

RE 61(2) e-FILING REPORT COVER SHEET

REPORT NAME: 2013 Service Quality Measure Report

COMPANY NAME: Portland General Electric

DOES REPORT CONTAIN CONFIDENTIAL INFORMATION? No

If known, please select designation: RE (Electric)

Report is required by:

OPUC Order No. 11-160, (amended Order No. 97-196 (UM 814))

Is this report associated with a specific docket/case? No

Key words: 2013 Service Quality Measure Report (SQM)

If known, please select the PUC Section to which the report should be directed:

Electric Rates and Planning



Portland General Electric Company
121 SW Salmon Street • Portland, Oregon 97204
PortlandGeneral.com

May 1, 2014

Public Utility Commission of Oregon
Attn: Filing Center
3930 Fairview Industrial Dr. SE
P.O. Box 1088
Salem, OR 97308-1088

RE: PGE 2013 Annual Service Quality Measure (SQM) Report

Pursuant to Order No. 11-160, which amended Order No. 97-196 (UM 814), PGE hereby submits via electronic only, the 2013 Annual Service Quality Measure Report.

Should you have any questions or comments regarding this filing, please contact George Jones at (503) 570-4554.

Please direct all formal correspondence and requests to the following email address pge.opuc.filings@pgn.com

Sincerely,

A handwritten signature in blue ink that reads "Karla Wenzel". The signature is fluid and cursive.

for Karla Wenzel
Manager, Pricing and Tariffs

Enclosure

Cc: Lori Koho, OPUC



Portland General Electric

2013 Service Quality Measure Report

SERVICE QUALITY MEASURE ANNUAL REVIEW

Review of Safety and Operational Performance Areas

Portland General Electric submits this annual report pursuant to OPUC Order 97-196 as later amended to provide information on the service quality of the Company. The information addresses Service Quality Performance Measures on the following:

- C1 “At Fault” customer complaint frequency
- R1 Average customer interruption duration
- R2 Average customer interruption frequency
- R3 Average momentary interruption frequency
- R4 Annual service restoration
- X1 Vegetation Management program
- X2 Pole and overhead facilities inspection, testing and maintenance program
- X3 Other Programs (Marina inspection and maintenance)

In addition to the reporting on the above stated service quality performance measures, and to provide a fuller picture of PGE’s service quality, PGE has included in this report since 2008, additional information we call 21st Century Service Quality Indicators. These 21st Century Service Quality Indicators are included in an Appendix to this report and provide information on the following: customer satisfaction, system reliability and NESC safety violations.

Table of Contents

Introduction:	
Service Quality Measure Annual Review	Page 2
2013 Annual Review of Safety and Operational Performance Areas	
A. Creating a Corporate Safety Culture	Page 4
B. Performance Measures C1 Customer “At Fault” Complaint Frequency	Page 5
Customer Complaint – “At Fault”	Page 5
Customer Complaint and Customer Service Measures	Page 5
C. Reliability Performance Measures: R1-SAIDI, R2-SAIFI, R3-MAIFI, R4-CAIDI	Page 5
Executive Summary	
a. 2013 Reliability	Page 5
b. Summary of Reliability Indices	Page 5
c. Underperforming Feeder Summary	Page 7
d. Worst SAIDI Days	Page 8
D. Performance Measure X1 Vegetation Management	Page 8
E. Performance Measure X2 Pole and Overhead Facilities Inspection	
Testing and Maintenance Program	Page 10
Summary of Inspection, Testing and Maintenance Program	Page 10
a. Corrections of Violations Discovered during Inspections	Page 10
b. PGE Quality Control	Page 10
c. Program Expenditures	Page 10
d. Repair and Replacement of Facilities	Page 10
e. 2014 Fitness Plans	Page 10
F. Performance Measure X3 - Other Programs	Page 11
a. Marina Inspections	Page 11
b. Status of Resolution	Page 11

Appendix:

21st Century Service Quality Indicators

1. Customer Survey Data	Page 12
2. Ranking Methodology	Page 13
3. Customer Satisfaction Results	Page 15
4. System Reliability Results	Page 15
5. Safety Results	Page 16
6. Feeder Classification Criteria	Page 17
7. Feeder Classification Performance Thresholds	Page 17
8. IEEE BETA Methodology Reference	Page 18
9. System Average RMS Variation Frequency Index (SARFI)	Page 19
10. Summary of SARFI SEMI results for 2013	Page 20
11. Graph: SARFI Events by Cause 2013	Page 22
12. Random Sample Inspection of Newly Constructed Poles	Page 24
13. Map of PGE Service Territory	Page 25

2013 Annual Review of Safety and Operational Performance Areas

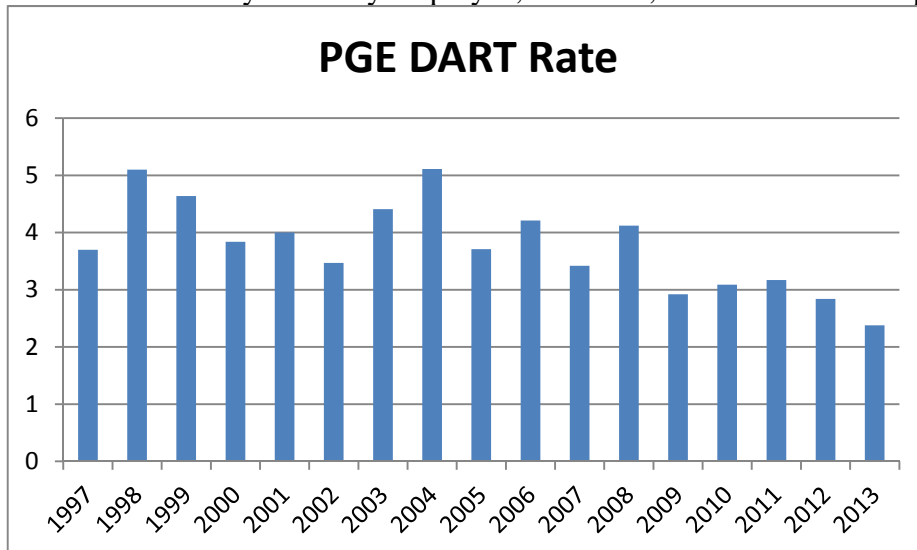
A. Creating an Enhanced Safety Culture

Safety is a core value at Portland General Electric where we are building a safety culture to support employees, customers, and the general public. The focus on safety comes from all areas, including front line employees, customer service, system design, first line supervision on up through senior management to our Officers and Board of Directors.

Leadership from a team of Officers and managers on the Executive Safety Council guides the various safety efforts throughout the company. Engaged employees are the energy behind the work necessary to implement new safety projects and build safety into the daily tasks performed throughout PGE. A safe electrical system from generation sites to the connection at every home or business relies on relentless safety from our designers, project managers, construction and maintenance crews, our inspectors, plus the leadership and support provided by supervisors and managers. It is a complex web that continually strengthens our safety foundation in all aspects of our business and encourages employees to provide safe and reliable service.

Employee led efforts on safety committees, SHARP and VPP teams, plus Grassroots Safety Teams help build employee engagement and personal commitment to safety. Frontline employees are the best resource to identify the hazards of daily tasks and helping to implement corrective actions for their workgroup and others with similar hazards. Safety meetings, corrective actions, safety suggestions, safety training, safety communications, improved work practices, and an increased level of safety awareness by all employees contribute to the safety improvements at PGE.

PGE employees and management continue to improve our safety focus and recognize the importance of the effort. Our employee Days Away, Restricted or Transferred (DART) rate is a lagging indicator that illustrates the results. Our goal is zero employee injuries and we are committed to safety for every employee, customer, and member of the public.



B. Performance Measures C1 Customer “At Fault” Complaint Frequency Customer Complaint and Customer Service Measures

In 2013, PGE’s OPUC Liaisons fielded 282 customer complaints, an increase from 208 complaints in 2012. Of these, the OPUC determined 16 “at-fault” designations resulting in PGE’s 2013 total at-fault complaint rate at 0.0193 per 1,000 customers. It is standard practice to meticulously review all at-fault complaints for root cause and lessons learned.

Year	Logged Complaints	Total Customers	At Faults	At Fault Frequency
2011	254	820,676	14	0.0171
2012	208	822,466	12	0.0146
2013	282	828,354	16	0.0193

C. Reliability Performance Measures: R1-SAIDI, R2-SAIFI, R3-MAIFI, R4-CAIDI Executive Summary

This executive summary provides an overview of the 2013 Reliability Report and highlights key information with comparisons to past years’ data. If there are any questions about this information, please call Rob Weik at (503) 464-8131.

a. 2013 Reliability:

The three year weighted average for SAIDI, SAIFI, and MAIFI indices for 2013 were 65.8 minutes, 0.49 occurrences, and 1.0 occurrence respectively. The SAIDI three-year weighted averages are below the OPUC thresholds, and reflect a reduction from the three year weighted average reported in 2012.

The five-year average service availability for Portland General Electric customers is 99.985%. Service availability in 2013 was 99.988%. Continued efforts in 2014 will improve system reliability by focusing on the poorest performing feeders and tap lines, putting processes in place to reduce the length of major outages and investigating outage causes that are trending up.

b. Summary of Reliability Indices

Table 1, on the following page, provides a 10 year summary of the PGE’s reliability indices (excluding Major Event Days) and shows that PGE’s three year system average stayed under the OPUC SAIDI, SAIFI, and MAIFI Level 1 and 2 threshold limits in 2013.

NOTE: A day is designated as a Major Event Day when the daily system SAIDI exceeds a threshold value, T_{MED} . PGE utilizes the IEEE Standard 1366 methodology to calculate the T_{MED} value. In 2013, April 7th, September 28th, and September 29th, were designated as Major Event Days.

TABLE 1
10 YEAR SUMMARY OF RELIABILITY INDICES
(EXCLUDING MAJOR EVENT DAYS)

Year	SAIDI (minutes)	SAIFI (occurrences)	MAIFI (occurrences)	CAIDI (minutes)	Number of outages
2013	62	0.45	0.91	138	4,495
2012	72	0.55	1.11	131	5,093
2011	66	0.51	0.89	129.0	4,535
2010	77	0.65	1.1	118.3	5,454
2009	115	0.81	1.4	141.6	6,354
2008	75	0.73	1.3	102.7	5,817
2007	77	0.71	1.3	108.5	5,994
2006	117	1.06	1.6	110.4	6,930
2005	86	0.83	1.6	103.6	5,560
2004	85	0.8	1.8	106.3	5,582
2003	82	0.8	2.1	102.5	5,366
3 Year Weighted Average for 2013	65.8	0.49	1.0	134.0	N/A
Level 1 Penalty	105	1.2	5	N/A	N/A
Level 2 Penalty	115	1.2	5	N/A	N/A

The following methods/assumptions were used to derive PGE's 2013 system reliability indices:

Correction factors for SAIDI and SAIFI were applied to tap line outages to more accurately reflect actual events. A factor of 0.8 for duration and 0.9 for number of customers has been used since 2004.

Note: Correction factors were not applied to feeder outages or outages affecting fewer than 30 customers as the information regarding number of customers affected and outage duration are more accurate for these types of outages.

The following were excluded from calculations:

- All outages of five minutes or less were excluded from SAIDI and SAIFI calculations
- Outage causes indicated as Non Outage, Telco Wire, Cable TV Wire, Verizon Equipment, Qwest Equipment, or Comcast Equipment

The three-year weighted averaging formula for 2013 was calculated with 2013 weighted at 50%, 2012 weighted at 30%, and 2011 weighted at 20%.

- PGE excluded April 7, September 28 and 29th as Major Event Days in 2013.

c. Underperforming Feeder Summary

PGE feeders are classified as Urban, Rural, or Remote and have established performance thresholds. Feeders with indices greater than or equal to the defined feeder classification thresholds are designated as underperforming.

A 10-year summary of PGE's underperforming feeders is shown below in Table 2. The number of underperforming feeders is display by year and filtered by reliability index and total. Of PGE's 587 feeders, 9 (1.5%) have been underperforming for the last three consecutive years and 17 (2.9%) have been underperforming for two out of the last three years.

**TABLE 2
10-YEAR SUMMARY OF UNDERPERFORMING FEEDERS**

Year	Number of Underperforming Feeders (by index)				Total Underperforming Feeders ²
	SAIDI	SAIFI	MAIFI	MAIFI ONLY ¹	
2013	53	19	10	7	63
2012	58	24	11	11	76
2011	56	29	11	12	61
2010	78	37	11	7	91
2009	124	44	25	12	136
2008	59	34	16	12	80
2007	71	35	25	17	96
2006	114	86	24	15	143
2005	76	49	33	27	111
2004	67	45	40	26	104
2003	77	45	51	36	116

¹ Designates feeders that are only underperforming for the MAIFI threshold and no other index thresholds (i.e. SAIDI and SAIFI). This column was added to show the benefit of tracking MAIFI on more feeders every year.

² A feeder can be underperforming for more than one index. Feeders that fall in multiple underperforming indices are only captured once in the Total Underperforming Feeders value.

d. Worst SAIDI Days

Table three displays the top 10 days with most significant impact to SAIDI in 2013 (NOTE: Major Event Days are excluded). The ranking is based on the total number of customer outage minutes for the day and associated contribution to SAIDI. These 10 days made up 31% of the total customer minutes in 2013 and contributed 19.5 minutes to the 2013 system SAIDI value.

**TABLE 3
10 WORST DAYS FOR SAIDI IN 2013
(EXCLUDING MAJOR EVENT DAYS)**

Rank	Date	Customer-Outage Minutes	Minutes Contributed to SAIDI Total	Outage Cause
1	5/4/13	2,867,334	3.41	Distribution - Weather (Other than Lightning)
2	5/2/13	2,496,292	2.97	Distribution - Vegetation
3	4/21/13	1,673,974	1.99	Loss of Supply - Substation
4	1/2/13	1,626,869	1.93	Distribution - Vegetation
5	8/28/13	1,572,681	1.87	Loss of Supply - Substation
6	9/27/13	1,489,779	1.77	Distribution - Public
7	12/8/13	1,373,444	1.63	Distribution - Equipment
8	6/30/13	1,236,992	1.47	Loss of Supply - Substation
9	7/1/13	1,034,941	1.23	Distribution - Animal
10	7/26/13	1,030,236	1.22	Loss of Supply - Substation

D. Performance Measure X1 – Vegetation Management

Description:

The Vegetation Management Program is a Basic Maintenance Program that is set apart from the other inspection and maintenance programs due to the crucial effect trees can have on system safety and reliability. Trees and other vegetation are trimmed or removed to provide line clearance and prevent system damage. The Vegetation Management personnel count is a valuable early warning indicator to alert Staff of the Company's ability to adequately maintain its system.

Understanding:

The Company acknowledges that "tickling," "brushing" contacts, brown leaves, desiccation, or any other descriptions, or results of, direct or arcing contact with primary conductors is interpreted by Staff as interference.

PGE Quality Control:

The Company shall inspect not less than 10% of recently completed tree trimming on a continuous basis to ensure compliance with the Program Plan and achievement of adequate clearance.

PGE Foresters monitor all trimming projects on a continual basis using QA performance logs for each project.

Program Expenditures:

The Annual Report will contain information showing the Company's actual annual expenditures compared with its previously planned expenditures. Information will include total budget with actual versus budgeted for each of the following elements: Maintenance Cycle Trimming, Customer Assistance Trimming, Line Construction Trimming, and PGE supervision and Administration.

Budget Plan and Actual Expenditures:

	<u>Actual</u>	<u>Budget</u>
2012 Actual versus budgeted:	\$12,780,774	\$12,781,976
2013 Actual versus budgeted:	\$13,199,330	\$13,320,884
PGE Supervision and Administration:	\$659,162	
Maintenance Cycle Trimming:	\$12,539,364	95%
Customer Assistance Trimming :	\$527,973	4%
Line Construction Trimming:	\$131,993	1%

Vegetation Management Personnel Information:

The Company's Annual Report shall include the number of full time employees assigned to the following positions for each of the last three years:

	2013	2012	2011
a) Company foresters:	8	8	8
b) Company tree trimmers and arborists; and	0	0	0
c) Contractor tree trimmers and arborists.	95	95	95

E. Performance Measure X2 Pole & Overhead Facilities Inspection, Testing, and Maintenance Program

Summary of Program

The year 2013 was our seventh year of the Facility Inspections and Treatment to the National Electrical Safety Code (FITNES) III 10-year cycle. 2013 FITNES overhead inspection and treatment was performed on 30,299 distribution and transmission poles and associated overhead distribution facilities (11.2% of 270,000 wood poles included in the FITNES Overhead Program).

a. Corrections of Violations Discovered During Inspections

- FITNES Program timelines are established and maintained to perform corrections, repairs, or replacement work within two (2) years of violation discovery. 13,700 violations were corrected in 2013.
- Violations deemed an immediate hazard receive expedited attention to ensure treatment/correction within 30 days

b. PGE Quality Control

- Accuracy of the inspection is ensured by performing QC on a random sampling pulled on average weekly.
- QC was also performed on 1,552 corrected violations (11.3% of total 13,700 corrections).

c. Program Expenditures

- 2013 Pole and Overhead Facilities Inspection, Testing and Pole Treatment: \$970,000 (Budget) \$1,050,000 (Actual)

d. Repair and Replacement of Facilities

- 2013 Pole and Overhead Facilities Repair
- \$1,608,000 (Budget¹) \$1,207,000 (Actual²)
- 2013 Replacement of Facilities (Capital)
- \$2,686,109 (Budget) \$2,806,000 (Actual)

^{1 and 2} *Budget and Actuals include Full Pole Transmission Project*

e. 2014 Fitness Plans

- PGE plans to stay on the Cycle 3 FITNES plan for Pole and OH Inspections and inspect approximately 28,000 poles and related OH facilities in 2014.

F. Performance Measure X3 - Other Programs

a. Marina Inspections

Two rounds of marina inspections were completed in 2013 on 47 marinas. The first round of inspections was conducted in the spring for high water findings, and the second round of inspections was performed in the fall for low water findings. Of these 47 marinas, 100% were inspected during each of the high and low watermarks.

From these inspections, six work orders were generated for repair of various violations.

These violations include:

1. SA - Service Attachment
2. CD - Broken conduit
3. DL – WH clearance
4. No Code – Rusted transformer
5. No Code – Suggested Moorage Re-design

The inspection work orders were forwarded to the appropriate Region for resolution.

b. Resolution Status of Violations Discovered During Inspection

The following lists the status of the six work orders generated by High Water and Low Water moorage inspections:

- One is scheduled for dry weather
- One is designed and in queue waiting for approval for scheduling.
- One is assigned to contract Service Design Project Manager (SDMP)
- Three referred to Planning Scheduling Line Dispatch (PSLLD) and/or SDPM for design or resource coordination.

2014 high water inspection begin week of May 1.

Appendix

21st Century Service Quality Indicators

1. Customer Survey Data

PGE collects survey data from Residential, Business and Large Industrial (Key) customers to measure and evaluate how customers perceive its performance across several areas including:

- Reliability and Power Quality
- Customer Service
- Management
- Communications
- Pricing
- Corporate Citizenship
- Billing and Payment

The surveys reveal relative strengths and weaknesses in the Company's performance as well as opportunities for improvement.

PGE contracts with Market Strategies International (MSI), an independent, full-service customer market research company headquartered in Michigan, to conduct customer satisfaction surveys among PGE's residential and general business customers.

Each quarter, MSI surveys 400 to 600 residential customers and every other quarter, (Q2 and Q4) they survey 300-400 general business customers. They analyze and benchmark the collected data and provide PGE with quarter-to-quarter and year-to-year comparisons based on the "percent total positive" (%6-10) scores on an 11-point scale (where 0 means the customer has a "Very Unfavorable" impression, 10 means the customer has a "Very Favorable" impression). According to the fourth-quarter 2013 MSI survey, PGE received a positive rating on overall satisfaction for both residential and business customers, placing it in the top ten percent (decile) of its peer utilities.

In addition, PGE also acquires the results of the annual J.D. Power and Associates Electric Utility Customer Satisfaction StudySM (J.D. Power Study) for both residential and general business customers. PGE uses the J.D. Power Study primarily as a benchmark to other electric utilities. PGE was again ranked as the top investor-owned utility in the nation for residential customer satisfaction, and also ranked as the top utility in the West for business customer satisfaction by J.D. Power & Associates in 2013.

For its large industrial customers (key customers), PGE contracts with TQS Research, Inc. (TQS), an independent market research firm, to conduct annual customer satisfaction surveys. TQS, headquartered in Georgia, specializes in business-to-business research among the largest energy users in the United States and Canada. For 2013, TQS completed 106 PGE key customer interviews and the data against the results of 52 other U.S. utility holding companies. TQS uses a 10-point scale (with 1 being *Very Dissatisfied* and 10 being *Very Satisfied*) and reports the percent of customers that give a rating of 8, 9, or 10 (%8-10).

In the 2013 TQS research, PGE ranked fourth nationally in overall customer satisfaction and number one in reliability with large key customers, placing it in the top ten percent (top decile) among electric utility holding companies.

2. Ranking Methodology:

National and/or peer comparison groups are not identical for MSI, J.D. Power and TQS research results, but there is some overlap in the utilities surveyed. In 2013, MSI included approximately 100 utilities serving residential customers and approximately 85 utilities serving business customers in their national databases. J.D. Power surveyed 126 utilities for its residential study and 95 utilities for its general business study. For both MSI and J.D. Power, PGE compares itself to all surveyed utilities and to a sub-set defined as a “peer group.” The TQS national comparison database contains 52 utilities and compares performance with respect to key customers only.

Utilities in the peer comparison groups for PGE are shown in the tables below for MSI, J.D. Power and TQS.

PGE’s 2013 MSI Survey peer group

Residential	Business
NV Energy North	NV Energy North
NV Energy South	NV Energy South
Pacific Gas & Electric	Pacific Gas & Electric
Pacific Power	Pacific Power
Portland General Electric	Portland General Electric
Puget Sound Energy	Puget Sound Energy
Rocky Mountain Power	Rocky Mountain Power
San Diego Gas & Electric	San Diego Gas & Electric
Seattle City Light	Southern CA Edison
Southern CA Edison	

PGE's 2013 J.D. Power Study Peer Group

Residential	Business
SRP	SRP
Sacramento Municipal Utility District	
Arizona Public Service	Arizona Public Service
	Southern California Edison
Southern California Edison	Edison
Pacific Power	Pacific Power
Rocky Mountain Power	Rocky Mountain Power
Puget Sound Energy	Puget Sound Energy
San Diego Gas & Electric	San Diego Gas & Electric
Pacific Gas and Electric	Pacific Gas and Electric
NV Energy	NV Energy
Xcel Energy-West	Xcel Energy-West
	LA Dept. of Water & Power
LA Dept. of Water & Power	Power

2013 TQS National Utility Benchmark Study of Large Key Accounts

Top 20 of 52 Holding Companies
MidAmerican Holding
Southern Co
SCE&G
Portland General
WE Energies
FP&L
IdaCorp
Wisconsin PS
Duke Energy
Avista
Arizona PS
Pepco
TVA
Minnesota Power
Entergy
TECO
NiSource
Salt River
Ameren
PPL Corp

3. Customer Satisfaction Results:

➤ Survey Question & Result

MSI:

Survey Question: “Based on your overall experience as a customer of PGE, how would you rate the company on a 0-10 scale, where a 0 means you are extremely dissatisfied and 10 mean you are extremely satisfied?”

TQS:

Survey Question: “Overall, how satisfied are you with the full package of electrical services provided by your local utility?” See PGE Customer Satisfaction results below.

PGE Customer Satisfaction Rolling Average Results

	MSI: Residential (%6-10)	MSI: General Business (%6-10)	TQS: Key Customers (%8-10)
2013	90%	94%	90.90%
2012	86%	94%	93.90%
2011	86%	92%	90.50%
2010	86%	94%	81%
2009	85%	92%	72%
2008	85%	94%	82%
2007	83%	92%	75%
2006	82%	92%	76%
2005	81%	93%	64%
2004	80%	87%	58%

Year End 2013 Rank on Customer Satisfaction

National	4th/100	4th/91	4th/52
Peers	2nd/10	1st/9	NA

4. System Reliability Results:

➤ Survey Question and Results

MSI:

Survey Question: “Thinking about the overall reliability of electric service to your [home/business], on a 0-10 scale, where 0 means you are extremely dissatisfied and 10 means you are extremely satisfied, how satisfied are you with the overall reliability of electric service?”

TQS:

Survey Question: “Concerning the reliability of electric power, please rate the reliability at this site on the following overall how satisfied are you with the reliability of electric power?”

PGE System Reliability Rolling Average Results

Year End 2012 Rank on System Reliability

	MSI: Residential (%6-10)	MSI: General Business (%6-10)	TQS: Key Customers (%8-10)
2013	97%	96%	96.60%
2012	96%	96%	97.60%
2011	95%	98%	88.40%
2010	95%	95%	95.70%
2009	94%	98%	86.60%
2008	95%	96%	86.20%
2007	94%	95%	85%
2006	95%	94%	88%
2005	94%	94%	83%
2004	93%	91%	71%

Year End 2013 Rank on System Reliability

National	1st/99	2nd/90	1st /52
Peers	1st /10	1st/9	NA

5. Safety Results – Note: Safety Not asked in 2013 Survey

➤ 2012 Survey Question and Results

MSI:

Survey Question (2012): “Using this same 0-10 scale, how would you rate PGE in terms of helping customers use electricity safely in their [homes/businesses]?”

PGE Safety

	Residential (MSI) (%6-10)	General Business (MSI) (%6-10)
2012	80%	80%
2011	76%	83%
2010	75%	79%
2009	76%	70%
2008	76%	64%
2007	77%	70%
2006	79%	67%
2005	74%	62%
2004	74%	60%

6. PGE Feeder Classification Criteria:

- Urban – 50% or more of the feeder load is located inside the Urban Growth Boundary (UGB)
- Rural – One or more of the following apply:
 - a. Load is greater than 0.5 MVA per square mile
 - b. More than 100 customers per square mile
 - c. Serving load inside an incorporated city
 - d. Directly adjacent to the UGB with feeder ties into the UGB
- Remote – Not classified as Urban or Rural

7. PGE Feeder Classification Performance Thresholds:

Feeder Classification	SAIDI (minutes)	SAIFI (occurrences)	MAIFI (occurrences)
Urban	120	2.0	5
Rural	300	2.6	10
Remote	420	2.6	15

8. IEEE 2.5 BETA Methodology Reference

IEEE 2.5 BETA Method

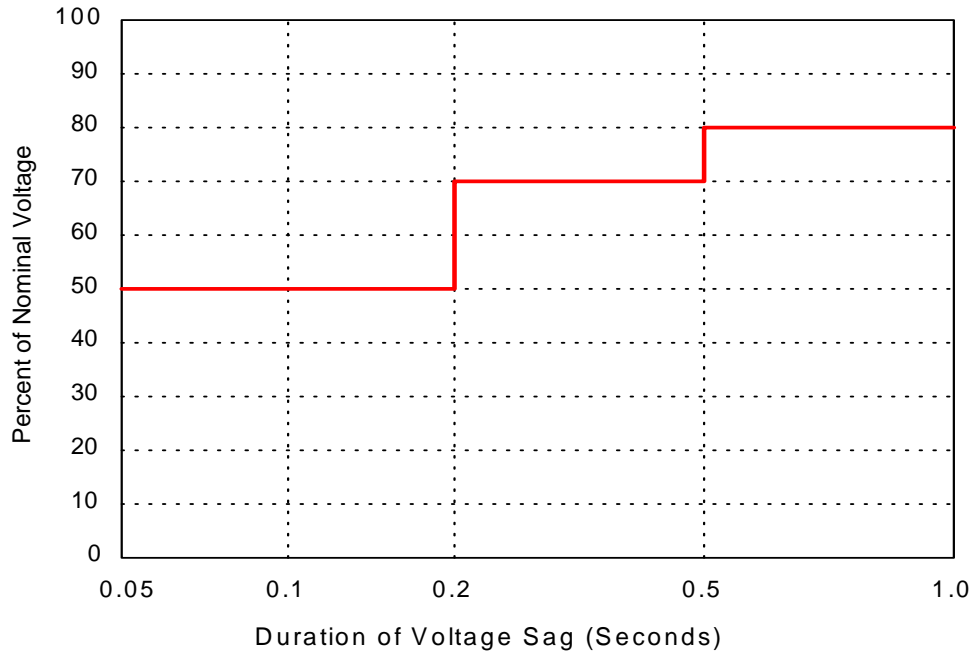
The 2.5 Beta Method looks at the Daily SAIDI values of a utility and compares them to a threshold value (T-MED) obtained by performing a logarithmic distribution analysis on the previous 5 years of outage data. Calculating a T-MED value allows the utility to identify and study days in which the distribution system experienced stresses beyond what is observed under daily operation. Per IEEE Standard 1366-2003 the steps to obtain major event day threshold (T-MED) are outlined below.

IEEE GUIDE FOR ELECTRIC POWER DISTRIBUTION RELIABILITY INDICES	IEEE Std 1366-2003
<p>a) Collect values of daily SAIDI for five sequential years ending on the last day of the last complete reporting period. If fewer than five years of historical data are available, use all available historical data until five years of historical data are available.</p> <p>b) Only those days that have a SAIDI/Day value will be used to calculate the T_{MED} (do not include days that did not have any interruptions).</p> <p>c) Take the natural logarithm (\ln) of each daily SAIDI value in the data set.</p> <p>d) Find α (Alpha), the average of the logarithms (also known as the log-average) of the data set.</p> <p>e) Find β (Beta), the standard deviation of the logarithms (also known as the log-standard deviation) of the data set.</p> <p>f) Compute the major event day threshold, T_{MED}, using equation (25).</p> $T_{MED} = e^{(\alpha + 2.5 \beta)} \quad (25)$ <p>g) Any day with daily SAIDI greater than the threshold value T_{MED} that occurs during the subsequent reporting period is classified as a major event day.</p> <p>Activities that occur on days classified as major event days should be separately analyzed and reported.</p>	

Since OPUC, PGE, Pacific Corp., and Idaho Power have collaborated on incorporating the IEEE-2.5 Beta method for calculating Major Event Days into Oregon's Electric Service Reliability Rules. The new rules became affective January of 2012.

9. System Average RMS Variation Frequency Index (SARFI)

System Average RMS Variation Frequency Index (SARFI) represents the average number of RMS sag events experienced by a customer over a time period, where the disturbances are those with a magnitude less than the semiconductor equipment voltage sag ride-through capability curve specified in SEMI F47-0200 (below).



The Semiconductor Equipment and Materials International (SEMI) developed the SEMI F47-0200 standard for semiconductor process equipment voltage sag immunity. The standard specifies minimum voltage sag ride-through requirements of semiconductor processing equipment. A voltage sag event is defined as a short term decrease in voltage (10 - 90% of nominal) ranging between 0.5 cycles and one minute. Voltage sags can be caused by bad weather, tree into line, car hit pole, failed equipment on PGE's system, or events originating outside PGE's system.

In 2013, PGE's Large Customer Quality and Reliability Program (QRP) tracked voltage sag events against the SEMI F47 curve for 25 customers who have unique power quality and reliability requirements.

The PGE Quality and Reliability Program (QRP) is a focused effort to provide a high level of service reliability to a group of customers determined to have unique reliability needs. The QRP program includes monitoring and reporting of power quality and reliability metrics for 26 customer sites and customers located within our three Reliability Areas. These Reliability Areas are Downtown Salem Core, Hillsboro-Sunset, and Downtown Portland Network.

Additional objectives of the QRP Program include:

- working with stakeholders to review the facilities serving QRP customers and identify potential system improvements
- developing detailed maintenance plans including enhanced system inspections and testing.
- managing implementation of identified capital improvements
- performing root cause investigations and identifying preventive actions for significant reliability events

Through this effort, PGE is providing a higher level of service excellence to meet the service quality and reliability needs of an increasingly sophisticated and demanding customer base.

Events below the curve are considered a SARFI event.

SARFI is calculated using the following formula:

$$SARFI = \sum \frac{\text{Total Number of Events}}{\text{Total Number of Customers}}$$

The 2013 SARFI results reflect 16 events.

Year	SEMI F47 (occurrences)	SEMI F47 (occurrences originating inside PGE system)	SARFI (total)	SARFI (originating inside PGE system)
2013	17	17	0.65	0.65

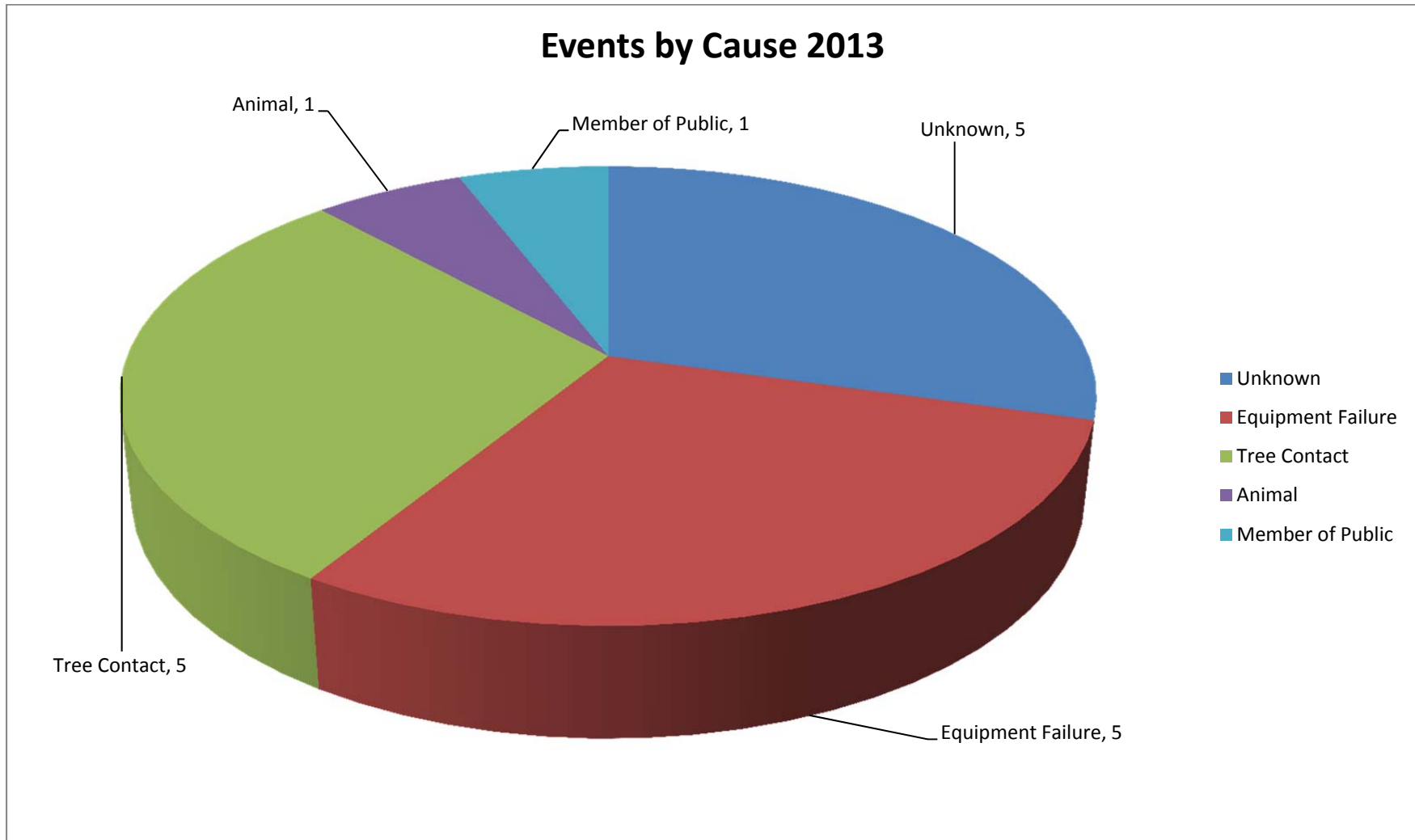
10. Please see the table below for a summary of SARFI SEMI results for 2013

# of Customers	Event Date	Duration	Worst Case Voltage	Description of Event	Follow-Up
1	1/16/2013	6.72 Cycles	25.55%	Town Center - Sunnybrook 13 kV tripped and reclosed for unknown reasons.	None.
1	1/24/2013	26.1 Cycles	24.38%	Sunnybrook 13 kV relayed to lockout. Arrester failure.	Removed bad-order arrester
1	2/28/2013	6.2 Cycles	29.73%	Trip and reclose on Town Center-Sunnybrook 13 kV for unknown reasons.	None.
1	3/16/2013	35 Cycles	45.31%	UG cable disconnect failure on pole.	Crew opened cable disconnect to isolate faulted section.
1	4/14/2013	20.51 Cycles	49.19%	R212 tripped and locked out. Bad order B phase primary.	IR inspection completed of TriQuint campus. Findings under engineering review.
1	5/29/2013	7.08 Cycles	6.01%	Trees into line, wire down.	Repairs made.
1	5/29/2013	16.61 Cycles	41.08%	Tree Limb on line at D2206B / PL2458.	Removed tree limb and restored service
1	6/2/2013	4.32 Cycles	44.92%	Tree top fell through line St. Mary's West - Wacker 115 kV.	Crew patrolled line and tree top on ground.
1	6/9/2013	4.32 Cycles	21.38%	R118 tripped and reclosed.	None.

# of Customers	Event Date	Duration	Worst Case Voltage	Description of Event	Follow-Up
1	8/15/2013	26.62 Cycles	59.62%	Squirrel into arrester on SW8406.	Replaced arrestors.
1	8/19/2013	12.01 Cycles	4.14%	Overhead conductor failure. Wire down. Relay fault locator indicates ABC fault 1 mile from Culver.	Crew isolated faulted section and made repairs.
1	9/6/2013	59.93 Cycles	79.30%	Tree Limb into feeder	None.
1	9/22/2013	1.24 Seconds	9.10%	Tree into line, wire down.	Repairs made.
1	9/28/2013	5.76 Cycles	10.39%	Storm in area, OMS #2147713. SDDDB#12511	None.
1	9/29/2013	5.76 Cycles	12.83%	Unknown. High winds in the area.	None.
1	10/9/2013	27.95 Cycles	21.25%	Failed Padmount switch on Sunset-Blanchet caused sag.	Failed switch replaced.
1	12/23/2013	32.15 Cycles	27.58%	Truck ripped down wire on SE Ambler Rd.	Working with customer on solution to protect equipment.

* % Sag is the percentage of nominal voltage remaining during event

11. The graph below shows the sources for the 17 SARFI events that occurred during 2013



12. Random Sample Inspection of Newly Constructed Poles / NESC Violations

Starting in 1999, a random sample of newly constructed poles was inspected by trained personnel looking for any National Electric Safety Code (NESC) violation. Quarterly, the results are reviewed with line crew management in each Region. The same crew that built a given pole is sent back to correct any violation identified.

Steady progress has been achieved over the last 10 years in construction to the NESC. Annual training for line crews includes a review of the most common violations found.

In 2013, 515 newly constructed poles were randomly selected and individually inspected. On average, 0.002 NESC violations were found per pole.

REGION	POLES	ABANDONED ANCHOR	BUILDING CLEARANCE	B/O GROUND	CONDUIT DAM/BRKTS	CLEARANCE PEDESTRIAN	CLIMBING SPACE	GROUND ROD	WH CLEARANCE	GUY BONDING	GUY SLACK	INSULATOR BROKEN	WIRE OFF INSULATOR	STRUCTURE CLEARANCE	LOOSE WIRE	RISER GROUNDING	SECONDARY CLEARANCE	DRIVEWAY CLEARANCE	AG CLEARANCE	POLE-COM CLEARANCE	ROAD CLEARANCE	RAILROAD CLEARANCE	SERVICE ATTACHMENT	MIDSPAN COM CLEARANCE	SERVICE CLEARANCE	VERTICAL CLEARANCE	TOTAL VIOLATIONS	VIOLATIONS PER POLE
		AH	BC	BG	CD	CP	CS	DG	DL	GI	GS	IB	IW	LC	LW	MR	NC	OC	OG	PC	RC	RR	SA	SC	SD	VC		
PSC	143																										0	0.000
ORE CITY	90																										0	0.000
EASTERN	12																										0	0.000
SOUTHERN	37																										0	0.000
WESTERN	233			1																							1	0.004
TOTAL	515																										1	0.002

PGE SERVICE TERRITORY

Including Regional Boundaries

REVISED: 2/24/2012

Legend

- SERVICE TERRITORY BOUNDARY
- EASTERN
- SOUTHERN
- WESTERN



© PORTLAND GENERAL ELECTRIC

