RE08 Affordability Evaluation of Reliability Related Capital Investment

Background

The RE08 Framework established in Docket No. 17-12-03RE08 creates an approach for evaluating reliability-related electric distribution capital investments. The goal is to balance reliability performance with cost-effectiveness, efficiency, and affordability. RE08 established a definition of affordability that is a rebuttable presumption for purposes of determining the threshold for "unaffordable rates" and ultimately containing costs ("Framework"). The Framework states that a program budget is unaffordable if it exceeds the Company's historic average annual reliability program budget, using a data set of the annual reliability program budgets from the 10 years preceding the chosen test year and factoring in reasonable escalation factors. Further, the rebuttable presumption also contemplates that reliability program budgets that are incremental to the average 10-year program budget (plus reasonable escalation factors) must come with some measurable improvement to the reliability metrics. As discussed below, pursuant to RE08, the capital plan set forth in this proceeding is below the Framework threshold and is therefore considered affordable.

Notwithstanding the Company's ability to meet this test, and appreciating the Authority's desire to center affordability, the Company nevertheless does not believe that the test is a sound definition for affordability. As written, the test accounts for "reasonable escalation factors" but determining those is a difficult exercise, accounting for multiple drivers, like inflation, infrastructure aging, exogenous grid stressors like weather events and electrification and standardized equipment sizes.

Introduction

The RE08 framework requires utilities to define the subset of their capital investment that is reliability-related ("Reliability Plan") to distinguish between baseline reliability programs (which maintain existing system performance) and incremental reliability programs (which are intended to improve reliability beyond historical levels). This distinction is important because it determines which approach must be used to determine if the investments are affordable per the RE08 test. Baseline programs are those programs necessary to sustain the system's current level of reliability, such as infrastructure replacement, and capacity expansion to avoid overload. Incremental programs are those that provide a marginal improvement in reliability performance, typically measured through improvements in reliability metrics such as SAIDI.

Table 1 below details CL&P's 2027 total proposed capital expenditures. Each component of capital investment was evaluated to determine whether it supports reliability under the RE08 definition.

Table 1. 2027 Total Capital Spending (Nominal)

Type of Investment	2027 Forecast of Capital Spending in $M	Excluded Programs[1]	2027 Reliability Plan Forecast
Basic Business	$264.2	$117.1	**$147.1**
Peak Load Capacity	50.0	0.0	**50.0**
Regulatory Commitments	5.5	0.5	**5.0**
Reliability	254.3.2	5.2	**249.1**
Facilities	23.0	23.0	**0.0**
Information Technology	18.0	18.0	**0.0**
New Customer Additions	75.0	0.0	**75.0**
Total Capital Spending	$690.0	$163.8	**$526.2**

Table 2 defines how capital spending supports system reliability ("Reliability Investment Driver") and then further defines the capital program as baseline or incremental based on its function and objective in the system. The detailed definition of each Reliability Investment Driver is provided in Capital Investment Panel Testimony.

Table 2. 2027 Reliability Plan Capital Spending (Nominal)

2027 Reliability Plan Budget ($M)	Baseline Reliability Plan	Incremental Reliability Plan	Total Reliability Plan
Infrastructure Replacement	284.9	17.7	302.6
Capacity	50.0	0.0	50.0
Distribution Transformer	39.5	0.0	39.5
New Customer Additions	75.0	0.0	75.0
Enhancements	9.5	5.0	14.5
Maintenance	44.7	0.0	44.7
Total	**503.5**	**$22.7**	**$526.2**

(*) See Appendix A for Reliability Plan for 2028-2031

Affordability Threshold Calculations & Test Results:

[1] Capital spending on vehicles, facilities, meters, lighting, line relocation, environmental, and other capital that is not planned for traditional reliability reasons has been excluded from the Reliability Framework. A more detailed discussion of the categories of excluded capital spending is provided in the Capital Investment Panel testimony.

The Framework recognizes that using a BCA is not necessarily the most appropriate test for different types of investments, particularly for baseline reliability programs. Many baseline investments, such as infrastructure replacement or capacity upgrades, are necessary to prevent degradation in system performance or to meet established operational standards. In these cases, deferring or forgoing the investment is not a viable option, as it would lead to increased outage risk or failure to meet reliability obligations. Accordingly, the Framework explicitly notes that traditional BCA is often not appropriate for such investments, and instead directs utilities to apply an inflationary test using the last ten years of spending. Specifically, the test requires the Company to show the Table 19 reliability programs do not exceed the prior 10-year average annual reliability plan budgets inflated to current year dollars using reasonable escalation factors.

Table 3 displays the unadjusted programmatic costs from 2016 – 2025, the Handy-Whitman (HW) inflation factor for each year, and the escalated programmatic costs for the total Reliability Plan. Based on the average of the escalated costs, the threshold is $607.2M.

Table 3. Budgeted Affordability Threshold Calculation

Year	Unadjusted Reliability Plan Capital Spending ($M)	Inflation Factor Handy Whitman (%)	Escalated Costs in 2025 ($M)	Affordability Threshold ($M)
2016	$322.9	87%	$603.8	$607.2
2017	$370.6	85%	$685.7	
2018	$372.6	77%	$659.6	
2019	$430.7	68%	$723.5	
2020	$394.3	63%	$642.8	
2021	$383.1	58%	$605.3	
2022	$454.9	44%	$655.1	
2023	$554.9	13%	$627.1	
2024	$429.1	3%	$442.0	
2025	$427.6	0%	$427.6	

While the Authority initially stated in RE08 that historical capital expenditures should be escalated by factoring in the GDP Deflator index published by the U.S. Bureau of Economic Analysis, the Authority later acknowledged that "the HW Index better reflects costs of utilities doing business, while the GDP Deflator reflects costs from the consumer's perspective." Application of the United Illuminating Company to Amend its Rate Schedule, Docket No. 24-10-04, at 43 (Conn. PURA October 28, 2025) ("UI 2025 Decision"). CL&P agrees with the Authority and UI that the HW

Index more accurately reflects how inflation impacts utilities within the Northeast. As stated by the Authority:

> The Handy-Whitman Index reflects escalation of utility costs over time and has an index specific to northeast utilities (rather than the entire country, as the GDP Deflator Index reflects). Id. Specifically, the GDP Deflator Index considers economy-wide measures such as personal consumption expenditures, private domestic investment, exports of goods and services, and government expenditures and consumption. Ex. UI-CIP-9, p. 36. By contrast, the HW Index considers utility construction costs by FERC plant account (e.g., transformers, meters, overhead conductors, station equipment). Id.

Thus, while the GDP Deflator has been appropriately used in other contexts, the northeast distribution plant HW Index more accurately reflects how inflation impacts Distribution Companies within the region, and therefore is the appropriate inflation factor for the affordability test.

Table 4 below lists CL&P budgeted dollar amounts across all of Table 19 programs for 2027-2031, first in nominal dollars of the corresponding year and then adjusted to 2025 dollars with a compounding annual 3% inflation rate assumption. The LRP is below the affordability threshold, with the average annual spending of the LRP being 93% of the affordability threshold.

Table 4. CL&P Table 19 Budgets 2027-2031

Year	Unadjusted Reliability Plan Budget ($M)	Compounding Inflation Factor (%)	Adjusted LRP Costs in 2025 ($M)
2027	$526.2	106.09%	$496.0
2028	$598.5	109.27%	$547.7
2029	$642.4	112.55%	$570.7
2030	$682.7	115.93%	$588.9
2031	$725.1	119.41%	$607.3

In what follows, the Company is showcasing that, over and above the affordability test, the investment levels it proposes in its LRP are effective and efficient, in that they, respectively, reduce SAIDI and that they have a greater than 1 benefit-to-cost ratio. For programs where a benefit cost analysis cannot be performed, like asset-health based infrastructure replacements, CL&P provides a comparison of its historical data to industry averages based on literature reviews.

Reliability Programs appropriate for BCA

A central challenge in evaluating electric distribution investments under the Reliability Framework and developing a BCA is that the value of reliability is inherently difficult to quantify. Reliability is not a traded commodity with a transparent market price. Instead, its value must be inferred from impacts associated with power interruptions. These impacts vary significantly across customer classes, geographies, outage durations, and system conditions. As a result, it is necessary to use analytical tools and empirical research to estimate the economic value of reliability improvements where possible.

Among the most widely accepted approaches in the industry are those developed by the Lawrence Berkeley National Laboratory ("LBNL"), including the Interruption Cost Estimate ("ICE") Calculator. The ICE Calculator is a publicly available tool used by utilities, regulators, and planning organizations to estimate the costs incurred by customers due to power interruptions. The tool can be used to determine the value associated with improvements in reliability performance and is based on decades of survey data collected from residential, commercial, and industrial customers.

The ICE Calculator works by looking at pre- and post-investment improvements in standard performance metrics such as SAIDI, CAIDI, and SAIFI. The types of investments that the Company may make that would typically be associated with increased reliability metrics above the baseline include:

- **Grid modernization and automation programs**, including distribution automation on lines, smart switches, recloser control systems, line sensors, and substation interface automation, which enable faster fault detection, automated isolation, and more rapid service restoration.
- **Inspection and maintenance programs**, including targeted surveys and asset condition monitoring, which support proactive identification of risks and reduce failure rates.
- **Underground Network Automation,** which address known infrastructure vulnerabilities and reduce the likelihood of failure-driven outages.
- **Targeted reliability technologies**, such as TripSaver or recloser-based programs, which reduce sustained outages by allowing temporary faults to clear without requiring manual intervention.
- **System Resiliency**, which focuses on targeted zone hardening to reduce the risk of outages and improve system performance under major weather events.

The Company has developed an internal tool that associates level of reliability spending to reliability benefits by optimizing the grid locations and the mitigations for each. This tool is based on approximately 10 years of historical data; the Company analyzed samples of reliability

investments over this horizon and determined the expected SAIDI and SAIFI reduction factors from various types of reliability investment. The tool utilizes these historical data-based improvement factors to find the optimal locations to perform reliability mitigations to maximize the reliability benefit for each dollar spent in reliability programs. The tool encompasses the following programs: TripSavers, Reclosers, sectionalizing with Smart Switches and reconductoring. The tool expects an input of the total baseline and incremental spend for these programs and produces a list of optimal locations and associated mitigations to maximize the reduction of SAIDI minutes with the input budget. In terms of Table 19, this includes baseline and incremental spending across infrastructure replacement and enhancement categories.

For example, the Company's LRP proposes a $90.5M of spending in 2030 on these programs (that include both baseline and incremental spending). Based on the internal reliability optimization tool, this level of investment in these programs results in a reduction of 8.47 minutes of SAIDI and 0.06 SAIFI.

This level of reliability improvement was ran through the ICE calculator to determine the value of lost load (VOLL). Using rationed commercial customer numbers to 50% of the actual population to get a more conservative result, the VOLL is $288.9M. Said otherwise, the reliability investments optimized by the Company's reliability optimization tool have a 3.2 benefit cost ratio (BCR), which means that the ratepayer benefits are 220% higher than the capital investment required to achieve them.

While the industry has not reached consensus on the appropriateness of using the ICE calculator for resilience investments, the Company ran the total numbers of reliability and resilience spend through the ICE calculator for completeness. The BCR is 2.44 meaning that the benefits to ratepayers are 144% higher than the capital investment required to achieve them. This is an even more conservative estimate because it accounts for the entirety of the capital investment for reliability and resilience but only takes into account the VOLL for blue sky SAIDI and SAIFI improvement (rather than the corresponding all-in values that would result in an exponentially higher VOLL).

In addition to the benefits that can be quantified by the ICE tool, there are additional known (but hard to quantify) benefits that accrue to ratepayers from reliability improvements such as general reductions in O&M expenditures. There is a customer value gained from investments that enable technologies and programs that reduce the need for truck rolls. Distribution automation technologies, advanced reclosers, and sensor-based monitoring systems enable utilities to detect, isolate, and in some cases resolve faults remotely. This in turn can reduce the need for dispatching field crews, which results in operational savings. Other reliability and resilience investments like reconductoring could result in less interruptions, since reinforced wires with different construction are on average less susceptible to tree interruptions.

In summary, this BCR estimate is highly conservative because (i) there are additional benefits to lowering O&M costs for emergent failures during storms or blue-sky days and (ii) the Company is rationing the ICE calculator results by reducing the VOLL of small commercial customers by 50%, since this is the largest VOLL per unit in the ICE calculator.

Industry Benchmarking for Reliability Programs Not Amenable for BCA

Table 19 includes some reliability programs, that, because of their nature and how they are triggered, cannot be subject to benefit-cost analysis. In lieu of a cost-benefit analysis, Eversource analyzed historical data and compared it to industry estimates. This exercise is focused on bulk station transformers as a proxy of asset-health based infrastructure replacements and the largest contributor to the totals of this category of spending.

Eversource data indicate that seven (7) station transformer failures occurred from 2016 to 2025 over a population of 230 bulk transformers, which results in an annual failure rate of 0.3%; this is commensurate with the average industry standard annual failure rate of 0.4%. This indicates that CL&P's asset-health investment strategy and associate spending is on par with the industry.

These proactive station transformer replacements are based on risk of failure, and a core input to that risk estimate, amongst others, is the age of the transformers. CL&P's fleet is continuing to age, which means that proactive replacement pace is slower than aging. This means that system needs drive larger spending levels than CL&P's historical spending on asset replacement. Typical lifetime for station transformers is 40 years. Currently, 50% of CL&P's station transformers are older than 40 years old. The average age of the fleet is currently 39 years. CL&P proactive replacements of transformers are on average 2.3 transformers a year, but age-based replacements would require that 4-5 transformers be replaced annually to keep the age of the transformer fleet stable (but not reduced, further replacements over the 4-5 annually would be required to reduce the transformer fleet average age).

Appendix A

2028 Reliability Plan Budget ($M)	Baseline Reliability Plan	Incremental Reliability Plan	Total Reliability Plan
Infrastructure Replacement	$328.2	$52.6	$380.8
Capacity	67.0		67.0
Distribution Transformer	40.7		40.7
New Customer Additions	77.0		77.0
Enhancements	11.0	5.1	16.1
Maintenance	16.9		16.9
Total	**$540.8**	**$57.7**	**$598.5**

2029 Reliability Plan Budget ($M)	Baseline Reliability Plan	Incremental Reliability Plan	Total Reliability Plan
Infrastructure Replacement	$346.4	$60.4	$406.8
Capacity	84.0		84.0
Distribution Transformer	41.9		41.9
New Customer Additions	80.0		80.0
Enhancements	7.4	5.2	12.6
Maintenance	17.1		17.1
Total	**$576.8**	**$65.6**	**$642.4**

2030 Reliability Plan Budget ($M)	Baseline Reliability Plan	Incremental Reliability Plan	Total Reliability Plan
Infrastructure Replacement	$336.3	$95.9	$432.2
Capacity	96.0		96.0
Distribution Transformer	43.2		43.2
New Customer Additions	82.0		82.0
Enhancements	6.8	5.3	12.1
Maintenance	17.3		17.3
Total	**$581.5**	**$101.2**	**$682.7**

2031 Reliability Plan Budget ($M)	Baseline Reliability Plan	Incremental Reliability Plan	Total Reliability Plan
Infrastructure Replacement	$346.2	$120.3	$466.5
Capacity	96.0		96.0
Distribution Transformer	44.5		44.5
New Customer Additions	86.0		86.0
Enhancements	7.1	6.6	13.7
Maintenance	18.5		18.5
Total	**$598.3**	**$126.9**	**$725.1**