STAFF REPORT

July 11, 2011 Service Interruptions

ComEd Service Territory

October 24, 2011

INTRODUCTION

Staff prepared and presented to ComEd an extensive set of data requests pertaining to the storm and service interruptions that began on July 11, 2011.[1] Staff from the Energy, Financial Analysis, and Consumer Services Divisions sought to gather information that would assist in our review of the following areas:

- System condition, maintenance, and inspection before the storm,
- Characteristics of the storm and its effect on the power delivery infrastructure,
- Emergency plans: preparation, implementation, and results,
- Storm restoration activities,
- Circuits and substations that experienced service interruptions,
- ComEd's reported conclusions regarding the mitigating effects of smart grid,
- Storm costs: ComEd's estimated $80 million expenditures, prior years' costs, and accounting for costs in the proposed formula rate plan, and
- Customer service and communications.

Staff sent data requests to ComEd between July 19th and October 19th and ComEd delivered its responses between September 1st and October 19th. The data requests and responses are attached as appendices.

[1] The storm system reached ComEd's service territory in the early morning on July 11th. ComEd restored service to over 900,000 customers, and completed the final storm-related service restoration on July 17th. For purposes of this Staff Report, the weather events are referred to as the July 11th storm, or simply the storm.

The following sections of this Staff Report present for each of the three Divisions the purpose of the inquiry, an overview of the questions, a summary of the responses, and Staff's comments, conclusions and recommendations.

Energy Division's Review

Staff focused its review on the electric delivery system and designed its questions to determine the degree to which the condition of the distribution system and ComEd's response to the outages may have contributed to the magnitude and duration of the service interruptions. Those questions and ComEd's responses are summarized below.

A. System Condition, Maintenance, and Inspection Before the Storm

Staff asked ComEd (1) to describe its electric delivery system inspection programs, how well the programs conform to National Electric Safety Code ("NESC") rules and good utility practices, and whether those programs provide ComEd with a good awareness of system condition, (2) to explain the degree to which its maintenance, vegetation management, and replacement and refurbishment programs and practices are consistent with good utility practices, (3) to provide monthly corrective and preventive maintenance backlogs for the last five years and (4) to provide information specific to ComEd's vegetation management programs, with a focus on trees that are allowed to overhang distribution lines. Staff's questions and ComEd's responses are presented in Appendix A.

While in many respects Staff found ComEd's responses satisfactory, such as the plans, procedures and details of ComEd's inspection and maintenance programs, Staff's review has identified areas of concern.

- Staff's finds as unreasonably high the backlog of corrective distribution system maintenance.[2] A greater concern, however, is the *growing* backlog that has been trending upward since early 2007. Workers become frustrated as the list

[2] A growing maintenance backlog and the need to reduce that backlog was the focus of Recommendation Nine-9 in Liberty's "First Report of the Investigation of Commonwealth Edison's Transmission and Distribution Systems", June 2000, http://www.icc.illinois.gov/downloads/public/ng/Liberty%20Report.zip

grows and reported issues are not addressed in a timely manner. Eventually, maintenance issues may not be reported or the list of items to look for during an inspection may simply be reduced.

- Staff believes the backlog of corrective substation maintenance has also reached an unsatisfactory level, with an upward trend that began in early 2010.
- Vegetation overhanging 12kV and 4kV distribution facilities contributes to the number of customer outages. In 2007, ComEd enhanced the cyclic maintenance vegetation clearance guidelines for its 34kV system to allow no overhanging limbs, and the result was a decline in tree-related interruptions. However, Staff's analysis shows that, even with the elimination of tree overhang, other tree-related incidents, including tree contacts, uprooted trees and limbs broken from trees, accounted for 34% of the 34kV circuit lock-outs[3] during the July 11th storm. Staff agrees with ComEd's statement that it is reasonable that a program that eliminated all vegetation overhanging the 12kV and 4kV distribution facilities would significantly reduce outages,[4] but that even such a program would not eliminate outages caused by tree contacts, uprooted trees, and broken limbs from trees like those that impacted the 34kV system on July 11th.
- In the spring of 2011, Commission Staff conducted a series of field inspections as part of Staff's assessment of ComEd's annual Part 411[5] reliability report. Staff's purpose was to inspect portions of certain circuits to see if there were any obviously visible reasons for poor reliability performance. Six of the circuits inspected by Staff were among the 527 ComEd circuits that were locked out due to the July 11th storm. Staff observed a number of materials and maintenance issues that would contribute to poorer reliability performance during a typical storm, such as bad pole tops, disconnected cross-arm supports, loose or broken down guy wires, disconnected or blown lightning arrestors, primary wires so

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3 A circuit lock-out occurs when the circuit supply is disconnected from the circuit, usually after a number of automatic attempts to reclose, and the recloser or breaker (the switch) is locked open.

4 ComEd identifies additional factors to be considered when discussing the removal of overhang, including environmental conservation, visual appearance, the type of facility, tree species, and other site conditions.

5 83 Ill. Adm.Code 411, Electric Reliability.

close to a tree that the wire was leaning against the tree and being protected by a line hose,[6] areas where trees were into or close to the primary, and areas with overhead tree canopies above the primary wires. However, Staff's review of the characteristics of the July 11th storm and its effects on the power delivery infrastructure (in the next section of this report) makes Staff less certain that the existence of deficiencies in materials or maintenance would have made much of a difference during the July 11th storm, when, for example, the force of up-rooted trees likely exceeded the facilities' design limits.

Recommendations

- ComEd should develop a plan to reduce the number of danger and hazard trees (defined in ANSI A300 72.5[7] and 72.8[8]).
- ComEd should enhance cyclic maintenance clearance guidelines for the 12kV and 4kV distribution facilities to allow no overhanging limbs similar to the enhanced program utilized for the 34kV system.
- ComEd needs to reduce corrective maintenance backlogs.

B. Characteristics of the Storm and Its Effect on the Power Delivery Infrastructure

Staff asked ComEd (1) to provide a complete factual description of the storm that produced service interruptions, including the timing and path of the storm and the severity and magnitude of the storm in comparison to previous storms in ComEd's service territory, (2) to describe the damage the storm caused to ComEd's delivery system with discussions of distribution, transmission, substation facilities, and the causes of outages of circuits and equipment and (3) to describe the stresses that the storm placed on ComEd's facilities and why the facilities failed, and (4) to quantify the number of customers who were out of service during and after the storm until all

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6 Line hose is an item of worker protective equipment that consists of a split section of rubber insulating hose that line workers install temporarily onto bare high voltage wires while working in close proximity to them. Line hose is not intended to be a permanent installation.

7 ANSI A300 72.5 **danger tree:** A tree on or off the right-of-way that could contact electric supply lines.

8 ANSI A300 72.8 **hazard tree:** A structurally unsound tree that could strike a target when it fails. As used in this clause the target of concern is electrical supply lines.

customers were back in service. Staff's questions and ComEd's responses are presented in Appendix B.

Staff is satisfied that ComEd correctly identified the storm as being of such scale and intensity that even distribution facilities that were up to full as-built standards would have experienced significant damage and associated service interruptions.

C. Emergency Plans

Staff asked ComEd to describe its emergency plan and how it is designed to react to the July 11th storm and to provide a discussion of the effectiveness of the emergency plan as it applied to the storm. Staff requested a discussion of ComEd's employees' understanding of the emergency plan and their ability to implement the plan. Staff inquired about how often ComEd provided practice drills for its employees and when ComEd last updated its emergency plan. Staff's questions and ComEd's responses are presented in Appendix C.

Staff finds ComEd's emergency plan satisfactory in most respects and notes it was updated in July 2010. ComEd conducts annual drills with mandatory employee attendance which should, in Staff's opinion, facilitate better preparation and faster customer restorations.

Recommendation

- ComEd did not describe in its emergency plan any efforts to coordinate and train with the Illinois Emergency Management Agency ("IEMA"). IEMA coordinates the State's disaster mitigation, preparedness, response and recovery programs and activities, functions as the State Emergency Response Commission, and maintains a 24-hour Communication Center and State Emergency Operations Center.[9] ComEd should include coordination and training with IEMA in future plans.

[9] See IEMA's website: http://www.state.il.us/iema/about/

D. Storm Restoration

Staff asked ComEd (1) to describe what was known about the approaching storm and when ComEd knew it, (2) a description of ComEd's pre-storm and alert processes used for the storm and an explanation of the methods and timing of ComEd's mobilization of its emergency response organization, (3) to identify the times ComEd called upon contract line crews, contract tree trimming crews and mutual assistance crews to aide with storm restoration, and (4) to provide a timeline showing how many field personnel were working on storm restoration from the beginning of the storm until all customers were back in service. Staff's questions and ComEd's responses are presented in Appendix D.

Staff is satisfied that ComEd explained what was known about the approaching storm, the methods and timing of mobilization of its emergency response organization, and the requested restoration timeline. Given the severity of the storm, there is nothing in this review to indicate service could have been restored in a more timely manner.

E. Details of the Circuits and Substations Impacted by the Storm

Staff asked ComEd to provide detailed information for each circuit that experienced service interruption(s) due to the storm, if any service interruption(s) were the result of device failures within substation(s) and to provide detailed information about those devices and substations. ComEd reported to Staff that, as a result of the widespread nature of the storm, nearly every ComEd distribution circuit experienced service interruptions. To filter the data to a point where it would be more meaningful, Staff focused its analyses and review on those circuits that were locked out as a result of the storm, that is, those that completely lost power. Staff's questions and ComEd's responses are presented in Appendix E.

ComEd provided very detailed and satisfactory responses for each of the 495 4kV/12 kV circuits, thirty-two 34kV circuits, and 23 substations that were locked out as a result of the storm.

It is widely believed that service from an underground distribution circuit versus an overhead distribution circuit would afford assurances against service interruptions in

such a storm. However, Staff learned that a total of 15 circuits[10] were locked out due to underground equipment-related failures and also discovered that 230 (46%) of the 495 4kV and 12kV circuits locked out due to the storm were predominantly underground distribution circuits (where more than 50% of the circuit was underground). Staff is awaiting responses to its inquiries regarding the nature of the underground circuit failures and will continue to work with ComEd to understand the precise causes of the underground circuit failures with a goal of reducing future service interruptions.

Out of the 527 (495 4kV/12kV and thirty-two 34kV) circuits locked out during the outage, ComEd listed 263 circuits (50% of those locked out) that received or were scheduled to receive major improvements with a total of 480 programs for improvement. The severity of the storm apparently overwhelmed even those circuits that had recently received major improvement work.

ComEd installed 377 new poles while repairing damage from the storm which Staff believes is a good indicator of the severity of the storm and of the large scope of the restoration work done in a relatively short period of time.

Staff learned that five 4kV/12kV distribution circuits had gone more than four years since the last circuit inspection and one 4kV/12kV circuit had gone more than four years since the last circuit-wide tree trim. While this could have had no more than a minor, if any, impact on service interruptions, those inspection intervals do exceed ComEd standards[11] as well as commitments[12] made to the Commission on the

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[10] Staff asked ComEd for an explanation of the 15 underground equipment related failures (whether they were related to overloads from lightning strikes, flooding of underground devices, etc.), ComEd's response, Oct 7, 2011, was: **"Underground Fault" was reported as the cause of all 15 of the underground failures. If other causes had been specifically identified in the field, they would have been reported as such.** Staff finds ComEd's lack of understanding on this cluster of underground failures a reason for concern and will pursue this further.

[11] VM-ED-P025, Rev 2, Section 5.9.3; VM-CE-P038; Data Request Response OUT_1.01(a).

[12] January 29, 2002, David Helwig, ComEd, to ICC Staff, "… ComEd will remove vegetation to ensure that vegetation does not grow back into contact with ComEd's overhead electric distribution lines or grow or deteriorate into a position or a condition that threatens ComEd's overhead electric distribution lines, electric service reliability, employees, or the general public before ComEd returns to trim again in a maximum of four years …"; additionally, ComEd has made commitments to address Liberty Recommendations to bring ComEd's performance in line with good utility practices that are summarized in Liberty's "Final Report of the Investigation of Commonwealth Edison's Transmission and Distribution Systems" http://www.icc.illinois.gov/downloads/public/en/010416ComEdLib4.zip which is a summary of Liberty's First, Second, and Third reports:

maximum cycle time for circuit inspection and circuit-wide tree trimming. Staff will follow-up with ComEd on this timing issue in our next annual reliability assessment review.

Recommendation

- ComEd should investigate and report to the Commission on the reasons for the 5 circuit inspections and 1 circuit-wide tree trim that were over the 4-year cycle time.

F. ComEd's Infrastructure Investment

Staff asked ComEd a number of questions about technical details of ComEd's representation[13] that the impact of the storm would have been much less severe if certain investments[14] had been made in the past in ComEd's power delivery infrastructure. Staff's questions and ComEd's responses are presented in Appendix F.

ComEd offered no technical or engineering analyses that would support their contention that 20%[15] of the outages, or about 200,000 customers, would have been avoided if smart grid had been implemented. That claim is apparently based entirely on the reliability metrics provisions of SB1652 which Staff will discuss in more detail below.

ComEd testified before the Illinois House Public Utilities Committee that infrastructure investment in smart metering technology would have helped speed

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http://www.icc.illinois.gov/downloads/public/ng/Liberty%20Report.zip
http://www.icc.illinois.gov/downloads/public/en/000717ComEd2.zip
http://www.icc.illinois.gov/downloads/public/en/001019ComEdLib3.zip

[13] Reported in the "Daily Herald" 7/14/2011 by Anna Marie Kukec who interviewed ComEd spokeswoman Tabrina Davis.

[14] ComEd appears to be admitting failure in their Commitment to Liberty Recommendation, Three-1: "ComEd should dedicate the necessary funds to maintain and improve the reliability of its T&D systems" where ComEd's response was: "Agree. ComEd is committed to maintaining and improving the reliability of its T&D system. We are also committed to maintaining the transmission and distribution system in a reliable state of readiness and to delivering high quality service to our customers, and will dedicate the funds necessary to do so." ComEd' Response to 1st Liberty Report, Docket 10-0527, Staff Exhibit 11.0, Attachment N, p. 8
http://www.icc.illinois.gov/downloads/public/edocket/282565.pdf

[15] In part 5 of her testimony to the Illinois House Public Utilities Committee on August 16, 2011, in Highland Park, IL Anne Pramaggiore, ComEd President and Chief Operating Officer, reported that smart grid "…would have reduced outages by 15-20 percent, or almost 200,000 fewer outages. This would have reduced the pressure on our restoration process allowing us to move through the remaining outages more efficiently."
https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_08162011.pdf

restoration of the service interruptions by identifying which customers were out of service.[16] However, ComEd already has the ability to learn when customers are out of service with their Supervisory Control And Data Acquisition ("SCADA") system. ComEd's SCADA system notifies dispatchers when a circuit is locked out. Of the 495 4kV/12kV circuits that were locked out, all but four[17] were on the SCADA system and all of the thirty-two 34kV circuits that were locked out were on the SCADA system. ComEd knew when those circuits were locked out and thus would have known that all customers served by the locked out circuits were out of service.

As to ComEd's claim about how many customers would not have experienced outages if they had already invested in a "smarter" distribution system, Staff's review of the SB1652 metrics leads to a conclusion that the metrics are designed to be achieved passively, that is, without ComEd needing to take action to improve system reliability. In fact, it appears that the SB1652 metrics would almost inevitably, because of the provision excluding nine major outage events in any single year under consideration, demonstrate a significant reliability improvement year-to-year even without improvement in outage statistics.

G. Summary and Conclusion

1. Storm Severity and Impacts

ComEd's descriptions of the July 11th storm, and the extent to which it downed trees in ComEd's service territory, reveal the severity of the storm (Sections I.B. and I.D. above). When trees or major tree branches fall on overhead electric delivery lines, the likely result is the facilities will break or the lines will come in contact with one another and cause equipment outages and service interruptions. The age and condition of the

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[16] ibid

[17] ComEd response to Staff Data Request OUT_2.01 10-6-2011.

RESPONSE:

a. The Substations in ComEd's Response to Staff Data Request OUT 1.02 had SCADA ability. The distribution circuits that did not have SCADA ability are as follows: D123, C850, C853 and C905.

b. The four (4) distribution circuits identified in subpart (a) above operate at 4kV and do not currently have SCADA capabilities. The substations that feed these four (4) circuits have SCADA capabilities for 34kV and 12kV circuits.

poles, crossarms, wires, and other electrical equipment will not make a significant difference in such cases. Even new poles and lines cannot support heavy trees when they fall. ComEd's responses to Staff's inquiries provide no evidence that the material condition of ComEd's distribution system contributed to any significant degree to the number or duration of customer outages. Staff will continue to focus on maintenance and materials condition in subsequent annual reliability assessment reviews.

2. ComEd System Condition and Restoration

The widespread damage to ComEd's overhead delivery systems and the resulting service interruptions were due to a storm system of sufficient force to exceed the design, construction, and maintenance standards required by the Commission. Staff found no evidence to indicate that ComEd's storm restoration efforts were significantly magnified by ComEd's system condition prior to the storm, that system condition negatively affected restoration efforts, or that restoration efforts were deficient in any significant way. ComEd should reduce its distribution system's preventative and corrective maintenance backlogs, and reverse the upward trend in the backlogs. However, while those practices can be a valuable indicator of how ComEd might make improvements in distribution system reliability during less severe weather, it is Staff's opinion that those backlogs did not significantly contribute in this case to the effects of the storm upon the system. Staff will revisit the backlog issue in upcoming annual reliability assessment reviews.

3. Undergrounding

One claim often made in instances when severe weather damages overhead electricity delivery systems is that the systems could be less severely affected if their components were underground. In the case of the July storm, however, customers served by underground circuits also experienced service interruptions. Unless circuits are completely underground, severe weather still has the potential to negatively affect the overhead portions of the circuits and result in equipment outages and customer service interruptions. Many partially undergrounded circuits on ComEd's system suffered outages in the storm because trees fell on and damaged the overhead portions of those circuits: of the 495 either 4kV or 12kV distribution circuits which completely lost

power from the storm, nearly one-half (230) of those circuits were predominately underground distribution circuits. Additionally, ComEd's responses to Staff's inquiries indicated that there were also an unexpected number of instances where underground portions of *partially buried* circuits were adversely affected. As discussed in Section I.E. above, ComEd has not yet explained to Staff the 15 underground faults that occurred as a result of the storm.

4. Trees

The principal danger to electricity delivery systems from severe weather is trees. The U.S.-Canada Power System Outage Task Force concluded:.

> …[I]t is generally accepted that the single largest cause of electric power outages occurs when trees, or portions of trees, grow or fall into overhead power lines. The odds are that every single electric customer in the US and Canada has, at one time or another, experienced a sustained electric outage as a direct result of a tree and power line conflict.[18]

Staff learned that ComEd revised its cyclical maintenance clearance guidelines in 2007 to remove all branch overhangs above their 34kV lines and experienced a decline in tree-related interruptions after 2007. That type of reliability improvement could prove to be even more significant if it allows the electric utility to devote more time to other distribution system activities, such as maintaining original NESC construction standards.

More extensive tree removal from areas near electricity delivery lines to reduce the risk of trees and tree branches falling on and damaging those lines during severe weather could provide major reliability improvements. The Commission has adopted the NESC that contains Rule 218, which states that, "Trees that may interfere with ungrounded supply conductors should be trimmed or removed."[19] That rule does not

[18] U.S.-Canada Power System Outage Task Force, Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations (April 2004) (Final Blackout Report).

[19] 2002 NESC adopted by the Commission in Illinois Administrative Code 305.20 on June 15, 2003 NESC Rule 218(A)(1) and its associated note state the following:

> "Trees that may interfere with ungrounded supply conductors should be trimmed or removed.
> *NOTE:* Normal tree growth, the combined movement of trees and conductors under adverse weather conditions, voltage, and sagging of conductors at elevated temperatures are among the factors to be considered in determining the extent of trimming required.

mandate removing all overhanging branches or trees that could fall on electricity delivery lines during storms. To take that major step would be a significant move beyond traditional electric utility tree trimming practices and would likely generate major public opposition, but Staff is convinced that it would also lead to major reliability improvements on electricity delivery systems during severe storms.

5. Distribution System Modernization and Smart Grid

As mentioned above, another conclusion that Staff reached after studying all the information that ComEd supplied in its responses to Staff's inquiries is that ComEd could not support its claims about the degree to which smart grid enhancements on its system would have reduced the frequency and duration of the outages. As for service interruption frequency, that is, how many or how often customers suffered service interruptions, no electric distribution system will function well when it is lying on the ground under an uprooted tree. As to service interruption duration, that is, how long any utility takes to learn about outages and to eliminate those outages, ComEd's distribution system is already, and has been for several years, equipped with an extensive SCADA system which lets ComEd's system operations personnel to know as quickly as a smart meter could tell them when a circuit has lost power.

In a storm of this magnitude, where whole circuits are knocked to the ground, ComEd system operators know that information through their SCADA system. Smart system enhancements, often called "distribution automation," such as the SCADA system, and other devices which can communicate to ComEd system operators and "self heal" the system, can contribute significantly to ComEd's system reliability under normal weather circumstances. The July 11th storm was an extreme weather event.

As to questions about performance metrics mentioned previously, ComEd testified before the House Public Utilities Committee that, if there had been infrastructure investment in smart metering technology, it would have helped speed

service restoration by identifying which customers were out of service.[20] That claim is apparently based entirely on the reliability metrics provisions of SB1652.

ComEd is required by SB 1652 to meet certain reliability targets during the ten years following enactment of the law and demonstrate the following reliability improvements:

> (f) [ComEd] shall develop and file with the Commission multi-year metrics designed to achieve, ratably over a 10-year period, improvement over baseline performance values as follows:
>
> (1) Twenty percent improvement in the System Average Interruption Frequency Index ["SAIFI"], using a baseline of the average of the data from 2001 through 2010.
>
> (2) Fifteen percent improvement in the system Customer Average Interruption Duration Index ["CAIDI"], using a baseline of the average of the data from 2001 through 2010.[21]

and

> . . . [ComEd] may exclude up to 9 extreme weather event days from such calculation for each year. For purposes of this Section, an extreme weather event day is a 24-hour calendar day (beginning at 12:00 a.m. and ending at 11:59 p.m.) during which any weather event (e.g., storm, tornado) caused interruptions for 10,000 or more of the participating utility's customers for 3 hours or more.[22]

The metric employed is an annual system-wide average that excludes data from the nine worst performance days in a target year and compares that metric to an average of the ten years, 2001 through 2010, that <u>does</u> <u>not</u> exclude worst performance days, the so-called major event days ("MED").

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[20] August 16, 2011, testimony of Anne Pramaggiore, ComEd President and Chief Operating Officer, before a House Public Utilities Committee hearing in Highland Park, Ill., https://www.comed.com/sites/newsroom/News%20Room/newsroomreleases_08162011.pdf

[21] SB1652 Enrolled version – p. 95, l. 6-16

[22] SB1652 Enrolled version – p. 97, l. 7-17

To gauge how the metric might work, Staff compared historical data to a calculated ComEd reliability performance baseline. Though SB 1652 is contemplated to be effective in 2011, no data exists at this time for ComEd's 2011 reliability performance or to permit excluding ComEd's nine worst performance days for 2011. As a general approximation, Staff computed ComEd's average reliability performance for the period of 2001 through 2010 for both SAIFI and CAIDI (Column 1 below), calculated the degree to which those numbers would have to be improved upon for ComEd to meet its reliability performance metric for 2010 (Col. 2) and then excluded from ComEd's actual 2010 performance data (Col. 3) Staff's best and conservative estimate of what ComEd's 2010 reliability performance would have been after excluding the nine worst performance days (Col. 4).

Staff determined, recalculating SAIFI and CAIDI using 2010 as the base year, that ComEd would have met not only the "ratable" percentage improvements for the first of the ten years, but also would have exceeded the entire ten-year 20% reliability performance metric.

Staff concludes from this analysis that the SB 1652 provision excluding the nine worst MEDs in any single target year would almost inevitably demonstrate a significant reliability improvement for that target year over ComEd's ten-year average reliability performance, not excluding any MEDs, without requiring ComEd to make any actual improvements to its distribution system performance.

Col. 1	Col. 2	Col. 3	Col. 4
Ten Year 2001-2010 SAIFI Avg	TARGET SAIFI Avg less 20%	ACTUAL 2010 SAIFI	2010 SAIFI Excluding 9 Estimated MED's
1.27	1.02	1.35	1.0145

Ten Year 2001-2010 CAIDI Avg	TARGET CAIDI Avg less 20%	ACTUAL 2010 CAIDI	2010 CAIDI Excluding 9 Estimated MED's
141.4	120.19	181	106.5455

Notes:

- SAIFI = (Total number of customer interruptions)/(Total number of customer served)
- CAIDI = (Sum of all customer interruption durations)/(Total number of customer interruptions)
- Ten Year SAIFI and CAIDI is based on ComEd Annual Reliability Report filings for 2001 - 2010
- Target SAIFI is the Average of the 2001-2010 SAIFI times 80%
- Target CAIDI is the Average of the 2001-2010 CAIDI times 85%
- Actual 2010 SAIFI and CAIDI are from table 18a, p. H-2, ComEd 2010 Annual Reliability Report

Financial Analysis Division's Review

In its 10-Q filing with the SEC on July 27, 2011, ComEd stated:

> On July 11, 2011, a significant wind and lightning storm affected more than 850,000 customers in ComEd's service territory; one of the worst storms in terms of damage and customer impact in ComEd's history. ComEd's restoration efforts included significant costs associated with employee overtime, support from other utilities in other states and incremental equipment and supplies. ***ComEd estimates that the restoration efforts included operating and maintenance expense and capital expenditures of approximately $55 million and $25 million, respectively****,* for the third quarter. ***The vast majority of the operating and maintenance expenses are incremental to ComEd's normal budget for summer storm activity***. As the aforementioned outages resulted directly from weather events outside of ComEd's control, ComEd intends to request a waiver from the provisions of the Illinois Public Utilities Act that could require damage compensation to customers. (*Emphasis added*)

The Financial Analysis Division ("FAD") was interested in the breakdown of ComEd's estimated $80 million storm expenditure, in particular, the portion "incremental to ComEd's normal budget for summer storm activity." (Staff Data Request MS 1.01) FAD was also interested in a comparison of storm restoration expense in prior years. (Staff Data Request MS 1.02) Lastly, given ComEd's proposed SB 1652, FAD was interested in understanding how the July 11th storm expenses would be treated under the Company's proposed formula rate plan. (Staff Data Request MS 1.03)

A. Details of Estimated $80 Million Storm Expenditure

For the July 11th storm and cumulatively for other 2011 storms, Staff requested information regarding (1) the difference between the normal level of expenses and the amount due to the storm, (2) the details of the storm expense including the accounting classifications such as distribution vs. transmission, expense vs. capital expenditure, overtime vs. regular labor costs, and (3) the costs and other information associated with ComEd, foreign and contractor crews. Staff's data request MS 1.01 and ComEd's responses are presented in Appendix G.

The Company's response indicates approximately $70 million of *incremental* storm restoration expense for the July 11th storm. Of that amount, $50.7 million is

classified as operating and maintenance expense and $19.3 million is capitalized. The bulk of these costs were allocated to the utility's distribution function.

Of the $80 million of estimated total costs for the storm, most were for payment to contractors ($45.8 million), materials and supplies ($9.2 million) and overtime for ComEd's labor force ($8.1 million). The same three categories have the highest cost estimates for all storm expenses incurred January 1 through July 11, 2011.

The estimated cost for hiring foreign utility crews for the July 11th storm is $5.9 million. This compares to the estimated $6.9 million estimated to have been incurred from January 1 through July 11, 2011 for hiring foreign utility crews.

B. Comparison of Prior Years' Storm Expenses

Staff requested a history of total annual storm restoration costs from 2004 through projected 2011 and a breakdown between operating and maintenance (O&M) and capital expenditures for the *total company* and for *jurisdictional* delivery service. Data for both total company costs and for jurisdictional delivery service costs were requested to clarify the magnitude of the storm costs that could be considered in the level of storm costs to allow for recovery from ratepayers in future rate proceedings. Staff's data request MS 1.02 and ComEd's responses are presented in Appendix H.

The Company's response indicates that the *jurisdictional* O&M portion of actual storm restoration expense from 2004 to 2010 ranged from a low of $18.2 million in 2005 to a high of $73.2 million in 2008. Further, the *jurisdictional* capitalized portion of actual storm restoration expense over the same period ranged from a low of $8.5 million in 2009 to a high of $34.6 million in 2006. The projected 2011 *jurisdictional* O&M portion of storm restoration expense is $160.8 million and the capitalized portion is $55.3 million.

On a *total company* basis, the O&M portion of actual storm restoration expense from 2004 to 2010 ranged from a low of $18.4 million in 2005 to a high of $75.2 million in 2008. Further, the *total company* capitalized portion of actual storm restoration expense over the same period ranged from a low of $8.5 million in 2009 to a high of $39.9 million in 2006. The projected 2011 *total company* O&M portion of storm restoration expense is $161.9 million and the capitalized portion is $56.6 million.

C. Ratemaking Treatment for Storm Expenses

Staff asked ComEd to explain how the July 11th storm restoration costs would be considered in the determination of rates under its proposed formula rate legislation (SB 1652). Staff's data request MS 1.02 and ComEd's responses are presented in Appendix I.

The Company's response indicates that under SB 1652, the estimated incremental O&M expense of the July 11, 2011 storm of $50.7 million would be amortized over five years at approximately $10.1 million per year beginning with the 2011 reconciliation for the formula rate. In addition, SB 1652 provides that the unamortized balance associated with the deferred recovery of storm expense would be included in rate base and thereby earn a carrying cost. Thus, ratepayers would pay approximately $57,212,000 for the July 11, 2011 storm starting in 2013 as follows:

$12,745,000 in 2013;
$12,094,000 in 2014;
$11,442,000 in 2015;
$10,791,000 in 2016;
$10,140,000 in 2017.

Under traditional ratemaking, a normalized level of storm expense (typically a multi-year average) is recovered through rates. This method recognizes that the company experiences higher storm costs in some years and lower costs in others. While a large storm will influence the annual and multi-year average costs, today's ratemaking policy does not allow such a storm to stand alone for special ratemaking treatment, as is permitted by SB 1652.

D. Conclusions

The Company's data request responses indicate that the projected 2011 *total company* and *jurisdictional* storm restoration costs are more than double than was incurred in 2008, the year with the highest reported storm costs in the period 2004 through 2010.

These results are driven by the high storm restoration expenses ComEd estimates to have been incurred as a result of the July 11, 2011 storm. Of the $80

million estimated to have been spent for restoring service due to that storm, $70 million (87.5%) is incremental to what would have been spent on normal operations had the storm not occurred.

The provisions of SB 1652 would permit ComEd to recover from customers $57,212,000, or approximately $6.5 million more than the $50.7 million O&M storm costs.

Consumer Services Division's Review

The volume of contacts from ComEd customers to the Consumer Services Division ("CSD") increased significantly during and immediately following the July 11th storm. Between July 11th and July 15th, CSD recorded 703 customer contacts, which is significantly higher than weeks without storm activity. The table below illustrates the difference in total customer contacts recorded by category for the week of the July 11th storm and the weeks preceding and following the storm. CSD sent an inquiry to ComEd about issues raised in customer complaints the week of the storm as well as ComEd's procedures for customer service and communication during storms. The questions and ComEd's responses are attached as Appendix J.

CUSTOMER CONTACTS BY CATEGORY

	6/27 - 7/1	7/4 - 7/8	7/11 - 7/15	7/18 - 7/22
BILLING	198	157	406	260
CREDIT & DEPOSIT	12	9	14	10
OTHER	10	8	25	11
RATES	1	3	4	3
SERVICE	33	26	214	65
TERMINATION	59	50	40	17
TOTAL	313	253	703	366

Customers contacted CSD with complaints of lengthy outages and the Company's inability to provide accurate information about when service would be restored. In many instances customers reported that they had experienced frequent outages in the past and thought the Company should provide better service. Staff notes

that the increase in customer complaints the week of the storm was not limited to service related issues. A significant increase in contacts also pertained to billing issues.

A. Call Center

When ComEd activates its Emergency Response Organization due to storms, company personnel, including Customer Service Representatives ("CSRs"), give priority to outage related calls and operations which predominately limits customers with other issues to the automated call handling functions of ComEd's Voice Response Unit ("VRU"). From customer complaints, Staff learned that ComEd continued automated collection calls to customers during the storm period driving additional customers to the call center during a period of high volume. This directly contributed to an increase in calls to CSD as these customers were limited to mainly automated functions of ComEd's call center and customers were not able to speak with a live CSR to resolve their issues. Staff made ComEd aware of the continuance of automated collection calls during the storm period and ComEd agreed to suspend these calls until normal operating conditions resumed. Responses to Staff's inquiry confirmed that ComEd has a Storm/Emergency Manual that includes criteria for determining when an emergency storm mode exists based on weather conditions and certain levels of distribution system operating conditions, the roles and responsibilities of personnel, and procedures to be followed.

Staff asked ComEd to provide information pertaining to call volume, abandoned call rates and customer wait time to reach a CSR. ComEd provided the following information regarding its Customer Call Center abandoned call rate and wait time. ComEd noted that on July 11, 12, and 13, the Customer Care Center ("CCC") was only taking service interruption calls. On July 14 and 15, the CCC was taking some normal business calls, but not at full capacity. On July 16 and 17, the CCC was operating under normal business conditions. Based on the data supplied by ComEd, there were approximately 66,000 abandoned calls from July 11 through July 17.

DAY	DATE	TOTAL CALL VOLUME (CSR and VRU)	ABANDON CALL RATE	CUST. TO CSR WAIT TIME (SECONDS)
MON	7/11/2011	614,518	6.9%	156.1
TUE	7/12/2011	283,854	3.7%	80.3
WED	7/13/2011	136,704	5.2%	45.0
THU	7/14/2011	91,826	3.1%	90.5
FRI	7/15/2011	73,437	3.7%	117.0
SAT	7/16/2011	26,294	2.5%	90.1
SUN	7/17/2011	19,731	1.7%	41.4

Staff notes that the customer-to-CSR wait time is an average and does not reflect longer wait times described in customer complaints to CSD. The average customer-to-CSR wait time calculation also does not include wait times for the approximately 66,000 abandoned calls.

ComEd stated before the House Public Utilities Committee on August 16, 2011 that it plans to add 1,000 additional phone lines to its Call Center, doubling its capacity from 1,000 lines. Staff observes that access to a CSR is jointly driven by phone line capacity and manpower limitations.

Recommendations

- Staff recommends that ComEd revise its procedures to include the suspension of automated collection calls when it determines that CSRs will not be able to take calls from the customers contacted through the automated collection calls.
- Staff recommends that ComEd perform a quality review following major storm events or emergencies that would include a comparison of its practices with the procedures manual to ensure consistency and to determine whether changes are appropriate.

- Staff recommends that ComEd review its processes and third party agreements for handling increased volumes of calls during storm events or emergencies of this magnitude for opportunities to increase capacity for customers to speak to a CSR.
- Staff recommends that ComEd share with Staff details pertaining to the implementation of 1,000 additional lines allowing access to the call center.

B. Estimated Time to Restore ("ETR")

In response to Staff's inquiry regarding ETR calculations and resulting communications, ComEd responded that it uses a job aid that has been developed based on more than 10 years of data to help assist storm teams in establishing storm ETRs. An ETR calculator program is also used to develop an ETR for each reporting center. During storms, auto ETRs are initially suppressed and not available to customers. Once the storm has passed through the service territory, ETRs are established based on the magnitude and type of storm and resources available for restoration. The approved ETRs are uploaded to the Outage Management System, the suppression is removed and ETRs are available to customers. When ETRs are available, customers may obtain ETR information via phone through the VRU or CSRs, and via text messages if they subscribe to the outage alert program. Information is also available through ComEd's website, Facebook, and Twitter.

ComEd states that its goal is to review ETRs as restoration efforts progress. Crews are required to update the ETR once they arrive on the jobsite, identify the work required and determine the amount of time the repair will take.

Staff notes that although customers included in the example ETR provided by the Company had service restored in advance, the ETR did not accurately predict when electricity will be restored. As much as consumers likely appreciate service restoration earlier than predicted, the ETR provided was inaccurate by approximately four days. Accurate ETRs are essential to consumers making contingency plans during an outage. Additional examples may demonstrate how the ETR is changed or refined as new information becomes available. Staff notes that it received complaints from consumers

about the accuracy of the ETRs provided during the outages, and it should be ComEd's goal to improve the availability of accurate ETRs.

Recommendation

- Staff recommends that ComEd review its overall process for determining ETRs and consider any possible alternatives that would result in more accurate ETRs being communicated to its customers.

C. Conclusions

The magnitude of the July 11th storm severely impacted customer service, and, while this was a large storm, it offers ComEd the opportunity to review its operating procedures to determine what areas can be improved when its storm mode is activated. Improving the accuracy of the ETR (Estimated Time to Restore) is important to customers and community officials. While acknowledging the value of giving priority to outage calls, ComEd should review the impact of limited access upon day to day business and determine ways to mitigate the adverse impact on customers. Staff recommends that ComEd revise its procedures to include the suspension of collection calls when it determines that CSRs will not be able to take calls from the customers contacted through the automated collection calls. ComEd should also review all its scripts to determine whether messages to customers can be improved.