

Utilities & Storm Resiliency

- Unutil's Storm Resiliency Program

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Unutil Overview

- System Overhead Distribution
 - NH ~ 75,000 customers
 - MA ~ 30,000 customers
 - NH ~ 1,180 miles
 - MA ~ 420 miles





Unitil Vegetation Management

- Cycle Pruning – 5 year cycle
- Hazard Tree Mitigation Program
- Mid-Cycle Program
- Forestry Reliability Program
- “Core Work”
 - Customer requests
 - Make-safe jobs
 - Emergency / Trouble work
 - Hot Spot work



Climate as VM Programs implemented

Increasing frequency and severity of severe storms

- Windstorm – Feb 2010
- Hurricane Irene – Aug 2011
- “Snowtober” – Oct 2011
- Hurricane Sandy – Oct 2012
- Blizzard “Nemo” – Feb 2013
- Severe Thunderstorms -2014
- Heavy Wet Snow – Nov 2015



Northeast Climate

- Changing customer expectations
- Decreasing tolerance toward outages lasting more than three days
- Increased reliance on technology
- Economic loss in the community drives extreme behavior



Unitil Response



Storm Resiliency Program (SRP)

- Companion program to VMP
- Select circuits only
- Critical sections of 3 phase only
- Ground-to-sky clearing
- Intensive Risk Tree Assessment & Removal



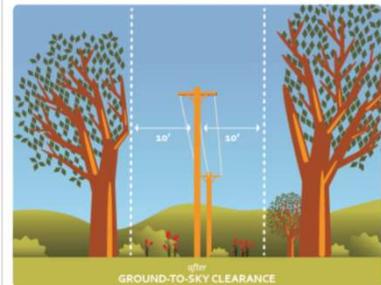
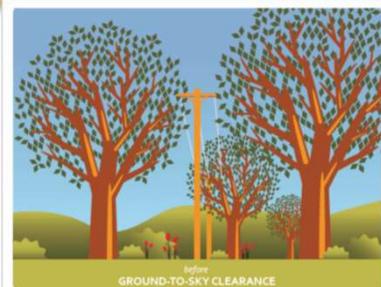
Storm Resiliency – Pilot began May 2012

Planning phase – looked at utility and town desires

- Fire Departments
- Police Departments
- Schools
- Town Halls



Implementation



Results



Before



After



Results



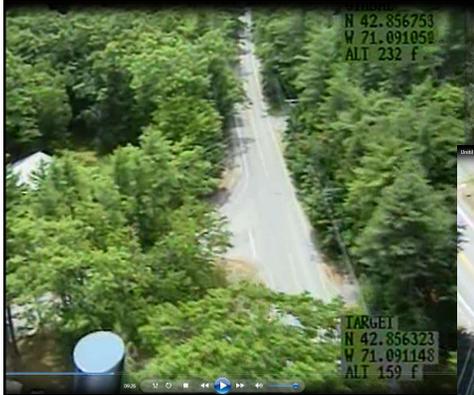
Before



2015 - 3 Yrs After



Results – Aerial Video Images



Before



After



Results – Aerial Video Images



Before



After



1st test of Storm Resiliency – During Pilot

- Hurricane Sandy – October 29, 2012 occurred while work being implemented
- *1 of 3 circuits almost complete*
- *1 circuit – tree work just being started (all trees marked for removal)*
- *1 circuit – tree work not yet started*
- *Field Review Immediately after storm passed*

Hurricane Sandy Outcomes

Almost Complete

- No circuit lockout
- 1 tree failure in the resiliency portion
- Tree was in negotiations with customer
- Obtained removal consent after event

Just Started (marked trees)

- Circuit lockout
- 2 tree failures of previously identified hazard trees



Circuit Specific – Sandy Tree Events

- Comparison of areas with storm pilot program vs. areas without



Multi-phase
Single-phase

1 Event on area worked
18 Events on areas not worked



First Test - Customer Perception

Hurricane Sandy – October 2012



t @tgnh

Thanks @Unitil for the intense tree removal in my town recently. I'm sure it's why we did not lose power!

[View conversation](#)



6m



“Just wanted to let you know how wonderful it was not to lose power during the hurricane. I believe it was directly attributable to all the tree cutting and trimming Unitil did especially in the Pollard Road and Westville Road area. My husband and I had our home built here thirty seven years ago....this is the **first** big storm that I can remember that power remained on!! I know there is no assurance that this will be the norm but I think you are all striving hard to make it that way. Thanks so much!!” - Plaistow, NH Customer

Regulatory Approval



- 2nd year of pilot in NH approved for 2013
- Made a case for regulatory approval in NH (initially approved for 2013)
- Approved in 2013 rate case proceeding



SRP Summary

Years: 2012 – 2016 (Massachusetts program began in 2014)

Storm Resiliency Work Details			
Year	Completed Miles	# of Removals	Ave Removals per Mile
2012	14.7	1,685	115
2013	32.3	2,271	70
2014	34.7	2,056	59
2014 (MA)	7.9	490	62
2015	30.2	1,834	61
2015 (MA)	9.8	624	64
2016	33.8	1,741	52
2016 (MA)	15.4	682	44
Total	178.8	11,383	64

Red indicates year TGR application began



SRP 2013 – Before & After

Bow Bog Rd – Bow, NH



Second Test of SRP

-Thanksgiving 2014 – Heavy Wet Snow

Thursday, November 27, 2014

- Concord, NH area – **76% of customers without power**
- High Definition - Vehicle Mounted Video Capture
- Created a video presentation of the results
- <https://youtu.be/rJzwHZmNAxM>



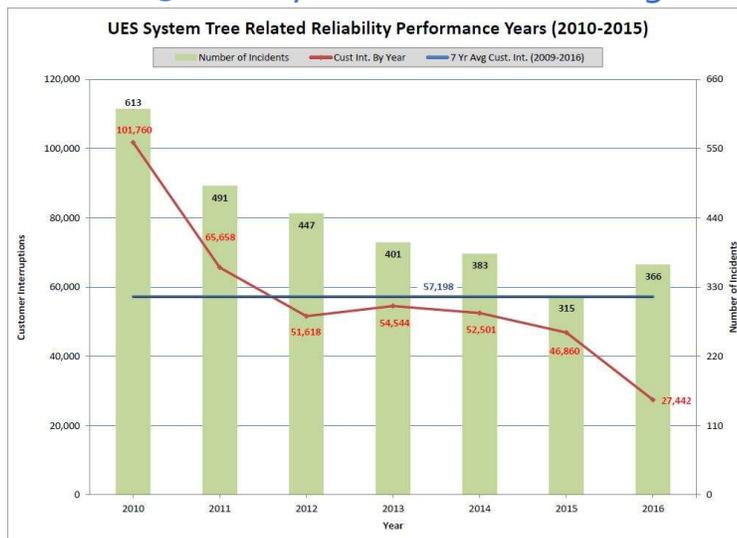
Second Test of SRP

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Reliability Results

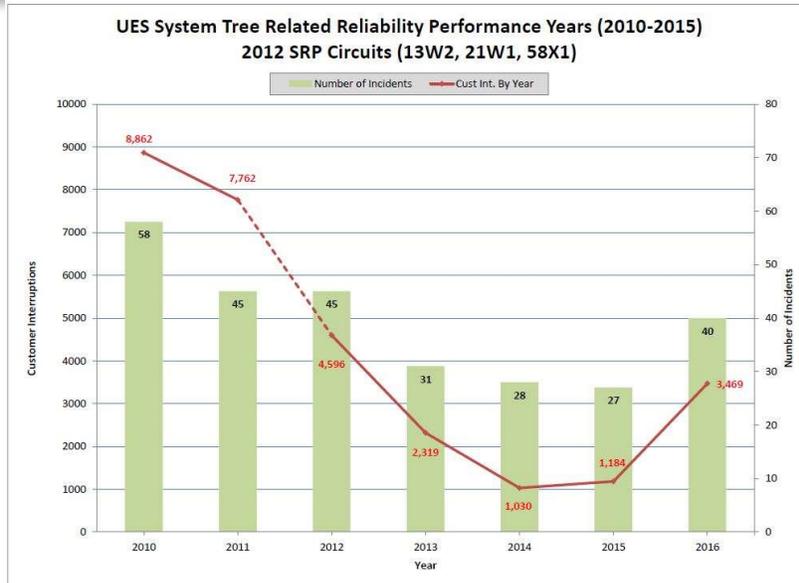
- System Level

- 11.3 % of system worked through 2016



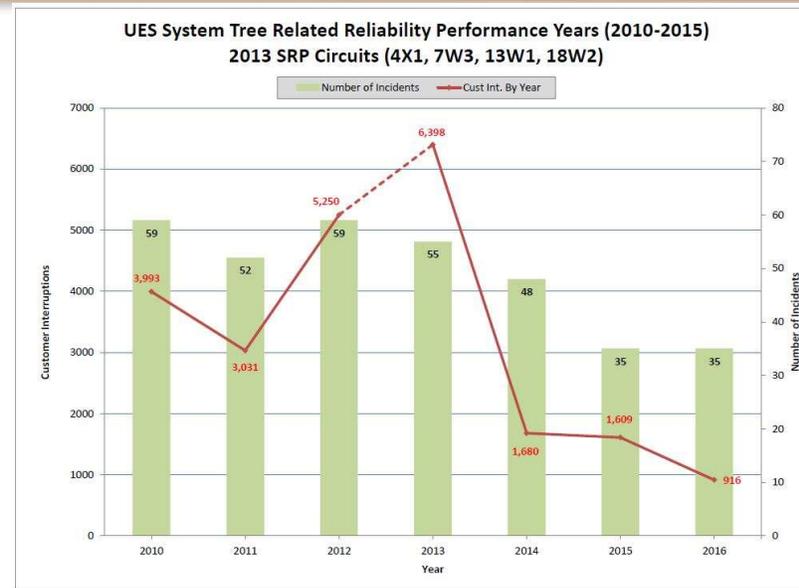
Reliability Results

- SRP Circuit Level



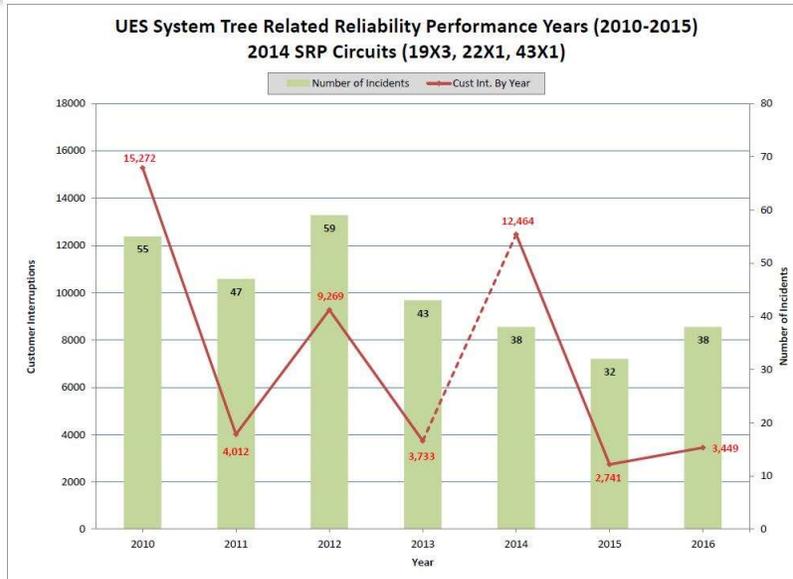
Reliability Results

- SRP Circuit Level



Reliability Results

- SRP Circuit Level



Reliability Results

- Number of Tree Troubles

- 2012 SRP Circuit Reliability Comparison

(all tree related outage data including major storms 1/1/2013 thru 12/31/2013)

	OH Miles	Outages per OH Mile	Cust-Int per OH Mile
SRP Circuits *	88.41	0.29	20.31
All Other Circuits	1,059.50	0.40	56.49

*E58X1, E21W1, E13W2



Reliability Results

- Number of Tree Troubles??

- 2012 & 2013 SRP Circuit Reliability Comparison

(all tree related outage data including major storms 1/1/2014 thru 6/30/2015)

	OH Miles	Outages per OH Mile	Cust-Int per OH Mile
SRP Circuits*	213.09	0.75	93.12
All Other Circuits	953.21	0.79	143.51

*E58X1, E21W1, E13W2, C13W1, C18W2, C4X1, C7W3



2016 Evolution of SRP

- Application of Tree Growth Regulators



- Goal - Improve the health of the adjacent trees along the overhead electric line corridor
- Reduce the resulting tree growth after pruning and positively affect the tree's health.
 - increased root density
 - improved drought and heat resistance
 - higher tolerance to insects and diseases.

Growth Regulators



SRP Results

Conclusion – Success!!!

How we measured success...

- Customer acceptance of work
- Positive Results in a storm event
- Expected continuation of positive results



Questions?

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