

Eversource

Reliability Enhancement Program

Docket DE 09-035

2014 Year End Report

Eversource

Reliability Enhancement Program

Docket DE 09-035

Executive Summary

Executive Summary Reliability Enhancement Program Docket DE 09-035

This report provides program-specific details for the full calendar year of Eversource's enhanced Reliability Enhancement Program (REP II) ending December 31, 2014 as well as the Operation and Maintenance (O&M) expenditures formerly included in the Company's initial REP (Base REP). The initial REP was established as a 5-year effort under the settlement agreement approved by the Commission in Order No. 24,750 in Docket No. DE 06-028 and became effective July 1, 2007. The results of the reliability work under the initial REP were documented in the report submitted by Eversource on February 18, 2011. As part of the Settlement Agreement on Permanent Distribution Rates (the "Settlement Agreement") approved by the Commission in Order No. 25,123 issued in Docket No. DE 09-035, the settling parties agreed that Eversource should continue its existing REP expenditures from the initial REP and incorporate the revenue requirement for the O&M portion into base distribution rates. Additionally, the Settlement Agreement provided for an additional \$4 million per year of revenue for the duration of the Settlement to support enhanced O&M and capital spending under a so-called "REP II" initiative.

Reliability Enhancement Program (REP)



As noted above, this report provides results of the calendar year ending December 31, 2014 and includes all capital and O&M spending included under both the initial REP and REP II. Additionally, this report includes details on proposed capital spending now funded under REP II through June, 2015, marking the end of REP II.

2009 RATE CASE	
Docket DE 09-035	
Revenue Requirement Allocations	
Initial REP O&M	\$8,200,000
REP II O&M Programs	2,500,000
Capital Financing	1,500,000
Total	\$12,200,000

The combined REP provides Eversource with \$12.2 million in annual (program year) distribution revenue requirements to stabilize reliability through enhanced distribution capital investment and operation and maintenance (O&M) expenditures.

Annual revenue was allocated between the components shown in the table to the left pursuant to agreement reached during settlement discussions for docket DE 09-035. The capital component was designed to provide for between \$12.8 and \$14 million of additional capital investment annually. The

O&M component was determined by assessing various existing maintenance and repair activities as well as new activities. The base component was also O&M-related, but focused specifically on vegetation management and National Electrical Safety Code (NESC) inspections. See *Eversource Rate Case DE No. 09-035 REP Revenue Allocations* for first year detail breakdown by area and activity.

The table at the right shows actual expenditures for calendar year 2014 under the current REP. These general REP areas represent multiple tracked programs and activities.

Actual O&M results through December 31, 2014 show \$8.5 million spent and 36,897 tasks completed, leaving

\$980,437¹ to carry over to 2015 based on the original plan provided in the 2013 report. Although O&M was underspent in 2014, the Capital plan was overspent by \$3,400,768 when compared to the original plan provided in the 2013 report. See Section 1, *Year End 2014 Summary of Eversource Reliability Enhancement Program – O&M* for details on individual activity cost and unit count. See Section 7, 2015

2014 O&M Plan vs Actual:	
2014 Planned O&M Expenditures	\$ 8,700,000
2013 Carryover	757,481
2014 Total Planned O&M Expenditures	9,457,481
2014 Actual O&M Expenditures	8,477,044
Variance	\$ (980,437)

¹ Carryover is the budgeted O&M per Docket DE 09-035 compared with actual O&M spend.

Executive Summary Reliability Enhancement Program Docket DE 09-035

O&M and Capital Summary Plan, for details on individual activity cost and unit count to complete the 2014 capital program.

2014 EXPENDITURES

REP AREA	12-mo Ending Dec 2014
Base REP - Vegetation Manag	3,601,590
Base REP - NESC Inspect/Rej	2,123,017
Base REP - O&M Activities	761,985
REP II O&M Programs	1,987,475
Accounting Adjustment	2,977
Total O&M	\$8,477,044
New REP Specific Capital	\$15,049,419
Capital due to Base REP	5,270,349
Specific Capital Projects	\$20,319,768
Capital Financing Required (Annualized Carrying Charge)	\$2,438,372
Total REP Revenue Req'ts.	\$10,915,416

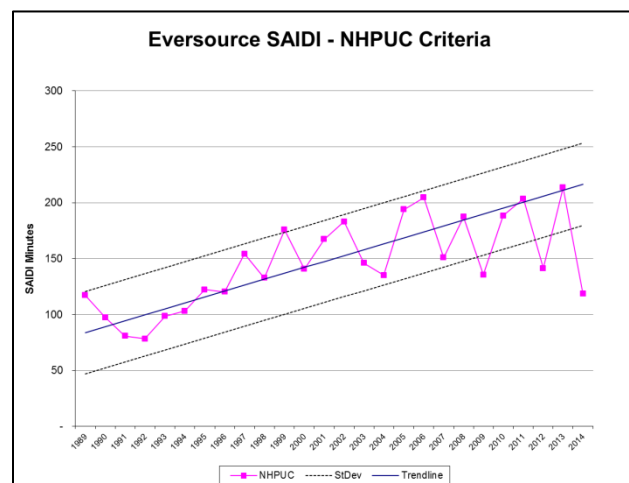
For capital expenditures, Eversource spent \$20.3 million on the stipulated budget line items or projects. See Section 5, *Year End 2014 Summary of Eversource Reliability Enhancement Program – Capital* for details on budget item/project descriptions and expenditures by item or project. Eversource tracks all reliability capital projects in order to ensure the funding allocated to REP is over and above what normally would have been accomplished.

As noted above, the Settlement Agreement provides that the Base REP O&M activities discussed in this report are now included with those O&M and capital programs included under REP II. Funding for these Base REP activities is based on a level amount of revenues annually amounting to \$8.2M.

The funding for the overall program has been completely spent. Eversource plans to spend \$8.2M (Base REP) in O&M funding in accordance with the settlement agreement. There are no plans for REP II O&M or capital expenditures in 2015.

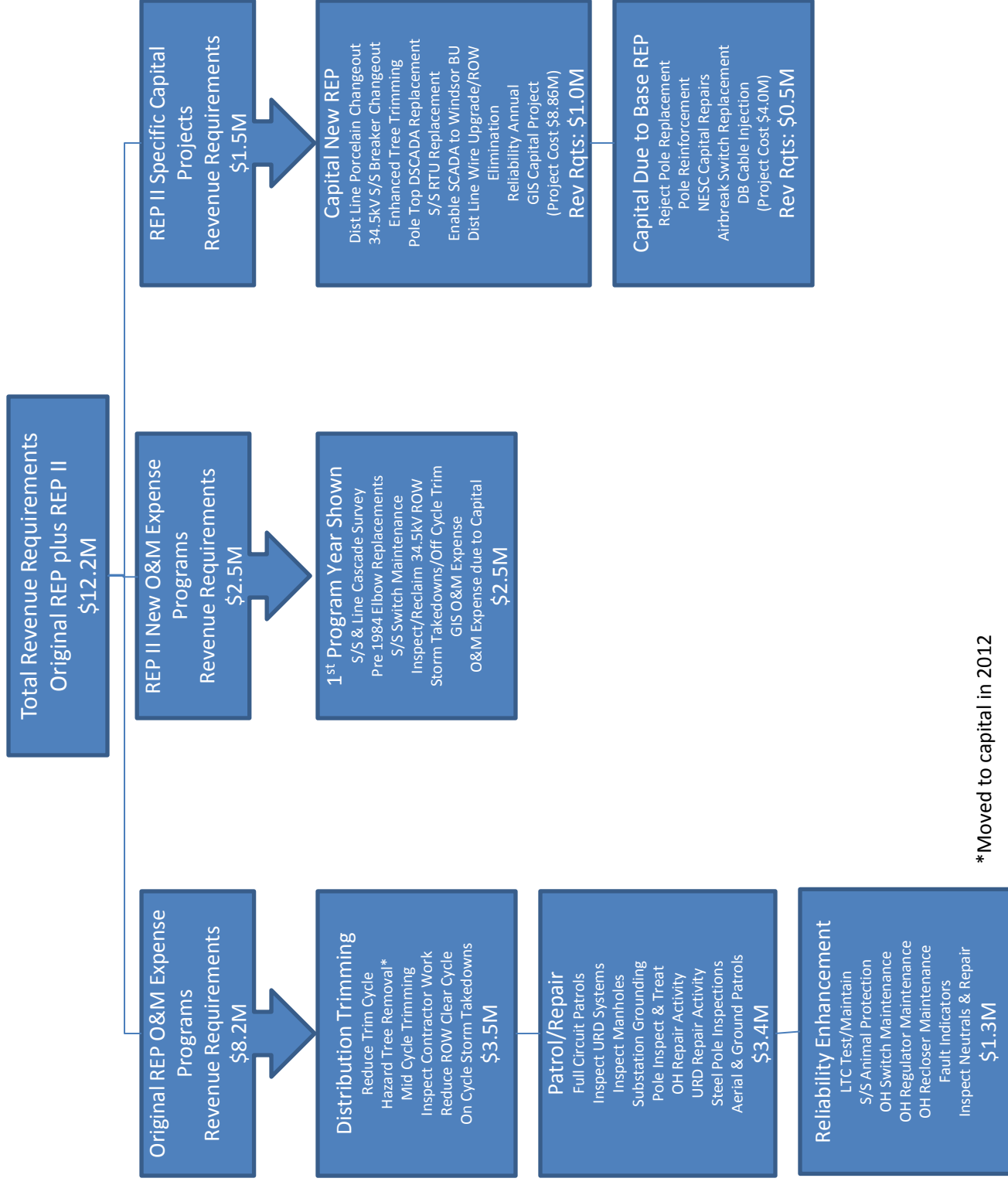
Storm related impacts to the electric system affected Eversource's absolute SAIDI performance. There was 1 declared Major Storm during 2014, beginning on November 26, 2014. Additionally, there were 8 minor storm days which contributed 28.95 minutes to Eversource SAIDI. We note, however, since the REP was implemented, the trend from 2006 onward has been improved on a weather normalized basis. We continue to see benefits from the REP activities and fully believe we are preventing problems from occurring and reducing repair effort and outage times by having the Eversource electric system work as designed. The REP activities are critical and important in concert with Eversource's continued efforts to maintain the system in the normal course of business.

See Section on NHPUC SAIDI Graphs.



Eversource Reliability Enhancement Program (REP) Effective July 1, 2010

Rate Case DE 09-035 REP Revenue Allocations



*Moved to capital in 2012

NHPUC

RELIABILITY GRAPHS

NHPUC SAIDI Graphs Summary
Reliability Enhancement Program
Docket DE 09-035

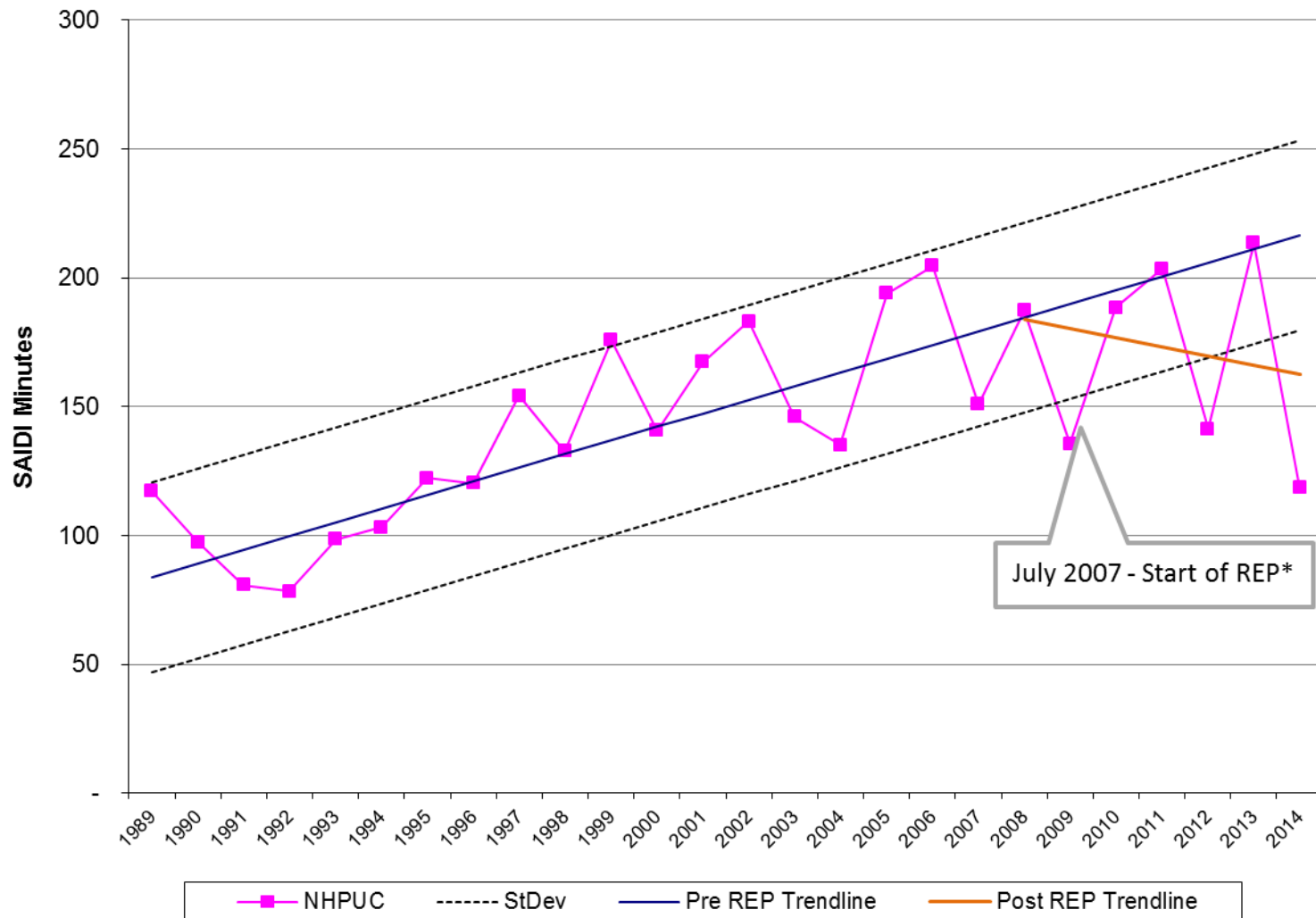
The following is a brief description of the SAIDI Graphs contained in this section and the related REP activities for them:

1. Eversource SAIDI – NHPUC Criteria. The company SAIDI was considerably reduced in 2014 compared with 2013. The pre-REP trend lines shown are based on data for 1989 through 2005.
2. Top 50 Hit List SAIDI Contribution from Year to Year. Each year Eversource reviews SAIDI by circuit and determines which have contributed the most minutes according to the NHPUC Criteria. Shown on this graphic are the total SAIDI minutes for the top 50 circuits in a year, the amount of SAIDI minutes for those circuits remaining on the top 50 list from the previous year, and the percentage of SAIDI these carry forward circuits represent compared to the Top 50 total. In 2014 we had a significant decrease in SAIDI contribution coming from the top 50. There was also a decrease in percent SAIDI from circuits remaining in the top 50 from 2013 to 2014.
 - a. *See section 6 Other summary for specific actions taken on each circuit*
3. Eversource SAIDI – NHPUC Criteria With and Without Storms. NHPUC SAIDI does not include emergency events which are booked to the storm reserve. These are catastrophic events and are shown on this chart over and above the NHPUC reported SAIDI. Off-scale impacts are shown for the December Ice Storm in 2008; the February wind storm in 2010; the two major storms declared in 2011, Tropical Storm Irene and a major snowstorm occurred in August and October, respectively; Hurricane Sandy in 2012; and the Thanksgiving weekend storm in 2014. A major storm is declared when there are 200 concurrent power outages affecting 10% of customers served or 300 concurrent power outages. Eversource also tracks minor storms when 100 or more primary power outages occur within a storm timeframe and not deemed a NHPUC major storm. Eversource experienced 8 minor storm events in 2014, contributing 28.95 SAIDI minutes to Eversource's performance. This minor storm component subtracted from NHPUC reported SAIDI leaves a Weather normalized SAIDI. As shown, that component continues to be below levels present when REP was initiated in July, 2007.
4. Eversource Tree Related SAIDI. The largest cause group for SAIDI is trees and limbs, primarily from outside of the clearance area. Tree related SAIDI and the NHPUC reported SAIDI trend very closely and are sensitive to weather. Weather Normalized Tree SAIDI had been trending upward slightly with a slowing and improving trend in recent years. There is a cumulative effect for vegetation management and we believe the effort from last half of 2007 through year end 2014 is showing results. Our efforts to establish the target 4.5 year trimming cycle for the distribution system has been achieved. Eversource's current trimming cycle is approximately 3.9 years. REP activities relating to this are:
 - a. O&M expense Vegetation Management activities including Scheduled Maintenance trimming to shorten the maintenance cycle, Hazard tree removals, Mid cycle trimming
 - b. Capital trimming at Enhanced Tree Trimming specifications for establishing larger clearance both for existing lines and whenever new additions and upgrades are made to the system.
5. Eversource Equipment Related SAIDI. The second largest cause group for SAIDI is equipment failures in substations and on distribution lines. There is much less weather effect and the difference between NHPUC criteria performance and weather normalized performance is small. A decrease has occurred in this area in 2014 compared with 2013, resulting in performance similar to 2012. Performance in 2010 was unusually low. A variety of REP actions affect this and include:
 - a. Porcelain changeouts
 - b. Switch maintenance and replacement programs
 - c. Recloser maintenance
 - d. Cable testing and replacement

NHPUC SAIDI Graphs Summary
Reliability Enhancement Program
Docket DE 09-035

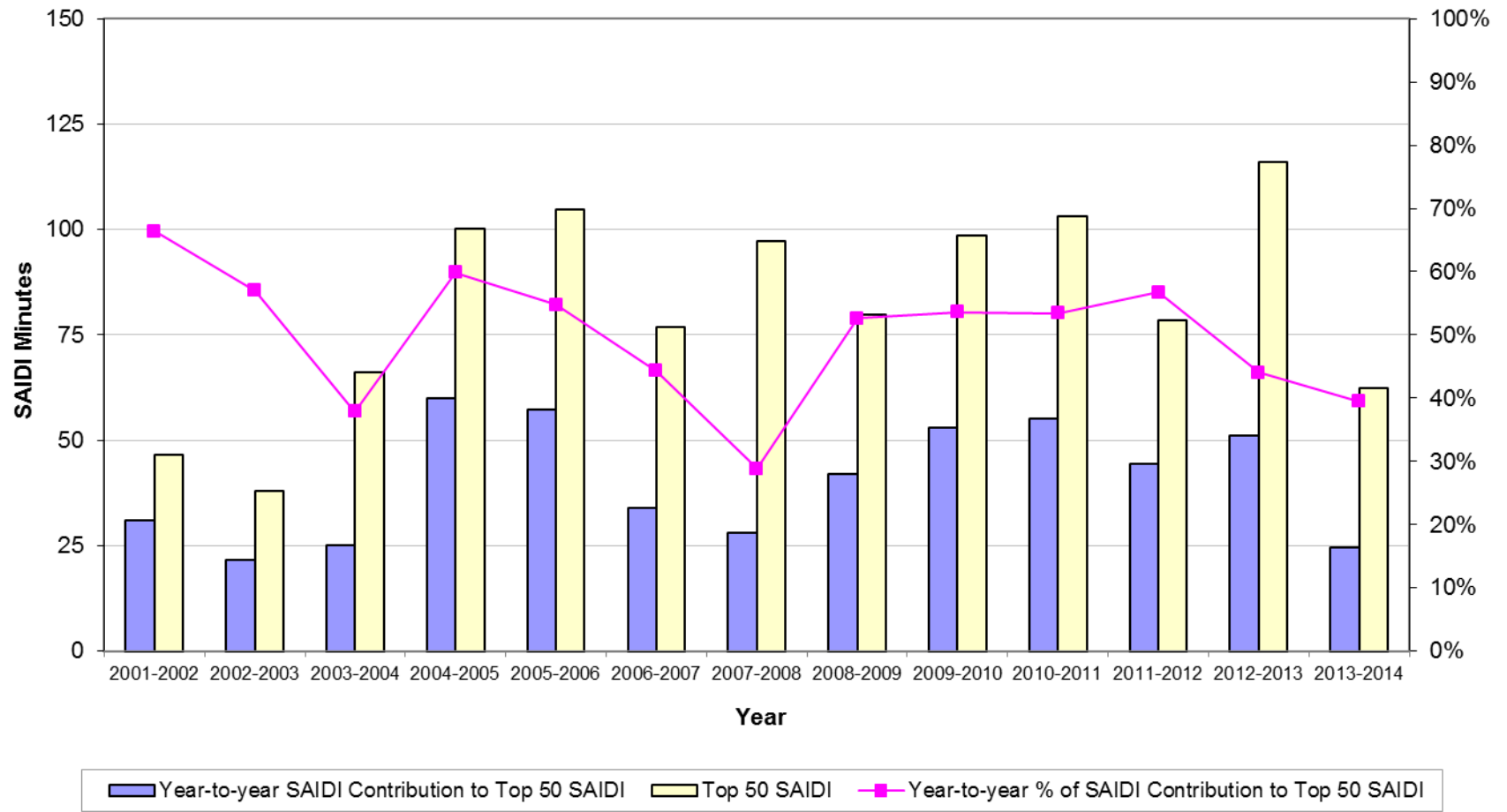
6. Eversource SAIDI – NHPUC Criteria Substation Reliability. Power outages caused by actions or problems inside substations are typically large and widespread. The amount of SAIDI minutes relating to these events is generally declining and there is essentially no difference due to weather. There was a small decrease in SAIDI minutes in 2014. We continue to track a very low SAIDI contribution in this area through 2014 and can be associated with REP activities such as:
 - a. 34.5 kV Substation Breaker replacement program
 - b. Animal Protection in Substations
 - c. Efforts made reducing the corrective maintenance backlog.

Eversource SAIDI - NHPUC Criteria



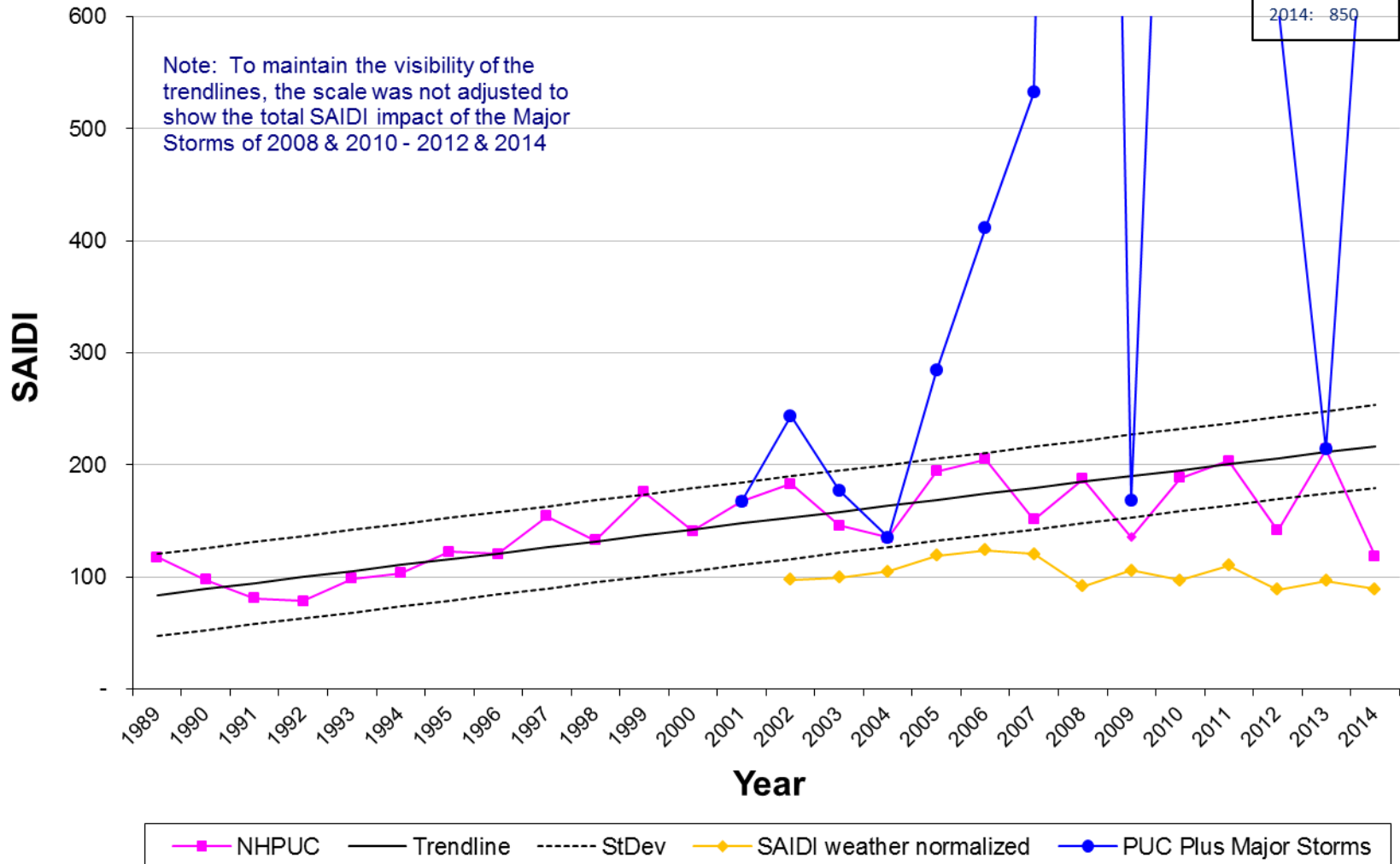
Top 50 Hit List SAIDI Contribution from year to year

NHPUC Criteria



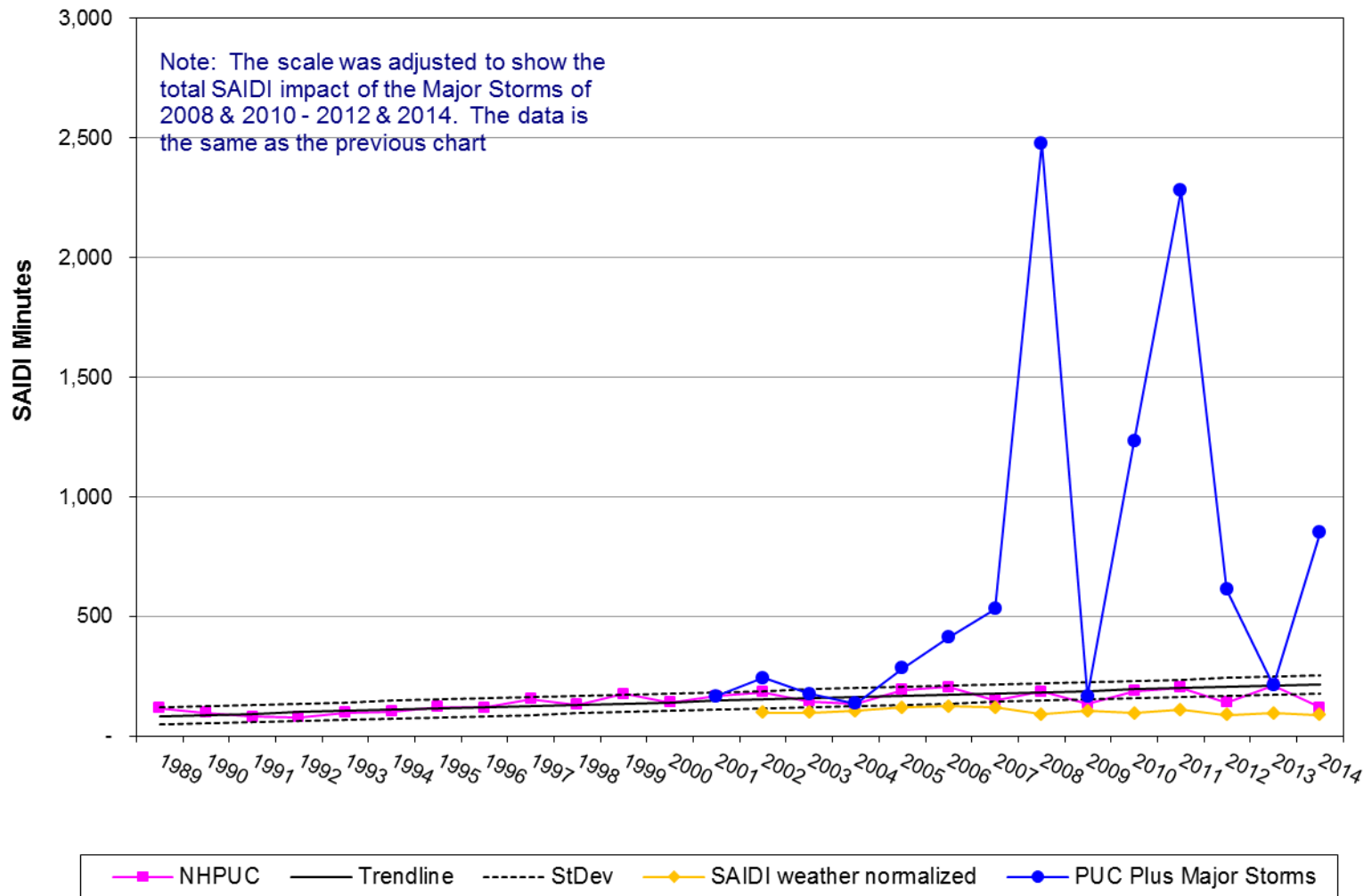
Eversource SAIDI - NHPUC Criteria

With and Without Storms



Eversource SAIDI - NHPUC Criteria

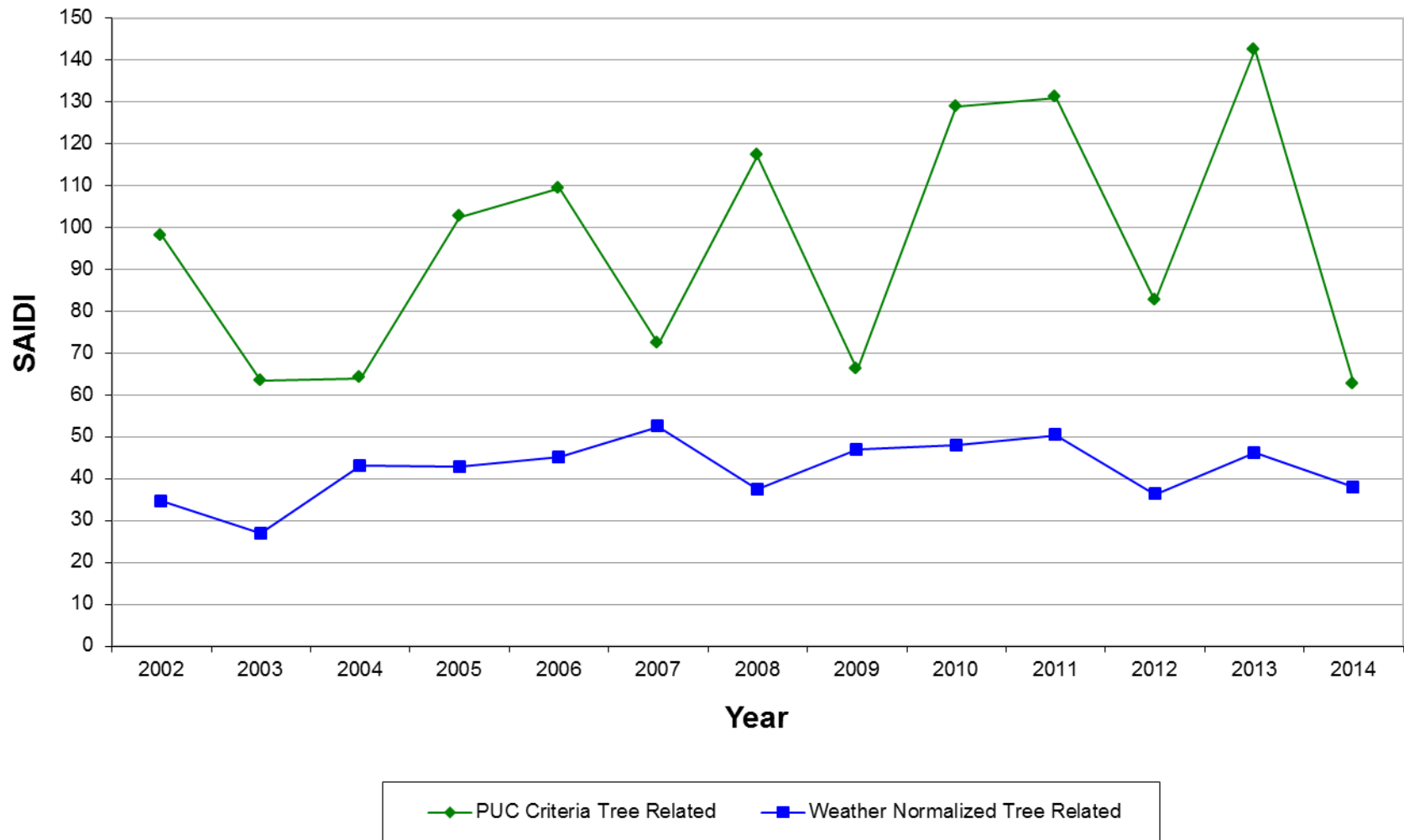
With and Without Storms



Eversource Tree Related SAIDI

NHPUC Criteria

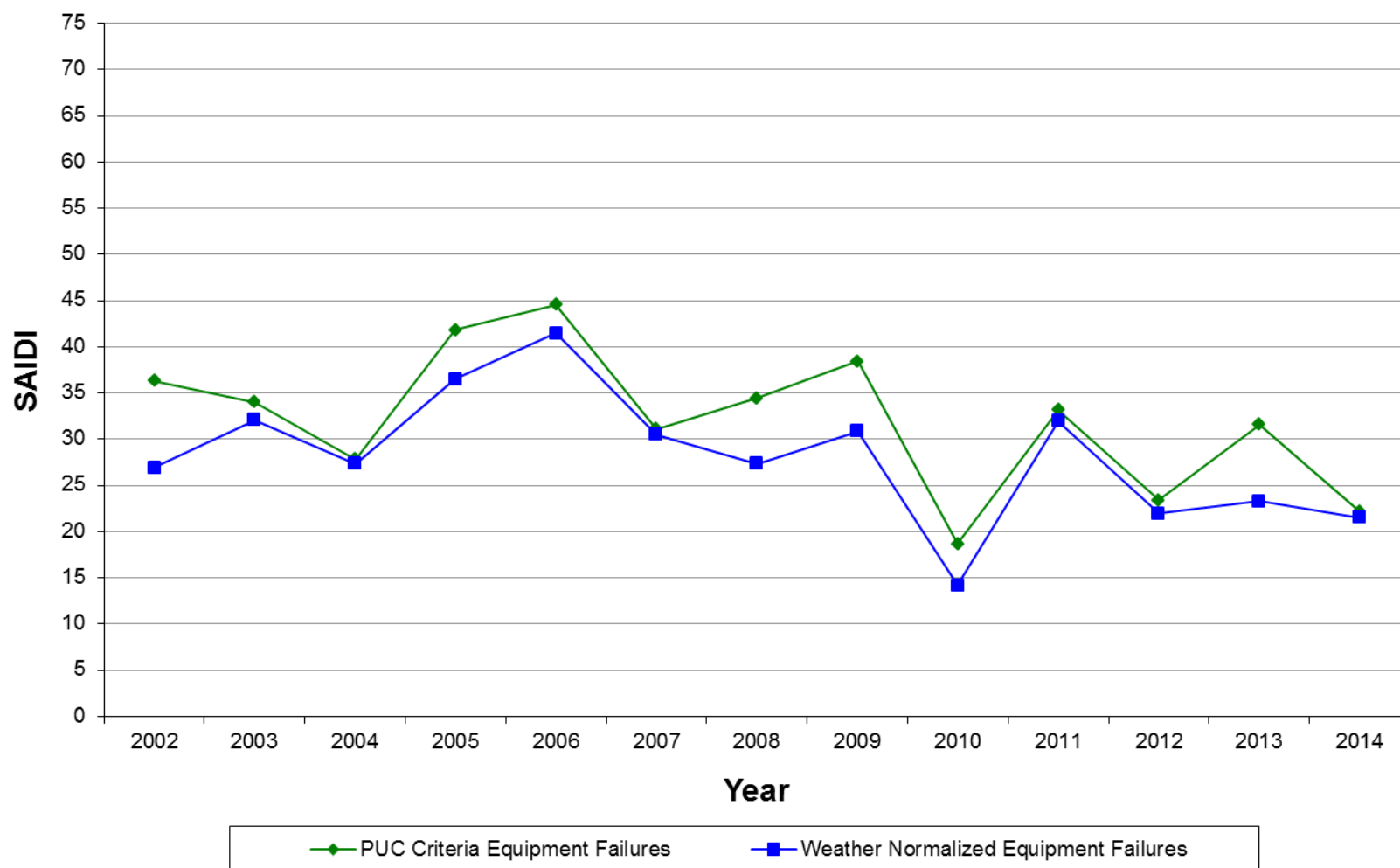
(100% of Trees/Limbs, 50% of Ice/Sleet/Snow & Wind and 40% of Patrolled Nothing Found related troubles)



Eversource Equipment Related SAIDI

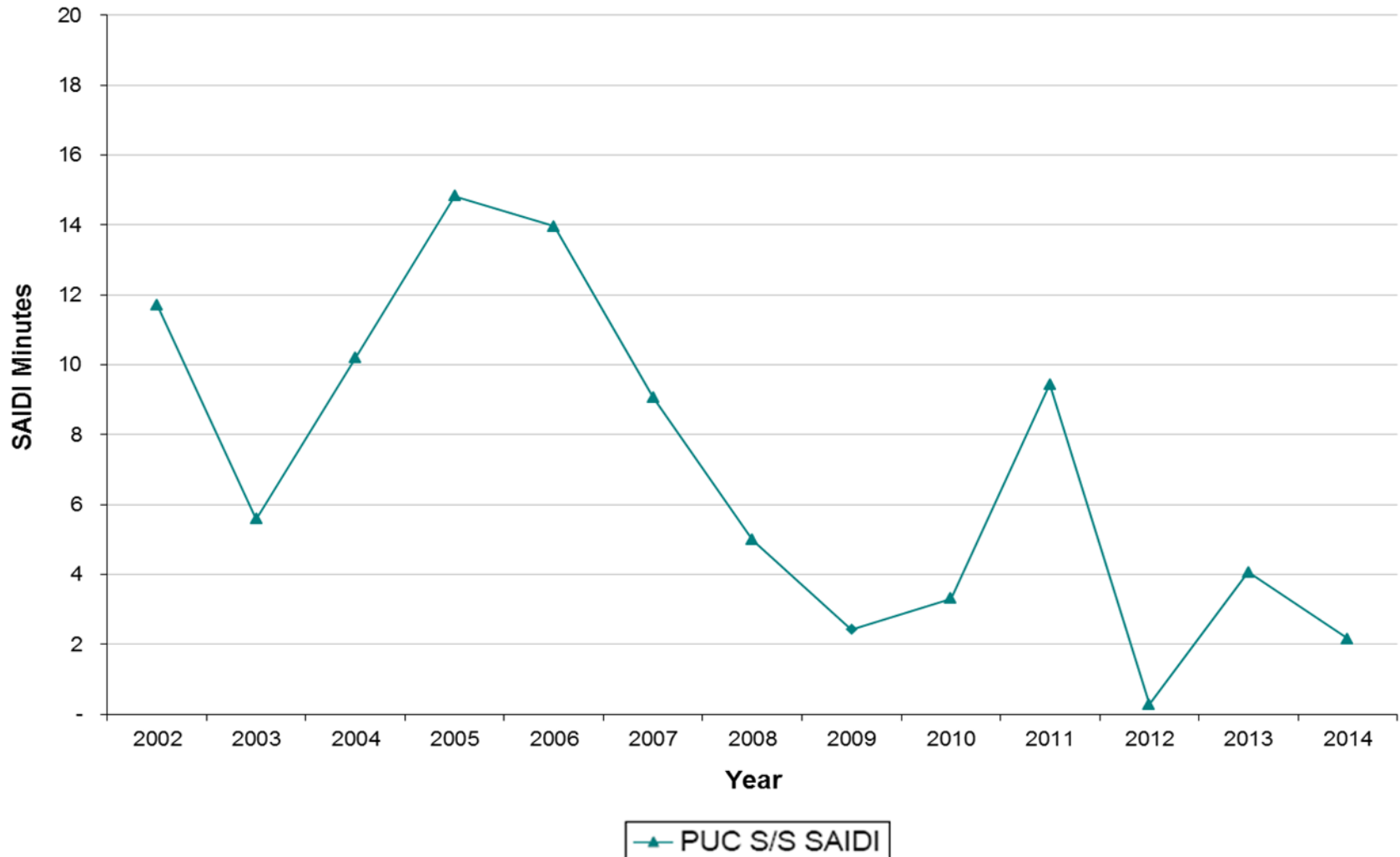
NHPUC Criteria

(100% of Equipment Failure, Improper Install, Loose Connection, Open Neutral and Overload related troubles)



Eversource SAIDI - NHPUC Criteria

Substation Reliability



EVERSOURCE 2014 YEAR END RELIABILITY ENHANCEMENT PROGRAM

TOPIC	SECTION
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Section 1

2014 O&M Summary

Year End 2014 Summary of Eversource Reliability Enhancement Program – O&M
Docket No. DE 09-035
Jan 1 2014 - Dec 31 2014



TRIMRC - VEGETATION MANAGEMENT (O&M)				
	Units	\$ Expended	Units Completed	Cost Per Unit
Reduce Scheduled Maintenance Trim Cycle	# Miles	\$3,253,590	716	\$4,544
Hot Spot Trimming	N/A	\$135,000	N/A	N/A
Mid Cycle Trimming	# Miles	\$91,000	28	\$3,250
Inspect Contractor	# Miles	N/A (1)	2,622	N/A
Reduce Distribution Rights-of-Way Cycle	# Acres	\$122,000	400	\$305
Subtotal - Base REP		\$3,601,590	3,766	
Takedowns	N/A	N/A (1)	N/A (1)	N/A
Cycle Impact	N/A	N/A (1)	N/A (1)	N/A
ETT Maintenance Trimming	# Miles	\$614,618	121	\$5,079
Subtotal - REP II		\$614,618	121	
Total TRIMRC		\$4,216,208	3,887	

NESCRC - National Electrical Safety Code (O&M)				
	Units	\$ Expended	Units Completed	Cost Per Unit
Full Circuit Patrol	# Miles	\$36,723	0	N/A
Inspect Underground Systems	# Underground Maps	\$531,087	564	\$942
Repair Underground Systems	# Underground Maps	\$4,782	259	\$18
Inspect Manholes	# Manholes	N/A (1)	132	N/A
Pole Inspection and Treatment	# Poles	\$781,425	25,666	\$30
Overhead Repair Activity	# Repair Orders	\$639,660	4,459	\$143
Foot Patrol ROW	# Miles	\$129,340	407	\$318
Subtotal - Base REP		\$2,123,017	31,487	
Subtotal - REP II		\$0	0	
TOTAL NESCRC		\$2,123,017	31,487	

RELIOM - RELIABILITY (O&M)				
	Units	\$ Expended	Units Completed	Cost Per Unit
Overhead Switch Maintenance	# Switches	\$227,809	72	\$3,164
Recloser Maintenance	# Recloser Orders	\$188,373	71	\$2,653
Fault Indicators	# Fault Indicators	\$336,590	1,345	\$250
Test & Repair Direct Buried Unjacketed Cable	# Runs	\$9,213	0	N/A
Subtotal - Base REP		\$761,985	1,488	
Install CLFs on 12 kV Main Lines	N/A	\$4,354	35	\$124
GIS O&M	N/A	\$227,028	N/A	N/A
O&M Portion of Capital	N/A	\$1,141,475	N/A	N/A
Subtotal - REP II		\$1,372,857	35	
TOTAL RELIOM		\$2,134,842	1,523	

TOTAL O&M ONGOING FROM BASE REP	\$6,486,592	36,741
NEW O&M FOR REP II	\$1,987,475	156
Accounting Adjustment (2)	\$2,977	
TOTAL O&M	\$8,477,044	36,897

(1) Data is imbedded in another category as specified in O&M Briefing Sections.

(2) Correction for incorrect charging activity.

VEGETATION MANAGEMENT- O&M

REDUCE SCHEDULED MAINTENANCE TRIM CYCLE (BASE REP):

Program Description: Reduce the schedule maintenance trimming (SMT) cycle to a system average of less than 4.5 years.

Total Unit Population: Eversource is responsible for trimming approximately 11,000 miles of overhead distribution lines.

Maintenance Cycle: For 2014, the trim cycle is 3.88 years – 2,623 miles of regular maintenance 121 miles of ETT Maintenance (METT) and 90.3 miles of ETT.

Reliability Benefit: Increasing the number of miles trimmed annually will reduce the number of growing seasons between maintenance trimming cycles. This will result in less tree growth toward the conductors between trimming operations. This will also result in a circuit being inspected for hazard trees more frequently, which will reduce the number of “outside the trim zone” outages.

O&M Cost:

\$ Expended	Miles Trimmed	Cost Per Mile
\$3,253,590	716	\$4,557

HOT SPOT TRIMMING (BASE REP)

Program Description: Trim locations identified outside normal maintenance cycle that have been identified during reliability improvement inspections.

Total Unit Population: Eversource is responsible for trimming approximately 11,000 miles of overhead distribution line.

Maintenance Cycle: None.

Reliability Benefit: Prevent outages that may occur prior to the next maintenance cycle.

O&M Cost:

\$ Expended	Units	Cost Per Unit
\$135,000	N/A	N/A

MID CYCLE TRIMMING (BASE REP):

Program Description:	Perform mid-cycle trimming in areas where vegetation problems develop between maintenance cycles.
Total Unit Population:	Eversource is responsible for trimming approximately 11,000 miles of overhead distribution line. Vegetation problems develop between maintenance cycles in areas where tree growth is excessive and where owners have not given permission to trim to full clearance specification.
Maintenance Cycle:	The current maintenance program does not identify areas that could benefit from trimming between cycles. The Reliability Enhancement Program will target a limited mid-cycle program of approximately 50 miles in 2010 and 100 miles annually thereafter.
Reliability Benefit:	Mid-cycle inspections will identify areas of vegetation problems resulting from owner refusals for full clearance trimming. More frequent trimming in these problem areas will reduce "inside the zone" outages.
O&M Cost:	

\$ Expended	Miles Trimmed	Cost Per Mile
\$91,000	28	\$3,250

INSPECT ALL CONTRACTOR WORK (BASE REP):

Program Description:	Inspect 100% scheduled maintenance trimming to ensure that the contractor is trimming to specification within the bounds of owner permissions.
Total Unit Population:	Eversource is responsible for trimming approximately 11,000 miles of overhead distribution line. Inspections will be made of 100% of the miles trimmed under the scheduled maintenance trimming program.
Inspection Cycle:	The current maintenance program trims approximately 2,200 miles annually with an additional 300 miles trimmed annually under the Reliability Enhancement Program. The quality assurance program currently targets inspections on approximately 80% of the circuit miles. The Reliability Enhancement Program will target inspecting 100% of the circuit miles trimmed annually.
Reliability Benefit:	Performing contractor inspections on 100% of the circuit miles trimmed will ensure that trimming specifications are being met and that no area is skipped or trimmed below standards which could cause "inside the zone" outages. Additionally, it will ensure that danger trees identified for removal have been addressed.
Results:	100% of the trimmed miles (2,744 miles including REP and non-REP)
O&M Cost:	No expenditures are reported here because the cost for these inspections is included within the maintenance trimming budget.

REDUCE DISTRIBUTION RIGHTS-OF-WAY (ROW) MOWING CYCLE (BASE REP):

Program Description: Reduce the average maintenance mowing cycle of 34.5 kV rights-of-way to an average of 4 years. Vegetative growth is close to conductors at the end of the current 5 year maintenance cycle. Reducing the mowing cycle to 4 years will also identify hazard trees and potential problems in wetlands, buffers and backyards on a shortened schedule. This includes mowing the deck of the rights-of-way, removal of hazard trees outside the rights-of-way and manual cutting for buffers, wetlands and other sensitive areas. This will also bring the maintenance schedule of 34.5 kV right-of-ways more in line with the transmission mowing schedule of 3 to 4 years.

Total Unit Population: Eversource is responsible for mowing approximately 7,930 acres of 34.5 kV right-of-ways. Approximately 6,641 acres are in "distribution only" rights-of-way and approximately 1,289 acres in rights-of-way shared with transmission lines.

Inspection Cycle: ROW mowing averages 1,660 acres per year, which results in a four year cycle. In 2014, 400 acres were completed.

Reliability Benefit: Increasing the number of rights-of-way acres maintained annually will reduce the number of growing seasons between maintenance mowing cycles. This will result in less tree growth toward the conductors and more frequent inspections for hazard trees.

O&M Cost:

\$ Expended	Acres Mowed	Cost Per Acre
\$122,000	400	\$305

ETT MAINTENANCE TRIMMING (REP II):

Program Description: The specification and bid price for scheduled maintenance trimming is insufficient to meet ETT specifications. The program is to perform maintenance trimming to ETT specifications on lines that ETT has been performed and are on cycle for maintenance trimming.

Total Unit Population: Total of 573 miles through 2012. Eversource is adding approximately 70 miles per year.

Inspection Cycle: Trimming cycle is identical to the maintenance trimming cycle of approximately 4 years.

Reliability Benefit: ETT provides additional clearance to conductors resulting in fewer outages.

O&M Cost:

\$ Expended	Miles Completed	Cost Per Mile
\$614,618	121	\$5,079

NATIONAL ELECTRICAL SAFETY CODE (NESC) – O&M

FULL CIRCUIT PATROL (BASE REP):

Program Description:	Establish a full circuit patrol cycle for distribution lines to inspect for adherence to the National Electrical Safety Code including primary distribution lines, secondaries and services. Identify and log all issues requiring maintenance, additions or replacement, including animal protection, within a reasonable time period.
Total Unit Population:	Eversource is responsible for approximately 11,000 circuit miles of distribution lines.
Maintenance Cycle:	Initially, complete a full circuit patrol of the 11,000 miles in four years. Beyond the initial cycle, perform full circuit patrols on a cycle similar to vegetation management - scheduled maintenance trimming (SMT).
Reliability Benefit:	Proactive identification of potential problems related to safety, grounding, clearance, attachments, asset maintenance and replacement.
Results:	Most common repair items have been grounding guys, adding squirrel guards, and repairing clearance problems to communications equipment. Inspection of the entire 11,000 miles of distribution lines was completed in 2011. Beginning in 2012, 10% of the system was inspected to transition to a 10 year inspection cycle. Expenditures in 2014 are related to program administration and record keeping for 2013 circuit patrols.

O&M Cost:

\$ Expended	Miles Completed	Cost Per Mile
\$36,723	0	N/A

INSPECT & REPAIR UNDERGROUND SYSTEMS (BASE REP):

Program Description: Establish an inspection cycle for underground systems to identify any issues and to install fault indicators – refer to next section on “Other Reliability – O&M – Install Fault Indicators.”

Total Unit Population: Eversource is responsible for approximately 2,142 underground development system maps in addition to underground facilities providing service from the company's overhead system.

Maintenance Cycle: Initially, a complete cycle of the underground system maps will be completed in five years. NU Maintenance requirements were revised in 2013 incorporating a 10 year inspection cycle.

Results: Mostly minor repair items are identified and corrected at the time of inspection. Some of the other findings included ornamental shrubs planted in front of the doors, minor rusting of the cabinets, and updates needed to the URD maps. Eversource uses its own crews to perform these inspections. Costs include the inspection of manholes and other underground equipment.

Reliability Benefit: Potential problems related to transformer assets are identified proactively.

O&M Cost:

	\$ Expended	Maps Completed	Cost Per Map
Inspect	\$531,087	564	\$942
Repair	\$4,782	259	\$18

INSPECT MANHOLES (BASE REP):

Program Description: Establish a cycle program to inspect manholes. A rating is given to each manhole to indicate the structural condition. A program has been established to replace the structurally deficient manholes.

Total Unit Population: Eversource has approximately 634 manholes.

Maintenance Cycle: Inspect on a cycle not to exceed ten years per NU Maintenance Manual, except those requiring inspection more frequently.

Reliability Benefit: National Electrical Safety Code (NESC) requires facilities to be inspected on a periodic basis. Expected reliability benefits are proactively correcting structural problems and repairing cable and switch equipment prior to failure.

Results: In 2014, 132 manholes were inspected, 29 of which were re-inspections from previous inspections.

O&M Cost: (Note 1) Cost is included in Underground System Inspection cost.

\$ Expended	Manholes Inspected	Cost Per Manhole
N/A ⁽¹⁾	132	N/A

POLE INSPECT AND TREAT (BASE REP):

Program Description: Establish a long-term preventive maintenance cycle for roadside distribution poles to inspect, treat, reinforce or replace decayed or damaged poles to ensure reliable and safe use of this asset.

Total Unit Population: Eversource is responsible for approximately 240,000 poles to inspect and treat. Eversource performs pole inspect and treatment in Eversource set areas only.

Maintenance Cycle: 10 years at 24,000 poles annually to inspect and treat (240,000 divided by 10).

Reliability Benefit: Reliable performance and safety of poles in high winds, heavy wet snow, pole accidents or other events that cause undue stress in addition to normal service of this asset.

Results: Inspection performed in 2014 found that approximately 1.7% of the poles required either reinforcement or replacement.

O&M Cost:

\$ Expended	# Poles Inspected	Cost Per Pole
\$781,425	25,666	\$30

OVERHEAD REPAIR ACTIVITY (BASE REP):

Program Description: Complete O&M maintenance orders generated from National Electrical Safety Code (NESC) inspection including work associated with animal guards.

Total Unit Population: Dependent on program inspection results.

Maintenance Cycle: Complete maintenance orders within a reasonable period of time from initial identification.

Reliability Benefit: Proactive identification of potential problems related to safety, grounding, clearance, attachments, asset maintenance and replacement.

Results: Approximately 16% of open repair orders were completed in 2014.

O&M Cost:

\$ Expended	# Repair Orders Completed	Cost Per Repair Order
\$639,660	4,459	\$143

FOOT PATROL RIGHT-OF-WAY (BASE REP):

Program Description: Inspect from the ground the 862 miles of overhead line in ROW. Identify for correction all NESC code violations and reliability issues.

Total Unit Population: 862 miles (updated mileage new lines and updated GIS information)

Maintenance Cycle: Starting in 2013, the NU Maintenance Manual requires an annual helicopter patrol and a foot patrol on a minimum of a five year cycle.

Reliability Benefit: Identify for correction items that may cause an outage or an NESC violation.

Results: Foot patrols were performed on 407 miles of lines in ROW. Items found were prioritized with items identified during aerial patrols and corrected as required.

O&M Cost:

\$ Expended	Miles Patrolled	Cost Per Mile
\$129,340	407	\$318

OTHER RELIABILITY – O&M

OVERHEAD LINE SWITCH MAINTENANCE (BASE REP):

Program Description:	Establish program to maintain and exercise overhead switches to ensure reliable operation when needed. Bypass switching will be installed as needed to facilitate this program going forward.
Total Unit Population:	Eversource has approximately 775 switches to be included in this program.
Maintenance Cycle:	NUMM specifies a six year maintenance cycle.
Reliability Benefit:	Proactive identification of potential problems related to switching. Maintenance will minimize failure of the switch to operate when called on.
Results:	The initial maintenance of 775 switches was completed in 2011. The six year cycle requires approximately 129 switches be maintained per year,

O&M Cost:

\$ Expended	Switches Maintained	Cost Per Switch
\$227,809	72	\$3,164

OVERHEAD RECLOSER MAINTENANCE (BASE REP):

Program Description:	Reclosers are scheduled to be maintained on a time and fault operation based frequency.
Total Unit Population:	Eversource has 1,701 reclosers installed.
Maintenance Cycle:	Starting in 2013, NUMM specifies 12 years for oil type reclosers and 200 fault operations for reclosers with contacts in vacuum.
Reliability Benefit:	Improved reliability due to improved operational performance of equipment.
Results:	Eversource is now back on prescribed maintenance cycle.

O&M Cost:

\$ Expended	Reclosers Maintained	Cost Per Recloser
\$188,373	71	\$2,653

INSTALL FAULT INDICATORS (BASE REP):

Program Description: Install fault indicators on equipment and at locations which will facilitate identifying the locations of faults on the distribution system. On the underground system, they will be installed at transformers and sector cabinets on outgoing primary cables. Refer to previous section "NESC – O&M – Inspect & Repair Underground Systems." On the overhead system, locations will be determined by the Circuit Owners during trouble report, top 50 worst circuits, three or more outages analyses, and 200 or more customers out analyses. Installation will reduce the outage duration.

Total Unit Population: Underground - 1:1 ratio with single phase padmount transformers, overhead to be determined.

Maintenance Cycle: Battery life is in excess of 20 years. Fault indicators will be replaced before the end of their useful lives. Underground fault indicator battery replacement will be performed during underground inspections, within an appropriate timeframe. Overhead fault indicator locations will be entered into CASCADE maintenance data base with an appropriate trigger for replacement.

Reliability Benefit: Expedited recognition of fault locations in the underground and overhead systems.

Results: Equipped Eversource underground system with fault indicators. Fault indicators are installed in conjunction with the underground systems inspection item.

O&M Cost:

\$ Expended	Fault Indicators Installed	Cost Per F.I. Installed
\$336,590	1,345	\$250

TEST & REPAIR DIRECT BURIED UNJACKETED CABLE - CONCENTRIC NEUTRALS (BASE REP):

Program Description: Testing of direct buried unjacketed cable concentric neutral to determine if there is a sufficient neutral path. Determine if the underground system cable is a candidate for cable rejuvenation.

Total Unit Population: Eversource has approximately 2,000,000 feet or 5,764 runs of direct buried cable. Not all direct buried cable is a candidate for rejuvenation. Cable which is not a candidate for rejuvenation will not be tested.

Maintenance Cycle: Once.

Reliability Benefit: Replacement or rejuvenation of direct buried cable will save outages to customers by preventing faults on the cable.

Results: Testing was not conducted in 2014. Testing in 2013 included older residential developments where a substantially higher failure rate of the neutrals was found. Temporary overhead neutrals were required for those locations where the neutrals had completely failed. Cost incurred in 2014 was the result of installing temporary neutrals at locations identified in 2013. In addition, Eversource spent over \$552,000 more than planned in its cable replacement program (capital).

O&M Cost:

\$ Expended	# Runs Completed	Cost Per Run
\$9,213	0	N/A

INSTALL CLFS ON 12 KV MAIN LINES (REP II):

Program Description: Install full range current limiting fuses (CLFs) on 12 kV transformers on circuit main lines.

Total Unit Population: 122 12 kV circuits

Maintenance Cycle: One time

Reliability Benefit: The installation of CLFs will prevent the operation of upstream protection devices for transformer bushing failures and animal contacts at the transformer bushings. The installation on main lines will result in preventing outages to entire circuits for single transformer events.

Results: CLFs were installed on main line transformers on one 12 kV circuit in 2014. Charges for work performed in 2014 were \$2,532. The remaining charges were contractor charges from work completed in late 2013.

O&M Cost:

\$ Expended	CLFs Installed	Cost Per CLF Installed
\$4,354	35	\$124

GEOSPACIAL INFORMATION SYSTEM (GIS) O&M PORTION OF CAPITAL (REP II):

Program Description:	This item represents the O&M portion (allocation) from Capital work related to the GIS project at Eversource.
Results:	The 2014 components of GIS O&M include maintenance training for the mappers and the elimination of duplicate circuit numbers in the GIS. Duplicate circuit renumbering was accomplished for 18 34.5 kV circuits and 54 lower voltage circuits. The elimination of duplicate circuits will continue in 2015 in anticipation of the Outage Management System (OMS) installation.
O&M Cost:	\$227,028

O&M PORTION OF CAPITAL (REP II):

Program Description:	This represents the O&M portion (allocation) from Capital work related to the Reliability Enhancement Program.
Results:	The O&M portion of REP II capital projects averaged 5.62% in 2014.
O&M Cost:	\$1,141,475

Section 2

2014 O&M VEGM Programs

2014 PLAN AND PROGRESS**PROGRAMS:****PAGE****PLAN & PROGRESS SUMMARY****1****PROGRAM GRAPH - COST****2****PROGRAM GRAPH - UNITS COMPLETED****4**

Year End 2014 Summary of Eversource Reliability Enhancement Program – O&M
Docket No. DE 09-035

Jan 1 2014 - Dec 31 2014

REP #

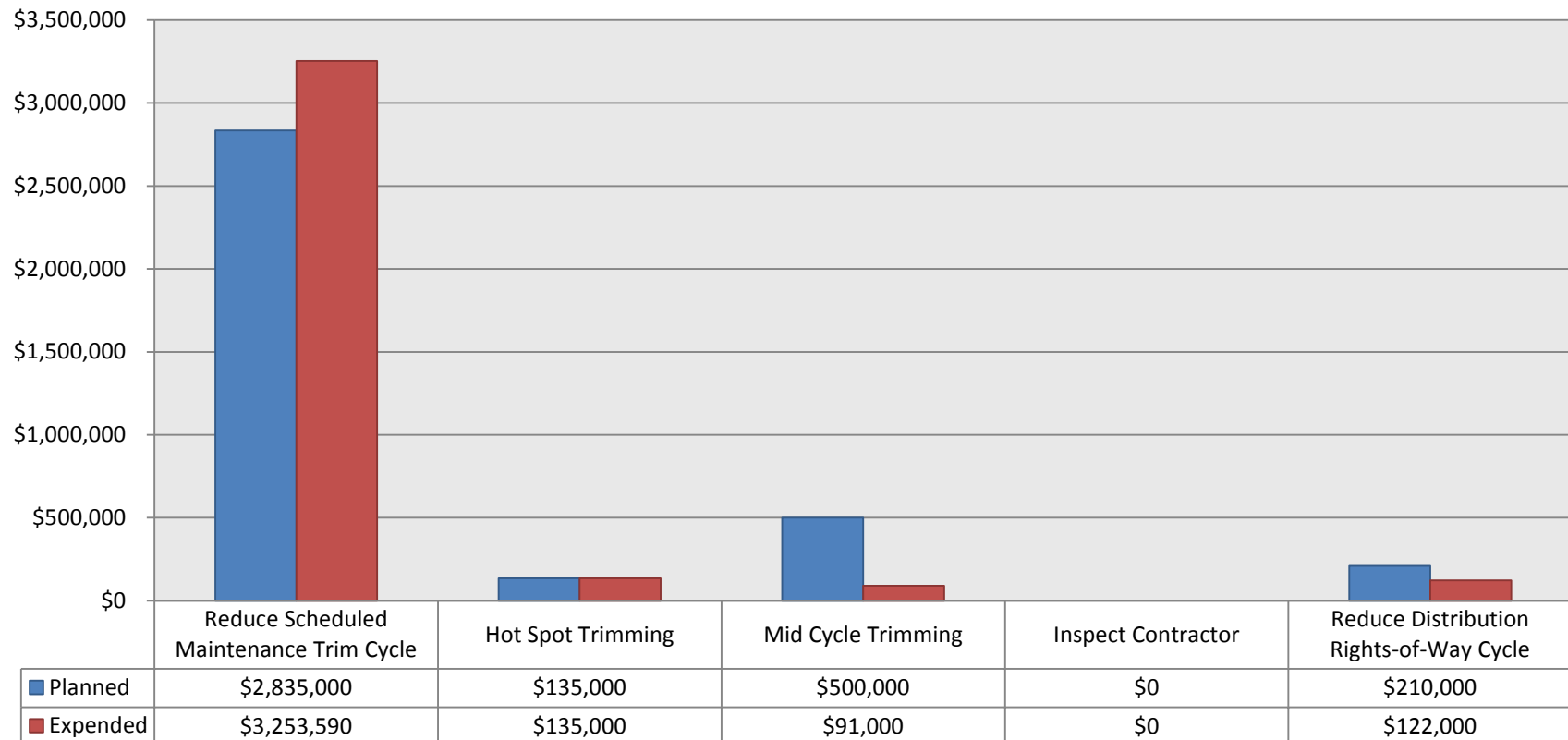
TRIMRC - VEGETATION MANAGEMENT (O&M)								
	Units	\$ Planned	\$ Expended	\$ Variance	Units Planned	Units Completed	Units Variance	Cost Per Unit
Reduce Scheduled Maintenance Trim Cycle	# Miles	\$2,835,000	\$3,253,590	\$418,590	614	716	102	\$4,544
Hot Spot Trimming	N/A	\$135,000	\$135,000	\$0	N/A (1)	N/A	N/A	N/A
Mid Cycle Trimming	# Miles	\$500,000	\$91,000	(\$409,000)	104	28	(76)	\$3,250
Inspect Contractor	# Miles	N/A (1)	N/A (1)	N/A	2,520	2,622	102	N/A
Reduce Distribution Rights-of-Way Cycle	# Acres	\$210,000	\$122,000	(\$88,000)	400	400	0	\$305
Subtotal - Base REP		\$3,680,000	\$3,601,590	(\$78,410)	3,638	3,766	128	
Takedowns	N/A	\$0	N/A (1)	N/A	0	N/A (1)	N/A	N/A
Cycle Impact	N/A	\$0	N/A (1)	N/A	0	N/A (1)	N/A	N/A
ETT Maintenance Trimming	# Miles	\$600,000	\$614,618	\$14,618	107	121	14	\$5,079
Subtotal - REP II		\$600,000	\$614,618	\$14,618	107	121	14	
TOTAL NESCRC		\$4,280,000	\$4,216,208	(\$63,792)	3,745	3,887	142	

(1) Data is imbedded in another category as specified in O&M Briefing Sections.

TRIMRC - VEGETATION MANAGEMENT (O&M)



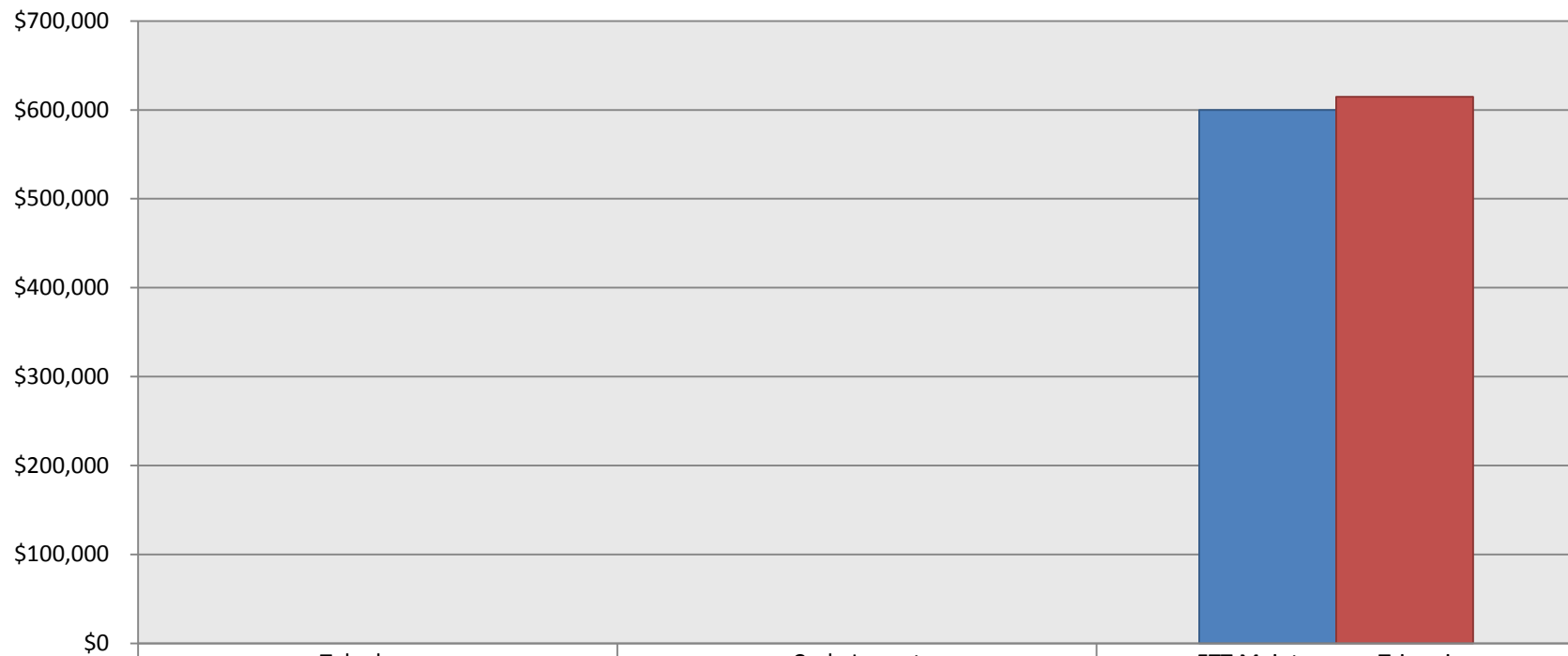
Cost - Base REP



TRIMRC - VEGETATION MANAGEMENT (O&M)



Cost - REP II

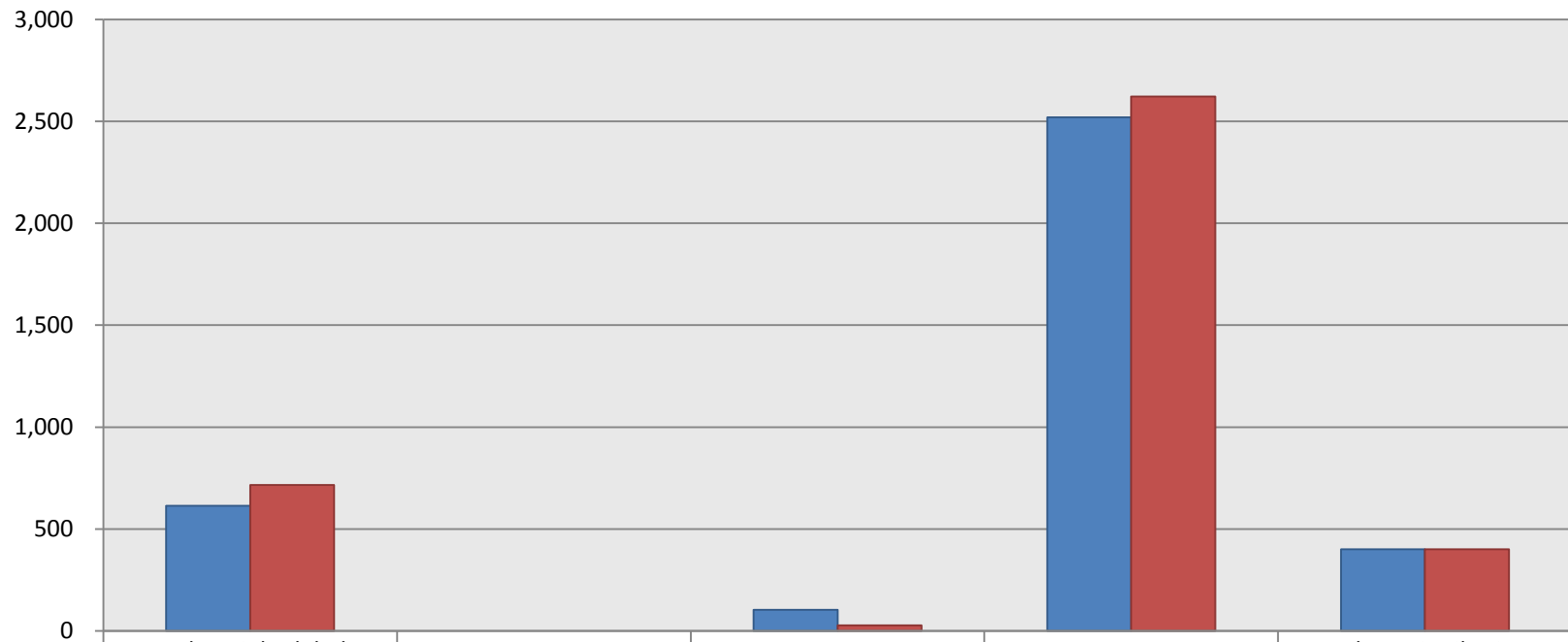


	Takedowns	Cycle Impact	ETT Maintenance Trimming
Planned	\$0	\$0	\$600,000
Expended	\$0	\$0	\$614,618

TRIMRC - VEGETATION MANAGEMENT (O&M)



Units Completed - Base REP

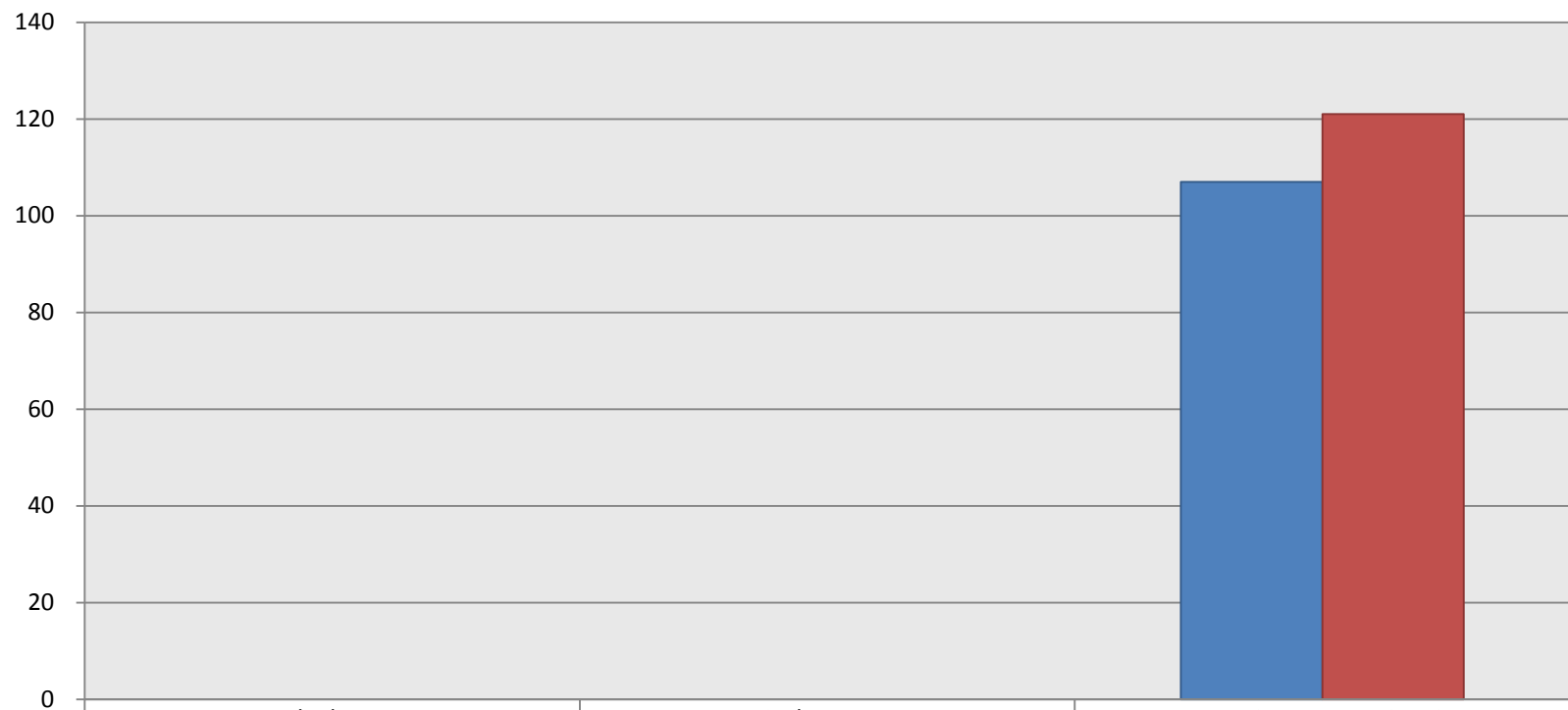


Planned	614	0	104	2,520	400
Completed	716	0	28	2,622	400

TRIMRC - VEGETATION MANAGEMENT (O&M)



Units Completed - REP II



	Takedowns	Cycle Impact	ETT Maintenance Trimming
Planned	0	0	107
Completed	0	0	121

Section 3

2014 O&M NESC Programs



RELIABILITY ENHANCEMENT PROGRAM -
NATIONAL ELECTRICAL SAFETY CODE



2014 PLAN AND PROGRESS

PROGRAMS:

PAGE

PLAN & PROGRESS SUMMARY

1

PROGRAM GRAPH - COST

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PROGRAM GRAPH - UNITS COMPLETED

3

Year End 2014 Summary of Eversource Reliability Enhancement Program – O&M
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REP #

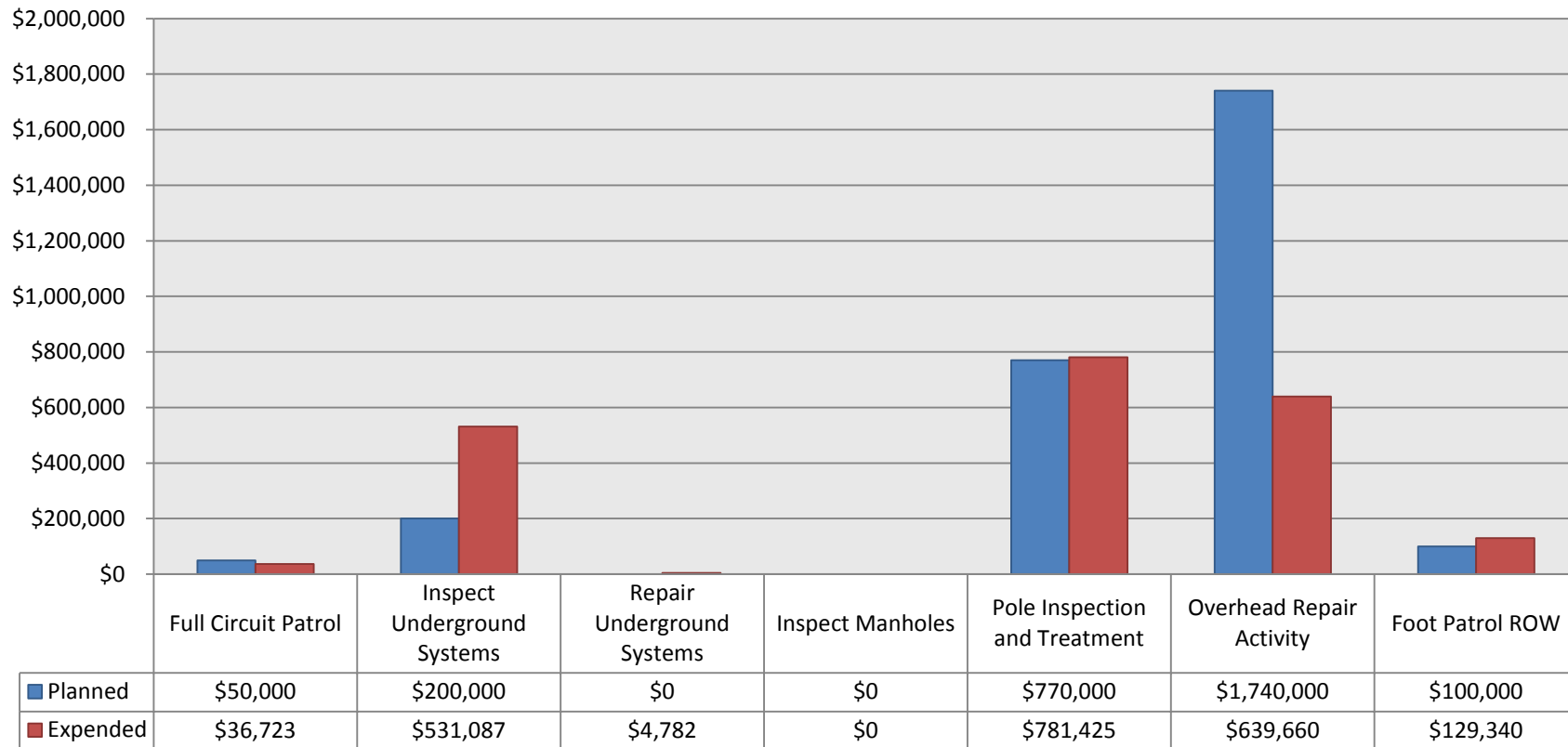
NESCRC - National Electrical Safety Code (O&M)								
	Units	\$ Planned	\$ Expended	\$ Variance	Units Planned	Units Completed	Units Variance	Cost Per Unit
Full Circuit Patrol	# Miles	\$50,000	\$36,723	(\$13,277)	1,085	0	-1085	N/A
Inspect Underground Systems	# Underground Maps	\$200,000	\$531,087	\$331,087	540	564	24	\$942
Repair Underground Systems	# Underground Maps	N/A (1)	\$4,782	N/A	N/A (1)	259	N/A	N/A
Inspect Manholes	# Manholes	N/A (1)	N/A ⁽¹⁾	N/A	32	132	100	N/A
Pole Inspection and Treatment	# Poles	\$770,000	\$781,425	\$11,425	24,000	25,666	1666	\$30
Overhead Repair Activity	# Repair Orders	\$1,740,000	\$639,660	(\$1,100,340)	23,326	4,459	-18867	\$143
Foot Patrol ROW	# Miles	\$100,000	\$129,340	\$29,340	168	407	239	\$318
Subtotal - Base REP		\$2,860,000	\$2,123,017	(\$741,765)	49,151	31,487	(\$17,923)	
Subtotal - REP II		\$0	\$0	\$0	0	0	0	
TOTAL NESCRC		\$2,860,000	\$2,123,017	(\$741,765)	49,151	31,487	(\$17,923)	

(1) Data is imbedded in another category as specified in O&M Briefing Sections.

NESCRC - National Electrical Safety Code (O&M)



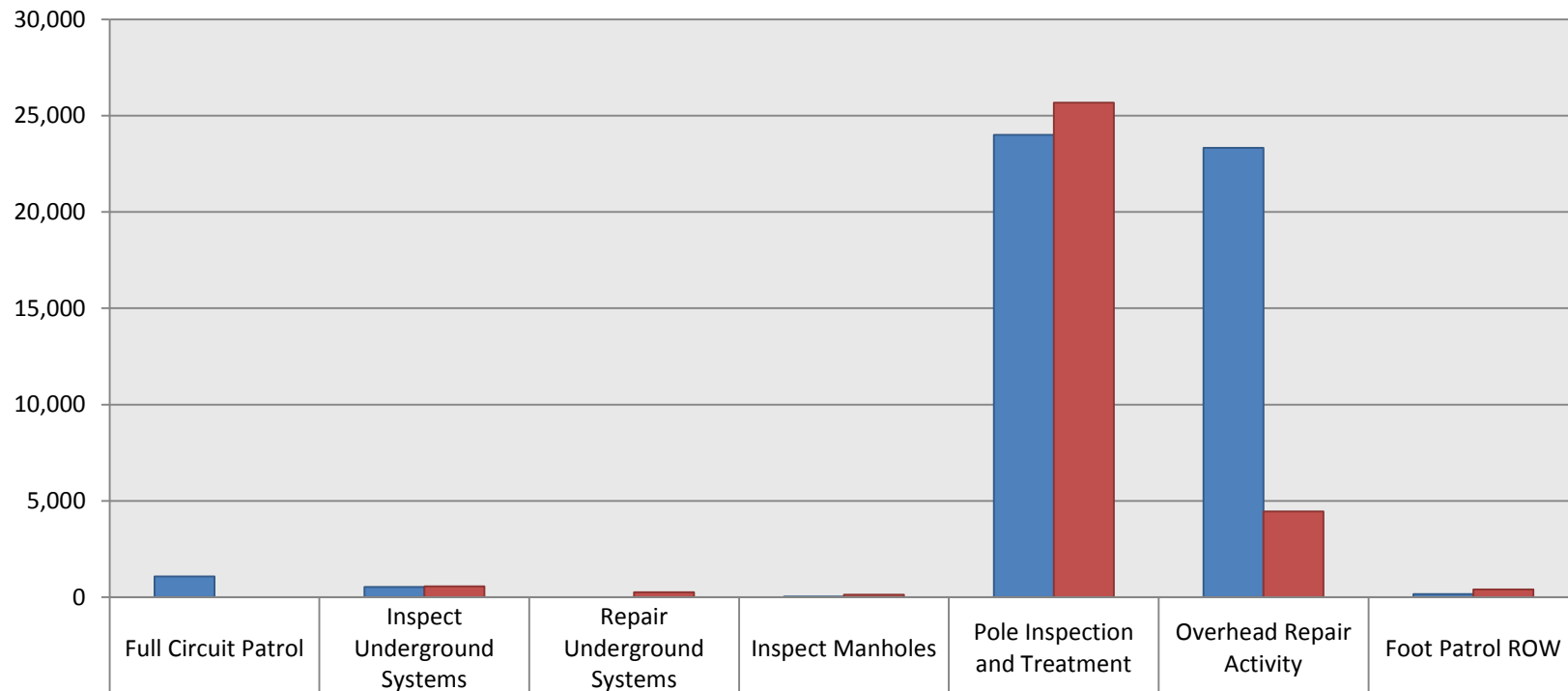
Cost



NESCRC - National Electrical Safety Code (O&M)



Units Completed



Planned	1,085	540	0	32	24,000	23,326	168
Completed	0	564	259	132	25,666	4,459	407

Section 4

2014 Other Reliability Programs



RELIABILITY ENHANCEMENT PROGRAM -
RELIABILITY (O&M)



2014 PLAN AND PROGRESS

PROGRAMS:

PAGE

PLAN & PROGRESS SUMMARY

1

PROGRAM GRAPH - COST

2

PROGRAM GRAPH - UNITS COMPLETED

4

Year End 2014 Summary of Eversource Reliability Enhancement Program – O&M
Docket No. DE 09-035

Jan 1 2014 - Dec 31 2014

REP #

RELIOM - RELIABILITY (O&M)								
	Units	\$ Planned	\$ Expended	\$ Variance	Units Planned	Units Completed	Units Variance	Cost Per Unit
Overhead Switch Maintenance	# Switches	\$200,000	\$227,809	\$27,809	75	72	(3)	\$3,164
Recloser Maintenance	# Recloser Orders	\$200,000	\$188,373	(\$11,627)	65	71	6	\$2,653
Fault Indicators	# Fault Indicators	\$100,000	\$336,590	\$236,590	645	1,345	700	\$250
Test & Repair Direct Buried Unjacketed Cable	# Runs	\$200,000	\$9,213	(\$190,787)	188	0	(188)	#DIV/0!
Subtotal - Base REP		\$700,000	\$761,985	\$61,985	973	1,488	515	
Install CLFs on 12 kV Main Lines	N/A	\$0	\$4,354	\$4,354	0	35	35	\$124
GIS O&M	N/A	\$300,000	\$227,028	(\$72,972)	N/A	N/A	N/A	N/A
O&M Portion of Capital	N/A	\$600,000	\$1,141,475	\$541,475	N/A	N/A	N/A	N/A
Subtotal - REP II		\$900,000	\$1,372,857	\$472,857	0	35	35	
TOTAL NESCRC		\$1,600,000	\$2,134,842	\$534,842	973	1,523	550	

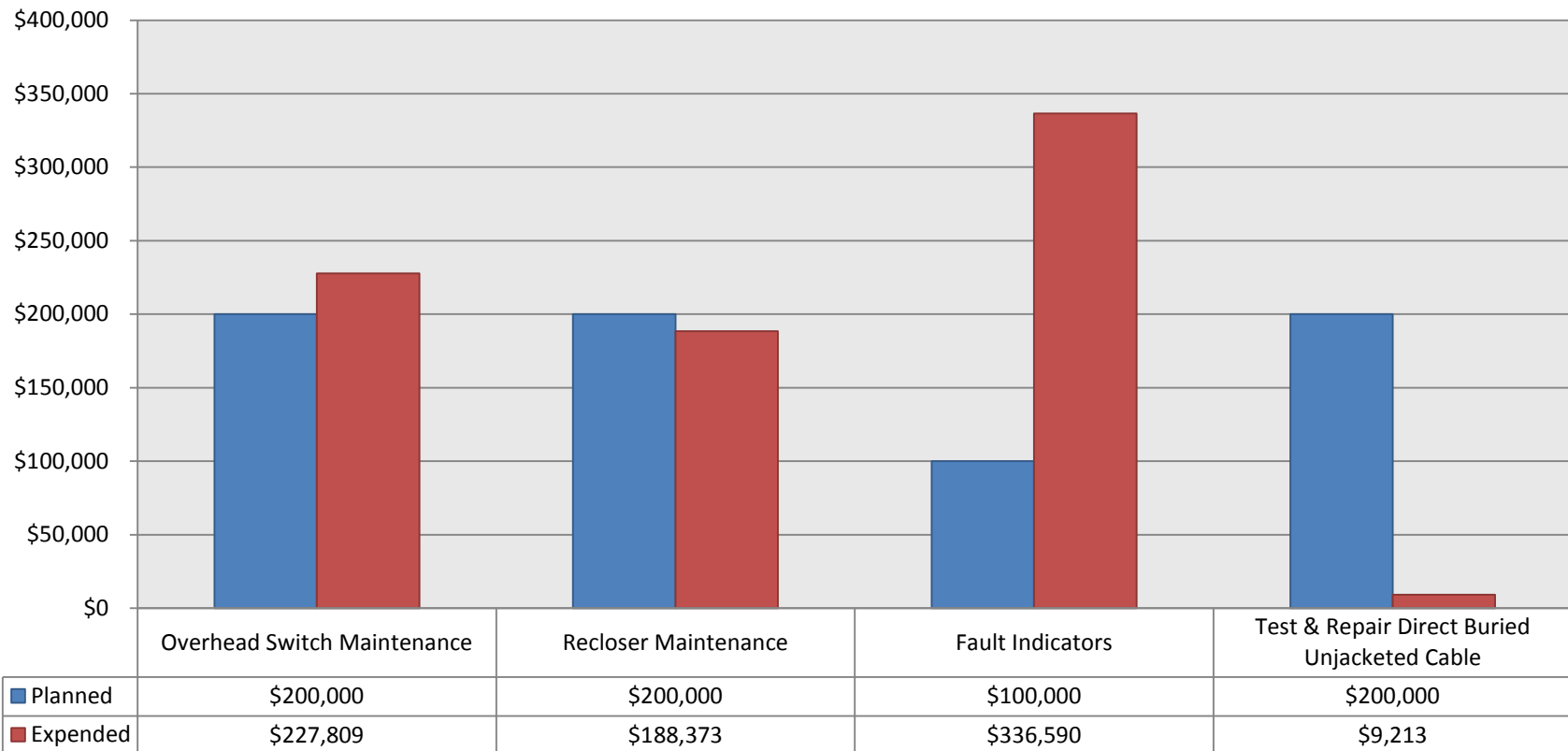
(1) Data is imbedded in another category as specified in O&M Briefing Sections.

(2) Reassessment/Correction of incorrect charging



RELIOM - RELIABILITY (O&M)

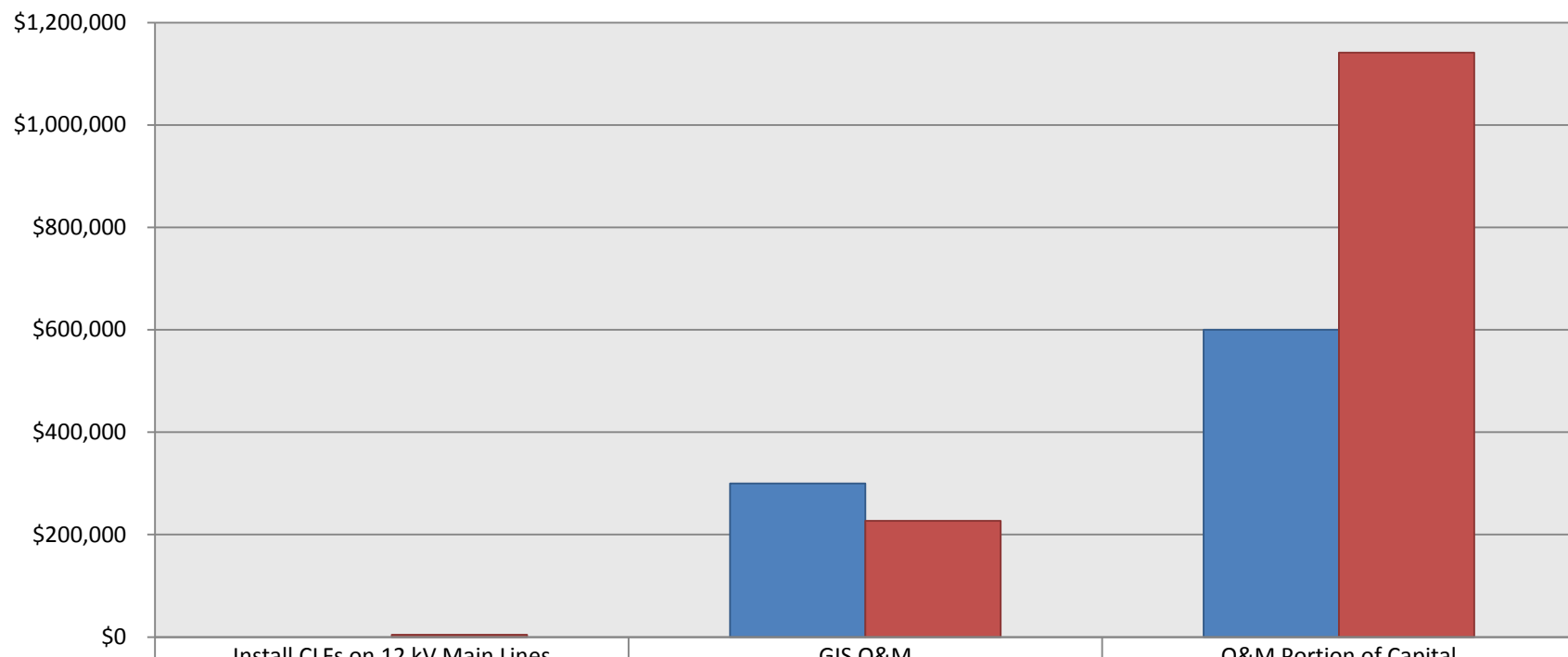
Cost - Base REP



RELIOM - RELIABILITY (O&M)



Cost - REP II

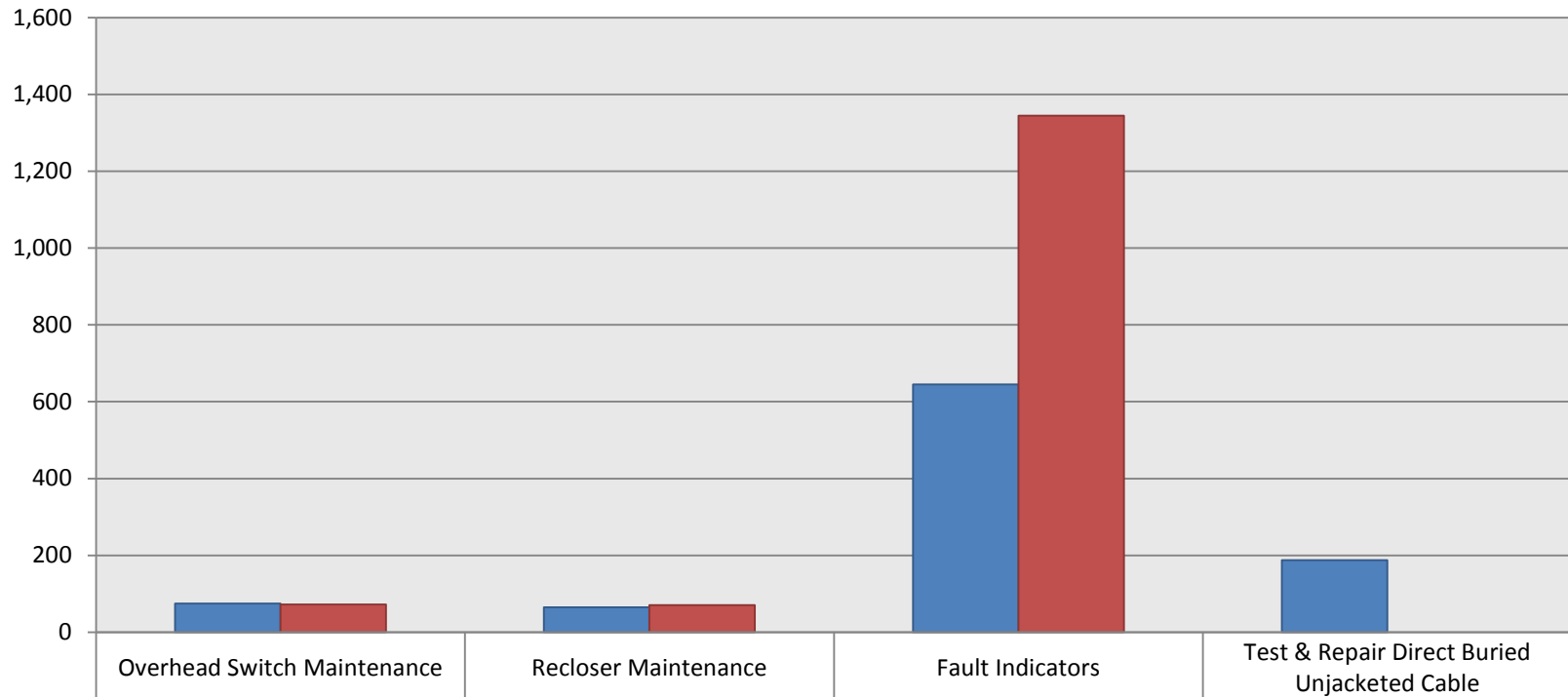


	Install CLFs on 12 kV Main Lines	GIS O&M	O&M Portion of Capital
Planned	\$0	\$300,000	\$600,000
Expended	\$4,354	\$227,028	\$1,141,475



RELIOM - RELIABILITY (O&M)

Units Completed - Base REP



Planned	75	65	645	188
Completed	72	71	1,345	0

Section 5

2014 Capital Summary

Year End 2014 Summary of Eversource Reliability Enhancement Program – CAPITAL
Docket No. DE 09-035
EVERSOURCE
 Jan 1 2014 - Dec 31 2014



CAPITAL - DUE TO BASE REP			
	\$ PLAN	\$ ACTUAL	\$ VARIANCE
Reject Pole Replacement	\$1,248,000	\$1,486,624	\$238,624
Pole Reinforcement	\$0	\$0	\$0
NESC Capital Work	\$1,000,000	\$1,706,037	\$706,037
Airbreak Switch Replacement	\$0	\$234,204	\$234,204
Direct Buried Cable Replacement	\$1,000,000	\$1,552,591	\$552,591
Direct Buried Cable Injection	\$1,000,000	\$290,893	(\$709,107)
	\$4,248,000	\$5,270,349	\$1,022,349

CAPITAL - REP II			
	\$ PLAN	\$ ACTUAL	\$ VARIANCE
Distribution Line Porcelain Changeout	\$2,000,000	\$2,125,246	\$125,246
34.5kV Substation Breaker Replacement	\$570,000	\$505,625	(\$64,375)
Enhanced Tree Trimming	\$3,090,000	\$4,499,780	\$1,409,780
Pole Top DSCADA Replacement	\$500,000	\$500,000	\$0
Substation RTU Replacement	\$0	\$2,892	\$2,892
Enable SCADA to Windsor Backup	\$0	\$12,253	\$12,253
Distrib. Line Wire Upgrade/Eliminate Narrow ROW	\$0	\$87,042	\$87,042
Reliability Improvements Annual (Ongoing)	\$1,000,000	\$1,700,890	\$700,890
GIS Capital Project	\$1,000,000	\$708,088	(\$291,912)
Hazard Tree Removal	\$1,068,000	\$3,080,795	\$2,012,795
Full Width ROW Clearing	\$3,443,000	\$1,826,807	(\$1,616,193)
	\$12,671,000	\$15,049,419	\$2,378,419

TOTAL REP CAPITAL	\$16,919,000	\$20,319,768	\$3,400,768
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CAPITAL DUE TO BASE REP

REJECT POLE REPLACEMENT (BASE REP):

Program Description: The preventive maintenance cycle for distribution poles to inspect, treat, reinforce or replace decayed or damaged poles to ensure reliable and safe use of this asset will generate approximately 2% of the poles inspected for replacement.

Eversource maintains 240,000 poles on its system. These are inspected every 10 years or 24,000 poles per year. Estimated reject rate is 2% requiring 480 poles to be replaced or reinforced. Poles are reviewed in the field for suitability to be reinforced; otherwise they are replaced. Estimate >70% replaced.

Total Unit Population: Dependent upon inspection results, estimate 4,800 poles to replace or reinforce.

Reliability Benefit: Reliable performance and safety of poles in high winds, heavy wet snow, pole accidents or other events that cause undue stress in addition to normal service of this asset.

Results: In 2014, 25,666 poles were inspected with 440 found to be defective and required replacement (1.7 % defective rate). In 2014, 119 poles were replaced. The remainder will be replaced in 2015.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$1,248,000	\$1,486,624	\$238,624

POLE REINFORCEMENT (BASE REP):

Program Description: Inspection of poles generates approximately 0.6% of poles that require being made safe or replaced within five working days, approximately 0.8% of poles must be replaced within one year and approximately 0.5% are eligible for reinforcement. Each of the poles eligible for reinforcement are reviewed in the field to determine if they will be reinforced.

Eversource maintains 240,000 poles on its system. These are inspected every 10 years or 24,000 poles per year. Approximately 120 poles are reviewed each year in the field to determine if they will be reinforced.

Total Unit Population: Dependent upon inspection results.

Reliability Benefit: Reliable performance and safety of poles in high winds, heavy wet snow, pole accidents or other events that cause undue stress in addition to normal service of this asset.

Results: In 2014, no poles were reinforced. More poles were replaced than planned. (See above.)

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$0	\$0	\$0

NATIONAL ELECTRICAL SAFETY CODE (NESC) GENERATED CAPITAL WORK (BASE REP):

Program Description:	Replace distribution plant units with deficiencies identified during NESC inspections which are required to conform to the National Electrical Safety Code (NESC). Correct NESC violations by installing plant units. Most often, the installation of poles and conductors are required to meet clearance problems to buildings, communications conductors, or over streets and roadways.
Total Unit Population:	For 2014, Eversource focused on its backlog of NESC maintenance orders. The year end backlog was reduced to 2,713 plant units. Additional units are identified during the Overhead Plant inspections.
Reliability Benefit:	This work is required to conform to NESC requirements.
Results:	The most common requirement is to replace poles to gain additional height to meet clearance to communications conductors or clearance to buildings or structures. In 2014, 457 plant units were replaced.
Capital Cost:	

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$1,000,000	\$1,706,037	\$706,037

AIRBREAK SWITCH REPLACEMENT (BASE REP):

Program Description:	Of the 725 airbreak switches on the system, 535 are on distribution lines. They are of various manufacturers, models, type, and vintage. This project accounts for the replacement of distribution line switches that are not suitable to be maintained, but remain in service. Replace with a new switch or recloser.
Total Unit Population:	535
Maintenance Cycle:	Airbreak Switches are maintained on a six year cycle with inspection every year.
Reliability Benefit:	Parts cannot be obtained for obsolete switches. Obsolete switches may not have sufficient capacity to break the load current of the circuit. Replacement with a recloser reduces the maintenance required and reduces the number of permanent outages.
Results:	In 2014, 6 obsolete airbreak switches were replaced.
Capital Cost:	

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$0	\$234,204	\$234,204

DIRECT BURIED CABLE REPLACEMENT (BASE REP):

Program Description: Replace direct buried cable with cable in conduit.

2,000,000 feet of direct buried cable was installed at Eversource until 1985 with earliest vintages from 1970. Cable insulation is subject to age failure and bare concentric neutral conductors are subject to corrosion. Testing has indicated that in many locations the concentric neutral is no longer sufficient to provide a path to ground for the electric system. This project is to replace unjacketed direct buried cable in specific developments which have experienced a high failure rate or where cable has been rejected as a candidate for cable injection. Live front transformers and/or pre-1987 elbows are replaced along with the cable.

Total Unit Population: 2,000,000 feet

Reliability Benefit: Direct buried cable was installed at Eversource until approximately 1985 with a significant amount installed in the 1970's. New cable and new construction standards will provide enhanced reliability for the long-term.

Results: An estimated 25,100 feet of direct buried cable was replaced with new cable in conduit as part of this project in 2014. An additional estimated 49,500 feet of direct buried cable was replaced in conduit as part of non-REP projects.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$1,000,000	\$1,552,591	\$552,591

DIRECT BURIED CABLE INJECTION (BASE REP):

Program Description: 2,000,000 feet of direct buried cable was installed at Eversource until 1985 with earliest vintages from 1970. The cable insulation is subject to age failure and the bare concentric neutral is subject to corrosion. This project is to inject unjacketed direct buried cable if it has shown by test that the concentric neutral has the majority of its integrity remaining.

Total Unit Population: 2,000,000 feet of direct buried cable. The actual amount eligible for injection is determined after concentric neutral testing.

Maintenance Cycle: None.

Reliability Benefit: The insulating capability of the cable is restored reducing the probability of a cable failure. Pre-1987 elbows and live front transformers are replaced as they are encountered.

Results: An estimated 16,319 feet of cable was injected in 2014. The estimated cost was \$14.50 per foot, compared to \$53 per foot for cable replacement in conduit.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$1,000,000	\$290,893	(\$709,107)

CAPITAL – REP II

DISTRIBUTION LINE PORCELAIN PRODUCT CHANGEOUT (REP II):

Program Description:	<p>This targeted capital project, addressing safety and reliability, is a proactive program aimed at eliminating distribution line porcelain equipment with a known impact on the System Average Interruption Duration Index (SAIDI).</p> <p>The specific goal is to replace all designated porcelain equipment with polymer in ten years. The program will specifically replace porcelain 4 ¼" disc insulators, cutouts, non-transformer lightning arrestors, and solid core in-line disconnect switches with new polymer equipment.</p>
Total Unit Population:	Estimate of 150,000 porcelain units to change out. Eversource has 11,000 miles of line so this equates to 13.6 pieces of porcelain per mile on average.
Maintenance Cycle:	Complete in 10 years. 150,000 pieces of porcelain divided by 10 years equals 15,000 units per year.
Reliability Benefit:	Reduced failure of this product.
Results:	An estimated 4,689 porcelain cutouts, insulators, lightning arresters and in-line disconnect were replaced with polymer units in 2014. Failures of polymer insulators and cutouts have been very low.
Capital Cost:	

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$2,000,000	\$2,125,246	\$125,246

34.5 KV SUBSTATION BREAKER REPLACEMENT (REP II):

Program Description:	This program addresses the replacement of existing substation 34.5 kV breakers which are old, problematic repair or operation, unique or no longer supported by vendors for parts and repair material. There are 251- 34.5 kV breakers on the system of various manufacturers, models, types and vintage.
Total Unit Population:	251- 34.5 kV breakers (replace 2 breakers first program year)
Maintenance Cycle:	Breakers are maintained on a 10 year cycle at the time the substation is maintained.
Reliability Benefit:	Reduce failure to operate of breakers. Reduce maintenance costs.
Results:	In 2014, 2 breakers were replaced as part of REP. An additional 4 were replaced as part of non-REP projects.
Capital Cost:	

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$570,000	\$505,625	(\$64,375)

ENHANCED TREE TRIMMING (ETT) (REP II):

Program Description: Trim main lines for reliability using an enhanced tree trimming (ETT) specification to create ground to sky clearance versus the smaller maintenance trim zone.

Expanded clearance is obtained by performing greater off zone takedowns and clearing and higher than normal vertical clearing. Approximately 11,000 miles of overhead line exists with the project targeted up to 50 miles per year on circuits with highest tree related reliability (top 50 list).

Total Unit Population: Eversource is responsible for trimming approximately 11,000 miles of overhead distribution line. A portion of these miles are candidates for ETT to improve reliability on main lines.

Reliability Benefit: Increasing the trim zone at targeted main line locations significantly reduces the risk of tree outages associated with significant SAIDI (customer) impact.

Results: In 2014, 90.3 miles of ETT was performed.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$3,090,000	\$4,499,780	\$1,409,780

POLE TOP DSCADA REPLACEMENT (REP II):

Program Description: Replace obsolete remote terminal units (RTUs) at the same time the radios are upgraded to 220 MHz.

Total Unit Population: 135 total unit population. Replace approximately 20 units per year.

Reliability Benefit: Existing RTUs have reliability issues and parts are no longer available for repair. Additionally, the existing hardware at the Electric System Control Center (ESCC) will not accept the installation of any additional units in the field. New RTUs provide advanced technology e.g. time stamped events, line readings, and connection of multiple devices with different communication protocols.

Results: A total of 33 units were replaced. A \$2,800,000 program funded replacement of 30 units - \$500,000 from REP and \$2,300,000 from non-REP. An additional 3 units were replaced as part of other projects.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$500,000	\$500,000	\$0

SUBSTATION RTU REPLACEMENT (REP II):

Program Description: This project is to replace the remaining estimated 15 of 23 older Remote Terminal Units (RTUs) at various substations. Older units are not supported by vendors for repair and utilize single REDAC 70 communication protocol. New RTUs provide time stamp, line reading data, and connection to devices with different communication protocols.

Total Unit Population: 15 of 23 older Remote Terminal Units (replace 3 first program year).

Maintenance Cycle: Substation RTUs normally are repaired or replaced when they fail to operate.

Reliability Benefit: Fewer failures to communicate with substation SCADA controlled devices.

Results: In 2014, there were no obsolete substation RTUs replaced. Charges in 2014 are related to final activities associated with work completed in 2013.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$0	\$2,892	\$2,892

ENABLE SCADA TO WINDSOR BACKUP (REP II):

Program Description: Connect existing remote terminal units (RTUs) to the backup computer server in Windsor, CT. Supervisory Control and Data Acquisition (SCADA) refers to a centralized control system to perform automated activities through RTUs.

Total Unit Population: 33 total unit population.

Reliability Benefit: In the event of a computer server failure at the Electric System Control Center in Manchester, NH, all RTUs will be able to be accessed via the backup server at Windsor, CT, providing redundant/reliable operations. This also meets NERC and ISO requirements.

Results: In 2014, the last site was connected. This program is now complete.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$0	\$12,253	\$12,253

DISTRIBUTION LINE WIRE UPGRADE/ELIMINATE NARROW RIGHT-OF-WAY (REP II):

Program Description: Replace #6 and #4 copper conductor in locations where it is susceptible to burn down by tree limbs. Primary locations are in rural areas of the western part of the company - Peterborough, New Ipswich, Rindge, Jaffrey, Dublin, but may be in other areas. Bring overhead lines out onto the street. These lines are currently located in narrow rights-of-way (ROW) which are difficult to patrol and repair and expensive to maintain.

Total Unit Population: Unknown.

Reliability Benefit: Reduce repair time by replacing small copper conductor that burns down and relocating lines out of narrow inaccessible ROWs.

Results: In 2014, 5 projects were completed. Many of these projects were started in 2013. Actual cost includes only 2014 charges.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$0	\$87,042	\$87,042

RELIABILITY IMPROVEMENTS ANNUAL (REP II):

Program Description: This project provides funding for a variety of activities relating to reliability of service, each of which costs less than \$50,000. This includes unfused lateral protection, recloser upgrades and installs, line construction to provide added phases or alternate feeds, switch and manual disconnect installations, and other specific capital work to improve circuit and area reliability. Average cost per typical Engineering Work Request (EWR) is about \$8,900.

Total Unit Population: N/A

Maintenance Cycle: None.

Reliability Benefit: Reduce the number of customers affected by outages by fusing laterals and adding additional sectionalizing devices. Reduce permanent outages by installing reclosers. Perform other activities as identified.

Results: Reliability projects were completed on most hit list (top 50) circuits. .

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$1,000,000	\$1,700,890	\$700,890

GIS CAPITAL PROJECT (REP II):

Program Description:

Define overall scope and desired end products; determine technology requirements, select vendors and define overall implementation plan to establish a GIS at Eversource. Initial deliverables would include establishing Eversource's overhead maps onto a land base, connecting the new GIS to existing internal databases including Customer Information and Vegetation Management with outputs to automate engineering models and analysis tools. Next steps would include capturing underground systems, incorporating switching and distribution operating information (DSCADA), as well as right-of-way lines. Integration with other readily available GIS data from other entities would also be performed such as for wetlands and property ownership information that is available from federal, state and municipal agencies. Eversource would also explore ways to share our information with others. Subsequent steps are to move the GIS to desktop/infield design of line extensions and system upgrades. An outage management system and work management opportunities would then become practical expansions of this system.

Reliability Benefit:

Provide a single location for data that can be easily accessed to analyze the distribution system, provide a base for future Outage Management System and provide mapping of the distribution system that is geographically correct.

Results:

Conversion of all areas was completed in 2013 along with business process rollout. GIS system is functional and in production. In 2014, information technology work was performed in preparation of the new outage management system. For example, programming was required for the GIS to OMS interface.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$1,000,000	\$708,088	(\$291,912)

HAZARD TREE REMOVAL (REP II):

Program Description: Remove trees greater than 16 inches in diameter within the trim zone and others outside the trim zone that are identified as a hazard to falling onto primary conductors.

Total Unit Population: Population is unknown. Candidates are identified during maintenance trimming and by employees during reliability investigations.

Reliability Benefit: Identifying and removing trees that have a high likelihood of contacting primary conductors significantly reduces the risk of tree outages associated with significant SAIDI (customer) impact.

Results: In 2014, 11,685 trees were removed.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$1,068,000	\$3,080,795	\$549,396

RECLAIM ROWS TO FULL WIDTH (REP II):

Program Description: Research easements, determine the easement boundaries and clear ROWs to the full extent of the easements.

Total Unit Population: Distribution in ROW is approximately 841 miles. ROWs are prioritized based upon outage histories.

Reliability Benefit: Clearing ROWs to the full width of the easements will reduce the risk of tree outages associated with significant SAIDI (customer) impact.

Results: In 2014, 22 miles of ROWs were reclaimed.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$3,443,000	\$1,826,807	(\$1,616,193)

Section 6

2014 Other Activities

2012 Rank	2014 Co SAIDI Rank	Change in Rank Gain (Worse) from 2012	Circuit	AWC	SMT	Hazard Tree Removal	Mid Cycle	ETT	NESC Full Circuit Patrol	NESC Repair Activity	Inspect URD Systems	Pole Inspect & Test	Pole Replace or Reinforce	ROW Patrol	Switch Maint	Recloser Maint	Recloser Additions	Test & Repair DB Cable	DB Replace	Porcelain Change Out	Other Corrective Actions	Corrective Actions Comments
1	NR	NR	3141X	DERRY	X	X				X					X	X				X	X	Unfused side tap. Planning for new Kingston line.
2	21	19	18W1	TILTON							X						X			X	X	Split circuit, added fusing.
3	NR	NR	2W2	TILTON							X										X	Added remote line monitoring equipment.
4	19	15	3114X	TILTON						X	X				X						X	Added reflectors on poles for improved visibility.
5	NR	NR	3133X	DERRY				X		X					X		X	X	X		X	Fuse coordination correction.
6	NR	NR	3271X2	BEDFORD												X					X	Thermovision Repairs
7	18	11	W13	KEENE	X	X					X					X	X			X	X	Protection upgrades.
8	NR	NR	355X10	LANCASTER						X							X					
9	74	65	319X1	TILTON	X	X					X											
10	163	153	316X1	NEWPORT		X		X		X	X					X	X	X		X	X	SMT and METT currently in progress on this circuit; Distribution automation.
11	NR	NR	319	TILTON								X		X								
12	13	1	3525X2	BERLIN						X							X					
13	16	3	316	NEWPORT		X				X	X	X					X	X			X	Distribution Automation.
14	234	220	W110	KEENE	X	X		X			X	X	X				X				X	Protection Upgrades - Hurricane Road.
15	357	342	23X5	MILFORD						X	X							X			X	Removed Line from ROW - Pond Parish Rd, Amherst.
16	209	193	311X8	BEDFORD		X		X		X	X		X								X	Off-Road Line Moved To Road
17	6	(11)	3410	NEWPORT	X	X				X	X	X	X			X	X				X	Distribution Automation.
18	83	65	31W1	TILTON	X	X		X					X			X					X	Replace poles to eliminate fiberglass pole top extensions; Added fault indicators; Upgraded protection
19	39	20	311	BEDFORD		X											X				X	Full Width clearing; Scada-mate Switches Installed
20	73	53	3157	ROCHESTER													X					Two SCADA switches added; SCADA added to two additional Vipers.
21	24	3	3615	HOOKSETT		X		X			X	X	X									
22	69	47	313X4	KEENE																	X	SMT currently in progress on this circuit.
23	64	41	3271X4	BEDFORD	X											X	X					
24	482	458	3116X1	CHOCORUA	X	X				X			X			X	X				X	Relocate section from off road to along road; Added fusing; Built new source along Rt 113A
25	9	(16)	3184X	HOOKSETT	X	X		X		X	X	X	X						X			DB Replacement - Terrace Woods Rd
26	421	395	41H2	ROCHESTER						X		X										
27	2	(25)	3115X12	EPPING		X	X			X	X					X	X			X		
28	90	62	348X1	LANCASTER							X						X			X	X	Fusing upgrades; Replace failing equipment identified during thermovision inspection.
29	43	14	3217X	NASHUA							X			X	X							
30	72	42	55W2	NEWPORT	X	X		X								X	X			X	X	Protection upgrades.
31	151	120	39X1	KEENE		X				X		X	X		X	X				X	X	Fusing Upgrades - Poocham Road.
32	96	64	3128X	DERRY	X			X		X							X	X				
33	125	92	9W1	TILTON							X										X	Added remote line monitoring equipment.
34	NR	NR	24X1	KEENE		X		X		X	X	X				X		X		X		
35	116	81	3445X	NASHUA							X				X		X					
36	191	155	371X14	ROCHESTER						X												
37	33	(4)	78X1	KEENE	X	X					X									X	X	New Feed on Plain Road.
38	26	(12)	313X1	KEENE		X				X			X			X		X			X	SMT currently in progress. More ETT scheduled.
39	22	(17)	64W1	PORTSMOUTH						X												
40	15	(25)	13W1	TILTON							X											
41	4	(37)	339	PORTSMOUTH		X																
42	106	64	3891	NASHUA											X							
43	544	501	3525X5	BERLIN												X	X			X		
44	458	414	2W4	PORTSMOUTH							X	X	X							X	X	Relocate section from off road to along road.
45	142	97	336X	CHOCORUA							X	X	X									
46	434	388	14X126A	HOOKSETT	X	X		X		X	X					X					X	Thermovision Repairs; Unfused Laterals
47	NR	NR	348X3	LANCASTER		X		X		X						X	X				X	Adding fusing; Improved fusing and recloser coordination.
48	237	NR	3177X1	NASHUA						X	X											
49	98	NR	3110X	NASHUA		X		X							X							
50	29	(21)	3152X	EPPING	X	X					X				X	X						

31 # Circuits Improving in Rank
19 # Circuits Worsening in Rank
78% Avg improvement (change in position) in Rank for all 50 Circuits
NR NR indicates this circuit had no outages so it is Not Ranked

Section 7

2015 O&M and Capital

Summary Plan

**2015 SUMMARY PLAN OF EVERSOURCE RELIABILITY PROGRAM
O&M**



Docket No. DE 09-035



TRIMRC - VEGETATION MANAGEMENT (O&M)				
	Unit of Measure	\$ Budget	Unit Budget	Cost Per Unit
Scheduled Maintenance Trim Cycle	# Miles	\$4,580,000		
Mid Cycle Trimming	# Miles	N/A ⁽¹⁾		
Hot Spot Trimming	N/A	N/A ⁽¹⁾		
Inspect Contractor	# Miles	N/A ⁽¹⁾		
Maintenance Enhanced Tree Trimming ⁽²⁾	# Miles	\$600,000		
Distribution Rights-of-Way Maintenance Cycle	# Acres	\$600,000		
Subtotal - Base REP		\$5,780,000		
Subtotal - REP II		\$0		
Total TRIMRC		\$5,780,000		

NESCRC - National Electrical Safety Code (O&M)				
	Unit of Measure	\$ Budget	Unit Budget	Cost Per Unit
Full Circuit Patrol	# Miles	\$50,000		
Inspect and Repair Underground Systems	# UG Maps	\$400,000		
Inspect Manholes	# Manholes	N/A ⁽¹⁾		
Pole Inspection and Treatment	# Poles	\$420,000	13,000	\$32
Overhead Repair Activity	# Repair Orders	\$750,000		
Foot Patrol ROW	# Miles	\$125,000		
Subtotal - Base REP		\$1,745,000		
Subtotal - REP II		\$0		
TOTAL NESCRC		\$1,745,000		

RELIOM - RELIABILITY (O&M)				
	Unit of Measure	\$ Budget	Unit Budget	Cost Per Unit
Overhead Switch Maintenance	# Switches	\$250,000	48	\$5,208
Recloser Maintenance	# Recloser Orders	\$200,000	71	\$2,817
Fault Indicators	# Fault Indicators	\$225,000		
Subtotal - Base REP		\$675,000		
Subtotal - REP II		\$0		
TOTAL RELIOM		\$675,000		

Total O&M Spending 2015

\$8,200,000

Rate Case O&M Plan		\$8,200,000
Booked Reserve (3) (Carried Over from 2014)		
TOTAL O&M Spending 2015		\$8,200,000

(1) Data is imbedded in another category as specified in O&M Briefing Sections.

(2) Transferred from REP II to Base REP for 2015 program.

(3) Carryover is the budgeted O&M per Docket DE 09-035 compared with actual O&M spend.

NOTE: 2015 line item O&M initiatives are subject to change based on carrying cost requirements for existing in service capital projects and 2015-2016 capital investment. Base REP budgeted amounts are the anticipated expenditures for the full year.

**2015 SUMMARY PLAN OF EVERSOURCE RELIABILITY
PROGRAM
CAPITAL**

EVERSOURCE

Docket No. DE 09-035



CAPITAL - REP II

	Project #	\$ Budget
None		\$0
		\$0

CAPITAL - DUE TO BASE REP

	Project #	\$ Budget
None		\$0
		\$0

TOTAL REP CAPITAL

\$0

NOTE: 2015 line item capital investment is subject to change based on carrying cost requirements for existing in service capital projects, 2015-2016 capital investment, and possible extension of REP program beyond June 30, 2015.