

BEFORE THE STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

In the matter of:

Public Service Company of New Hampshire d/b/a Eversource Energy
Docket No. DE 24-070
Distribution Service Rate Case

Direct Prefiled Testimony

Of
Charles J. Underhill, PE
Director of Rates and Markets Policy
Office of the Consumer Advocate

Dated: January 23, 2025

1 **Q. Please state your name, position, and business address.**

2 A. My name is Charles J. Underhill, PE. I am presently the Director of Rates and
3 Markets Policy for the Office of the Consumer Advocate. My office is located at 21
4 South Fruit Street, Concord, New Hampshire 03301.

5 **Q. Please provide some information with respect to your professional
6 background and qualifications.**

7 A. I hold a Bachelor of Science degree in Civil Engineering from the University of
8 Vermont and a master's degree in business administration from the University of
9 Vermont. I was a registered Professional Engineer in Vermont in Civil Engineering.
10 I worked for 43 years in the electric utility industry; 29 years in Vermont and 14 years
11 in Massachusetts. I worked for Green Mountain Power, an investor-owned utility;
12 the Vermont Public Power Supply Authority (VPPSA), a joint action agency;
13 Danvers Electric, a Massachusetts municipal light plant; Reading Municipal Light
14 Department, a Massachusetts municipal light plant; Northpoint Consulting; and
15 Rates by Design (my own consulting enterprise). I have been involved in various
16 industry activities, including financing, forecasting, cost of service, cost allocation,
17 rate design, efficiency programs, electrification, integrated resource planning, power
18 supply planning, wholesale market operations, both pre and post establishment of
19 ISO-New England, and teaching classes in business, rate design, and project
20 management for the Electric Council of the Northeast and the Northeast Public
21 Power Association (NEPPA). I served on several American Public Power
22 Association (APPA) sub-committees and presented at several APPA annual meetings
23 for those sub-committees. I participated in well over 100 dockets and provided
24 expert testimony before the Vermont Public Service Board (since renamed the

1 Vermont Public Utility Commission) and the Federal Energy Regulatory
2 Commission (FERC). I have experience in cost of service, cost allocation, rate
3 design, financing, accounting, strategic planning, forecasting, project management,
4 power supply portfolio management, distributed generation, efficiency,
5 electrification, hydroelectric facility relicensing, integrated resource planning,
6 enterprise risk management, meter data management, and advanced metering
7 infrastructure. During my tenure as CFO, VPPSA received an A3 financial rating
8 from Moody's.

9 **Q. What is the purpose of your testimony in this Docket?**

10 A. I have reviewed and will be commenting on aspects of reliability with respect to
11 operation of the Public Service Company of New Hampshire d/b/a Eversource
12 Energy (PSNH) distribution system as presented by PSNH in this docket.

13 **Q. Please elaborate on PSNH reliability activities as a component of the rate**
14 **case.**

15 A. Reliability activities present themselves as several different components of the overall
16 cost of service for a distribution utility such as PSNH. Reliability metrics are most
17 often reported as System Average Interruption Frequency Index (SAIFI), System
18 Average Interruption Duration Index (SAIDI), Customer Average Interruption
19 Duration Index (CAIDI), and Momentary Average Interruption Frequency Index
20 (MAIFI). MAIFI measures service interruptions of less than five minutes duration
21 while SAIFI, SAIDI, and CAIDI metrics measure interruptions of more than five
22 minutes and are reported as both with and without major storms. As a result, the
23 distinction with respect to major storms plays an important role in evaluating the
24 response of PSNH as it addresses system reliability, which is in turn reflected in the
25 cost of service. Rule Puc 307.09 defines the individual indices and establishes the

1 quarterly reporting requirements for reliability. While the indices are defined in Puc
2 rules, there are no specific standards or threshold values against which they are
3 measured. The Energy Information Administration (EIA) publishes a summary
4 report of power interruptions across the United States. The latest report, published
5 in January 2024 for the period 2013-2022, shows New Hampshire above the U.S.
6 average and fifth in the nation in 2022 for duration of interruptions (SAIDI) behind
7 Florida, West Virginia, Maine, and Vermont.

8 **Q. How do retail customers perceive reliability?**

9 A. By any metric one chooses to apply, reliability is a significant issue to PSNH
10 customers. Over the past several years, the value of reliability to consumers has
11 changed, in no small part due to the social changes engendered by COVID-19. A
12 customer survey on reliability was ordered in DE 19-057; this survey was completed
13 by PSNH in 2021 and filed with the Puc in DE 20-161. The survey addressed the
14 issue of how consumers value reliability and customers working from home
15 indicated an increased dependence on reliable electric service; on the other end of
16 the spectrum, retired residents indicated less dependence on continuity of service.
17 The survey results indicated that consumers would be willing to see a minor increase
18 in electric rates to maintain or improve reliability, especially if it reduced the length
19 of Major Storm level outages.

20 **Q. Is PSNH recovering the ongoing cost of reliability from ratepayers?**

21 A. No, PSNH has a significant balance in its storm cost reserve account 186430. As of
22 3/31/2024, the balance was \$334,857,807 (per the Audit Staff in the Division of
23 Enforcement at the Department of Energy in its report on Major Storms August
24 2022 through August 2023, which was provided as Attachment MPT-RDW-JJD-05
25 to the testimony of Toscano, Willoughby, and DeVirgilio (Bates page 000044)).

1 There are several problems with where this stand at present. The first is whether
2 PSNH has the appropriate mix of reliability programs, both proactive and reactive, in
3 place to address reliability issues most cost-effectively and the second is whether
4 retail rates are sufficient to recover the cost of service for any mix of reliability
5 measures implemented by PSNH.

6 **Q. Are there different components that contribute to a utility's approach to**
7 **addressing reliability?**

8 A. Yes, a utility's approach to addressing reliability can be considered as comprised of
9 four components: hardening the system, vegetation management, storm response,
10 and pre-staging. Hardening the system usually refers to capital investment, whether
11 addressing resiliency using more durable construction materials for the field
12 conditions (underground service, pole alternatives, Hendrix cable) or developing
13 monitoring and automated response systems (SCADA, automatic reclosers).
14 Vegetation management is an aspect of reliability that removes components of the
15 environment which contribute to service interruptions; this includes undergrowth,
16 hazard trees, and customer-owned trees with special handling needs. Vegetation
17 management could be considered as an aspect of hardening the system, but it is an
18 activity on the operating side of the ledger, rather than the capital investment side
19 and therefore uses a different set of evaluative criteria for cost-effectiveness and
20 value. Storm response is divided into categories of major and non-major. Pre-staging
21 is a special category that applies only to major storm activity as a mitigation activity
22 against significant storm damage. Note that Puc 307.09(c) requires the reporting of
23 service interruptions as both with and without major storms.

24 **Q. How does New Hampshire address reliability in its regulatory environment?**

1 A. Each component of reliability has a separate process to implement the programs
2 PSNH has established to address compliance with the regulatory programs
3 established to manage reliability. Hardening the system as a component of reliability
4 falls primarily under the umbrella of capital investment and is subject to the
5 regulatory considerations that all capital investment activity is subject to, including
6 capital allocation prioritization decisions made by Eversource, the parent company
7 among its multiple divisions. In the Settlement Agreement filed on 10/09/2020 in
8 DE 19-057, Section 11 provided for an assessment of future distribution
9 infrastructure needs. Specifically, Section 11.2 provided that “as part of the condition
10 assessment, the engineering firm shall review the cost effectiveness of using: (1) steel
11 poles in right-of-way (ROW); (2) Class 2 poles as a standard pole; (3) composite
12 cross arms; (4) relocated ROW facilities; (5) spacer cable and tree wire; and (6)
13 reconductoring of under-sized wire. The assessment shall also include ETT and
14 Hazard Tree Removal activities”. The study was completed and filed in DE 20-161.
15 Puc 307.10 lays out minimum standards for vegetation management. Section
16 307.10(b) requires that “utilities shall implement measures such as mid-cycle reviews
17 to identify and mitigate elevated risk from tree exposure on circuits or sections of
18 circuits that are significantly and/or continually experiencing tree-related
19 interruptions, where it is practical to do so.” While the rules call for the
20 implementation of mitigation measures, there are no standards or triggers established
21 for doing so in the rules. This section of the rules has been in place since 2014. The
22 most recent previous rate case for PSNH, Docket DE 19-057, established a bit more
23 rigor with respect to vegetation management, setting the annual budget for
24 vegetation management allowed in base rates at \$27.1 million plus up to 10 percent
25 over, recoverable in the Regulatory Reconciliation Adjustment Mechanism (RRAM).

1 The annual filing of the Regulatory Reconciliation Adjustment (RRA) allows PSNH
2 to adjust this amount as prudence and reasonableness dictate. The budgeted amount
3 in PSNH's vegetation management plan for 2025 is \$43.8 million, an increase of over
4 61.6 percent in five years. Section 6.3 of the Settlement Agreement in DE 19-057
5 required PSNH to undertake a review of enhanced tree trimming (ETT) and hazard
6 tree removal, reporting back recommendations for targeted application of these
7 programs. The assessment requirement was repeated in Section 11.2, as noted above.
8 While hardening and vegetation management are proactive approaches to reliability,
9 storm recovery is reactive. Storm recovery is divided into two categories and is
10 reported as such, once with low impact storms and once with low impact and major
11 storms combined. A major storm is defined for PSNH as either 200 troubles and at
12 least 10 percent of the customers with service interruptions or 300 troubles. A
13 trouble is defined as lasting at least five minutes. Major storm is an important
14 distinction because New Hampshire responds differently to events designated as
15 such. Major storms are processed differently and receive different regulatory
16 treatment than lower impact storm events. In addition, the Puc has defined a pre-
17 staging category for major storm response with specific metrics to identify qualifying
18 major storm events.

19 **Q. How is hardening the system progressing at present for PSNH?**

20 A. PSNH acquired the joint pole interest of Consolidated Communications in the
21 PSNH service territory and is working to improve the resilience of a significant
22 number of those poles to storm damage. The Puc ruled on the acquisition in DE 21-
23 020, which was closed in September 2023. The transfer agreement reflected a
24 reduction in the gross price of \$9 million due to poles failing inspection. This is
25 roughly 25 percent of the total poles in the transfer to PSNH. Unfortunately, a

1 number of these unreliable poles are likely being replaced during storm recovery
2 periods in ones and twos, rather than by whole sections under blue sky conditions.
3 This is a less than efficient approach to hardening the system. A more economical
4 approach would be to perform a comprehensive pole replacement for poles
5 identified as unreliable. PSNH is constrained from pursuing the more economical
6 approach, due to other capital priorities for Eversource and the recent capital
7 constraints placed upon Eversource, the parent.

8 **Q. What capitalization constraints is Eversource facing?**

9 A. Eversource, the parent, was placed on credit watch last year by Standard and Poor's
10 and recently downgraded because of an anticipated low funds from operations
11 (FFO) to debt ratio for the foreseeable future. While still investment grade, it was a
12 warning to improve the debt to FFO ratio. Responding to this action by Standard
13 and Poor's and Fitch will put pressure on Eversource's investment capital and may
14 limit or reduce capital budgets over the near term. Hardening the system cost-
15 effectively will be impacted and this has the potential to degrade reliability indices by
16 increasing outages and the time to restore service. Against the ratio issue, Eversource
17 has announced a scaling back of investment in Eversource subsidiary Connecticut
18 Light & Power of \$500 million due to regulatory uncertainty in Connecticut; it is not
19 clear how the combination of capital investment management activities will impact
20 the PSNH Grid Transformation Enablement Program, established by PSNH in DE
21 19-057 to accelerate investments in system resilience.

22 **Q. Can you establish an approximation of the impact of reliability on the cost of**
23 **service in this docket?**

1 A. In this rate case filing, PSNH has requested a distribution revenue requirement
2 totaling \$618,188,728¹. While the capital impacts are difficult to assess without
3 knowing how every PSNH capital project will impact reliability, operating impacts
4 are more readily identifiable. The 2025 planned vegetation management budget is
5 \$43.8 million and the 2024 budget was \$39.8 million. Major storm interruption
6 recovery costs were \$231.7 million in 2023 and the 7-year average for major storm
7 interruption recovery costs was \$56.5 million. The cost of less impactful storms (net
8 of the three record storms) in 2023 was \$32.5 million. Taking the least impactful set
9 of reliability numbers, the annual impact of reliability is \$71.8 million or 11.61
10 percent of the requested cost of service in this case. Taking into account the three
11 record-setting storms reported in DE 24-041, the impact of reliability on the
12 requested revenue requirement is \$100.3 million or 16.22 percent.

13 **Q. Is the storm recovery expense in 2023 abnormal?**

14 A. Yes...and no. From a historical perspective, 2023 was a record year for storm
15 recovery expenses, including the highest single event and three of the highest
16 recorded events in PSNH history. PSNH disclosed in a technical session in DE 24-
17 041 that 2024 experienced storm recovery expenses on the same order of magnitude
18 as were experienced in 2023. Two years do not make a trend, but the impacts of
19 climate change are being experienced, reported, and recorded here in New
20 Hampshire as well as elsewhere throughout the US. The financial impacts of storm
21 recovery will be significantly impactful on ratepayers for the next several years and it
22 is important to remember that hardening the system is a long-term investment and
23 that if storm activity is going to continue to be more impactful over the next 25-40

¹ Attachment ES-REVREQ-1 5 Schedule ES-REVREQ-3 6 June 11, 2024, Page 1 of 1,
Column D, Line 22.

1 years, then hardening measures should be evaluated to see if the investment in
2 hardening measures should be more proactive.

3 **Q. Please summarize the regulatory history of pre-staging and what you**
4 **considered in your review of PSNH's pre-staging activity.**

5 A. Pre-staging was introduced by PSNH in DE 12-320 when PSNH requested to
6 incorporate pre-staging into its Major Storm Cost Reserve (MSCR) and approved by
7 the PUC in its Order 25,465 dated February 26, 2013. Once approved by the PUC,
8 PSNH has filed pre-staging results as part of PSNH's MSCR filing every year for the
9 past 14 years. I evaluated the results of those filings for Dockets DE 19-050, DE 19-
10 105, DE 20-062, DE 21-089, DE 22-031, DE 23-051, and DE 24-041.

11 **Q. Has pre-staging been a successful component of PSNH's reliability activities?**

12 A. It has been partially successful. Over the seven years I considered in my review, pre-
13 staging has incurred significant expense for ratepayers without a demonstrable
14 benefit. Over the past seven years, pre-staging has proven to be accurate for
15 qualifying major storms 54 percent of the time, which is akin to a toss of the coin in
16 predicting qualifying major storms. The 46 percent of the time when the forecasts
17 failed to accurately predict qualifying major storms incurred an average of \$4.55
18 million per year. This amounts to 0.74 percent of the requested revenue requirement
19 in this docket. During that same period, pre-staging has been a self-contained part of
20 the reliability efforts of PSNH. The only test applied to qualifying pre-staging costs
21 for MSCR recovery has been the forecasted magnitude of the storm. Over the past
22 few years, most of the predicted storms were category level 3 storms that failed to
23 impact PSNH with the degree of severity that qualified them to be major storms. It
24 is also worth considering whether investments in capital improvements intended to
25 harden the distribution system have had or will have their intended effect on

1 reliability by reducing the number of trouble events caused by storms, especially at
2 lower storm intensity levels. For the cases where I had data, the average number of
3 troubles averaged 74 per year. I would note that PSNH and the Department of
4 Energy are currently engaged in a discussion of the definition of “troubles” in DE
5 24-041 that could impact the number of qualifying pre-staging events; it is quite
6 possible that fewer pre-staging events would qualify for MSCR cost recovery.
7 Predicted category level 4 and category level 5 storms did, in fact, impact PSNH
8 sufficiently to meet the threshold requirements for major storms. The 46 percent rate
9 of non-qualifying storms increases if only the storms projected to be category 3 are
10 considered. If the qualifying category level for pre-staging cost inclusion in MSCR
11 were raised to category 4, there would be a savings to ratepayers of an average of
12 \$4.55 million per year with very limited impact on reliability statistics.

13 **Q. You mentioned the potential for hardening to mitigate storm-related outages.**
14 **Has there been any comparative analysis of the cost-effectiveness of on-going**
15 **proactive versus reactive reliability efforts?**

16 A. Until recently, each aspect of reliability was a self-contained component of the
17 overall package of reliability measures and was evaluated in various dockets in a
18 manner that kept them from being compared for cost-effectiveness. In this docket,
19 PSNH has filed a case that proposes to bring them all under the cost-of-service
20 umbrella by requesting they be rolled into base rates and included a request for
21 performance based ratemaking (PBR), which encourages optimizing the investment
22 in and performance of each aspect of reliability against the other aspects.

23 **Q. On what basis is it reasonable to compare cost and performance of reliability**
24 **components in order to maximize reliability and achieve consumer value at**
25 **the lowest cost to ratepayers?**

1 A. RSA 378:37 states, in part “that it shall be the energy policy of this state to
2 meet the energy needs of the citizens and businesses of the state at the
3 lowest reasonable cost while providing for the reliability and diversity of
4 energy sources”. Both the statutory and regulatory governance of
5 distribution utilities confers the obligation of optimization on distribution
6 utilities including the optimization of proactive and reactive components of
7 reliability.

8 **Q. On what basis are you recommending increased expenditures for vegetation
9 management?**

10 A. The Department of Energy Audit Staff’s review of MSCR annual filings by PSNH
11 stated for every major storm that “a random selection of additional trouble events
12 was tested, including information regarding the onsite date, the cause and location,
13 and the restoration date of the troubles. The cause of the reported troubles for
14 sampled outages was predominantly tree related, due to tree and/or limb interference
15 with the power supply.”

16 **Q. What is your overall reaction to the PSNH filing in this docket?**

17 A. PSNH has proposed eliminating certain components of rate adjustment mechanisms
18 and instead, integrating the relevant costs back into base rates and launching PBR
19 This affords the opportunity to consider the interaction among the components of
20 reliability when before, they were in separate proceedings and evaluated on a stand-
21 alone basis. PSNH filed a rate increase request predicated on Performance Based
22 Regulation (PBR). This has the potential to be an effective tool in navigating the
23 dynamic nature of the electric utility industry. Getting this right the first time is
24 critical, not only for PSNH, but for the entire regulatory process in NH, should this

1 model receive regulatory approval for implementation. It will require a thorough
2 analysis of how PSNH is responding to dynamic change in its operating
3 environment; what specific performance metrics should be adopted, where the bar
4 should be set for those metrics, and establishing appropriate monitoring and
5 adjustment mechanisms to be visited during the pendency of this model.

6 **Q. What do you consider as important background factors in this case?**

7 A. One of the important issues is New Hampshire utility regulation and oversight is
8 what is often referred to as the “stay out” provision of rate case decisions. Rate cases
9 are expensive propositions, and New Hampshire has been seeking a successful
10 approach to extending the time between rate case filings for all regulated utilities.
11 The objective is to allow the utilities the opportunity to earn their allowed rate of
12 return while protecting the utilities and the ratepayers from dynamic changes in the
13 regulated utility operating environments due to policy, restructuring, technology
14 changes, social changes, and other underlying economic factors. This has been
15 implemented through rate adjustment mechanisms, revenue decoupling, and step
16 adjustment rates with varying degrees of success.

17 **Q. How will reliability and performance-based ratemaking interact?**

18 A. Reliability is a significant cost of service item for PSNH and is extremely volatile,
19 depending on storm activity over any given period. Hardening the system should
20 reduce some of the volatility by increasing resiliency of the system to storm damage,
21 thereby causing fewer troubles and, in turn, fewer dispatches. Because it will take
22 time to make the capital investment necessary to harden the system and increase
23 resiliency to storm damage, clearing the primary cause of storm damage – fallen trees
24 and branches – becomes more critical over the near term and the balance between
25 vegetation management and achieving system hardening needs to be carefully

1 planned, implemented, and monitored. With the right performance metrics, PBR has
2 the potential to achieve that balance and allow PSNH to operate effectively between
3 rate cases.

4 **Q. Is PBR the sole requirement to effectively manage reliability for PSNH?**

5 A. No, PSNH has been experiencing significant costs under its MSCR program that will
6 not be appropriately managed by PBR. These storm costs exceed the capacity of the
7 MSCR program to appropriately address their impacts on retail customers and the
8 risks of incurring significant costs over the near term will not be mitigated by PBR.
9 To that end, an exit strategy and separate regulatory review for any costs incurred in
10 excess of the design limits of PBR reliability metrics will need to be established.

11 **Q. What are your recommendations with respect to the cost of service in this**
12 **docket?**

13 A. Based on my review of reliability activity for PSNH, I recommend the following:

- 14 • Change the threshold level in pre-staging from a category three storm event
15 to a category four storm event. This will dramatically improve the economics
16 of pre-staging with minimal impact on the reliability metrics.
- 17 • Eliminate category three from pre-staging qualification and move the \$4.5
18 million anticipated savings from pre-staging to vegetation management.
- 19 • Use a portion of the \$500 million freed up in Eversource CLP service
20 territory to accelerate pole replacement and system hardening on the PSNH
21 distribution system.
- 22 • Add \$5.5 million (10 percent of average annual storm recovery costs) to
23 vegetation management where it will be used to begin to address the root
24 cause of storm outages as identified by Department of Energy's Audit Staff

1 during their audit of major storms filed by PSNH in DE 24-041. The primary
2 application of these funds should be ETT and Hazard Tree removal.

- 3 • Evaluate storm interruption reports to determine cost-effectiveness of
4 further increasing vegetation management budget proactively to reduce
5 reactive costs of storm interruption recovery.
- 6 • Repeat the operational and capital investment reliability study as agreed to in
7 DE 19-057 Settlement Agreement section 11.2 and filed in De 20-161.
- 8 • Repeat the customer value survey as agreed to in DE 19-057 Settlement
9 Agreement section 11.4 and filed in De 20-161.

10 **Q. Will your proposals stabilize and resolve reliability issues for PSNH?**

11 A. No. What I propose are simply first steps. PSNH needs to move to a more proactive
12 approach to reliability and that involves an assessment of where things stand at
13 present and what impacts climate change will bring to bear on New Hampshire. We
14 know that the PSNH distribution system is not sufficiently hardened to withstand
15 the more intense storms in recent experience; PSNH reported large numbers of
16 broken poles in DE 24-041 that were replaced and capitalized along with vegetation
17 impacts during major storms in the form of downed trees and broken limbs as the
18 primary cause of service interruptions. PSNH has yet to formally report storm cost
19 recovery for 2024, but PSNH's experience in the most recent two years resulted in in
20 more than \$200 million of storm-related recovery costs each year. We know that
21 even taking out the three record-breaking storms documented in DE 24-041 still
22 leaves the cost of major storms reported in DE 24-041 well in excess of the funding
23 established in the MSCR.

24 **Q. How does a more proactive approach compare to the reactive approach to**
25 **reliability?**

1 A. A proactive approach has the risk of uncertainty to deal with and the reactive has the
2 higher costs of implementation due to higher labor costs and the inefficiency of
3 unscheduled and unplanned restoration activities. While we cannot predict with any
4 degree of certainty the magnitude of storm activity and its direct impact on New
5 Hampshire, we can stabilize the cost impact through more aggressive proactive
6 behavior, including ramping up the physical hardening of the distribution system
7 through capital investment and enhanced, targeted vegetation management. As noted
8 previously in my testimony, New Hampshire is above the national averages for
9 SAIFI and SAIDI indices, due in no small part to the forested nature of its terrain.
10 Again, over 16 percent of PSNH's requested cost of service in this docket is directed
11 to reliability efforts as operating expense. Reliability needs to be a significant focus of
12 PBR efforts, with appropriate metrics developed for implementation and tracking.

13 **Q. Does this conclude your testimony?**

14 A. Yes, it does.