



Unitil Energy Systems, Inc.
Major Storm Cost Reserve Fund Report
2021

Prepared By: Business Resiliency & Compliance and Accounting

February 28, 2022

Introduction

Unitil Energy Systems, Inc. (“UES” or the “Company”) submits this annual Major Storm Cost Reserve (“MSCR”) Fund Report for the 12 month period ending December 31, 2021. This filing complies with the New Hampshire Public Utilities Commission (“Commission”) requirements set forth in the Company’s Rate Plan Settlement Docket No. DE 10-055 and as ordered in the Commission’s Order in DE 11-277 Order No. 25,351 *Order Granting Increase to Storm Recovery Adjustment Factor* (“SRAF”) issued April 24, 2012 (requiring UES “to file annual reports on the Storm Reserve Fund and storm recovery updates for those storms where costs are recovered through the SRAF”). The rate levels resulting from the distribution revenue changes specified in Section 2 of the Settlement Agreement approved in docket DE 10-055 and revised in Docket No. DE 13-065 (Order No. 25,502 issued April 29, 2013) include \$0.8 million annually for the MSCR, which will be used to recover costs associated with preparing for, responding to and recovering from, qualifying major storms. The MSCR Fund Balance at December 31, 2021 is in a deficit position of (\$3,140,898).

Please refer to the *UES MSCR Fund Reconciliation as of December 31, 2021* on page 3 for a summary of the costs.

Please refer to the Storm Recovery Adjustment Factor Reconciliation which provides the reconciliation of the SRAF through December 31, 2021 on page 4. Beginning May 1, 2021, revenue included in the Storm Recovery Adjustment Factor Reconciliation decreased due to the completion of recovery of the costs incurred as result of extraordinary storm Wind Storm, which occurred in October 2017. In accordance with its tariff Storm Recovery Adjustment Factor, Schedule SRAF, effective May 1, 2018, and for a period of 3 years, the cost associated with this extraordinary storm was recovered through the SRAF at a rate of \$0.00037 per kWh. UES filed the final disposition of the balance for this cost piece on June 28, 2021. Beginning May 1, 2022, the SRAF will decrease by \$0.00047 per kWh due to the completion of the recovery of the costs of extraordinary storm Winter Storm Quinn which occurred in March 2018. In accordance with its tariff, Schedule SRAF, the costs associated with this extraordinary storm was to be recovered at a rate of \$0.00047 per kWh over 3 years ending April 30, 2022. UES will file the final disposition of the balance for this cost piece by June 30, 2022. The resulting SRAF effective May 1, 2022 is \$0.00000 per kWh, as there will be no storms being recovered through the SRAF.

Section 8 of the Settlement Agreement approved by the Commission in DE 10-055 provides, in part, that:

8.1 The rate levels resulting from the distribution revenue changes specified in Section 2 include \$800,000 annually for the Major Storm Cost Reserve, which will be used to recover costs associated with responding to and recovering from qualifying major storms. Qualifying major storms shall include severe weather events causing 16 concurrent troubles (interruption events occurring on either primary or secondary lines) and 15 percent of customers interrupted, or 22 concurrent troubles, in either the Capital or Seacoast regions of Unitil, as well as costs associated with planning and preparation activities in advance of severe weather if a qualifying major storm is likely to occur.

Planning and preparation activities will include pre-staging of crews, standby arrangements with external contractors, incremental compensation of employees, and other costs that may be incurred to prepare for a qualifying major storm. A qualifying major storm will be considered likely to occur if the Energy Event Index (“EEI”) from the Company’s professional weather forecaster reaches an EEI level of 3 or greater with a “high” (greater than 60 percent) level of confidence.

8.2 The parties recognize that certain weather events may result in extraordinary expenditures to prepare for, or recover from, storms or natural disasters that do not meet the defined criteria for a qualifying major storm. The Company may petition the Commission to recover the extraordinary costs of such events from the Major Storm Cost Reserve and has the burden to demonstrate the reasonableness of its expenditures.

Unitil Energy Systems, Inc.
Major Storm Cost Reserve Fund – Reconciliation
As of December 31, 2021

Section #	Date	Description	Surplus (Deficit)
	12/31/2020	MSCR BALANCE (As Filed on 3/3/2021)	\$ (3,246,823)
Adjustments to 2020 Report as Filed			
	08/04/2020	Tropical Storm Isaias Calypso Adjustment	2,437
		Adjusted Opening Balance 1/1/2021	\$ (3,244,386)
2021 Deferred Charges			
1.0	12/05/2020	Nor'easter	(161,545)
2.0	12/25/2020	Nor'easter	(81,531)
3.0	02/01/2021	Winter Storm Event	(143,064)
4.0	03/01/2021	Wind Event	(126,267)
5.0	06/30/2021	Thunderstorms	(9,232)
2021 Recovery			
2021		Current Annual Recovery Rate	800,000
2021		Interest Rate	5.21%
2021 Carrying Charges			(174,873)
	12/31/2021	MSCR BALANCE	\$ (3,140,898)

Unitil Energy Systems, Inc.

Storm Recovery Adjustment Factor Reconciliation

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
	Beginning Balance	Total Costs	Total Revenue	Ending Balance Before Interest (a + b - c)	Average Monthly Balance ((a+d) / 2)	Interest Rate	Computed Interest	Ending Balance with Interest (d + g)
Jan-21	\$822,860 (1)	\$0	\$84,727	\$738,134	\$780,497	5.21%	\$3,453	\$741,587
Feb-21	\$741,587	\$0	\$84,695	\$656,892	\$699,240	5.21%	\$2,795	\$659,687
Mar-21	\$659,687	\$0	\$87,702	\$571,985	\$615,836	5.21%	\$2,725	\$574,710
Apr-21	\$574,710	\$0	\$70,750	\$503,960	\$539,335	5.21%	\$2,309	\$506,269
May-21	\$506,269	\$0	\$54,176	\$452,093	\$479,181	5.21%	\$2,120	\$454,213
Jun-21	\$454,213	\$0	\$47,635	\$406,578	\$430,396	5.21%	\$1,843	\$408,421
Jul-21	\$408,421	\$0	\$52,751	\$355,671	\$382,046	5.21%	\$1,691	\$357,361
Aug-21	\$357,361	\$0	\$53,482	\$303,879	\$330,620	5.21%	\$1,463	\$305,342
Sep-21	\$305,342	\$0	\$52,613	\$252,729	\$279,035	5.21%	\$1,195	\$253,924
Oct-21	\$253,924	\$0	\$40,755	\$213,169	\$233,546	5.21%	\$1,033	\$214,202
Nov-21	\$214,202	\$0	\$39,199	\$175,003	\$194,603	5.21%	\$833	\$175,836
Dec-21	\$175,836	\$0	\$46,093	\$129,743	\$152,790	5.21%	\$676	\$130,419
Total			\$714,578				\$22,136	

(1) As filed in Unitil Energy Systems, Inc.'s Major Storm Cost Reserve Fund Report, March 3, 2021.

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Attachments

[Attachment A - Notification of Change to Weather Provider Services](#)

[Attachment B - Weather Energy Event Index \(EEI\)](#)

[Attachment C - Sample DTN Weather Forecast](#)

1. December 5th, 2020 (Nor'easter)

Note: This event was reported in the previous year's report. It has been updated with final accounting.

1.1. Description of the Storm

Beginning on Wednesday, December 2nd, Unitil's weather service provider and other weather services began forecasting the development of a strong winter storm system with the potential to produce heavy rain, strong coastal winds and possibly snow on Saturday December 5th. As the system approached the northeast forecasters predicted high gusts along the coast and snow amounts between 8 – 12 inches across Unitil's service territory with the possibility of heavier, wet snow occurring in some areas (see Figure 2). As the system moved across Unitil's service area wind gusts up to 40 mph were experienced with heavy wet snow reported at the onset of the event before switching to a drier (normal) consistency. Final snow totals ranged between 4 and 8 inches across Unitil's NH territory.

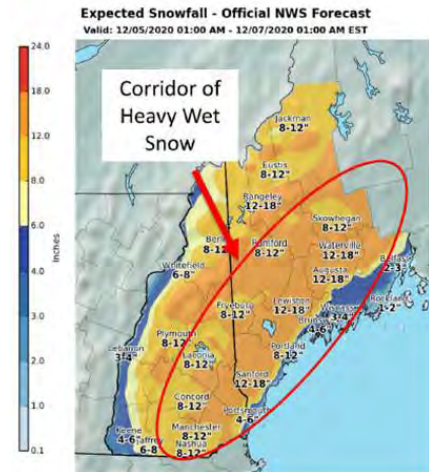


Figure 1 - Expected Snowfall Dec 5th

1.2. Summary of the Extent of the Storm Damage

Unitil Energy Systems experienced the following impact as detailed in the table below.

UES Region	Total # Outages	Peak # Outages	Total Customers Interrupted	Peak Customers Interrupted	Percentage Affected (Peak)
Seacoast	22	9	2,459	1,991	4.2%
Capital	92	41	7,827	3,479	11.3%

1.3. Preparations

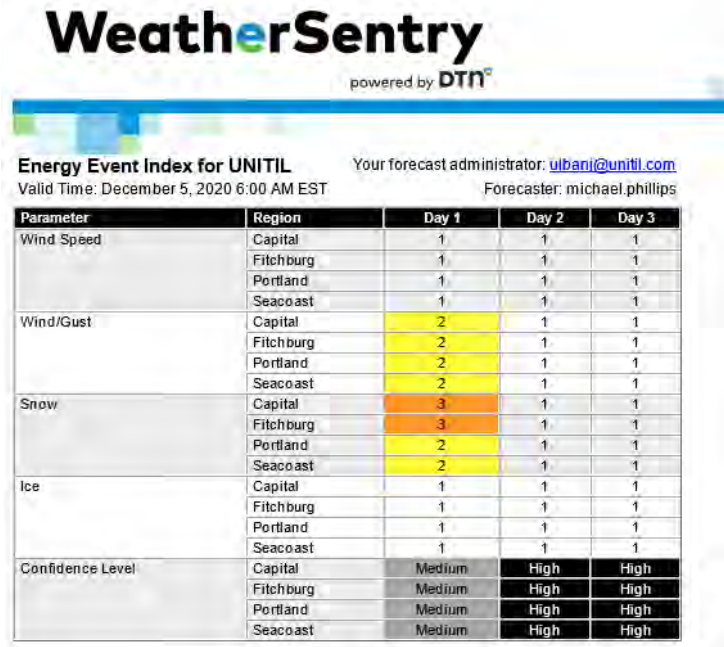
Unitil began communicating internally on Wednesday, December 2nd to coordinate initiation of preparation activities, including public notifications (via press releases) and outreach to life support customers, municipal, regulatory and elected officials, and state emergency management agencies (via email). Additional preparation activities such as contractor availability outreach and checking inventory, stock levels and fleet vehicles were also completed prior to the event. The Company held internal coordination calls leading up to the event and activated key response employees to staff the Seacoast, Capital and System emergency operating centers throughout the event to respond to any interruptions and communicate with affected stakeholders.

1.4. Restoration

Scattered outages occurred (listed in Section 1.2) in both the Seacoast and Capital Regions mostly attributed to broken limbs and tree damage. Interruptions began at approximately 8:30 AM on Saturday December 5th with the majority of affected customers restored by the afternoon of the 6th, while the Capital Region which experienced more damage was restored by the end of the day. Unitil had its normal contingent of internal crews (10), on system contractors (11), and tree crews (14) and secured additional wires down personnel (6) for the NH territory.

1.5. Exclusionary Criteria

This event qualified for recovery of preparation costs (due to the EEI of 3) for hazardous snow and recovery costs (due to outages) in the Capital Region only; Preparation and restoration costs associated with the Capital region are summarized in Section 1.6.



Energy Event Index Definition

No Leaves (Nov 17 - Apr 30)

EEI	Wind Speed	Wind/Gust	Snow	Ice
1	< 40 mph	< 45 mph	< 6 in.	< 1/10 in.
2	>= 40 mph	>= 45 mph	>= 6 in.	>= 1/10 in.
3	>= 50 mph	>= 55 mph	>= 8 in.	>= 3/8 in.
4	>= 60 mph	>= 70 mph	>= 12 in.	>= 1/2 in.
5	>= 70 mph	>= 85 mph	>= 24 in.	>= 1 in.

Confidence Level	
Low	<30% chance the most likely index level remains at that level through the event
Medium	30-60% chance the most likely index level remains at that level through the event
High	>=60% chance the most likely index level remains at that level through the event

*Note: Confidence is NOT a measure of probability of an event occurring; if you have an accompanying forecast discussion, that information can be found there. Confidence is a measure of how likely the forecasted index level will stay at that level from now through the event, or a way to measure the potential for variability in the forecast. So for example, if it is Monday and there are level 2 gusts forecasted on Wednesday with high confidence, and if your customizable threshold for high confidence is set at 60%, it means the following: There is a >=60% chance the most likely forecasted gusts will remain at level 2 with all updates from now through Wednesday.

Forecast for Unitil from DTM
For Phone Consulting: 1-800-361-4972
Issued Date: 12/05 0600
Forecaster: Sam Umhoefer

Zones (Forecast for next 30 hrs)	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Event	SNOW/GUSTS	SNOW/GUSTS	SNOW/GUSTS	SNOW/GUSTS
Event Begin Time	11am Sat	8am Sat	9am Sat	2pm Sat
Event End Time	2am Sun	12am Sun	11pm Sat	6am Sun
Event Confidence	60%	70%	70%	60%
Thunderstorm Wind Gusts				
Lightning Intensity				
Storm Direction				
Rain Amount				
Snow Amount	3-10"	7-14"	6-12"	3-9"
Snow Ratio	6:1-9:1	7:1-9:1	6:1-9:1	6:1-9:1
Max Sustained Winds				
Wind Gusts	45-50	40-50	40-50	50-55
Temp. Extremes	42/28	39/26	44/26	40/27

UNITIL SERVICE AREA 48 HOUR OUTLOOK:

CAPITAL: A Nor'easter today is expected to bring accumulating snow and gusty winds today into Saturday night. The axis of heaviest snowfall continues to shift across the northeast, leaving the exact location of the heaviest snowfall uncertain. Rain is expected to change to snow between 8am-11am Saturday. Snow

continues through the afternoon/evening and eventually diminishing overnight. Timing of heaviest snow: 1-9pm. Wind gusts of 30-40 mph likely, with isolated gusts of 40-50 mph possible late today into Sunday morning, peaking on Saturday evening between 6-11pm. Dry conditions expected on Sunday. Wind gusts of 30-40 mph possible through the day.

Confidence: Confidence in snowfall amounts Saturday is medium-low. Confidence in snowfall amounts reaching hazard levels Saturday is medium-high. EEI-2/3/4 snow chance: 70%/40%/30%. Confidence is medium that EEI-2 gusts will occur on Saturday. Chance for EEI-2 gusts: 30%.

FITCHBURG: A Nor'easter is expected to bring accumulating snow and gusty winds today into tonight. The axis of heaviest snowfall continues to shift across the northeast, leaving the exact location of the heaviest snowfall uncertain. Rain is expected to change to snow between 9am-12pm Saturday. Snow continues through the afternoon/evening and eventually diminishing overnight. Timing of heaviest snow: 1-7pm. Wind gusts of 30-40 mph possible later today and overnight. Wind gusts of 30-40 mph likely, with isolated gusts of 40-50 mph possible late today into Sunday morning, peaking on Saturday evening between 6-11pm. Dry conditions expected on Sunday. Wind gusts of 30-40 mph possible through the day.

Confidence: Confidence in snowfall amounts Saturday is medium-low. Confidence in snowfall amounts reaching hazard levels Saturday is medium-high. EEI-2/3/4 snow chance: 70%/40%/30%. Confidence is medium that EEI-2 gusts will occur on Saturday. Chance for EEI-2 gusts: 30%.

SEACOAST: A Nor'easter is expected bring accumulating snow and gusty winds today and into the night. The axis of heaviest snowfall continues to shift across the northeast, leaving the exact location of the heaviest snowfall uncertain. Rain is expected to change to snow between 11am-1pm Saturday. Snow continues through Saturday afternoon/evening and eventually diminishing overnight. Timing of heaviest snow: 3-11pm. Wind gusts of 30-40 mph possible later today and overnight. Peak gusts of 45-50 mph could occur between 5-10pm Saturday. Dry conditions expected on Sunday. Wind gusts of 30-40 mph possible through the day.

Confidence: Confidence in snowfall amounts Saturday is medium-low. Confidence in snowfall amounts reaching hazard levels Saturday is medium-high. EEI-2/3 snow chance: 70%/30%. Confidence is medium that EEI-2 gusts will occur on Saturday. EEI-2 gust chance: 40%.

PORTLAND: A Nor'easter is expected bring accumulating snow and gusty winds today and into the night. The axis of heaviest snowfall continues to shift across the northeast, leaving the exact location of the heaviest snowfall uncertain. Rain is expected to change to snow between 11-2pm Saturday. Light to occasionally moderate snow may continue through the afternoon/evening today and eventually diminish overnight. Timing of heaviest snow: 3pm Sat-3am Sun. Wind gusts of 30-40 mph possible late Saturday into Saturday night. Peak gusts of 50-55 mph could occur between 5-10pm Saturday. Dry conditions expected on Sunday. Wind gusts of 30-40 mph possible through the day.

Confidence: Confidence in snowfall amounts Saturday is medium-low. Confidence in snowfall amounts reaching hazard levels Saturday is medium-high. EEI-2/3 snow chance: 70%/30%. Confidence is medium that EEI-2 gusts will occur on Saturday. EEI-2 gust chance: 40%.

1.6. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was \$161,545 with a breakdown of charges in the following table:

Payroll	\$34,834
Materials & Supplies	\$7,526
Transportation	\$16,444
Contractor Invoices & Other	\$244,062
Less Amount Capitalized	(\$141,321)
<hr/>	
Total To Storm Reserve	\$161,545

2. December 25th, 2020 (Nor'easter)

Note: This event was reported in the previous year's report. It has been updated with final accounting.

2.1. Description of the Storm

Beginning on December 19th, weather services began forecasting a cold front that could bring hazardous rain and winds on Christmas day. As the storm approached wind speed predictions grew increasingly worrisome and by Wednesday December 23rd multiple sources were reporting the potential for periods of 60 mph winds, 1-2 inches of rain, and flood risk in our service territories. The weather event was expected to being around 11pm Thursday night and continue through noon on Friday with the peak winds expected to be between 3-10am. The precipitation started early Friday morning (approximately 3am) in both regions and continued into the evening. However, the predicted wind speeds did not materialize with a peak wind speed of 35mph in the Capital Region and 39mph in the Seacoast Region.

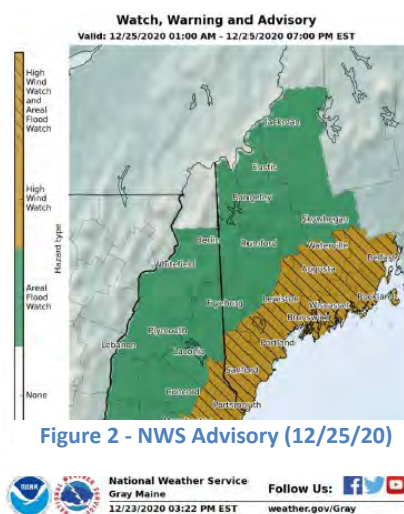


Figure 2 - NWS Advisory (12/25/20)

2.2. Summary of the Extent of the Storm Damage

Unitil Energy Systems experienced the following impact as detailed in the table below

Region	Total # Outages	Peak # Outages	Total Customers Interrupted	Peak Customers Interrupted	Percentage Affected (Peak)
Seacoast	1	1	177	177	0.37%
Capital	3	1	54	51	0.16%

2.3. Preparations

Unitil began communicating internally on Monday December 21st to coordinate initiation of preparation activities, including public notifications (via press releases) and outreach to life support customers, municipal, regulatory and elected officials, and state emergency management agencies (via email). Additional preparation activities such as contractor availability outreach and checking inventory, stock levels and fleet vehicles were also completed prior to the event. The Company held several internal coordination calls leading up to the event and activated key response employees to staff the Seacoast, Capital and System emergency operating centers throughout the event to respond to any interruptions and communicate with affected stakeholders.

2.4. Restoration

As noted in Section 2.2 only a few, isolated outages occurred throughout the day which were promptly responded to and restored by available resources. Unitil had internal crews (10), on system contractors (10) and tree crews (9) and secured an additional (3) contractor line crews to respond to any interruptions and activated additional EOC support staff to remain onsite to assist.

2.5. Exclusionary Criteria

This event had the capability of having a considerable impact to the area based on the forecasted wind conditions and the significant timing of the event (Christmas Day). Though we did not meet exclusionary criteria, prudent measures had to be taken to coordinate operations, acquire resources and prepare for possible impact; therefore the Company is seeking to classify this storm as an exogenous event and recover its associated costs.

2.6. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was \$81,531 with a breakdown of charges in the following table:

Payroll	\$23,049
Materials & Supplies	\$41
Transportation	\$6,081
Contractor Invoices & Other	\$53,022
Less Amount Capitalized	(\$662)
Total To Storm Reserve	\$81,531

3. February 1st, 2021 (Winter Storm Event)

3.1. Description of the Storm

Beginning on January 28th, weather services began forecasting a winter storm with the potential to bring 6 inches of snow and wind gusts of 45mph to New England Monday (Feb. 1st) into Tuesday (Feb. 2nd). Winter Storm and Wind Chill Watches were issued across the region as confidence grew in predictions of up to a foot of snow and breezy conditions. The snow began to fall across Unitil's service territory around 4:00pm on February 1st and continued through mid-morning on the 2nd. Snow totals between 7 and 12 inches were seen across the service area with the higher totals being in the Capital area. Winds gusts stayed under 35mph for the entirety of the event.

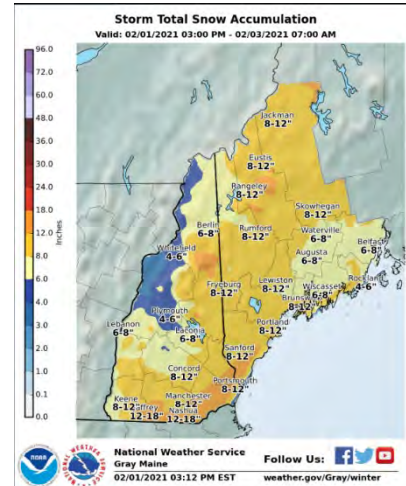


Figure 1 – Feb. 1st–2nd Projected Snow Totals

3.2. Summary of the Extent of the Storm Damage

Unitil Energy Systems experienced the following impact as detailed in the table below:

Region	Total # Outages	Peak # Outages	Total Customers Interrupted	Peak Customers Interrupted	Percentage Affected (Peak)
Seacoast	4	4	141	141	0.29%
Capital	0	0	0	0	0%

3.3. Preparations

Unitil began communicating internally on Thursday (Jan. 28th) to coordinate initiation of preparation activities, including public notifications (via press releases) and outreach to life support customers, municipal, regulatory and elected officials, and state emergency management agencies (via email). Additional preparation activities such as contractor availability outreach and checking inventory, stock levels and fleet vehicles were also completed prior to the event. The Company held internal coordination calls leading up to the event and activated key response employees to staff the Seacoast emergency operating center throughout the event to respond to any interruptions and communicate with affected stakeholders.

3.4. Restoration

As noted in Section 3.2 our Capital region did not experience any outages while the Seacoast Region experienced 4 outages during this event. Unitil had internal crews (10), on system contractors (14) and tree crews (11) and secured an additional (10) contractor line crews to respond to any interruptions. Seacoast began experiencing outages in the late night hours of Feb. 1st and ultimately restored impacted customers within 12 hours.

3.5. Exclusionary Criteria

This event qualified for recovery of preparation costs due to the EEI of 3 for snow with a high confidence level for the Seacoast Region (see attached forecast). The actual experience of this event did not meet the concurrent trouble requirement in either the Seacoast or Capital Regions; therefore restoration costs do not qualify for recovery. Preparation only costs recovered through the MSCR are summarized in Section 3.6.

Unitil Energy Systems, Inc. d/b/a Unitil Corp
Major Storm Cost Reserve Fund Report 2021

Energy Event Index for UNITIL Your forecast administrator: ulbani@unitil.com
Valid Time: February 1, 2021 1:00 PM EST Forecaster: tony dello

Parameter	Region	Day 1	Day 2	Day 3
Wind Speed	Capital	1	1	1
	Fitchburg	1	1	1
	Portland	1	1	1
	Seacoast	1	1	1
Wind/Gust	Capital	1	1	1
	Fitchburg	1	1	1
	Portland	1	1	1
	Seacoast	2	2	1
Snow	Capital	2	2	1
	Fitchburg	3	3	1
	Portland	3	3	1
	Seacoast	3	3	1
Ice	Capital	1	1	1
	Fitchburg	1	1	1
	Portland	1	1	1
	Seacoast	1	1	1
Confidence Level	Capital	High	High	High
	Fitchburg	High	High	High
	Portland	High	High	High
	Seacoast	High	High	High

Energy Event Index Definition

No Load (Nov 17 - Apr 30)

EEI	Wind Speed	Wind/Gust	Snow	Ice	Confidence Level
1	<= 40 mph	<= 45 mph	<= 0 in	<= 0.1 in	Low
2	<= 45 mph	<= 50 mph	<= 0.5 in	<= 0.5 in	Medium
3	<= 50 mph	<= 55 mph	<= 1 in	<= 1 in	High
4	<= 55 mph	<= 60 mph	<= 1.5 in	<= 1.5 in	Very High
5	<= 60 mph	<= 65 mph	<= 2 in	<= 2 in	Extremely High
6	<= 65 mph	<= 70 mph	<= 2.5 in	<= 2.5 in	Extremely High
7	<= 70 mph	<= 75 mph	<= 3 in	<= 3 in	Extremely High

Note: Confidence is NOT a measure of probability of an event occurring. If you have an accompanying forecast discussion, that information can be found there. Confidence is a measure of how likely the forecasted index level will stay at that level from now through the event. In a way to measure the potential for variability in the forecast. So for example, if it is Monday and there are level 2 gusts forecasted on Wednesday with high confidence, and if your customizable threshold for high confidence is set at 60%, it means the following: There is a >60% chance the most likely forecasted gusts will remain at level 2 with all updates from now through Wednesday.

Forecast for Unitil from DTN
For Phone Consulting: 1-800-361-4972
Issued Date: 02/01 1300
Forecaster: Tony Dello

Zones (Forecast for next 30 hrs)	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Event	SNOW	SNOW	SNOW	SNOW
Event Begin Time	4PM MON	4PM MON	2PM MON	6PM MON
Event End Time	8AM TUE	10AM TUE	7AM TUE	12PM TUE
Event Confidence	HIGH	HIGH	HIGH	HIGH
Thunderstorm Wind Gusts				
Lightning Intensity				
Storm Direction				
Rain Amount				
Snow Amount	7-11"	6-10"	10-15"	6-10"
Snow Ratio	7-12:1 (NRML-WET)	10-13:1 (NRML)	9-12:1 (NRML)	10-14:1 (NRML)
Ice Amount				
Max Sustained Winds	15-28 MPH	12-20 MPH	12-22 MPH	14-26 MPH
Wind Gusts	35-50 MPH	25-40 MPH	30-45 MPH	30-47 MPH
Temp. Extremes	34/24	28/22	32/21	31/18

UNITIL SERVICE AREA 48 HOUR OUTLOOK:

CAPITAL: Shortened snow window with this update and lowered most likely snowfall occurrence to EEI-2 with this event. Snow arrives by mid to late afternoon and will fall moderate to heavy through the evening and overnight hours when the bulk of the accumulation will occur. Snowfall through 6am Tuesday: 5-8". Winds will also increase this evening and through the midday on Tuesday. Common wind gusts: 25-35 mph with peak gusts to 40 mph possible tonight/Tue AM. Peak gust timing: 10pm Mon-10am Tue. After 6am Tuesday, occasional light snow will be possible throughout the day and overnight. Additional accumulation after 6am Tuesday: 1-2". See table/discussions above for event details.

Confidence: Confidence is high in at least EEI-2 snowfall. EEI-2/3 snow chance: 80%/40%. Confidence is high that wind gusts will stay below EEI-2 levels tonight through Tue.

SEACOAST: Shortened snow window with this update. Snow arrives by late this afternoon and will fall moderate to heavy for the evening and through much of tonight when the bulk of the accumulation will occur. Snowfall through 6am Tuesday: 6-10". Winds will also increase by mid to late afternoon and more so for this evening and remain elevated through around midday/early afternoon on Tuesday. Common wind gusts: 35-45 mph with peak gusts to 50 mph possible this evening/Tue AM. Peak gust timing: 5pm Mon-10am Tue. After 6am Tuesday, occasional light snow will

be possible throughout the day and overnight with a slight chance of a light wintry mix/freezing drizzle. Ice: Trace. Additional snow accumulation after 6am Tuesday: Around 1" or less. See table/discussions above for event details.

Confidence: Confidence is high for EEI-2/3 snowfall. EEI-2/3 snow chance: 100%/70%. Confidence is medium that wind gusts will stay below EEI-2 levels tonight through Tue. Chance of EEI-2 Gusts: 50%.

3.6. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was \$143,064 with a breakdown of charges in the following table:

Payroll	\$4,706
Transportation	\$6,239
Contractor Invoices & Other	\$132,119
<hr/>	
Total To Storm Reserve	\$143,064

therefore restoration costs qualify for recovery. Restoration costs recovered through the MSCR are summarized in Section 4.6.

4.6. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was \$126,267 with a breakdown of charges in the following table:

Payroll	\$21,663
Materials & Supplies	\$10,048
Transportation	\$4,313
Contractor Invoices & Other	\$148,265
Less Amount Capitalized	(\$58,022)
Total To Storm Reserve	\$126,267

5. June 30th, 2021 (Thunderstorms)

5.1. Description of the Storm

After several days of a heat wave in the north east a series of thunderstorms passed through the region Wednesday (June 30th) and Thursday (July 1st). Initially, the second set of storms looked to be the more concerning, but between the AM and PM forecasts on June 29th the wind speeds for June 30th were increased from 25-35mph to 35-50mph for UES' service territories. On the 30th the forecast once again saw a bump in wind speeds to 45-65mph as we prepared for the event to being. However, as the storm passed through the region winds in our service territory stayed fairly low with a peak of 17 mph in the Capital and 23mph in the Seacoast regions.

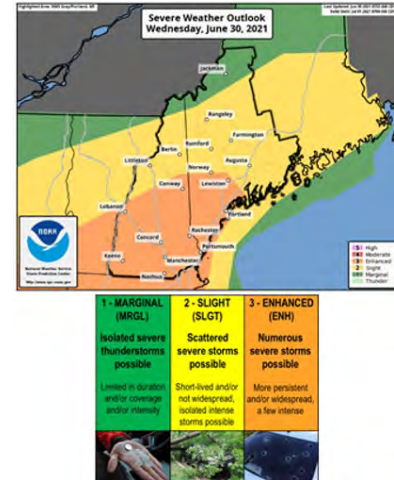


Figure 3 – June 30th Severe Weather Outlook

5.2. Summary of the Extent of the Storm Damage

Unitil Energy Systems experienced moderate impacts resulting from this event in both Regions.

UES Region	Total # Outages	Peak # Outages	Total Customers Interrupted	Peak Customers Interrupted	Percentage Affected (Peak)
Seacoast	22	7	1882	1840	3.82%
Capital	4	2	157	107	0.35%

5.1. Preparations

Unitil began communicating internally on Tuesday, June 29th to coordinate initiation of preparation activities, including public notifications (via press releases) and outreach to life support customers, municipal, regulatory and elected officials, and state emergency management agencies (via email). Additional preparation activities such as contractor availability outreach and checking inventory, stock levels and fleet vehicles were also completed prior to the event. The Company held several internal coordination calls leading up to the event and prepared key response employees to staff the Seacoast, Capital and System emergency operating centers if needed to respond to any interruptions and communicate with affected stakeholders.

5.2. Restoration

Unitil experienced a moderate impact to customers as detailed in Section 5.2. Interruptions began at approximately 5 PM on Wednesday, June 30th with nearly all affected customers restored by 5 AM the following morning (July 1st). Unitil had its normal contingent of internal line crews (9), on system line contractors (8), tree crews (11) and secured additional (12) line crews.

5.3. Exclusionary Criteria

This event qualified for recovery of preparation costs due to the EEI of 3 for strong winds with high confidence level for the Seacoast Region and medium confidence level for Capital (see attached forecast). The actual experience of this event did not meet the concurrent trouble requirement in either the Seacoast or Capital Regions; therefore, restoration costs do not qualify for recovery. Preparation only costs recovered through the MSCR are summarized in Section 5.6.

Unitil Energy Systems, Inc. d/b/a Unitil Corp
Major Storm Cost Reserve Fund Report 2021

Energy Event Index for UNITIL Your forecast administrator: ulban@unitil.com
Valid Time: June 30, 2021 1:00 PM EDT Forecaster: gregory.louis

Parameter	Region	Day 1	Day 2	Day 3
Wind Speed	Capital	1	1	1
	Fitchburg	1	1	1
	Portland	1	1	1
	Seacoast	1	1	1
Wind/Gust	Capital	3	1	1
	Fitchburg	3	1	1
	Portland	3	1	1
	Seacoast	3	1	1
Confidence Level	Capital	High	High	High
	Fitchburg	High	High	High
	Portland	High	High	High
	Seacoast	High	High	High

Energy Event Index Definition

EEI	Wind Speed	Wind/Gust	Confidence Level
1	< 30 mph	< 35 mph	Low
2	= 30 mph	= 35 mph	Medium
3	= 45 mph	= 50 mph	High
4	= 60 mph	= 65 mph	High
5	= 75 mph	= 75 mph	High

Note: Confidence is NOT a measure of probability of an event occurring. If you have an accompanying forecast discussion, that information can be found there. Confidence is a measure of how likely the forecasted index level will stay at that level from now through the event. For example, if it is Monday and there are level 2 gusts forecasted on Wednesday with high confidence, and 8 year customizable threshold for high confidence is set at 80%, it means the following: There is a >80% chance the most likely forecasted gusts will remain at level 2 with all updates from now through Wednesday.

Forecast for Unitil from DTN
For Phone Consulting: 1-800-361-4972
Issued Date: 06/30 1300
Forecaster: G Louis

Zones (Forecast for next 30 hrs)	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Event	T-STORM	T-STORM	T-STORM	T-STORM
Event Begin Time	5pm Wed	5pm Wed	6pm Wed	4pm Wed
Event End Time	9pm Wed	10pm Wed	10pm Wed	10pm Wed
Event Confidence	High	High	High	High
Thunderstorm Wind Gusts	50-65 mph	45-65 mph	50-65 mph	45-60 mph
Lightning Intensity	Low-medium	Low-medium	Low-medium	Low-medium
Storm Direction	E-SE	E-SE	E-SE	E-SE
Rain Amount				
Max Sustained Winds				
Wind Gusts				
Temp. Extremes	92/71	93/68	96/72	90/69

UNITIL SERVICE AREA 48 HOUR OUTLOOK:

CAPITAL: Strong to severe thunderstorms expected this afternoon/evening, best chances from 5-7pm. See table above for details. Isolated tornadoes may occur in storms, but the chance is under 5%. Rainfall: 0.50-1.00". Rain and isolated thunderstorms possible from about 3pm Thu-3am Fri. Lightning amount: Low. T-storm gusts: 25-35 mph. Rainfall: 0.25-1.00" with localized amounts to 1.50" possible.

Confidence: Confidence is high that thunderstorms will occur this afternoon and evening, 70% chance of storms. High confidence that at least EEI-2 gusts occur in storms. Chances for EEI-2/3/4 gusts: 70%/50%/10%. For Thursday afternoon/night, confidence is high that any thunderstorms should be isolated. T-storm chance: 20%. High confidence that hazard gusts and rainfall do not occur with storms Thu afternoon/night, but there is a 10% chance of EEI-2 gusts and a 20% chance for rain amounts to exceed 1.00".

SEACOAST: Strong to severe thunderstorms expected this afternoon/evening, best chances from 5-7pm and along/east of I-95. See table above for details. Isolated tornadoes may occur in storms, but the chance is under 5%. Rainfall: 0.50-1.00". Rain and isolated thunderstorms possible from about 4pm Thu-4am Fri. Lightning amount: Low. T-storm gusts: 25-35 mph. Rainfall: 0.25-1.00" with localized amounts to 1.50" possible.

Confidence: Confidence is high that thunderstorms will occur this afternoon and evening, 80% chance of storms. High confidence that at least EEI-2 gusts occur in storms. Chances for EEI-2/3/4 gusts: 80%/60%/20%. For Thursday afternoon/night, confidence is high that any thunderstorms should be isolated. T-storm chance: 20%. High confidence that hazard gusts and rainfall do not occur with storms Thu afternoon/night, but there is a 10% chance of EEI-2 gusts and a 20% chance for rain amounts to exceed 1.00".

5.4. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was \$9,232 with a breakdown of charges in the following table:

Unitil Energy Systems, Inc. d/b/a Unitil Corp
Major Storm Cost Reserve Fund Report 2021

Payroll	\$2,110
Contractor Invoices & Other	\$7,122
<hr/>	
Total To Storm Reserve	\$9,232

Attachment A

To: NH PUC

Topic: Change in Weather Provider Services at Unitil Service Corp

During the technical sessions of UES' most recent rate case, the Company asserted that it had worked with its weather provider, Weather Systems Inc. (WSI), to develop a Power Disruption Index (PDI) that better reflects the potential impact of adverse weather conditions. As an outcome of that discussion and for conditions with a PDI of 2 with a high confidence level, the Company may recover its preparation cost.

Following this, WSI abruptly notified its electric utility clients that it would no longer offer weather services as of April 1, 2011. As a result, the Company reviewed several, alternate weather providers and selected Telvent DTN (DTN).

Unitil worked with DTN to perfect a methodology for delivering the same level of service we enjoyed with WSI. DTN has created an Energy Event Index (EEI) similar to the PDI (see Attachment B for the criteria composing the EEI). The Company worked closely to ensure the same criteria discussed at the technical sessions continue to apply to the DTN equivalent.

Below are the specific levels associated with the EEI; however, to better align the EEI levels with the operational levels in Unitil's Emergency Response Plan (ERP), we began the EEI at Level 1, which differs from the former PDI that began at Level 0. Therefore, an EEI Level 3 is equivalent to the PDI Level 2.

The Estimated Impact Indices or EEI is summarized by day as a table within a typical daily weather forecast (see Attachment C).

- Five levels starting at 1. Estimates the impact for forecasted Wind Speeds, Wind Gusts, Ice Accretions, and Snow Amounts and the forecast's Confidence Level (Low, Medium, or High) to calculate the EEI:
 - Level 1 (Normal Operations/Blue Sky Day, None or Few Outages)
 - Level 2 (Moderate Weather, Isolated Outages)
 - Level 3 (Moderate-Severe Weather, Scattered Outages)
 - Level 4 (Moderate-Severe Weather, Widespread Outages)
 - Level 5 (Severe Weather, Extensive Outages)

Attachment B

Event Energy Index (EEI) Criteria

Forecasted Wind Speed/Wind Gusts

For “With Leaves” Period (May 1 – Nov 16)			For “No Leaves” Period (Nov 17 – Apr 30)		
Level	Wind Speed	Wind Gusts	Level	Wind Speed	Wind Gusts
EEI = 1	< 30 mph	< 35 mph	EEI = 1	< 40 mph	< 45 mph
EEI = 2	> = 30 mph	> = 35 mph	EEI = 2	> = 40 mph	> = 45 mph
EEI = 3	> = 45 mph	> = 50 mph	EEI = 3	> = 50 mph	> = 55 mph
EEI = 4	> = 60 mph	> = 65 mph	EEI = 4	> = 60 mph	> = 70 mph
EEI = 5	> = 70 mph	> = 75 mph	EEI = 5	> = 70 mph	> = 85 mph

Forecasted Ice Accretion (assumes “normal” wind speed)

Level	Ice Accretion
EEI = 1	< 1/10 inch
EEI = 2	> = 1/10 inch
EEI = 3	> = 3/8 inch
EEI = 4	> = 1/2 inch
EEI = 5	> = 1 inch

Forecasted Snow Amounts (*assumes dry snow consistency*). These amounts are factored with wind speed more so than actual accumulation.

Level	Snow
EEI = 1	< 6 inches
EEI = 2	> = 12 inches
EEI = 3	> = 18 inches
EEI = 4	> = 24 inches
EEI = 5	< 24 inches

Forecasted Snow Amounts (*assumes wet snow consistency*). Season will modify amount within level – A fall storm (with leaves) will have a significantly increased impact.

Level	Snow (Without Leaves)	Snow (With Leaves)
EEI = 1	< 6 inches	< 4 inches
EEI = 2	> = 6 inches	> = 4 inches
EEI = 3	> = 8 inches	> = 6 inches
EEI = 4	> = 12 inches	> = 12 inches
EEI = 5	> = 24 inches	> = 24 inches

Forecast Confidence Levels

Low	Medium	High
< 30% Chance	$\geq 30 \leq 60\%$ Chance	> 60% Chance

Attachment C

Sample Weather Forecast with EEI Table

Energy Event Index for UNITIL

Your forecast administrator: ulbanj@unitil.com

Valid Time: March 1, 2019 1:00 PM EST

Forecaster: jim.murphy

Parameter	Region	Day 1	Day 2	Day 3
Wind Speed	Capital	1	1	1
	Fitchburg	1	1	1
	Portland	1	1	1
	Seacoast	1	1	1
Wind/Gust	Capital	1	1	1
	Fitchburg	1	1	1
	Portland	1	1	1
	Seacoast	1	1	1
Snow	Capital	1	1	3
	Fitchburg	1	1	2
	Portland	1	1	3
	Seacoast	1	1	2
Ice	Capital	1	1	1
	Fitchburg	1	1	1
	Portland	1	1	1
	Seacoast	1	1	1
Confidence Level	Capital	High	High	Medium
	Fitchburg	High	High	Medium
	Portland	High	High	Medium
	Seacoast	High	High	Medium

Energy Event Index Definition

No Leaves (Nov 17 - Apr 30)

EEI	Wind Speed	Wind/Gust	Snow	Ice
1	< 40 mph	< 45 mph	< 6 in.	< 1/10 in.
2	>= 40 mph	>= 45 mph	>= 6 in.	>= 1/10 in.
3	>= 50 mph	>= 55 mph	>= 8 in.	>= 3/8 in.
4	>= 60 mph	>= 70 mph	>= 12 in.	>= 1/2 in.
5	>= 70 mph	>= 85 mph	>= 24 in.	>= 1 in.

Confidence Level	
Low	<30% chance the most likely index level remains at that level through the event
Medium	30-60% chance the most likely index level remains at that level through the event
High	>=60% chance the most likely index level remains at that level through the event

*Note: Confidence is NOT a measure of probability of an event occurring; if you have an accompanying forecast discussion, that information can be found there. Confidence is a measure of how likely the forecasted index level will stay at that level from now through the event, or a way to measure the potential for variability in the forecast. So for example, if it is Monday and there are level 2 gusts forecasted on Wednesday with high confidence, and if your customizable threshold for high confidence is set at 60%, it means the following: There is a >=60% chance the most likely forecasted gusts will remain at level 2 with all updates from now through Wednesday.

Date: March 1, 2019

Time: 1:00 PM EST

Forecaster: J Murphy

Zones	SEACOAST	CAPITAL	FITCHBURG	PORTLAND
Event Starting in 30hrs				
Event Begin Time				
Event End Time				
Event Confidence				
Tstrm Wind Gusts				
Ltng Intensity				
Storm Mvmt Dir				
Rain Amount				
Snow Amount				
Snow Character				
Ice Amount				
Sustained Wind				
Wind Gust				
Temp. Extremes	36/23	35/17	35/20	35/19

UNITIL SERVICE AREA 48 HOUR OUTLOOK:

CAPITAL: This afternoon and tonight will be dry and hazard-free. A storm system will spread snow showers over the area after 7am Saturday morning and end by 11pm Saturday. Snowfall: 2-3". Snow character: Normal-wet.

Confidence: High confidence that no hazards will occur in the next 48 hours.

FITCHBURG: This afternoon and evening will be dry and hazard-free. A storm system will spread snow over the area after 3am Saturday morning and end by 11pm Saturday. Snowfall: 2-4". Snow character: Normal-wet.

Confidence: High confidence that no hazards will occur in the next 48 hours.

SEACOAST: This afternoon and evening will be dry and hazard-free. A storm system will spread snow over the area after 3am Saturday morning and end by 11pm Saturday. Snowfall: 3-5". Snow character: Normal-wet.

Confidence: High confidence that no hazards will occur in the next 48 hours. Chance of EEI-2 snow: 10%.

PORTLAND: Today and tonight will be dry and hazard-free. A storm system will spread snow showers over the area after 8am Saturday morning and end by 12am Sunday. Snowfall: 2-4". Snow character: Normal-wet.

Confidence: High confidence that no hazards will occur in the next 48 hours.

UNITIL SERVICE AREA 3-5 DAY OUTLOOK: Another stronger storm system could bring anywhere from 6-15" of additional Normal-wet snow Sunday evening into Monday, but confidence is only medium at this point due to significant model differences in track and strength. The higher snow amounts will be across Capital and Portland where up to 10-15" will be possible with 6-10" expected across Seacoast and Fitchburg. Winds will be breezy Sunday night into Monday with gusts of 30-40 mph possible. Dry and hazard-free conditions are expected on Tuesday.

Confidence: Confidence is medium on Sunday and Monday. Chance for EEI-2/3/4 snow for Sunday night into Monday: 80%/60%/30% Capital and Portland; 70%/40%/- Seacoast and Fitchburg. Confidence is high that no hazards will occur on Tuesday