to provide assistance to Northern Region. On December 16, 2019, Central Region deployed 35 line workers to assist Northern Region with restoration.

As customer outages in Northern Region increased, the Company requested additional resources from Central Region. In response, Central Region deployed an additional 36 line workers to Northern Region at 14:00 that day.

JCP&L line workers and line contractors continued to restore customers affected by this Storm Event. On December 18, 2019, thirty-four additional contractors from FirstEnergy affiliated companies in Pennsylvania were deployed to assist with JCP&L's restoration.

Those employees and contractors continued to assist Northern Region with restoration efforts throughout the storm event. In addition to the 411 JCP&L line resources and 98 forestry contractors working restoration, JCP&L engaged a total of 942 FTEs, including hazard responders and supporting personnel to restore the approximately 27,000 customers.

Storm Event Impacts and Restoration

The Storm Event began impacting JCP&L customers on in the early afternoon on December 16, 2019, producing snow and ice mix and wind gusts of up to 43 mph. This Storm Event required the issuance[9] of 32 transformers, 32 wood poles, 91 crossarms and/or braces, and 18,963 feet of wire and cable.

[9] Note that these totals reflect the counts of equipment issued from JCP&L's stores facilities and were not necessarily all installed in the field.

JC-003328 - 4/13/2020

Storm	Date	Outages	Storm Costs ($k)									Cost-Per-Customer-Restored	Customers-Per-Trouble-Order
			Non-FE Mutual Assistance	Forestry	Straight Labor	Overtime Labor	Materials	Lodging and Meals	Other	Staging Sites	Total		
JC-003328	4/13/2020	51,994	$1,292	$749	$1,250	$1,082	$157	$1	$32	$0	$4,564	$88	31

Overview

This storm summary report covers the Company's response to thunderstorms that impacted the JCP&L service territory on April 13, 2020. These thunderstorms, hereby defined for purposes of this summary as the "Storm Event", produced heavy rain and sustained wind gusts of 45 to 55 mph with a peak wind gust of 82 mph recorded in Island Beach State Park. This Storm Event downed trees, poles, and wires, damaged equipment, and caused approximately 50,000 JCP&L customer outages.

Storm Event Forecasting and Preparations

On Friday, April 10, 2020 at 10:59, FE Meteorological issued a weather alert that predicted a significant weather event would impact the JCP&L territory on Monday, April 13, 2020. The forecast models predicted sustained winds of 35 to 45 mph, with possible gusts in the 50 mph range along the coastline. These gusts would start at dawn and increase in frequency and magnitude as the storm front approached.

On Sunday, April 12, 2020, FE Meteorologists issued a weather alert update indicating an increase in wind gusts to 50 to 60 mph wind gusts. The OVM was run and indicated up to nearly 30,000 customers could be impacted.

On Monday, April 13, in response to the potential impacts of this Storm Event, JCP&L initiated the expansion of the ICS and activated its ECC. JCP&L conducted an internal storm call to discuss the potential impacts of the Storm Event and preparations.

Resources and Mutual Assistance

In preparation for this Storm Event, JCP&L increased its staffing by filling all trouble shifts and holding all available resources on property. Additionally, JCP&L reassigned 98 on-site line contractors to storm restoration.

JCP&L utilized a support staff consisting of internal and external resources to restore customers affected by this Storm Event. In addition to the 413 JCP&L line workers and 98 contractor line workers, 490 forestry contractors, 202 hazard responders, and 144 public protectors, and 153 additional support personnel worked to quickly and safely restore approximately 50,000 customers.

JCP&L maintained strict social distancing protocols due to this storm occurring during the onset of the COVID-19 pandemic. All contractors and employees were limited to one person per vehicle as well as one person per hotel room, as needed. Crew movement and mixing was curtailed as much as possible to reduce the possibility of virus transmission/exposure between pre-arranged "pods." A total of twenty-five JCP&L line employees were unavailable due to COVID-19, which could include being unavailable due to illness, quarantine, caring for a child, and caring for a family member.

Storm Event Impacts and Restoration

The Storm Event began impacting JCP&L customers on April 13, 2020, producing heavy rain and strong wind gusts of up to 82 mph. This Storm Event required the issuance[10] of 42 transformers, 37 wood poles, 132 crossarms and/or braces, and 13,110 feet of wire and cable. The majority of customers were restored within six hours with some isolated cases extending beyond that time into the following day, April 14, 2020, when the last customer was restored at 21:32. The ECC closed on April 13, 2020 at 14:00 with continuing operations turned over to the Company's DCC for the remainder of the restoration.

[10] Note that these totals reflect the counts of equipment issued from JCP&L's stores facilities and were not necessarily all installed in the field.

Appendix B

Mutual Assistance Costs Summary ($k)				
Storm	**Date**	FE Affiliate	Other Utility	Contractors
JC-002419*	**3/31/2016**	$158	$0	$1,736
JC-002485 - Hurricane Hermine	**9/3/2016**	$1,620	$0	$5,261
JC-002542	**1/22/2017**	$358	$0	$1,204
JC-002811 - Hurricane Florence	**9/8/2018**	$0	$0	$11,864
JC-002858 - Hurricane Willa	**10/23/2018**	$850	$0	$5,142
JC-002997	**4/15/2019**	$0	$0	$1,015
JC-003274	**12/16/2019**	$0	$0	$2,597
JC-003328	**4/13/2020**	$0	$0	$1,292

*As discussed above, the mutual assistance costs shown here are for the major event of April 3,2016-April 7, 2016 (and do not pertain to the period March 31, 2016-April 2, 2016).

Jersey Central Power & Light
A FirstEnergy Company

Report to the New Jersey Board of Public Utilities

Response to Winter Storms Riley and Quinn
March 2, 2018 – March 13, 2018

Submitted: April 4, 2018

JCP&L Major Event Report
March 2, 2018 – March 13, 2018

OVERVIEW

This Major Event report covers two Nor'easters, Winter Storms Riley and Quinn, which occurred across the Jersey Central Power & Light Company ("JCP&L" or "Company") service territory on March 2, 2018 and March 7, 2018, respectively. These winter storms overlapped such that Winter Storm Quinn arrived prior to the completion of recovery and restoration of all affected customers from Winter Storm Riley.

Together, these storms, described below (and hereinafter collectively referred to as the "Storm Event") caused widespread extensive damage to the electrical system infrastructure over the period of March 2-13, 2018. Specifically, the Storm Event caused outages to more than 526,000 customers in the JCP&L service territory and involved the deployment of more than 7,000 full time equivalent ("FTE") workers, which was JCP&L's largest recovery effort since Hurricane Sandy. In addition, the Governor of New Jersey declared a State of Emergency (**see** Appendix A) on March 6 for the ongoing impact from Winter Storm Riley and the threatening Winter Storm Quinn due March 7. The State of Emergency was subsequently rescinded on March 13, 2018.

As discussed herein, this Storm Event resulted in extensive tree damage and required the issuance[1] of 2,507 crossarms, 805 poles, 517 transformers, and 362,965 feet (68.7 miles) of wire and cable. In preparation for and during this Storm Event and as required by the Hurricane Irene and Sandy Board Orders[2], JCP&L executed its Emergency Response Plan for Service Restoration ("E-Plan") which includes the use of the Incident Command System ("ICS") within its emergency response organization. Also, the JCP&L Emergency Preparedness Manager (as required by the Irene Order) Manager coordinated and maintained operational information to the media, government, regulatory, emergency management agencies, company executives and internal organizations.

Storm Forecasting and Preparations

On Sunday, February 25, FirstEnergy Meteorological Services ("FE Meteorologists") began monitoring the potential for high winds in New Jersey. The first internal forecast by the FE Meteorologists for JCP&L was issued on Wednesday, February 28 and predicted wind gusts of 40-50 MPH with the possibility of isolated gusts up to 55 MPH on Friday, March 2 and Saturday, March 3. No snow was forecasted for JCP&L's service territory. This forecast was consistent with the New Jersey focused forecasts of the National Weather Service ("NWS"), which was also monitoring the developing conditions. Commensurate with then current and forecast conditions JCP&L's ICS is always operational and, on February 28, in response to, and in anticipation of, the potential impacts associated with the weather forecast the Incident Commander decided to

[1] Note that these totals reflect the counts of equipment issued from JCP&L's stores facility and were not necessarily all installed in the field.

[2] See New Jersey Board of Public Utilities ("Board" or "BPU") Hurricane Irene (*i.e.*, *I/M/O the Board's Review of the Utilities' Response to Hurricane Irene*, in BPU Docket No. E011090543, dated January 23, 2013 (the "Irene Order") and *I/M/O the Board's Review of the Utilities' Response to Hurricane Sandy*, BPU Docket No. E012111050, dated May 29, 2013 (the "Sandy Order")) (collectively, the "Storm Orders").

expand the then current level of ICS implementation to include additional levels in the form of additional storm response functions.

In addition to expanding ICS on February 28, JCP&L began holding internal storm calls and activated its Emergency Command Center ("ECC") at 1300 hours (also known as the storm room). Ultimately, the storm calls would continue two to three times a day and the ECC would remain open through March 13. As of February 28, weather forecasts were only predicting a period of winds gusts and no snow was forecasted for JCP&L. In addition, JCP&L's activation of its E-Plan included running the Outage Volume Model ("OVM") as required by the Storm Orders (specifically BPU-31), which predicted only 7,770 customers as likely being impacted. Thus, the Incident Commander's restoration plan only included the projected use of JCP&L's internal line workers. External contractors already on site would switch to restoration work if needed. Therefore, there was no request for external resources at this time.

On Thursday, March 1, FE Meteorologists[3] still forecasted wind gusts but expanded the forecasted wind affected area to include all of JCP&L's service territory and added the potential for 3-5 inches wet snow with the possibility of 6-9 inches in the northern-most portion of JCP&L for March 2. This forecast was again consistent with the NWS forecasts across New Jersey. As JCP&L continued the execution of its E-plan, and 24-hours in advance of the wind, the Liaison Officer proactively notified critical care and well water customers at 1130 hours on March 1 of potential outages via interactive voice recorder ("IVR") messaging. The OVM model was run again using updated forecast information and predicted only 13,950 customers as likely being impacted. The Incident Commander continued with the then current restoration plan, which included the activation of the Hazard and Forestry departments at 0700 hours on March 2. JCP&L's Public Information Officer (the "PIO") initiated a public information campaign starting with a news release describing the potential for outages, how to report outages and electrical safety. JCP&L's Emergency Preparedness Manager, who also served as the Incident Action Plan ("IAP") Editor, documented the first of thirty-three IAPs for the Storm Event.

Winter Storm Riley began impacting the JCP&L service territory on March 2. As the day unfolded, weather forecasts were revised to include 10-14 inches across most of JCP&L's service territory. In actuality, JCP&L experienced a full day of heavy, wet snow that exceeded 16 inches in JCP&L's Northern Region and 7 inches in JCP&L's Central Region. Additionally, JCP&L's entire service territory experienced wind gusts around 40 mph through March 3, with a recorded maximum wind gust of 71 mph on March 2. The impact of Winter Storm Riley's arrival was dramatic and far worse than expected. For example, within a four-hour period on Friday, March 2, from 0800 hours to 1200 hours, more than 100,000 customers were affected. Three hours later, by 1500 hours, the number quickly rose to 150,000 customer outages. As the weather unfolded and outages escalated on March 2, JCP&L already had its E-Plan activated and was immediately able to respond to outages. The Incident Commander requested an additional 800

[3] On March 1 the FE Meteorologists also began to forecast potential impacts of Winter Storm Riley for portions of Maryland, West Virginia and Pennsylvania. The potential for weather (which included the wind forecasted in JCP&L) triggered the activation of the Corporate Emergency Operations Center ("EOC") in Akron, Ohio with limited staffing at 0800 on March 1. The EOC would later be fully staffed the following day, March 2 at 0600 hours. The EOC would subsequently coordinate the overall response effort and resource needs for all FirstEnergy Affiliates ("FE Affiliates") which included JCP&L.

external line resources. The process of acquiring internal (*i.e.*, FE Affiliate) and external resources is further explained in the Resources and Mutual Assistance section of this report.

On Sunday, March 4, as JCP&L continued with the restoration efforts related to Winter Storm Riley, the FE Meteorologists began monitoring a new winter weather system, Winter Storm Quinn that was expected to bring between 3-5 (with some areas potentially receiving 6-9) inches of wet, heavy snow to JCP&L's Northern Region in the early hours of March 7. On March 5, weather forecasts issued by the FE Meteorologists increased the snow amount for March 7 to 6-10 inches. On March 6, the forecast for this system was revised to further increase snowfall totals to 10-16 inches in the JCP&L Northern Region and 3-10 inches across the rest of northern New Jersey. This revised forecast also added wind gusts of 35-40 mph along the New Jersey coast. Again, these forecasts were consistent with those of the NWS.

By the end of day on Tuesday, March 6, less than 25,000 customers impacted from Winter Storm Riley remained out of service and JCP&L was on track to meet the global estimated time of restoration ("ETR") established as required by the Storm Orders. However, when the OVM model was run again in preparation for Winter Storm Quinn it predicted more than 100,000 customers as likely being impacted by the new storm. As JCP&L continued to prepare for the new storm and new outages, some E-Plan preparations were re-initiated, such as the Liaison Officer proactively notified critical care and well water customers at 2000 on March 6 of potential outages via IVR messaging. As indicated above and as discussed further herein, the process of acquiring internal and external mutual assistance was underway and crews were already arriving.

Beginning on Wednesday, March 7 at 0900 hours, Winter Storm Quinn moved into JCP&L's service territory, bringing high winds and additional wet, heavy snow. The Northern Region received up to an additional 13 inches and the Central Region received more than an additional 7 inches. In addition, the Northern Region experienced wind gusts up to 30 mph, and the Central Region up to 40 mph on March 7. The effects of Winter Storm Quinn compounded the effects and damage already caused by Winter Storm Riley. For instance, Winter Storm Riley struck areas in the Northern Region (*e.g.*, Summit and Boonton) directly and heavily and, once Winter Storm Quinn hit, it also impacted those same areas as well as severely impacted additional areas in the Central Region.

Resources and Mutual Assistance

Beginning on February 28, the EOC participated in daily mutual assistance calls with various Regional Mutual Assistance Groups ("RMAGs") to discuss resource needs and availability of all the FE Affiliates. On February 28 and March 1, based on forecasts, JCP&L determined it could adequately handle restoration with its internal resources without requesting mutual assistance at the outset based on the forecast as to Company impacts, and taking into account the small number of mutual assistance resources available and the relative degree of need as between the various utilities seeking mutual assistance. However, JCP&L did notify all onsite contractors that they would be held onsite to assist with restoration as needed.

Shortly after the Storm Event began on March 2, the potential severity of the impact became evident and at 1000 hours, JCP&L initially requested a total of 800 additional line FTEs through the RMAG process, outside contractors and FE Affiliates to support restoration efforts followed by, subsequent requests for additional resources as the Storm Event unfolded. Also, that same

JCP&L Major Event Report
March 2, 2018 – March 13, 2018

date on March 2, after closely monitoring the forecasts for central New Jersey, JCP&L determined it had sufficient personnel on hand in JCP&L's Central Region to deal with weather and, therefore, began sending internal mutual assistance in the form of Central Region crews, that began arriving in its Northern Region on March 2 at 1100 hours to assist with restoration. These crews, 78 line FTEs in total, continued to assist the JCP&L Northern Region with restoration efforts throughout the Storm Event, with some beginning to be released on March 13.

In total, JPC&L was able to acquire more than 3,100 line FTEs in addition to the 360 JCP&L line FTEs available. In total, JCP&L had over 3,400 line FTEs supporting the recovery and restoration efforts in response to the Storm Event making this the largest restoration event since Hurricane Sandy in terms of line and total FTEs.

RMAG Process
As actual impacts and effects were more severe than forecasted and began to become evident in Ohio and Pennsylvania as Winter Storm Riley slowly moved east, FE Affiliates as well as most Mid-Atlantic and New England companies quickly ramped up efforts to obtain additional resources. Many utilities, including JCP&L, belong to various RMAGs. Through these groups, JCP&L and other member companies may request or offer resources to assist with restoration efforts for events that result in large outages and/or wide-spread damage. FirstEnergy utilized three RMAG organizations during this Storm Event, including the North Atlantic Mutual Assistance Group ("NAMAG"), the Southern Electric Exchange ("SEE"), and the Great Lakes Mutual Assistance ("GLMA"). Since most FE Companies were expected to be, and were, impacted by Winter Storms Riley and Quinn, additional resources were requested through these RMAG groups on behalf of all FE Affiliates. However, many resources were not available through the process since many of the member companies were also impacted by outages.

Non-RMAG Resources
In addition to working through the RMAG organizations, FirstEnergy worked concurrently to secure resources from non-RMAG utility companies and contractors. The majority of resources used by JCP&L were obtained through non-RMAG companies. JCP&L received resources from as far west as Texas and as far south as Louisiana. The first non-company, off-site, non RMAG contractor crews began arriving on March 3 at approximately 1100 hours and non-RMAG resources continued arriving through March 10.

FE Affiliated Resources
In addition to the impact in New Jersey, other FE Affiliates were also severely impacted. Over the course of the weather event, the FE Affiliates (excluding JCP&L) experienced more than 600,000 customer outages. This resulted in very few resources from other FE Affiliates available to assist JCP&L at the onset of the event. As other FE Affiliates completed restoring their service territories and were confident they could release crews, many of their resources were sent to JCP&L. FE Affiliate resources began arriving in JCP&L service territory on March 4.

Staging Sites
During this large-scale restoration, JCP&L activated a total of four staging sites to feed and house the large workforce supporting restoration efforts as well as to store materials. JCP&L also opened three additional sites to assist with parking overflow from the original four sites. Planning for the staging sites began on March 2 as outages began to escalate.

The following staging sites were opened:

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- March 4 - Sussex County Fairgrounds in Augusta, New Jersey, which was a site equipped to handle 556 people;
- March 5 - County College of Morris in Randolph, New Jersey, which was a site equipped to handle 360 people;
- March 5 - 3M Facility in Flemington, New Jersey, which was a site equipped to handle 432 people; and
- March 9 - Livingston Mall in Livingston, New Jersey, which was a site equipped to handle 504 people.

Three additional sites were opened on March 10 at Ferring Pharmaceuticals in Parsippany, New Jersey; Modelez Global in Whippany, New Jersey; and US Metal Powders in Flemington, New Jersey to assist with overflow parking from the four staging sites.

Hazard and Damage Assessment

On March 2 at 0700 hours, JCP&L activated the hazard process to identify and make-safe hazard conditions and to assess system damage as a result of Winter Storm Riley. This process is overseen by the Planning and Analysis Section ("P&A Section"). In total, over 800 hazard responders worked to clear more than 19,000 hazard locations resulting from nearly 28,000 trouble orders. On March 2, JCP&L also began to secure additional qualified hazard responders, which were obtained from FE Affiliates and FE Corporate employees at the start of Winter Storm Riley. Starting on March 3, contractor resources first became available and JCP&L continued to increase the number of hazard responders.

This process is critical to maintaining public safety, aids in the effective and timely assessment of damage. Hazard responders are dispatched to hazard locations such as those reported to have downed wires or damaged related electrical equipment. Those hazard responders then perform a hazard assessment and reports the details of the condition.[4]

Due to the extraordinary extensive damage in the form of downed trees, poles, and wires as well as deep snow blocking roads and access to locations, the initial hazard responders were hindered or delayed. Therefore, to assist with assessing the damage, beginning on March 4, JCP&L also used three helicopters and a drone to patrol lines. **See** Appendix B for pictures of the damage.

On March 8, JCP&L also activated its circuit quarantine process for eleven circuits that were heavily damaged in the Northern Region[5]. JCP&L completed the quarantine process[6] on March

[4] The responders are then responsible for safeguarding the location, which includes standing by until relieved by a line or service crew, or a public protector, if necessary, in order to keep the public safe during emergency operations. Hazard responders are dispatched to the highest safety priority locations first.

[5] Specifically, during quarantine the circuit is deenergized and damage assessors patrol the circuit in its entirety to identify and document the damage (e.g., number of broken poles and equipment needs). Next, tree and line crews follow closely behind while working in parallel to remove trees and limbs and make repairs. This process eliminates bottlenecks, optimizes response times, improves internal and external communications, maximizes resource utilization, and allows for improved data and information flow during large-scale emergency restoration events.

[6] The damage assessment teams utilized Toughpads (*i.e.*, hand-carried computer tablets) to capture the damage which enabled the quarantine team to quickly create work packages for the tree and line crews.

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10 with permanent (not temporary) repairs being completed during the quarantine process on these circuits.

Restoration Efforts

The extraordinarily extensive damage from and during the Storm Event in the form of downed trees, poles, and wires as well as deep snow blocking roads and access to locations together with hazardous road conditions and continuous high winds created significant challenges to the recovery and restoration efforts. By late afternoon on Friday, March 2 several main highways were closed in certain sections making it hard to navigate to repair locations. JCP&L worked with the BPU to help with the opening of many state, local and county roads which were impassable in order to respond to customer outages. Also, JCP&L worked with the New Jersey State Regional Operations and Intelligence Center ("ROIC") and the BPU to address JCP&L needs regarding the snow plowing of roads in order to access repair locations.

By March 2, 2018 at 2100 hours, restoration was stopped across the entire JCP&L service territory when winds increased to over 40 MPH exceeding the threshold for bucket trucks to safety operate in the air. Crews resumed restoration activities on March 3 at 0800 hours. Then again, on March 7 at 1430 hours, restoration was stopped in the Northern Region for a second time when road conditions were too hazardous for travel. Crews resumed restoration activities on March 8 at 0600 hours.

JCP&L worked through these restoration challenges and implemented the restoration priorities established by the BPU for this Storm Event. These priorities included clearing roadways to open roads blocked by electrical equipment and wires. Following the established prioritization hierarchy, JCP&L worked along-side county officials to implement its road opening process where more than 1900 roads were opened. JCP&L next focused on restoring nearly 250 schools impacted by this Storm Event. Then, JCP&L provided priority restoration to customers remaining without power from Winter Storm Riley when Winter Storm Quinn arrived and caused additional outages.

JCP&L also coordinated with the telecommunications companies to assist with the replacement of poles for which JCP&L is attached. In particular, JCP&L arranged for a Verizon employee to work in its Holmdel Office from March 3-13 to assist with the coordination of efforts to replace poles owned by Verizon. In total, 348 telecommunications owned poles where JCP&L is attached were replaced during this storm. JCP&L replaced 118 of these poles (34 were owned by Verizon and 84 were owned by CenturyLink) and Verizon replaced the remaining 230 poles.

Communications

JCP&L's communication outreach to and with its customers, media, local officials and the BPU throughout the Storm Event was extensive. The Company proactively began its communication campaign on March 1 by releasing the first of ten news releases focusing primarily on the status of storm preparation efforts and on how customers could report outages. These news releases transitioned towards describing the restoration process as well as safety information beginning

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March 2 through the entire Storm Event. The Company also activated social media messaging on Twitter and Facebook on March 1 and made a total of 566 posts for the Storm Event. In addition, Company representatives also responded to over 140 media inquiries from radio, television, and newspaper reporters.

The Company also communicated to the public through its "24-7 PowerCenter" website where customers were not only able to view real-time outage information and ETRs when available, they were also able to report outages, obtain information about water and ice locations when activated, and view safety-related information.

In addition, FirstEnergy's "My Town" website application was populated to display critical outage-related information specific to individual communities including ETRs. These "My Town" pages were expanded (as required in the Storm Orders (BPU-25)) on March 5 to include the time outages occurred, damage assessment information, ETRs, and projections of customers to be restored by day. These details were deactivated on March 13 with the closing of the ECC/storm room.

On March 3, water and ice was available for customers experiencing outages through March 14. Water and ice locations were announced in a press release, on social media and listed on the Company's website.

The FirstEnergy Call Center provided customers with information updates primarily through four methods: Customer Service Representatives ("CSRs"), IVR, web-based communications, and SMS texting and/or mobile app. Automatic outbound ETR SMS alerts were disabled during the period of March 4-March 12. Customers could still get updates by requesting a status of their outage or texting "STAT". The decision to suspend these alerts was made to help alleviate ETR updates that would be confusing to customers.

During this Storm Event, JCP&L also made the decision to suspend the restoration call-back feature available via the IVR for the period of March 5-10.[7] This was to avoid customers receiving additional information from the IVR that was confusing. During this period, a total of 36,000 customers who requested a callback but did not receive one, were customers who were also associated with restored outage orders restored this time period. JCP&L undertook extra efforts to be sure power was, indeed, restored for these customers by initiating an IVR callback campaign on March 10 targeted to this block of 36,000 customers to confirm restoration. Although the numbers were small, there were a few additional customers identified that were indeed not restored.

The FirstEnergy Contact Centers received 315,260 outage calls during the Storm Event beginning on March 2 and ending on March 13 at an overall average speed of answer ("ASA") of 11 seconds and an Abandonment Rate ("AR") of 1.5%.

Local Officials Communications

[7] This feature is when a restoration is made, customers who opt for the service, receive a call from the IVR that explains a restoration was made in their area and asks the customer to confirm if their power has been restored.

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The Company's External Affairs function lead by Liaison Officer maintained regular contact with state and municipal officials throughout JCP&L's service territory which included mobilizing additional communications and External Affairs staff to support communications. Beginning March 1, these representatives (conducted proactive calls and responded to incoming phone calls, sent numerous emails, updates, and provided local officials educational materials for use with their respective constituents. Beginning March 3, JCP&L leadership held daily officials calls through March 12 to provide officials information regarding the Company's preparations and communication efforts as well as restoration updates related to the Storm Event. These calls also provided stakeholders an opportunity for questions and answers. In addition, a total of thirteen County Offices of Emergency Management ("OEMs") were opened in the Company's service territory for this Storm Event. The Company complied with the request to staff all thirteen OEMs. A JCP&L representative was at the ROIC throughout the Storm Event. Also, JCP&L activated its Emergency Response Phone Center which provides a unique 800 number to key external stakeholders as well as emergency management personnel to contact the Company.

Beginning on March 4, Mayors and BPU Staff were provided daily System Status Reports (as required by the Storm Orders (Sandy-5)) that provided global ETR information, number of customers out of service, the number of circuits and substations out of service, a high-level summary of restoration efforts and information pertaining to situational awareness. This report was suspended on March 7 due to the Winter Storm Quinn and was reinitiated on March 8 and continued through March 12.

Beginning on March 5, Mayors and BPU Staff were provided daily specific details regarding their municipality (as required by the Storm Orders (Sandy-6)). These details included number of customers out of service, the number of damaged circuits, the number of tree cutting locations, the number of damaged poles, the number of damaged locations on the circuits, the number of road closures, the number of circuits scheduled to be worked that day, the number of customers to be restored per day until restoration is completed. This report was suspended on Match 7 due to Winter Storm Quinn and was reinitiated on March 9 and continued through March 12.

In total 43 External Affairs representatives worked before and during the Storm Event to provide more than 9,800 communications. These communications included individual phone calls, emails and text to provide updates, answer questions and escalate items that required immediate attention. The Company also provided 52 blast e-mail communications between March 1-12, 2018 with topics such as weather updates, elected official calls, System Status Reports and advance notification of helicopter patrols.

The Company is conducting post event surveys with State and municipal stakeholders (as required by the Storm Orders (BPU-53)).

BPU Communications

Beginning on February 28, JCP&L remained in daily contact with the BPU throughout the Storm Event. In addition to regular phone communications, JCP&L provided staffing and outage updates and responded to questions. Also on March 5, JCP&L began supplying the daily estimated manhours (as required by the Storm Orders (BPU-51)) needed to restore remaining affected customers. This report was suspended on March 7 due to the onset of Winter Storm Quinn and was reinitiated on March 8 and continued through March 12.

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Major Event Classification

The period of the Storm Event from of March 2, 2018 through March 13, 2018 has been classified as a single major event for JCP&L because (consistent with the definition of "major event" in N.J.A.C. 14:5-1.2) more than 10% of JCP&L customers in both the Northern Region (407,881 customer or 88%) and Central Region (118,532 customers or 18%) were impacted by outages caused by this Storm Event (**See** Appendix C for the customers served). In addition, Governor Philip D. Murphy issued Executive Order #14 on March 6 declaring a State of Emergency for the weather on March 2 and March 7. The State of Emergency remained in effect until March 13.

INFORMATION REQUIRED PURSUANT TO N.J.A.C. *14:5-8.9(a)*

1. **The date and time when the EDC's storm or major event center opened and closed;**

   For the purposes of this report, the Storm Event commenced on March 2 at 0600 hours when the first of two winter storms began impacting JCP&L customers. However, JCP&L's ECC opened on February 28 at 1300 hours in preparation for this Storm Event. The ECC remained open through the Storm Event, closing on March 13 at 0930 hours with continuing operations turned over to the Company's Distribution Control Center.

2. **The total number of customers out of service over the course of the major event over four hour intervals, identified by operating area or circuit area. For purposes of this count, the starting time shall be when the storm center opens and the ending time shall be when the storm center closes. Regardless of when the storm center is closed, the EDC shall report the date and time when the last customer affected by a major event is restored;**

   The charts below indicate the outages experienced by JCP&L Northern Region and Central Region customers during the period of the Storm Event from March 2, 2018 at 0600 – March 13, 2018 at 1548. The last customer affected by this event was restored at 1548 hours on March 13, 2018 in the JCP&L Northern Region and 0951 hours on March 13, 2018 in the JCP&L Central Region.

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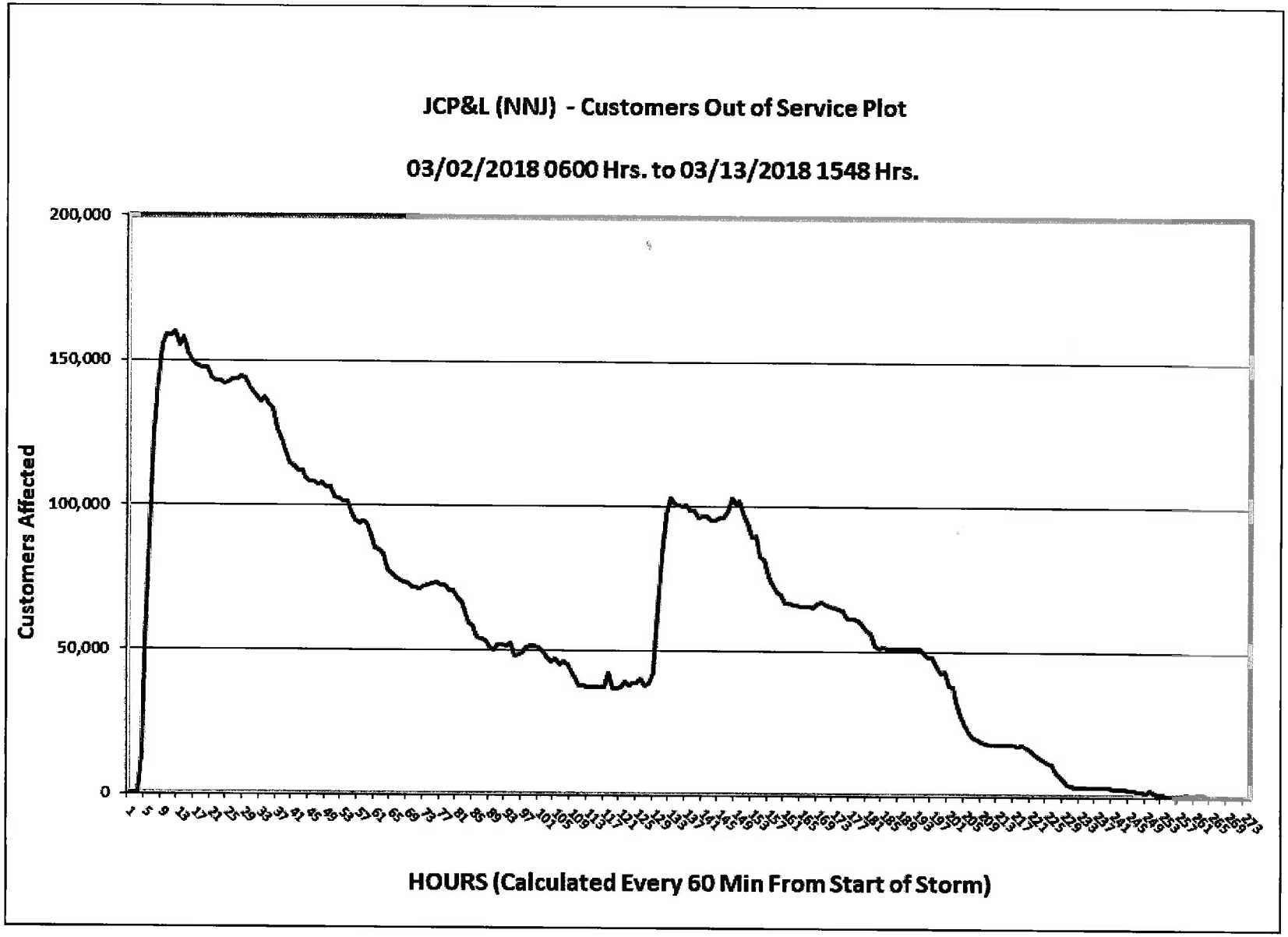

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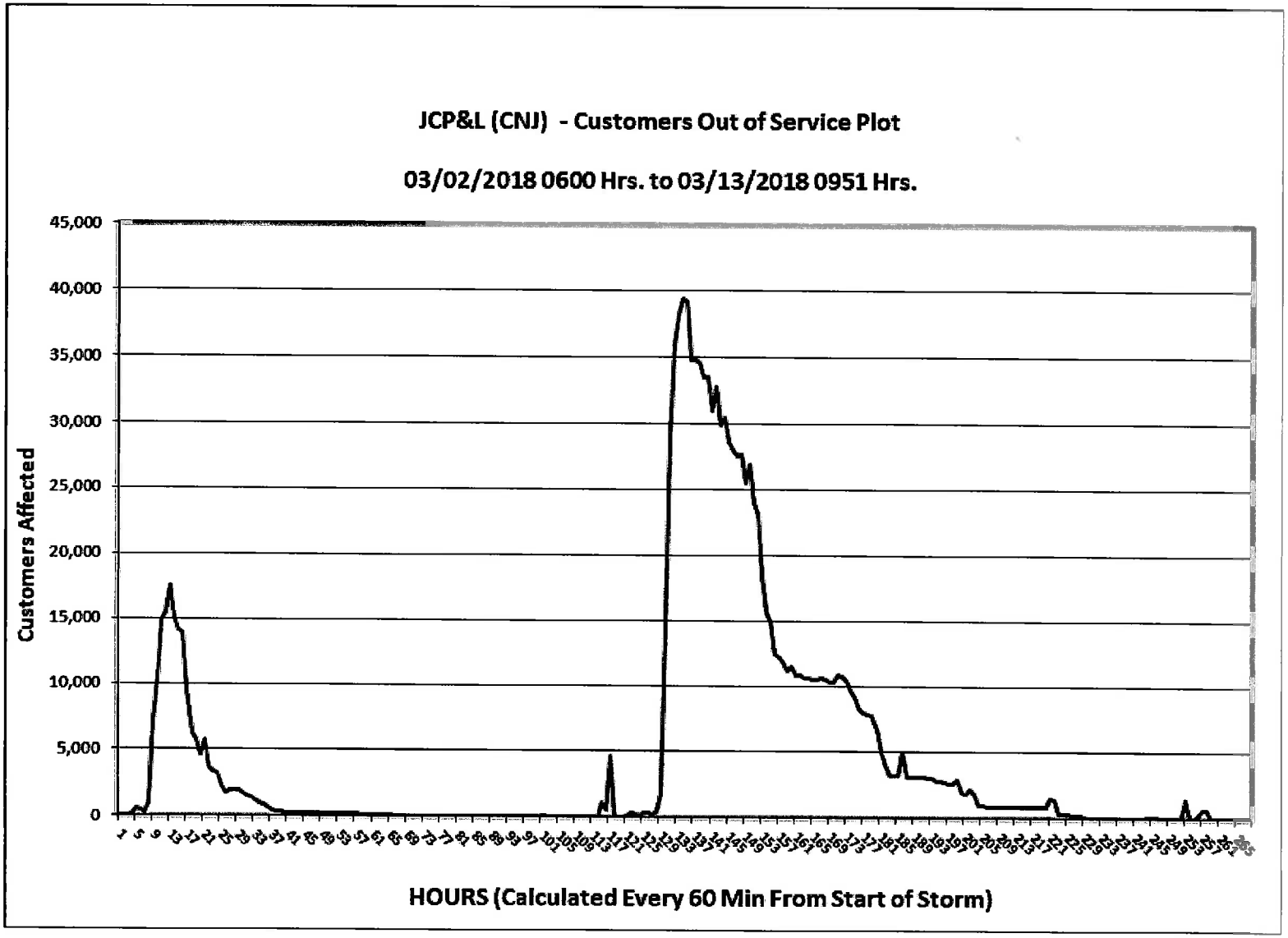

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Total Number of Customers Impacted		
Region	**Storm Period**	**Customers Affected**
JCP&L - Northern Region	3/2/2018 0600 hours – 3/13/2018 1548 hours	407,881
JCP&L - Central Region	3/2/2018 0600 hours – 3/13/2018 0951 hours	118,532
Total JCP&L		**526,413**

Damaged Equipment in JCP&L During Storm Event			
Broken Poles	**Damaged Crossarms**	**Damaged Transformers**	**Damaged Wire (miles)**
805	2,507	517	68.7

3. The number of trouble locations and classifications;

Total Orders			
Region	**Storm Period**	**Trouble Orders***	**Outage Orders****
JCP&L - Northern Region	3/2/2018 0600 hours – 3/13/2018 1548 hours	24,307	4,934
JCP&L - Central Region	3/2/2018 0600 hours – 3/13/2018 0951 hours	3,278	796
Total JCP&L		**27,585**	**5,730**

**Trouble orders represent orders in the outage management system where there is a report of some trouble issue in the field. This does not represent locations in the field nor does it represent customers that were out of power because more than one order may pertain to a single location, and multiples of customers may be affected by a single order.*

***Outage orders represent orders in the outage management system where customers are reported out of lights. This does not represent locations in the field because more than one order may pertain to a single location.*

4. The time at which the mutual aid and non-company contractor crews were requested, arrived for duty and were released, and the mutual aid and non-contractor response(s) to the request(s) for assistance;

See the Resources and Mutual Assistance section above for the time at which mutual aid and non-company contractor crews (other than those already on-site at the outset of the Storm Event) were requested, the responses to those requests, and the times mutual aid and non-company contractor crews began arriving.

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5. A timeline profile of the number of company line crews, mutual aid crews, non-company contractor line and tree crews working on restoration activities during the duration of the major event;

Table 1 reflects (i) the number of JCP&L line crews addressing outages that arose in the JCP&L service territory during the period of the Storm Event from March 2, 2018 – March 13, 2018, (ii) 296 FirstEnergy affiliated line FTEs, and (iii) 2,807 contractor line FTEs. This table also reflects the 49 JCP&L Central Region crews (78 FTEs) that provided mutual assistance to JCP&L Northern Region.

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Table 1

JCP&L Line Crews																		
		NNJ			CNJ			FE Affiliate		Contractor		Service		Total				
Date	Time	1 Man Crew	2-3 Man Crew	FTEs	1 Man Crew	2-3 Man Crew	FTEs	>2 Man Crews	FTEs	>2 Man Crew	FTEs	>2 Man Crews	FTEs	1 Man Crews	>2 Man Crews	Total Crews	FTEs
3/2/2018	0800	5	3	14	0	0	0	0	0	0	0	0	0	5	3	8	14
	1200	27	31	113	25	63	169	0	0	10	22	0	0	52	104	156	304
	1600	28	45	138	25	61	149	0	0	33	77	34	49	53	173	226	413
	2000	30	54	155	26	57	142	0	0	38	91	34	49	56	183	239	437
3/3/2018	0000	30	56	158	28	56	142	0	0	38	91	34	49	58	184	242	440
	0400	30	54	147	29	54	136	0	0	23	57	35	50	59	166	225	390
	0800	30	54	147	29	54	136	0	0	38	91	35	50	59	181	240	424
	1200	31	53	151	32	52	143	0	0	38	91	35	50	63	178	241	435
	1600	31	50	144	32	51	143	0	0	60	167	35	50	63	196	259	504
	2000	32	56	154	32	50	137	0	0	83	239	35	96	64	224	288	626
3/4/2018	0000	32	56	154	32	50	137	0	0	82	233	35	96	64	223	287	620
	0400	32	56	154	31	50	132	0	0	49	156	35	96	63	190	253	538
	0800	32	56	154	31	50	132	0	0	64	190	35	96	63	205	268	572
	1200	32	56	156	31	52	140	15	29	79	261	35	96	63	237	300	682
	1600	32	56	156	31	51	132	22	43	105	363	49	105	63	283	346	799
	2000	33	58	164	30	49	127	22	43	108	375	49	105	63	286	349	814
3/5/2018	0000	33	59	166	30	50	128	22	43	108	375	49	105	63	288	351	817
	0400	27	47	130	30	50	127	22	43	111	384	44	100	57	274	331	784
	0800	27	47	130	30	50	127	22	43	126	418	44	100	57	289	346	818
	1200	30	51	144	31	55	135	54	106	146	558	45	105	61	351	412	1,048
	1600	30	51	144	31	55	135	66	131	157	646	55	119	61	384	445	1,175

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JCP&L Line Crews																	
		NNJ			CNJ			FE Affiliate		Contractor		Service		Total			
Date	Time	1 Man Crew	2-3 Man Crew	FTEs	1 Man Crew	2-3 Man Crew	FTEs	>2 Man Crews	FTEs	>2 Man Crew	FTEs	>2 Man Crews	FTEs	1 Man Crews	>2 Man Crews	Total Crews	FTEs
	2000	30	51	144	31	56	138	66	131	150	619	55	119	61	378	439	1,151
3/6/2018	0000	32	54	155	31	56	138	66	131	150	619	55	119	63	381	444	1,162
	0400	28	53	149	32	55	137	66	131	150	613	55	119	60	379	439	1,149
	0800	28	53	149	32	55	137	70	139	154	639	55	119	60	387	447	1,183
	1200	28	53	149	34	54	139	85	169	188	780	55	133	62	435	497	1,370
	1600	30	62	175	34	54	139	85	169	188	798	68	135	64	457	521	1,416
	2000	34	68	191	34	54	141	85	169	252	959	68	143	68	527	595	1,603
3/7/2018	0000	34	68	191	34	54	141	85	169	243	933	68	143	68	518	586	1,577
	0400	34	68	191	34	54	141	85	169	243	933	68	143	68	518	586	1,577
	0800	34	68	191	34	54	141	85	169	245	940	68	143	68	520	588	1,584
	1200	34	67	191	35	56	144	85	169	257	1,093	68	143	69	533	602	1,740
	1600	34	67	191	35	56	146	85	169	264	1,165	68	143	69	540	609	1,814
	2000	34	67	191	35	56	147	85	169	264	1,165	68	143	69	540	609	1,815
3/8/2018	0000	35	68	194	35	56	147	85	169	264	1,165	68	143	70	541	611	1,818
	0400	35	68	194	35	56	147	85	169	264	1,156	67	138	70	540	610	1,804
	0800	35	68	194	35	56	147	85	169	264	1,156	67	138	70	540	610	1,804
	1200	35	68	194	35	56	147	95	189	252	1,133	67	138	70	538	608	1,801
	1600	34	58	174	35	62	162	105	199	258	1,157	67	138	69	550	619	1,830
	2000	34	58	174	35	62	162	105	202	275	1,200	67	138	69	567	636	1,876
3/9/2018	0000	34	58	174	35	62	163	105	202	285	1,292	69	143	69	579	648	1,974
	0400	34	58	174	35	62	163	113	218	286	1,293	69	143	69	588	657	1,991
	0800	34	58	174	35	62	163	113	218	286	1,293	69	143	69	588	657	1,991
	1200	34	59	175	36	62	165	111	212	297	1,355	69	143	70	598	668	2,050

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JCP&L Line Crews																	
		NNJ			CNJ			FE Affiliate		Contractor		Service		Total			
Date	Time	1 Man Crew	2-3 Man Crew	FTEs	1 Man Crew	2-3 Man Crew	FTEs	>2 Man Crews	FTEs	>2 Man Crew	FTEs	>2 Man Crews	FTEs	1 Man Crews	>2 Man Crews	Total Crews	FTEs
	1600	34	59	175	36	62	165	111	212	324	1,505	72	148	70	628	698	2,205
	2000	34	59	175	36	62	165	111	212	354	1,661	72	148	70	658	728	2,361
3/10/2018	0000	34	59	175	36	62	165	111	212	351	1,642	72	160	70	655	725	2,354
	0400	34	57	175	35	62	164	111	212	360	1,693	72	160	69	662	731	2,404
	0800	34	57	175	35	62	164	111	212	360	1,693	72	160	69	662	731	2,404
	1200	34	57	175	36	63	165	111	212	443	1,944	72	160	70	746	816	2,656
	1600	34	57	175	36	63	165	111	212	450	2,317	72	149	70	753	823	3,018
	2000	34	56	174	36	63	165	111	212	464	2,409	72	155	70	766	836	3,115
3/11/2018	0000	34	56	174	36	63	165	111	212	493	2,574	87	188	70	810	880	3,313
	0400	34	56	174	36	63	165	111	212	482	2,516	87	188	70	799	869	3,255
	0800	34	56	174	36	63	165	111	212	484	2,520	87	188	70	801	871	3,259
	1200	34	56	174	36	63	166	140	267	490	2,550	104	216	70	853	923	3,373
	1600	34	56	174	36	64	166	143	272	489	2,545	104	216	70	856	926	3,373
	2000	34	56	174	36	64	166	143	272	489	2,555	104	216	70	856	926	3,383
3/12/2018	0000	34	56	174	36	64	166	133	249	489	2,555	106	216	70	848	918	3,360
	0400	34	56	174	36	64	166	133	249	489	2,555	106	216	70	848	918	3,360
	0800	34	56	174	36	64	166	133	249	489	2,555	106	216	70	848	918	3,360
	1200	34	56	174	36	64	166	133	249	492	2,563	97	199	70	842	912	3,351
	1600	34	56	174	36	65	166	133	249	494	2,572	97	199	70	845	915	3,360
	2000	34	56	174	36	65	166	133	249	494	2,572	97	199	70	845	915	3,360
3/13/2018	0000	24	41	113	36	65	166	85	158	444	2,356	91	147	60	726	786	2,940
	0400	24	41	113	36	65	166	85	158	444	2,356	91	147	60	726	786	2,940
	0800	24	41	113	36	66	166	85	158	444	2,356	91	147	60	727	787	2,940

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JCP&L Line Crews																	
		NNJ			CNJ			FE Affiliate		Contractor		Service		Total			
Date	Time	1 Man Crew	2-3 Man Crew	FTEs	1 Man Crew	2-3 Man Crew	FTEs	>2 Man Crews	FTEs	>2 Man Crew	FTEs	>2 Man Crews	FTEs	1 Man Crews	>2 Man Crews	Total Crews	FTEs
	1200	24	41	113	36	66	166	46	76	273	1,393	89	135	60	515	575	1,883

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JCP&L Major Event Report
March 2, 2018 – March 13, 2018

Table 2 reflects the number of forestry crews working in the JCP&L service territory during the period of the Storm Event from March 2, 2018 – March 13, 2018. Initially JCP&L utilized its forestry contactors already on its system. Due to the extensive tree damage, JCP&L also acquired additional outside tree contractors to assist with the damage.

Table 2

Forestry Contractor Resources							
Date	Time	NNJ		CNJ		Total	
		FTEs	Crews	FTEs	Crews	FTEs	Crews
3/2/2018	0800	11	2	3	0	14	2
	1200	11	2	3	0	14	2
	1600	146	52	71	30	217	82
	2000	146	52	71	30	217	82
3/3/2018	1200	14	3	31	11	45	14
	0400	14	3	31	11	45	14
	0800	149	53	71	30	220	83
	1200	180	67	40	16	220	83
	1600	180	67	40	16	220	83
	2000	180	67	40	16	220	83
3/4/2018	1200	177	66	40	16	217	82
	0400	11	2	3	0	14	2
	0800	187	70	12	5	199	75
	1200	187	70	12	5	199	75
	1600	187	70	12	5	199	75
	2000	187	70	12	5	199	75
3/5/2018	1200	187	70	12	5	199	75
	0400	36	10	9	3	45	13
	0800	211	79	9	3	220	82
	1200	405	131	9	3	414	134
	1600	582	201	9	3	591	204
	2000	582	201	9	3	591	204
3/6/2018	1200	520	175	3	0	523	175
	0400	520	175	3	0	523	175
	0800	582	201	9	3	591	204
	1200	589	201	9	3	598	204
	1600	702	246	9	3	711	249
	2000	633	219	3	0	636	219
3/7/2018	1200	633	219	3	0	636	219
	0400	633	219	3	0	636	219
	0800	702	245	9	3	711	248

JCP&L Major Event Report
March 2, 2018 – March 13, 2018

Forestry Contractor Resources							
Date	Time	NNJ		CNJ		Total	
		FTEs	Crews	FTEs	Crews	FTEs	Crews
	1200	689	238	9	3	698	241
	1600	689	238	9	3	698	241
	2000	620	212	3	0	623	212
3/8/2018	1200	620	212	3	0	623	212
	0400	620	212	3	0	623	212
	0800	620	212	3	0	623	212
	1200	514	174	9	3	523	177
	1600	607	205	9	3	616	208
	2000	713	243	3	0	716	243
3/9/2018	1200	713	243	3	0	716	243
	0400	713	243	3	0	716	243
	0800	782	269	9	3	791	272
	1200	782	269	9	3	791	272
	1600	771	264	9	3	780	267
	2000	768	270	9	3	777	273
3/10/2018	1200	862	298	9	3	871	301
	0400	862	298	9	3	871	301
	0800	868	301	3	0	871	301
	1200	868	301	3	0	871	301
	1600	868	301	3	0	871	301
	2000	881	308	3	0	884	308
3/11/2018	1200	881	308	3	0	884	308
	0400	881	308	3	0	884	308
	0800	881	308	3	0	884	308
	1200	881	308	3	0	884	308
	1600	881	308	3	0	884	308
	2000	856	297	3	0	859	297
3/12/2018	1200	856	297	3	0	859	297
	0400	856	297	3	0	859	297
	0800	856	297	3	0	859	297
	1200	856	297	3	0	859	297
	1600	781	268	3	0	784	268
	2000	781	268	3	0	784	268
3/13/2018	1200	781	268	3	0	784	268
	0400	781	268	3	0	784	268
	0800	856	297	3	0	859	297

JCP&L Major Event Report
March 2, 2018 – March 13, 2018

Forestry Contractor Resources							
Date	Time	NNJ		CNJ		Total	
		FTEs	Crews	FTEs	Crews	FTEs	Crews
	1200	569	219	3	0	572	219

6. A timeline profile of the number of company crews sent to an affected operating area to assist in the restoration effort.

See the response to Question No. 5 above for JCP&L crews working in JCP&L service territory during this Storm Event.

JCP&L Major Event Report
March 2, 2018 – March 13, 2018

Appendix A – State of Emergency

JCP&L Major Event Report
March 2, 2018 – March 13, 2018

State of New Jersey
Executive Order #14

Governor Philip D. Murphy

WHEREAS, the State of New Jersey is expected to experience a major winter storm causing severe weather conditions, including heavy and wet snow, sleet, rain, and high winds; and

WHEREAS, the National Weather Service has issued storm warnings for a substantial portion of the State, including a Winter Storm Warning for portions of central and northern New Jersey, and a Winter Storm Watch throughout other portions of central and southern New Jersey; and

WHEREAS, this major winter storm is expected to produce heavy snow accumulations, with rates as high as two inches per hour, and strong winds with gusts as high as 35 miles per hour; and

WHEREAS, this major winter storm is expected to produce hazardous travel conditions due to heavy snowfall and significant reductions in visibility; and

WHEREAS, this major winter storm may cause downed power lines and trees, resulting in power outages, and is expected to impede the normal operation of public and private entities; and

WHEREAS, these severe weather conditions may make it difficult or impossible for citizens to obtain the necessities of life, as well as essential services such as police, fire, and first aid; and

WHEREAS, residents in areas that are expected to be impacted by this major winter storm are still recovering from the effects of a winter storm that began on March 2, 2018, which brought severe weather conditions, including snow, rain, high winds, tidal and coastal flooding, river flooding, and downed trees and power lines; and

WHEREAS, this impending major winter storm is expected to compound the effects of the storm that began on March 2; and

WHEREAS, this impending major winter storm constitutes an imminent hazard that threatens and presently endangers the health, safety, and resources of the residents of the State; and

WHEREAS, this situation may become too large in scope to be handled in its entirety by the normal county and municipal operating services in some parts of this State, and this situation may spread to other parts of the State; and

WHEREAS, the Constitution and statutes of the State of New Jersey, particularly the provisions of N.J.S.A. App.A: 9-33 et seq., N.J.S.A. 38A:3-6.1, and N.J.S.A. 38A:2-4 and all amendments and supplements thereto, confer upon the Governor of the State of New Jersey certain emergency powers;

NOW, THEREFORE, I, PHILIP D. MURPHY, Governor of the State of New Jersey, in order to protect the health, safety, and welfare of the people of the State of New Jersey DO DECLARE and PROCLAIM that a State of Emergency exists throughout the State of New Jersey, effective at 8:00 p.m., Eastern Standard Time, on March 6, 2018; and I hereby ORDER and DIRECT the following:

1. I authorize and empower the State Director of Emergency Management, who is the Superintendent of State Police, to implement the State Emergency Operations Plan and to direct the activation of county

and municipal emergency operations plan as necessary, and to coordinate the recovery effort from this emergency with all governmental agencies, volunteer organizations, and the private sector.

2. I authorize and empower, in accordance with N.J.S.A. App. A:9-33, et seq., as supplemented and amended, the State Director of Emergency Management, who is the Superintendent of State Police, through the police agencies under his control, to determine and control the direction of the flow of vehicular traffic on any State or interstate highway, municipal or county road, and any access road, including the right to detour, reroute, or divert any or all traffic and to prevent ingress or egress from any area that, in the State Director's discretion, is deemed necessary for the protection of the health, safety, and welfare of the public, and to remove parked or abandoned vehicles from such roadways as conditions warrant.

3. I authorize and empower the Attorney General, pursuant to the provisions of N.J.S.A. 39:4-213, acting through the Superintendent of State Police, to determine and control the direction of the flow of vehicular traffic on any State or interstate highway, municipal or county road, and any access road, including the right to detour, reroute, or divert any or all traffic, to prevent ingress or egress, and to determine the type of vehicles or vehicles to be operated on such roadways. I further authorize all law enforcement officers to enforce any such order of the Attorney General or Superintendent of State Police within their respective municipalities.

4. I authorize and empower the State Director of Emergency Management to order the evacuation of all persons, except for those emergency and governmental personnel whose presence the State Director deems necessary, from any area where their continued presence would present a danger to their health, safety, or welfare because of the conditions created by this emergency.

5. I authorize and empower the State Director of Emergency Management to utilize all facilities owned, rented, operated, and maintained by the State of New Jersey to house and shelter persons who may need to be evacuated from a residence, dwelling, building, structure, or vehicle during the course of this emergency.

6. I authorize and empower the executive head of any agency or instrumentality of the State government with authority to promulgate rules to waive, suspend, or modify any existing rule, where the enforcement of which would be detrimental to the public welfare during this emergency, notwithstanding the provisions of the Administrative Procedure Act or any law to the contrary for the duration of this Executive Order, subject to my prior approval and in consultation with the State Director of Emergency Management. Any such waiver, modification, or suspension shall be promulgated in accordance with N.J.S.A. App.A:9-45.

7. I authorize and empower the Adjutant General, in accordance with N.J.S.A. 38A:2-4 and N.J.S.A. 38A:3-6.1, to order to active duty such members of the New Jersey National Guard who, in the Adjutant General's judgment, are necessary to provide aid to those localities where there is a threat or danger to the public health, safety, and welfare and to authorize the employment of any supporting vehicles, equipment, communications, or supplies as may be necessary to support the members so ordered.

8. In accordance with N.J.S.A. App.A:9-34 and N.J.S.A. App.A:9-51, I reserve the right to utilize and employ all available resources of the State government and of each and every political subdivision of the State, whether of persons, properties, or instrumentalities, and to commandeer and utilize any personal services and any privately-owned property necessary to protect against this emergency.

9. In accordance with N.J.S.A. App. A:9 40, no municipality, county, or any other agency or political subdivision of this State shall enact or enforce any order, rule, regulation, ordinance, or resolution

JCP&L Major Event Report
March 2, 2018 – March 13, 2018

which will or might in any way conflict with any of the provisions of this Order, or which will in any way interfere with or impede the achievement of the purposes of this Order.

10. It shall be the duty of every person or entity in this State or doing business in this State and of the members of the governing body and every official, employee, or agent of every political subdivision in this State and of each member of all other governmental bodies, agencies, and authorities in this State of any nature whatsoever, to cooperate fully with the State Director of Emergency Management in all matters concerning this state of emergency.

11. In accordance with N.J.S.A. App. A:9-34, N.J.S.A. App. A:9-40.6, and N.J.S.A. 40A:14-156.4, no municipality or public or semipublic agency shall send public works, fire, police, emergency medical, or other personnel or equipment into any non-contiguous disaster-stricken municipality within this State, nor to any disaster-stricken municipality outside this State, unless and until such aid has been directed by the county emergency management coordinator or his deputies in consultation with the State Director of Emergency Management.

12. This Order shall take effect at 8:00 p.m., Eastern Standard Time, on March 6, 2018, and shall remain in effect until such time as it is determined by me that an emergency no longer exists.

GIVEN, under my hand and seal this 6th day of March, Two Thousand and Eighteen and of the Independence of the United States the Two Hundred and
Forty-Second.

/s/ Philip D. Murphy

Governor

Attest:

/s/ Matthew J. Platkin

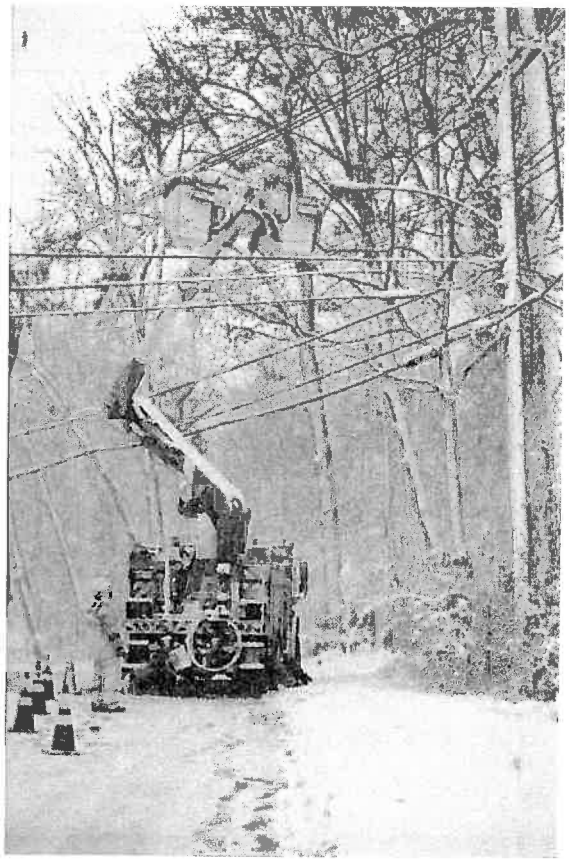
Chief Counsel to the Governor

JCP&L Major Event Report
March 2, 2018 – March 13, 2018

Appendix B

Damage Pictures

JCP&L Major Event Report
March 2, 2018 – March 13, 2018



JCP&L Major Event Report
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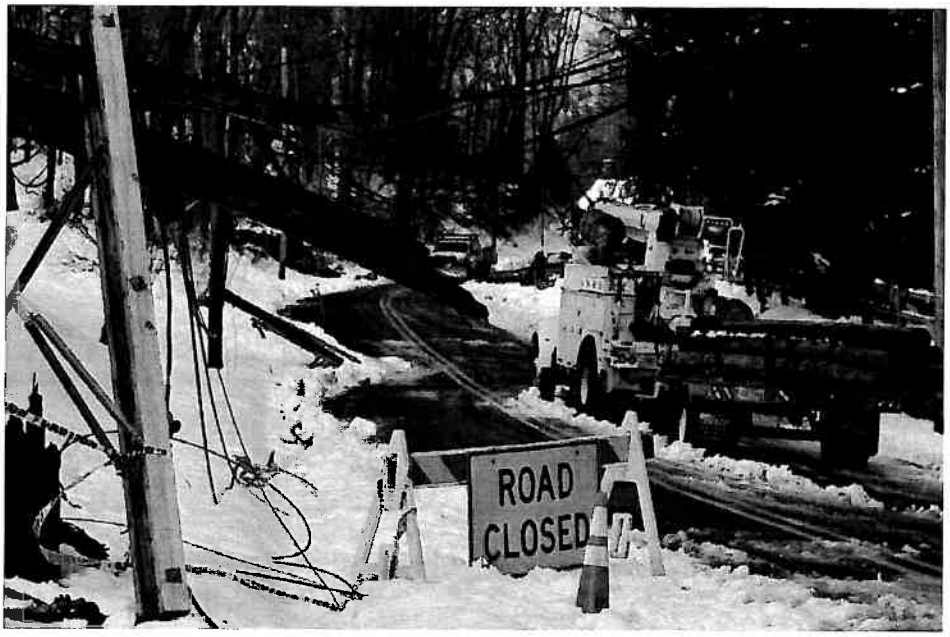

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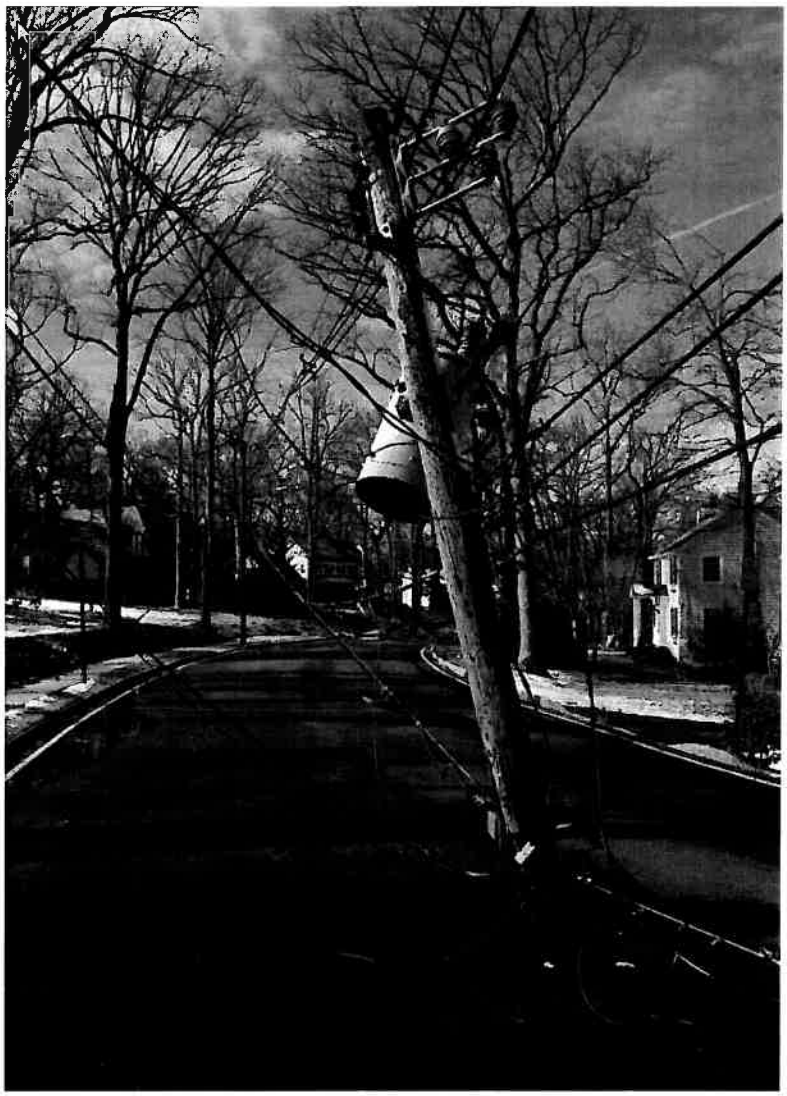

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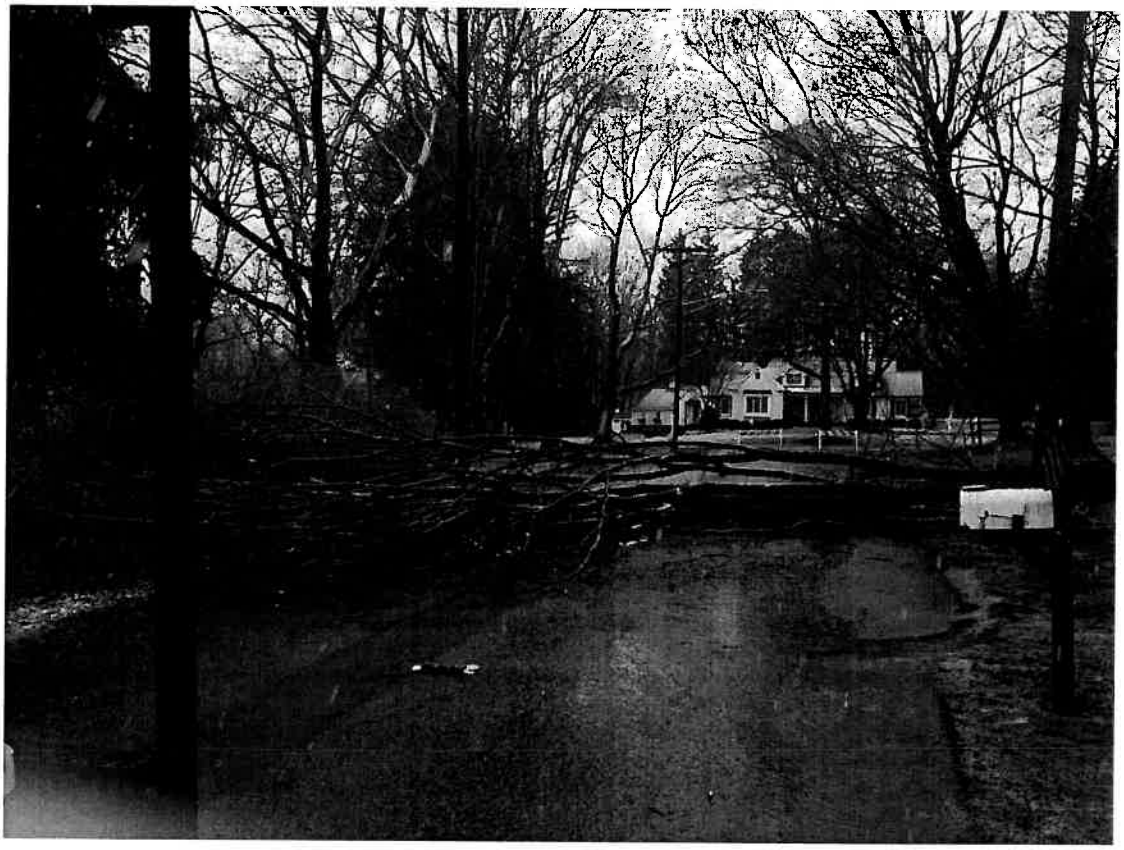

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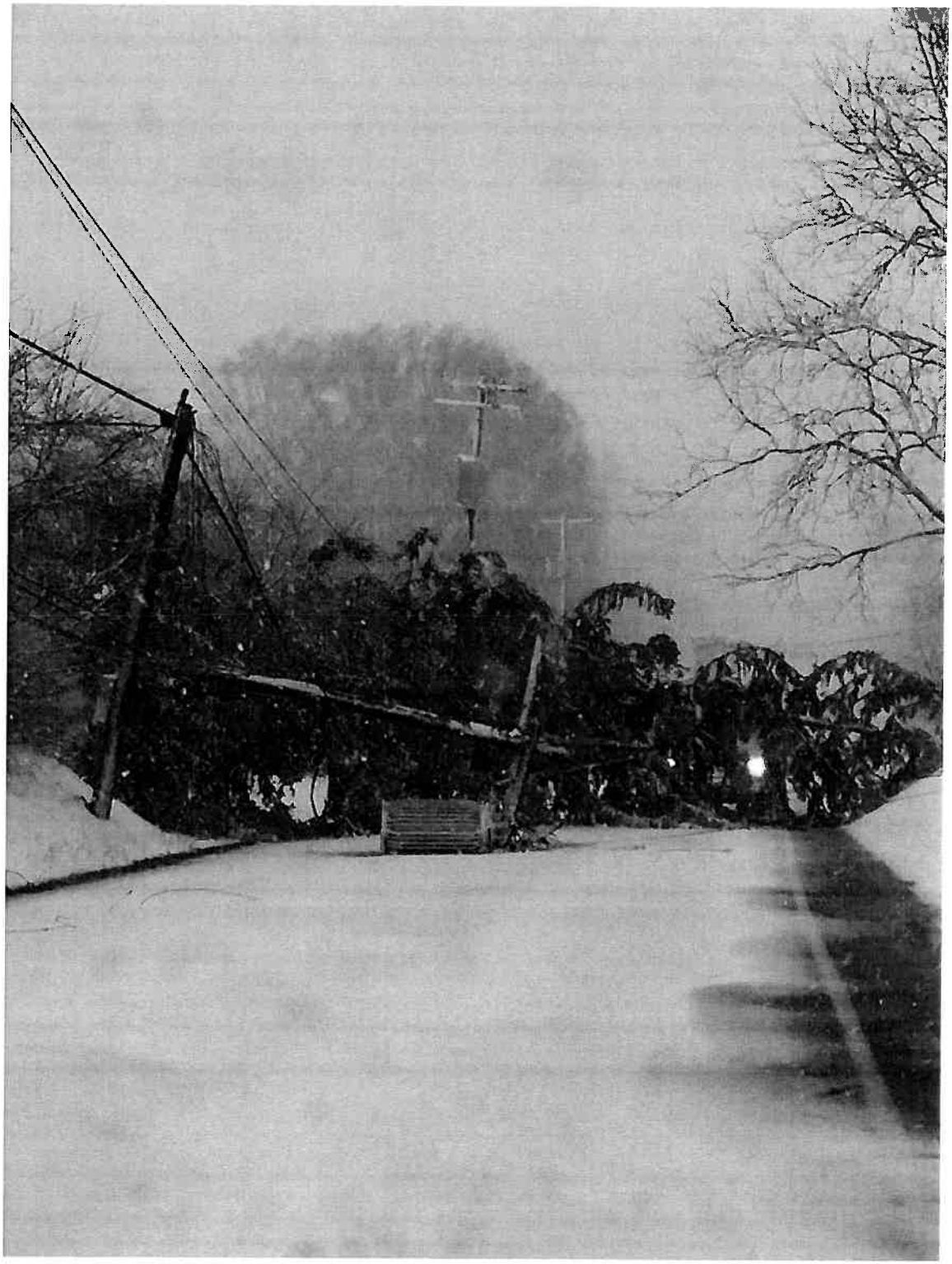


JCP&L Major Event Report
March 2, 2018 – March 13, 2018

Appendix C

JCP&L – Total Customers Served

Total number of customers served in the JCP&L Northern Region and JCP&L Central Region, as well as total number of customers served by JCP&L.

461,463	Northern
641,419	Central
1,102,882	Total

Jersey Central Power & Light
A FirstEnergy Company

Report to the New Jersey Board of Public Utilities

Response to Winter Storm Toby
March 21, 2018 – March 26, 2018

Submitted: April 17, 2018

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

OVERVIEW

On Tuesday, March 20, 2018, New Jersey Governor Philip D. Murphy issued Executive Order No. 17 (attached hereto as Appendix A) declaring a State of Emergency in the State of New Jersey to take effect on March 21 at 0000. According to the Executive Order No. 17, the National Weather Service ("NWS") issued a Winter Storm Warning for the entire State of New Jersey. Specifically, the NWS forecasted a major winter storm to impact New Jersey on March 21, 2018, with severe weather conditions throughout the State, which included heavy, wet snow with heavy snow accumulations with rates as high as two to three inches per hour, strong winds with gusts as high as 45 mph, as well as sleet, rain, and coastal flooding. The State of Emergency ended March 26, 2018 at 1256 when Executive Order No. 18 (attached hereto as Appendix B) rescinded the previous Executive Order. This time period of the State of Emergency is hereinafter defined as the "Storm Event."

The Storm Event began to impact the Jersey Central Power & Light ("JCP&L" or the "Company") service territory in the early morning hours on March 21. The Northern Region experienced winds between 20 to 30 mph and received up to six inches of snow in some areas. The Central Region experienced winds between 30 to 40 mph with the highest recorded gust of wind at 41 mph and received up to twelve inches of snow in some areas.

The Storm Event caused approximately 70,836 outages with 4,492 outages in the JCP&L Northern Region and 66,344 outages in the JCP&L Central Region. **See** Appendix C for the total number of customers served by JCP&L. The Storm Event required the issuance[1] of 183 crossarms, 47 poles, 27 transformers, and 19,152 feet of wire and cable.

In preparation for and during this Storm Event and as required by the Hurricane Irene and Sandy Board Orders[2], JCP&L executed its Emergency Response Plan for Service Restoration ("E-Plan") which includes the use of the Incident Command System ("ICS") within its emergency response organization. Also, the JCP&L Emergency Preparedness Manager (as required by the Irene Order) coordinated and maintained operational information to the media, government, regulatory, emergency management agencies, company executives and internal organizations.

Storm Forecasting and Preparation

Preparations for this Storm Event began on March 19 and covered a wide-spectrum of activities, including monitoring advance weather forecasts (provided by FirstEnergy Meteorological Services) and participating on internal corporate conference calls regarding the storm planning and response efforts. Additionally, JCP&L began holding its own internal conference calls on March 20 at 0900, which were held two times a day through March 23. The JCP&L Emergency Command Center ("ECC") was opened on March 20 at 1100.

JCP&L's ICS is always operational but on March 20, in response to and in anticipation of, the potential impacts associated with the weather forecast, the Incident Commander decided to expand the then current

[1] Note that these totals reflect the counts of equipment issued from JCP&L's stores facilities and were not necessarily all installed in the field.

[2] See New Jersey Board of Public Utilities ("Board" or "BPU") Hurricane Irene (*i.e., I/M/O the Boards' Review of the Utilities' Response to Hurricane Irene*, in BPU Docket No. E011090543, dated January 23, 2013 (the "Irene Order") and *I/M/O the Board's Review of the Utilities' Response to Hurricane Sandy*, BPU Docket No. E012111050, dated May 29, 2013 (the "Sandy Order")) (collectively, the "Storm Orders"0.

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

level of ICS to include additional levels in the form of additional storm response functions. An Incident Action Plan ("IAP") was also initiated on March 20, as part of ICS.

On March 19 and again on March 20, critical care and well water customers were notified in advance of this Storm Event via Interactive Voice Recorder ("IVR") messaging. On March 20, the Company initiated flood mitigation measures at the Morristown, Seabright, and Monmouth Beach substations which included closing flood gates, and all cameras and flood sensors were verified as operational.

Mutual Assistance

On March 19, JCP&L requested 800 line contractor full time equivalent ("FTE") workers in anticipation of the Storm Event. Requests were made through the Regional Mutual Assistance Groups ("RMAGs") and FirstEnergy Affiliated companies. In total, 1,515 line FTEs were secured from thirty-six contractor companies, four FirstEnergy Affiliated companies, and one out-of-state utility. The first of these mutual assistance crews began arriving as early as March 19 at 2000. Additional crews continued arriving through March 22 to assist with restoration efforts. Many of the crews were strategically staged prior to the Storm Event.

Two staging sites were activated on March 20, one in the Northern Region at Six Flags in Jackson, New Jersey, and one site in the Central Region at the Livingston Mall in Eisenhower, New Jersey. Both staging sites were operational on March 21.

On March 22 at 0600, JCP&L Northern Region determined that based on its current outages and the current forecast, it had sufficient resources to provide mutual assistance to the Central Region. In total, the Northern Region deployed sixteen crews (thirty-one FTEs) to assist the Central Region with its restoration efforts. Those Northern Region crews provided assistance through March 24 at 0600 and returned to their home territory at 1200 on that same day.

Most customers affected by the weather were restored by March 22 and therefore, JCP&L began releasing the first of these mutual assistance crews on March 23 when it determined it had sufficient resources to quickly and effectively restore the remaining customers affected during this Storm Event.

Assessment and Restorations

On March 21 at 0700, JCP&L activated the hazard process to identify and make-safe hazard conditions and to assess system damage as a result of the Storm Event. In total, 493 hazard responders worked to clear nearly 3,500 trouble orders.

The hazard process is critical to maintaining public safety and aids in the effective and timely assessment of damage. Hazard responders are dispatched to hazard locations such as those reported to have downed wires or damaged related electrical equipment. Those hazard responders then perform a hazard assessment and report the details of the condition[3].

[3] The responders are then responsible for safeguarding the location, which includes standing by until relieved by a line or service crew, or a public protector, if necessary, in order to keep the public safe during emergency operations. Hazard responders are dispatched to the highest safety priority locations first.

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

The winter weather conditions made traveling by road dangerous and as part of the Executive Order No. 17, the State of New Jersey issued a travel ban for commercial vehicles on State Routes 280, 80, 287, and 78. That ban was then lifted at 0000 on March 22. In addition, utility vehicles were banned from traveling on the Garden State Parkway until 0630 on March 22 due to dangerous driving conditions. To assist with the hazard and damage assessment process, helicopters were used beginning March 22 to patrol hard to reach lines.

Communications

JCP&L proactively began its communication campaign for the Storm Event on March 19 with its customers, media, local officials, and the BPU. On March 19, JCP&L participated in the Board of Public Utilities ("BPU") call with all EDCs. Moreover, in preparation for the Storm Event, JCP&L proactively sent communication messages focusing primarily on the status of storm preparation efforts, safety, communication tools, and information on how customers could report outages. Beginning on March 20, social media such as Twitter and Facebook were activated and regularly updated throughout the Storm Event.

Customers were able to view real-time outage information and estimated times of restoration ("ETR") through the Company website (firstenergycorp.com). FirstEnergy's *"24-7 PowerCenter"* website application was utilized throughout this Storm Event to display ETR status updates alongside confirmed outage cases. FirstEnergy's "My Town" website application was populated to display critical outage-related information specific to individual communities and also included ETRs.

The Company's Communication department issued two news releases, the first on March 20 providing information regarding preparations for the storm, including safety tips and "how to" guidance on reporting power outages and the second on March 22 providing information on its restoration process. The Company responded to 24 media calls, conducted 5 live television interviews, and provided public service announcements on ten radio stations. The Company maintained communications through the use of email updates, social media posts, three entries in the JCP&L Storm Blog, and a QuestLine email to 500,000 customers providing information on the restoration process.

On March 22 at 1600, water and ice was available for customers experiencing outages in JCP&L's Central Region. Water and ice locations were announced in the March 22 press release, on social media, and listed on the Company's website.

The Company's External Affairs Managers maintained regular contact with state, municipal and county officials throughout JCP&L's service territory. The External Affairs staff supported communication efforts, which included proactive outbound calls, sending updates via email, and answering incoming phone calls. The Company held a local officials call on March 21 at 1300 and also provided JCP&L's staffing plan to the BPU at 1151 that same day. Educational materials related to communication tools and safety were distributed to officials for use with their respective constituents. The Company also provided six blast e-mail communications on March 20 and March 21 with topics such safety information, how to report an outage, elected officials calls, and a restoration update. The Company staffed four Offices of Emergency Management ("OEMs") beginning on March 21 until they returned to normal operations on March 22.

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

Major Event Classification

The period of the Storm Event from March 21, 2018 through March 26, 2018 has been classified as a single major event for JCP&L because (consistent with the definition of "major event" in N.J.A.C. 14:5-1.2) Governor Philip D. Murphy issued Executive Order No. 17 declaring a State of Emergency for New Jersey in anticipation of a major winter storm forecasted for March 21, 2018, and issued Executive Order No. 18 to rescind the previous order on March 26, 2018 at 1256.

INFORMATION REQUIRED PURSUANT TO N.J.A.C. *14:5-8.9(a)*

1. **The date and time when the EDC's storm or major event center opened and closed;**

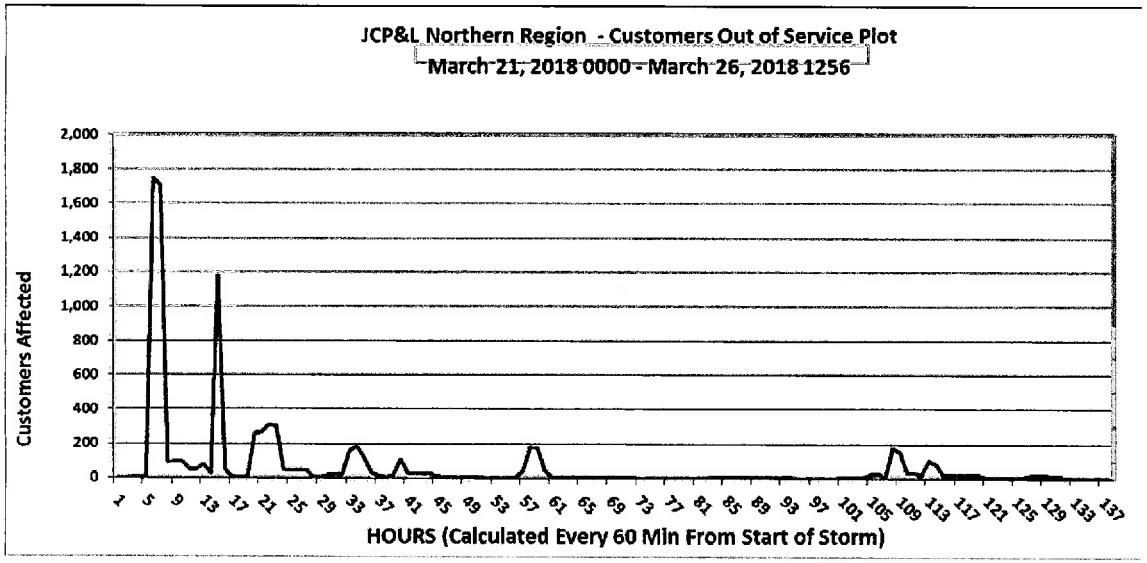
   For the purposes of this report, the Storm Event commenced on March 21 at 0000 when the State of Emergency went into effect. The Storm Event concluded on March 26 at 1256 when the State of Emergency was rescinded.

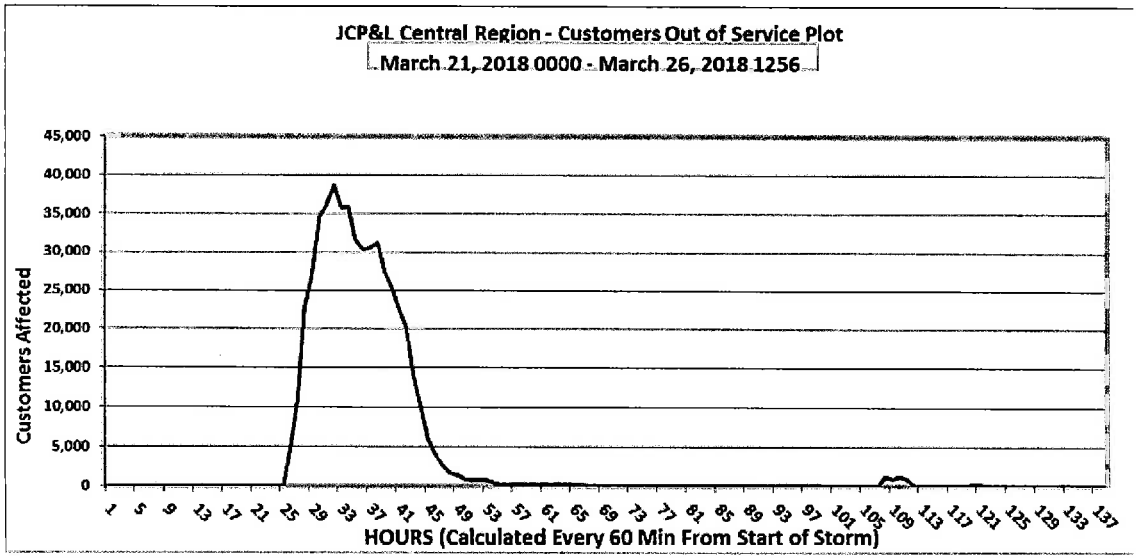
   JCP&L's ECC opened on March 20 at 1100 in preparation for the Storm Event. The ECC closed on March 23 at 1030 with continuing operations turned over to the Company's Distribution Control Center.

2. **The total number of customers out of service over the course of the major event over four-hour intervals, identified by operating area or circuit area. For purposes of this count, the starting time shall be when the storm center opens and the ending time shall be when the storm center closes. Regardless of when the storm center is closed, the EDC shall report the date and time when the last customer affected by a major event is restored;**

   The charts below indicate the outages experienced by JCP&L Northern Region and Central Region customers during the period of the Storm Event from March 21, 2018 at 0000 – March 26, 2018 at 1256. The last customer affected during this Storm Event was restored at 1100 on March 26 in both JCP&L's Northern and Central Region.

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018





JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

Total Number of Customers Impacted		
Region	**Storm Period**	**Customers**
JCP&L - North NJ Region	03/21/2018 00:00 to 03/26/2018 12:56	4,492
JCP&L - Central NJ Region	03/21/2018 00:00 to 03/26/2018 12:56	66,344
Total JCP&L		**70,836**

Damaged Equipment in JCP&L During Storm Event			
Broken Poles	**Damaged Crossarms**	**Damaged Transformers**	**Damaged Wire (feet)**
47	183	27	19,152

3. The number of trouble locations and classifications;

Total Number of Orders			
Region	**Storm Period**	**Trouble Orders***	**Outage Orders****
JCP&L - North NJ Region	03/21/2018 00:00 to 03/26/2018 12:56	436	81
JCP&L - Central NJ Region	03/21/2018 00:00 to 03/26/2018 12:56	3,035	549
Total JCP&L		**3,471**	**630**

**Trouble orders represent orders in the outage management system where there is a report of some trouble issue in the field. This does not represent locations in the field nor does it represent customers that were out of power because more than one order may pertain to a single location, and multiples of customers may be affected by a single order.*

***Outage orders represent orders in the outage management system where customers are reported out of lights. This does not represent locations in the field because more than one order may pertain to a single location.*

4. The time at which the mutual aid and non-company contractor crews were requested, arrived for duty and were released, and the mutual aid and non-contractor response(s) to the request(s) for assistance;

See the Mutual Assistance section above for the time at which mutual aid and non-company contractor crews were requested, the responses to those requests, and the times mutual aid and non-company contractor crews began arriving.

5. A timeline profile of the number of company line crews, mutual aid crews, non-company contractor line and tree crews working on restoration activities during the duration of the major event;

Table 1 reflects (i) the number of JCP&L line crews addressing outages that arose in the

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

JCP&L service territory during the period of the Storm Event from March 21, 2018 – March 26, 2018, (ii) 82 FirstEnergy affiliated line FTEs, (iii) 1,415 contractor line FTEs, and (iv) 18 mutual assistance line FTEs. This table also reflects the 16 JCP&L Northern Region crews (31 FTEs) that provided mutual assistance to JCP&L Central Region.

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

Table 1

JCP&L Line Crews											
		NNJ		CNJ		FE Affiliate	Contractor	Total			
Date	Time	1 Man Crew	2-3 Man Crew	1 Man Crew	2-3 Man Crew	>2 Man Crews	>2 Man Crew	1 Man Crews	>2 Man Crews	Total Crews
3/21/2018	0000	13	1	22	43	0	0	35	44	79
	0400	13	1	12	0	0	0	25	1	26
	0800	15	29	21	45	23	0	36	97	133
	1200	22	28	24	50	18	0	46	96	142
	1600	22	33	34	49	18	0	56	100	156
	2000	22	33	30	49	18	0	52	100	152
3/22/2018	0000	13	7	28	47	0	0	41	54	95
	0400	10	9	12	3	0	0	22	12	34
	0800	20	26	25	45	0	24	45	95	140
	1200	20	24	26	60	18	29	46	131	177
	1600	19	29	34	59	24	29	53	141	194
	2000	19	23	30	62	24	30	49	139	188
3/23/2018	0000	12	1	25	38	0	0	37	39	76
	0400	11	3	12	5	0	0	23	8	31
	0800	20	23	26	60	24	30	46	137	183
	1200	20	23	27	67	24	30	47	144	191
	1600	20	22	35	65	24	26	55	137	192
	2000	20	22	31	63	24	3	51	112	163
3/24/2018	0000	11	1	22	39	0	0	33	40	73
	0400	10	3	10	4	0	0	20	7	27
	0800	20	23	19	58	24	3	39	108	147
	1200	14	14	19	58	24	3	33	99	132
	1600	11	13	29	56	24	3	40	96	136
	2000	11	13	27	56	24	3	38	96	134
3/25/2018	0000	5	1	20	32	0	0	25	33	58
	0400	5	1	11	4	0	0	16	5	21
	0800	6	6	9	25	6	3	15	40	55
	1200	6	6	9	25	6	13	15	50	65
	1600	2	5	11	23	6	14	13	48	61
	2000	2	5	10	23	6	3	12	37	49
3/26/2018	0000	1	4	7	7	0	0	8	11	19
	0400	1	0	3	4	0	0	4	4	8
	0800	3	0	4	20	0	14	7	34	41
	1200	3	4	4	20	0	11	7	35	42

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

Table 2 reflects the number of forestry crews working in the JCP&L service territory during the period of the Storm Event from March 21, 2018 – March 26, 2018. This table also reflects seven off-site forestry crews (thirteen FTEs) that provided assistance to JCP&L Central Region.

Table 2

Forestry Contractor Resources				
Date	Time	NNJ Crews	CNJ Crews	Total Crews
3/21/2018	0000	127	7	134
	0400	127	7	134
	0800	163	7	170
	1200	183	16	199
	1600	184	35	219
	2000	184	35	219
3/22/2018	0000	151	35	186
	0400	151	35	186
	0800	45	0	45
	1200	170	46	216
	1600	121	106	227
	2000	26	201	227
3/23/2018	0000	26	201	227
	0400	26	201	227
	0800	29	111	140
	1200	29	111	140
	1600	29	111	140
	2000	29	111	140
3/24/2018	0000	12	2	14
	0400	12	2	14
	0800	12	2	14
	1200	12	2	14
	1600	12	2	14
	2000	12	2	14
3/25/2018	0000	12	2	14
	0400	12	2	14
	0800	12	2	14
	1200	12	2	14
	1600	12	2	14
	2000	12	2	14
3/26/2018	0000	12	2	14
	0400	12	2	14
	0800	12	2	14
	1200	12	2	14

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

6. A timeline profile of the number of company crews sent to an affected operating area to assist in the restoration effort.

See the response to Question No. 5 above for JCP&L Northern Region crews that provided mutual assistance to the Central Region from March 22 at 0600 to March 24 at 1200.

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

Appendix A

EXECUTIVE ORDER NO. 17

WHEREAS, the State of New Jersey is expected to experience a major winter storm causing severe weather conditions, including heavy and wet snow, sleet, rain, and high winds; and

WHEREAS, the National Weather Service has issued a Winter Storm Warning for the entire State of New Jersey, a Coastal Flood Warning for the coastal regions of Atlantic, Burlington, Cape May, Cumberland, and Ocean Counties, and a Coastal Flood Advisory for the coastal regions of Essex, Hudson, Middlesex, Monmouth, Salem, and Union Counties; and

WHEREAS, this major winter storm is expected to produce heavy snow accumulations, with rates as high as two to three inches per hour, and strong winds with gusts as high as 45 miles per hour; and

WHEREAS, this major winter storm is expected to produce hazardous travel conditions due to heavy snowfall and significant reductions in visibility; and

WHEREAS, this major winter storm may cause downed power lines and trees, resulting in power outages, and is expected to impede the normal operation of public and private entities; and

WHEREAS, these severe weather conditions may make it difficult or impossible for citizens to obtain the necessities of life, as well as essential services such as police, fire, and first aid; and

WHEREAS, residents in areas that are expected to be impacted by this major winter storm are still recovering from the effects of a recent winter storm which produced a state of emergency lasting from March 6th until March 13th and brought severe weather conditions including snow, rain, high winds, tidal and coastal flooding, river flooding, and downed trees and power lines; and

WHEREAS, the impending major winter storm is expected to compound the effects of the storm that began on March 6th; and

WHEREAS, this impending major winter storm constitutes an imminent hazard that threatens and presently endangers the health, safety, and resources of the residents of the State; and

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

WHEREAS, this situation may become too large in scope to be handled in its entirety by the normal county and municipal operating services in some parts of this State, and this situation may spread to other parts of the State; and

WHEREAS, the Constitution and statutes of the State of New Jersey, particularly the provisions of N.J.S.A. App.A: 9-33 et seq., N.J.S.A. 38A:3-6.1, and N.J.S.A. 38A:2-4 and all amendments and supplements thereto, confer upon the Governor of the State of New Jersey certain emergency powers;

NOW, THEREFORE, I, PHILIP D. MURPHY, Governor of the State of New Jersey, in order to protect the health, safety, and welfare of the people of the State of New Jersey DO DECLARE and PROCLAIM that a State of Emergency exists throughout the State of New Jersey, effective at 7:00 p.m., Eastern Daylight Time, on March 20, 2018; and I hereby ORDER and DIRECT the following:

1. I authorize and empower the State Director of Emergency Management, who is the Superintendent of State Police, to implement the State Emergency Operations Plan and to direct the activation of county and municipal emergency operations plan as necessary, and to coordinate the recovery effort from this emergency with all governmental agencies, volunteer organizations, and the private sector.

2. I authorize and empower, in accordance with N.J.S.A. App.A:9-33, et seq., as supplemented and amended, the State Director of Emergency Management, who is the Superintendent of State Police, through the police agencies under his control, to determine and control the direction of the flow of vehicular traffic on any State or interstate highway, municipal or county road, and any access road, including the right to detour, reroute, or divert any or all traffic and to prevent ingress or egress from any area that, in the State Director's discretion, is deemed necessary for the protection of the health, safety, and welfare of the public, and to remove parked or abandoned vehicles from such roadways as conditions warrant.

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

3. I authorize and empower the Attorney General, pursuant to the provisions of N.J.S.A. 39:4-213, acting through the Superintendent of State Police, to determine and control the direction of the flow of vehicular traffic on any State or interstate highway, municipal or county road, and any access road, including the right to detour, reroute, or divert any or all traffic, to prevent ingress or egress, and to determine the type of vehicles or vehicles to be operated on such roadways. I further authorize all law enforcement officers to enforce any such order of the Attorney General or Superintendent of State Police within their respective municipalities.

4. I authorize and empower the State Director of Emergency Management to order the evacuation of all persons, except for those emergency and governmental personnel whose presence the State Director deems necessary, from any area where their continued presence would present a danger to their health, safety, or welfare because of the conditions created by this emergency.

5. I authorize and empower the State Director of Emergency Management to utilize all facilities owned, rented, operated, and maintained by the State of New Jersey to house and shelter persons who may need to be evacuated from a residence, dwelling, building, structure, or vehicle during the course of this emergency.

6. I authorize and empower the executive head of any agency or instrumentality of the State government with authority to promulgate rules to waive, suspend, or modify any existing rule, where the enforcement of which would be detrimental to the public welfare during this emergency, notwithstanding the provisions of the Administrative Procedure Act or any law to the contrary for the duration of this Executive Order, subject to my prior approval and in consultation with the State Director of Emergency Management. Any such waiver, modification, or suspension shall be promulgated in accordance with N.J.S.A. App.A:9-45.

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

7. I authorize and empower the Adjutant General, in accordance with N.J.S.A. 38A:2-4 and N.J.S.A. 38A:3-6.1, to order to active duty such members of the New Jersey National Guard who, in the Adjutant General's judgment, are necessary to provide aid to those localities where there is a threat or danger to the public health, safety, and welfare and to authorize the employment of any supporting vehicles, equipment, communications, or supplies as may be necessary to support the members so ordered.

8. In accordance with N.J.S.A. App.A:9-34 and N.J.S.A. App.A:9-51, I reserve the right to utilize and employ all available resources of the State government and of each and every political subdivision of the State, whether of persons, properties, or instrumentalities, and to commandeer and utilize any personal services and any privately-owned property necessary to protect against this emergency.

9. In accordance with N.J.S.A. App.A:9-40, no municipality, county, or any other agency or political subdivision of this State shall enact or enforce any order, rule, regulation, ordinance, or resolution which will or might in any way conflict with any of the provisions of this Order, or which will in any way interfere with or impede the achievement of the purposes of this Order.

10. It shall be the duty of every person or entity in this State or doing business in this State and of the members of the governing body and every official, employee, or agent of every political subdivision in this State and of each member of all other governmental bodies, agencies, and authorities in this State of any nature whatsoever, to cooperate fully with the State Director of Emergency Management in all matters concerning this state of emergency.

11. In accordance with N.J.S.A. App.A:9-34, N.J.S.A. App.A:9-40.6, and N.J.S.A. 40A:14-156.4, no municipality or public or semipublic agency shall send public works, fire, police, emergency medical, or other personnel or equipment into any non-contiguous disaster-stricken municipality within this State, nor to any disaster-stricken

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

municipality outside this State, unless and until such aid has been directed by the county emergency management coordinator or his deputies in consultation with the State Director of Emergency Management.

12. This Order shall take effect at 7:00 p.m., Eastern Daylight Time, on March 20, 2018, and shall remain in effect until such time as it is determined by me that an emergency no longer exists.

GIVEN, under my hand and seal this 20th day of March, Two Thousand and Eighteen, and of the Independence of the United States, the Two Hundred and Forty-Second.

[seal]

/s/ Philip D. Murphy

Governor

Attest:

/s/ Matthew J. Platkin

Chief Counsel to the Governor

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

Appendix B

EXECUTIVE ORDER NO. 18

WHEREAS, Executive Order No. 17 (2018), declaring a State of Emergency, was issued on March 20, 2018, because of severe weather events forecasted for March 21, 2018; and

WHEREAS, the severity of the conditions necessitating the declaration of a State of Emergency has eased;

NOW, THEREFORE, I, PHILIP D. MURPHY, Governor of the State of New Jersey, by virtue of the authority vested in me by the Constitution and by the Statutes of this State, do hereby ORDER and DIRECT:

1. The State of Emergency declared in Executive Order No. 17 (2018) is terminated.

2. This Order shall take effect immediately.

GIVEN, under my hand and seal this 26th day of March, Two Thousand and Eighteen, and of the Independence of the United States, the Two Hundred and Forty-Second.

[seal]

/s/ Philip D. Murphy

Governor

Attest:

/s/ Matthew J. Platkin

Chief Counsel to the Governor

JCP&L Major Event Restoration Summary
March 21, 2018 – March 26, 2018

Appendix C

JCP&L – Total Customers Served

Total customers served in the Northern and Central Regions as well as total customers served by JCP&L.

461,463	Northern
641,419	Central
1,102,882	**Total**

Jersey Central Power & Light
A FirstEnergy Company

Report to the New Jersey Board of Public Utilities

Response to Severe Thunderstorms and High Winds
May 15, 2018 – May 21, 2018

Submitted: June 12, 2018

JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018

OVERVIEW

Beginning Tuesday, May 15, 2018, the Jersey Central Power & Light Company ("JCP&L" or "Company") service territory experienced outages due to severe thunderstorms and high winds (herein defined as the "Storm Event"). Specifically, a line of dangerous, severe thunderstorms formed and moved quickly east through northern and central Pennsylvania. This line of storms intensified in strength, beyond the initial predictions, as it moved east and caused widespread damage with high winds. This storm began to impact the JCP&L service territory at approximately 1450 on May 15 and continued until approximately 2330 on May 16.

The Northern Region experienced wind gusts in excess of 60 mph with the highest recorded wind gust of 67 mph. These winds caused widespread damage throughout the Northern Region with Morris, Passaic, Sussex, and Warren counties sustaining the most significant damage. As discussed below, the Central Region provided line crews to the Northern Region beginning May 15, in response to its request for mutual assistance.

The Storm Event caused approximately 159,049 outages with 149,578 outages in the JCP&L Northern Region and 9,471 outages in the JCP&L Central Region. **See** Appendix A for the total number of customers served by JCP&L. The Storm Event required the issuance[1] of 508 crossarms, 118 poles, 168 transformers, and 77,438 feet (14.67 miles) of wire and cable.

In preparation for and during this Storm Event and as required by the Hurricane Irene and Sandy Board Orders[2], JCP&L executed its Emergency Response Plan for Service Restoration which includes the use of the Incident Command System ("ICS") within its emergency response organization. Also, the JCP&L Emergency Preparedness Manager (as required by the Irene Order) coordinated and maintained operational information to the media, government, regulatory, emergency management agencies, company executives and internal organizations.

Storm Forecasting and Preparation

Preparations for this Storm Event began on May 15 and covered a wide-spectrum of activities, including monitoring weather forecasts (provided by FirstEnergy Meteorological Services) and participating on internal corporate conference calls regarding the storm planning and response efforts. Additionally, JCP&L began holding its own internal conference calls on May 15 at 1230, which were held two times a day through May 19. The JCP&L Emergency Command Center ("ECC") was opened on May 15 at 1230.

JCP&L's ICS is always operational but on May 15, in response to and in anticipation of, the potential impacts associated with the weather forecast, the Incident Commander decided to expand the then current level of ICS to include additional levels in the form of additional storm response functions. An Incident Action Plan was also initiated on May 15, as part of ICS.

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[1] Note that these totals reflect the counts of equipment issued from JCP&L's stores facilities and were not necessarily all installed in the field.

[2] See New Jersey Board of Public Utilities ("Board" or "BPU") Hurricane Irene (*i.e., I/M/O the Boards' Review of the Utilities' Response to Hurricane Irene*, in BPU Docket No. E011090543, dated January 23, 2013 (the "Irene Order") and *I/M/O the Board's Review of the Utilities' Response to Hurricane Sandy*, BPU Docket No. E012111050, dated May 29, 2013 (the "Sandy Order")) (collectively, the "Storm Orders")).

JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018

On May 15, critical care and well water customers were notified via Interactive Voice Response messaging. On May 16, the Company initiated flood mitigation measures at the Morristown and Canoe Brook substations which included closing flood gates and installing pumps.

Mutual / Contractor Assistance

On May 15, JCP&L requested 500 line contractor full time equivalent ("FTE") workers in anticipation of the Storm Event. Requests were made through the Regional Mutual Assistance Groups, FirstEnergy Affiliated companies, and outside contractors. In total, 507 line FTEs were secured from fourteen contractor companies, four FirstEnergy Affiliated companies, and one municipal utility. The first of these external crews began arriving as early as May 15 at 1300. Additional crews continued arriving through May 18 to assist with restoration efforts.

Three material laydown sites were activated on May 15 in the Northern Region at the Sussex County Fairgrounds in Augusta, New Jersey, the Livingston Mall in Eisenhower, New Jersey, and a site in West Wharton, New Jersey. All three staging sites were operational on May 16.

On May 15 at 1900, in response to the Northern Region's request for mutual assistance, the Central Region determined that based on its current outages and the current forecast, it had sufficient resources to provide mutual assistance to the Northern Region. In total, the Central Region deployed thirty-eight crews (sixty-seven FTEs) to assist the Northern Region with its restoration efforts. Those Central Region crews provided assistance until they were released and returned ready to work in their home territory at 2000 on May 21.

Assessment and Restorations

On May 15, JCP&L activated the hazard process to identify and make-safe hazard conditions and to assess system damage as a result of the Storm Event. In total, 294 hazard responders worked to clear more than 4,500 trouble orders.

The hazard process is critical to maintaining public safety and aids in the effective and timely assessment of damage. Hazard responders are dispatched to hazard locations such as those reported to have downed wires or damaged related electrical equipment. Those hazard responders then perform a damage assessment and report the details of the condition.[3]

[3] The responders are then responsible for safeguarding the location, which includes standing by until relieved by a line or service crew, or a public protector, if necessary, in order to keep the public safe during emergency operations. Hazard responders are dispatched to the highest safety priority locations first.

On May 16, JCP&L activated its circuit quarantine process for three circuits that were heavily damaged in the Northern Region.[4] JCP&L completed the quarantine process on May 19.

JCP&L worked along-side county officials to implement its road opening process where approximately 400 roads were opened. JCP&L next focused on restoring approximately sixty-six schools impacted by this Storm Event.

Due to the extensive damage in the form of downed trees, poles, and wires, and the road closures, JCP&L tried to utilize a helicopter to assist with the damage assessment process, however, the helicopter was unable to fly due to weather conditions until March 21.

Communications

JCP&L proactively began its communication campaign for the Storm Event on May 15 with its customers, media, local officials, and the BPU. Moreover, in advance of the Storm Event, JCP&L sent communication messages focusing primarily on the status of storm preparation and response efforts, safety, communication tools, and information on how customers could report outages. Beginning on May 15, social media such as Twitter and Facebook were activated and regularly updated throughout the Storm Event.

Customers were able to view real-time outage information and estimated times of restoration ("ETR") through the Company website (firstenergycorp.com). FirstEnergy's *"24-7 PowerCenter"* website application was utilized throughout this Storm Event to display ETR status updates alongside confirmed outage cases. FirstEnergy's "My Town" website application was populated to display critical outage-related information specific to individual communities and also included ETRs.

The Company's Communication department issued two news releases on May 16 providing information regarding restoration efforts, safety tips and "how to" guidance on reporting power outages, and the availability and locations for water and ice for customers experiencing outages in JCP&L's Northern Region. Water and ice locations were also listed on social media and on the Company's website. The Company responded to twenty-four media calls and the Company maintained communications through the use of email updates and social media posts.

The FirstEnergy Call Center provided customers with information updates primarily through four methods: Customer Service Representatives, IVR, web-based communications, and SMS texting and/or mobile applications.

The FirstEnergy Contact Centers received 137,405 outage calls during the Storm Event beginning on May 15 and ending on May 21 at an overall average speed of answer of six seconds and an abandonment rate of 1.17%.

[4] Specifically, during quarantine, the circuit is deenergized and damage assessors patrol the circuit in its entirety to identify and document the damage (e.g., number of broken poles and equipment needs). Next, tree and line crews follow closely behind while working in parallel to remove trees and limbs and make repairs. This process eliminates bottlenecks, optimizes response times, improves internal and external communications, maximizes resource utilization, and allows for improved data and information flow during large-scale emergency restoration events.

JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018

Local Officials Communications

The Company's External Affairs function lead by the Liaison Officer, maintained regular contact with state, municipal and county officials throughout JCP&L's service territory. The External Affairs staff supported communication efforts, which included proactive outbound calls, sending updates via email, and answering incoming phone calls. Educational materials related to communication tools and safety were distributed to officials for use with their respective constituents. The Company also provided six blast e-mail communications on May 15 and May 16 with topics such safety information, how to report an outage, and a restoration update. The Company complied with requests to staffed three Offices of Emergency Management beginning on May 15 until they returned to normal operations on May 19.

On May 16, JCP&L activated its Emergency Response Phone Center which provides a unique 800 number to key external stakeholders as well as emergency management personnel to contact the Company.

Beginning on May 16, BPU Staff and Mayors in the affected areas were provided daily System Status Reports (as required by the Storm Orders (Sandy-5)) that provided global ETR information, number of customers out of service, the number of circuits and substations out of service, a high-level summary of restoration efforts and information pertaining to situational awareness, and JCP&L's staffing plan. These reports were provided through May 19. The Company also held local officials calls on May 17 and 18.

On May 17 and 18, BPU Staff and Mayors in the affected areas were provided daily specific details regarding their municipality (as required by Storm Orders (Sandy-6)). These details included the number of customers out of service, the number of damaged circuits, the number of tree cutting locations, the number of damaged poles, the number of damaged locations on the circuits, the number of road closures, the number of circuits scheduled to be worked that day, and the number of customers to be restored per day until restoration is completed.

The Company is conducting post event surveys with State and municipal stakeholders (as required by Storm Orders (BPU-53)).

BPU Communications

Beginning May 16, JCP&L remained in daily contact with the BPU throughout the Storm Event. In addition to phone communications, JCP&L provided staffing and outage updates and responded to questions. The Company provided the estimated manhours (as required by Storm Orders (BPU-51)) needed to restore remaining affected customers on May 16 through May 18.

Major Event Classification

The period of the Storm Event from May 15, 2018 through May 20, 2018 has been classified as a single major event for JCP&L Northern Region because (consistent with the definition of "major event" in N.J.A.C. 14:5-1.2) outages caused by high winds and thunderstorms affected 149,578 customers, or 32.4% (see Appendix A for total customers served). Because the JCP&L Northern Region needed mutual aid from JCP&L's Central Region, which provided assistance from May 15 through May 21 when the Central Region crews returned to their home base, the classification of the event as a Major Event is deemed to extend to the JCP&L Central Region during the timeframe when assistance was provided.

JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018

INFORMATION REQUIRED PURSUANT TO N.J.A.C. *14:5-8.9(a)*

1. **The date and time when the EDC's storm or major event center opened and closed;**

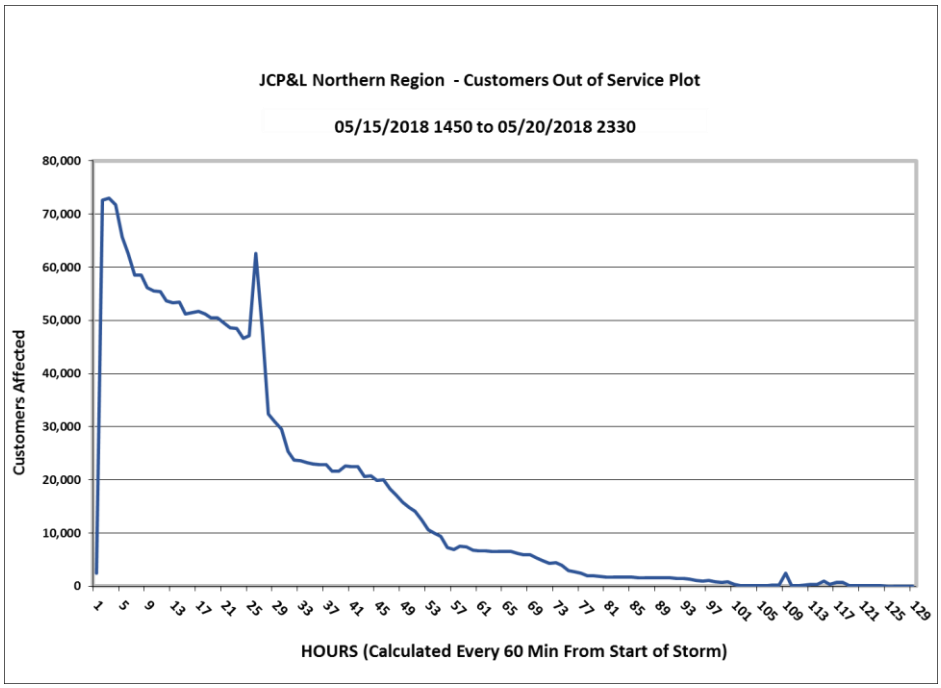
   For the purposes of this report, the Storm Event commenced on May 15 at 1450 for the Northern Region when the storm began impacting the Northern Region. The Storm Event for Northern Region concluded on May 20 at 2330 when the last customer affected by the weather was restored. The Storm Event commenced on May 15 at 1900 for the Central Region when crews assembled for departure to Northern Region where they provided mutual assistance. The Storm Event concluded on May 21 at 2000 when crews returned to their home base.

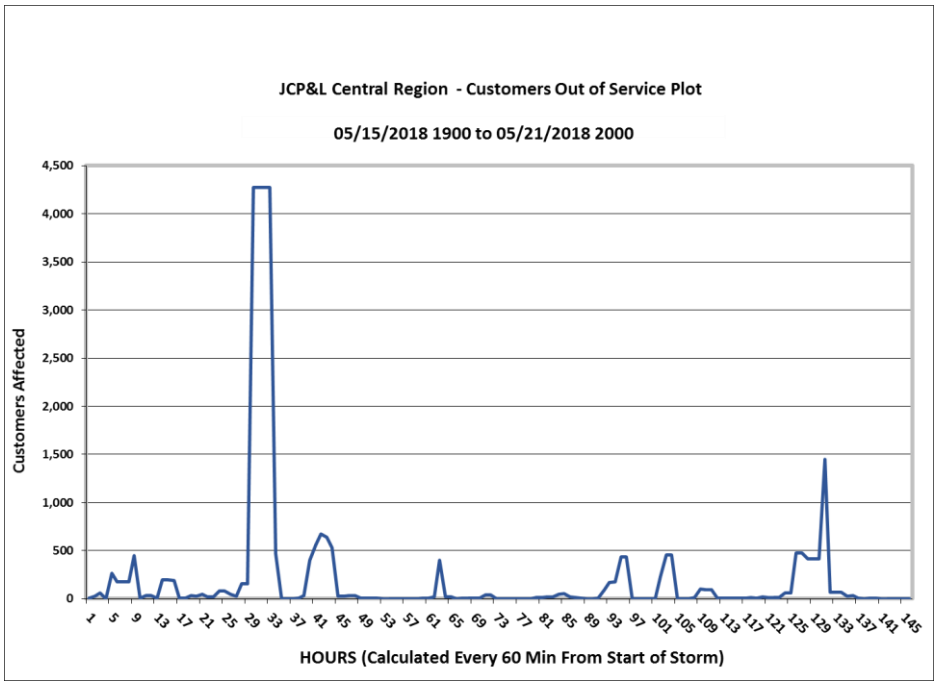
   JCP&L's ECC opened on May 15 at 1230 in preparation for the Storm Event. The ECC closed on May 19 at 1700 with continuing operations turned over to the Company's Distribution Control Center.

2. **The total number of customers out of service over the course of the major event over four-hour intervals, identified by operating area or circuit area. For purposes of this count, the starting time shall be when the storm center opens and the ending time shall be when the storm center closes. Regardless of when the storm center is closed, the EDC shall report the date and time when the last customer affected by a major event is restored;**

   The charts below indicate the outages experienced by JCP&L Northern Region customers during the period of the Storm Event from May 15, 2018 at 1450 – May 20, 2018 at 2330 and May 15, 2018 at 1900 – May 21, 2018 at 2000 for the Central Region. The last customer affected during this Storm Event was restored at 2330 on May 20 in JCP&L's Northern Region.

JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018





JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018

Total Number of Customers Impacted		
Region	**Storm Period**	**Customers**
JCP&L – Northern Region	05/15/2018 1450 to 05/20/2018 2330	149,578
JCP&L - Central Region	05/15/2018 1900 to 05/21/2018 2000	9,471
Total JCP&L		**159,049**

Damaged Equipment in JCP&L During Storm Event			
Damaged Poles	**Damaged Crossarms**	**Damaged Transformers**	**Damaged Wire (feet)**
168	508	168	77,438 (14.67 Miles)

3. The number of trouble locations and classifications;

Total Number of Orders			
Region	**Storm Period**	**Trouble Orders***	**Outage Orders****
JCP&L - North NJ Region	05/15/2018 1450 to 05/20/2018 2330	4,167	1,165
JCP&L - Central NJ Region	05/15/2018 1900 to 05/21/2018 2000	352	112
Total JCP&L		**4,519**	**1,277**

**Trouble orders represent orders in the outage management system where there is a report of some trouble issue in the field. This does not represent locations in the field nor does it represent customers that were out of power because more than one order may pertain to a single location, and multiples of customers may be affected by a single order.*

***Outage orders represent orders in the outage management system where customers are reported out of lights. This does not represent locations in the field because more than one order may pertain to a single location.*

4. The time at which the mutual aid and non-company contractor crews were requested, arrived for duty and were released, and the mutual aid and non-contractor response(s) to the request(s) for assistance;

See the Mutual / Contractor Assistance section above for the time at which mutual assistance and non-company contractor crews were requested, the responses to those requests, and the times mutual assistance and non-company contractor crews began arriving.

5. A timeline profile of the number of company line crews, mutual aid crews, non-company contractor line and tree crews working on restoration activities during the duration of the major event;

Table 1 reflects (i) the number of JCP&L line crews addressing outages that arose in the

JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018

JCP&L service territory during the period of the Storm Event from May 15, 2018 – May 21, 2018, (ii) fifty FirstEnergy affiliated line FTEs, and (iii) 457 contractor line FTEs. This table also reflects the thirty-eight JCP&L Central Region crews (sixty-seven FTEs) that provided mutual assistance to JCP&L Northern Region.

JCP&L Major Event Restoration Summary
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Table 1

JCP&L Line Crews										
		NNJ		CNJ		FE Affiliate	Contractor	Total		
Date	Time	1 Man Crew	2-3 Man Crew	1 Man Crew	2-3 Man Crew	>2 Man Crews	>2 Man Crew	1 Man Crews	>2 Man Crews	Total Crews
5/15/2018	1600	27	31	9	25	0	0	36	56	92
	2000	27	32	29	49	0	0	56	81	137
5/16/2018	0000	24	17	15	41	0	0	39	58	97
	0400	23	13	11	2	0	0	34	15	49
	0800	23	40	11	42	4	6	34	92	126
	1200	23	64	9	28	6	6	32	104	136
	1600	34	68	17	25	7	6	51	106	157
	2000	35	67	14	25	7	6	49	105	154
5/17/2018	0000	28	33	12	24	0	0	40	57	97
	0400	24	11	11	0	0	0	35	11	46
	0800	23	62	7	25	12	27	30	126	156
	1200	23	62	7	25	25	50	30	162	192
	1600	34	70	12	25	25	50	46	170	216
	2000	34	68	10	25	25	57	44	175	219
5/18/2018	0000	28	42	8	24	0	0	36	66	102
	0400	24	12	8	0	0	0	32	12	44
	0800	19	53	7	23	25	70	26	171	197
	1200	18	52	8	23	25	72	26	172	198
	1600	23	57	13	23	25	72	36	177	213
	2000	23	53	10	21	25	72	33	171	204
5/19/2018	0000	18	35	8	20	0	0	26	55	81
	0400	14	10	9	0	0	0	23	10	33
	0800	14	40	6	18	25	72	20	155	175
	1200	14	35	7	18	25	72	21	150	171
	1600	25	44	12	18	25	72	37	159	196
	2000	25	45	9	18	25	72	34	160	194
5/20/2018	0000	21	29	8	17	0	0	29	46	75
	0400	17	7	9	0	0	0	26	7	33
	0800	7	16	4	4	0	42	11	62	73
	1200	7	14	4	0	0	31	11	45	56
	1600	4	12	6	0	0	31	10	43	53
	2000	4	14	4	0	0	31	8	45	53
5/21/2018	0000	2	14	4	0	0	0	6	14	20
	0400	2	3	3	0	0	0	5	3	8
	0800	2	7	1	0	0	31	3	38	41
	1200	2	4	1	0	0	31	3	35	38
	1600	2	3	1	0	0	31	3	34	37
	2000	0	3	1	0	0	31	1	34	35

JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018

Table 2 reflects the number of forestry crews working in the JCP&L service territory during the period of the Storm Event from May 15, 2018 – May 21, 2018.

Table 2

Forestry Contractor Resources				
Date	Time	NNJ Crews	CNJ Crews	Total Crews
5/15/2018	1600	24	18	42
	2000	77	26	103
5/16/2018	0000	100	3	103
	0400	256	3	259
	0800	256	3	259
	1200	256	3	259
	1600	258	1	259
	2000	58	1	59
5/17/2018	0000	58	1	59
	0400	259	0	259
	0800	259	0	259
	1200	259	0	259
	1600	259	0	259
	2000	59	0	59
5/18/2018	0000	59	0	59
	0400	259	0	259
	0800	259	0	259
	1200	217	0	217
	1600	217	0	217
	2000	59	0	59
5/19/2018	0000	59	0	59
	0400	217	0	217
	0800	217	0	217
	1200	217	0	217
	1600	217	0	217
	2000	16	0	16
5/20/2018	0000	16	0	16
	0400	217	0	217
	0800	77	0	77
	1200	16	0	16
	1600	16	0	16
	2000	16	0	16
5/21/2018	0000	4	0	4
	0400	4	0	4
	0800	4	0	4
	1200	0	0	0
	1600	0	0	0
	2000	0	0	0

JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018

6. A timeline profile of the number of company crews sent to an affected operating area to assist in the restoration effort.

See the response to Question No. 5 above for JCP&L Central Region crews that provided mutual assistance to the Northern Region from May 15 at 1900 to May 21 at 2000.

JCP&L Major Event Restoration Summary
May 15, 2018 – May 21, 2018

Appendix A

JCP&L – Total Customers Served

Total customers served in the Northern and Central Regions as well as total customers served by JCP&L.

461,463	Northern
641,419	Central
1,102,882	**Total**

Jersey Central Power & Light
A FirstEnergy Company

Report to the New Jersey Board of Public Utilities

Response to the State of Emergency in Preparation for a Major Winter Storm January 19, 2019

Submitted: February 11, 2019

JCP&L Major Event Report
January 19, 2019

OVERVIEW

On Saturday, January 19, 2019, New Jersey Governor Murphy issued Executive Order No. 50 (attached hereto as Appendix B) declaring a State of Emergency (the "Executive Order"). According to the Executive Order, the National Weather Service forecasted that a major winter storm would impact New Jersey beginning on January 19, 2019, causing hazardous weather throughout the State, including heavy, wet snow, sleet, heavy and freezing rain, ice, bitter cold, sustained high winds, tidal and coastal flooding and main street and river flooding. The Storm Event continued into January 21, 2019, ending at 1730 when the last crew returned to their home service territory and were ready to work.

The Storm Event began to impact the Jersey Central Power & Light ("JCP&L" or the "Company") service territory during the early evening hours on January 19, 2019. The inclement weather impacted JCP&L's Northern Region with snowfall totaling four inches and ice accumulation reaching 0.30 inches in some areas. Also impacting the region were gusty winds that reached approximately forty miles per hour. While snow and ice accumulation in JCP&L's Central Region was not significant, wind gusts reached forty-seven miles per hour. This Storm Event caused outages to approximately 28,314 customers with 15,224 customers affected in the JCP&L Northern Region and 13,090 customers affected in the JCP&L Central Region.

Prior to the onset of the storm, JCP&L Central Region determined that, based on the current forecast, it had sufficient resources to provide mutual assistance to the Northern Region. In total, the Central Region deployed thirty-six line resources to assist the Northern Region with its restoration efforts. Those Central Region crews assembled on January 19, 2019 at 1200 for departure to the Northern Region and assisted with restoration efforts until January 21, 2019 at 1730 when they returned to their home service territory and were ready to work.

Storm Preparation

Storm preparations began on January 16, 2019 when FirstEnergy initiated its first corporate storm call to bring awareness of the potential impact the storm could have on the Company's service area. Corporate storm calls continued daily through January 20, 2019. In addition, JCP&L conducted its own internal storm calls on January 18, 2019 and January 19, 2019. On January 16, 2019, JCP&L updated the Board of Public Utilities ("BPU") Staff with its storm preparations *via* phone. On January 18, 2019, JCP&L took part in a conference call organized by BPU Staff for all New Jersey utilities to discuss storm preparations. JCP&L also participated in two mayor's calls, held on January 19, 2019 at 1600 and January 20, 2019 at 1500.

An Incident Action Plan ("IAP") was initiated on January 17, 2019 as part of the implementation of the Incident Command System ("ICS") structure. The JCP&L Emergency Command Center ("ECC") opened at 0700 on January 20, 2019.

JCP&L proactively notified critical care and well water customers *via* interactive voice recorder messaging on January 17, 2019 in advance of the predicted weather and potential outages.

In advance of the storm, 600 line contractors, 400 forestry contractors, 200 hazard responders and 200 damage assessors were requested to assist JCP&L. JCP&L successfully secured approximately 600 line contractors, 200 forestry contractors, 200 hazard responders and 130 damage assessors, which began arriving on January 18, 2019. The majority of the line contractors came from Michigan; however, some arrived from as far away as Alabama, Florida, Illinois, Kentucky, New York, Ohio and Tennessee. Most of these field resources were

strategically staged across the territory prior to the onset of the storm. The Company also opened a staging site at the Livingston Mall on January 19, 2019 to quickly process, house and feed the expected contractors and to stage materials.

Communications

In preparation of the Storm Event, FirstEnergy issued press releases on January 17th and 18th which provided information on the Company's storm preparation plans and the number and type of resources secured. During the event, customers were able to view real-time outage information and estimated times of restoration ("ETR") through the Company website (firstenergycorp.com). Radio ads and social media advised customers to prepare for potential outages and to report outages if they do occur. JCP&L also responded to media inquiries.

On January 20, 2019, Governor Murphy visited JCP&L's ECC and Distribution Control Center for a brief tour. JCP&L executive leadership shared the storm preparation process, weather status, customer outages and restoration progress.

Major Event Classification

The period of the Storm Event from January 19, 2019 through January 21, 2019 has been classified as a single major event for JCP&L because (consistent with the definition of "major event" in N.J.A.C. 14:5-1.2) Governor Murphy issued Executive Order 50 declaring a State of Emergency for New Jersey in anticipation of a major winter storm forecasted for January 19, 2019. Because the JCP&L Northern Region needed mutual aid from JCP&L's Central Region, which provided assistance from January 19 through January 21 when the Central Region crews returned to their home service territory, the classification of the event as a Major Event is deemed to extend to the JCP&L Central Region during the timeframe when assistance was provided.

INFORMATION REQUIRED PURSUANT TO N.J.A.C. 14:5-8.9

1. **The date and time when the EDC's storm or major event center opened and closed;**

   For the purposes of this report, the Storm Event commenced on January 19, 2019 at 1200 when the State of Emergency was declared by the Governor pursuant to the Executive Order. The Storm Event for Northern Region concluded on January 21, 2019 at 1645 when the last customer affected by the weather was restored. The storm event commenced for Central Region on January 19, 2019 at 1200 when crews assembled for departure to Northern Region where they provided mutual assistance. The Storm Event concluded on January 21, 2019 at 1730 when crews returned to their home service territory.

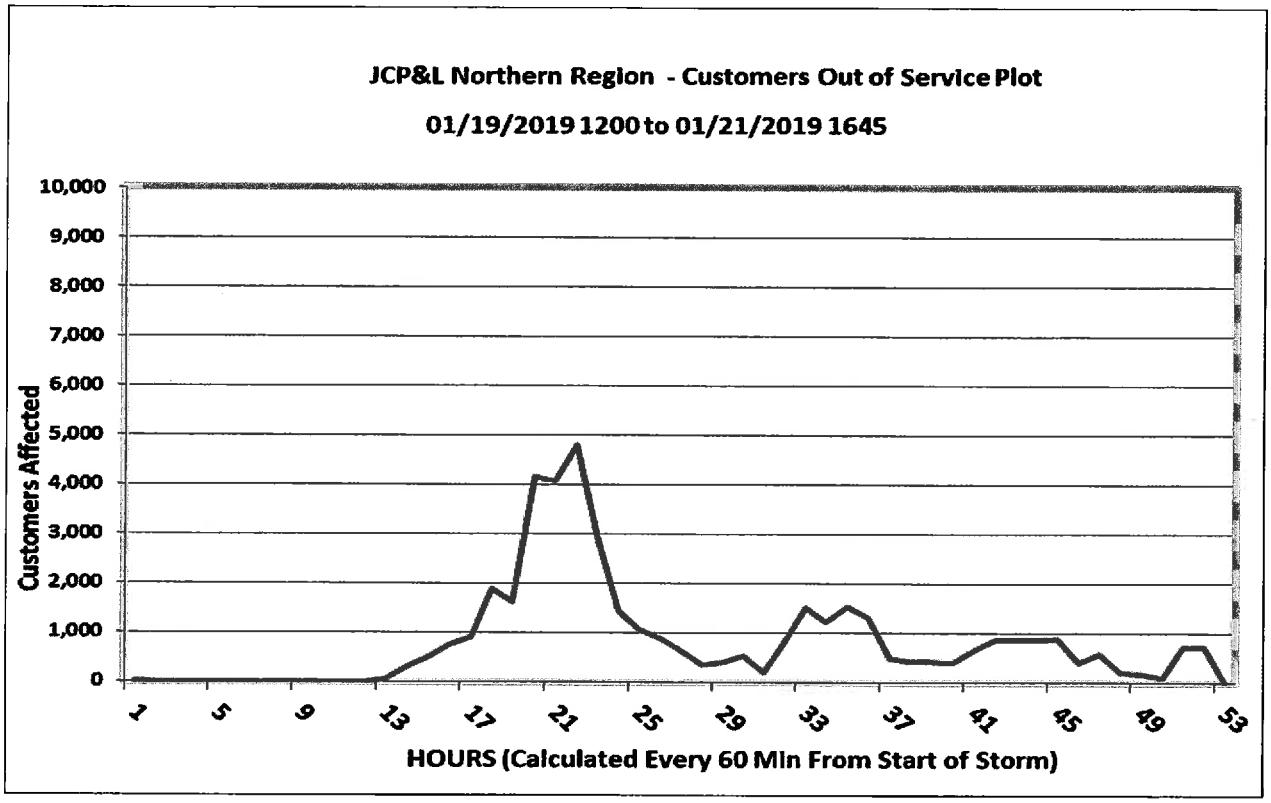
   JCP&L's ECC opened on January 20, 2019 at 0700 to support the Storm Event. The ECC closed at approximately 2300 on January 20, 2019 with continuing operations turned over to the Company's Distribution Control Center.

2. **The total number of customers out of service over the course of the major event over four hour intervals, identified by operating area or circuit area. For purposes of this count, the starting time shall be when the storm center opens and the ending time shall be when the storm center closes. Regardless of when the storm center is**

JCP&L Major Event Report
January 19, 2019

closed, the EDC shall report the date and time when the last customer affected by a major event is restored;

The charts below indicate the outages experienced by JCP&L Northern Region and Central Region customers during the period of the Storm Event that began January 19, 2019 at 1200. The last customer affected by this Storm Event was restored in the Northern Region on January 21, 2019 at 1645.



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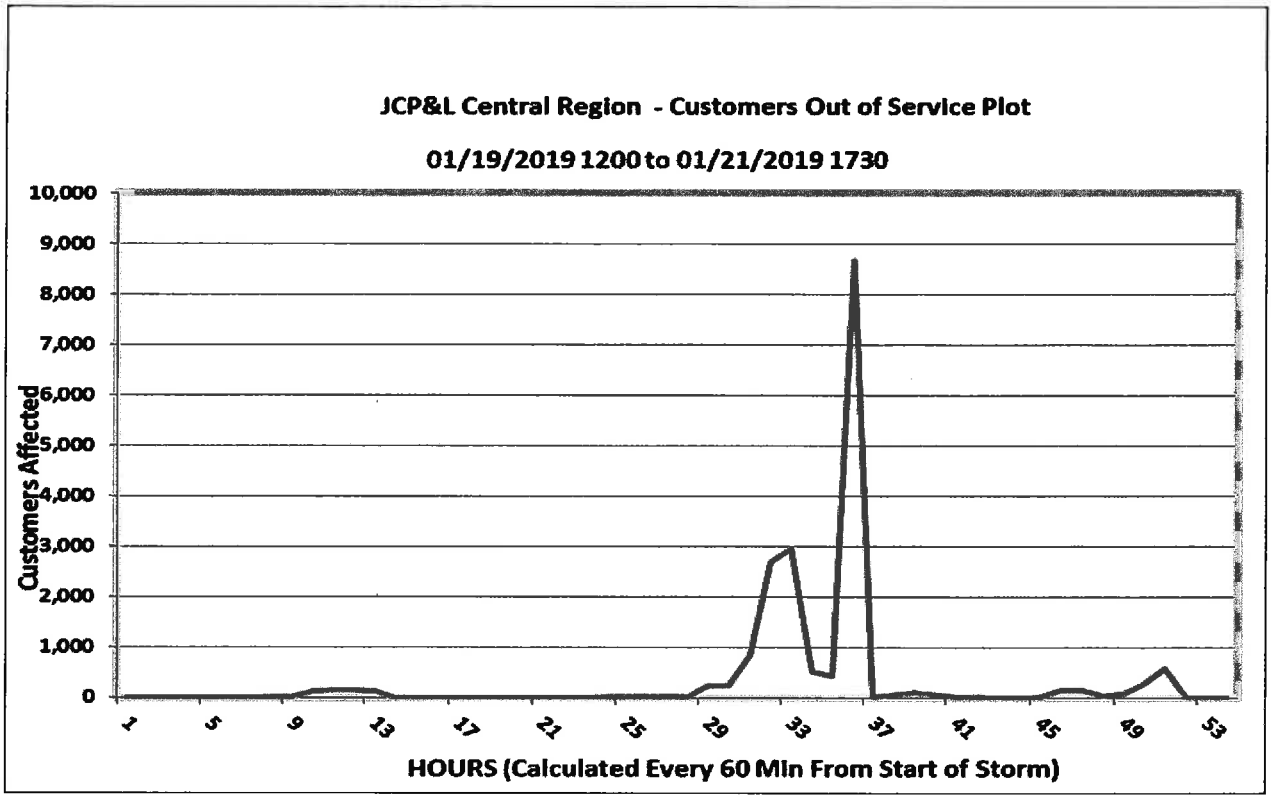

Total Number of Customers Impacted 1/19/2019 1200 – 1/21/2019 1730		
Region	**Storm Period**	**Customers**
JCP&L - Northern Region	1/19/19 1200 to 1/21/2019 1645	15,224
JCP&L - Central Region	1/19/19 1200 to 1/21/2019 1730	13,090
Total JCP&L		28,314

3. The number of trouble locations and classifications;

Total Number of Orders 1/19/2019 1200 – 1/21/2019 1730			
Region	**Storm Period**	**Trouble Orders***	**Outage Orders****
JCP&L - Northern Region	1/19/19 1200 to 1/21/2019 1645	266	144
JCP&L - Central Region	1/19/19 1200 to 1/21/2019 1730	103	62
Total JCP&L		369	206

JCP&L Major Event Report
January 19, 2019

**Trouble orders represent orders in the outage management system where there is a report of some trouble issue in the field. This does not represent locations in the field nor does it represent customers that were out of power because more than one order may pertain to a single location, and multiples of customers may be affected by a single order.*

***Outage orders represent orders in the outage management system where customers are reported out of lights. This does not represent locations in the field because more than one order may pertain to a single location.*

4. The time at which the mutual aid and non-company contractor crews were requested, arrived for duty and were released, and the mutual aid and non-contractor response(s) to the request(s) for assistance;

See the Storm Preparation section above for the time at which non-company contractor resources were requested and the time those crews began arriving. Mutual assistance was provided to JCP&L Northern Region by JCP&L Central Region, which was comprised of thirty-six line resources beginning on January 19, 2019 at 1200, who returned to their home service territory at 1730 on January 21, 2019.

5. A timeline profile of the number of company line crews, mutual aid crews, non-company contractor line and tree crews working on restoration activities during the duration of the major event;

Table 1 reflects the number of line crews addressing outages that arose in the JCP&L service territory during the period of the Storm Event from January 19, 2019 at 1200 to January 21, 2019 at 1730.

Table 1

Line Crews									
		NNJ		CNJ		Contractor	Total		
Date	Time	1 Man Crew	2-3 Man Crew	1 Man Crew	2-3 Man Crew	>2 Man Crew	1 Man Crews	>2 Man Crews	Total Crews
1/19/2019	1200	51	23	95	17	136	146	176	322
	1600	47	23	89	16	136	136	175	311
	2000	46	19	86	17	136	132	172	304
1/20/2019	0000	21	4	26	3	136	47	143	190
	0400	22	4	24	3	136	46	143	189
	0800	57	19	67	10	136	124	165	289
	1200	58	26	92	16	62	150	104	254
	1600	53	25	79	19	62	132	106	238
	2000	55	26	76	20	62	131	108	239
1/21/2019	0000	28	4	23	4	62	51	70	121
	0400	24	4	21	4	62	45	70	115
	0800	40	25	32	35	62	72	122	194

JCP&L Major Event Report
January 19, 2019

Line Crews									
		NNJ		CNJ		Contractor	Total		
	1200	47	29	41	47	15	88	91	179
	1600	43	28	23	30	15	66	73	139

Table 2 reflects the number of forestry crews working in the JCP&L service territory during the period of the Storm Event from January 19, 2019 at 1200 to January 21, 2019 at 1730.

Table 2

Forestry Contractor Resources				
Date	Time	NNJ Crews	CNJ Crews	Total Crews
1/19/2019	1200	0	0	0
	1600	18	18	36
	2000	18	18	36
1/20/2019	0000	18	18	36
	0400	18	18	36
	0800	97	39	136
	1200	87	39	126
	1600	40	12	52
	2000	18	12	30
1/21/2019	0000	18	12	30
	0400	18	12	30
	0800	41	33	74
	1200	23	33	56
	1600	5	5	10

6. A timeline profile of the number of company crews sent to an affected operating area to assist in the restoration effort.

See the response to Question No. 5 above for crews working in the JCP&L service territory during this Storm Event.

JCP&L Major Event Report
January 19, 2019

Appendix A

JCP&L – Total Customers Served

Total customers served in JCP&L's Northern and Central Regions as well as total customers served by JCP&L.

461,463	Northern
641,419	Central
1,102,882	Total

EXECUTIVE ORDER NO. 50

WHEREAS, beginning Saturday, January 19, 2019, the State of New Jersey is expected to experience a major winter storm causing hazardous weather conditions including heavy and wet snow, sleet, heavy and freezing rain, ice, bitter cold, sustained high winds, tidal and coastal flooding, and main stream and river flooding; and

WHEREAS, the National Weather Service has issued storm warnings for a substantial portion of the State, including a Winter Storm Warning for the northern portion of New Jersey, and a Winter Storm Watch throughout central New Jersey; and

WHEREAS, this severe winter storm is expected to produce hazardous travel conditions across the State due to heavy snowfall, ice accumulations, and reductions in visibility; and

WHEREAS, this major winter storm may cause downed power lines and trees, resulting in power outages, and is expected to impede the normal operation of public and private entities; and

WHEREAS, these severe weather conditions may make it difficult or impossible for citizens to obtain the necessities of life, as well as essential services such as police, fire, and first aid; and

WHEREAS, this impending major winter storm constitutes an imminent hazard that threatens and presently endangers the health, safety, and resources of the residents of the State; and

WHEREAS, this situation may become too large in scope to be handled in its entirety by the normal county and municipal operating services in some parts of this State, and this situation may spread to other parts of the State; and

WHEREAS, the Constitution and statutes of the State of New Jersey, particularly the provisions of N.J.S.A. App.A: 9-33 et seq., N.J.S.A. 38A:3-6.1, and N.J.S.A. 38A:2-4 and all amendments and supplements thereto, confer upon the Governor of the State of

New Jersey certain emergency powers;

NOW, THEREFORE, I, PHILIP D. MURPHY, Governor of the State of New Jersey, in order to protect the health, safety, and welfare of the people of the State of New Jersey DO DECLARE and PROCLAIM that a State of Emergency exists throughout the State of New Jersey, effective at 12:00 p.m., Eastern Standard Time, on January 19, 2019; and I hereby ORDER and DIRECT the following:

1. I authorize and empower the State Director of Emergency Management, who is the Superintendent of State Police, to implement the State Emergency Operations Plan and to direct the activation of county and municipal emergency operations plans, as necessary, and to coordinate the recovery effort from this emergency with all governmental agencies, volunteer organizations, and the private sector.

2. I authorize and empower, in accordance with N.J.S.A. App. A:9-33, et seq., as supplemented and amended, the State Director of Emergency Management, who is the Superintendent of State Police, through the police agencies under his control, to determine and control the direction of the flow of vehicular traffic on any State or interstate highway, municipal or county road, and any access road, including the right to detour, reroute, or divert any or all traffic and to prevent ingress or egress from any area that, in the State Director's discretion, is deemed necessary for the protection of the health, safety, and welfare of the public, and to remove parked or abandoned vehicles from such roadways as conditions warrant.

3. I authorize and empower the Attorney General, pursuant to the provisions of N.J.S.A. 39:4-213, acting through the Superintendent of State Police, to determine and control the direction of the flow of vehicular traffic on any State or

interstate highway, municipal or county road, and any access road, including the right to detour, reroute, or divert any or all traffic, to prevent ingress or egress, and to determine the type of vehicle or vehicles to be operated on such roadways. I further authorize all law enforcement officers to enforce any such order of the Attorney General or Superintendent of State Police within their respective municipalities.

4. I authorize and empower the State Director of Emergency Management to order the evacuation of all persons, except for those emergency and governmental personnel whose presence the State Director deems necessary, from any area where their continued presence would present a danger to their health, safety, or welfare because of the conditions created by this emergency.

5. I authorize and empower the State Director of Emergency Management to utilize all facilities owned, rented, operated, and maintained by the State of New Jersey to house and shelter persons who may need to be evacuated from a residence, dwelling, building, structure, or vehicle during the course of this emergency.

6. I authorize and empower the executive head of any agency or instrumentality of the State government with authority to promulgate rules to waive, suspend, or modify any existing rule, where the enforcement of which would be detrimental to the public welfare during this emergency, notwithstanding the provisions of the Administrative Procedure Act or any law to the contrary for the duration of this Executive Order, subject to my prior approval and in consultation with the State Director of Emergency Management. Any such waiver, modification, or suspension shall be promulgated in accordance with N.J.S.A. App.A:9-45.

7. I authorize and empower the Adjutant General, in accordance with N.J.S.A. 38A:2-4 and N.J.S.A. 38A:3-6.1, to order

to active duty such members of the New Jersey National Guard who, in the Adjutant General's judgment, are necessary to provide aid to those localities where there is a threat or danger to the public health, safety, and welfare and to authorize the employment of any supporting vehicles, equipment, communications, or supplies as may be necessary to support the members so ordered.

8. In accordance with the N.J.S.A. App.A:9-34 and N.J.S.A. App.A:9-51, I reserve the right to utilize and employ all available resources of the State government and of each and every political subdivision of the State, whether of persons, properties, or instrumentalities, and to commandeer and utilize any personal services and any privately-owned property necessary to protect against this emergency.

9. In accordance with N.J.S.A. App. A:9-40, no municipality, county, or any other agency or political subdivision of this State shall enact or enforce any order, rule, regulation, ordinance, or resolution which will or might in any way conflict with any of the provisions of this Order, or which will in any way interfere with or impede the achievement of the purposes of this Order.

10. It shall be the duty of every person or entity in this State or doing business in this State and of the members of the governing body and every official, employee, or agent of every political subdivision in this State and of each member of all other governmental bodies, agencies, and authorities in this State of any nature whatsoever, to cooperate fully with the State Director of Emergency Management in all matters concerning this state of emergency.

11. In accordance with N.J.S.A. App. A:9-34, N.J.S.A. App. A:9-40.6, and N.J.S.A. 40A:14-156.4, no municipality or public or

semipublic agency shall send public works, fire, police, emergency medical, or other personnel or equipment into any non-contiguous disaster-stricken municipality within this State, nor to any disaster-stricken municipality outside this State, unless and until such aid has been directed by the county emergency management coordinator or his deputies in consultation with the State Director of Emergency Management.

12. This Order shall take effect at 12:00 p.m., Eastern Standard Time, on January 19, 2019, and shall remain in effect until such time as it is determined by me that an emergency no longer exists.

GIVEN, under my hand and seal this 18th day of January, Two Thousand and Nineteen, and of the Independence of the United States, the Two Hundred and Forty-Third.

[seal]

/s/ Philip D. Murphy

Governor

Attest:

/s/ Parimal Garg

Deputy Chief Counsel to the Governor

Jersey Central Power & Light
A FirstEnergy Company

Report to the New Jersey Board of Public Utilities

Response to Weather Events and Response to JCP&L Request for Mutual Assistance October 31, 2019 – November 4, 2019

Submitted: November 26, 2019

JCP&L Major Event Report
October 31, 2019 – November 4, 2019

OVERVIEW

This Major Event report covers a strong storm system caused by an incoming cold front that affected the Jersey Central Power & Light Company ("JCP&L" or "Company") service territory during the period of October 31, 2019 to November 4, 2019. In total, this event, as described below (hereinafter defined as the "Storm Event"), affected approximately 59,635 customers, with 48,650 outages in the JCP&L Northern Region and 10,985 outages in the JCP&L Central Region.

On October 31 at approximately 0000, the JCP&L service territory began to experience outages due to a strong storm system, which produced locally heavy rain of up to two inches and wind gusts of nearly forty miles per hour in some areas. The cold front which followed, resulted in more damaging winds with some very localized areas experiencing wind speeds of approximately one hundred miles per hour. On November 1 at approximately 0023, an EF1[1] tornado touched down in Morris County, New Jersey. Additionally, on November 1 at approximately 0104, straight line winds with an estimated maximum speed of 100 miles per hour caused damage to several wooden utility poles in Wall Township in Monmouth County, New Jersey.

On October 31, 2019, the Northern Region requested mutual assistance to restore customers. After considering its current outages, resources, and the current forecast, the Central Region determined it had sufficient resources to provide mutual assistance to the Northern Region. On Friday, November 1, 2019 at 1100, eleven Central Region line workers assembled for deployment to assist the Northern Region. On Saturday, November 2, twenty-four more Central Region line workers deployed for the Northern Region to provide assistance. All thirty-five Central Region line workers provided assistance until they were released and returned ready to work in their home territory at 0700 on November 4, 2019. Furthermore, 158 onsite and off-site line contractors from six companies provided assistance beginning on October 31.

JCP&L worked alongside county officials on restoring approximately thirteen schools and forty-three road closures impacted by this Storm Event. This Storm Event required the issuance[2] of 158 crossarms, 53 poles, 62 transformers, and 17,746 feet (3.36 miles) of wire and cable.

Storm Preparation

In preparation for this Storm Event, JCP&L closely monitored advance weather forecasts (provided by FirstEnergy Meteorological Services). On October 30 and October 31, 2019, critical care and well water customers were notified in advance of this Storm Event via Interactive Voice Response messaging. On October 31, 2019, flood mitigation measures were implemented at multiple substations across the JCP&L service territory.

JCP&L's Incident Command System ("ICS") is always operational and on October 31, 2019, in response to the impact of the Storm Event, the Incident Commander elected to expand the then current level of ICS to include additional storm response functions. An Incident Action Plan was also initiated. Additionally, JCP&L held internal conference calls from October 31, 2019 through November 1, 2019.

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[1] Enhanced Fugita scale

[2] Note that these totals reflect the counts of equipment issued from JCP&L's stores facilities and were not necessarily all installed in the field.

JCP&L Major Event Report
October 31, 2019 – November 4, 2019

Communications

On October 30, 2019, JCP&L provided an update on its storm preparations to the New Jersey Board of Public Utilities. Social media such as Twitter and Facebook were activated and regularly updated throughout the Storm Event beginning on October 31. JCP&L proactively communicated with local officials and sent storm and restoration updates via email blasts. The Company released a news release on November 1 focusing primarily on the status of storm restoration efforts, how customers could report outages and safety information. Company representatives also responded to one media inquiry from a television reporter.

Customers were able to view real-time outage information and estimated times of restoration ("ETR") through the Company website (firstenergycorp.com). FirstEnergy's *"24-7 PowerCenter"* website application was utilized throughout this Storm Event to display ETR status updates alongside confirmed outage cases. FirstEnergy's "My Town" website application was populated to display critical outage-related information specific to individual communities.

On November 2, the Company activated a total of twenty-eight water and ice locations for customers experiencing outages. Twenty-seven locations were activated throughout Somerset, Union, Morris, Essex, Hunterdon, Warren and Sussex Counties in the Northern Region and one location was activated in Monmouth County in the Central Region. Communication was made to the public via social media.

Major Event Classification

The period of October 31, 2019 through November 3, 2019 is classified as a major event for the Northern Region since (consistent with the definition of "major event" in N.J.A.C. 14:5-1.2) the outages caused by the Storm Event affected 48,650, or 10.5%, of customers (see Appendix B for total customers served).

Additionally, the period of November 1, 2019 through November 4, 2019 is classified as a major event for the Central Region since (consistent with the definition of "major event" in N.J.A.C. 14:5-1.2) field resources from the Central Region provided assistance to the Northern Region for purposes of outage restoration during the Storm Event.

INFORMATION REQUIRED PURSUANT TO N.J.A.C. 14:5-8.9

1. **The date and time when the EDC's storm or major event center opened and closed;**

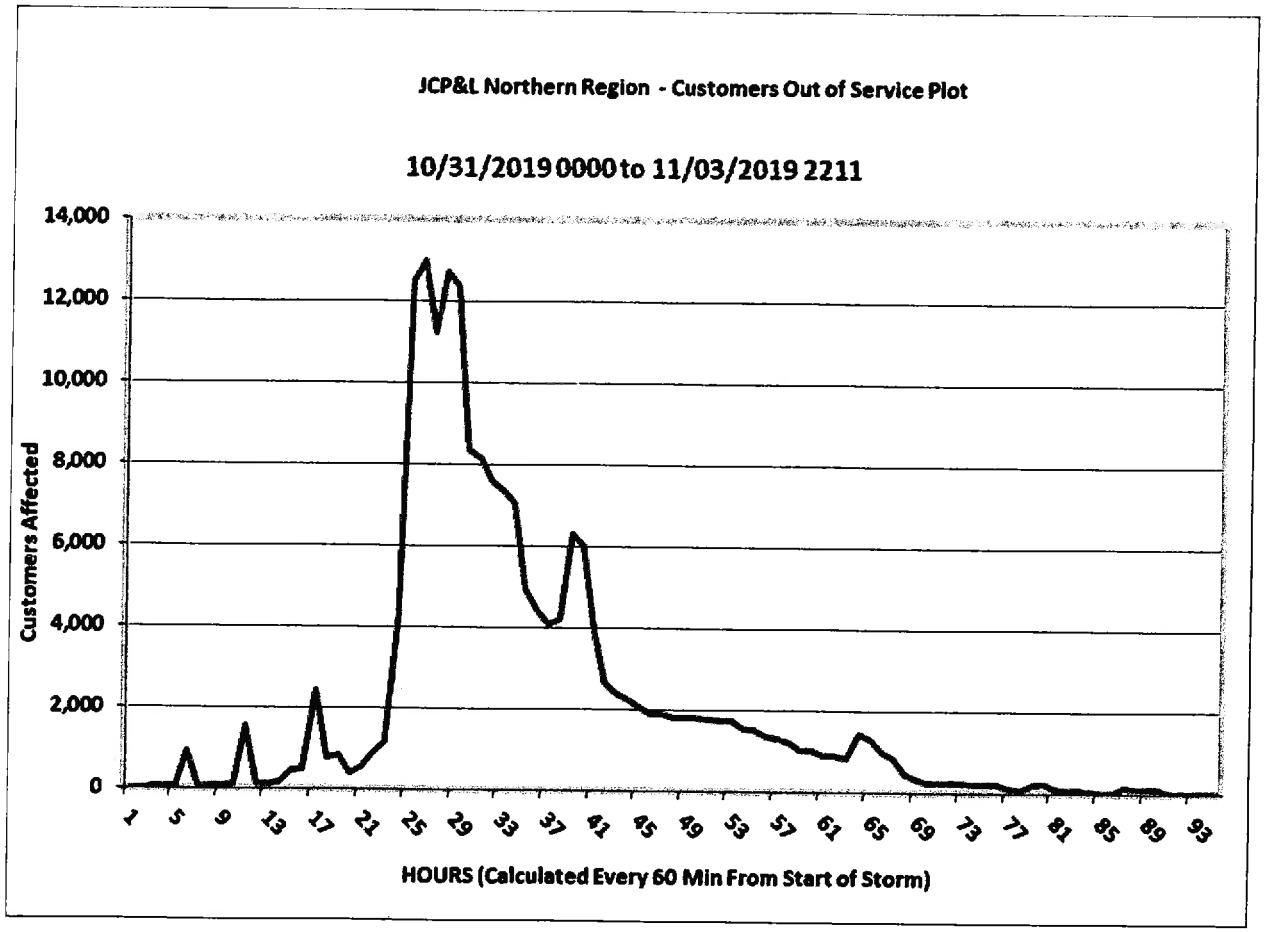
   For the purposes of this report, the Storm Event commenced on October 31, 2019 at 0000 when rain and wind initially moved across New Jersey causing outages. On October 31, the Company's Distribution Control Center ("DCC") acted as the storm center. However, JCP&L's Emergency Control Center ("ECC") opened on November 1 at 0800. The ECC remained open through the Storm Event, closing on November 1 at 2300 with continuing operations turned over to the Company's DCC. This Storm Event concluded when Central Region crews returned to their home service territory and were ready to work on November 4, 2019 at 0700.

2. **The total number of customers out of service over the course of the major event over four-hour intervals, identified by operating area or circuit area. For purposes of this count, the starting time shall be when the storm center opens and the ending time shall be when the storm center closes. Regardless of when the storm**

JCP&L Major Event Report
October 31, 2019 – November 4, 2019

center is closed, the EDC shall report the date and time when the last customer affected by a major event is restored;

The charts below indicate the outages experienced by JCP&L customers during the period of the Storm Event from October 31, 2019 at 0000 to November 3, 2019 at 2211 for the Northern Region and November 1, 2019 at 1100 to November 4, 2019 at 0700 for the Central Region. The last customer affected during this Storm Event was restored on November 3, 2019 at 2211 in the Northern Region.



JCP&L Major Event Report
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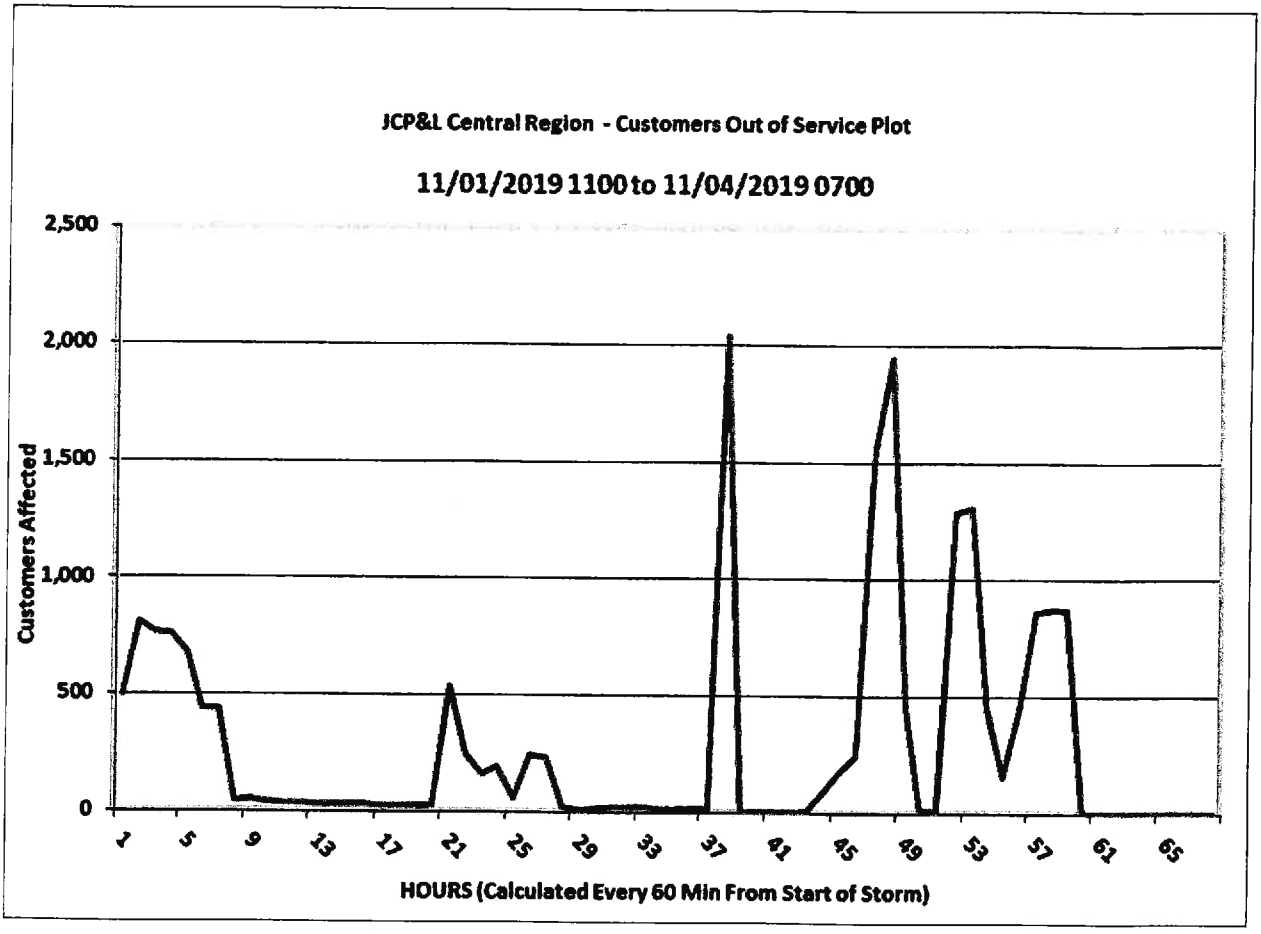

Total Number of Customers Impacted 10/31/2019 0000 – 11/04/2019 0700		
Region	**Storm Period**	**Customers**
JCP&L - Northern Region	10/31/2019 0000 to 11/03/2019 2211	48,650
JCP&L - Central Region	11/01/2019 1100 to 11/04/2019 0700	10,985
Total JCP&L		59,635

3. The number of trouble locations and classifications;

Total Number of Orders 10/31/2019 0000 – 11/04/2019 0700			
Region	**Storm Period**	**Trouble Orders***	**Outage Orders****
JCP&L - Northern Region	10/31/2019 0000 to 11/03/2019 2211	1,363	539
JCP&L - Central Region	11/01/2019 1100 to 11/04/2019 0700	337	89
Total JCP&L		1,700	628

**Trouble orders represent orders in the outage management system where there is a report of some trouble issue in the field. This does not represent locations in the field nor does it represent customers that were out of power because more than one order may pertain to a single location, and multiples of customers may be affected by a single order.*

***Outage orders represent orders in the outage management system where customers are reported out of lights. This does not represent locations in the field because more than one order may pertain to a single location.*

4. **The time at which the mutual aid and non-company contractor crews were requested, arrived for duty and were released, and the mutual aid and non-contractor response(s) to the request(s) for assistance;**

   Mutual assistance was provided by JCP&L, which was comprised of thirty-five Central Region line resources, to JCP&L's Northern Region on November 1, 2019 at 1100. The Central Region crews returned to their home service territory and were ready to work on November 4, 2019 at 0700.

   See also the Summary section, above, for the time at which mutual aid and non-company contractor crews were requested, the responses to those requests, and the times mutual aid and non-company contractor crews began arriving.

5. **A timeline profile of the number of company line crews, mutual aid crews, non-company contractor line and tree crews working on restoration activities during the duration of the major event;**

   Table 1 reflects the number of JCP&L line crews addressing outages that arose in the JCP&L service territory during the period of the Storm Event from October 31, 2019 to November 4, 2019. This table also reflects the thirty-five Central Region FTEs that provided mutual assistance to the Northern Region for the time period of November 1 to November 4.

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Table 1

		JCP&L Line Crews								
		NNJ		CNJ		FE Affiliate	Contractor	Total		
Date	Time	1 Man Crew	2-3 Man Crew	1 Man Crew	2-3 Man Crew	>2 Man Crews	>2 Man Crew	1 Man Crews	>2 Man Crews	Total Crews
10/31/2019	0000	13	2	22	2	0	0	35	4	39
	0400	10	2	25	2	0	0	35	4	39
	0800	22	23	35	29	0	0	57	52	109
	1200	26	32	37	39	0	0	63	71	134
	1600	29	19	41	19	0	1	70	39	109
	2000	34	20	52	23	0	15	86	58	144
11/1/2019	0000	28	4	42	10	0	15	70	29	99
	0400	30	6	39	10	0	15	69	31	100
	0800	32	27	44	21	0	16	76	64	140
	1200	33	30	56	32	0	16	89	78	167
	1600	21	23	38	22	0	22	59	67	126
	2000	22	23	47	22	0	22	69	67	136
11/2/2019	0000	25	3	28	7	0	22	53	32	85
	0400	29	5	32	6	0	24	61	35	96
	0800	38	10	40	6	0	27	78	43	121
	1200	45	19	63	11	0	28	108	58	166
	1600	32	15	51	7	0	31	83	53	136
	2000	32	14	53	7	0	30	85	51	136
11/3/2019	0000	19	2	32	2	0	30	51	34	85
	0400	25	2	33	3	0	30	58	35	93
	0800	47	1	44	7	0	30	91	38	129
	1200	51	15	55	15	0	30	106	60	166
	1600	34	13	40	14	0	30	74	57	131
	2000	34	13	46	12	0	23	80	48	128
11/4/2019	0000	18	1	25	2	0	6	43	9	52
	0400	21	1	25	2	0	6	46	9	55

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Table 2 reflects the number of forestry crews working in the JCP&L service territory during the period of the Storm Event from October 31, 2019 to November 4, 2019.

Table 2

Forestry Contractor Resources				
Date	Time	NNJ Crews	CNJ Crews	Total Crews
10/31/2019	0000	0	0	0
	0400	0	0	0
	0800	73	40	113
	1200	73	40	113
	1600	73	40	113
	2000	6	6	12
11/1/2019	0000	24	18	42
	0400	24	18	42
	0800	104	62	166
	1200	104	62	166
	1600	80	43	123
	2000	80	43	123
11/2/2019	0000	20	18	38
	0400	20	18	38
	0800	95	41	136
	1200	95	41	136
	1600	76	29	105
	2000	76	29	105
11/3/2019	0000	6	2	8
	0400	6	2	8
	0800	6	2	8
	1200	6	2	8
	1600	6	2	8
	2000	6	2	8
11/4/2019	0000	2	0	2
	0400	2	0	2

6. A timeline profile of the number of company crews sent to an affected operating area to assist in the restoration effort.

See the response to Question No. 5 above for crews working in the JCP&L service territory during this Storm Event.

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Appendix A

JCP&L – Total Customers Served

Total customers served in JCP&L's Northern and Central Regions as well as total customers served by JCP&L.

462,443	Northern
650,486	Central
1,112,929	Total

Regional Mutual Assistance Groups: A Primer

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NARUC Grants & Research

NARUC

The National Association of Regulatory Utility Commissioners

November 2015

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Appendix D

Acknowledgements and Disclaimers

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Christopher Villarreal, *Minnesota Public Utilities Commission*
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Executive Summary

Electric utilities across the country have been providing mutual aid to each other during emergencies for years. One strategy for communicating and coordinating information as well as tangible resources needed on a wider scale is to use regional mutual assistance groups (RMAGs). This paper explains what an RMAG is, identifies some of the reasons why they are a central mechanism for assuring electric grid reliability and resilience of the power system, and offers suggestions for how we can take a great idea and make it even stronger and better.

For regulators who haven't had very much experience with mutual assistance, this paper may help explain why it's an important grid reliability tool; for those who have extensive exposure to RMAGs, this might help catalyze discussion on ways to address larger-scale emergencies, how to coordinate better across jurisdictions, and how mutual assistance may be used to address less-understood threats like cyberattacks or large-scale acts of terrorism.

The paper begins by defining mutual assistance, explaining how mutual assistance works, and why it is needed. Next, the steps in the order of restoration are explained. This is followed by examples of mutual assistance when severe events occur. Thereafter, the process for how requests for assistance are initiated and carried out is covered. Then, an explanation is provided for RMAGs including how it works on a regional basis in various parts of the U.S. for both investor owned utilities and public power utilities, and commonly shared resources. Next, NARUC workshops on mutual assistance that explored how we value mutual assistance as a part of a portfolio of resilience, reliability, and infrastructure protection investments, is discussed. Scenarios in these workshops highlight the strengths and weaknesses of the policies that underlie and promote mutual assistance. Conclusions that came out of these workshops reflect the questions and concerns facing regulators with regard to mutual assistance. The benefits and obstacles to mutual assistance, which draw from the workshops as well as conversations with utility companies and state PUCs, are then explained. Lastly, various strategies and programs that have worked well in mutual aid agreements between utilities are covered. These programs can enhance resilience of the electric power system and can be utilized to request equipment and labor for events including but not limited to cyber attacks, physical attacks, electromagnetic pulse events, and severe weather events.

One area that has become clear is that the range of risks is far too broad for case-by-case preparation to prevent every possible eventuality. Commissions and companies must manage a broad range of risks to prioritize high impact events that have the worst combination of vulnerability, likelihood, threats, and consequence. A primary tool that helps implement corrective measures to almost any kind of hazard is mutual assistance. There may be areas – such as cybersecurity – where shared preparedness and response may be underexplored. This paper explores ways that State Commissions can take this cornerstone of grid resilience and continue to nourish and improve it.

Introduction

The power sector in the United States is subjected to the recurring threat of hurricanes, superstorms, wildfires, winter weather, accidents, attacks, earthquakes and the occasional disgruntled pickup truck owner. From 2008 to 2012, weather-related power outages cost the economy as much as $200 billion.[1] Yet the restoration efforts in the United States are the envy of the world after power is disrupted. This is accomplished through the principle of "strength in numbers".

In the worst and most widespread outages, one company may not have the skilled people, trucks, equipment, experts, and data to get lights back on all by itself. The power system is an interconnected network and restoring service to the grid goes faster when utilities can share resources to make the necessary repairs and replace specialized electrical equipment among other things. Utilities address these resource constraints by using "mutual aid" or "mutual assistance" programs that allow companies to pool resources to meet their shared needs during emergency events.

Mutual assistance refers to voluntary partnerships among utilities in the same region, where utilities can get help from other utilities in the same mutual assistance network. Utilities may also belong to two or more regional networks. Partnerships such as these save utilities from having to keep large numbers of emergency crews on staff all the time. Generally, the items that are shared include utility employees and contractors, specialized equipment, supplies, and information.[2]

Utility restoration workers are often from neighboring or nearby utilities, but as the power system becomes more interconnected and there are a bigger set of response events, a wider net is cast when utilities activate these mutual assistance networks. Today, restoration crews often travel long distances - sometimes hundreds of miles like in the cases of Hurricanes Katrina and Sandy - to help the requesting utility rebuild power lines, repair or replace other damaged infrastructure, and to provide logistical support to the restoration workers. Mutual assistance partnerships streamline the process for utilities to use to request support from other utilities near and far, which they have agreements with.

If you have ever personally experienced a broad-area outage, you may have seen utility lineworker crews and bucket trucks from companies other than your home utility working on restoration, or lined up in convoys on the highway travelling to help their neighbors. It's not just crews however – some of the other commonly shared items[3] are distribution and transmission equipment including transformers and substations, specialized workers (tree trimming crews, damage assessors, logistics managers), and other experts such as engineering supervisors and hydraulic technicians. Additional items include shelter, food, poles, mobile transformers and generators, communications gear, and other support infrastructure. Utilities also engage in sharing outage and restoration information during emergencies.

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[1] Ernest Moniz "Energy Infrastructure Needs Our Attention." Houston Chronicle, April 2015, http://www.pressreader.com/usa/houston-chronicle/20150506/282553016801822/TextView.

[2] Edison Electric Institute, "Understanding the Electric Power Industry's Response and Restoration process." May 2014, pg. 2, http://www.eei.org/issuesandpolicy/electricreliability/mutualassistance/Documents/MA_101FINAL.pdf.

[3] Aaron Strickland, Georgia Power/Southern Company, Personal Interview, July 2015; Curtis Pohl, Northwestern Energy, Personal Interview, August 2015.

Public Utility Commissioners are not emergency managers. Nevertheless, the State Commission role in cost recovery and prudency reviews of restoration costs are a central element – without PUC approval, mutual assistance (or its alternatives) cannot be enacted. Reliable service is at the heart of a Commission's oversight role, and mutual assistance is an indispensable tool for assuring that. Many PUCs conduct after action reviews to identify problems and help improve utility response after a major event. Finally, PUCs can also play a vitally important proactive role in motivating and nurturing mutual aid by asking the utilities questions about their practices, and by supporting their efforts with political stakeholders.

NARUC's staff used several sources in writing this paper. In addition to internet sources, NARUC staff spoke with a number of experts at the utilities and at the utility commissions (acknowledged in our acknowledgements section). In 2014-2015, NARUC also ran a series of six workshops geared at determining what issues exist that create potential policy obstacles and opportunities for improving mutual assistance. These workshops took place in multiple regions and reached a number of partners. The workshops used a highly interactive format that engaged teams of regulators, utility officials, emergency managers, and others in problem-solving scenarios that explored how we value mutual assistance as a part of a portfolio of resilience, reliability, and infrastructure protection investments. The scenarios were designed to highlight strengths and weaknesses of the policies that underpin and support mutual assistance and generally focused on a combination of weather events and man-made hazards. Using the feedback from participants in these workshops, NARUC extrapolated a number of conclusions that reflect the questions and concerns facing regulators in the arena of mutual assistance. We used the experience of running these workshops extensively in understanding the regulatory interface with mutual assistance: what works, what doesn't, and what regulators can do about it.

How We Restore Power After A Disruptive Event

Before discussing how working together affects power restoration, it's worth taking a quick look at the order of restoration. As with all stories, this one has a beginning, middle, and end.

Pre-Event: Before the event, companies are gathering information about system operating conditions and sharing it. Some events aren't predictable. Earthquakes, physical and cyberattacks, accidents, and other human-influenced events give little warning. Other disasters give some lead-time. Hurricanes, wildfires, storms and floods are often discretely predictable with some lead-time, and in a broader way occur with a statistical regularity that supports planning for them. Agencies like the National Weather Service, the US Forest Service, the US Army Corps of Engineers, US Department of Homeland Security, Federal Bureau of Investigation, and the US Department of Energy can play a supportive role in communicating impending threats, and associations like the Edison Electric Institute (EEI), American Public Power Association (APPA), and NARUC can help disseminate that information.

Communication and coordination between utilities and state or local emergency operations centers is necessary for determining restoration priorities.[4] This effort should start by identifying those with key communications and IT components that are critical to the continuation of essential services in an emergency. Emergency managers also specify any procedures to be followed in the hours preceding a storm to protect records. They develop a team that will take action during and following an emergency. (This task must clearly define employee roles and responsibilities and establish a chain of command for operational functions and maintenance of communications infrastructure and IT services.) They develop employee contact lists that include office telephone numbers, work cell phone and other contact numbers, and office email addresses.[5] Examples of preparatory measures taken before an emergency include pre-staging of equipment and personnel, locating places for them to sleep, stocking food and water, making plans to save lives and to help response and rescue operations, and determining how to assure medical care, public safety, and other services.

During the event: While an event is occurring, power companies are managing a long task list of assessing, identifying, prioritizing, and repairing systems from those that enable the most customers to receive restored power to those that serve the fewest (although exceptions are made to prioritize key systems like hospitals, public safety, national security, and other critical social functions). Responding to an event requires help from specialized workers with training. Using mutual assistance means utilities can count on adequately trained crews of high competence. Restoration work is not only difficult but also complicated. It requires utility equipment knowledge as well as the knowledge to assess outages, prioritize them, and manage the logistics of restoration. This is a big job. A great deal of information sharing is required that is only possible through mutual assistance. Crews must also be supported during the event. They need food, water, shelter, medical care, and other essentials.

After the event: Mutual assistance is voluntary and sometimes crews come from areas that are also affected, or when a new event appears (like a second hurricane) that may mean they need to return quickly to deal with that next incident. In some circumstances, quick response may mean a quick exit.

Recovery involves decisions and actions such as restoring interrupted utility and other essential services, as well as reestablishing transportation routes,[6] and permanently repairing and rebuilding infrastructure.[7] Additional measures include evaluation of the incident to identify lessons learned, post incident reporting, and development of initiatives to mitigate the effects of future incidents.[8]

The recovery process requires balancing the more immediate need to return the community to normalcy with the longer-term goal of reducing future vulnerability. Because the recovery function has

[4] Connecticut State Government's General Assembly, "An Act Enhancing Emergency Preparedness and Response." March 2012, https://www.cga.ct.gov/2012/ba/2012SB-00023-R000401-BA.htm.

[5] Federal Communication Commission's Public Safety and Homeland Security Bureau, "Emergency Planning: First Responders, Preparation, Communications and Continuity of Operations." 2015, https://transition.fcc.gov/pshs/emergency-information/guidelines/first-responders.html.

[6] Malcolm E. Baird. The Recovery Phase of Emergency Management. January 2010. Vanderbilt Center for Transportation Research (VECTOR), pg. 7.

[7] Baird, pg. 2.

[8] FEMA, FEMA Strategic Plan; Fiscal Years 2008-2013. 2008, pg. 52.

such long-lasting effects at usually high costs, the participants in the process are numerous. They include all levels of government, the business community, political leadership, community activists, and individuals. Each of these groups plays a role in determining how the recovery will progress.[9]

After the event, crews need to get home; this can involve a number of transportation and permitting headaches. In some cases where aircraft or other equipment from the federal government were used, it also requires new ways of coordinating across jurisdictions and new relationships that extend beyond the scope of the Regional Mutual Assistance Group (RMAG) agreement. Thankfully, there are groups working on initiatives to relieve some of the logistical and permitting issues.[10] In addition, accounts must be settled and lessons learned must be internalized and acted on to be even better prepared for the next event.

What Are Some Examples of Mutual Assistance?

Mutual assistance has proven itself repeatedly in the worst storm-driven disruptions of the last decade. Some of the most notable examples follow.

Superstorm Sandy in October 2012: Approximately 8.5 million[11] customers lost power across 24 states in the Northeast, Mid-Atlantic, and parts of the Midwest. Tens of thousands of restoration workers—representing 80 utilities from almost every state and Canada – were involved in the response and recovery efforts.

June 2012 derecho: A sudden and widespread storm with peak wind gusts ranging from 80-100 miles per hour caused more than four million customers across Ohio and the Mid-Atlantic to lose power. Utilities responded with a workforce of about 30,000, including local utility workers and crews from as far away as Canada, Texas, and Wyoming.

Hurricane Irene, August 2011: Hurricane Irene made landfall on the East Coast, leaving approximately 5.9 million[12] customers without power. Nearly 50,000 electric utility restoration workers from regions as distant as the West Coast and Canada assisted with the restoration efforts in 14 states and the District of Columbia.

Hurricane Katrina, August 2005: When this hurricane hit the Gulf of Mexico, it damaged almost an entire 400-mile section of coastline from southeast Texas to central Louisiana. More than 46,000 electric utility restoration workers and contractors from around the country travelled to the Gulf Coast to help the local electric utilities with restoration. It was followed by a second hurricane – Rita - less than a month later, creating widespread destruction and millions of outages in Texas.

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[9] Baird, pg. 2.

[10] Multi-State Fleet Response Working Group 2015, http://www.fleetresponse.org/home/.

[11] U.S. Department of Energy Office of Electricity Delivery and Energy Reliability, 'Hurricane Sandy Situation Report #20.' November 7, 2012, http://www.oe.netl.doe.gov/docs/2012_SitRep20_Sandy_11072012_1000AM.pdf

[12] U.S. Department of Energy Office of Electricity Delivery and Energy Reliability, 'Hurricane Irene Situation Report #5.' August 28, 2011, http://www.oe.netl.doe.gov/docs/2011_SitRep5.pdf

How Mutual Assistance Requests Are Initiated and Carried Out

Companies maintain a skilled workforce sufficient to provide for maintenance, operations, and system management as well as to meet most of the restoration needs they face, such as relatively-commonplace storms, downed trees, and accidents. Most of the time, when a power utility is faced with a service outage, it draws from its own resources to restore service. If more help is required, the affected utility may draw from approved contractors that supply line workers and trucks as well as other skilled workers (electricians, substation techs, etc.). If the utility still needs more assistance, it may initiate a request for further assistance through the RMAG it belongs to and will notify its RMAG of what resources are needed. The RMAG then sends out an email to initiate a conference call with the other utility members. Once the member utilities are on the call, the event is summarized and the needs are communicated. Each member utility identifies the resources they have available to provide and how long it will take them to get to the affected area. Lastly, helping utilities travel to the affected area and resources are deployed. When a utility receives mutual assistance crews and other equipment, the utility receiving the assistance is responsible for them financially, covering the costs for the crews and dealing with liability and other related expenses. However, responding utilities are expected to handle the logistics of their travel to the requesting utility.

However, the terms of this sharing are not simply ad-hoc. Agreements are put into place well before-hand, defining the roles to be played (and money to be paid) by utilities engaged in mutual assistance. These agreements for mutual aid can differ in content and format – sometimes they are contracts and other times they are memorandums of understanding (MOU) between utilities.[13] These contracts and agreements vary slightly from state to state.

If utilities are aware of an oncoming event such as with Hurricane Sandy, a few days before landfall individual utilities begin planning and evaluating their resource needs. Utilities try to meet the needs of the affected areas with their own resources, and contact RMAGs for additional resources.[14]

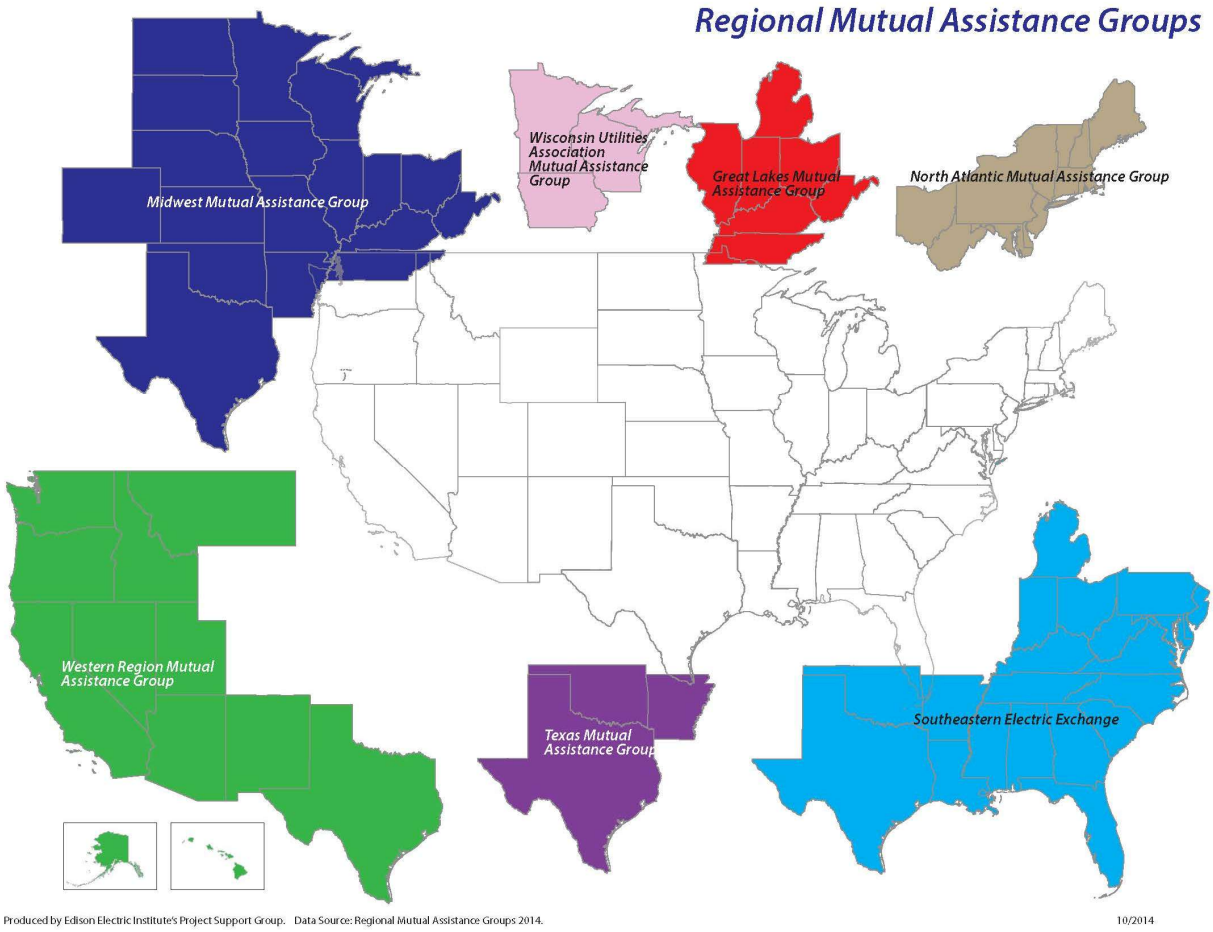
Mutual Assistance on a Regional Level

Many mutual aid agreements among investor owned utilities (IOUs) are managed by seven RMAGs across the country. Figure 1 below illustrates RMAGs for IOUs.

[13] Jorge Camacho, District of Columbia Public Service Commission, Personal interview, August 2015.

[14] Edison Electric Institute, "Understanding the Electric Power Industry's Response and Restoration process." May 2014, pg. 2, http://www.eei.org/issuesandpolicy/electricreliability/mutualassistance/Documents/MA_101FINAL.pdf.

Figure 1: RMAG Map for IOUs[15]



These RMAGs are groups of utilities in a state, region, or across the country that have agreements to offer mutual aid assistance when a request is made. RMAGs facilitate the process of identifying available restoration workers and help utilities coordinate the logistics and people to help with restoration efforts when the affected area is regional in scope.[16] Investor-owned utilities (IOUs) that are in RMAGs follow guidelines established by the EEI, and also establish additional guidelines that aid in the communication process and rapid mobilization and response efforts. If needed, utilities in one RMAG will assist those in another region.[17]

[15] Produced by Edison Electric Institute's Project Support Group. Data Source: Regional Mutual Assistance Groups 2014.

[16] Edison Electric Institute, "Understanding the Electric Power Industry's Response and Restoration process." May 2014, pg. 2, http://www.eei.org/issuesandpolicy/electricreliability/mutualassistance/Documents/MA_101FINAL.pdf.

[17] Iliana Rentz, Florida Power and Light, Personal Interview, August 2015.

Mutual aid also varies by region. The Eastern Interconnection utilities contend with weather-driven widespread outages and tend to enact mutual assistance more regularly, and as such tend to use RMAGs more often. Utilities in the western states generally coordinate responses directly with each other, rather than through an RMAG.[18] In Colorado, for instance, regional mutual assistance is coordinated by the state's Division of Homeland Security and Emergency Management organization using the Emergency Management Assistance Compact (EMAC).[19] EMAC was established in 1996 and is a national disaster-relief compact that facilitates the sharing of resources, personnel, and equipment across state lines. Fifty states, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands are members. EMAC offers assistance during governor-declared states of emergency through a system that allows states to send resources to help disaster relief efforts in other states.[20] To help organize EMAC responses in Colorado, the Colorado Department of Public Safety, Division of Fire Safety, maintains a database of local resources for mutual assistance. The Division of Emergency Management provides an EMAC coordinator to facilitate EMAC resource requests and deployment.[21] Information on how mutual aid works in California can be found in paragraph two of the section titled 'Things that have been working well' on pg. 15 of this report.

The most commonly shared items according to NorthWestern Energy and Southern Company are distribution and transmission equipment including transformer and substations, specialized workers (line crews, tree trimming crews, damage assessors, logistics managers), and other experts such as engineering supervisors and hydraulic technicians.[22] Additional items include shelter, food, poles, and information sharing.

Public power utilities are involved with APPA's mutual aid program. These utilities have local, state, and regional contracts and agreements for mutual aid, and there is also a national mutual aid agreement with over 2,000 public power and rural electric cooperatives, that connects utilities so they are able to help one another when needed. Figure 2 below illustrates the mutual assistance regions for public power utilities.

[18] Edison Electric Institute, "Understanding the Electric Power Industry's Response and Restoration process." May 2014, pg. 2, http://www.eei.org/issuesandpolicy/electricreliability/mutualassistance/Documents/MA_101FINAL.pdf.

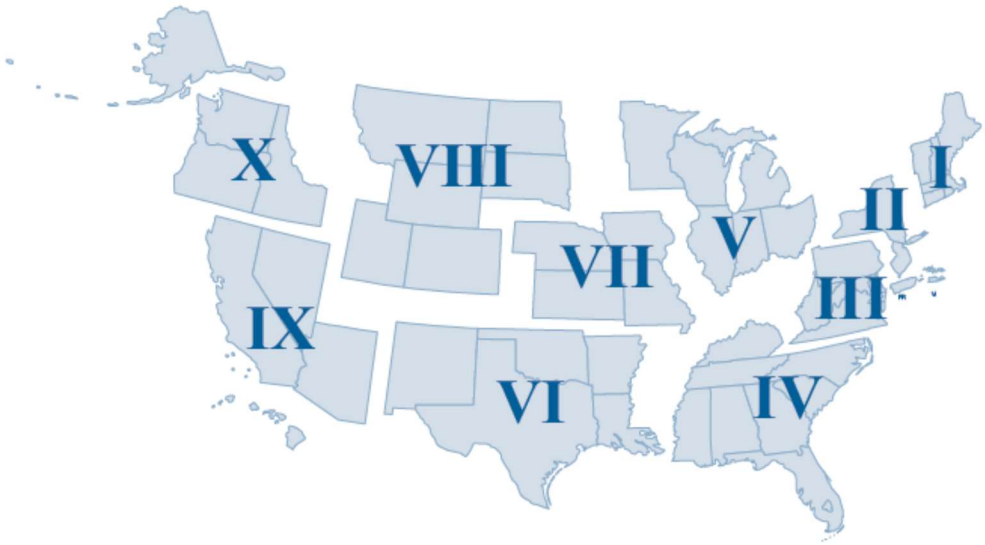
[19] Larry Duran, State of Colorado Public Utilities Commission, Personal interview, July 2015.

[20] Emergency Management Assistance Compact, "What is EMAC?," August 2015 (date retrieved), http://www.emacweb.org/index.php/learnaboutemac/what-is-emac.

[21] Colorado Division of Homeland Security and Emergency Management, "Colorado Procedures for Emergency Management Assistance Compact Requests." August 2015 (date retrieved), www.coemergency.com/2010/05/colorado-procedures-for-emergency.html.

[22] Strickland; Reed McKee, NorthWestern Energy, Personal interview, August 2015.

Figure 2: Public Power Utilities Mutual Aid Regions[23]



The mutual aid roles and responsibilities for public power utilities are defined at the local/state, regional, and national levels. Level 2 and 3 events, which are at the local/state or regional levels, involve utility and network coordinators. A level 4 event, which is on a national level, involves the utility coordinator, network coordinator, and APPA serving as national coordinator. For a national level event, APPA works with network coordinators from the following affected industry associations: EEI, the National Rural Electric Cooperative Association, the trade association for the cooperative electric utilities, and other organizations such as the National Emergency Management Association.[24]

National Response Events

Given the increasing severity of storms in the United States, such as Superstorm Sandy in 2012, the electric power industry recognized the value of enhancing the mutual assistance process to scale it to a national level. The EEI, through the efforts of a project team, developed the National Response Event process[25]. An industry-wide National Response Event (NRE) is a natural or man-made event that is forecasted to cause or that causes widespread power outages impacting a significant population or several regions across the U.S. and requires resources from multiple RMAGs.

A requesting utility's CEO (or a designated officer) from an EEI member utility may initiate the NRE process if or when multiple RMAGs cannot adequately support the resource requirements. When an

[23] American Public Power Association, "Public Power's Mutual Aid Network." September 2015 (date retrieved), pg. 2, http://appanet.files.cms-plus.com/PDFs/Mutual%20Aid%20Playbook%20Executive%20Summary.pdf.
[24] American Public Power Association, "Public Power's Mutual Aid Network." September 2015 (date retrieved), pg. 3, http://appanet.files.cms-plus.com/PDFs/Mutual%20Aid%20Playbook%20Executive%20Summary.pdf.
[25] See here for more information on the NRE Process: http://www.eei.org/meetings/meeting_documents/deric.pdf.

NRE is declared, all available emergency restoration resources (including contractors) will be pooled and allocated to participating utilities in a safe, efficient, transparent, and equitable manner without regard to RMAG affiliation. Each utility will designate a "Home" RMAG for NRE events at the operating utility level. Resource allocation in regional events will continue to be managed through the existing RMAG processes. This process works to ensure that resources are equitable distributed for a large-scale, multi-regional event.[26]

Benefits of Mutual Assistance

The advantages to being part of a mutual assistance program are numerous. Outlined below are some of the key benefits that were identified through the workshops, as well as conversations with utility companies and directly with state utility commission staff:

(a) Resource Sharing**:** Mutual assistance provides a way for utilities affected by natural or man-made hazards, to request and receive emergency assistance in the form of personnel, equipment, materials, and other specialized resources and associated services.[27] (Non-tangible services commonly offered range from training and guidance, to reviewing utilities' mutual aid plans and offering recommendations.[28])

(b) Cost Effectiveness: Mutual aid allows for a more efficient allocation of resources by eliminating the need for utilities to keep additional full-time staff on-hand for emergency only situations; this also saves utilities money by not having to keep additional labor on staff for these situations.

(c) Information Sharing: RMAGs can also provide a forum for discussing industry related topics, forming supportive relationships, sharing best practices, minimizing individual company risks and labor costs, setting safety expectations, and coordinating regional restoration.[29]

(d) Emergency Preparedness: These partnerships are helping to improve emergency preparedness by facilitating more collaboration as well as streamlining coordinated processes between state and local governments and the electric power industry, which can help ensure that we are even more prepared for the next major outage.[30]

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[26] Thomas Kirkpatrick, AEP and Miki Deric, Davies Consulting, LLC, "Overview of the Electric Power Industry's Mutual Assistance Process During a National Response Event (NRE)." Slide 5, Presentation at Edison Electric Institute's Executive Storm Response Symposium, May 2014, http://www.eei.org/meetings/meeting_documents/deric.pdf.

[27] FEMA, "Glossary and Acronyms." September 2015 (date retrieved), pg. 12, http://www.fema.gov/pdf/emergency/nrf/nrf-glossary.pdf.

[28] Duran, *supra*.

[29] Pat Conti, "2011 Summer Reliability Meeting Mid Atlantic Mutual Assistance Group (MAMA)." Duquesne Light Company, 2011, Slides 9 and 10, https://www.puc.state.pa.us/electric/pdf/Reliability/Summer_Reliability_2011-DQE.pdf.

[30] Edison Electric Institute, "Mutual Assistance Enhancements." October 2013, pg. 4, http://www.eei.org/issuesandpolicy/RES/TAB%205.pdf.

(e) Rapid Response: Mutual aid networks provide rapid, short-term dispatch of emergency services by responding utilities to restore operations of the utility experiencing an interruption or outage. Mutual aid partnerships can speed up recovery when replacement equipment is needed, for example.[31]

Elements of Mutual Aid That Have Been Working Well

The underlying principle of mutual aid is "strength in numbers, and generally this has proven a reliable proposition. A number of practices have emerged that underpin this success. One practice that Southern Company and other utilities have been using is called Area Supervision, which has operational, efficiency, and safety aspects. Under this arrangement, restoration crews have defined electrical boundaries by feeder, substation, etc., that they have full control over in a given area. Other features include: (a) you can only work within your assigned area, so you can better ensure the safety of your team; (b) outside entities cannot perform work in this area without permission from the Area Supervisor; (c) all work must be completed within this boundary before moving to the next area; (d) switching the power back on after the work is complete, is turned over from the Distribution Operations center to the Area Supervisor overseeing the area under restoration, and thereafter control is returned back to the Distribution Operations Center (others cannot perform any switching that could jeopardize your area or safety); and (e) areas are both geographically and electrically assigned so that areas do not overlap and create safety issues. This strategy has been shown to reduce restoration times when used by utilities. Utilities have found it more efficient for a crew to finish work in one section and make one call at the end to the designated area of control to confirm that each circuit's power has been restored, rather than running multiple workgroups into and out of the same area and having the crews make multiple calls throughout the restoration process to the designated area of control.[32]

Another example of what works well can be seen in California. When there is a governor-declared state of emergency, the State of California utilizes the Standardized Emergency Management System (SEMS) and coordinates directly with the California Utilities Emergency Association (CUEA).[33] CUEA is part of the Incident Command System (ICS)[34] at the Office of Emergency Services (OES) and operates within the

[31] FEMA, "Glossary and Acronyms." September 2015 (date retrieved), pg. 12, http://www.fema.gov/pdf/emergency/nrf/nrf-glossary.pdf.

[32] Strickland, *supra.*

[33] CUEA is a private company in the governor's office, which serves as a point of contact for critical infrastructure utilities before, during and after an event to facilitate communications and cooperation between member utilities and public agencies, and with non-member utilities when possible; provides emergency response support wherever practical for electric, petroleum pipeline, telecommunications, gas, water and wastewater utilities; and supports utility emergency planning, mitigation, training, exercises and education. Members take part in both statewide and interstate mutual assistance agreements with Washington, Oregon, Nevada, and other border states. The CUEA is unique to California and has been functioning very effectively in disaster recovery events. http://www.cueainc.com/about/.

[34] The ICS is a standardized management tool for addressing emergency or nonemergency situations on any scale including for planned events, natural disaster, and terrorist acts. It represents "best practices" and is a key feature of the National Incident Management System (NIMS). The ICS is designed to enable effective and

State Operations Center (SOC) during a catastrophic event.[35] ICS was developed after a number of disastrous fires in urban areas of California in the 1970s, which caused millions of dollars in damages to property as well as injuries and deaths. Response problems with these events were not largely attributable to a lack of resources or failure of tactics, but rather, response problems were far more likely a result of inadequate management than from any other single reason.[36] Local mutual assistance is coordinated at a local or state level through the SEMS structure within California that incorporates the ICS structure.[37]

The level of involvement by state utility commissions with mutual aid varies from state to state. Mutual aid has been working very effectively in the state of Florida. The Florida Public Service Commission (FPSC) only gets involved to a limited extent, however, because the utilities have been handling mutual aid very well on their own. The nature of aid from the FPSC to utilities in need of mutual aid has been logistical (coordinating air lifts, etc.) and in the form of helping crews obtain access to affected areas. Since Florida frequently experiences hurricanes, much of the usual mutual aid problems encountered in other states have been worked out in Florida over the years. A key element that has helped Florida address the problem of utilities and other companies experiencing delays at toll booths and weigh stations when crossing state lines, is that Florida developed standard language in the Governor's executive order that gives the authority to grant waivers and permits to the extent the waivers and permits are needed. This then gives authority to the Department of Transportation during an emergency event, to waive tolls as well as some size and weight restrictions on vehicles transporting emergency equipment.[38]

Other things that help facilitate effective mutual assistance include: having clearly written contracts or MOUs in place well in advance to help avoid delays;[39] having government employees at all levels as well as utilities and others involved with mutual aid efforts participate in emergency exercises;[40] and a strong willingness by all members to participate since high participation is crucial for programs to succeed.[41]

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efficient domestic incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure. A basic premise of ICS is that it is widely applicable. ICS is used by all levels of government—Federal, State, local, and tribal—as well as by many private-sector and nongovernmental organizations and is also applicable across disciplines. It is normally structured to facilitate activities in five major functional areas: command, operations, planning, logistics, and finance and administration. http://training.fema.gov/emiweb/is/icsresource/assets/reviewmaterials.pdf.

[35] Maria Solis, California Public Utilities Commission, Personal Interview, August 2015.

[36] FEMA, "Incident Command System." May 2008, pg. 1, http://training.fema.gov/emiweb/is/icsresource/assets/reviewmaterials.pdf.

[37] Solis, *supra*.

[38] Rick Moses, Florida Public Service Commission, Personal interview, August 2015.

[39] Camacho, *supra*; Solis, *supra*.

[40] Solis, *supra*.

[41] Camacho, *supra*.

Obstacles to Mutual Assistance

Although mutual assistance is a potent tool in our resilience toolbox, it is not without challenges. These include:

(1) Logistical coordination is highly complex: Once crews arrive at the site where help is needed, they must be provided for (i.e., food, beds, bathrooms, etc.). Arranging for these items to be readily available and dispatched on time can be challenging, especially if access to an area is limited due to roads being blocked, for example, by trees or downed power lines. Additionally, hotels can sometimes be filled to capacity with local residents displaced from their residences, requiring mobile housing, restrooms, etc. to be brought in.[42]

(2) Political pressures can sometimes be strong**:** Local pressure to keep utilities from deploying help to other areas can be strong. The view that "our crews will stay in our state until all our customers are back online" may reduce the ability to handle a multistate outage with the greatest efficiency. Additionally, when mutual assistance crews are deployed there can be pressure for them to return home as quickly as possible, and depending on the job they are facing, they may need more time. Some state commissions find it beneficial to educate their elected officials and emergency management partners about the RMAG process and how beneficial it can be to restoration. For example, letting stakeholders know that if utility crews are kept within the state and not allowed to assist others, it may affect the offers to assist that state in the future.

(3) There can sometimes be varying degrees of red tape: For example, permitting when crews are responding across state lines has been a challenge. Often when electric utilities that are part of a mutual aid network are called upon for help, they experience delays – sometimes as long as 12 hours at toll collection areas and or weigh stations – as they try to move resources across state lines due to these utility crews not having the necessary licenses to travel through non-affected states. As a result, there are delays encountered in obtaining the appropriate authority to pass through these states, thereby delaying power restoration to communities experiencing outages and delivery of food and water supplies.[43]

(4) Mutual assistance is expensive, but it's worthwhile. The state receiving help must reimburse the helping state utility crew for their time, lodging and meals. However, this is much more cost effective than utilities keeping additional emergency crews and/or contractors on staff around the clock for high impact, low frequency events[44].

(5) Funding Constraints: At smaller utilities, resources are more limited and there can be a lack of oversight for tracking, monitoring, and mitigating risks to infrastructure. As a result, someone in IT, for

[42] William Atkinson. "Mutual Aid Comes of Age." April 2012, American Public Power Association, http://www.publicpower.org/Media/magazine/ArticleDetail.cfm?ItemNumber=34001.
[43] EEI / NAFA Fleet Management Association Workshop. Washington, D.C., May 18, 2015.
[44] EEI / NAFA Fleet Management Association Workshop. Washington, D.C., May 18, 2015.

example, may end up wearing multiple hats for areas where they do not possess high expertise, due to these budget constraints[45].

(6) Cybersecurity risks to critical infrastructure**:** There is great deal of information about cybersecurity threats on various fronts, regulations, and best practices. The high volume of activity and information can sometimes be overwhelming to keep up with and monitor at the county, city, state, and federal levels[46].

(8) Local crews are familiar with local systems: Political and logistical pressures may not be the only restraints on relying on crews shared by other utilities. There may be resistance to this for reasons as simple as efficiency brought about by familiarity with the system, procedures and practices, that would lead to a decision to use crews close to home.

(7) Travel distance**:** Often times, utility restoration crews must travel long distances to reach the areas affected by utility service disruptions or outages. Florida, for example, has a long peninsula that takes a long time for helping utilities to traverse, so utilities that need help request it as early as possible[47].

(8) Response time: Restoring utility services to communities in a timely manner can be challenging due to the aforementioned permitting issues, difficulty accessing areas with outages when there are downed power lines, trees, etc. that need to be cleared.

(9) Safety rules and terminology: It is sometimes the case that the same terms can mean different things to different utilities, which can be a challenge to overcome.[48]

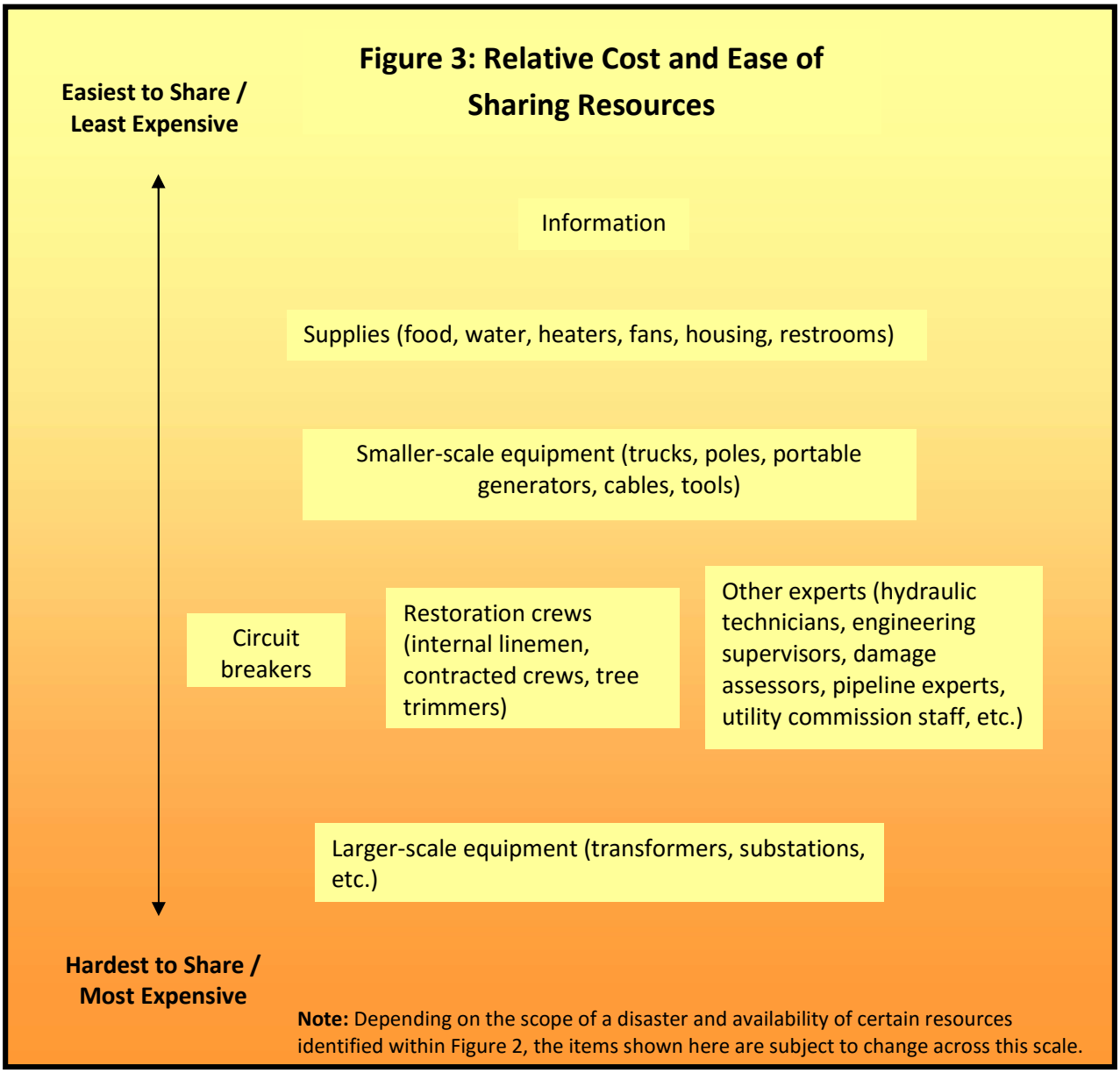
(10) Utility System Design: Individual utilities apply different criteria to design and install their equipment. It is crucial that workers are knowledgeable in system design applications and equipment deployment.

Additional Resources That Can Improve Mutual Assistance

Sharing of linemen, equipment, and supplies are the most common resources shared among utilities in a mutual assistance programs.

Figure 2 below illustrates examples of resources that can be shared on scale indicating the ease of sharing them and their costs relative to each other.

[45] Duran, *supra*.
[46] Duran, *supra*.
[47] Rentz, *supra*.
[48] McKee, *supra*.



Other resources areas being discussed by industry that could contribute to mutual aid are programs focusing on resilience mutual aid and cybersecurity mutual aid.[49] It could be worth exploring if there are possibilities of including contractual provisions for these or other institutional devices that are multi-utility or multi-state. One program for cybersecurity is called InfraGard, which is a partnership between the Federal Bureau of Investigation and the private sector. It is an association comprised of

[49] Rentz, *supra*.

representatives from businesses, academia, state and local law enforcement agencies, and others to share information and intelligence to prevent hostile attacks against the U.S. InfraGard provides a mechanism for the public and private sectors to exchange information pertaining to cyber intrusion matters, computer network vulnerabilities and physical threats on infrastructures.[50]

The following programs are available that make sharing resources other than crews, much easier. The following programs would address mutual aid from a resilience standpoint and can be utilized to request equipment when events such as cyber attacks, physical attacks, electromagnetic pulses resulting from solar storms (coronal mass ejections) or man-made explosions (high altitude nuclear explosions), and severe weather events occur:

The Spare Transformer Equipment Program (STEP) is an electric industry program that aids with quicker restoration of the transmission system as a result of terrorist attacks. Any electric utility – regardless of ownership structure – in the U.S. or Canada, can be part of this program. STEP currently has fifty-four utility members and helps to increase the inventory of spare transformers and streamline the process of transferring them to affected utilities when there are transmission outages due to terrorist attacks. Participating electric utilities must maintain a specific number of transformers. The program requires each participating utility to sell its spare transformers to any participating utility that suffers from an act of terrorism that destroys or disables one or more substations, and results in a state of emergency declaration by the U.S. President.[51]

SpareConnect is a program for utility asset owners and operators, which allows them to network with other SpareConnect members to share transmission and generation step-up (GSU) transformers and related equipment, including bushings, fans, and auxiliary components.[52] SpareConnect establishes a formal program which already exists on an informal basis, to communicate equipment needs in the event of emergency or other non-routine failures, and to connect interested utilities more effectively and efficiently.[53]

Emerging energy assurance programs: there is a dynamic and growing range of additional private sector responses that address these types of resilience approaches. For example, a product in the market that started up in June 2015 is Grid Assurance LLC, which is a collaborative effort by utilities to cost-

[50] Ronald L. Dick, "Testimony Before the Senate Committee on Governmental Affairs "Federal Bureau of Investigation." May 2002, https://www.fbi.gov/news/testimony/critical-infrastructure-information-sharing.

[51] Edison Electric Institute, "Spare Transformers." July 2014 (date retrieved), http://www.eei.org/issuesandpolicy/transmission/Pages/sparetransformers.aspx#sthash.iPgrVBEk.dpuf.

[52] SpareConnect does not create or manage a central database of spare equipment, but rather, provides decentralized access to points of contact at power companies so that in an emergency, members can connect quickly with one another in affected voltage classes. SpareConnect does not obligate participants to provide any information or to make any particular piece of equipment available. Once connected, participants who are interested may provide additional information or share equipment directly and privately with each other on the specific terms and conditions of any potential equipment sale or other transaction. http://www.eei.org/issuesandpolicy/transmission/Pages/sparetransformers.aspx#sthash.iPgrVBEk.dpuf

[53] Spare Connect, "About." August 2015 (date retrieved), https://spareconnect.com/about/.

effectively improve the resiliency of their transmission and bulk electric systems. This program will provide utility and transmission-owning subscribers with timely access to emergency spare transmission equipment, which typically take long periods of time to acquire. The equipment is stored in secure warehouses and readily deployable after a major system failure.

Grid Assurance plans to own and maintain equipment at secure, strategically located warehouses to facilitate the equipment being placed in service faster than traditionally possible. It expects to offer additional logistics support to expedite transportation of equipment to impacted sites. Grid Assurance can complement existing programs in the industry such as STEP and SpareConnect.[54] Grid Assurance filed a petition with the Federal Energy Regulatory Commission (FERC) in late June 2015 seeking confirmation that this service can be part of a transmission-owning entity's strategy to effectively address grid resiliency mandates. Grid Assurance will not be FERC regulated, but plans to charge cost-based subscription fees, similar to FERC-regulated transmission formula rates. Cost-based subscription fees are expected to facilitate subscribers' ability to recover expenses. Moving forward the power sector is likely to see other adaptive offerings to help bolster response and resilience.

Cybersecurity and Shared Network Defense

A great deal of attention has been paid in this paper to response to physical events that disrupt the power system, but an area of growing risk awareness and preparedness relates to cybersecurity. There is extensive literature that explores the vulnerabilities of the power grid to potential cyberattacks, and the increased use of intelligent systems in this sector creates additional cyber vulnerability to manage even as it helps manage outage impacts and improve system visualization.

Can mutual assistance help here as well? Conceptually, shared network defense against cyberattacks and system restoration appears to make sense. In the information gathering and threat assessment areas, a great deal of collaboration is already the norm for the power sector, with institutions like the Electricity Information Sharing and Analysis Center (E-ISAC) convening dialogue among power companies. It is worth noting that robust debate still exists about whether information sharing efforts are adequate and what can be done to improve them, ranging from a push to increase the number of asset owners and operators with clearances, to broader declassification of threat information.[55]
It is possible that market barriers and other forces impede or disincentivize the idea of mutual assistance and shared defense in the cyber arena. The power sector does have some advantages, though: concerns about sharing commercially sensitive information between companies are generally less in this sector than in others where monopoly service providers are less prominent, and competitive pressures are different between companies.

[54]Grid Assurance, "A new, cost effective solution to electric grid restoration." August 2015, http://gridassurance.com/.

[55] Two excellent information assessment nad sharing tools available from the Federal Government are the Cybersecurity Risk Information Sharing Program (CRISP, a broad federal-private sector partnership that provides information analysis and sharing) and the Electric Sector Cybersecurity Capability Maturity Model (ES-C2M2, online at http://energy.gov/oe/services/cybersecurity/cybersecurity-capability-maturity-model-c2m2-program).

Yet, cyber mutual assistance remains essentially unexplored. No determined, highly effective and damaging cyberattack has ever been successful against an electric utility. A serious attack on the scale of the Shamoon attacks[56] in the Middle East may require the repair of tens of thousands of systems, massive data quarantine procedures, and large reinstallation operations – maybe even hardware replacements at a larger scale than anything experienced to date. In the event of such an attack, it may be worth considering whether individual companies, acting independently, have the number of skilled personnel and expertise needed to repel and recover from the most serious attacks. In short, the utility industry may not have explored this kind of arrangement because it has never needed to.

Some of the experts we talked to in the States felt that the issues involved with a cyberattack were not comparable to those from a natural disaster, and that most times cyber-oriented disruptions would require different responses by people with a different set of skills. This question may be worth further exploration to see whether the same benefits apply when translated from preparedness for a physical hazard to preparedness for a cyber hazard. Utility commissioners may wish to explore this topic with companies and by asking questions catalyze conversations among owners and operators about how they can explore the possibilities and potentially create agreements, drills, training, communications networks, institutions and other instruments that enable shared cybersecurity expertise, restoration capabilities, and network defense in the power sector.

Conclusion

Mutual assistance is an indispensable tool in our electric power system's resilience. Although it poses profound benefits and is often one of the most cost-effective tools for response, it faces numerous challenges**.** The greatest challenges come with the larger scale emergencies, and when these occur on a national scale, that makes resources even more scarce and complicated to share. However, clear and regular communication, strong partnerships, and shared practices are what make RMAGs strong and effective.

Mutual assistance has proven that we are stronger together, and mutual assistance must resist political pressures that trend policymakers towards insularity. It is important for regulators to consider and help motivate not only the sharing of lineworker crews, but be open minded about shared equipment, hardware, and expertise. As the power system becomes more inextricably linked to intelligence, the growth of cyber vulnerabilities must also be managed. As much as they play an important role in overcoming the barriers to traditional mutual assistance, State regulators may play a tremendously influential role in supporting and engaging shared strength in non-traditional areas like shared stocks of equipment and spares, the sharing of information, and the defense and restoration of cyber assets.

[56] The Shamoon virus overwrote the boot sector of tens of thousands of oil company workstations in the Persian Gulf in the summer of 2012. A vernacular summary is online at https://en.wikipedia.org/wiki/Shamoon

SUGGESTED GOVERNING PRINCIPLES COVERING EMERGENCY ASSISTANCE ARRANGEMENTS BETWEEN EDISON ELECTRIC INSTITUTE MEMBER COMPANIES

Electric companies have occasion to call upon other companies for emergency assistance in the form of personnel or equipment to aid in maintaining or restoring electric utility service when such service has been disrupted by acts of the elements, equipment malfunctions, accidents, sabotage or any other occurrences where the parties deem emergency assistance to be necessary or advisable. While it is acknowledged that a company is not under any obligation to furnish such emergency assistance, experience indicates that companies are willing to furnish such assistance when personnel or equipment are available.

In the absence of a continuing formal contract between a company requesting emergency assistance ("Requesting Company") and a company willing to furnish such assistance ("Responding Company"), the following principles are suggested as the basis for a contract governing emergency assistance to be established at the time such assistance is requested:

1. The emergency assistance period shall commence when personnel and/or equipment expenses are initially incurred by the Responding Company in response to the Requesting Company's needs. (This would include any request for the Responding Company to prepare its employees and/or equipment for transport to the Requesting Company's location but to await further instructions before departing). The emergency assistance period shall terminate when such employees and/or equipment have returned to the Responding Company, and shall include any mandated DOT rest time resulting from the assistance provided and reasonable time required to prepare the equipment for return to normal activities (e.g. cleaning off trucks, restocking minor materials, etc.).

2. To the extent possible, the companies should reach a mutual understanding and agreement in advance on the anticipated length – in general – of the emergency assistance period. For extended assistance periods, the companies should agree on the process for replacing or providing extra rest for the Responding Company's employees. It is understood and agreed that if; in the Responding Company's judgment such action becomes necessary the decision to terminate the assistance and recall employees, contractors, and equipment lies solely with the Responding Company. The Requesting Company will take the necessary action to return such employees, contractors, and equipment promptly.

3. Employees of Responding Company shall at all times during the emergency assistance period continue to be employees of Responding Company and shall not be deemed employees of Requesting Company for any purpose. Responding Company shall be an independent Contractor of Requesting Company and wages, hours and other terms and conditions of employment of Responding Company shall remain applicable to its employees during the emergency assistance period.

4. Responding Company shall make available at least one supervisor in addition to crew foremen. All instructions for work to be done by Responding Company's crews shall be given by Requesting Company to Responding Company's supervisor(s); or, when

Responding Company's crews are to work in widely separate areas, to such of Responding Company's foremen as may be designated for the purpose by Responding Company's supervisor(s).

5. Unless otherwise agreed by the companies, Requesting Company shall be responsible for supplying and/or coordinating support functions such as lodging, meals, materials, etc. As an exception to this, the Responding Company shall normally be responsible for arranging lodging and meals en route to the Receiving Company and for the return trip home. The cost for these in transit expenses will be covered by the requesting company.

6. Responding Company's safety rules shall apply to all work done by their employees. Unless mutually agreed otherwise, the Requesting Company's switching and tagging rules should be followed to ensure consistent and safe operation. Any questions or concerns arising about any safety rules and/or procedures should be brought to the proper level of management for prompt resolution between management of the Requesting and Responding Companies.

7. All time sheets and work records pertaining to Responding Company's employees furnishing emergency assistance shall be kept by Responding Company.

8. Requesting Company shall indicate to Responding Company the type and size of trucks and other equipment desired as well as the number of job function of employees requested but the extent to which Responding Company makes available such equipment and employees shall be at Responding Company's sole discretion.

9. Requesting Company shall reimburse Responding Company for all costs and expenses incurred by Responding Company as a result of furnishing emergency assistance. Responding Company shall furnish documentation of expenses to Requesting Company. Such costs and expenses shall include, but not be limited to, the following:

   a. Employees' wages and salaries for paid time spent in Requesting Company's service area and paid time during travel to and from such service area, plus Responding Company's standard payable additives to cover all employee benefits and allowances for vacation, sick leave and holiday pay and social and retirement benefits, all payroll taxes, workmen's compensation, employer's liability insurance and other contingencies and benefits imposed by applicable law or regulation.

   b. Employee travel and living expenses (meals, lodging and reasonable incidentals).

   c. Replacement cost of materials and supplies expended or furnished.

   d. Repair or replacement cost of equipment damaged or lost.

   e. Charges, at rates internally used by Responding Company, for the use of transportation equipment and other equipment requested.

f. Administrative and general costs, which are properly allocable to the emergency assistance to the extent such costs, are not chargeable pursuant to the foregoing subsections.

10. Requesting Company shall pay all costs and expenses of Responding Company within sixty days after receiving an invoice therefor.

11. Requesting Company shall indemnify, hold harmless and defend the Responding Company from and against any and all liability for loss, damage, cost or expense which Responding Company may incur by reason of bodily injury, including death, to any person or persons or by reason of damage to or destruction of any property, including the loss of use thereof, which result from furnishing emergency assistance and whether or not due in whole or in part to any act, omission, or negligence of Responding Company except to the extent that such death or injury to person, or damage to property, is caused by the willful or wanton misconduct and / or gross negligence of the Responding Company. Where payments are made by the Responding Company under a workmen's compensation or disability benefits law or any similar law for bodily injury or death resulting from furnishing emergency assistance, Requesting Company shall reimburse the Responding Company for such payments, except to the extent that such bodily injury or death is caused by the willful or wanton misconduct and / or gross negligence of the Responding Company..

12. In the event any claim or demand is made or suit or action is filed against Responding Company alleging liability for which Requesting Company shall indemnify and hold harmless Responding Company under paragraph (11) above, Responding Company shall promptly notify Requesting Company thereof, and Requesting Company, at its sole cost and expense, shall settle, compromise or defend the same in such manner as it in its sole discretion deems necessary or prudent. Responding Company shall cooperate with Requesting Company's reasonable efforts to investigate, defend and settle the claim or lawsuit.

13 Non-affected companies should consider the release of contractors during restoration activities. The non-affected company shall supply the requesting companies with contact information of the contactors (this may be simply supplying the contractors name). The contractors will negotiate directly with requesting companies.

Last update September 2005

- Section 11 and 12 updated

Edison Electric Institute
Mutual Assistance Agreement

Edison Electric Institute ("EEI") member companies have established and implemented an effective system whereby member companies may receive and provide assistance in the form of personnel and equipment to aid in restoring and/or maintaining electric utility service when such service has been disrupted by acts of the elements, equipment malfunctions, accidents, sabotage, or any other occurrence for which emergency assistance is deemed to be necessary or advisable ("Emergency Assistance"). This Mutual Assistance Agreement sets forth the terms and conditions to which the undersigned EEI member company ("Participating Company") agrees to be bound on all occasions that it requests and receives ("Requesting Company") or provides ("Responding Company") Emergency Assistance from or to another Participating Company who has also signed the EEI Mutual Assistance Agreement; provided, however, that if a Requesting Company and one or more Responding Companies are parties to another mutual assistance agreement at the time of the Emergency Assistance is requested, such other mutual assistance agreement shall govern the Emergency Assistance among those Participating Companies.

In consideration of the foregoing, the Participating Company hereby agrees as follows:

(1) When providing Emergency Assistance to or receiving Emergency Assistance from another Participating Company, the Participating Company will adhere to the written principles developed by EEI members to govern Emergency Assistance arrangements among member companies ("EEI Principles"), that are in effect as of the date of a specific request for Emergency Assistance, unless otherwise agreed to in writing by each Participating Company.

(2) With respect to each Emergency Assistance event, Requesting Companies agree that they will reimburse Responding Companies for all costs and expenses incurred by Responding Companies in providing Emergency Assistance as provided under the EEI Principles, unless otherwise agreed to in writing by each Participating Company; provided, however, that Responding Companies must maintain auditable records in a manner consistent with the EEI Principles.

(3) During each Emergency Assistance event, the conduct of the Requesting Companies and the Responding Companies shall be subject to the liability and indemnification provisions set forth in the EEI Principles.

(4) A Participating Company may withdraw from this Agreement at any time. In such an event, the company should provide written notice to EEI's Director of Security of Transmission and Distribution Operations.

(5) EEI's Director of Security of Transmission and Distribution Operations shall maintain a list of each Participating Company which shall be posted on the RestorePower web site at www.restorepower.com. However, a Participating Company may request a copy of the signed Mutual Assistance Agreement of another Participating Company prior to providing or receiving Emergency Assistance.

_____

Company Name

_____

Signature

Officer Name:
Title:
Date: