STATE OF CONNECTICUT
PUBLIC UTILITIES REGULATORY AUTHORITY
OFFICE OF EDUCATION, OUTREACH & ENFORCEMENT

December 2, 2022

Chairman Marissa P. Gillett
Public Utilities Regulatory Authority
10 Franklin Square
New Britain, CT 06051

Re: 17-12-03RE08 PURA INVESTIGATION INTO DISTRIBUTION SYSTEM PLANNING OF THE ELECTRIC DISTRIBUTION COMPANIES – RESILIENCE AND RELIABILITY STANDARDS AND PROGRAM

Dear Chairman Gillett:

The Public Utilities Regulatory Authority's ("Authority") Office of Education, Outreach, and Enforcement ("EOE") respectfully submits this report pertaining to the above referenced docket. The report provides recommendations for the implementation of an Undergrounding Strategy regarding the electric distribution system in Connecticut.

Sincerely,

PUBLIC UTILITIES REGULATORY AUTHORITY
Office of Education, Outreach, and Enforcement

Office of Education, Outreach, and Enforcement Report on Undergrounding, Docket 17-12-03RE08

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I. SUMMARY

A. REVIEW OF PURA'S DIRECTION TO CREATE THIS REPORT

In the final decision of August 31, 2022 in Docket No. 17-12-03RE08, the Public Utilities Regulatory Authority (PURA or the Authority) directed the Office of Education, Outreach, and Enforcement (EOE) to lead a limited-purpose working group (Rule 20 Working Group[1]) to address undergrounding strategy proposals for Connecticut. The Authority directed EOE to file recommendations regarding an undergrounding program structure as a motion, with supporting analysis appended in a report, by December 5, 2022.[2] EOE respectfully submits the enclosed recommendations for further comment by the public and consideration by PURA. Importantly, the Authority directed EOE to consider California's undergrounding scheme (and any other relevant and helpful information from other jurisdictions) established under its Rule 20 system. Accordingly, positives and negatives of Rule 20 are discussed throughout this report.

B. WORKING GROUP

The working group held four meetings.[3] Members came to consensus on a few matters. Members had general consensus that the primary purpose of the undergrounding strategy in Connecticut is to enhance the reliability and resiliency of electrical service in Connecticut. While aesthetics may be an added benefit (and in California a primary reason for the Rule 20 program's initiation in 1967), that is not a primary rationale for this effort.

[1] For more background on Rule 20 in California, please see: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/infrastructure/electric-reliability/undergrounding-program-description/cpuc-rule-20-undergrounding-programs----faqs.
[2] See Final Decision of August 31, 2022 in Docket No. 17-12-03RE08 - PURA Investigation into Distribution System Planning of the Electric Distribution Companies – Resilience and Reliability Standards and Program, Order 15 (hereinafter "Resiliency and Reliability Final Decision").
[3] In addition to working group meetings, EOE circulated a first draft of the operative sections of the report for further discussion and comments before the submission of the final report.

Members generally agreed that the environmental benefit of minimizing tree impacts in areas where undergrounding is implemented is an important aspect of this effort.[4] It was noted that municipalities have very specific roles under California's Rule 20 structure. While California's exact system may ultimately not be a perfect match for Connecticut and the objectives in Docket 17-12-03RE08, there was consensus that municipalities should have a role in any system developed for Connecticut.[5]

Members generally agreed that it is not feasible nor necessary to place every distribution line underground, and that the undergrounding strategy should look at select projects as they are presented for evaluation. Members also agreed that the Rule 20 "work credit" system is not a good fit for Connecticut. Eversource and UI submitted information regarding current policies and procedures in place at the EDCs regarding underground projects. An assessment revealed that current undergrounding procedures in use at the EDCs do not present the risk of appreciable conflict with efforts ongoing in this group. However, since policies (such as Eversource's New Business or "NB" practices) are PURA-approved, any changes to those policies caused by an approved undergrounding strategy would also need approval. The group appeared to have consensus that annual capital budget filings, reviewed by PURA, may be the best format to put selected underground projects before the Authority for review. These budgets are currently filed in Rate Adjustment Mechanism (RAM) proceedings. This would allow the Authority to see proposed undergrounding projects in the context of the entire EDC annual capital budget. Although other undergrounding projects may not need PURA review ahead of time because they are to be funded by the specific requestor, the work and costs on these items should also be provided to PURA, so the authority has a holistic up-to-date picture of undergrounding efforts.

The working group finally raised a concern regarding poles with multiple utilities (cable, telephone, power) attached. There are other interested parties when a decision is made to place lines underground. Engineering standards may prohibit placing all of

[4] EOE believes that environmental considerations are meant to be addressed in the evaluation process for prioritizing undergrounding presented below, and to the extent needed, can be further specified in procedures put forth by the EDCs as required.

[5] EOE believes municipalities will have ample opportunity for involvement in this process through the specific steps outlined below, as well as through the general administrative process that accompanies any docket process undertaken by the Authority.

the utilities in close proximity underground (when manholes are involved vs. trenches, for example). Additionally, other utilities may not have to place their lines underground if an EDC decides to. A more in-depth understanding of pole ownership and the various interests of other utilities may be beneficial and should be part of any assessments of undergrounding projects.[6]

C. LEGAL AUTHORITIES

Conn. Gen. Stat. §§ 16-244i and 16-32g are discussed at length in the final decision of Docket No. 17-12-03RE08. As stated by PURA, "[P]ursuant to Conn. Gen. Stat. § 16-244i(d), the Authority is required to oversee the quality of service provided by the EDCs."[7] Additionally, PURA noted "pursuant to Conn. Gen. Stat. § 16-32g, each EDC must submit to the Authority annually 'a plan for the maintenance of poles, wires, conduits or other fixtures, along public highways or streets for the transmission or distribution of electric current, owned, operated, managed or controlled by [the EDC].' "[8] These two statutes provide the basic authority to require a Resilience Framework, and in turn, an undergrounding strategy. Additionally, the Authority has, by decision, determined that it has the power to order facilities to be relocated underground in appropriate circumstances.[9] Accordingly, EOE does not believe additional statutory or regulation authority is necessary to implement an undergrounding strategy.[10]

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[6] EOE believes these concerns can be best addressed through the "Preliminary Step" process outlined below.
[7] See Resiliency and Reliability Final Decision at 58.
[8] Id. at 50.
[9] Final Decision, 86-02-14, June 26, 1991, Petition of City of New Britain Board of Public Works for Declaratory Ruling Regarding the Location of Underground Utilities, at 2323. "However, the issuance of an order to relocate facilities by this Authority pursuant to any of these statutes and regulations would be based upon a necessity that such an expenditure is necessary in order for the utilities to provide adequate service in a manner that is safe and in compliance with state standards, and when, therefore, there is a direct benefit to the ratepayers of these utilities. That determination having been made, if such orders were issued by this Authority for the relocation of facilities, said relocation costs would be the responsibility of the utility. However, the prudency of the actual implementation of these orders must be assessed before recovery of these costs is assured."
[10] At a later date legislative goals or benchmarks may be helpful, but EOE believes this should not delay the present implementation of an undergrounding strategy.

II. DISCUSSION ON COSTS

There are well-founded concerns about the costs involved with the implementation of an undergrounding strategy. Use of the plan set forth below will involve spreading costs across the rate base for expected large-scale benefits. The benefits expected are not solely an anticipated lessening of electric distribution outages. They also include significant economic benefits as well. These economic benefits are anticipated to come in the form of reduced repair materials and labor for systems that fail, but also indirect economic benefits from ensuring businesses stay open, citizens can continue to work, food supplies are not impacted, healthcare systems remain fully operational, and other potential benefits.

Eversource noted that full undergrounding of its service territory would involve approximately 16,781 miles of overhead at a cost of over $62 billion dollars. This provides a benchmark against which to consider, in a general sense, undergrounding economic benefits.[11] EOE stresses again, however, that not every mile needs to be placed underground, nor could it be placed underground. A generous estimate for consideration of the magnitude of costs on all sides might be 2/3 of this amount (assuming 2/3 of these miles were placed underground), or $43 billion dollars. A reasonable estimate of underground facility lifespan for use in this discussion is 40 years.[12] EOE suspects that an in-depth study of the direct and indirect economic losses over the past 40 years from storm-related outages and damage could exceed the estimated cost of undergrounding 2/3 of the Eversource distribution lines in the state based. A full assessment of the economic losses due to power outages that could have been prevented by hardening measures is not possible here. However, EOE believes

[11] The discussion on costs that follows is simply meant to provide basic perspective on the potential magnitude of the issues informing this strategy, using actual historical events impacting Connecticut.

[12] See, e.g. Replacing Overhead Lines with Underground Cables in Finland, February 14, 2019 available at: climate-adapt.eea.europa.eu/en/metadata/case-studies/replacing-overhead-lines-with-underground-cables-in-finland (noting "The technical lifetime of underground cables is estimated to lie between 50 years and 70 years. The regulatory or economic lifetime may be slightly shorter."); and OLR Research Report, Undergrounding Electric Lines, October 3, 2011, available at: https://cga.ct.gov/2011/rpt/pdf/2011-R-0338.PDF (noting "Underground equipment typically has a shorter lifespan than overhead equipment (on average 30 years versus 50 years")).

looking at the frequency and magnitude of events causing outages is illustrative towards appreciating the costs at issue in this discussion.

Below is a list of disasters since 1982 that are each credited with causing $1 billion or more in damage in the U.S. areas they impacted.[13] Each one caused damage in Connecticut, the total expressed is the amount of damage caused throughout states impacted, with outages for Connecticut specifically where found:

a. July 2021 - Tropical Storm Elsa – $1.3 B (peak outage 13,000)[14]
b. August 2020 - Tropical Storm Isais - $5.3 B (peak outage over 700,000)[15]
c. May 2018 - Tornadoes - $1.6 B
d. March 2018 - Nor'easter - $2.6 B (117,000 peak outage)[16]
e. January 2018 - Nor'easter - $1.2 B
f. June 2015 - severe weather - $1.4 B
g. February 2015 - $3.7 B, winter storm
h. October 2012 - Storm Sandy - $81.9 B (600,000 peak outages)[17]
i. October 2011 - winter storm - $1.2 B (nearly 1,000,000 peak outages)[18]
j. September 2011 - Tropical Storm Lee - $3.2 B
k. August 2011 -Tropical Storm Irene - $17.4 billion (800,000 peak outages)[19]

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[13] U.S. Billion-Dollar Weather & Climate Disasters 1980-2022; National Oceanic and Atmospheric Administration, available at: www.ncei.noaa.gov/access/billions/events.pdf.
[14] Hartford Courant, July 9, 2021, Tropical Storm Elsa Wraps Up After Soaking Connecticut; www.courant.com/breaking-news/hc-br-hartford-connecticut-shoreline-tropical-storm-elsa-arrives-20210709-crtjowl54fawdmoxaubi4zgkbi-story.html.
[15] State of Emergency: Isaias Knocks out Power to Over 700,000 in Conn.; Restoration Could Take Days, August 5, 2020, available at: www.nbcconnecticut.com/weather-news/cleanup-begins-after-isaias-kills-1-knocks-out-power-to-nearly-700000-people-in-conn/2313844/
[16] Nor'Easter Causes Lots of Damage Across State; March 7, 2018, available at: www.nbcconnecticut.com/weather-news/stories/damages-across-the-state-as-high-impact-snow-storm-pulls-away/130825/
[17] Connecticut Power Outages After Sandy Highlight Preparation Lapses, November 12, 2012, available at: www.huffpost.com/entry/connecticut-power-outages_n_2116601
[18] A decade ago, an epic October snowstorm shut down the Northeast, exposing weakness of the power grid, Washington Post, October 28, 2021, available at: www.washingtonpost.com/weather/2021/10/28/snowstorm-northeast-october2011-power-grid/
[19] Tropical Storm Irene Delivered a Sunday Punch to Connecticut; University of Connecticut Sea Grant, Winter 2011, available at: opencommons.uconn.edu/cgi/viewcontent.cgi?article=1067&context=wracklines#:~:text=At%20the%20height%20of%20the,9%20days%20to%20fully%20restore

l. March 2010 - flooding - $2.5 B
m. April 2007 - severe weather - $3.5 B
n. September 1999 - Hurricane Floyd - $11.3 B (50,000 peak outages)[20]
o. January 1999 - winter storm -$1.8 B
p. January 1994 – ice storm - $2.1 B
q. March 1993 - blizzard - $11.3 B
r. December 1992 - winter storm - $5.1 B
s. August 1991 - Hurricane Bob - $3.2 B (250,000 CL&P outages)[21]
t. December 1989 - winter storm - $1.6 B
u. September 1985 - Hurricane Gloria $2.3 B (peak outage 700,000)[22]
v. Spring 1984 - Severe storms - $1.7B
w. January 1982 - winter storm - $2.1B

During 2011 through 2021, there have been at least 3.2 million reported customer outages in Connecticut immediately ascertainable from this list. This averages to 877 outages, every day of the year, for 10 years.[23] This is only the combined amount of known outages for approximately half of the "billion dollar" events during this period, and these numbers also do not include any smaller weather events - thus the average daily outages data point during this ten year period is even higher than 877 per day.

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[20] Hartford Courant, Floyd's Not So Tough, September 16, 1999, available at: www.courant.com/news/connecticut/hc-xpm-1999-09-17-9909170039-story.html
[21] August 19 Anniversaries: A Look Back at Hurricane Bob and the 1955 Flood, August 19, 2021, available at: www.nbcconnecticut.com/weather-news/stories/decades-later-a-look-back-at-hurricane-bob-and-the-1955-flood/2564073/
[22] Hurricane Gloria: "Storm of the Century," September 16, 2022, available at: https://connecticuthistory.org/hurricane-gloria-storm-of-the-century/#:~:text=The%20damage%20it%20caused%20in,Gloria%E2%80%9D%20from%20their%20name%20rotation
[23] For additional perspective, this data point is comparable to the amount of outages caused by a strong low pressure system. See https://portal.ct.gov/DEMHS/External-Weather-Updates/11_30_2022-Wind-Advisory-1030amhttps://portal.ct.gov/DEMHS/External-Weather-Updates/11_30_2022-Wind-Advisory-1030am (On the night of November 30, 2022 a cold front with heavy rain and expected wind gusts up to 55 mph moved across Connecticut. At 4 p.m. the next day, Eversource had 688 outages across the state).

There are numerous significant weather events that are not "billion dollar" damage events, but still had a large scale impact on customers. For example, Tropical Storm Henri is not on this list, but caused at least 30,000 power outages in Connecticut in 2021.[24] On October 31, 2019 a storm caused at least 16,000 customers to lose power.[25] In late October 2017, a storm caused at least 160,000 customers to lose power.[26] A February 2013 winter storm caused a peak outage of 38,000 customers.[27] A March 2010 storm led to 100,000 customer outages.[28] Averaged in with the 877 outages per day data point above, the daily average outages from storms rises to 944 outages per day, every day, for a ten year period. The "billion dollar" list also does not mention the countless smaller events, such as thunderstorms, or smaller snowstorms, that contribute to the cost impacts under consideration here.

Additionally, damage to utility facilities is only one element of cost concerns. There are many other costs directly attributable to power loss:

- Business losses (sales, manufacture, peak productivity, etc.)
- Employee wage losses
- Food and other perishables costs
- Medical supplies and services impacts
- Tourism impacts
- Child care costs

The outages referenced above were not remedied in a day. For example, it is reported it took at least nine days to restore all customers after Storm Irene. Thus, these non-damage related costs must be evaluated while considering they could continue to accrue for days. The purpose of presenting these data points is not to

[24] August 22, 2021, Hurricane Henri Leaves Thousands Without Power in Connecticut, New Jersey, available at: www.fox29.com/weather/henri-leaves-thousands-without-power-in-connecticut-new-jersey
[25] November 1, 2019, Thousands Still Without Power as Temperatures Start to Dip, available at: www.nbcconnecticut.com/news/local/connecticut-halloween-storm-power-outages-damage/2029077/
[26] October 29, 2017, CT Power Outages: 30,000 Still Without Power Late Tuesday, available at: patch.com/connecticut/greenwich/power-outages-reported-worst-storm-moves-now
[27] February 12, 2013, Power outages in Connecticut drop below 650 www.norwichbulletin.com/story/news/2013/02/13/power-outages-in-connecticut-drop/65023352007/
[28] November 11, 2011, Connecticut storm highlights decades of repeat issues www.thehour.com/norwalk/article/Connecticut-storm-highlights-decades-of-repeat-8163432.php

conduct a benefit-cost analysis here. It is merely to demonstrate that the scale of economic loss from non-hardened systems is not out of the realm of the scale of cost anticipated for undergrounding a large portion of the state's electric distribution facilities. On one hand a fair cost estimate of undergrounding 2/3 of Eversource's of above ground lines is $43 billion, and one can consider an average lifespan of underground facilities of 40 years. On the other hand, the state has likely, over the past 40 years, experienced economic loss that is comparable to or could even exceed to this amount. Thus, while the scale of undergrounding cost is quite large, so is the economic loss that could be mitigated or avoided by undergrounding and other hardening measures. Again, EOE submits this general analysis so that all involved in this process have a basic understanding of the magnitude of benefits to be gained from successfully implementing an undergrounding strategy, to be viewed in context against the magnitude of cost of implementation.

III. GENERAL RULE 20 COMMENTS[29]

The group reviewed California's "Rule 20" structure, and understood that the rule's primary purpose was to improve aesthetics related to distribution systems. The group understood that the primary rationale for an undergrounding strategy in Connecticut was to enhance the reliability and resiliency of electrical service in Connecticut. While aesthetics may be an added benefit (and in part of the evaluation under "public interest" concerns discussed further below), it is not seen as a primary rationale to pursue an undergrounding project or develop the strategy discussed in this report.

Additionally, the Rule 20 model in California employs a work credit system. Essentially, a community accumulates Rule 20 work credit allocations and must have a sufficient amount before proceeding with a ratepayer-funded undergrounding project. The work credits are distributed annually by a utility and communities can accumulate them over several years until they have sufficient funding for a project. In practice,

[29] EOE has reviewed aspects of the undergrounding programs of Washington D.C., Maryland, and Florida in addition to California's Rule 20. EOE believes any beneficial concepts from those programs, as related to the general structure put forth herein, are reflected in this report.

communities have “borrowed” against future credits, and trading or pooling of work credits is also part of the Rule 20 system. The group agreed the work credit concept does not comport with primary concerns related to resiliency, and thus any undergrounding strategy should not involve such a system in Connecticut.

In sum, Rule 20 works as a basic model for stratification of the various types of rate-payer funded and requestor-funded projects that can accelerate undergrounding as a resiliency measure, but EOE was cautious to not follow the main rational for Rule 20 and instead focused on how to design a system that would accelerate resiliency efforts within the state.

IV. PROPOSED UNDERGROUNDING MODELS

A. WORKING GROUP MEMBER SUBMISSIONS

In the final decision for 17-12-03RE08, the Authority asked for “…proposals from stakeholders related to any undergrounding matters, and comments thereto, that may benefit from the General Assembly’s consideration in a subsequent legislative session.” (emphasis added). Such proposals were to be filed in that docket no later than October 7, 2022. During the first working group meeting, the group agreed that that filing would be used to start discussions on proposals put before the working group. EOE in addition provided some specific questions for those submitting recommendations to address in their proposals. Three sets of correspondence were filed in the docket in response to the October 7, 2022 item directed by the Authority under 17-0-12-03RE08. One proposal was received from one EDC, filed by Eversource. This model presented the best starting point for developing a formal approach to undergrounding.

Eversource suggested that undergrounding projects within a strategy fall within one of four categories:

1. An EDC’s strategic identification and management of undergrounding circuit zones needed to address general safety, reliability and resilience goals with the cost of such projects allocated to all rate payers.

2. Developer requested undergrounding for properties or new developments within a municipality in which the cost of such undergrounding is allocated to the developer.

3. Requested installation to underground service by a single customer in which the cost of the undergrounding is allocated to the requestor.

4. Customer and/or municipality conversion of existing overhead circuits to underground with cost allocation to those customers or municipality who requested the conversion.

B. EOE RECOMMENDED MODEL

EOE believes the above categorization is a good starting point for establishing a model for undergrounding distribution lines within the state. EOE believes the categories above can be simplified, for the purposes of an undergrounding strategy related to resiliency, to the following:

- *Undergrounding projects fully-funded by ratepayers after an EDC evaluates and identifies a project, through PURA approved processes, as necessary to address general safety, reliability and resilience goals.*

    - *Projects here may be requested projects, or those identified by the EDC* sua sponte*.*

- *Customer-requested projects, whether new development or conversion from above-ground lines, that do not sufficiently meet criteria demonstrating public benefit towards resiliency goals. These may be single-user, developer, or municipal requests.*

There is an additional possible “hybrid” category, discussed in the working group and presented here for evaluation:

- *Municipal-requested undergrounding projects where a portion is ratepayer funded, and the remainder is funded by the requesting municipality.*

It is assumed this hybrid category would apply to conversions only and not new proposed distribution systems. There are positive and negative aspects to this hybrid category. Some working group members proposed this type of category should be approved as it would allow for more options to move lines underground. California has a partially rate-payer funded category similar in concept, under Rule 20B. That rule provided approximately 20-40% of rate payer funds to subsidize requests for undergrounding in this type of hybrid scenario - essentially the equivalent cost of above-ground facilities that would have been used in the absence of applying Rule 20B. The remainder of project costs would be paid by the requestor. A positive aspect of this type of category is that it provides another avenue for undergrounding, and may thus accelerate the pace of resiliency measures implemented within the state.

EOE notes there are negative aspects to this category as well. First, this category may create some conflict with the underlying purpose of resiliency measures. In one sense, one can hold the view that a project either is or is not sufficiently necessary so as to provide significant public benefit and therefore justify full ratepayer funding. The partially rate-payer funded avenue creates a middle category that may undercut the rationale for full ratepayer funding of certain projects – i.e., creating a category where there is “some” public benefit, but not enough to justify fully funding a project. This ultimately might make it more difficult to find which projects deserve placement into a non-ratepayer funded category.

More concerning is the use of ratepayer funds towards projects that don’t necessarily meet the most stringent resiliency needs, but nonetheless can go forward because a municipality has the funds to pay for their portion of a project. The following example is offered:

Town A and Town B request undergrounding conversion of overhead lines for projects that are similar in all aspects including cost. However, Town A has funding concerns not present in Town B, and Town B has the funds to pay for their share of the conversion in a "hybrid category" scenario. If Town B is allowed to proceed, they will essentially have been subsidized with ratepayer funds not available to Town A. EOE sees the potential for ratepayer funds to disproportionately subsidize communities that can better afford the projects they want under the hybrid category.

Rule 20B (the partially rate-payer funded category) under the California system is not tied to resiliency goals and thus EOE does not support an exact use of Rule 20B in Connecticut. Providing a ratepayer subsidy in the amount of the cost of above-ground facilities for an area is not directly related to hardening the electric distribution system. Use of a partially rate-payer funded "hybrid category" would be more connected to the resiliency effort if a different cost item was used to determine rate payer contributions to such projects. EOE submits that instead of the cost of above-ground facilities, the avoided cost of maintenance, such as estimated vegetation management costs, for the life of equivalent above-ground facilities, be used to generate the amount of rate payer contribution to a hybrid category project.[30]

If a hybrid category system is used as part of a resiliency strategy, the issue of equity in its application remains to be measured. EOE recommends that if PURA deems a "hybrid category" option is added to the undergrounding strategy, that the amount of ratepayer funds allocated to projects under this category be closely monitored and possibly capped annually.

V. STRATEGY INTEGRATION WITH DECISION 17-12-03RE08

The final decision of August 31, 2022 in Docket No. 17-12-03RE08 directed the

[30] Final Decision 13-12-03RE08, Table 21 discusses avoided pole, storm restoration, and avoided interruption costs, which might also be factored into this assessment. EOE, however, remains concerned about additional amounts shifting more of the burden of undergrounding costs from local requestors to state-wide ratepayers not receiving as full a resiliency benefit from this category.

EDCs to develop, among other items, Resiliency Frameworks, which are essentially long term plans designed to help maintain and improve the resiliency of the Connecticut electric distribution system in the most cost-effective method possible. While undergrounding distribution lines is relevant to both Reliability and Resiliency concepts, it most appropriately falls under the mitigation/hardening aspect of Resiliency. EOE believes the working group efforts and recommendations here, with respect to an undergrounding strategy, must be presented with integration into the Resiliency Framework in mind. Accordingly, a brief overview of the Resiliency Framework development and review process and where undergrounding fits into those processes is helpful.

EOE notes that UI filed its current rate case in August 2022, and did not include a Resiliency Framework. Eversource is expected to file its next rate case soon, but given the timeframe needed to fully adjudicate a rate case, it could be over one year before their Resiliency framework is ready for review and approval, assuming it is filed with that rate case application. It may be several years before a formal Resiliency Framework, with undergrounding plans integrated, is available for use by each EDC. Thus, EOE's recommendations in this report are designed to promote the immediate start of undergrounding efforts where they can improve Resiliency in the interim while Resiliency Frameworks are completed, and provide an undergrounding strategy that can easily be integrated into expected Resiliency Frameworks once approved by PURA.

In the 17-12-03RE08 decision, the Authority stated that Resiliency Frameworks would be presented for review upon the filing of the next rate case of each EDC. The Resiliency Framework development and review process involves the following:

1. *A classification of "zones" that will ultimately be used to prioritize resiliency projects.*

    a. The classification process must include an evaluation of environmental justice, community needs, medical issues, commercial and industrial customer needs, and system specific issues (such as geographic remoteness) at a minimum. Table 20 in the final decision encompasses specific criteria (including SADI, CAIDI, and SAFI data) to be evaluated as part of this process.

b. Concerns over whether public interests would be adequately considered in the undergrounding strategy development and implementation were discussed during the working group meetings. EOE notes that the recommendations here will address consideration of the issues in 1.a. above, and believes these criteria adequately encompass “public interest” concerns about undergrounding projects.

c. Of note, the final decision also mandated that the EDCs report on efforts to seek federal funding to offset the cost of resiliency projects. Additionally, concerns over the consideration of climate change policy in the undergrounding process were discussed. EOE believes that both of these topics are also fully incorporated into the Resiliency Framework process, and thus recommendations here are meant to address consideration of those concerns until the Resiliency Frameworks are approved.

2. *Based on the prioritized list, determine and then select cost-effective resilience solutions for zones identified. Undergrounding distribution lines is one specific solution listed in this portion of the final decision.*

a. The EDCs were directed to develop a methodology that can be applied to identified Zones under to the Resilience Framework, to allow for determination of an appropriate solution set of resilience measures that relies at least in some part on both cost-effectiveness testing as well as some degree of customer feedback regarding willingness to pay.

b. Eversource identified the following criteria in its comments as what it would use to evaluate resiliency projects:

i. Historical Reliability Performance and Outage Drivers for the electric circuit during blue, gray and dark-sky days.
ii. System routing and characteristics of the electric circuit, including Density and

Type of Vegetation affecting it.

iii. Feasibility of construction, including existing underground utility congestion and easement rights and a timeline investigation (both in terms of project duration and in terms of urgency prioritization across the various needs).
iv. Project intensity and impact on resources (human, budget etc).
v. Cost-benefit of measures available.
vi. Alignment with company Standards, as well as IEEE, NERC etc.
vii. Alignment with all applicable regulatory requirements (e.g., 17-12-03RE08).

EOE recommends these criteria be used to assess projects the EDCs investigate on their own for implementation (Category 1), and requests for undergrounding projects (Category 2). Category 2 requests should be first evaluated and shown to not warrant Category 1 treatment before concluding they will not be funded by ratepayers. EOE believes these criteria can serve as a "methodology" specifically for an undergrounding strategy, and when the Resiliency Framework is developed, these criteria can be folded into the larger methodology developed for the Framework.

The working group discussed whether these criteria addressed other considerations such as the environmental benefit of trees saved due to undergrounding, the impacts on property values when another hardening option is used in place of undergrounding, and ensuring the undergrounding strategy is applied equitably across the various communities. EOE notes that the criteria of environmental justice, community needs, medical issues, commercial and industrial customer needs, and system specific issues (such as geographic remoteness) discussed in the zone identification process would address these additional concerns. Therefore, EOE recommends that the EDCs be required to consider these criteria as well in their evaluation of undergrounding projects, until those criteria are fully implemented in Resiliency Framework zone identification process.

3. *For all projects to be identified as solutions in zones, a benefit-cost analysis for each project that includes a reasonable estimate of program costs and a reasonable prediction of benefits will be performed.*

a. EOE again believes the recommendations in this report include consideration of benefit-cost data as part of the methodology discussed, and thus, when the Resiliency Framework is developed, the undergrounding strategy can be folded into the Framework more easily.

4. *Resiliency costs will be recorded and tracked during the Annual Review process put forth in Section II.B.5.a.ii. Annual Review Process of the final decision.*

a. Until the Resiliency Frameworks are approved, costs will need to be tracked through a different process. EOE recommends in the interim an annual proceeding such as the rate adjustment mechanism (RAM) proceedings be utilized to track and review costs, as discussed further below.

A. RECOMMENDED STRATEGY PROCESS UNTIL FRAMEWORKS COMPLETED

As discussed, there is no administrative process in place to review or otherwise approve undergrounding projects. Once the Resiliency Frameworks are in place, it is assumed that oversight of undergrounding projects will take place under those plans and the annual review process. Until then, a system ensuring the EDCs are appropriately considering, undertaking, and completing undergrounding projects is needed. EOE proposes the following:

1. EDCs assess sections of the distribution system for undergrounding. These assessments will be conducted on areas identified *sua sponte* by the EDCs, as well as through municipal requests for undergrounding received by the EDCs. This period should extend March 1 through April 15 for 2023 through 2025.[31]

[31] It is understood that every mile of the distribution system cannot be placed underground in Connecticut, nor should this occur. Additionally, once the Resiliency Frameworks are in place, there will be assessments under those frameworks that lead to the implementation of non-undergrounding hardening measures – i.e., projects won't just be evaluated with undergrounding in mind. For the time being,

2. The EDCs will evaluate the potential candidates for undergrounding using the criteria described herein.[32]

3. On July 30 of 2023, 2024, and 2025, the EDCs will file reports in docket 17-12-03RE08 indicating which projects reviewed should be selected for full or hybrid rate-payer treatment.

4. The reports will be reviewed as part of the annual Rate Adjustment Mechanism proceedings and approved for implementation if warranted.[33] The EDCs will also file reports summarizing non-ratepayer projects completed each year so that PURA can gain a holistic picture of how many undergrounding projects are completed each year.

B. PROCESS AND CATEGORY COMBINED REVIEW

Because of the multiple procedural and substantive aspects of this report, it may be helpful to combine these two aspects to show how the recommended undergrounding strategy would work.

Preliminary Step for First Year of This Program: By January 31, 2023 the EDCs submit their interim methodologies to PURA that address how they will identify *sua sponte* projects worthy of undergrounding, and how they will evaluate those *sua sponte* and requested projects using the criteria listed in Step 1 below.[34] This step will serve as the "Interim Procedure" to be used for undergrounding until the Resiliency Frameworks required by the final decision in 17-12-03RE08 are finalized and approved and can incorporate undergrounding procedures established here.

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however, EOE assumes there are sufficient circuits that can be identified as candidates that are highly likely to lead to undergrounding as the best solution for hardening to allow for an undergrounding strategy to commence and continue until it can be subsumed into the Resiliency Framework process.

[32] Since the EDCs will be developing their methodologies for evaluating projects per the 17-12-03RE08 decision, this may serve as a useful way to help test and fine-tune the development of those methodologies.

[33] EOE believes the timing of the annual RAM proceedings will allow for this process to be mapped into the Annual Reviews under the Resiliency Framework more easily.

[34] EOE notes that some documents addressing this step may already exist. See United Illuminating responses to interrogatories RSR-1 through RSR-13 in docket 22-08-08, Application of The United Illuminating Company to Amend Its Rate Schedule.

Step 1: March 1 through April 30, EDCs assess projects for undergrounding, identified *sua sponte* or received as requests for undergrounding projects from municipalities. EDCs will evaluate these projects based on the following criteria:

i. Historical Reliability Performance and Outage Drivers for the electric circuit during blue, gray and dark-sky days.
ii. System routing and characteristics of the electric circuit, including Density and Type of Vegetation affecting it.
iii. Feasibility of construction, including existing underground utility congestion and easement rights and a timeline investigation (both in terms of project duration and in terms of urgency prioritization across the various needs).
iv. Project intensity and impact on resources (human, budget, etc).
v. Cost-benefit of measures available, as discussed in the 17-12-03RE08 decision.
vi. Alignment with company Standards, as well as IEEE, NERC etc.
vii. Alignment with all applicable regulatory requirements.
viii. Environmental justice, community needs, medical issues, commercial and industrial customer needs as discussed in the 17-12-03RE08 decision.[35]

Projects that, after review of these criteria, are recommended *to proceed as fully ratepayer funded due to their public benefit*, will be Category 1 projects. EDC-identified projects not selected for Category 1 treatment will be tabled for later consideration. Municipal requests not selected for Category 1 treatment will be considered for Category 2 (partial rate-payer funding) treatment. If such a municipal request Does not sufficiently satisfy the criteria above but nonetheless encompasses a viable undergrounding project, it should be identified as a Category 2 project: *Municipal-*

[35] It is understood that the EDCs may not be prepared today to evaluate these topics at the level eventually expected under the Resiliency Frameworks. Nonetheless, they must make a good faith effort to assess these considerations pursuant to the undergrounding strategy, since they are relevant considerations in determining resiliency measures under those frameworks, and undergrounding is a resiliency measure.

requested undergrounding projects where a portion is ratepayer funded, and the remainder is funded by the requesting municipality. The ratepayer-funded portion shall not exceed the amount of funds expected to be needed to maintain the reliability and resiliency of equivalent above-ground facilities for the expected life of those facilities.[36]

Step 2: By July 30, produce a report identifying which projects are selected for "Category 1" treatment and "Category 2" treatment. Municipalities disagreeing with the categorizing of a request as "Category 2" may provide comments on the reports regarding the reasons for their disagreement. Unless otherwise identified, Docket 17-12-03RE08 will be used to collect the reports.

Step 3: As part of the rate adjustment mechanism proceedings, PURA will review all proposed undergrounding Category 1 and 2 projects. Once the undergrounding program has run for a full year, PURA will also be able to review projects implemented during the prior year. Category 3 projects are *customer-requested projects, whether new development or conversion from above-ground lines, that do not sufficiently meet criteria demonstrating public benefit towards resiliency goals and may be single-user, developer, or municipal requests.* Information on the completion of these projects, and proposed projects falling into this category, is expected to be provided at RAM proceedings as well. Although rate-payer fuds are not used for these projects, reporting on them will give PURA a more holistic view of overall resiliency efforts.

Step 4: At the close of the RAM proceedings, as part of the final decision PURA will identify which projects may proceed as Category 1 and Category 2 projects.

Step 5: The above steps recommence each January 1, until the underground strategy discussed herein can be folded into the expected Resiliency Frameworks.

[36] For example, the amount expected for vegetation management. This metric may better tie the ratepayer funds to resiliency efforts.