# Unitil Energy Systems, Inc.

# Major Storm Cost Reserve Fund Report

# Calendar Year 2020

Prepared By: Business Resiliency & Compliance and Accounting

September 28, 2021

## 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, 2020. 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, 2020 is in a deficit position of ($3,244,348).

Please refer to the *UES MSCR Fund Reconciliation as of December 31, 2020* 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, 2020 on page 4. The recovery rate for the SRAF in 2020 was $0.00084 per kWh.

**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 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, 2020**

| Section # | Date | Description | Surplus (Deficit) |
|---|---|---|---|
| | **12/31/2019** | **MSCR BALANCE (As Filed on 2/28/2020)** | **$ (3,406,149)** |
| | **Adjustments to 2019 Report as Filed** | | |
| | 2/25/2019[1] | Winter Storm Ryan Calypso Adjustment | 3,969 |
| | 2/25/2019[2] | Winter Storm Ryan Adjustment | (238) |
| | 10/17/2019[3] | Winter Storm Riley | 10,827 |
| | | **Adjusted Opening Balance 1/1/2020** | **$ (3,391,591)** |
| | **2020 Deferred Charges** | | |
| 1.0 | 12/02/2019 | Winter Storm Event | (398,268) |
| 2.0 | 08/04/2020 | Tropical Storm Isaias Event | (73,030) |
| | **2020 Recovery** | | |
| | **2020** | **Current Annual Recovery Rate** | **800,000** |
| | **2020** | **Interest Rate** | **5.21%** |
| | **2020 Carrying Charges** | | **(181,459)** |
| | **12/31/2020** | **MSCR BALANCE** | **$ (3,244,348)** |

[1] The Final Audit Report on the Company's 2020 MSCR was filed on May 6, 2020 and included the Company's agreement to Audit Issue #1, which removed $3,969 of communication service costs.
[2] The Company's 2019 MSCR reported costs for the 2/5/2019 Winter Storm Ryan totaling $162,004. An additional $238 in costs was identified subsequent to that report, bringing total costs to $158,273. This amount includes the reduction of cost reflected in footnote 1.
[3] The Company's 2019 MSCR reported the Winter Storm Riley with a total of $457,442. A reduction of costs were identified subsequent to that report, bringing the total down to $446,614.

## Unitil Energy Systems, Inc.

### Storm Recovery Adjustment Factor Reconciliation

| | (a) Beginning Balance | (b) Total Costs | (c) Total Revenue | (d) Ending Balance Before Interest (a + b - c) | (e) Average Monthly Balance ((a+d) / 2) | (f) Interest Rate | (g) Computed Interest | (h) Ending Balance with Interest (d + g) |
|---|---|---|---|---|---|---|---|---|
| Jan-20 | $1,732,530 (1) | $0 | $88,693 | $1,643,837 | $1,688,184 | 5.21% | $7,450 | $1,651,287 |
| Feb-20 | $1,651,287 | $0 | $84,746 | $1,566,541 | $1,608,914 | 5.21% | $6,642 | $1,573,183 |
| Mar-20 | $1,573,183 | $0 | $82,835 | $1,490,348 | $1,531,765 | 5.21% | $6,759 | $1,497,107 |
| Apr-20 | $1,497,107 | $0 | $69,136 | $1,427,971 | $1,462,539 | 5.21% | $6,246 | $1,434,217 |
| May-20 | $1,434,217 | $0 | $66,636 | $1,367,580 | $1,400,899 | 5.21% | $6,182 | $1,373,762 |
| Jun-20 | $1,373,762 | $0 | $81,575 | $1,292,188 | $1,332,975 | 5.21% | $5,692 | $1,297,880 |
| Jul-20 | $1,297,880 | $0 | $95,332 | $1,202,548 | $1,250,214 | 5.21% | $5,517 | $1,208,065 |
| Aug-20 | $1,208,065 | $0 | $100,373 | $1,107,692 | $1,157,879 | 5.21% | $5,110 | $1,112,801 |
| Sep-20 | $1,112,801 | $0 | $87,700 | $1,025,101 | $1,068,951 | 5.21% | $4,565 | $1,029,666 |
| Oct-20 | $1,029,666 | $0 | $67,139 | $962,527 | $966,097 | 5.21% | $4,396 | $1,966,923 |
| Nov-20 | $966,923 | $0 | $69,731 | $897,191 | $932,057 | 5.21% | $3,980 | $901,172 |
| Dec-20 | $901,172 | $0 | $82,107 | $819,065 | $860,118 | 5.21% | $3,796 | $822,860 |

(1) As filed in Unitil Energy Systems, Inc.'s Major Storm Cost Reserve Fund Report, February 26, 2020. Includes an adjustment of $164.36 to correct interest for the period January-December 2019, due to a change in the interest rate from 5.20% to 5.21% that occurred on January 1, 2019.

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Attachments

## 1. December 2nd, 2019 (Winter Storm Event)

### 1.1. Description of the Storm

Beginning on November 27th, weather services began forecasting a winter storm bringing between 7 to 14 inches of wet to normal snow and breezy conditions (winds 20 to 30 mph) across the New England area from Sunday (Dec 1st) through Tuesday (Dec 3rd). Winter Storm Warnings were issued across the region for this long duration nor'easter event. The snow began across Unitil's service territory Sunday evening (approximately 6pm) and continued through noon on Tuesday, though there was a lull for the afternoon and evening of Monday (Dec 2nd). Snow totals ranged between 7 and 18 inches across the service area with the Seacoast Region experiencing a wet snow mixing however winds remained under 30 mph for the entirety of the event.


Figure 1 - Snowfall Map (courtesy of WMUR)

### 1.2. 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 | 26 | **5** | 1,555 | 984 | 2% |
| Capital | 0 | **0** | 0 | 0 | 0% |

### 1.3. Preparations

Unitil began communicating internally on Friday (Nov 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 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

As noted in Section 1.2 our Capital region did not experience any outages while the Seacoast Region experienced 26 outages during this event. Unitil had internal crews (10), on system contractors (10) and tree crews (16) and secured an additional (15) contractor line crews to respond to any interruptions. Seacoast began experiencing outages early on Dec 2nd and ultimately restored most impacted customers within 12 hours however smaller, isolated outages continued throughout the day on the 2nd and were promptly responded to.

1.5. Exclusionary Criteria

This event qualified for recovery of preparation costs due to the EEI of 3 for snow with a high confidence level (EEI 4 of medium confidence) for both Seacoast and Capital Regions (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 1.6.

**Energy Event Index for UNITIL** Your forecast administrator: ulbanj@unitil.com
Valid Time: December 1, 2019 6:00 AM EST Forecaster: jimmy.cayer

| 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 | 4 | 4 | 4 |
| | Fitchburg | 4 | 4 | 4 |
| | Portland | 2 | 2 | 2 |
| | Seacoast | 3 | 3 | 3 |
| 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 | Medium | Medium | Medium |
| | Seacoast | High | High | High |

**Energy Event Index Definition**
No Leaves (Nov 17 - Mar 31)

| 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: December 1, 2019
Time: 6:00 AM EST
Forecaster: J Cayer

| Zones (Forecast for next 30 hrs.) | SEACOAST | CAPITAL | FITCHBURG | PORTLAND |
|---|---|---|---|---|
| Event | SNOW | SNOW | SNOW | SNOW |
| Event Begin Time | 5PM SUN | 4PM SUN | 3PM SUN | 10PM SUN |
| Event End Time | 4PM TUE | 2PM TUE | 2PM TUE | 7PM TUE |
| Event Confidence | HIGH | HIGH | HIGH | MEDIUM |
| Thunderstorm Wind Gusts | | | | |
| Lightning Intensity | | | | |
| Storm Direction | | | | |
| Rain Amount | | | | |
| Snow Amount | 7-14" | 9-16" | 8-15" | 6-12" |
| Snow Character | Wet | Normal/Wet | Normal/Wet | Wet |
| Ice Amount | | | | |
| Max Sustained Winds | | | | |
| Wind Gust | | | | |
| Temp. Extremes | 35/22 | 35/18 | 34/22 | 33/20 |

UNITIL SERVICE AREA 48 HOUR OUTLOOK:

CAPITAL: Dry and hazard-free through Sunday morning. A storm system will develop across the area Sunday afternoon and last through early Tuesday afternoon, with likely chances for a long duration heavy snow event. See table above for details. Winds will be breezy Sunday night into Monday as well, with gusts of 20-30 mph possible.

Confidence: Confidence is high that no hazards will occur through Sunday morning. Confidence is high that hazard level snow will occur Sunday afternoon into Tuesday. EEI-2/3/4 snow chance: 100%/90%/50%.

SEACOAST: Dry and hazard-free through early Sunday early afternoon. A storm system will develop across the area late Sunday afternoon and last through Tuesday afternoon, with likely chances for a long duration snow event. See table above for details. Winds will be breezy Sunday night into Monday as well, with gusts of 20-30 mph possible.

Confidence: Confidence is high that no hazards will occur through early Sunday early afternoon. Confidence is medium in the evolution of the storm system Sunday into Monday. While snow is expected to be the dominant precipitation type, some sleet could mix in at times, cutting into overall storm totals. Confidence is high that hazard level snow will occur. EEI-2/3/4 snow chance: 100%/80%/30%.

1.6. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was $398,268 with a breakdown of charges in the following table:

| | |
|---|---|
| Payroll | $39,184 |
| Transportation | $7,649 |
| Contractor Invoices & Other | $351,435 |
| Less Amount Capitalized | $0 |
| Total To Storm Reserve | $398,268 |

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## 2. August 4th, 2020 (TS Isaias)

### 2.1. Description of the Storm


Figure 2 - Isaias Projected Path

Beginning around July 30th, Unitil's weather service provider and other major weather outlets began reporting the expected track of Hurricane Isaias which was projected to impact nearly the entire eastern seaboard from Florida to the Mid-Atlantic before impacting the northeast as a weakened Topical Storm. In the days leading to its arrival, weather models continued to project a significant impact to much of the northeast with tropical force winds, heavy amounts of rains and possible tornadic activity. Just Weather service provider expected periods of heavy rain, and hazardous wind speeds with gusts up to 60 mph across much of the northeast. Unitil's service territory began to experience the impacts of TS Isaias the evening of August 4th with periods of high winds, heavy rain and gusts up to 50 mph reported across different portions of the NH service area.

### 2.2. 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 | 50 | **37** | 7,118 | 5,185 | 10.9% |
| Capital | 40 | **25** | 6,317 | 3,533 | 11.5% |

### 2.3. Preparations

Unitil began communicating internally on Thursday, July 30th 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

Unitil experienced a moderate impact to customers as detailed in Section 2.2. Interruptions began at approximately 5 PM on Tuesday, August 4th with nearly all affected customers restored by 9 AM the following morning (August 5th). Unitil had its normal contingent of internal line crews (10) on system line contractors (16), and tree crews (12).

2.5. Exclusionary Criteria

Although this event was forecasted several days in advance with a significant impact expected to the northeast, this event did not meet the EEI threshold for recovery of preparation costs, however the actual experience of the event met the concurrent trouble requirement in both the Seacoast and Capital Regions; therefore restoration costs qualify for recovery. Restoration costs recovered through the MSCR are summarized in Section 2.6.

2.6. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was $73,030 with a breakdown of charges in the following table:

| | |
|---|---|
| Payroll | $43,696 |
| Materials & Supplies | $5,209 |
| Transportation | $6,870 |
| Contractor Invoices & Other | $56,935 |
| Less Amount Capitalized | ($39,680) |
| Total To Storm Reserve | $73,030 |

## 3. December 5th, 2020 (Nor'easter)

**Note**: This event was not listed on the Reconciliation (pg.3) as final costs were not available at the time of this report. Final costs for this event will be included in the 2021 MSCR Report.

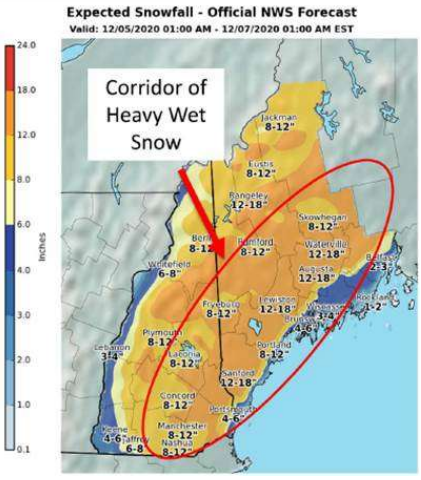

Figure 3 - Expected Snowfall Dec 5th

### 3.1. 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.

### 3.2. 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% |

### 3.3. 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.

### 3.4. Restoration

Scattered outages occurred (listed in Section 3.2) 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.

3.5. 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 3.6.

WeatherSentry
powered by DTN

**Energy Event Index for UNITIL**
Valid Time: December 5, 2020 6:00 AM EST

Your forecast administrator: ulbanj@unitil.com
Forecaster: michael.phillips

| 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 | 2 | 1 | 1 |
| | Fitchburg | 2 | 1 | 1 |
| | Portland | 2 | 1 | 1 |
| | Seacoast | 2 | 1 | 1 |
| Snow | Capital | 3 | 1 | 1 |
| | Fitchburg | 3 | 1 | 1 |
| | Portland | 2 | 1 | 1 |
| | Seacoast | 2 | 1 | 1 |
| Ice | Capital | 1 | 1 | 1 |
| | Fitchburg | 1 | 1 | 1 |
| | Portland | 1 | 1 | 1 |
| | Seacoast | 1 | 1 | 1 |
| Confidence Level | Capital | Medium | High | High |
| | Fitchburg | Medium | High | High |
| | Portland | Medium | High | High |
| | Seacoast | Medium | High | High |

**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 DTN
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%.

### 3.6. Qualifying Costs Charged to the Storm Reserve

The amount charged to the storm reserve for this event to date is $184,000. Final costs for this event were not available at the time of this report and will be included in the 2021 MSCR Report.

## 4. December 25th, 2020 (Nor'easter)

**Note**: This event was not listed on the Reconciliation (pg.3) as final costs were not available at the time of this report. Final costs for this event will be included in the 2021 MSCR Report.

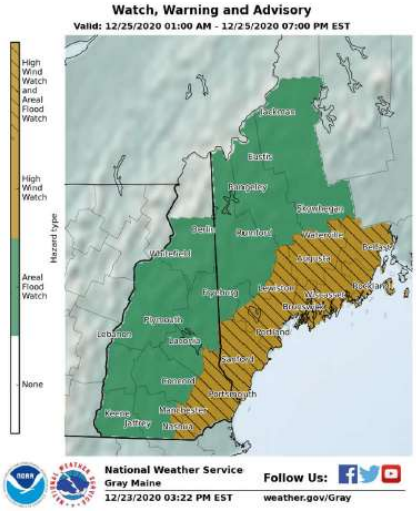


Figure 4 - NWS Advisory (12/25/20)

### 4.1. 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.

### 4.2. 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% |

### 4.3. 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.

### 4.4. Restoration

As noted in Section 4.2 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.

4.5. 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.

4.6. Qualifying Costs Charged to the Storm Reserve

The amount charged to the storm reserve for this event to date is $85,000. Final costs for this event were not available at the time of this report and will be included in the 2021 MSCR Report.

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 | ≥ 30 ≤ 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

# Unitil Energy Systems, Inc.

# Major Storm Cost Reserve Fund Report

# Calendar Year 2020

Prepared By: Business Resiliency & Compliance and Accounting

September~~March~~ 28~~3~~, 2021

## 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, 2020. 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, 2020 is in a deficit position of ($3,24~~46~~,348~~823~~).

Please refer to the *UES MSCR Fund Reconciliation as of December 31, 2020* 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, 2020 on page 4. The recovery rate for the SRAF in 2020 was $0.00084 per kWh.

**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 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, 2020**

| Section # | Date | Description | Surplus (Deficit) |
|---|---|---|---|
| | **12/31/2019** | **MSCR BALANCE (As Filed on 2/28/2020)** | **$ (3,406,149)** |
| | **Adjustments to 2019 Report as Filed** | | |
| | 2/25/2019[1] | Winter Storm Ryan Calypso Adjustment | 3,969 |
| | 2/25/2019[2] | Winter Storm Ryan Adjustment | (238) |
| | 10/17/2019[3] | Winter Storm Riley | 10,827 |
| | | **Adjusted Opening Balance 1/1/2020** | **$ (3,391,591)** |
| | **2020 Deferred Charges** | | |
| 1.0 | 12/02/2019 | Winter Storm Event | (398,268) |
| 2.0 | 08/04/2020 | Tropical Storm Isaias Event | (735,030~~467~~) |
| | **2020 Recovery** | | |
| | **2020** | **Current Annual Recovery Rate** | **800,000** |
| | **2020** | **Interest Rate** | **5.21%** |
| | **2020 Carrying Charges** | | **(181,459~~97~~)** |
| | **12/31/2020** | **MSCR BALANCE** | **$ (3,2446,348~~823~~)** |

[1] The Final Audit Report on the Company's 2020 MSCR was filed on May 6, 2020 and included the Company's agreement to Audit Issue #1, which removed $3,969 of communication service costs.
[2] The Company's 2019 MSCR reported costs for the 2/5/2019 Winter Storm Ryan totaling $162,004. An additional $238 in costs was identified subsequent to that report, bringing total costs to $158,273. This amount includes the reduction of cost reflected in footnote 1.
[3] The Company's 2019 MSCR reported the Winter Storm Riley with a total of $457,442. A reduction of costs were identified subsequent to that report, bringing the total down to $446,614.

## Unitil Energy Systems, Inc.

### Storm Recovery Adjustment Factor Reconciliation

| | (a) Beginning Balance | (b) Total Costs | (c) Total Revenue | (d) Ending Balance Before Interest (a + b - c) | (e) Average Monthly Balance ((a+d) / 2) | (f) Interest Rate | (g) Computed Interest | (h) Ending Balance with Interest (d + g) |
|---|---|---|---|---|---|---|---|---|
| Jan-20 | $1,732,530 (1) | $0 | $88,693 | $1,643,837 | $1,688,184 | 5.21% | $7,450 | $1,651,287 |
| Feb-20 | $1,651,287 | $0 | $84,746 | $1,566,541 | $1,608,914 | 5.21% | $6,642 | $1,573,183 |
| Mar-20 | $1,573,183 | $0 | $82,835 | $1,490,348 | $1,531,765 | 5.21% | $6,759 | $1,497,107 |
| Apr-20 | $1,497,107 | $0 | $69,136 | $1,427,971 | $1,462,539 | 5.21% | $6,246 | $1,434,217 |
| May-20 | $1,434,217 | $0 | $66,636 | $1,367,580 | $1,400,899 | 5.21% | $6,182 | $1,373,762 |
| Jun-20 | $1,373,762 | $0 | $81,575 | $1,292,188 | $1,332,975 | 5.21% | $5,692 | $1,297,880 |
| Jul-20 | $1,297,880 | $0 | $95,332 | $1,202,548 | $1,250,214 | 5.21% | $5,517 | $1,208,065 |
| Aug-20 | $1,208,065 | $0 | $100,373 | $1,107,692 | $1,157,879 | 5.21% | $5,110 | $1,112,801 |
| Sep-20 | $1,112,801 | $0 | $87,700 | $1,025,101 | $1,068,951 | 5.21% | $4,565 | $1,029,666 |
| Oct-20 | $1,029,666 | $0 | $67,139 | $962,527 | $966,097 | 5.21% | $4,396 | $1,966,923 |
| Nov-20 | $966,923 | $0 | $69,731 | $897,191 | $932,057 | 5.21% | $3,980 | $901,172 |
| Dec-20 | $901,172 | $0 | $82,107 | $819,065 | $860,118 | 5.21% | $3,796 | $822,860 |

(1) As filed in Unitil Energy Systems, Inc.'s Major Storm Cost Reserve Fund Report, February 26, 2020. Includes an adjustment of $164.36 to correct interest for the period January-December 2019, due to a change in the interest rate from 5.20% to 5.21% that occurred on January 1, 2019.

Table of Contents



Attachments

## 1. December 2nd, 2019 (Winter Storm Event)

### 1.1. Description of the Storm

Beginning on November 27th, weather services began forecasting a winter storm bringing between 7 to 14 inches of wet to normal snow and breezy conditions (winds 20 to 30 mph) across the New England area from Sunday (Dec 1st) through Tuesday (Dec 3rd). Winter Storm Warnings were issued across the region for this long duration nor'easter event. The snow began across Unitil's service territory Sunday evening (approximately 6pm) and continued through noon on Tuesday, though there was a lull for the afternoon and evening of Monday (Dec 2nd). Snow totals ranged between 7 and 18 inches across the service area with the Seacoast Region experiencing a wet snow mixing however winds remained under 30 mph for the entirety of the event.


Figure 1 - Snowfall Map (courtesy of WMUR)

### 1.2. 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 | 26 | **5** | 1,555 | 984 | 2% |
| Capital | 0 | **0** | 0 | 0 | 0% |

### 1.3. Preparations

Unitil began communicating internally on Friday (Nov 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 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

As noted in Section 1.2 our Capital region did not experience any outages while the Seacoast Region experienced 26 outages during this event. Unitil had internal crews (10), on system contractors (10) and tree crews (16) and secured an additional (15) contractor line crews to respond to any interruptions. Seacoast began experiencing outages early on Dec 2nd and ultimately restored most impacted customers within 12 hours however smaller, isolated outages continued throughout the day on the 2nd and were promptly responded to.

1.5. Exclusionary Criteria

This event qualified for recovery of preparation costs due to the EEI of 3 for snow with a high confidence level (EEI 4 of medium confidence) for both Seacoast and Capital Regions (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 1.6.

**Energy Event Index for UNITIL** Your forecast administrator: ulbanj@unitil.com
Valid Time: December 1, 2019 6:00 AM EST Forecaster: jimmy.cayer

| 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 | 4 | 4 | 4 |
| | Fitchburg | 4 | 4 | 4 |
| | Portland | 2 | 2 | 2 |
| | Seacoast | 3 | 3 | 3 |
| 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 | Medium | Medium | Medium |
| | Seacoast | High | High | High |

**Energy Event Index Definition**
No Leaves (Nov 17 - Mar 31)

| 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: December 1, 2019
Time: 6:00 AM EST
Forecaster: J Cayer

| Zones (Forecast for next 30 hrs.) | SEACOAST | CAPITAL | FITCHBURG | PORTLAND |
|---|---|---|---|---|
| Event | SNOW | SNOW | SNOW | SNOW |
| Event Begin Time | 5PM SUN | 4PM SUN | 3PM SUN | 10PM SUN |
| Event End Time | 4PM TUE | 2PM TUE | 2PM TUE | 7PM TUE |
| Event Confidence | HIGH | HIGH | HIGH | MEDIUM |
| Thunderstorm Wind Gusts | | | | |
| Lightning Intensity | | | | |
| Storm Direction | | | | |
| Rain Amount | | | | |
| Snow Amount | 7-14" | 9-16" | 8-15" | 6-12" |
| Snow Character | Wet | Normal/Wet | Normal/Wet | Wet |
| Ice Amount | | | | |
| Max Sustained Winds | | | | |
| Wind Gust | | | | |
| Temp. Extremes | 35/22 | 35/18 | 34/22 | 33/20 |

UNITIL SERVICE AREA 48 HOUR OUTLOOK:

CAPITAL: Dry and hazard-free through Sunday morning. A storm system will develop across the area Sunday afternoon and last through early Tuesday afternoon, with likely chances for a long duration heavy snow event. See table above for details. Winds will be breezy Sunday night into Monday as well, with gusts of 20-30 mph possible.

Confidence: Confidence is high that no hazards will occur through Sunday morning. Confidence is high that hazard level snow will occur Sunday afternoon into Tuesday. EEI-2/3/4 snow chance: 100%/90%/50%.

SEACOAST: Dry and hazard-free through early Sunday early afternoon. A storm system will develop across the area late Sunday afternoon and last through Tuesday afternoon, with likely chances for a long duration snow event. See table above for details. Winds will be breezy Sunday night into Monday as well, with gusts of 20-30 mph possible.

Confidence: Confidence is high that no hazards will occur through early Sunday early afternoon. Confidence is medium in the evolution of the storm system Sunday into Monday. While snow is expected to be the dominant precipitation type, some sleet could mix in at times, cutting into overall storm totals. Confidence is high that hazard level snow will occur. EEI-2/3/4 snow chance: 100%/80%/30%.

1.6. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was $398,268 with a breakdown of charges in the following table:

| | |
|---|---|
| Payroll | $39,184 |
| Transportation | $7,649 |
| Contractor Invoices & Other | $351,435 |
| Less Amount Capitalized | $0 |
| Total To Storm Reserve | $398,268 |

.

## 2. August 4th, 2020 (TS Isaias)

### 2.1. Description of the Storm


Figure 2 - Isaias Projected Path

Beginning around July 30th, Unitil's weather service provider and other major weather outlets began reporting the expected track of Hurricane Isaias which was projected to impact nearly the entire eastern seaboard from Florida to the Mid-Atlantic before impacting the northeast as a weakened Topical Storm. In the days leading to its arrival, weather models continued to project a significant impact to much of the northeast with tropical force winds, heavy amounts of rains and possible tornadic activity. Just Weather service provider expected periods of heavy rain, and hazardous wind speeds with gusts up to 60 mph across much of the northeast. Unitil's service territory began to experience the impacts of TS Isaias the evening of August 4th with periods of high winds, heavy rain and gusts up to 50 mph reported across different portions of the NH service area.

### 2.2. 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 | 50 | **37** | 7,118 | 5,185 | 10.9% |
| Capital | 40 | **25** | 6,317 | 3,533 | 11.5% |

### 2.3. Preparations

Unitil began communicating internally on Thursday, July 30th 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

Unitil experienced a moderate impact to customers as detailed in Section 2.2. Interruptions began at approximately 5 PM on Tuesday, August 4th with nearly all affected customers restored by 9 AM the following morning (August 5th). Unitil had its normal contingent of internal line crews (10) on system line contractors (16), and tree crews (12).

2.5. Exclusionary Criteria

Although this event was forecasted several days in advance with a significant impact expected to the northeast, this event did not meet the EEI threshold for recovery of preparation costs, however the actual experience of the event met the concurrent trouble requirement in both the Seacoast and Capital Regions; therefore restoration costs qualify for recovery. Restoration costs recovered through the MSCR are summarized in Section 2.6.

2.6. Qualifying Costs Charged to the Storm Reserve

The total amount charged to the storm reserve for this event was $735,030~~467~~ with a breakdown of charges in the following table:

| | |
|---|---|
| Payroll | $43,696 |
| Materials & Supplies | $5,209 |
| Transportation | $6,870 |
| Contractor Invoices & Other | $569,935~~372~~ |
| Less Amount Capitalized | ($39,680) |
| Total To Storm Reserve | $735,030~~467~~ |

## 3. December 5th, 2020 (Nor'easter)

**Note**: This event was not listed on the Reconciliation (pg.3) as final costs were not available at the time of this report. Final costs for this event will be included in the 2021 MSCR Report.

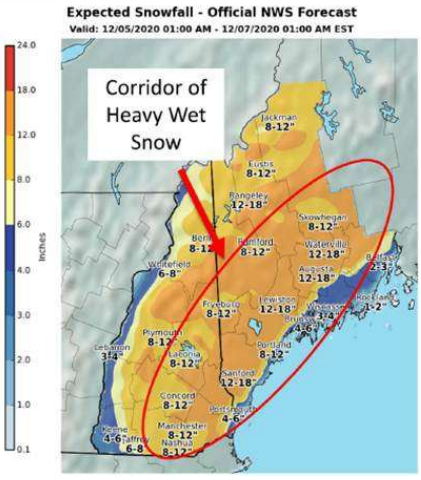

Figure 3 - Expected Snowfall Dec 5th

### 3.1. 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.

### 3.2. 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% |

### 3.3. 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.

### 3.4. Restoration

Scattered outages occurred (listed in Section 3.2) 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.

3.5. 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 3.6.

WeatherSentry
powered by DTN

**Energy Event Index for UNITIL**
Valid Time: December 5, 2020 6:00 AM EST

Your forecast administrator: ulbanj@unitil.com
Forecaster: michael.phillips

| 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 | 2 | 1 | 1 |
| | Fitchburg | 2 | 1 | 1 |
| | Portland | 2 | 1 | 1 |
| | Seacoast | 2 | 1 | 1 |
| Snow | Capital | 3 | 1 | 1 |
| | Fitchburg | 3 | 1 | 1 |
| | Portland | 2 | 1 | 1 |
| | Seacoast | 2 | 1 | 1 |
| Ice | Capital | 1 | 1 | 1 |
| | Fitchburg | 1 | 1 | 1 |
| | Portland | 1 | 1 | 1 |
| | Seacoast | 1 | 1 | 1 |
| Confidence Level | Capital | Medium | High | High |
| | Fitchburg | Medium | High | High |
| | Portland | Medium | High | High |
| | Seacoast | Medium | High | High |

**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 DTN
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%.

### 3.6. Qualifying Costs Charged to the Storm Reserve

The amount charged to the storm reserve for this event to date is $184,000. Final costs for this event were not available at the time of this report and will be included in the 2021 MSCR Report.

## 4. December 25th, 2020 (Nor'easter)

**Note**: This event was not listed on the Reconciliation (pg.3) as final costs were not available at the time of this report. Final costs for this event will be included in the 2021 MSCR Report.

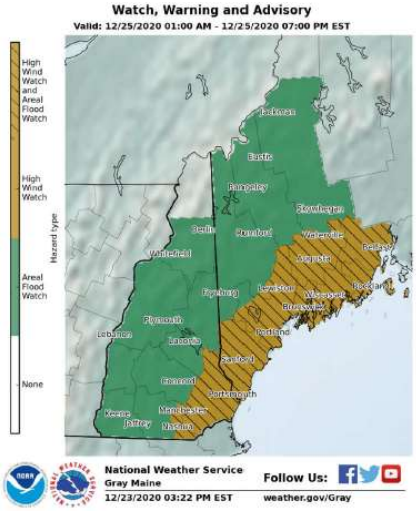


Figure 4 - NWS Advisory (12/25/20)

### 4.1. 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.

### 4.2. 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% |

### 4.3. 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.

### 4.4. Restoration

As noted in Section 4.2 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.

4.5. 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.

4.6. Qualifying Costs Charged to the Storm Reserve

The amount charged to the storm reserve for this event to date is $85,000. Final costs for this event were not available at the time of this report and will be included in the 2021 MSCR Report.

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 | ≥ 30 ≤ 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