

KENTUCKY PUBLIC SERVICE COMMISSION

Electric Distribution Utility Annual Reliability Report

SECTION 1: CONTACT INFORMATION

UTILITY NAME	Grayson Rural Electric Cooperative Corporation
REPORT PREPARED BY	Brian Poling/Mike Martin/Kyle Clevenger
E-MAIL ADDRESS OF PREPARER	brian.poling@graysonrecc.com
E-MAIL ADDRESS OF PREPARER	mike.martin@graysonrecc.com
E-MAIL ADDRESS OF PREPARER	kyle.clevenger@graysonrecc.com
PHONE NUMBER OF PREPARER	606-474-5136

SECTION 2: REPORTING YEAR

CALENDAR YEAR OF REPORT	2016
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SECTION 3: MAJOR EVENT DAYS (MED)

	T _{MED}	57.614
FIRST DATE USED TO DETERMINE	T _{MED}	1/1/2016
LAST DATE USED TO DETERMINE	T _{MED}	12/31/2016
NUMBER OF MED IN REPORT YEAR		2

NOTE: Per IEEE T_{med} should be calculated using the daily SAIDI values for the five prior years. If five years of data are not available, then utilities should use what is available until five years are accumulated

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SECTION 4: SYSTEM RELIABILITY INFORMATION AND RESULTS

System-wide Information

TOTAL CUSTOMERS:	<u>14,933</u>	TOTAL CIRCUITS	<u>42</u>
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Excluding MED

	<u>5 YEAR AVERAGE</u>		<u>REPORTING YEAR</u>
SAIDI	<u>339.0</u>	SAIDI	<u>440.2</u>
SAIFI	<u>2.95</u>	SAIFI	<u>3.23</u>

Including MED

	<u>5 YEAR AVERAGE</u>		<u>REPORTING YEAR</u>
SAIDI	<u>1240.4</u>	SAIDI	<u>674.3</u>
SAIFI	<u>3.71</u>	SAIFI	<u>3.66</u>

NOTES:

- 1) All durations indices (SAIDI) are to be reported in units of minutes.
- 2) Reports are due on the first business day of April of each year.
- 3) Reports cover the calendar year ending in the December before the reports are due.
- 4) IEEE 1366 (latest version) issued to define SAIDI, SAIFI and T_{MED}

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SECTION 5: CIRCUIT REPORTING

(CIRCUITS WITH SAIDI AND/OR SAIFI EXCEEDING 5 YEAR AVERAGE)

(CIRCUIT NUMBERS SHOULD BE REPORTED EXCLUDING MED)

1. Leon (Sub #2)
2. North Rt. 7 toward Grayson
3. Feeder 1
4. The sub is located on Rt. 1661 approximately 1.8 miles from Jct Rt. 7
5. Approximately 14.9 Primary Miles
6. 183 Active Consumers
7. Circuit was cut in 2009
8. Causes of last years outages:

431 Tree Failure-off ROW	34.6%
110 Maintenance	23.1%
590 Weather, other	19.2%
600 Small animal/bird	19.2%
800 Other	3.8%
9. The average SAIDI is 1051.47
10. The SAIDI for 2016 was 1543.57
11. The average SAIFI is 2.41
12. The SAIFI for 2016 was 3.56
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Mazie (Sub #4)
2. Located approximately 11.5 miles east of Sandy Hook on Rt. 32.
3. Feeder 2
4. Rt. 32 toward Blaine
5. Approximately 124.7 Primary Miles
6. 652 Active Consumers
7. Circuit was cut in 2014.
8. Causes of last years outages:

590 Weather, other	25.9%
430 Tree failure from overhang or dead tree without ice/snow	25.9%
110 Maintenance	12.3%
999 Cause unknown	8.6%
400 Decay/age of material/equipment	6.2%
431 Tree Failure-off ROW	4.9%
510 Wind, not trees	3.7%
100 Construction	2.5%
800 Other	1.2%
790 Public, other	1.2%
730 Fire	1.2%
700 Customer-caused	1.2%
460 Moisture	1.2%
440 Trees with ice/snow	1.2%
360 Other equipment installation/design	1.2%
190 Other planned	1.2%
9. The average SAIDI is 846.48
10. The SAIDI for 2016 was 1821.48
11. The average SAIFI is 4.04
12. The SAIFI for 2015 was 4.27
13. Refer to Section 7

KENTUCKY PUBLIC SERVICE COMMISSION

SECTION 5: CIRCUIT REPORTING

Continued

1. Mazie (Sub #4)
2. Located approximately 11.5 miles east of Sandy Hook on Rt. 32.
3. Feeder 3
4. Feeds toward Terryville
5. Approximately 20.6 Primary Miles
6. 88 Active Consumers
7. Records indicate this circuit has only been spot cut.
8. Causes of last years outages:

590 Weather, other	50.0%
430 Tree failure from overhang or dead tree without ice/snow	37.5%
110 Maintenance	6.3%
431 Tree Failure-off ROW	6.3%
9. The average SAIDI is 869.77
10. The SAIDI for 2016 was 904.34
11. The average SAIFI is 2.73
12. The SAIFI for 2016 was 3.38
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Argentum (Sub #1)
2. Located approx. one half mile north of AA Highway on Rt. 7
3. Feeder 2
4. Feeds south along Rt. 7 toward gas plant.
5. Approximately 99.3 Primary Miles
6. 663 Active Consumers
7. Circuit was last cut in 2011
8. Causes of last years outages:

431 Tree Failure-off ROW	33.8%
999 Cause unknown	21.3%
590 Weather, other	11.3%
500 Lightning	7.5%
600 Small animal/bird	6.3%
110 Maintenance	5.0%
300 Material or equipment fault/failure	3.8%
430 Tree failure from overhang or dead tree without ice/snow	2.5%
730 Fire	2.5%
800 Other	2.5%
400 Decay/age of material/equipment	1.3%
410 Corrosion/abrasion of material/equipment	1.3%
420 Tree growth	1.3%
9. The average SAIDI is 484.19
10. The SAIDI for 2016 was 617.71
11. The average SAIFI is 1.82
12. The SAIFI for 2016 was 3.0
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Newfoudland (Sub #2)
2. Located on Rt. 32 just south of the Junction of Rt. 7
3. Feeder 2
4. Follows Rt. 32 toward Brown Ridge
5. Approximately 33.8 Primary Miles
6. 229 Active Consumers
7. Records indicate this circuit has only been spot cut.
8. Causes of last years outages:

110 Maintenance	18.8%	3
400 Decay/age of material/equipment	18.8%	3
590 Weather, other	18.8%	3
999 Cause unknown	12.5%	2
100 Construction	6.3%	1
420 Tree growth	6.3%	1
431 Tree Failure-off ROW	6.3%	1
500 Lightning	6.3%	1
510 Wind, not trees	6.3%	1
9. The average SAIDI is 1461.94
10. The SAIDI for 2016 was 1331.86
11. The average SAIFI is 2.32
12. The SAIFI for 2015 was 2.48
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Argentum (Sub #1)
2. The sub is located on Rt. 7 0.6 miles north of the junction of AA Highway.
3. Feeder 3
4. Feeds East Tygart Road
5. Approximately 20.3 Primary Miles
6. 206 Active Consumers
7. Circuit was fully cut in 2011
8. Causes of last years outages:

999 Cause unknown	20.0%	3
431 Tree Failure-off ROW	13.3%	2
500 Lightning	13.3%	2
590 Weather, other	13.3%	2
100 Construction	6.7%	1
110 Maintenance	6.7%	1
300 Material or equipment fault/failure	6.7%	1
430 Tree failure from overhang or dead tree without ice/snow	6.7%	1
710 Motor vehicle	6.7%	1
800 Other	6.7%	1
9. The average SAIDI is 504.2
10. The SAIDI for 2016 was 320.32
11. The average SAIFI is 2.21
12. The SAIFI for 2016 was 2.64
13. Refer to Section 7

KENTUCKY PUBLIC SERVICE COMMISSION

SECTION 5: CIRCUIT REPORTING

Continued

1. Carter City Sub (10)
2. Located approx 0.2 miles north of Jct of 474 on Rt. 2 & 7
3. Feeder 2
4. Feed Rt. 2 toward Olive Hill
5. Approximately 52.4 Primary Miles
6. 286 Active Consumers
7. Records indicate this circuit has only been spot cut.
8. This circuit was cut in 2010

999 Cause unknown	27.3%	15
431 Tree Failure-off ROW	16.4%	9
320 Conductor sag or inadequate clearance	12.7%	7
400 Decay/age of material/equipment	9.1%	5
590 Weather, other	9.1%	5
110 Maintenance	5.5%	3
600 Small animal/bird	5.5%	3
300 Material or equipment fault/failure	3.6%	2
410 Corrosion/abrasion of material/equipment	3.6%	2
800 Other	3.6%	2
340 Overload	1.8%	1
500 Lightning	1.8%	1
9. The average SAIDI is 1678.48
10. The SAIDI for 2016 was 597.99
11. The average SAIFI is 3.30
12. The SAIFI for 2015 was 3.93
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Low Gap (Sub #11)
2. Located just off Rt. 2 approximately 1 mile from the junction of Rt. 1459
3. Feeder 1
4. Rt. 2 toward North Fork and Warnock Substation
5. Approximately 8.5 Primary Miles
6. 92 Active Consumers
7. Circuit was cut in 2014
8. Causes of last years outages:

431 Tree Failure-off ROW	24.14%	14
999 Cause unknown	12.07%	7
110 Maintenance	10.34%	6
300 Material or equipment fault/failure	8.62%	5
420 Tree growth	8.62%	5
600 Small animal/bird	8.62%	5
400 Decay/age of material/equipment	6.90%	4
430 Tree failure from overhang or dead tree without ice/snow	5.17%	3
790 Public, other	5.17%	3
100 Construction	3.45%	2
000 Power supply	1.72%	1
500 Lightning	1.72%	1
590 Weather, other	1.72%	1
700 Customer-caused	1.72%	1
9. The average SAIDI is 647.42
10. The SAIDI for 2016 was 63.67
11. The average SAIFI is 1.70
12. The SAIFI for 2016 was 3.98
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Pactolus (Sub #8)
2. Located on Subsation Road about 0.4 miles south of Jct of Rt. 9 and 1959
3. Feeder 2
4. Along 1947/Sunset Hill/Radio Station
5. Approximately 11.2 Primary Miles
6. 256 Active Consumers
7. Circuit was cut in 2009
8. Causes of last years outages:

110 Maintenance	21.95%	9
500 Lightning	14.63%	6
590 Weather, other	14.63%	6
600 Small animal/bird	14.63%	6
999 Cause unknown	12.20%	5
431 Tree Failure-off ROW	4.88%	2
800 Other	4.88%	2
000 Power supply	2.44%	1
100 Construction	2.44%	1
190 Other planned	2.44%	1
420 Tree growth	2.44%	1
700 Customer-caused	2.44%	1
9. The average SAIDI is 884.58
10. The SAIDI for 2016 was 754.59
11. The average SAIFI is 3.24
12. The SAIFI for 2016 was 4.64
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Pactolus (Sub #8)
2. Located on Subsation Road about 0.4 miles south of Jct of Rt. 9 and 1959
3. Feeder 4
4. North on Rt 1 toward Oldtown
5. Approximately 77.4 Primary Miles
6. 604 Active Consumers
7. Circuit was cut in 2015
8. Causes of last years outages:

110 Maintenance	24.05%	19
500 Lightning	12.66%	10
431 Tree Failure-off ROW	10.13%	8
430 Tree failure from overhang or dead tree without ice/snow	7.59%	6
510 Wind, not trees	7.59%	6
300 Material or equipment fault/failure	6.33%	5
590 Weather, other	6.33%	5
600 Small animal/bird	5.06%	4
999 Cause unknown	5.06%	4
400 Decay/age of material/equipment	3.80%	3
100 Construction	2.53%	2
800 Other	2.53%	2
000 Power supply	1.27%	1
190 Other planned	1.27%	1
410 Corrosion/abrasion of material/equipment	1.27%	1
470 Borrower crew cuts tree	1.27%	1
790 Public, other	1.27%	1
9. The average SAIDI is 634.07
10. The SAIDI for 2016 was 534.47
11. The average SAIFI is 3.68
12. The SAIFI for 2015 was 5.15
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Pelfrey (Sub #5)
2. Located on US 60 0.8 miles west from the Junction of Grahn Road (Rt. 182)
3. Feeder 1
4. Follows Rt. 60 West toward Olive Hill and feeds Rt. 2 north toward Carter City
5. Approximately 79.8 Primary Miles
6. Active Consumers 568
7. Circuit was cut in 2012
8. Causes of last years outages:

300 Material or equipment fault/failure	19.72%	14
410 Corrosion/abrasion of material/equipment	18.31%	13
400 Decay/age of material/equipment	14.08%	10
590 Weather, other	11.27%	8
110 Maintenance	9.86%	7
999 Cause unknown	5.63%	4
431 Tree Failure-off ROW	4.23%	3
600 Small animal/bird	4.23%	3
800 Other	4.23%	3
610 Large animal	2.82%	2
100 Construction	1.41%	1
360 Other equipment installation/design	1.41%	1
500 Lightning	1.41%	1
510 Wind, not trees	1.41%	1
9. The average SAIDI is 879.44
10. The SAIDI for 2015 was 607.18
11. The average SAIFI is 2.83
12. The SAIFI for 2015 was 4.39
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Warnock (Sub #6)
2. Located on Hoods Run Road located 1.7 miles from Jct of Rt. 7 & 2 off Rt. 2
3. Feeder 2
4. Follows Rt. 2 to Greenbo State Park
5. Approximately 3.7 Primary Miles
6. Active Consumers 19
7. Circuit was cut in 2011
8. Causes of last years outages:

431 Tree Failure-off ROW	50%	1
590 Weather, other	50%	1
9. The average SAIDI is 155.83
10. The SAIDI for 2016 was 110.96
11. The average SAIFI is 0.28
12. The SAIFI for 2016 was 1.06
13. Refer to Section 7

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SECTION 5: CIRCUIT REPORTING

Continued

1. Sandy Hook (Sub #9)
2. Located on Bank Street in Sandy Hook
3. Feeder 3
4. Rt. 32 toward Isonville
5. Approximately 75.2 Primary Miles
6. Active Consumers 419
7. Records indicate this circuit has only been spot cut.
8. Causes of last years outages:

590 Weather, other	30.77%	20
999 Cause unknown	20.00%	13
400 Decay/age of material/equipment	9.23%	6
110 Maintenance	7.69%	5
430 Tree failure from overhang or dead tree without ice/snow	7.69%	5
431 Tree Failure-off ROW	4.62%	3
730 Fire	4.62%	3
800 Other	3.08%	2
190 Other planned	1.54%	1
340 Overload	1.54%	1
420 Tree growth	1.54%	1
500 Lightning	1.54%	1
520 Ice, sleet, frost, not trees	1.54%	1
600 Small animal/bird	1.54%	1
700 Customer-caused	1.54%	1
740 Public cuts tree	1.54%	1
9. The average SAIDI is 1476.91
10. The SAIDI for 2016 was 1583.18
11. The average SAIFI is 7.81
12. The SAIFI for 2015 was 5.23
13. Refer to Section 7

SECTION 6: VEGETATION MANAGEMENT PLAN REVIEW

INCLUDE CURRENT VEGETATION MANAGEMENT PLAN

Additional pages may be attached as needed.

In 2016 we cleared 109 miles through our circuit cutting program. We also re-cleared 149 miles, bush hogged 230 miles. We removed 12,364 individual trees and trimmed 7059 yard trees.

Our plans for 2017 include cutting two full circuits: Newfoundland Feeders 1 & 3 and Elliottville Feeder 3. We will finish cutting Newfoundland Feeder #2, Newfoundland Feeder #4, cut a couple circuits on Elliottville Feeder #3, spot cut Elliottville Feeder #1. We will also spray Argentum Feeder #1 and #2, Newfoundland Feeder #2.

SECTION 7: UTILITY COMMENTS

We now now begun a GPS-ing program that will accurately identify our facilities therefore helping us more accurately report outage indicies. We did not have any of the new data in our OMS system during 2016 so the data is still not as accurate as we would like. The GPS-ing project will not be completed until mid 2018.

We contracted an engineering firm to help us produce graphical analysis of last years data but that process had not been completed at the time this report was due. We will continue to dig into our data to determine where best to utilize our time and resources so as to providing more reliable power to our members.