Illinois Commerce Commission

Staff's Assessment Report of MidAmerican Energy Company 2010 Reliability Report

Pursuant to 83 Illinois Administrative Code Part 411

August 23, 2012

1. Executive Summary

On June 1, 2011, MidAmerican Energy Company ("MEC") filed its Annual Reliability Report for calendar year 2010 pursuant to Section 16-125 of 220 ILCS 5/ of the Public Utilities Act and Part 411 of 83 Illinois Administrative Code (Electric Reliability). Staff reviewed MEC's Report and concluded that it complied with Part 411 of the Code.

Generally, MEC's reliability performance deteriorated in 2010 compared to its reliability performance in 2009.

In 2010, the total number of customers who experienced interruptions exceeding reliability targets decreased by 28% compared to 2009 after increasing rapidly for the previous five consecutive years. Even after that decrease, the 2010 number is still the second largest since MEC started reporting the number of customers who experienced interruptions exceeding reliability targets in 2004. Customers are identified as having experienced service interruptions exceeding reliability targets when they go without electric service for a specified frequency or duration every year for three consecutive years.

MEC's increasing trend in the number of customers experiencing service interruptions in excess of reliability targets may have been influenced by severe weather. In its 2007 reliability report, MEC cited ice and winter storms that hit its service territory in February and December as major contributors to the increase in service interruptions. In its 2008 reliability report, MEC cited the derecho that passed through its service territory in July as a major contributor to the increase in service interruptions. MEC reported that severe summer storms in 2009 and 2010 impacted its service territory.

Although weather could have been a major factor in power outages, other factors such as infrequent circuit inspection and inadequate tree trimming practices might have kept the number of customers experiencing outages exceeding reliability targets at a high count. In 2010, the total number of outages increased from 2009 by more than a quarter and the total duration of those outages increased by more than one-half. Also in 2010, while the overall number of customer service interruptions increased by nearly one fifth from 2009, the total duration of customer service interruption nearly doubled. These increases occurred in spite of what MEC describes as actions it had taken to improve service reliability.

In 2010, MEC reported the second worst SAIFI among Illinois pubilc utilities at 2.99, having deteriorated by 19% compared to 2009.

In 2010, MEC reported the second worst CAIDI among Illinois public utilities at 172 minutes, having deteriorated by 62% compared to 2009..

In 2010, MEC reported that the leading cause of power outages was the weather, followed by overhead equipment failure, a virtual three-way tie between overhead equipment failure, transmission and substation equipment failure, and tree related outages as shown in Table 4.

During Staff inspection of twelve MEC circuits, Staff recorded 494 observations that Staff believed posed a threat to MEC's electric distribution system reliability, and nearly two thirds of these observations involved vegetation conflicts with MEC's equipment. In addition, Staff recorded several NESC violations, most of which pertain to vertical clearance and structural damage. A summary of Staff's circuit inspections is included in Section 7(D) of this assessment.

Section 9 of this assessment is a summary of MEC's updated description of several ongoing projects, identified in MEC's 2010 Reliability Report, that are aimed at improving the reliability of MEC's electric distribution system. MEC listed programs that it implements to inspect specific elements of its distribution and transmission systems on cyclical basis. Some of these programs have ten-year cycles. While Staff believes that these projects have the potential to improve reliability performance when fully implemented, the effectiveness of some of these programs can be significantly reduced by the length of the cycle that MEC was adopting until recently. Having a cycle that is shorter than ten years would enable MEC to identify reliability problems in a timelier manner and remedy them accordingly, and thereby increase chances of improving overall system reliability. Staff recommended that MEC adopt an inspection cycle of no longer than four years for its distribution system after its current NESC Corrective Action Plan is completed and MEC has very recently indicated that it would adopt a four-year circuit inspection cycle.

Staff recommends that MEC trim more vegetation away from its primary wires and overhead equipment and remove tree limbs that overhang its distribution facilities during its three-year vegetation cycle so that adequate vegetation clearance lasts for the full three years.

Table of Contents

2. Introduction

On June 1, 2011, MEC filed its Annual Reliability Report for the calendar year 2010 pursuant Section 16-125 of 220 ILCS 5/ Public Utilities Act and to Part 411 of the Code. According to Section 411.140, beginning with the year 1999 the Illinois Commerce Commission ("Commission") shall assess the annual reliability report of each electric public utility at least once every three years. Section 411.140 defines the parameters of such an assessment and the criteria for evaluation of such a report. Subsection 411.140(a)(2) requires the Commission to:

A) Assess the jurisdictional entity's historical performance relative to established reliability targets.

B) Identify trends in the jurisdictional entity's reliability performance.

C) Evaluate the jurisdictional entity's plan to maintain or improve reliability.

D) Include specific identification, assessment, and recommendations pertaining to any potential reliability problems and risks that the Commission has identified as a result of its evaluation.

E) Include a review of the jurisdictional entity's implementation of its plan for the previous reporting period.

The following is an assessment of MEC's 2010 Reliability Report. Staff followed the guidelines described in Section 411.140 to complete the required assessment. After thorough investigation and analysis, Staff reached conclusions and presented them throughout this report with a summary at the end.

3. MEC's Customer Base and Service Territory

MEC reported that its electric service territory in Illinois covers the Quad Cities area, which is predominately urban, and the outlying areas in and around the cities of Sherrard, Orion, and Reynolds, which are mostly rural. MEC reported that it serves 84,330 customers in Illinois.

4. MEC's Electric distribution System

MEC reported that its transmission system in Illinois is comprised of 345 kV, 161 kV and 69 kV networked transmission lines. This transmission network serves four 345/161 kV and five 161/69 kV substations in the Quad Cities (Illinois and Iowa) area. According to MEC, the 161 kV and 69 kV supply from these substations loops throughout the Quad Cities area to serve several 161/13 kV and 69/13 kV substations in Illinois. These distribution substations supply a radial 13.2 and 4 kV distribution system consisting of 117 distribution circuits. The distribution system consists of 8,050 overhead conductor-miles and 802 underground conductor-miles. MEC's transmission system in Illinois is composed of 3,798 towers and poles with an average age of approximately 31 years. MEC's distribution system in Illinois is composed of 85,160 poles, towers, and supporting structures with an average age of approximately 33 years.

MEC reported that it aerially inspects its Illinois 345 kV and 161 kV transmission lines twice per year. In each annual reliability report between 2003 and 2009, MEC reported that it performed a third aerial vegetation-only inspection, but did not mention aerial vegetation inspection in its 2010 reliability report. MEC reported that it inspects its 69 kV lines aerially or from ground once a year for general condition, trees clearance, damage, and right-of-way encroachments. MEC reported that it is performing complete circuit inspections on each of its Illinois circuits identifying National Electrical Safety Code ("NESC") violations and completing corrective actions based on MEC's NESC Corrective Action Plan dated January 31, 2008 ("NESC Corrective Action Plan"). In the past, MEC implemented ground patrol and inspection of all its Illinois transmission and distribution circuits on a 10-year cycle. However, MEC reported, "[the] schedule for future distribution circuit inspections will not be determined until the [NESC] Corrective Action Plan circuit inspection plans are completed." In the past, Staff continually urged MEC to shorten its distribution circuit inspection cycle to a length that enables MEC to discover risks or potential risks to its distribution system and correct them in a timely manner. Staff explained that ten years is a very long time to wait for discovery of problems that affect electric reliability and safety. Recently, MEC reported that it adopted a four-year distribution circuit inspection program.

5. Compliance of MEC's 2010 Reliability Report

When MEC filed its 2010 Reliability Report, Staff reviewed it for compliance with the reporting requirements specified in Section 411.120 of the Code and concluded that the Report complied with the reporting requirements. MEC structured its 2010 Reliability Report to respond to each section in Part 411 of the Code in an orderly manner.

6. MEC's Historical Performance Relative to Established Reliability Targets

Subsection 411.120(b)(3)(L) of the Code requires each electric public utility to provide a list of customers who experienced service interruptions that exceeded a benchmark for service reliability targets. The list is to identify the customers, not by their names or account numbers, but rather by a unique number assigned by the utility. The list is to include the number of interruptions, the interruption durations experienced in each of the three preceding years, and the number of consecutive years in which the customer has experienced interruptions in excess of the service reliability targets. The service reliability targets are specified in subsection 411.140(b)(4)(A-C) of the Code and are summarized in Table (1) below.

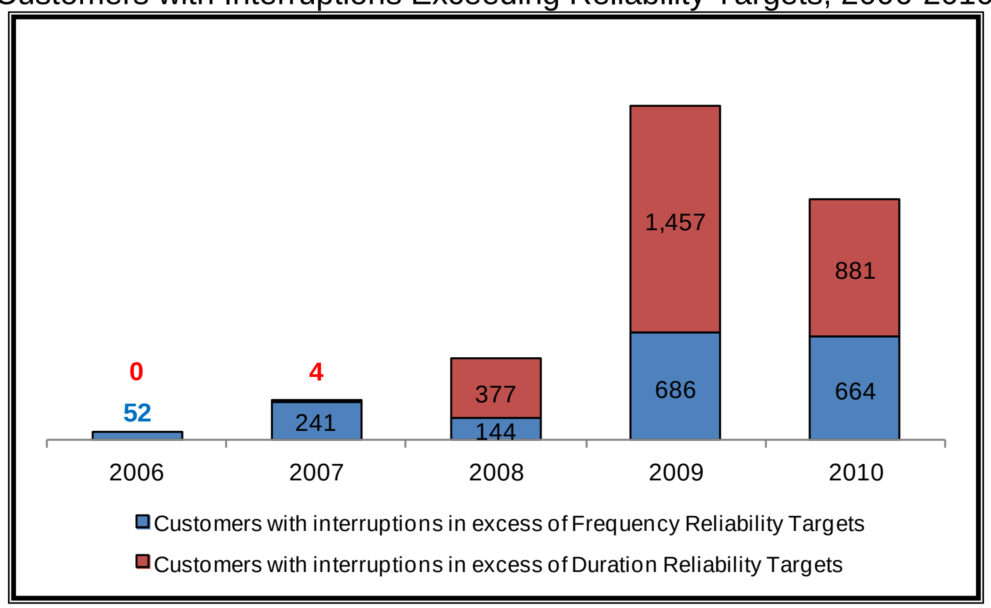
Table (1)
Service Reliability Targets

Immediate primary source of service operation voltage	Maximum number of interruptions in each of the last three consecutive years	Maximum hours of total interruption duration in each of the last three years
69,000 volts and above	3	9
Between 15, 000 and 69,000 volts	4	12
15,000 volt and below	6	18

Based on MEC's 2010 Reliability Report, all customers who experienced interruptions that exceeded service reliability targets were customers whose immediate primary source of service operation voltage is below 15 kV. Among those customers, 664 experienced interruptions that exceeded the interruption frequency target and 881 experienced interruptions that exceeded the interruption duration target.

The number of customers experiencing interruption frequency above the target decreased slightly (by approximately 3%) in 2010 compared to 2009. The number of customers experiencing interruption duration above the target decreased significantly (by nearly 40%) in 2010 compared to 2009. Figure (1) is a graphic representation of numbers of customers experiencing service interruptions in excess of service reliability targets from 2006 to 2010.

Figure (1)
Customers with Interruptions Exceeding Reliability Targets, 2006-2010



As shown in Figure (1), the number of customers experiencing interruptions exceeding the frequency target declined by 28% after it had been increasing steadily since 2006. The number of customers experiencing interruptions exceeding the duration target was greater than the number of customers experiencing interruptions exceeding the frequency target for three consecutive years. In a supplement to its 2010 Reliability Report, MEC suggested that the reason for the spike in those numbers was the occurrence of multiple major storms in 2008, 2009, and 2010. MEC reported that the most significant major storm in 2008 was the “derecho”[1] that passed through MEC’s Illinois service territory on July 21, 2008, but did not comment on the nature or severity of the 2009 or 2010 storms. Since the targets apply only to customers experiencing service interruptions for three consecutive years, it means those customers consistently experienced annual service interruptions more than six times and/or that totaled more than eighteen hours a year since at least 2008. Although the weather could be a major factor of power outages, other factors might have kept the number of customers who experienced outages in excess of reliability targets at a high count. Examining information that MEC provided Staff in 2010 and the preceding years leads Staff to believe that extreme weather just highlighted the increased possibility for MEC’s customers to experience poor electric service during such weather conditions.

MEC reported actions that it has taken or plans to take to improve reliability on the circuits that supply customers experiencing interruptions in excess of service targets. However, MEC did not provide specifics about its efforts to improve reliability for any customer or group of customers who sustained those problems, as required by the agreement between ICC and MEC on April 12, 2004, renewed on January 10, 2008, to provide a supplemental report containing such information as part of the annual reliability report. [2]

Although customers experiencing interruptions exceeding reliability targets decreased in 2010 compared to 2009, this number is far more that it was in 2006. While MEC did not report on whether the storms it faulted for its reliability problems exceeded the design criteria specified in Section 25 of the NESC, major storms happen often and citing only those events as the reason for the increase while ignoring different factors that might have contributed to the increase in customers experiencing interruptions exceeding reliability targets is misguided. Some portions of MEC’s electric system are vulnerable to out-of-the-ordinary events, which require that MEC address its distribution system vulnerability in a proactive manner.

[1] The National Weather Service defines the derecho as “a widespread and long lived windstorm that is associated with a band of rapidly moving showers or thunderstorms.”
[2] The two agreements are attached to this assessment as Appendices C and D.

7. Analysis of MEC's 2010 Reliability Performance

A. Statistical Reliability Data

Reliability Indices

Table (2) lists 2010 company-wide reliability indices for Illinois public utilities. MEC reported the second worst SAIFI[3] and the second worst CAIFI[4] among Illinois public utilities at 2.99 and 3.90, respectively, and the second worst CAIDI[5] among Illinois public utilities at 172 minutes.

Table (2)
2010 Reliability Indices by Utility

	SAIFI	CAIFI	CAIDI (min.)
AmerenCILCO	1.60	2.38	168
AmerenCIPS	1.27	2.01	103
AmerenIP	1.28	2.20	154
ComEd	1.35	2.09	181
MidAmerican	**2.99**	**3.90**	**172**
MCPU	4.89	4.93	121

Power Outages

Public utilities should list all customer service interruptions in accordance with Section 411.130 of the Code and categorize them based on their causes. Table (3) contains information provided by MEC in its 2010 Report. Table (3) is a summary breakdown and analysis of MEC's 2010 causes of power outages (referred to as outages) and their total durations based on the categories' classification in Section 411.130.

[3] System Average Interruption Frequency Index (SAIFI) is the average number of interruptions per customer during the year, including customers who did not experience service interruptions. It is calculated by dividing the total annual number of customer interruptions by the total number of customers served during the year.

[4] Customer Average Interruption Frequency Index (CAIFI) is the average number of interruptions for those customers who experienced interruptions during the year. It is calculated by dividing the total annual number of customer interruptions by the total number of customers affected by interruptions.

[5] Customer Average Interruption Duration Index (CAIDI) is the average interruption duration for those customers who experienced interruptions during the year. It is calculated by dividing the annual sum of all customer interruption durations by the total number of customer interruptions.

Table (3)
2010 Outages by Cause Category

CATEGORY	Number of Outages	Number of Outages (%)	Total Outage Duration (min.)	Total Outage Duration (%)
Animal Related	495	15.86%	51,480	5.30%
Overhead Equipment related	776	24.86%	162,184	16.71%
Underground Equipment Related	114	3.65%	34,770	3.58%
MidAmerican/Contractor Personnel-Errors	5	0.16%	435	0.04%
Other	40	1.28%	4,440	0.46%
Unknown	139	4.45%	15,985	1.65%
Public	66	2.11%	12,408	1.28%
Intentional	183	5.86%	21,777	2.24%
Transmission and Substation Equipment related	39	1.25%	8,190	0.84%
Tree related	390	12.50%	121,290	12.50%
Weather related	874	28.00%	537,510	55.39%
Total	3,121	100.00%	970,469	100.00%

Figure (2)
MEC 2010 Outages by Cause Category

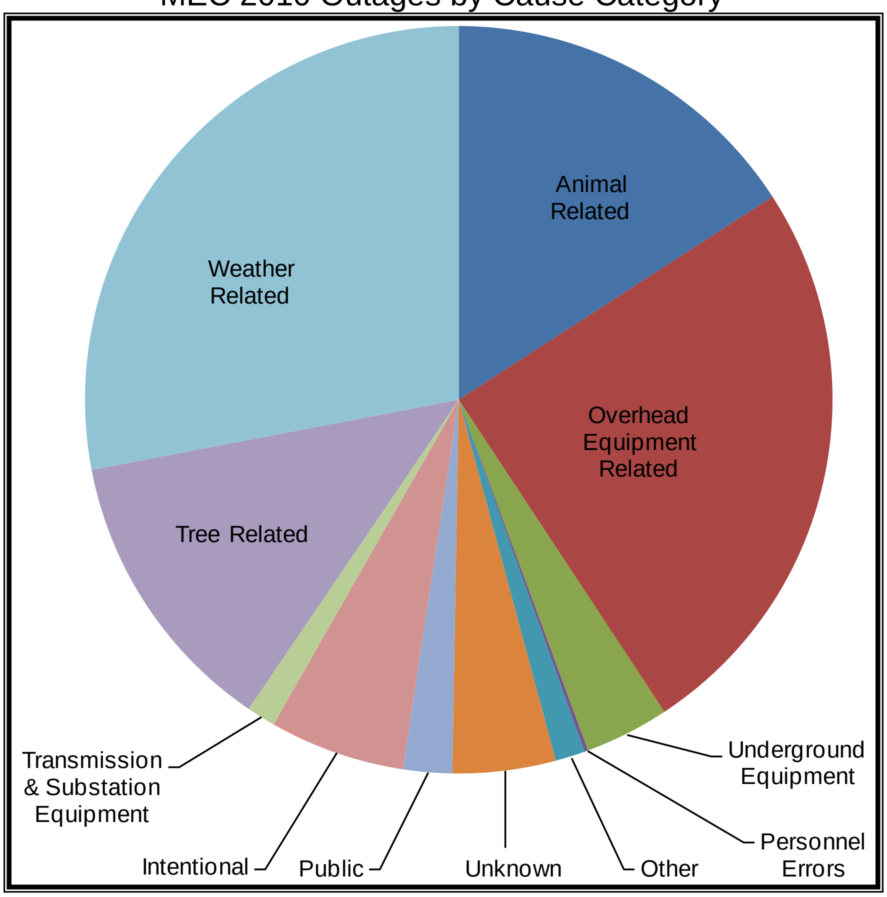


Figure (3)
MEC Outages by Major Cause, 2006-2010

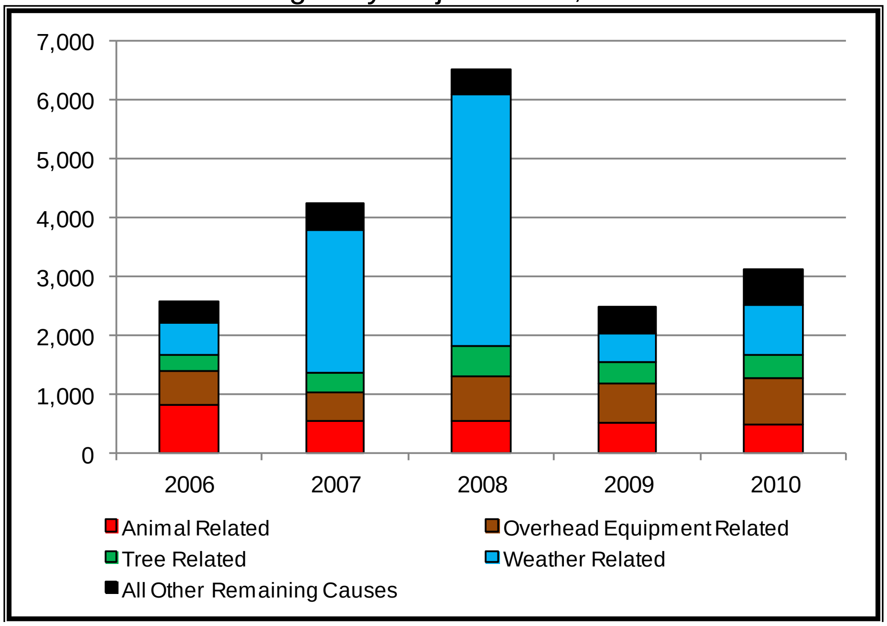
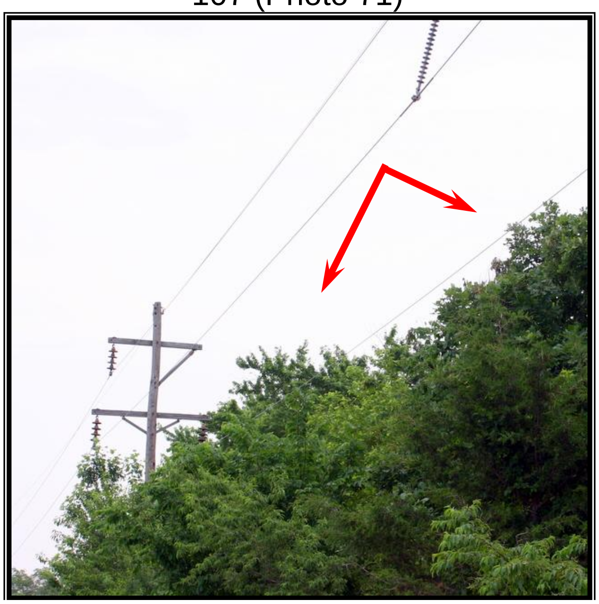


Figure (4)
Trees contact 69 kV line feeding Substation 107 (Photo 71)



Although transmission and sub-station-related outages account-ed for less than 1% of MEC's 2010 outages, the number of transmission and substation related outages increased by 333%, from 2009 to 2010. The total transmission and substation outage duration increased by nearly ten, fold, from 2009 to 2010.

Figure (4) is a photo of tree interference with a 69 kV line feeding Substation 107. Figure (2), Figure (3), Figures (5) and (6) are graphical representations of the above analyses.

Figure (5)
MEC 2010 Outage Duration by Cause Category

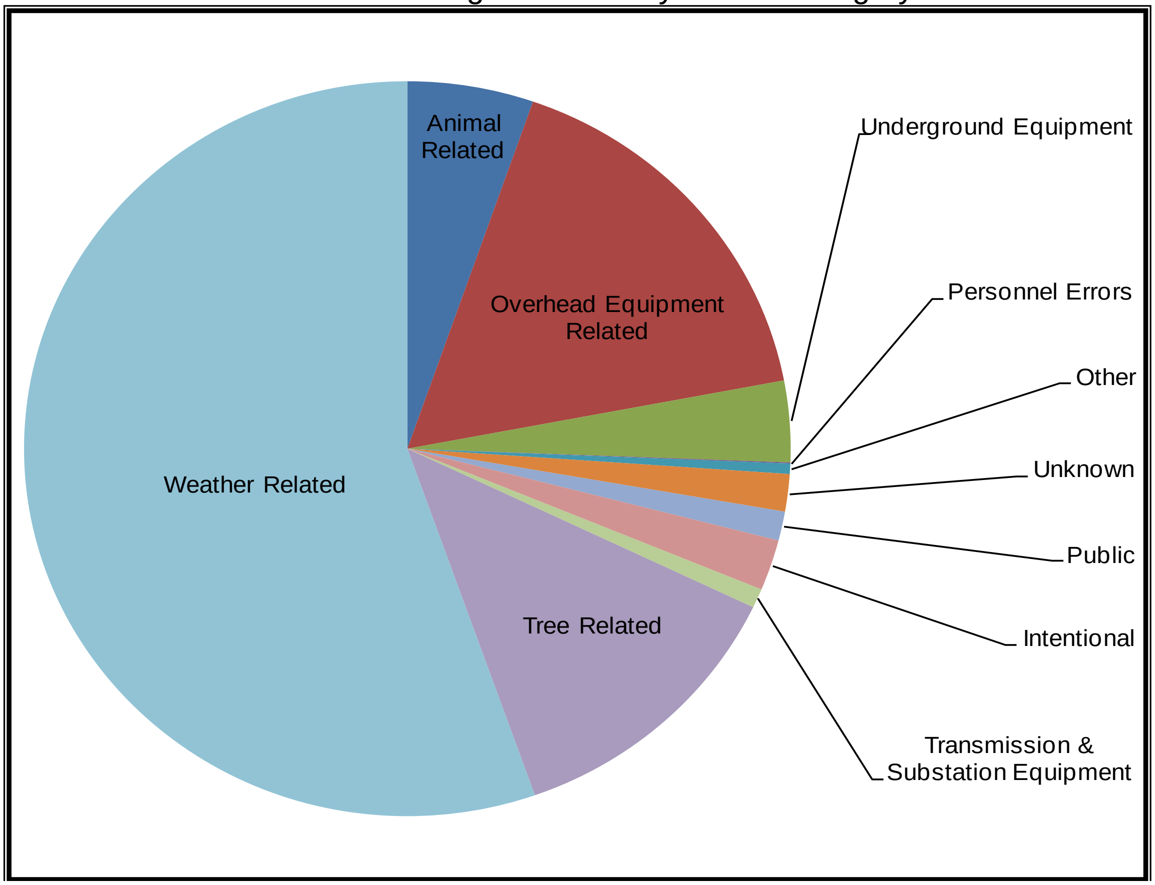
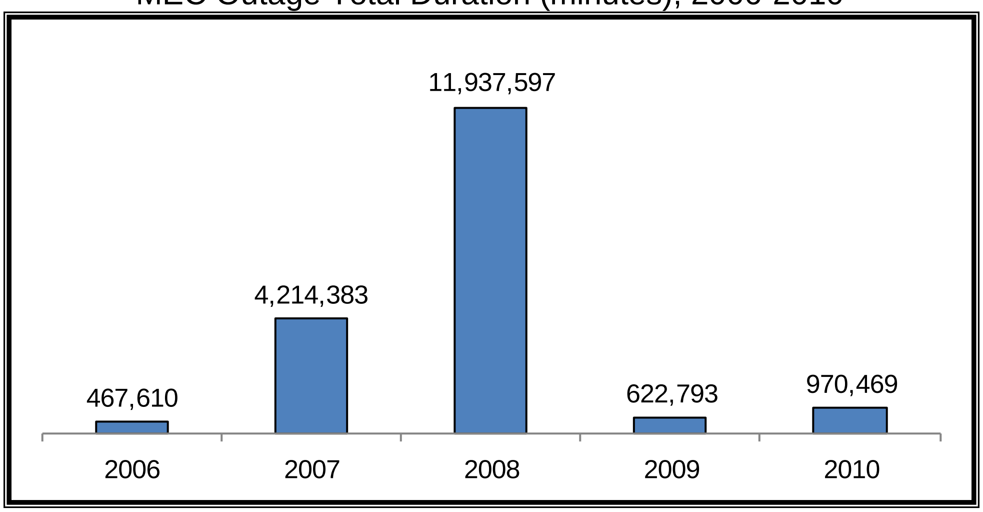


Figure (6)
MEC Outage Total Duration (minutes), 2006-2010



Customer Service Interruptions

Table (4) contains information about MEC's 2010 customer service interruptions, a summary breakdown and analysis of 2010 causes of customer interruptions and their total durations based on the categories' classification specified in Section 411.130.

Table (4)
2010 Customer Service Interruptions by Cause category

CATEGORY	Number of Customer Interruptions	Number of Customer Interruptions (%)	Customer Interruptions Duration (min.)	Customer Interruptions Duration (%)
Animal Related	11,254	4.43%	1,024,114	2.35%
Overhead Equipment related	47,072	18.55%	5,319,136	12.21%
Underground Equipment Related	1,070	0.42%	276,060	0.63%
MidAmerican/Contractor Personnel-Errors	69	0.03%	5,106	0.01%
Other	15,862	6.25%	301,378	0.69%
Unknown	7,829	3.09%	641,978	1.47%
Public	13,963	5.50%	1,438,189	3.30%
Intentional	1,740	0.69%	172,260	0.40%
Transmission and Substation Equipment related	46,800	18.44%	7,488,000	17.20%
Tree related	46,724	18.41%	7,849,632	18.03%
Weather related	61,388	24.19%	19,030,280	43.70%
Total	253,771	100.0%	43,546,133	100.00%

Figure (7)
2010 Customer Service Interruptions by Cause Category

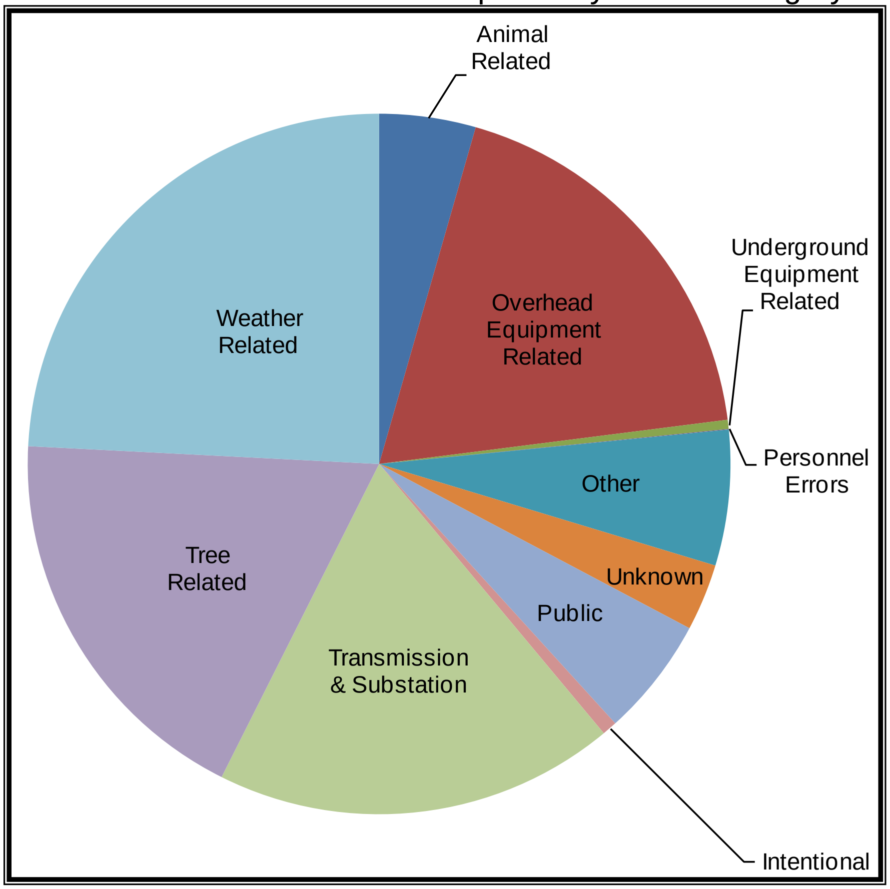


Figure (8)
MEC Customer Service Interruptions by Major Cause, 2006-2010

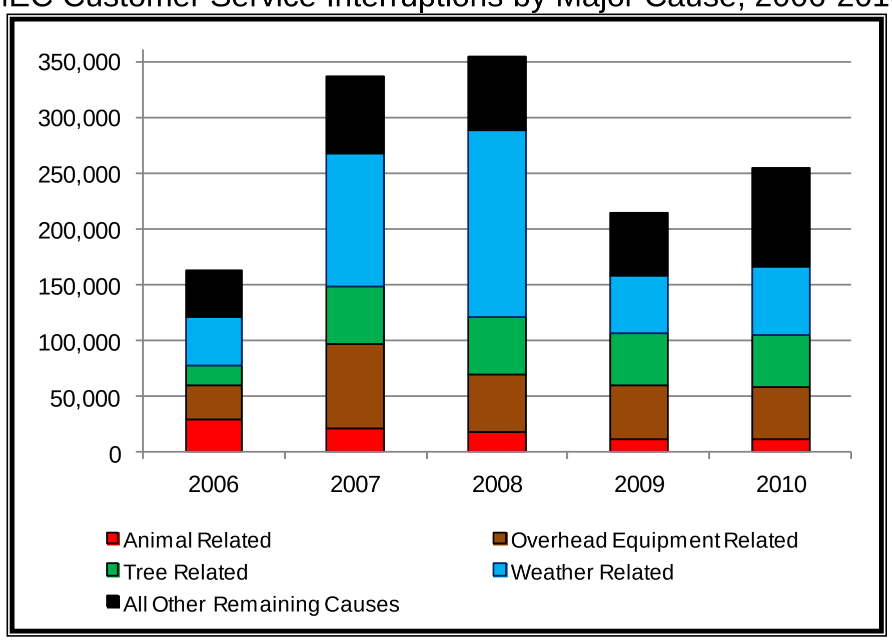


Figure (9)
2010 Customer Service Interruptions Duration by Cause Category

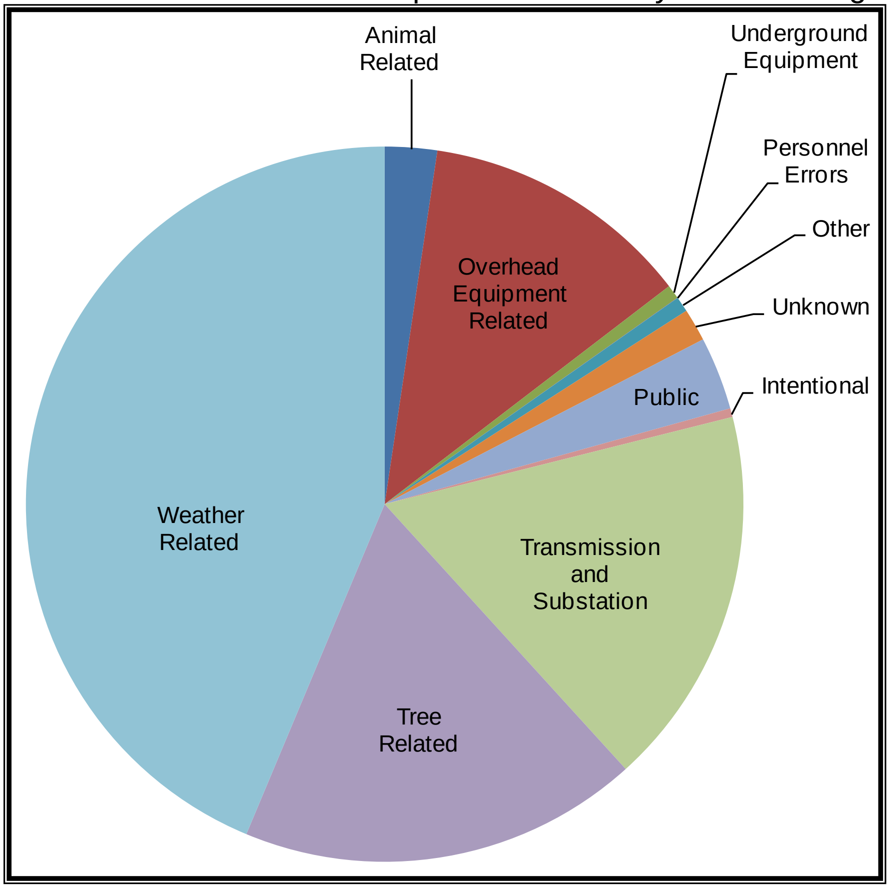
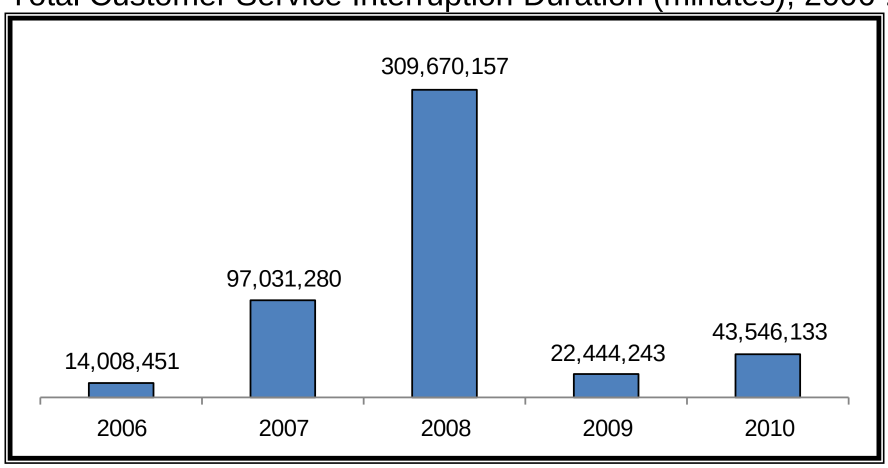


Figure (10)
MEC Total Customer Service Interruption Duration (minutes), 2006-2010



Subsection 411.120(b)(3)(F) of the Code requires public utilities to Include in their annual Reliability Report *[a] comparison of interruption frequency and duration for customers buying electric energy from the jurisdictional entity versus customers buying electric energy from another utility or alternative retail electric supplier for the annual*

reporting period. MEC stated it had no customers receiving power from another entity in 2010.

B. Customer Satisfaction Survey

Subsection 411.120(b)(3)(G)(v) of the Code requires each public utility to include in its annual Reliability Report the *"results of a customer satisfaction survey completed during the annual reporting period and covering reliability, customer service, and customer understanding of the jurisdictional entity's services and prices."* Pursuant to Subsection 411(b)(3)(G)(v), MEC included an independent customer satisfaction survey as part of its 2010 Reliability Report. The survey included a question regarding how MEC's residential customers rate the reliability of its electric service. Customers rate MEC electric service reliability on a scale that ranges from 0 to 10.

Figure (12)
MEC's Survey Score for Providing Reliable Electric Service, 2006-2010
(Scores range from 1.0 to 10.0)

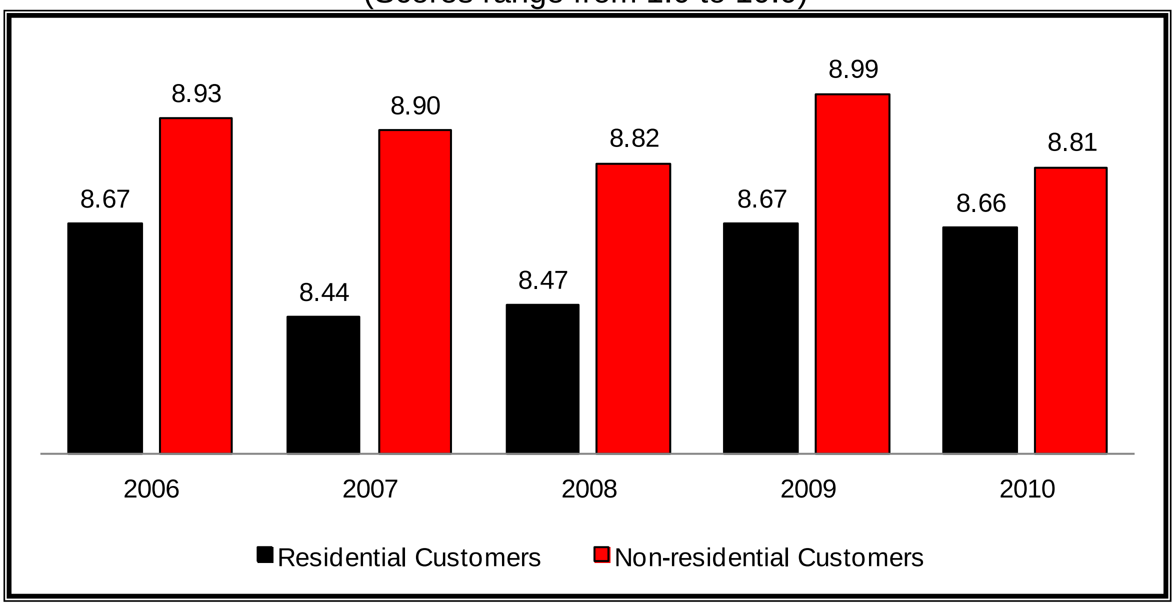


Figure (13) illustrates the scores that Illinois public utilities received from their residential customers from 2006 through 2010. In 2010, MEC led Illinois public utilities in reliability performance as rated by their residential customers for the fifth consecutive year.

Figure (13)
Residential Customers' Survey Scores for Providing
Reliable Electric Service by Utility, 2006-2010 (Scores range from 1.0 to 10.0)

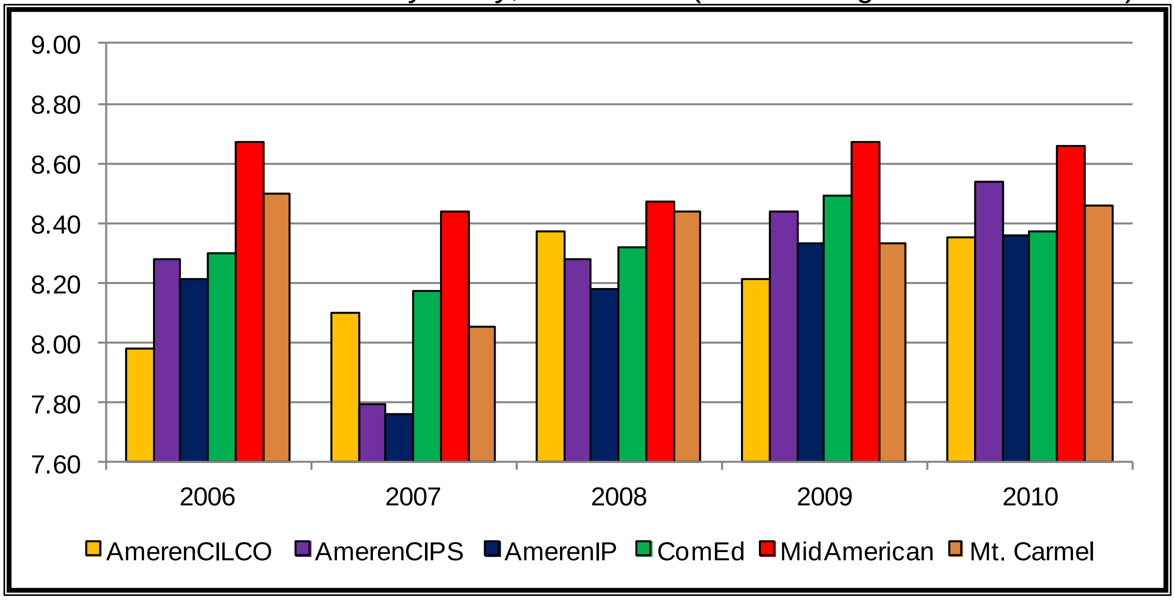
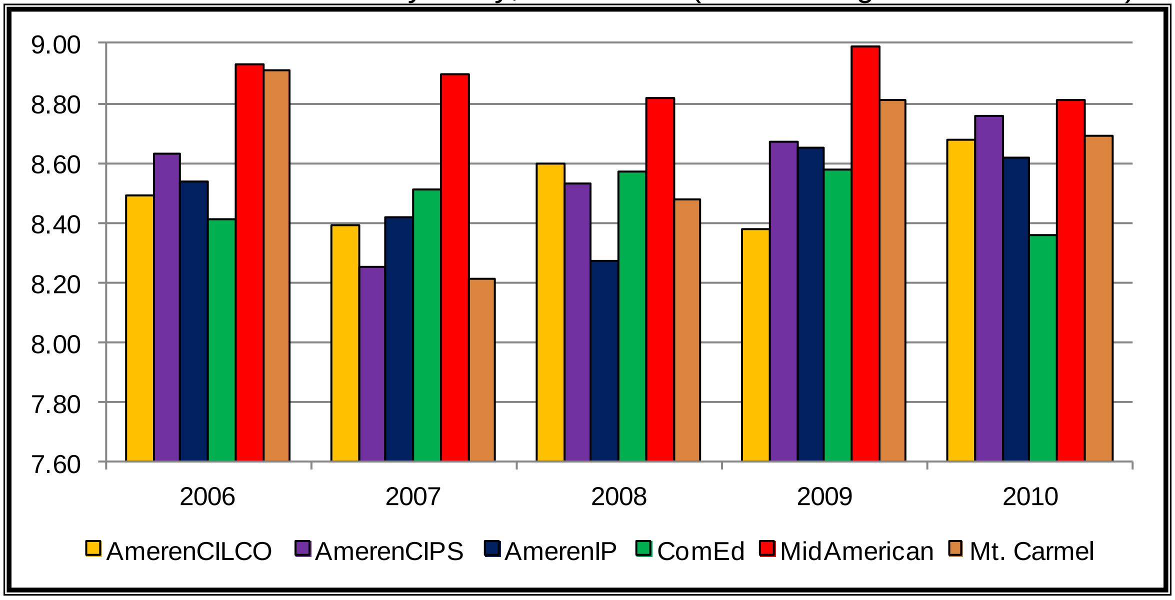


Figure (14) illustrates the scores that Illinois public utilities received from their non-residential customers from 2006 through 2010. In 2010, MEC led Illinois public utilities in reliability performance as rated by their non-residential customers for the fifth consecutive year.

Figure (14)
Non-Residential Customers' Survey Scores for Providing
Reliable Electric Service by Utility, 2006-2010 (Scores range from 1.0 to 10.0)



C. Worst Performing Circuits Data

Section 411.20 defines Worst Performing Circuits as follows:

"Worst-performing circuits" are those distribution circuits that, for each reliability index, are among the one percent of all circuits in an operating area (or at least one circuit for each reliability index) with the highest achieved values (lowest performance levels) for the reliability index. For the purpose of identifying worst-performing circuits, only distribution circuit interruptions and customers affected by such interruptions shall be considered in calculating the reliability indices.

Subsection 411.120(b)(3)(I) of the Code requires public utilities to list the worst performing circuits for the reported year in their reliability reports. The far left column of Table (6) includes MEC 2010 worst performing circuits. The bolded values are the values of the indices that caused the circuit to be a worst performer.

Table (6)
MEC 2010 Worst Performing Circuits

Circuit	SAIFI	CAIFI	CAIDI	Urban/ Rural	Service Area	Number of Customers
13-107-1	**8.0172**	**8.1273**	166	Rural	Mercer Co., Reynolds, Rock Island Co.	812
13-111-2	**7.3975**	**7.5208**	175	Rural	Coal Valley, Milan, Rock Island Co.	240
4-F-4	0.9136	1.0050	**1,211**	Urban	Rock Island	220
QSP214	0.1105	1.0000	**951**	Urban	Moline, Rock Island Co.	353

Subsection 411.120(b)(3)(J) of the Code requires Illinois public utilities to provide "*A statement of the operating and maintenance history of circuits designated as worst-performing circuits; a description of any action taken or planned to improve the performance of any such circuit (which shall include information concerning the cost of such action); and a schedule for completion of any such action. (The jurisdictional entity may decide, based on cost considerations or other factors, that it should take no action to improve the performance of one or more circuits designated as worst-performing circuits. If the jurisdictional entity decides to take no action to improve the performance of one or more circuits designated as worst-performing circuits, the jurisdictional entity shall explain its decision in its annual report.)*"

Circuit 13-107-1

MEC reported that the principal cause of high SAIFI for this circuit was six outages that impacted the entire circuit. MEC reported that four of those outages were due to weather, one due to wire failure, and one due to an emergency repair. MEC reported that it completed an inspection on this circuit in November 2008 as part of MEC's NESC Corrective Action Plan, which included ground line inspection of all the poles in the circuit. MEC reported that it installed nine voltage regulators and thirteen poles in three different locations within this circuit. In response to Staff's inquiry concerning the next scheduled general circuit inspection on this circuit, MEC stated, "the schedule for future distribution circuit inspections will not be determined until the [NESC] Corrective Action Plan circuit inspections are completed." In response to another Staff's inquiry, MEC indicated that it last trimmed this circuit on August 2010 and that it scheduled the next general tree trimming for August 2013. When Staff inspected this circuit in June, Staff noticed that many of the reliability problems on this circuit relate to vegetation. Staff circuit inspections are detailed later in this report.

MEC reported that it completed inspections on these circuits during 2008, 2009, or 2010 as part of MEC's NESC Corrective Action Plan, which included ground line inspection of all the poles in each circuit. In response to Staff's inquiries concerning the next scheduled general circuit inspection on each circuit, MEC stated, "the schedule for future distribution circuit inspections will not be determined until the [NESC] Corrective Action Plan circuit inspections are completed." Staff inspected MEC's worst performing circuits in May and June 2011. Details on Staff's inspection of this circuit in June are included later in this report.

Circuit 13-111-2

MEC reported that seven outages affected the entire circuit and caused high SAIFI for this circuit, two of those outages were due to weather, two were due to wire failure, one was due to an unknown cause, one was animal related, and one was due to emergency repair. MEC reported that it installed lightning arresters, animal guards, ground wire molding, guy guards, split tubing, fusing, replaced one pole and trimmed trees at various locations throughout the circuit in 2009. In response to a Staff's inquiry concerning tree trimming, MEC indicated that it last trimmed this circuit on July 2010 and that it scheduled the next general tree trimming for July 2013. When Staff inspected this circuit in May, Staff found only a few reliability concerns.

Circuit 4-F-4

MEC reported that the principal cause of high CAIDI for this circuit was a single outage that resulted from a major storm event on July 23, 2010. MEC reported that corrective actions and maintenance concerning issues uncovered during this circuit inspection are part of the 365-day follow-up work pursuant to its NESC Corrective Action Plan. In response to a Staff's inquiry concerning tree trimming, MEC indicated that it last trimmed this circuit on November 2008 and that it scheduled the next general tree trimming for November 2011.

Circuit QSP214

MEC reported that the principal cause for high CAIDI on this circuit was a single outage that occurred during a major storm event starting on July 23, 2010. MEC reported that there are no major improvements in progress or planned for this circuit, but did not explain why it did not take actions to improve this circuit's performance as mandated by Subsection 411.120(b)(3)(J). In response to a Staff's inquiry concerning tree trimming, MEC indicated that it last trimmed this circuit on December 2010 and that it scheduled the next general tree trimming for December 2013.

Worst Performing Circuits of the Previous Reporting Period

MEC provided the reliability indices of 2009 worst performing circuits as well as projects it implemented on them to improve their reliability. In 2009, MEC reported Circuit 13-S-3 and Circuit 13-S-4 as worst SAIFI performing circuits at 8.0943 and 7.1137 respectively but in 2010, those circuits improved to 0.2166 and 0.4737 respectively. In 2008, MEC reported Circuit 13-49-2 and Circuit 13-S-5 as worst performing CAIDI circuits at 876 minutes and 553 minutes respectively, but by 2010, CAIDI of those circuits improved to 91 and 280 minutes, respectively.

MEC reported that it completed circuit inspection on these circuits in 2010, which included ground line inspection of all the poles in the circuit. For Circuits 13-S-3, 13-S-4, and 13-S-5, MEC reported that corrective actions and maintenance concerning issues uncovered during this circuit inspection are part of the 365-day follow-up work pursuant to its NESC Corrective Action Plan. Regarding Circuit 13-49-2, MEC reported, "[the] inspection showed no NESC violations or maintenance issues and therefore no follow-up corrective actions were required."

D. Staff Circuit Inspections

Staff's Electrical Engineer Yassir Rashid performed inspections on twelve of MEC's distribution circuits in May and June 2011. Staff's Senior Electrical Engineer Greg Rockrohr accompanied Yassir Rashid in circuit inspections that Staff performed in May 2011. Gary Bowling, a MEC's Distribution Engineering inspector, accompanied Yassir Rashid in the June 2011 circuit inspections.

Field inspections allow Staff to verify that a utility has performed work on its distribution circuits and to see if there are any apparent reasons for poor performance of those circuits. Staff chose those circuits because they have been worst performing circuits or nearly worst performing circuits in the recent past. Among the circuits that Staff inspected, two supply two worst performing circuits, and two MEC had not inspected for more than ten years. During the circuit inspections, Staff shot pictures of situations that Staff believed would illustrate some of the reliability and safety problems on those circuits as well as NESC violations. It is important to mention that the pictures included in this report are the ones that Staff thought were most reflective of those situations.

On November 29, 2011, Staff informed MEC of its findings during the circuit inspections, and on December 20, 2011, MEC responded to Staff's findings and indicated that it completed or had plans to complete work to correct the reliability problems that Staff identified during May and June 2011 circuit inspections.

Below is a summary of Staff's findings while inspecting these circuits. This summary represents findings noted by Staff during the circuit inspections and is not intended to represent all of the problems or potential problems that may exist on each circuit. Staff does not intend its inspections to take the place of more thorough and detailed inspections that MEC should perform periodically and as needed. A detailed account of all findings during Staff's circuit inspection is attached to this report as Appendix A.

<u>Circuit 13-111-2, Coal Valley, Milan, and Rock Island County</u>

On May 9, 2011, Staff inspected Circuit 12-111-2, which serves 224 customers in predominantly rural parts of Coal Valley, Milan, and Rock Island County at 13.2 kV. MEC reported this circuit as a worst or next-to-worst SAIFI performing circuit three times in the last five years. In 2010, this circuit recorded the second highest (worst) SAIFI among all MEC distribution circuits. MEC performed a general circuit inspection on this circuit on November 2008 as part of its NESC Corrective Action Plan and performed general tree trimming on this circuit on July 2010. In 2010, Circuit 13-111-2 experienced twenty-six outages and MEC reported that six major outages, four due to weather, caused this circuit to be a next-to-worst SAIFI performing circuit in 2010. Overall, the facilities of this circuit are in good condition. Lightning arrestors are adequately spread throughout the circuit. While inspecting this circuit, Staff recorded twenty four observations, six of which related to vegetation conflicts with utility equipment. Rule 232.B.1 of the NESC specifies the vertical clearances of wires, conductors, and cables above ground, roadway, rail, or water surfaces. In one instance, Staff noticed what appeared to be a neutral wire vertical clearance violation. In another instance, Staff noticed what appeared to be a primary wire clearance violation. The rest of the observations relate to the physical conditions in the circuit. Figure (16) shows a disconnected lightning arrestor jumper. Figure (17) shows a missing crossarm brace, which is a common occurrence on MEC's distribution system. According to good utility practices, two braces should support each single wooden crossarms.

Figure (15)
Loose top pin insulators and decayed crossarm
(Circuit 13-111-2, Photo 4)

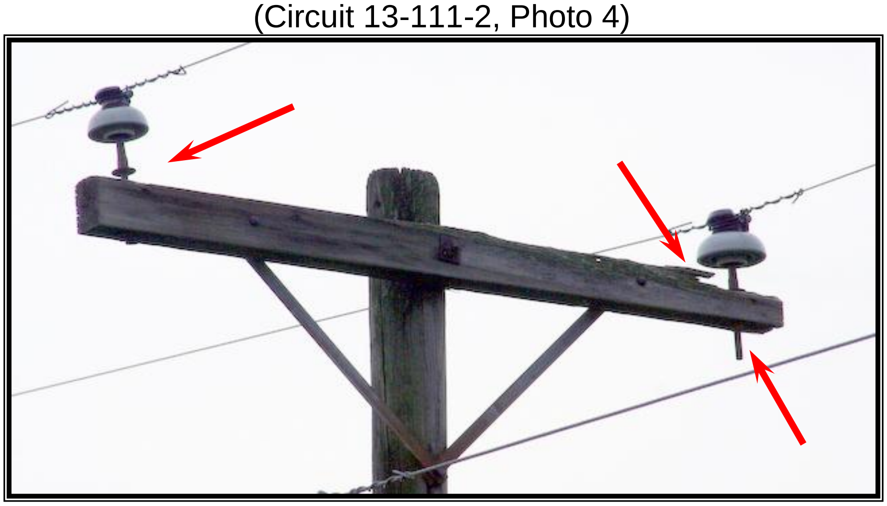


Figure (16)
Disconnected lightning arrestor jumper
(Circuit 13-111-2, Photo 3)

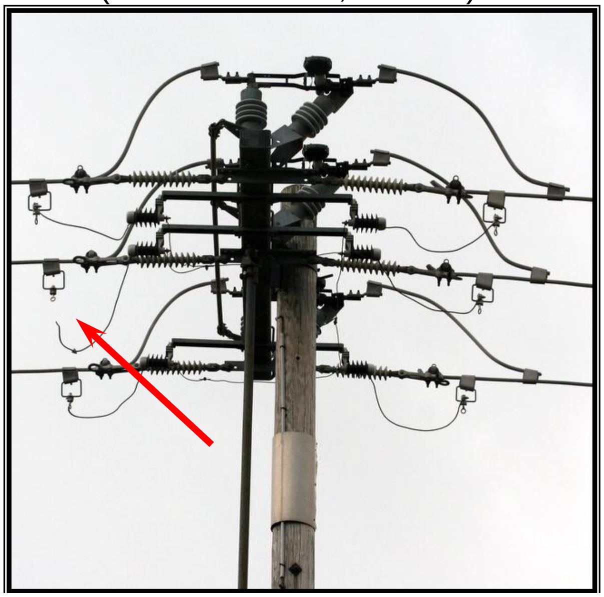


Figure (17)
Missing crossarm brace
(Circuit 13-111-2, Photo 5)

<u>Circuit 13-PC-1, Moline and Rock Island</u>

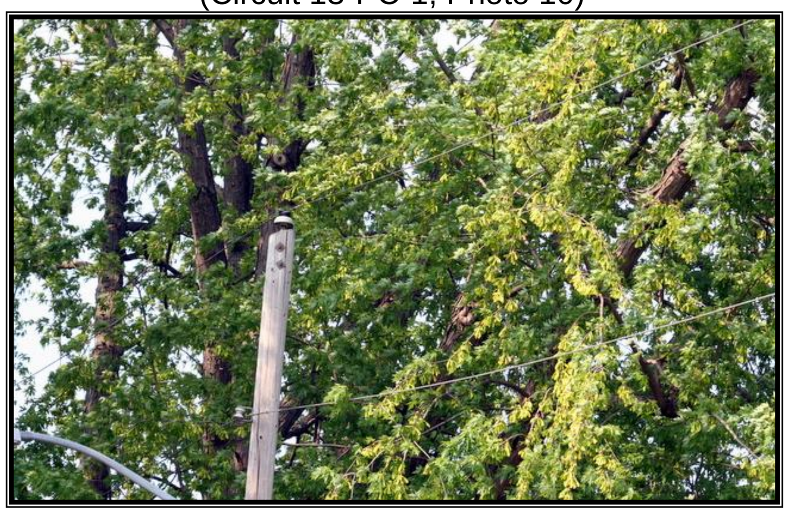
On May 9, 2011, Staff inspected Circuit 12-PC-1, which serves 1,213 customers in predominantly urban parts of Moline and Rock Island at 13.2 kV. MEC reported this circuit as a next-to-worst SAIFI performing circuit two times in the last three years. and because it is the source for Circuit 4-C-4, a next-to-worst circuit in 2010. MEC performed a general circuit inspection on this circuit on December 2008 as part of its NESC Corrective Action Plan and last performed general tree trimming on this circuit on November 2008. In 2010, Circuit 13-PC-1 experienced twenty three outages.

While inspecting this circuit, Staff recorded nineteen observations, eleven of which related to vegetation conflicts with utility equipment. Rule 232.B.1 of the NESC specifies the vertical clearances of wires, conductors, and cables above ground, roadway, rail, or water surfaces. In one instance, Staff noticed what could cause primary wires vertical clearance violations. At the yard of 408 1st St, Staff captured a photo of a pile of sand underneath MEC's 13.2 kV lines of this circuit and another three circuits. The presence of that pile of sand underneath MEC's primary lines reduces the vertical clearance of these lines, which may result in violation of NESC Rule 232.B.1. This situation is depicted in Figure (18) below. In other instance, Staff noticed what appeared to be service drops (secondary) clearance violations. The rest of the observations relate to the physical conditions in the circuit.

Figure (18)
Pile of sand underneath 13.2 kV lines (Circuit 13-PC-1, Photo 6)

Figure (19)
Burned pole top
(Circuit 13-PC-1, Photo 10)

Figure (20)
Trees close to primary wires
(Circuit 13-PC-1, Photo 10)



Circuit 4-C-4, Moline and Orion

On May 10, 2010, Staff inspected Circuit 4-C-4, which is relatively small and predominantly urban and serves 159 customers in Moline and Orion at 4.2 kV. In 2010, MEC reported this circuit as next-to-worst SAIFI performing circuit, and it was on the list of the circuits that have gone the longest since MEC last performed general circuit inspections on them. MEC reported that it last performed a general circuit inspection on this circuit on November 2001 and that it last performed general tree trimming on this circuit on November 2008 with the next tree trimming scheduled for November 2011. Circuit 4-C-4 experienced five outages in 2010. While inspecting this circuit, Staff recorded fifteen observations, seven related to vegetation conflicts with utility equipment in clear violation of NESC Rule 218.

NESC Rule 218 requires utilities to trim or remove trees that may interfere with ungrounded supply conductors or use appropriate methods to separate conductors from conflicting trees if trimming or removal is not practical. The rest of the observations related to the physical conditions in the circuit. Given the size of this circuit, nineteen instances of tree conflict with MEC's equipment is very significant. MEC has to act to correct the vegetation issues that Staff recorded and any other tree related issues before the next scheduled tree trimming.

Figure (21)

Weeds growing on the substation fence (Circuit 4-C-4, Photo 22)

<u>Circuit 4-C-2, Moline and Rock Island</u>

On May 10, 2010, Staff inspected Circuit 4-C-2, a relatively small and predominantly urban circuit that serves 142 customers in Moline and Rock Island at 4.2 kV. Staff inspected the circuit because it was among the circuits that have gone the longest since MEC last performed general circuit inspections on them. MEC reported that it last performed a general circuit inspection on this circuit in November 2001. MEC reported that it last performed general tree trimming on this circuit on November 2008 and that it scheduled the next tree trimming for December 2011. In 2010, Circuit 4-C-2 experienced six outages. While inspecting this circuit, Staff recorded nineteen observations, all but one of which related to vegetation conflicts with utility equipment. Given the size of this circuit, nineteen instances of tree conflict with MEC's equipment is very significant. MEC has to act to correct the vegetation issues that Staff recorded and any other tree related issues before the next scheduled tree trimming.

Figure (23)
Tree hanging over lines
(Circuit 4-C-2, Photo 31)

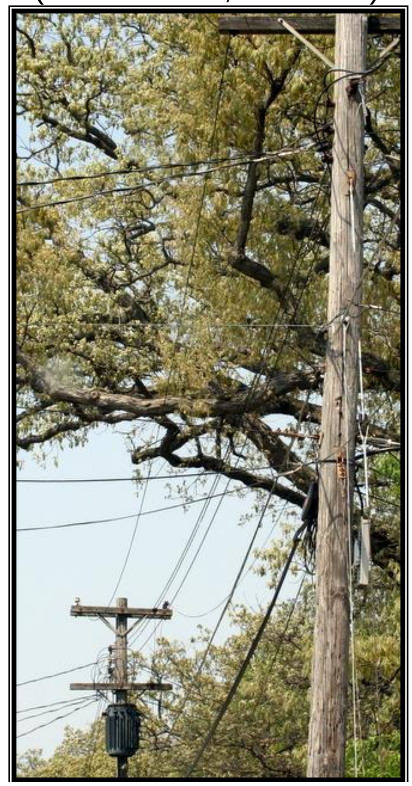


Figure (22)
Vines growing on overhead guy
(Circuit 4-C-2, Photo 29)

<u>Circuit QSP214, Moline and Rock Island County</u>

On May 10, 2011, Staff inspected Circuit QSP214, a relatively small and predominantly urban circuit that serves 353 customers in Moline and Rock Island County at 13.2 kV. In 2010, MEC reported this circuit as the second worst CAIDI performing circuit. It was the first time in the past five years that MEC reported this circuit as a worst or a next-to-worst performer. MEC last inspected this circuit on November 2009 as part of its NESC Corrective Action Plan. MEC last performed general tree trimming on this circuit on December 2010 and scheduled the next tree trimming for December 2013. In 2010, Circuit QSP214 experienced five outages and MEC reported that the principal cause for high CAIDI on this circuit was a single outage that occurred during a major storm event on July 23, 2010. Staff recorded only one observation while inspecting this circuit. The physical condition as well as the vegetation management of this circuit appeared to be adequate.

Circuit 13-38-1, Moline, Rock Island, and Rock Island County

Figure (24)
Broken riser duct
(Circuit 13-38-1, Photo 38)

Circuit 13-38-1 is a predominantly urban circuit that serves 958 customers in Moline, Rock Island, and Rock Island County at 13.2 kV. MEC reported this circuit as a next-to-worst SAIFI performing circuit for the last two consecutive years and for the third time in the last five years. MEC last inspected this circuit on October 2004 as part of its 10-year inspection cycle. MEC will perform a general circuit inspection on this circuit in 2011. MEC last performed a general tree trimming on this circuit on February 2010 and scheduled the next tree trimming for February 2013. In 2010, this circuit had twenty eight outages, nine of these outages were due to overhead equipment failure, seven were tree-related, and five were animal-related. On May 10, 2011, Staff inspected this circuit and made twenty-one observations, fifteen of which involved vegetation conflicts with utility equipment. Figure (24) shows a broken riser molding close to 4801 44th St. Staff noticed that riser that was not adequately grounded, a situation Staff recorded multiple times during circuit inspections in May and June 2010.

NESC Rule 314.B requires that "[conductive]-material ducts and riser guards that enclose electric supply lines or are exposed to contact with open supply conductors of greater than 300 V shall be effectively grounded."

Circuit 13-22-1, Moline

Circuit 13-22-1 is a predominantly urban circuit that serves 1,228 customers in Moline at 13.2 kV. On May 11, 2010, Staff inspected the circuit because MEC has not inspected this circuit since June 2000 as part of MEC's 10-year circuit inspection cycle. The purpose of inspecting this circuit was to check its physical condition as well as the vegetation condition along its lines. MEC reported that it last performed general tree trimming on this circuit on May 2008 and that it scheduled the next tree trimming for June 2011. In 2010, the circuit had twenty outages, six of which were due to overhead equipment failure, four were animal-related, and three were tree-related. Staff made forty one observations, thirty-seven of which involved vegetation conflicts with utility equipment. While the vegetation condition on the circuit was deplorable, the physical condition of this circuit was good and it appeared that MEC has kept this circuit to an adequate level of maintenance. MEC has to act to correct the vegetation issues that Staff recorded and any other tree related issues before the next scheduled tree trimming.

Figure (25) (Right)
Tree contacts primary wire
(Circuit 13-22-1, Photo 47)

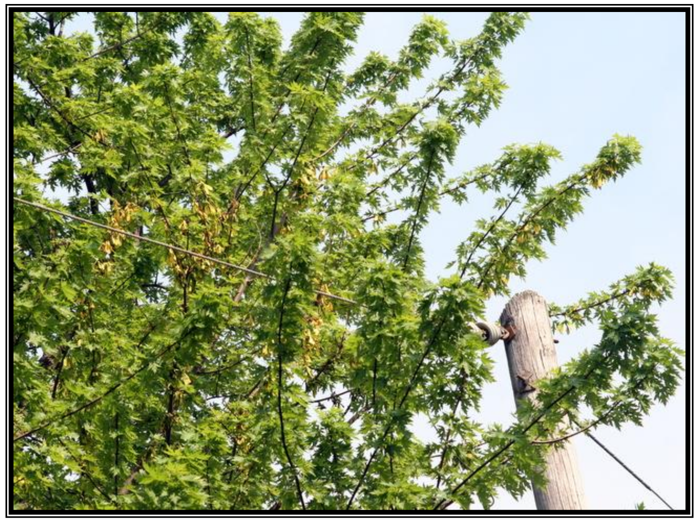
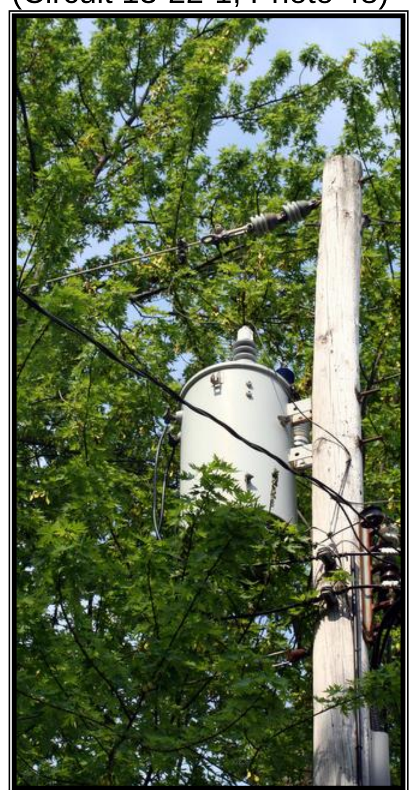


Figure (26)
Vines growing on pole
(Circuit 13-22-1, Photo 42)

Figure (27)
Pole surrounded by tree
(Circuit 13-22-1, Photo 46)

Figure (28)
Tree surrounds transformer
(Circuit 13-22-1, Photo 48)



<u>Circuit 13-47-1, East Moline, Hampton, Port Byron, Rapids City, and Rock Island County</u>

Circuit 13-47-1 is a predominantly urban circuit that serves 2,295 customers in East Moline, Hampton, Port Byron, Rapids City, and Rock Island County at 13.2 kV. MEC reported this circuit as next-to-worst SAIFI performing circuit for the last two consecutive years and for the third time in the last five years. MEC included this circuit in a list of the ten circuits that had the most tree contacts in 2008, 2009, and 2010. MEC indicated that it last performed a general circuit inspection on this circuit on December 2009 as part of its NESC Corrective Action Plan. MEC last performed a general tree trimming on this circuit on November 2008 and it scheduled the next tree trimming for November 2011. Thirty-one of the circuit's 107 outages were due to overhead equipment failure, twenty-three were animal-related, twenty were weather-related, eleven were tree-related, and thirteen were public-related. On May 11 and May 12, 2011, Staff inspected this circuit and made a hundred and eleven observations, ninety-four of which involved vegetation conflicts with utility equipment. In two instances, Staff noticed what appeared to be a primary wire vertical clearance violation. NESC Rule 261.C.2 states, "[when] guys are used to meet the strength requirements, they shall be considered as taking the entire load in the direction in which they act, the structure acting as a strut only, except for those structures considered to possess sufficient rigidity so that the guy can be considered an integral part of the structure." In three instances, Staff noticed broken anchor guys. MEC is required to investigate and correct these violations to comply with NESC.

Figure (29)
Tree contacts primary wire
(Circuit 13-47-1, Photo 54)

Figure (30)
Burns on tree trunk due to primary wire contact
(Circuit 13-47-1, Photo 61)

Figure (31)
Supply wires run through an opening carved between tree branches
(Circuit 13-47-1, Photo 56)

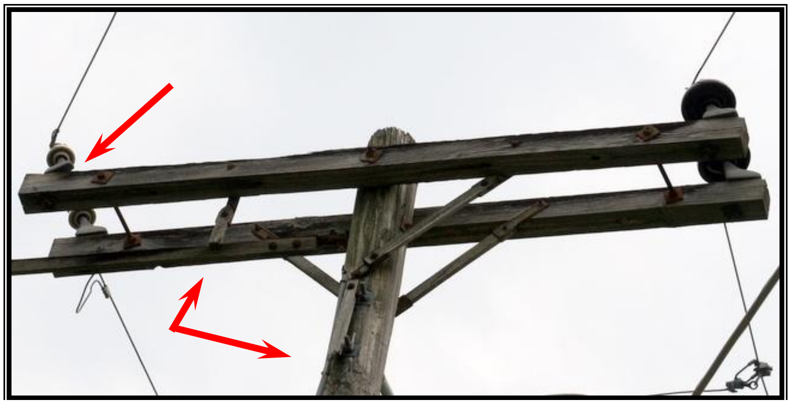


Figure (32) (Left)
Broken crossarm brace and twisted (loose) neutral pin insulator
(Circuit 13-47-1, Photo 60)

Figure (33)
Shell rotted pole
(Circuit 13-27-1, Photo 67)

<u>Circuit 13-27-1, Carbon Cliff, Cleveland, Colona, East Moline, Geneseo, Henry County, and Rock Island County</u>

Circuit 13-27-1 is a predominantly rural circuit that serves 3,346 customers in Carbon Cliff, Cleveland, Colona, East Moline, Geneseo, Henry County, and Rock Island County at 13.2 kV. MEC reported this circuit as next-to-worst SAIFI performing circuit for the last two consecutive years and for the third time in the last five years. MEC included this circuit in a list of the ten circuits that had the most tree contacts in 2008, 2009, and 2010. MEC last inspected this circuit on October 2010 as part of its NESC Corrective Action Plan. MEC last performed a general tree trimming on this circuit on December 2010 and it scheduled the next tree trimming for December 2013. In 2010 the circuit had 127 outages, thirty-one of which were weather related, twenty-five due to overhead equipment failure, seventeen animal-related, seventeen tree-related and thirteen due to underground equipment failure. On May 12 and 13, 2011, Staff inspected this circuit and made fifty six observations, twenty six of which involved vegetation conflicts with utility equipment. Staff noticed that the poles condition in this circuit is very poor relative to other circuits that Staff inspected this year, with eighteen instances of deteriorated, decayed, or split pole tops.

Figure (34)
Loose primary pin insulator
(Circuit 13-27-1, Photo 68)

Figure (35)
Bent primary insulator
(Circuit 13-107-1, Ph. 78)

Figure (36)
Lightning struck pole
(Circuit 13-107-1, Ph. 108)

<u>Circuit 13-107-1, Mercer Count, Reynolds, and Rock Island County</u>

On June 8 and June 10, 2011, Staff inspected Circuit 13-107-1, which serves 812 customers in predominantly rural parts of Mercer County, Reynolds, and Rock Island County at 13.2 kV. MEC reported this circuit as worst or next-to-worst SAIFI performing circuit three times in the last five years, and in 2010, this circuit recorded the highest SAIFI among MEC distribution circuits. MEC reported that it inspected this circuit on November 2008 as part of its NESC Corrective Action Plan. MEC last performed general tree trimming on this circuit on August 2010 and it scheduled the next tree trimming for August 2013. In 2010, Circuit 13-107-1 experienced seventy-four outages and MEC reported that the principal cause for high SAIFI and CAIFI in this circuit was six outages that impacted the entire circuit, four of which were due to weather. Lightning arrestors are adequately spread throughout the circuit. While inspecting this circuit, Staff recorded a hundred seventeen observations, forty-two of which related to vegetation conflicts with utility equipment. Staff noticed that the poles condition in this circuit is very poor relative to the other circuit that Staff inspected this year. Staff recorded twenty problems with poles, in ten instances with a type of insulator referred to as “gooseneck.” The problem with the gooseneck insulator is bending or twisting due to tension by the wires. Staff noticed twelve blown lightning arrestors. Figure (37) depicts three lightning arrestors connected to the primary wires with jumpers that are “coiled.” A coiled jumper introduces inductance to the circuit, which could create high impedance to high frequency current flows, which can reduce the effectiveness of lightning arresters. Lightning arrester jumpers should not be coiled as shown in Figure (37). In addition, Staff notices fourteen problems with crossarms and crossarm braces. In one instance, Staff noticed what appeared to be primary and neutral wire vertical clearance violations. Overall, the facilities of this circuit appeared to be in poor condition and MEC has to maintain them better. Figures (35) through Figure (39) represent some of the problems that Staff recorded during this circuit inspection.

Figure (37)
Coiled lightning arrestors jumpers (Circuit 13-107-1, Photo 105)

Figure (38)
Transformer enveloped by vine (Circuit 13-107-1, Photo 114)

Figure (39)
Disconnected crossarm brace (Circuit 13-107-1, Photo 115)

Circuit 13-P-3-IL, Rock Island

On June 9, 2011, Staff inspected Circuit 13-P-3-IL, which serves 913 customers in predominantly urban parts of Rock Island at 13.2 kV. Staff inspected this circuit because it is the source for Circuit 4-F-4, MEC's worst CAIDI circuit in 2010. Prior to Staff's June 9, 2011 inspection, MEC last performed a general circuit inspection on this circuit in August 2008 as part of its 10-year cycle inspection. On November 2011 MEC inspected the circuit as part of its NESC Corrective Action Plan. MEC last performed a general tree trimming this circuit on November 2011 and scheduled the next tree trimming for November 2014. In 2010, this circuit had eleven power outages, four of which were weather related and four were animal-related.

During Staff's inspection of this circuit, Staff recorded fifty-four observations, forty-nine of which related to vegetation conflicts with utility equipment. Vegetation management in this circuit is very poor. While inspecting this circuit, Staff observed MEC crews working on pole replacement that was necessary because, apparently, an overhanging tree branch fell and knocked down the utility's primary wires, which brought down the pole during a thunderstorm that occurred the previous night. Overall, the facilities of this circuit appeared to be in poor condition.

Figure (40)
Vines on pole (Circuit 13-P-3-IL, Ph. 86)

Figure (41)
Primary wire knocked down by a fallen tree branch (13-P-3-IL, Ph. 90)

Figure (42)
Tree contacts primary wire (Circuit 13-P-3-IL, Photo 91)

Figure (43)
Deteriorated pole top (Circuit 13-P-3-IL, Photo 85)

<u>Circuit 4-F-4, Rock Island</u>

On June 9, 2011, Staff inspected Circuit 4-F-4, a relatively small and predominantly urban circuit, serving 220 customers in Rock Island County at 4.2 kV. In 2010, MEC reported this circuit as the worst CAIDI performing circuit. MEC also reported this circuit as a worst SAIFI performing circuit in 2006. MEC last inspected this circuit on December 2010 as part of its NESC Corrective Action Plan. MEC last performed general tree trimming on November 2008 and scheduled the next tree trimming for November 2011. In 2010, Circuit 4-F-4 experienced three outages. MEC reported that the principal cause for high CAIDI for this circuit was a single outage that occurred during a major storm event July 23, 2010. Staff recorded sixteen observations while inspecting this circuit, six of which were vegetation conflict with MEC's equipment. While inspecting this circuit, Staff observed MEC crews performing repair work following a thunderstorm the occurred the previous night. MEC crews were replacing poles as part of their repair work. NESC Rule 232.B.1 specifies vertical clearance of wires, conductors, cables, equipment, and support arms mounted on supporting structures. In one instance, Staff noticed what appeared to be a violation of vertical clearance between primary wires crossing 41^{st} St, on the north side of 14^{th} Ave, and an overhead guy. Overall, the facilities of this circuit appeared to be in poor condition.

E. Vegetation Management

While inspecting MEC's distribution circuits on May and June 2011, Staff recorded 494 observations, 313 of which involved vegetation conflict with MEC's equipment. That is nearly two thirds of all the reliability issues that Staff believed posed a threat to MEC's system reliability. MEC should recognize that different vegetation species have different growth rates and that year-to-year weather variations have significant effect on vegetation growth. MEC should regularly inspect its circuits for vegetation conflicts with its equipment and eliminate those conflicts immediately. MEC should rely on more than

Staff's circuit inspections to discover these reliability problems and act accordingly. MEC increased its distribution vegetation management expenditure by 26% in 2010 compared to 2009, but reduced its transmission vegetation management expenditure by 20% in 2010 compared to 2009.

MEC has a three-year tree trimming cycle. To ensure that vegetation does not grow close to its distribution and transmission facilities, MEC should trim more vegetation away from those facilities so adequate clearance from vegetation lasts for the full duration of the tree trimming cycle. MEC should employ more proactive measures to prevent vegetation from growing near its facilities when the end of the tree trimming nears. Without addressing this problem, MEC will continue to violate NESC Rule 218.

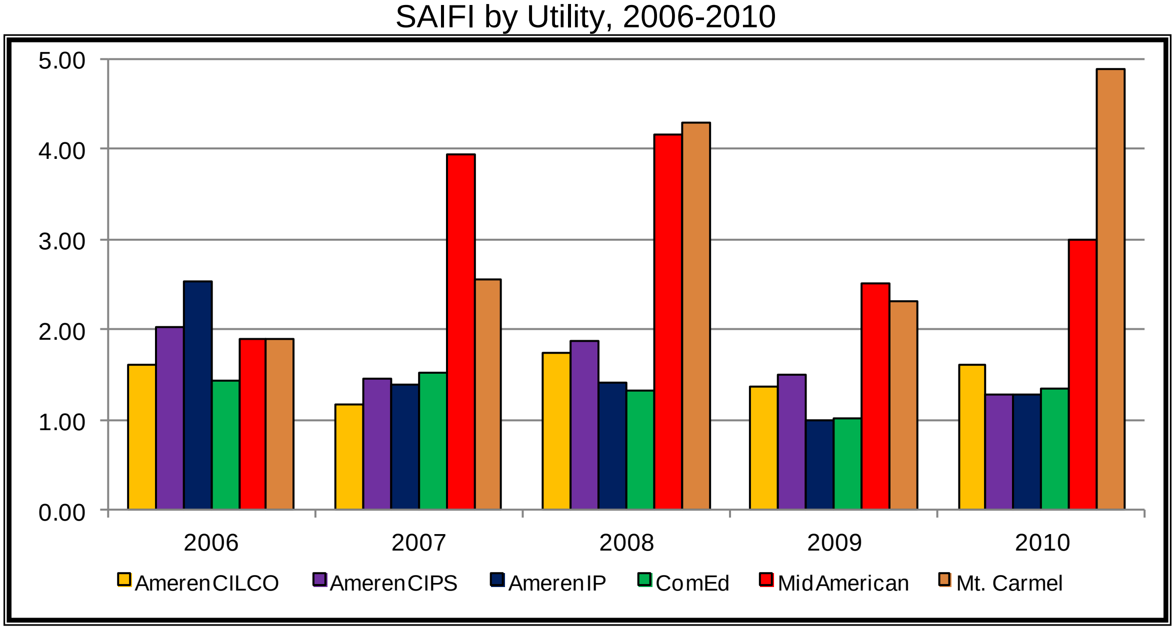
F. NESC Violations

On January 31, 2008, MEC agreed to implement a four-year NESC Corrective Action Plan[6]. According to that plan, MEC agreed to perform inspections of all its electric distribution circuits to locate and identify all NESC violations starting April 1, through March 31, 2012. MEC would mitigate NESC violations immediately after discovery and continuously proceed until mitigation work is completed.

8.Trends in MEC's Reliability Performance

Figure (44) is a plot of reported company-wide SAIFI for Illinois puplic utilities from 2006 to 2010. Figure (44) shows that in 2010, MEC reported the second highest (second worst) SAIFI among Illinois pubilc utilitits; and that in 2009, MEC reported the highest (worst) SAIFI among Illinois public utilities.

Figure (44)
SAIFI by Utility, 2006-2010



[6] NESC Corrective Action Plan is attached as Appendix B

Figure (45) shows MEC's company-wide SAIFI values from 2001 to 2010. In 2010, SAIFI increased by 19% compared to 2009, which is the third worst company-wide SAIFI value MEC has reported in the past ten years and three and one-half times the lowest SAIFI MEC reported in the past ten years.

Figure (45)
MEC Company-wide SAIFI, 2001-2010

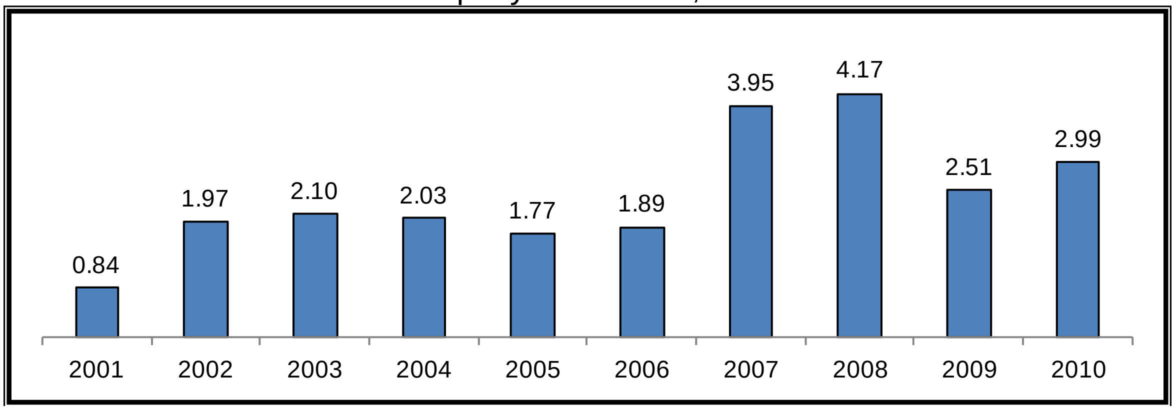


Figure (46) is a comparison of SAIFI values for each of Illinois public utilities' single worst performing circuit for the period from 2006 to 2010. In 2010, MEC's worst SAIFI performing circuit had the worst SAIFI among all Illinois public utilities' single worst SAIFI performing circuits. This is the third consecutive year in which MEC's worst SAIFI performing circuit records the highest SAIFI in Illinois.

Figure (46)
Worst-Circuit SAIFI by Utility, 2006-2010

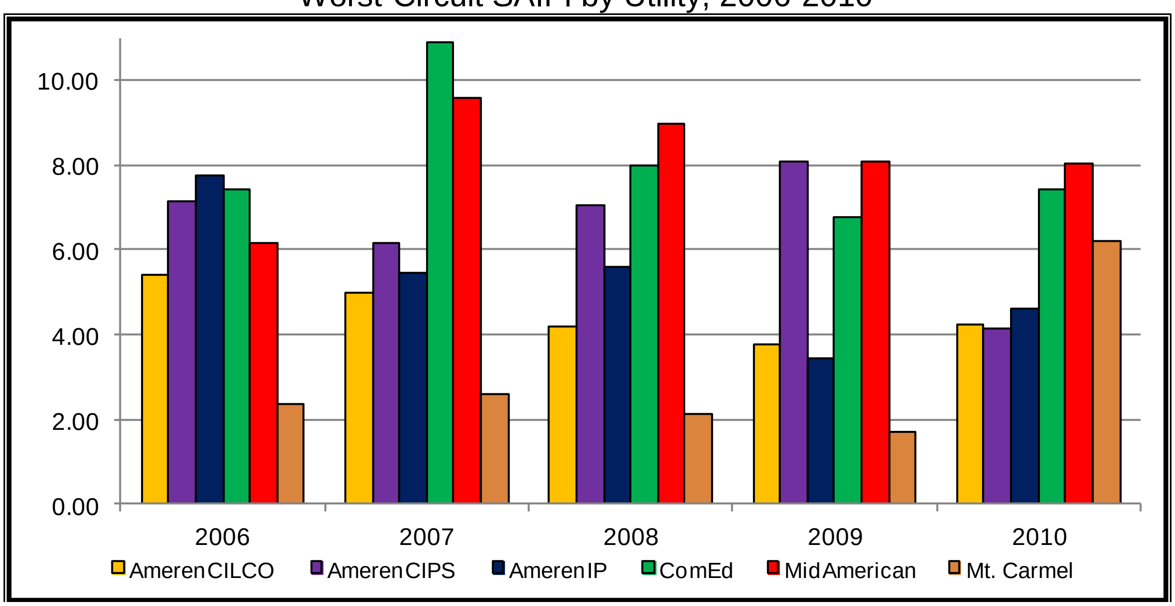


Figure (47) shows MEC's SAIFI values for worst SAIFI performing circuits from 2001 to 2010. SAIFI value for MEC's worst SAIFI performing circuit has been declining since 2008; however, the value is still 9% above the average worst SAIFI in the past ten years.

Figure (47)
MEC Worst Performing Circuit SAIFI, 2001-2010

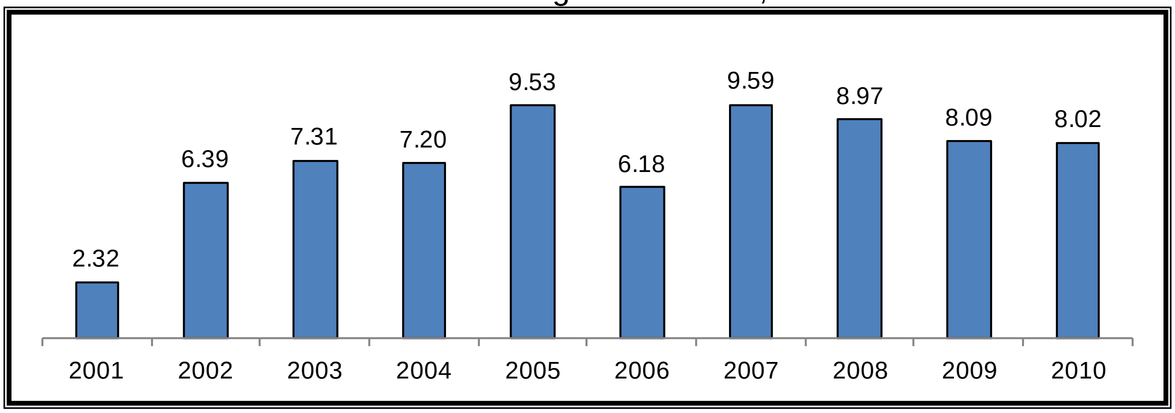


Figure (48) is a plot of company-wide CAIDI for all Illinois puplic utilities for the years 2006 to 2010. In 2010 MEC reported the second highest (second worst) CAIDI among Illinois public utilities, a 62% increase from MEC's 2009 CAIDI, which was the second best CAIDI among Illinois utilities.

Figure (48)
CAIDI by Utility, 2006-2010 (minutes)

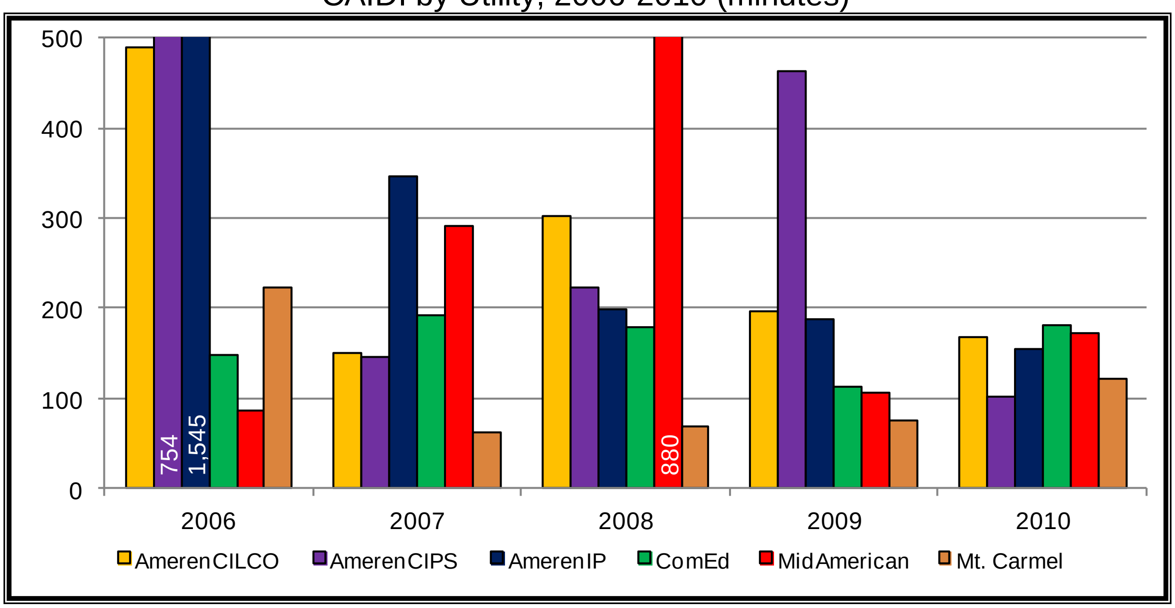


Figure (49) shows MEC's company-wide CAIDI values from 2001 to 2010. MEC's company-wide CAIDI deteriorated with a 62% increase from 2009 to 2010 and the fourth worst CAIDI that MEC reported in the last ten years.

Figure(49)
MEC Company-wide CAIDI, 2001-2010 (minutes)

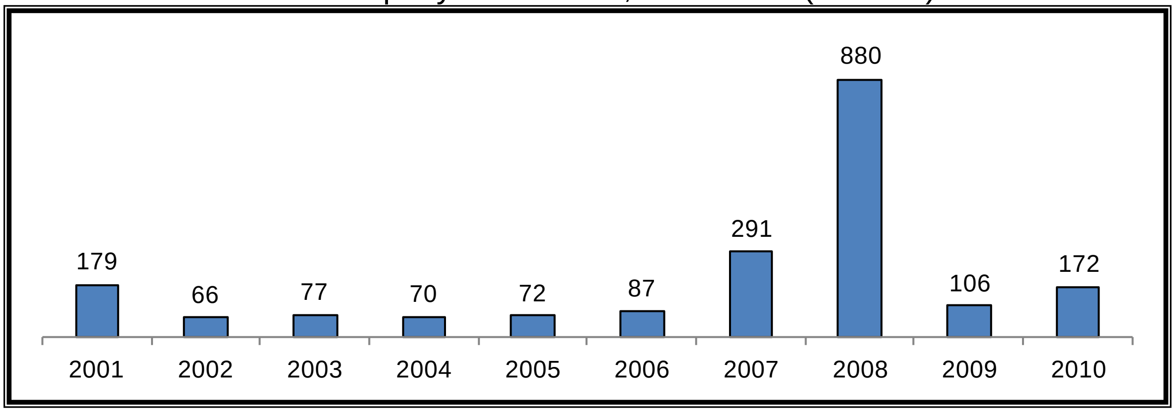


Figure (50) is a comparison of CAIDI values for each of Illinois public utilities' single worst performing circuit for the period from 2006 to 2010. MEC's worst CAIDI performing circuit for 2010 ranked in the middle among all Illinois public utilities' single worst CAIDI performing circuits while in 2009, MEC's worst CAIDI performing circuit recorded the second lowest CAIDI value among Illinois public utilities' single worst CAIDI performing circuits.

Figure (50)
Worst-Circuit CAIDI by Utility, 2006-2010 (minutes)

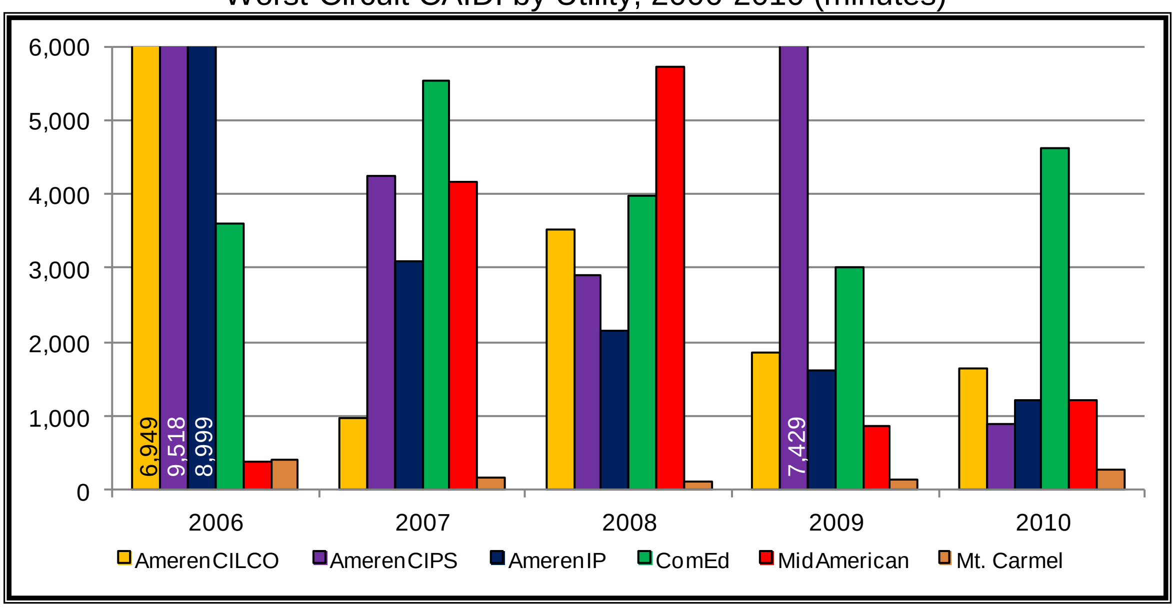
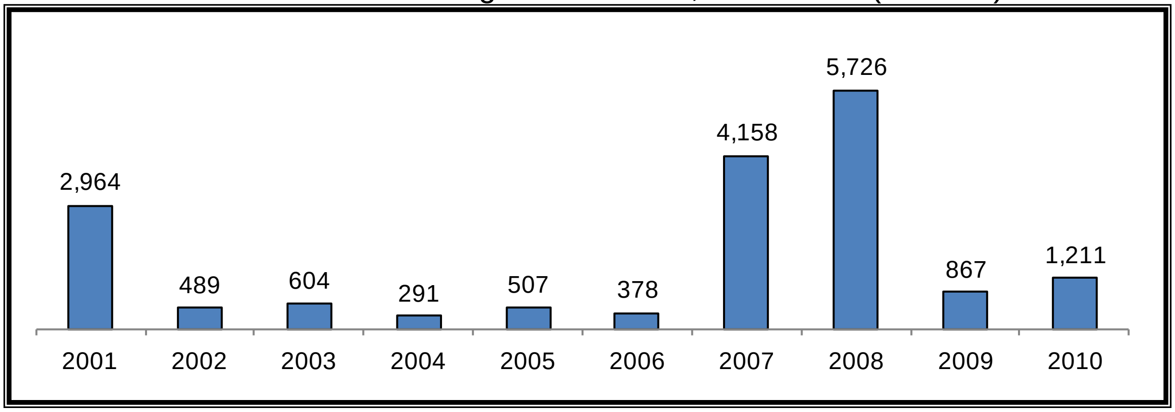


Figure (51) shows the CAIDI values for MEC's worst-performing CAIDI circuits from 2001 to 2010. In 2010, MEC's CAIDI number deteriorated by nearly 40% compared to 2009 and ranks fourth among MEC's worst-CAIDI performing circuits' since 2001.

Figure (51)
MEC Worst Performing Circuit CAIDI, 2001-2010 (minutes)



9. MEC's Plans to Improve Reliability

In accordance with Section 411.120(b)(3)(A) MEC listed in its 2010 Reliability Report specific plans to improve reliability in 2010 through 2013. Table (7) is a summary of the cyclical activities that MEC included in Attachment (B) to its 2010 Reliability Report.

Table (7)

Circuit type	**Activity**	**Frequency**
Transmission and high voltage distribution	Patrol for potentially hazardous vegetation situations	Once a year
	Arial inspection for 345 kV and 161 kV lines	Twice a year
	Arial inspection for 69 kV lines	Once a year
	Thorough inspection	Once every 10 years
	Wood pole plant inspection	Once every 10 years
	Steel tower painting program	Once every 18 years
Distribution	Tree trimming	Once every 3 years
	Thorough inspection	Once every 10 years, Schedule for future inspections is pending the conclusion of NESC Corrective Action Plan
	Switch inspection	Once every 10 years
	Capacitor inspection	As needed
	Line recloser inspection	Once a month
	Line recloser thorough inspection	Once every 3, 5, or 10 years based on type
	Voltage regulator inspection	Once a month
	Voltage regulator thorough inspection	Once every 3 years

Below is a narrative description of the activities listed in Table (7).

- MEC reported that it performs distribution circuit tree trimming on a three-year cycle basis.

- MEC reported that reliability issues uncovered during scheduled tree trimming, such as distribution capacitors inspections, line reclosers and voltage regulators inspections, are noted, reported, and MEC performs a follow-up to mitigate those issues.

- MEC reported that it performs thorough patrol and inspection of all Illinois distribution circuits on a 10-year cycle and schedules mitigation of problems found for maintenance. MEC reported that the schedule for future distribution circuit inspections would not be determined until the conclusion of its NESC Corrective Action Plan circuit inspection. In response to concerns that Staff expressed throughout this assessment regarding the length of MEC's circuit inspection cycle, MEC agreed to adopt Staff's recommendation that it implement a four-year inspection program.

- MEC reported that it performs an aerial inspection for its Illinois overhead transmission circuits with a voltage rating of 345 kV and 161 kV twice a year and each 69 kV line every year for general condition, tree clearances, damage, and right-of-way encroachments. MEC reported that it performs a thorough ground patrol and inspection of each circuit on a 10-year cycle and schedules any problems it finds for maintenance.

- MEC reported that it performs inspections for its Illinois transmission wood pole plant on a 10-year cycle and performs treatment if it is needed.

- MEC reported that it paints its Illinois transmission steel towers on an 18-year cycle.

- MEC reported that it inspects and maintains its Illinois overhead and underground switches on a 10-year cycle.

- MEC reported that it maintains capacitors on an "as-needed" basis using Automated Cannon Capacitor Control technology to determine which banks are operating correctly, and which banks require maintenance. MEC reported that, typically, an "exception" report is run early in the year to summarize a list of all capacitor banks not operating correctly, and repairs are scheduled and completed prior to the start of summer if the circuit is a summer peaking circuit, or fall, if it is a fall peaking circuit.

- MEC reported that its Distribution Operations inspects each three-phase recloser monthly, and records a log of trip/close operations then submits that log to Distribution Engineering for review. Based on the type of recloser, it is maintained on a 3, 5, or 10-year cycle in which each three phase and single phase recloser is removed from service and a thorough inspection performed by Substation Operations.

- MEC reported that its Distribution Operations inspects each voltage regulator monthly, and records a log of operations then submits that log to Distribution Engineering for review. MEC removes and services each regulator on a 3-year cycle.

In Attachment (A) of its 2010 Reliability Report, MEC listed projects that it would implement in 2010 to improve its distribution system reliability. Below is a summary description of the plans that MEC listed in its 2010 Reliability Report.

- MEC reported that it plans to add capacity to serve forecasted load growth in the Colona area. MEC indicated that instead of modifying the substation, it would add a substation to the Substation 39 – Substation 37 – Substation 27 69 kV line for additional substation transformer capacity, but did not provide a date for completion of this project.

- MEC reported that it plans to replace the relaying in Substation S and Substation R for the line Substation G to Substation R to Substation S in 2011.

- MEC reported that it plans to replace the relaying in Substations 39 and 48 for the Substation 39 to Substation 48 161 kV line in 2011.

- MEC reported that it plans to replace the relaying in Substations 39 and 17 for the Substation 39 to Substation 17 161 kV line in 2011.

- MEC reported that it plans to convert Circuit 4-F-4 from 4kV to 13kV by the end of 2011.

- MEC reported that it would continue implementing the NESC Corrective Action Plan.

Annual Expenditures

MEC reported annual expenditures and budgets for its capital projects and its operations and maintenance (O&M) for both its distribution and transmission systems. It provided expenditures for years 2007 through 2010, and budgets for years 2011 through 2014 for these categories. Table (8) incorporates data that Staff obtained from MEC's responses to Staff's data requests.

Table (8)
MEC Annual Transmission and Distribution Expenditure (thousands)[7]

Year	Transmission			Distribution		
	Capital	**O&M**	**Total**	**Capital**	**O&M**	**Total**
2005	$1,467	$1,681	$3,148	$6,169	$10,705	$16,874
2006	$9,106	$3,444	$12,550	$7,875	$11,358	$19,233
2007	$1,978	$3,537	$5,515	$14,028	$15,258	$29,286
2008	$45	$4,661	$4,706	$19,672	$21,728	$41,400
2009	$151	$5,266	$5,417	$13,340	$15,052	$28,392
2010	$21	$5,621	$5,642	$14,566	$16,348	$30,914
2011 Budget	$23	$3,578	$3,601	$12,240	$12,893	$25,133
2012 Budget	$61	$3,578	$3,639	$13,519	$12,893	$26,412
2013 Budget	$180	$3,578	$3,758	$9,197	$12,893	$22,090

Distribution Expenditures

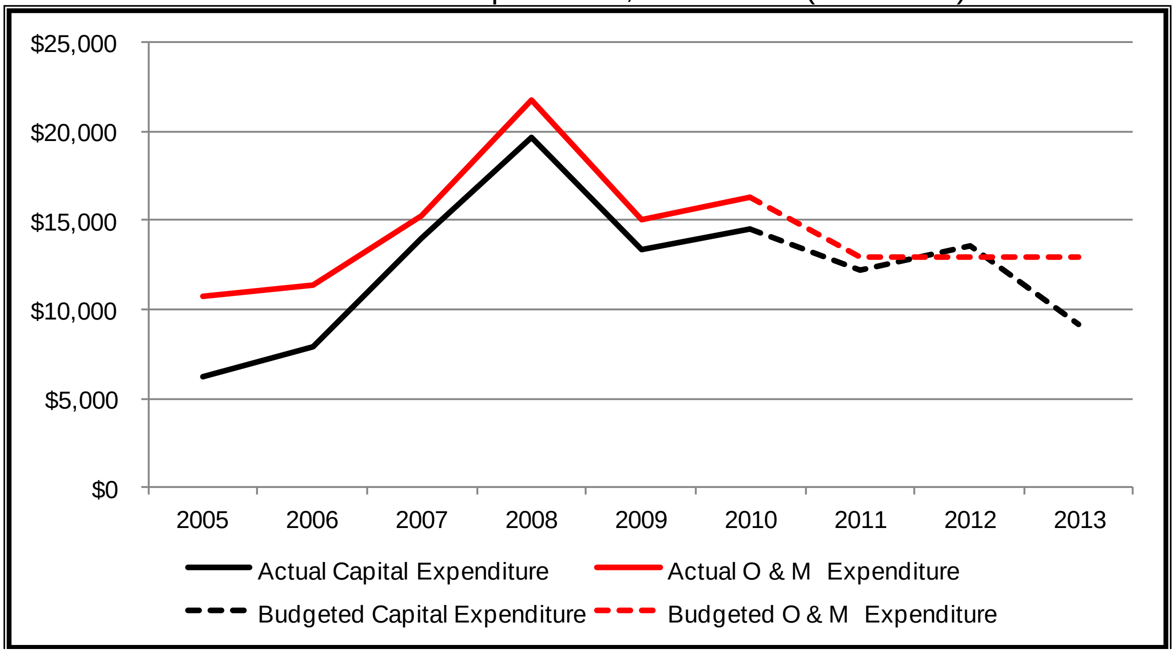
Figure (52) is a graphical representation of MEC's historical and future distribution expenditures. In 2010, MEC increased its distribution capital by 9.2% compared to 2009 and increased its distribution O&M expenditures 8.6% compared to 2009. MEC will decrease its distribution capital expenditure by 16.0% in 2011 compared to 2010 and its distribution O&M expenditures by 21.1% in 2011 compared to 2010.

The dramatic increase in MEC's overall distribution expenditures in 2008 was due to MEC's efforts to recover from several "major weather events" including the derecho that passed by its service territory in Illinois in July 2008.

MEC's overall distribution spending followed an increasing trend from 2005 until 2008 and it stayed relatively flat in 2009 and 2010. MEC expects that it will decrease its overall distribution spending in 2011 through 2013. The average actual overall distribution expenditure from 2005 to 2010 is approximately $27.7 million. MEC projects to spend $24.5 million on average each year in 2011, 2012, and 2013.

[7] All the dollar figures included in this section are in actual years' Dollars.

Figure (52)
MEC Distribution Expenditure, 2005-2013 (thousands)



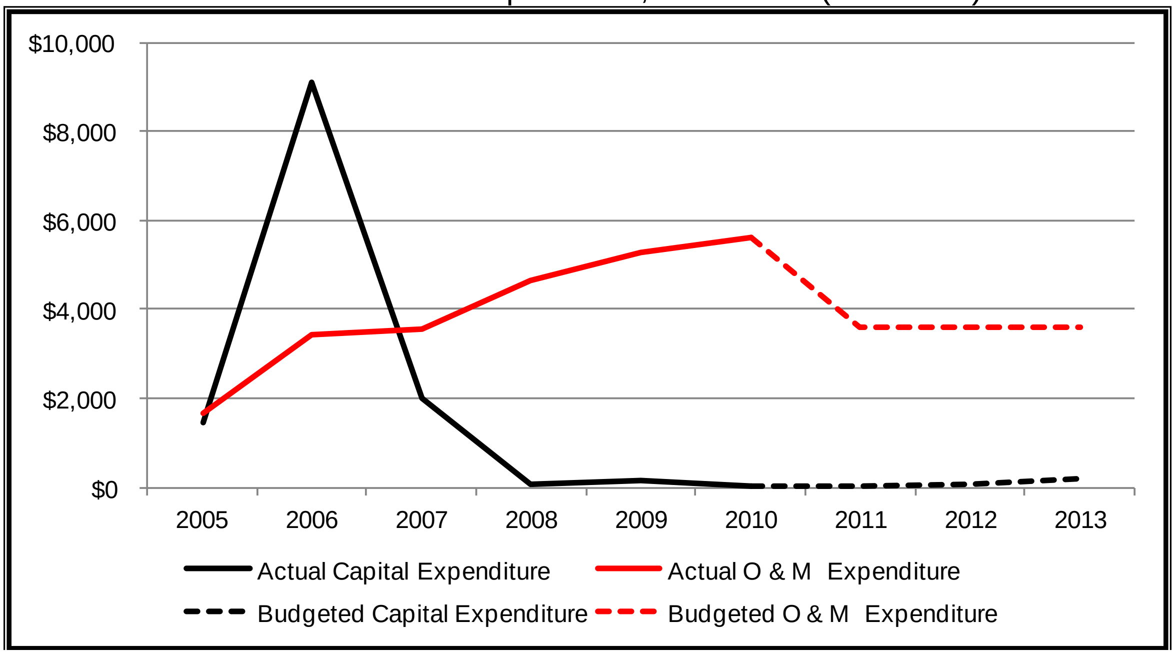
Transmission Expenditures

Figure (53) is a graphical representation of MEC historical and future transmission expenditures. MEC dramatically decreased its transmission capital expenditures from $310 thousand in 2004 to $21 thousand in 2010. Since it peaked in 2006, MEC's transmission capital expenditures followed a sharp declining trend. MEC plans to increase its spending on transmission capital projects steadily from 2011 through 2013.

MEC increased its transmission O&M expenditures by approximately 6.7% from 2009 to 2010, and plans to decrease its transmission O&M expenditures by nearly 36.3% in 2011 and keep them at that level for the following two years. In 2010, MEC sharply decreased its transmission capital expenditures by 86.1% from 2009 level. MEC expects to steadily increase its capital expenditures in each of the coming three years.

In 2008, 2009, and 2010, MEC spent an average of 1.4% of its overall transmission expenditures on capital projects but plans to spend an average of 2.4% of its overall transmission budget on capital projects in 2011, 2012, and 2013. Staff is concerned with the MEC's continuing trend of spending disproportionately far less money on transmission capital projects compared to transmission O&M expenditures. MEC has to provide an explanation for the highly disproportionate ratio between its capital spending and its O&M spending.

Figure (53)
MEC Transmission Expenditure, 2005-2013 (thousands)



<u>Vegetation Management Expenditures</u>

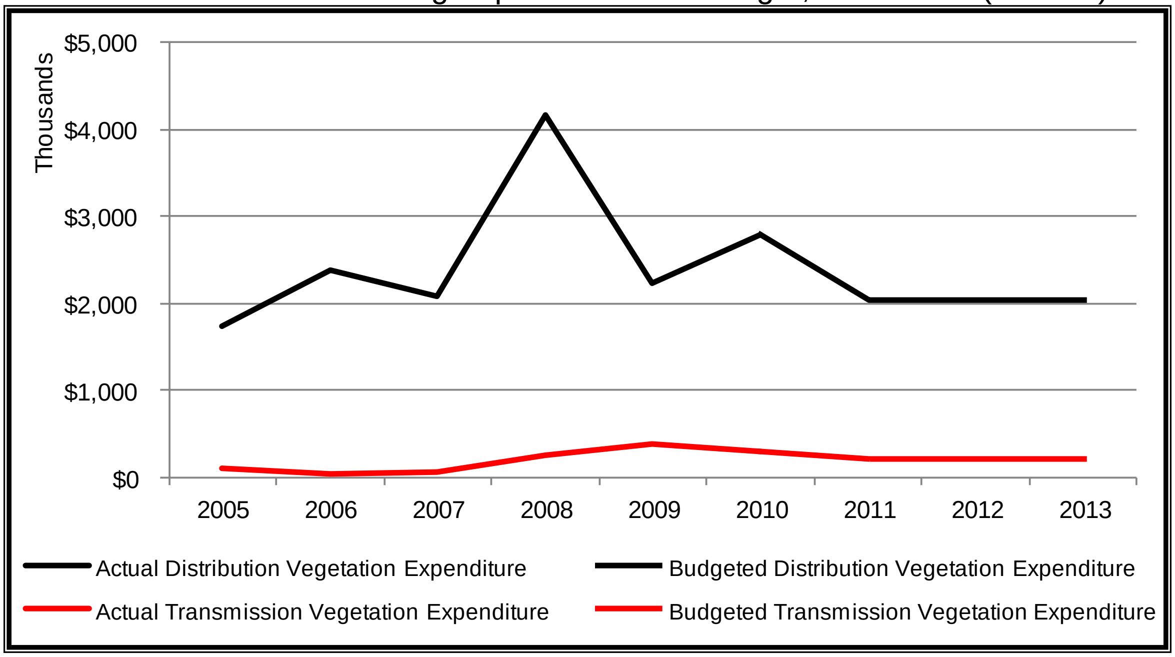
Table (9) and Figure (54) are numerical and graphical representation of MEC's annual tree trimming expenditures for its transmission and distribution systems for years 2005 through 2010 and budgets for years 2011 through 2013.

Table (9)
MEC Vegetation Management Expenditure, 2005-2013

Year	Distribution Vegetation Expenditure	Transmission Vegetation Expenditure	Total Vegetation Expenditure
2005	$1,738,133	$109,391	$1,847,524
2006	$2,383,845	$35,233	$2,419,078
2007	$2,082,000	$55,705	$2,137,705
2008	$4,163,531	$258,869	$4,422,400
2009	$2,221,526	$370,679	$2,592,205
2010	$2,797,431	$295,830	$3,093,261
2011 Budget	$2,047,000	$208,053	$2,255,053
2012 Budget	$2,047,000	$210,134	$2,257,134
2013 Budget	$2,047,000	$212,235	$2,259,235

Figure (54)

MEC Annual Tree trimming Expenditure and Budget, 2005-2012 (millions)



In 2010, MEC spending on its distribution tree trimming programs increased by 25.9% from its 2009 level, but MEC plans to decrease its distribution tree trimming expenditure in 2011 by approximately 26.8% compared to 2010. MEC plans to spend the same dollars (approximately $2.0 million per year) in each of the following three years, which is less than what MEC spent in each of the previous five years. Staff questioned MEC about the reasons of lowering the distribution tree trimming budget for each of the next three years. In response to Staff's inquiry, MEC stated, *"[the] primary reason annual distribution vegetation management budgeted expenditures for 2011 – 2013 are lower than the actual distribution vegetation management expenditure for 2010 is primarily due to unbudgeted storm restoration expenditures in 2010 and slightly reduced anticipated work load in 2011."* Given the vegetation situation that Staff observed during its circuit inspections, MEC's plan to reduce tree trimming expenditure in the next three years raises Staff's concerns about MEC's vegetation management and its effects on its distribution system reliability in the future.

In 2010, MEC decreased its transmission tree trimming expenditures by 20.2% compared to 2009. MEC expects to decrease its transmission vegetation expenditures by 29.7% in 2011 and then increase it slightly in 2012 and 2013. Staff is concerned that MEC spends less in its transmission tree trimming program. As notes earlier in this report, Staff observed tree conflict with a 69 kV line feeding Substation 107. Staff believes that reducing transmission tree trimming budget would result in situations similar to the one that Staff documented in Figure (4). Staff remains concerned about the effects low vegetation management budget will have on MEC's overall system reliability.

10. Potential Reliability Problems and Risks

MEC did not explicitly "identify all foreseeable reliability challenges" as required by Subsection 411.120(b)(3)(A)(iii), but did list projects to address those challenges in attachments to its 2010 Reliability Report. Based on Staff's circuit inspections, Staff believes that MEC faces reliability challenges relating to vegetation, animal protection, and overhead equipment.

According to MEC's 2010 Reliability Report, vegetation conflict with MEC equipment and facilities caused 13% of the total outages and caused 18% of all customer service interruptions in 2010. In most of the circuits that Staff inspected in May and June 2011, vegetation conflict with MEC's equipment and facilities was a serious issue. MEC should trim more vegetation away from those facilities such that adequate clearance from vegetation lasts for the full three years of its tree trimming cycle. MEC should employ more proactive measures to prevent vegetation from growing near its equipment and facilities for the whole period of its tree trimming cycle. The consequences of the absence of such measures were evident during Staff's circuit inspections. MEC should focus more on the single-phase parts of its circuits during tree-trimming operations.

Staff is more concerned about MEC's plans to reduce tree-trimming expenditure over the next three years and about the effect of such plans on the reliability of MEC's distribution system. Given the vegetation situation that Staff observed during circuit inspections, it is Staff's position that this budget cut will have a negative effect on reliability and public safety.

MEC reported in its 2010 Reliability Report that animals caused nearly 16% of total outages. Staff noticed that the degree of adequacy of animal protection varies from one circuit to another; however, generally, it was not adequate. There is a significant lack of animal guards on overhead transformers. Staff noted and documented wide openings on substation gates and beneath substation perimeter fences.

MEC reported that overhead equipment failure caused nearly 25% of total outages in 2010 and resulted in nearly 17% of total customer service interruptions in 2010. Staff believes that MEC can reduce these interruptions by performing circuit inspections more frequently and by taking appropriate corrective actions accordingly. Staff is concerned with MEC's practice of performing thorough circuit inspection once every ten years when more frequent circuit inspections could enable MEC to identify and rectify threats to reliability before they create outage and, in effect, customer service interruptions.

MEC concluded its NESC Corrective Action Plan on March 31, 2012. In response to this assessment, MEC agreed to adopt Staff's recommendation that it implement a four-year inspection program.

11. Review of MEC's Implementation Plan for the Previous Reporting Period

MEC's Actual vs. Budgeted Expenditures

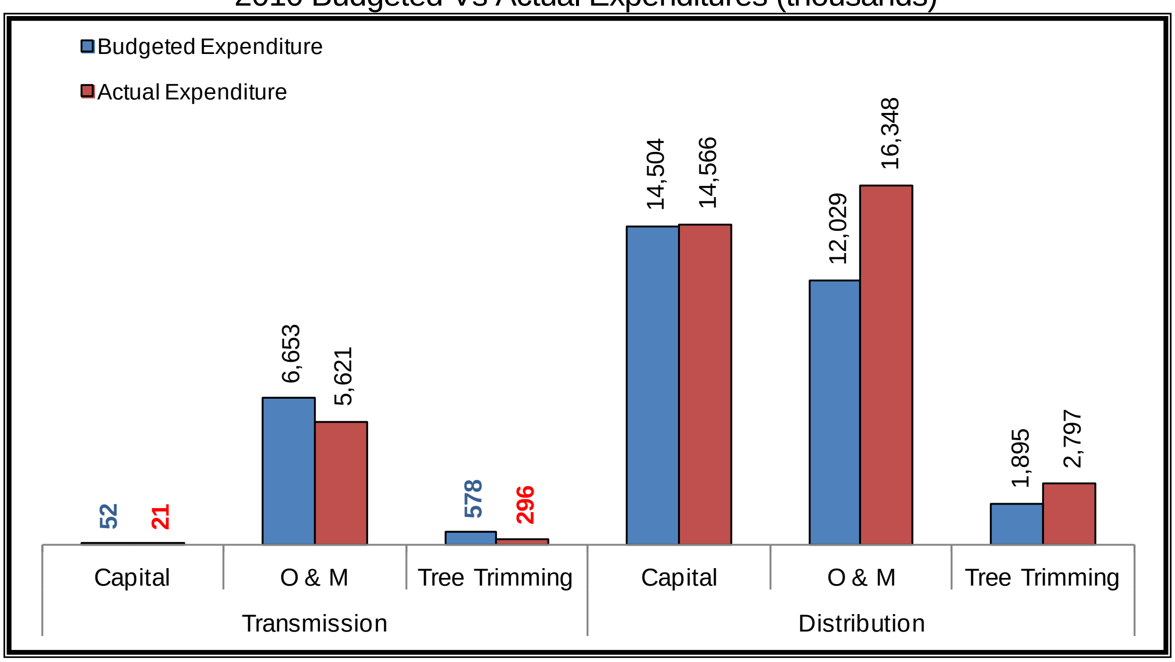
MEC reported its 2010 actual capital, O&M, and vegetation management expenditures for both its distribution and transmission systems. MEC deviated from the projections that it included in its 2009 reporting period for its transmission, distribution, and vegetation management expenditures. Table (10) summarizes these deviations.

Table (10)
2010 Budgeted Vs Actual Expenditures (thousands)

	Transmission			Distribution		
	Capital	O&M	Tree Trimming	Capital	O&M	Tree Trimming
2010 Budgeted Expenditure as reported in 2009 reporting period	$52	$6,653	$578	$14,504	$12,029	$1,895
2010 Actual Expenditure	$21	$5,621	$296	$14,566	$16,348	$2,797
Deviation from budget (%)	– 59.6%	– 15.5%	– 48.8%	0.4%	35.9%	47.6%

In 2010, MEC's transmission capital, O&M, and tree trimming expenditures went under-budget. On the other hand, in 2010, MEC's distribution capital, O&M, and tree trimming expenditures went over-budget. The most noticeable deviations occurred on the distribution O&M and tree trimming expenditures where MEC deviated from its last year's projections by 36% and 48% respectively.

Figure (55)
2010 Budgeted Vs Actual Expenditures (thousands)



Historically, MEC's budgeted expenditures varied significantly from what MEC actually spent year after year. Figures (56), (57), and (58) depict the variations between MEC's actual expenditures compared to MEC's reported budgets from 2005 until 2010. MEC should provide an explanation to these variations.

Figure (56)

Budgeted Vs Actual Distribution Expenditures, 2004 to 2010 (thousands)

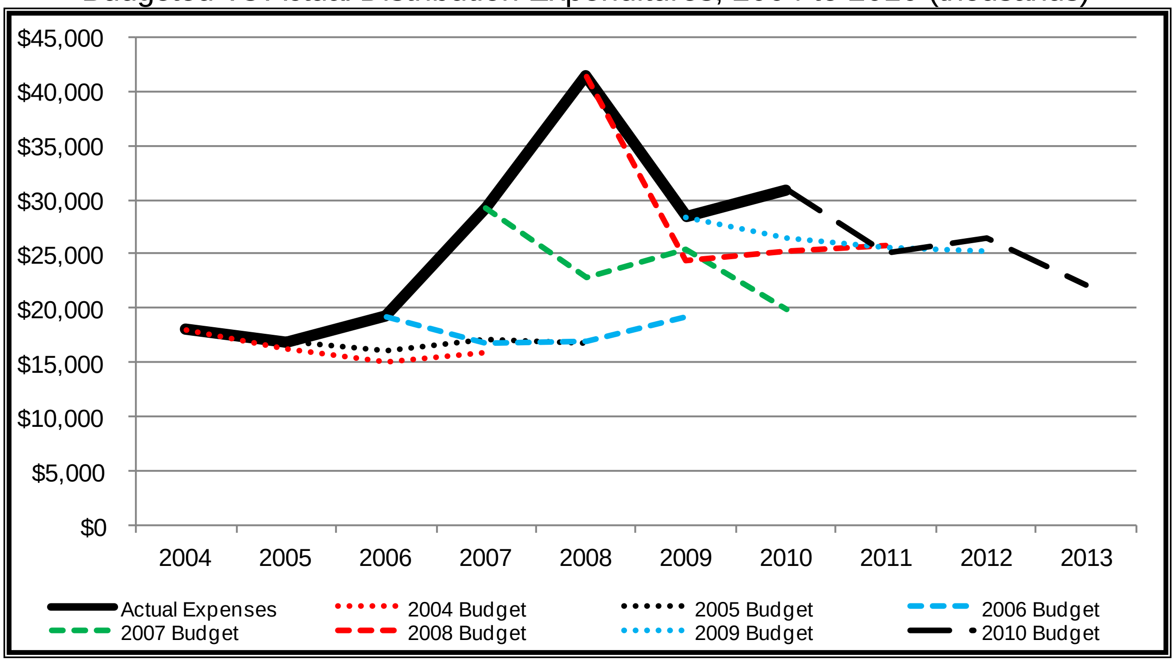


Figure (57)

Budgeted Vs Actual Transmission Expenditures, 2004 to 2010 (thousands)

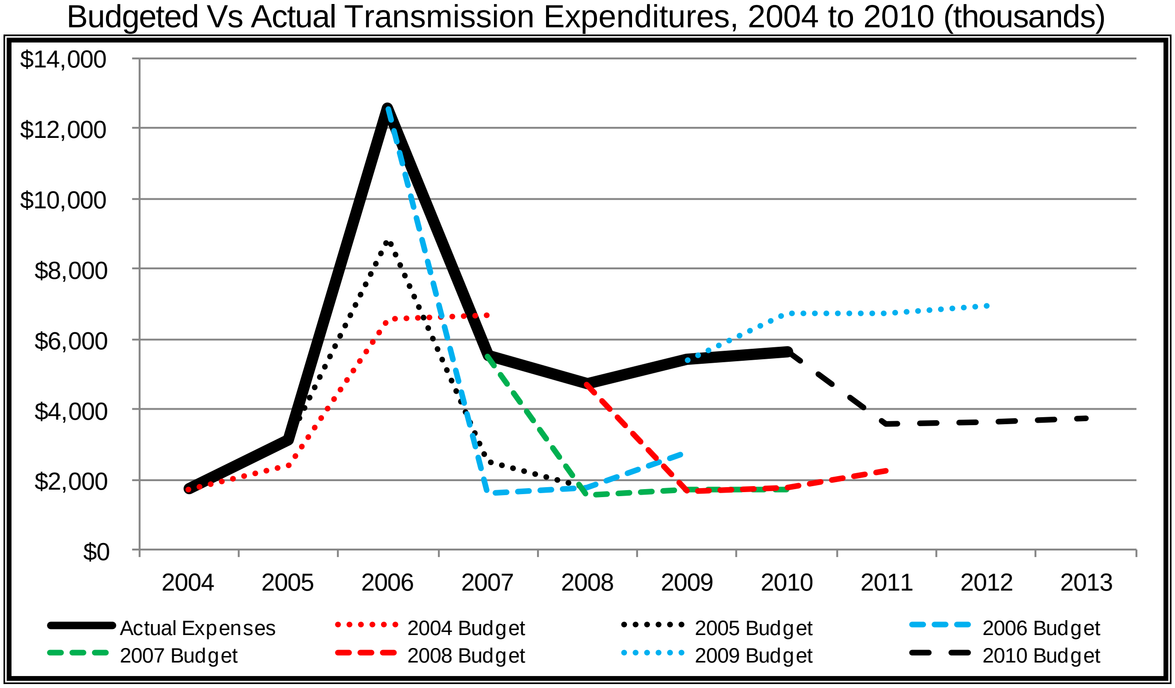
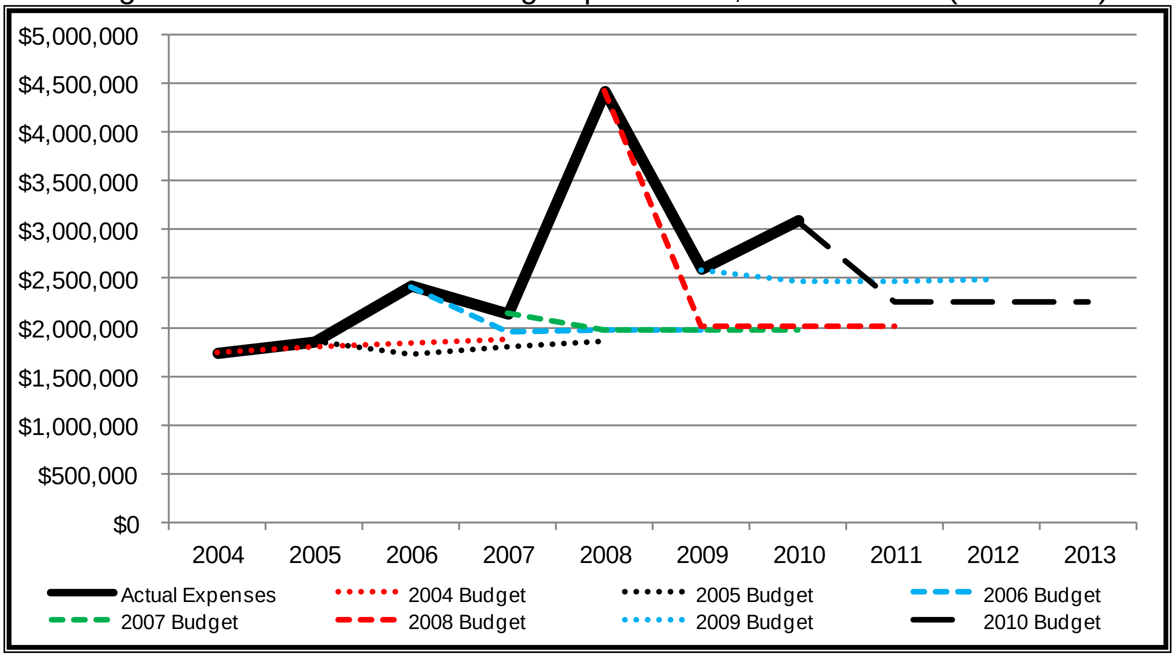


Figure (58)

Budgeted Vs Actual Tree trimming Expenditures, 2004 to 2010 (thousands)



<u>Update on projects on MEC's 2009 Reliability Report</u>

In accordance with Subsection 411.120(b)(3)(B), MEC provided an update on plans that it listed in its 2009 Reliability Report. Below is a summary of that update. MEC included a detailed update concerning those projects as Attachment (C) to its 2010 Reliability Report.

- In its 2009 Reliability Report, MEC reported that load growth in the Colona area required additional capacity to serve that load. MEC reported it plan to add a 161-13 kV substation to Substation 39 to Substation 43 161 kV line. MEC also reported that the proposed substation would include a 161-13 kV, 33 MVA transformer and a substation capacitor bank.

  In its 2010 Reliability Report, MEC stated that its 2009 plan is being modified to a 69-13 kV substation. MEC indicated that it plans to add the newly planned substation to the Sub 39-Sub 37-Sub 27 69 kV line. MEC reported that the new planned substation would provide additional substation transformer capacity.

- In its 2009 Reliability Report, MEC reported that it would add a 161-13 kV transformer at Substation 18 to support load growth and improve reliability. The plan for the project included installing a 161-13 kV, 33 MVA transformer at Substation 18 and adding a 4.8 MVAR substation capacitor bank.

  In its 2010 Reliability Report, MEC stated that it completed the project in 2010.

- In its 2009 Reliability Report, MEC reported that it would replace the relays on the Substation 30 to Substation P 69 kV line at Substation 30 and Substation P in 2010.

In its 2010 Reliability Report, MEC stated that it completed the project in 2010.

- In its 2009 Reliability Report, MEC reported that it would replace the relays on the Substation 30 to Substation R 69 kV line at Substation 30 and Substation R in 2010.

  In its 2010 Reliability Report, MEC stated that it completed the project in 2010.

- In its 2009 Reliability Report, MEC reported that it would replace a 69 kV line breaker at Substation 27 in 2010.

  In its 2010 Reliability Report, MEC stated that it completed the project in 2010.

- In its 2009 Reliability Report, MEC reported that it would be performing complete circuit inspections on each Illinois circuit identifying NESC violations and completing corrective actions based on MEC's NESC Corrective Action Plan.

  In its 2010 Reliability Report, MEC stated that in 2010, it continued circuit inspections and followed them with corrective actions as planned.

12. Summary of Recommendations

MEC should improve its tree trimming practices to ensure that it keeps vegetation away from its primary wires for the entire vegetation management cycle (maximum of three years) and prevents damage from falling trees and tree limbs to the greatest extent practical. MEC should trim more vegetation away from those facilities so adequate clearance from vegetation lasts for the full three years. MEC should employ more proactive measures to prevent vegetation from growing near its facilities when the end of the tree trimming nears. MEC should remove tree limbs that overhang its distribution facilities.

MEC should improve animal protection throughout its service territory. MEC should install overhead protection devices on its distribution circuits, such as lightning arresters and tap fuses as necessary, to minimize service interruptions and to minimize the number of customers affected when interruptions occur as well as the duration of such service interruptions.