



**EDISON ELECTRIC
INSTITUTE**

Utility Storm Restoration Response

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For:

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Executive Summary

In spite of all our advanced technology, we have not yet found a way to completely protect ourselves from Mother Nature. Severe storms cause billions of dollars of property damage in the United States. Electric utilities, with their vast networks of poles and wires, are particularly vulnerable to storms and suffer millions of dollars of damage every year.

Electric utilities mobilize vast resources to quickly rebuild electric systems that are literally torn apart by major weather events such as hurricanes and ice storms. However, in an era when even a momentary power outage causes economic losses and inconvenience, these restoration efforts never seem fast enough.

Are utilities falling behind in their storm restoration efforts? Or, is it just that electricity is harder than ever to live without—for any length of time?

This report examines utility responses to 44 major storms that occurred between 1989 and 2003. In addition, it presents two case studies of post-storm repair efforts that provide an historical perspective on utility performance.

The report finds that utilities responding to these storms have improved their ability to quickly repair significant damage done by major storms. They are deploying workers more efficiently, power is being restored quicker and the overall duration of storm outages is decreasing.

A lack of data, however, precludes conducting a similar analysis at a nationwide or industry-wide level. The industry does not have a program of reporting data for the purpose of gauging industry storm-restoration performance over time. As a result, data is not reported in a consistent format that can be compared “apples-to-apples.”

The report concludes with a word of caution: No matter how abundant or scarce the data may be, no two storms are the same, and no two electric systems are identical. Each repair effort presents unique challenges. To provide meaningful comparisons between storms, the industry must adopt consistent metrics that are defined broadly enough to account for the unique circumstances of each outage event.

Introduction

In December 2002, a major ice storm struck the Carolinas and nearly 2 million electric customers lost power. Less than a year later, Hurricane Isabel struck the mid-Atlantic, again causing power outages to more than 3 million customers. For both storms, utilities had many customers that were still without power after a week. Some customers in heavily damaged areas were without power for up to 16 days (Figure 1).

Figure 1: Storm Statistics For Recent Severe Storms

Storm Event	Utility	Customers Impacted	Cost (\$Million)	Outage Duration (Days)
2002 North Carolina Ice Storm	Progress Energy	560,660	\$ 39	8
	Duke Power	1,375,000	\$ 87	9
Hurricane Isabel	Pepco	545,000	N/A	11
	BGE	790,450	\$ 81	8
	Dominion VA Power	1,800,000	\$ 128	16

Source: Company Press Releases and Storm Reports

In an era where even a momentary outage can create major inconveniences and economic losses, multi-day power outages are viewed by many as intolerable. Industry critics have argued that cost cutting, brought on by deregulation, has made it difficult for utilities to respond to major storm events as well as they have in the past.

To obtain better insight into how utilities are performing after storm-related outages, this study identifies utility storm-restoration trends. One of the problems in conducting a study of this nature is a lack of data that can be compared “apples-to-apples” regarding utility storm-restoration activities.

To address this issue, the Edison Electric Institute (EEI) asked member utilities to provide data on their restoration efforts after major storm events. Utilities responded with data on 44 major storms between May 1989 and September 2003.

The report that follows summarizes major trends indicated by this survey data. It also reviews information from utility storm performance reports prepared after both the 2002 Ice Storm in North Carolina and Hurricane Isabel in September 2003.

The report finds:

- Evidence, based on storm reports, that utilities are improving their ability to quickly repair significant damage done to their systems by major storms.
- Significant storm-restoration trends for utility survey participants:
 - The duration of extended power outages has been decreasing.
 - The rate at which customers are being restored from outages has been increasing.

- Restoration workers are being deployed more efficiently to respond to major storms.
- Improvements need to be made in reporting data to provide a better assessment of utility storm-restoration performance at an industry level.

Measuring storm-restoration performance

One of the challenges in attempting to compare past and present utility storm-restoration performance is that no two storms are the same.

Ice storms can cause vastly different types of damage—depending on whether they hit when leaves are still on trees, the thickness of the ice, how high the accompanying winds are and whether the ice damages transmission lines as well as distribution lines.

Similarly no two hurricanes are the same. One hurricane might wreak havoc on a utility system with its high winds, while another creates considerable damage from flooding, and another does both. Because of these differences, it is unrealistic to compare storms and utility responses to them without considering the wide variety of factors that can impact a utility’s storm-restoration activities.

The other major challenge of evaluating whether utility responses are getting better or worse is obtaining good data on utility storm-restoration activities. The industry does not have a standardized method for evaluating post-storm restoration effectiveness. Hence, there is no consistent method of collecting data on utility storm-restoration activities.

Most data regarding storm damage is collected and maintained by individual utilities, and is used primarily for tracking costs and preparing “major storm reports” for state public utility commissions. Once again, there is no formal or informal standard for preparing these reports, either at the regional or national level.

To address this lack of comparable data, EEI designed a special survey to collect information on utility storm-restoration activities over at least a 10-year period of time. A copy of the survey is provided in Attachment 1. Key storm restoration metrics developed for the survey are discussed briefly below.

Peak Number of Customers Out of Power

One of the best indicators of the severity of a storm is the peak number of customers who lose power during the storm and who are without power at the same time.

The “peak number” of customers affected differs from another commonly reported statistic, “number of customers impacted,” which includes outages that occur during the storm repairs caused by feeders being switched in and out in an attempt to restore the system. Because “number of customers impacted” includes outages caused by the utility, it is not as appropriate of a measure of a storm’s impact.

In the past several years, utilities have become much more sophisticated in tracking outages. Traditionally, utilities rely on customer phone calls to notify them that power is out. If the customer does not call, the outage may not get reported.¹

Today, many utilities have outage-detection systems deployed on parts of their systems that let them track when outages have occurred, and where they are located. As a result, utilities may be reporting more outages with less reporting error today for storms of similar intensity than they did in the past, simply because they have more sophisticated means of collecting and reporting the outage data.²

Outage Duration

This metric measures the number of days it takes the utility to restore power to customers that have lost power due to the storm. It measures both the severity of the storm and the utilities' performance in restoring power after the storm.

More severe storms cause greater equipment damage that takes longer to repair. The duration of the outage also can be affected by the utility's storm planning and mobilization efforts. Equipment inventories and available restoration personnel can have a direct impact on the duration of a power outage following a major storm.

Peak Number of Line Restoration Personnel

This metric includes the line crews working to repair damage to the system, as well as field support personnel.

Utilities, whether investor-owned, municipal or cooperative, rarely have sufficient resources to respond to major storms with just their own people. When major storms hit, utilities rely on a vast network of support contractors and "mutual assistance" crews from other utilities.³

In its restoration efforts for Hurricane Isabel, for example, Baltimore Gas & Electric had a peak of more than 6,400 restoration personnel. Of these, nearly 3,000 were external personnel mobilized from as far away as Arizona and Colorado.

Typically the number of restoration personnel deployed by a utility peaks a day or two after a major storm, due to the time it takes to acquire and mobilize the extra workers required to restore power. This "extra" workforce declines as progress is made in restoring outages.

The peak number of restoration personnel deployed by the utility tends to correlate very closely with the severity of the storm.

¹ A representative of a Virginia rural electric cooperative tells the story of an isolated rural customer that used to send in a post card when her power went out. In this instance, it would take several days before the co-op knew the customer was without power.

² For example, in the past, the reporting error may have been 100,000 +/- 10% whereas with modern reporting technology it is 100,000 +/- 2%

³ Most utilities have found that they cannot staff up internally to provide the manpower they need to respond to major storms. Therefore, they rely on mutual-assistance agreements where they agree to share line crews and equipment to help each other respond to major storms.

Equipment Damage

This metric measures the direct impact of the storm on a utility's physical infrastructure. It is a reliable and consistent way to compare the severity of one storm versus another storm.

For the survey, three major equipment categories were selected as proxy for overall system damage:

- Total number of poles replaced
- Total number of transformers replaced
- Total miles of primary conductor replaced.

This is by no means an exhaustive list of the equipment damage utilities face during major storms. When combined, however, these three elements provide a useful index in measuring the severity of a storm and the effort required by the utility to restore power. And, since most utilities already use these equipment categories to report damage in reports to regulatory commissions, the data tends to be available more widely from utility to utility, and from storm to storm.

Storm Restoration Survey Results

In October 2003, EEI contacted storm-restoration managers at several investor-owned utilities known to have experienced multiple severe storms in the last decade. It asked them to complete the survey provided in Attachment 1 (page 18).

Six utilities responded to the confidential survey and provided the requested data for 44 major storms between 1989 and 2003. Combined, these storms affected more than 12 million customers, and caused almost 250 days of power outages (Figure 2, next page).

The relatively small number of survey respondents makes it difficult to use this data to reach specific conclusions regarding storm-restoration performance for the entire investor-owned electric utility industry. However, the 44 storms identified by the respondents provide a significant sample of data that proved useful in providing insight into storm-restoration trends.

These trends are briefly summarized on the following pages.

**Figure 2: EEI Major Storm Restoration Survey Results
1989-2003**

Storm Event	Date	Peak # Of Customers Out	Outage Duration (Days)	Peak # Of Restoration Personnel	Damage Estimates		
					Poles Replaced	Transformers Replaced	Wire Replaced (Miles)
Tornadoes	May-89	228,000	8				
Hurricane Hugo	Sep-89	696,000	18	3,500	8,800	6,308	700
Hurricane Hugo	Sep-89	180,000	12	2,338		2,300	286
Snow Blizzard	Mar-93	170,000	7				
Major Ice Storm	Feb-94	224,000	16	2,397	15,565	828	1,037
Ice event	Jan-96	61,000	4	1,130			
Ice Storm	Feb-96	650,000	8	4,000			100
Hurricane Bertha	Aug-96	225,000	4	3,035			
Hurricane Fran	Sep-96	790,000	10	8,250	5,500	2,800	3,000
Hurricane Fran	Sep-96	450,000	9	3,300	1,400	921	217
March-97 Ice Storm	Mar-97	160,000	5	1,110	420	420	100
April-97 Wind Storm	Apr-97	80,000	2	950	790	340	80
October-97 Snow And Wind Storm	Oct-97	213,000	4	1,495	670	610	170
Ice event	Jan-98	83,400	2	1,098			
May-98 Lightning And Wind Storm	Jun-98	442,000	8	3,920	1,540	1,210	470
July-98 Lightning And Wind Storm	Jul-98	106,000	2	883	570	820	90
Hurricane Bonnie	Sep-98	244,500	4	3,645			
Hurricane Georges	Sep-98	260,000	3	1,768	644	328	118
November-98 Snow And Wind Storm	Nov-98	160,000	3	1,755	860	780	130
Christmas Ice Storm 1998	Dec-98	167,700	5	1,704	525	276	
Ice Storm	Jan-99	120,000	4		100	100	
New Years Ice Storm 1999	Jan-99	109,685	5	837	153	62	
Ice Storm	Jan-99	220,000	4	1,600		250	38
May-99 Lightning And Wind Storm	May-99	99,000	2	680	680	570	110
Hurricane Floyd	Sep-99	537,000	6	6,300	1,160	586	680
Tropical Storm Floyd	Sep-99	322,494	8	852	350	210	85
Snowstorm	Jan-00	173,000	5	2,265			
Thunderstorms	May-00	155,000	4	1,000			
Dec Ice Storm #1 2000	Dec-00	226,139	8	4,196	1,917	174	547
Dec Ice Storm #2 2000	Dec-00	212,508	8	5,429	1,383	123	772
October-01 Snow And Wind Storm	Oct-01	99,000	3	993	580	620	120
March-02 Snow And Wind Storm	Mar-02	93,000	2	1,288	620	270	70
Hurricane Isidore	Sep-02	95,000	2	2,170	310	520	85
Hurricane Lili	Oct-02	243,000	2	5,880	1,800	920	202
Ice event	Dec-02	464,000	6	4,477	1,322	2,196	85
Ice Storm	Dec-02	1,375,000	9	9,500	3,200	2,300	549
Arkansas Ice Storm 2002	Dec-02	41,951	5	1,396	463	64	
Ice Storm	Feb-03	350,000	5	1,208			
April-03 Ice Storm	Apr-03	196,000	6	1,570	600	580	160
Thunderstorms	May-03	142,000	1.5	300			
Tornadoes	May-03	218,000	6	700	1,100	200	
Thunderstorms, high winds	Jun-03	350,000	3	750			
Hurricane Isabel	Sep-03	320,000	2	3,399	212	307	70
Tropical Storm Isabel	Sep-03	480,883	8	2,159	444	306	103
Average		278,029	5.6	2,567	1,789	884	363
Median		215,500	5.0	1,755	675	545	125

1) In recent years, survey respondents have improved the rate at which they are able to restore power to customers following a major storm event.

Figure 3 shows the average rate at which power was restored to customers following a major storm. The data was derived by dividing peak number of customers without power by total number of days required to restore power.

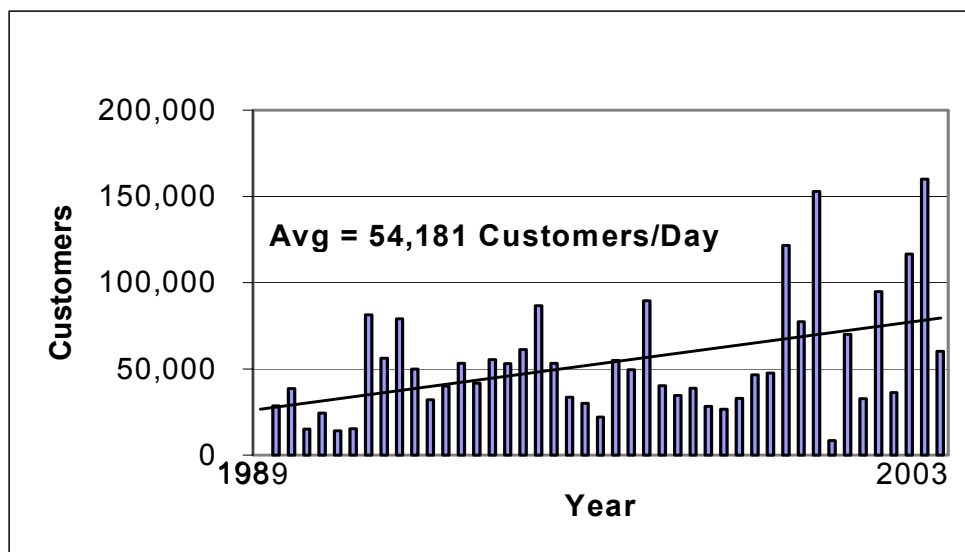
The data in Figure 3 illustrates that, in recent years, the utilities have restored power to as many as 150,000 customers/day following a major storm. This compares to an historical average of approximately 54,000 customers/day.

While this measure is one of the most commonly used storm-performance measures, this single statistic does not tell the whole story. Two storms may cause the same number of customer outages, but the outages from one can be much easier to restore than the other.

For example, a summer windstorm and a winter ice storm might have the same number of customers affected. The summer storm might result in a large number of outages due to blown fuses that are relatively easy to repair, compared to the damage caused by the ice storm, where ice-laden trees have taken down miles of lines, and crews must work in winter conditions with limited daylight to repair them.

Just as no two storms are the same, no two restoration efforts are the same. Relying only on “average number customers/restored per day” would mask these differences and result in misleading interpretations of restoration efforts.

**Figure 3: Average Customers Restored/Day
Major Storms 1989-2003**



Source: EEI Utility Survey

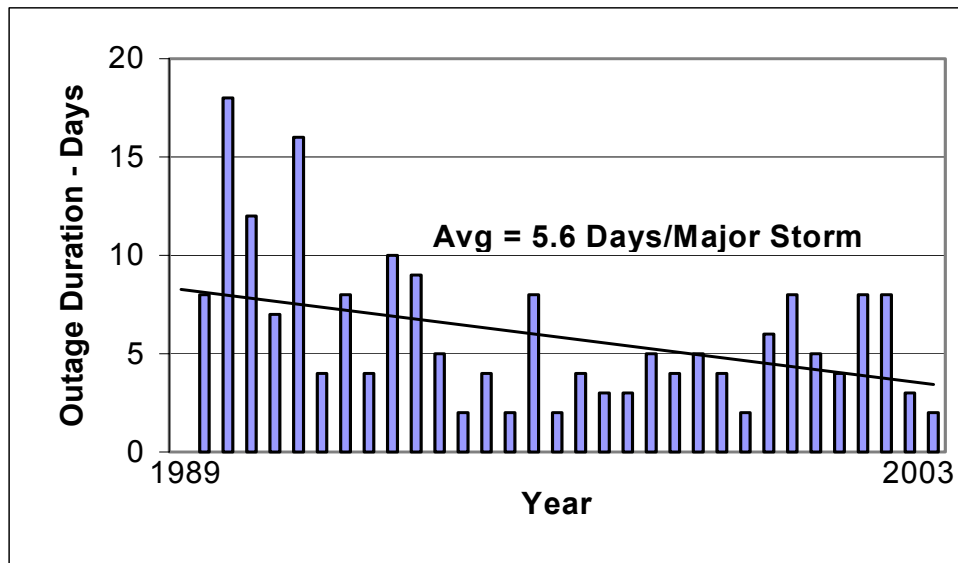
2) The average number of days required to complete restoration efforts following a major storm has decreased.

Figure 4 shows the number of days it took for survey respondents to restore power after major storms, over a 14-year period. The chart indicates that in recent years, utilities have been able to make restorations much more quickly than during the late 1980s and early 1990s.

There are two possible interpretations of this data. The first is that storms have not been as severe in recent years and therefore do not require as much effort by utilities to restore power. This conclusion is not consistent, however, with the data in Figure 2 that indicates large numbers of customer outages and substantial equipment damage in recent years. It also is not supported by the data in Figure 3 that shows utilities recently restoring power at record rates.

The other interpretation is that storms in recent years have been just as severe, but utilities have improved their post-storm performance and have reduced the overall time their customers are without power following a major storm. This conclusion is consistent with the data in Figures 2 and 3.

Figure 4: Duration of Storm Outages: Days per Major Storms 1989-2003



Source: EEI Survey

3) The number of restoration workers deployed after major storms has decreased fairly dramatically in recent years as the number of customers restored per worker has risen.

Figure 5 shows the average number of customers restored/restoration worker following a major power outage. Data for the chart is developed by dividing the peak number of customers without power by the peak number of restoration employees deployed during the outage restoration.

The data in Figure 5 indicates that in recent years, for each restoration worker deployed, as many as 450 customers had their power restored. This compares to an average of approximately 140 customers/restoration worker between 1989 and 2003.

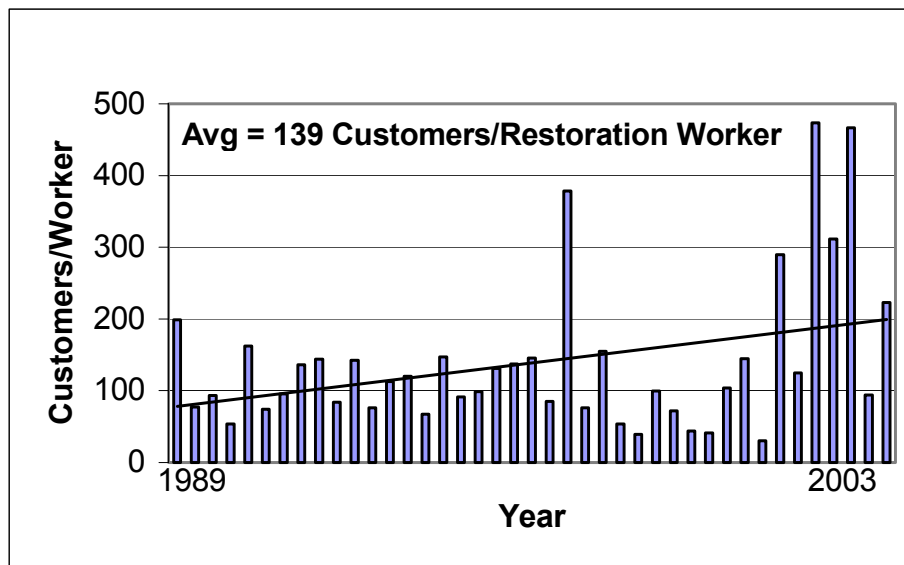
There also are two possible interpretations to this data.

The first is that utilities are not committing as many personnel resources to storm restoration as they have in the past. If this were the case, however, there is an expectation of an upward trend in the duration of storm outages (Figure 4), which is not the case.

Also, there is an expectation that with a lower number of restoration personnel deployed, one would expect the average rate at which customers are restored also to decrease. Figure 3 indicates just the opposite—an increase in the rate at which power is being restored.

The best explanation for the increase in the customer/restoration worker ratio in Figure 5 is that utilities are using their restoration personnel more effectively.

**Figure 5: Customers Restored/Restoration Worker
Major Storms 1989-2003**



Source: EEI Survey

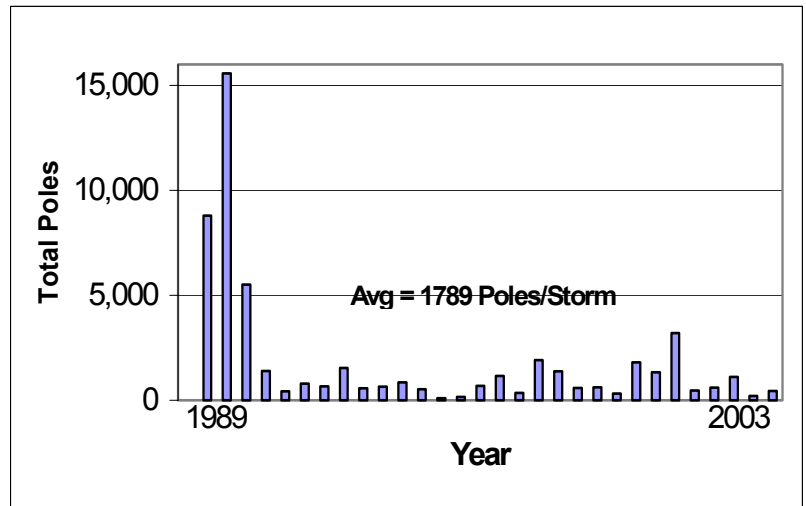
4) Based on equipment damage, recent storms do not appear to have been any more or less severe.

One of the best measures of a storm’s severity is the equipment damage it causes. The EEI survey collected information on damage to three types of equipment: poles, conductors, and transformers.

Figures 6, 7 and 8 show the total number of poles, conductors and transformers (respectively) replaced per storm. The equipment damage data presented in Figures 6-8 provides a useful means of evaluating the relative severity of the storms over the survey period.

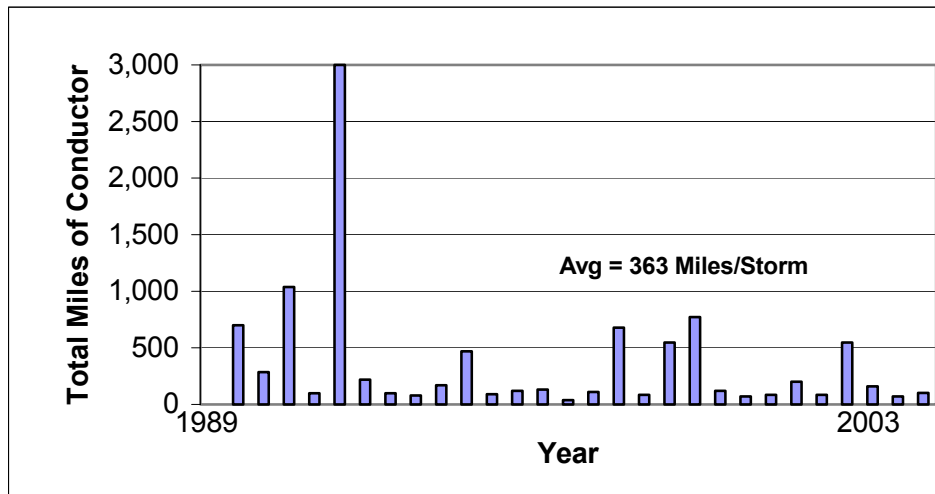
The data indicates that over the last half of the survey period, the damage caused by major storms has been fairly consistent. Had the data shown a decrease in storm damage in recent years, it might have called into question the general trends indicated by Figure 3, 4 and 5 discussed above.

**Figure 6: Total Poles Replaced/Storm
Major Storms 1989-2003**



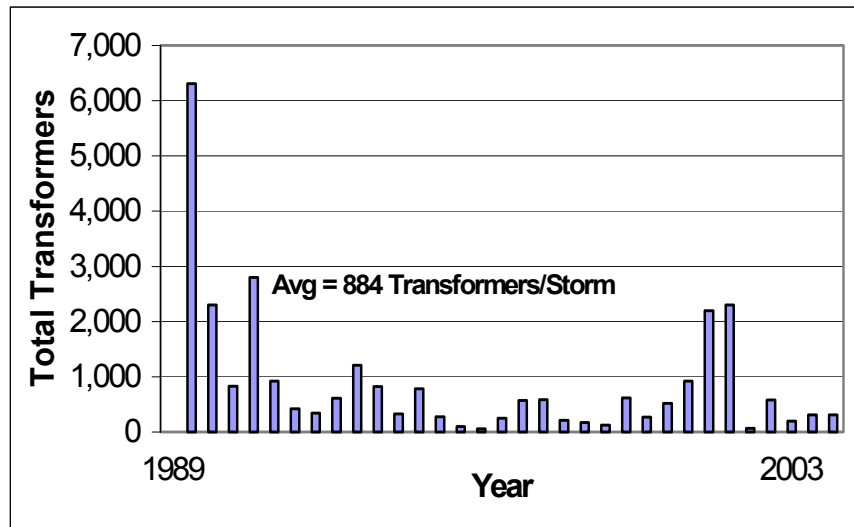
Source: EEI Survey

**Figure 7: Total Miles of Conductor Replaced/Storm
Major Storms 1989-2003**



Source: EEI Survey

Figure 8: Total Number of Transformers Replaced per Storm - Major Storms 1989-2003



Survey Qualifiers

Utilities and their customers would be ill-served to rely on any single performance criteria when evaluating utility storm-restoration performance.

Given the vagaries of storms and their varying degrees of impact on a utility system, utility restoration efforts should be viewed from every available perspective: the impact on customers, the level of resources committed to restoration, equipment damage and the duration of the restoration effort.

To look at any one these measures in isolation could present an inappropriate perspective on the restoration effort. However, when all of these criteria are taken into consideration and insight is developed into their interrelationships, a useful analytical framework is provided for effectively evaluating restoration efforts over an historical period.

Storm Restoration Case Studies

This study found much useful data on utility performance in the storm reports utilities prepare for state regulatory commissions. In some cases, the commissions also have prepared reports on utility performance. These voluminous reports contain an enormous amount of detail on utilities' storm responses, including mobilization efforts, communications, equipment replacements and call-center statistics. They also compare various storms.

Highlights of two recently issued storm reports are provided below. They provide useful insight into the enormous mobilization effort utilities undertake to respond to major storms, and suggest that the effectiveness of restoration efforts has been improving.

The first report is based on the North Carolina Utilities Commission report on Duke Power and Progress Energy's response to the December 2002 ice storm.⁴ The second is based on Baltimore Gas & Electric's response to Hurricane Isabel.⁵

North Carolina commission report on 2002 ice storm

On December 4 and 5, 2002, a major ice storm deposited up to an inch of ice on 40 North Carolina counties, causing unprecedented outages to nearly 2 million electric customers.

Figure 9 summarizes the impact of this storm on North Carolina's two largest utilities, Duke Power and Progress Energy. Together, these companies suffered \$125 million in damage to their systems. Some customers were without power for up to 9 days.⁶

Figure 10 compares the Duke and Progress Energy 2002 Ice Storm restoration effort with other major storms they have experienced in recent years. To respond to the 2002 ice storm, Progress Energy mobilized more than 5,000 restoration workers from 19 states and Duke Power mobilized more than 11,000 personnel.⁷

Each utility established separate staging areas to coordinate communications, material management, crew assignments and safety briefings. Duke Power took over the Durham County Stadium, and Progress Energy set up its staging area at the State Fairgrounds in Raleigh.

**Figure 9: December 2002 Ice Storm
Impact on Facilities**

Facilities	Duke	Progress
Poles Replaced	3,200	1,322
Transformers Replaced	2,300	2,196
Cross-arms Replaced	4,420	1,090
Insulators Replaced	37,000	3,760
Fuses Replaced	87,630	28,268

Source: December 2002 Ice Storm Report

⁴ "Report of the North Carolina Utilities Commission and the Public Staff to the North Carolina Natural Disaster Preparedness Task Force," September 2003

⁵ "Baltimore Gas and Electric Company Major Storm Report: Hurricane Isabel," October 2003

⁶ "Report of the North Carolina Utilities Commission and the Public Staff to the North Carolina Natural Disaster Preparedness Task Force," September 2003

⁷ Includes restoration personnel and total support personnel

Figure 10: Storm Restoration Statistics for Duke Power and Progress Energy 1989-2002

Storm Event	Year	Customers Impacted	Restoration Personnel	Outage Duration in Days	Avg # Of Customers Restored/Day	Costs In \$2002 (Millions)
Hurricane Hugo Duke	1989	696,000	N/A	18	38,667	94
Ice Storm Duke	1996	650,000	N/A	8	81,250	16
Progress Energy		61,000	1,130	4	15,250	7
Hurricane Fran Duke	1996	450,000	N/A	9	50,000	17
Progress Energy		790,000	8,250	10	79,000	115
Hurricane Floyd Progress Energy	1999	537,000	6,300	6	89,500	70
Snowstorm Progress Energy	2000	173,100	2,265	5	34,620	28
Ice Storm Duke	2002	1,375,000	8,747	9	152,777	87
Progress Energy		560,660	3,947	8	70,083	39

Source: December 2002 Ice Storm Report

Both companies used innovative work practices to manage their workforces and speed restoration efforts. These included shuttling crews to and from hotels so that their trucks could be refueled and restocked at night, preparing thousands of meals for crews to pick up at the staging areas, and supplying lunch to crews at job sites.

Baltimore Gas and Electric Response to Hurricane Isabel

On September 18 and 19, 2003, Hurricane Isabel struck the BGE system causing widespread damage due to flooding and sustained winds. Electric service was disrupted to more than 790,000 BGE customers, leaving some customers out of power for 8 days.

Total cost of the storm for BG&E was estimated at \$81 million. Figure 11 summarizes the impact of the storm on BG&E's facilities, and Figure 12 compares BG&E's restoration efforts for Hurricane Isabel in 2003 to Hurricane Floyd in 1999.

Figure 11: Hurricane Isabel Damage To BGE Facilities

Equipment Replaced	Number/Amount
Poles	444
Distribution Transformers	306
Fuses	33,665
Wire	105 Miles
Connectors	54,550
Crossarms	1,652
Cutouts	1,263
Insulators	8,120
Splices	42,704

Source: BGE Hurricane Isabel Storm Report

**Figure 12: BGE Storm Restoration Statistics
Hurricane Isabel vs. Hurricane Floyd**

Metric	Isabel	Floyd
Duration	8 days	8 days
Customer Data		
Total Number of Customer Interruptions	790,450	503,821
Peak Number of Customer Interruptions	480,883	322,494
Customer Calls Answered	712,380	290,000
Estimated Storm Cost	~\$81 Million	\$17.9 Million
System Damage		
Poles Replaced	444	350
Transformers Replaced	306	210
Sections of Wire Replaced	3,612	~3,000
Number of Jobs		
Trouble Cases	23,612	16,000
Field Restoration Jobs	15,583	11,000
Manpower Statistics		
BGE Line Crews	137	156
BGE Service Operations	71	74
External Line Crews	643	233
Overhead Secondary Crews	174	100
Tree Crews	304	163
BGE Damage Assessment Crews	361	100
Total Restoration Personnel	6,406	~3,300

Source: BGE Hurricane Isabel Storm Report

To accomplish the Hurricane Isabel restoration, BGE mobilized the largest workforce in its 200-year history. Nearly 6,400 workers participated in the restoration effort, including 3,000 non-BGE personnel mobilized from 27 states and Canada (Figure 13, next page).⁸

To manage this large workforce, BGE implemented its decentralized storm-operations procedures.

This required setting up three staging areas and three regional command centers. The staging areas were used to stage and feed external crews as well as provide equipment and materials.⁹

⁸ “Baltimore Gas and Electric Company Major Storm Report: Hurricane Isabel,” October 2003, page 3

⁹ “Baltimore Gas and Electric Company Major Storm Report: Hurricane Isabel,” October 2003, page 5

Conclusion

As our society continues to increase its dependence on electricity, customers grow ever less tolerant of power interruptions, especially extended outages, regardless of the reason for the outage. Electric utilities should expect that their storm-restoration activities will receive increased scrutiny by consumers, the media and state regulators.

The EEI survey on utility storm restoration activities represents an important first step in addressing the critical lack of data that can be used to identify trends in utility storm restoration performance at an industry level. The survey developed storm-performance criteria that are generally available from utilities and can be applied consistently to storms and utility restoration efforts. Although only six utilities were able to participate in this initial effort, valuable data was obtained on more than 40 significant storms over a 14-year period.

The resulting data and analysis shows that the utilities responding to the survey are making progress in responding to major storms that affect their systems.

These trends are validated by recent storm reports prepared by utility commission staff and individual utilities. They, too, have found utilities improving in their ability to restore their systems after storms. The reports echo the findings of the EEI survey, and conversely the EEI survey gives much insight into the reports. Utilities are undertaking monumental efforts to mobilize for restoration and rebuild their systems after they are torn apart by major storms.

One word of caution is in order: Each storm is different and each restoration effort presents its own set of challenges. It is not practical or useful to compare one utility with another in its storm-restoration efforts. This is not to say that utilities can't learn from past experiences, or from one another. But to be meaningful, comparisons need to be based on consistent metrics that are defined broadly enough to account for the unique circumstances that can affect storm-restoration activities.

At a minimum, any comparative analysis should consider the overall customer impact of the storm, the level of resources available to the utility, the degree of equipment damage, weather conditions during the restoration period (e.g., multi-day storms, or storms that occur on consecutive days) and the overall duration of the restoration effort.

Attachment 1
EEI Major Storm Restoration Survey

EEI is seeking member company support in obtaining historical data that can be used to demonstrate the effectiveness of the industry's response to major storm events in recent years, (e.g. Hurricane Isabel, 2002 North Carolina ice storm).

Please complete the following form for the 10 most severe storms your company has experienced since 1983. Use peak number of customers out of service to rank storm severity.

Completed surveys should be e-mailed to Brad Johnson at bwjohnson@acninc.net by October 31. All questions should be addressed to Brad Johnson at 703.532.3252 (Office) or 202.302.0892 (cell).

Company Name: _____

Name of Individual Completing Survey: _____

Individual Contact Information: _____

Phone number: _____

E-mail address: _____

Note: All specific company data will remain confidential. No company names will be released in any storm-data reports.

Major Storm Outage Data

Storm Event ¹	Date	Peak # Of Customers Out	Outage Duration (Days)	Peak # Of Line Restoration Personnel ²	Damage Estimates		
					Poles Replaced	Transformers Replaced	Primary Conductor Replaced (Miles)
<i>Hurricane Example</i>	<i>10/17/1985</i>	<i>550,000</i>	<i>8</i>	<i>2,265</i>	<i>1,121</i>	<i>1,769</i>	<i>125</i>

¹ Please identify type of storm, i.e. ice storm, hurricane, wind storm, thunderstorm, tornado (e.g. 1985 Ice Storm)

² Includes utility line workers, all field support personnel, contractors working in the field and mutual-assistance personnel

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Organized in 1933, EEI works closely with its members, representing their interests and advocating equitable policies in legislative and regulatory arenas. In its leadership role, the Institute provides authoritative analysis and critical industry data to its members, Congress, government agencies, the financial community and other influential audiences. EEI provides forums for member company representatives to discuss issues and strategies to advance the industry and to ensure a competitive position in a changing marketplace.

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- Advocating Public Policy
- Expanding Market Opportunities
- Providing Strategic Business Information

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