Connecticut Non-Wires Solutions Benefit-Cost Analysis Framework

Reference Manual – Version 1.0

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Prepared for:

Connecticut Public Utilities Regulatory Authority

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EXECUTIVE SUMMARY

[To be included in final version]

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Introduction

The Decision in Docket No. 17-12-03RE07 – *PURA Investigation into Distribution System Planning of the Electricity Distribution Companies Non-Wires Alternatives* (the "Decision") – established a Non-Wires Solution ("NWS") Process. The NWS Process will be a competitive and transparent mechanism to assess NWSs alongside traditional options to meet distribution system needs.

The *NWS Process Design Document* ("Design Document") was developed as part of the proceeding, and it outlines the design, structure, governance, and implementation of the NWS process. The Design Document and Decision establish the benefit-cost analysis ("BCA") framework for the NWS Process.

The ***Connecticut Non-Wires Solution Benefit-Cost Analysis Framework Reference Manual*** ("Reference Manual") provides additional detail with respect to the BCA framework, outlining the cost-effectiveness test and methodologies that will be used to evaluate bids submitted as part of an annual competitive NWS solicitation.

A guiding principle in the development and implementation of the NWS BCA Framework for Connecticut is comprehensiveness in order to enable the evaluation of a range of Distributed Energy Resources ("DERs"), and to allow the tool to become more sophisticated as additional data and information becomes available.

Connecticut NWS BCA Framework Reference Manual

Cost-Effectiveness Test: Modified Utility Cost Test similar to the cost-effectiveness test that is used to assess Conservation & Load Management programs but is further modified to assess NWSs.

Benefit and Cost Components: The NWS BCA includes 19 benefit and cost components – a mix of quantifiable and qualitative impacts. The components fall under the five categories: 1) Bulk System Benefits, 2) Distribution System Impacts, 3) Non-Wires Solution Costs, 4) Other Resource Impacts, and 5) Societal Impacts.

Implementation: This Reference Manual will be used by NWS project proponents, the PURA Process Monitor, and PURA staff to calculate and assess the net benefits of NWS proposals submitted as part of the annual competitive solicitation.

The **Reference Manual** is structured as follows:

- An **overview of key elements** of the NWS BCA Framework, including the cost-effectiveness test to be used, the approach to addressing wholesale market impacts, and the BCA benefit and cost components.
- **Detailed methodologies** for each benefit and cost component, including rationale for inclusion, equations and variables, and data sources and assumption.

BCA Framework Overview

Cost-Effectiveness Test

Scope

The Final Decision in Docket No. 17-12-03RE07 established the overarching framework for the NWS BCA. The Final Decision states that the *"creation of a specific benefit-cost analysis model and process, utilizing and building on the framework and inputs form the C&LM Plan, will be a key task for the Process Initiation Phase led by the PURA Process Monitor in collaboration with the EDCs and other stakeholders*." Furthermore, that "*Conn. Gen. Stat. § 16-19e(a) provides ample support for the appropriateness of the broader TRC test as the primary benefit-cost framework and a key decision-making criterion."*

It is noted that the primary cost-effectiveness test used to assess Conservation and Load Management ("C&LM") programs is a Modified Utility Cost Test ("MUCT").[1] And that the MUCT is closely aligned with a Total Resource Cost ("TRC") test as it considers all resource impacts. **To support consistency with the C&LM framework, as per the Final Decision in Docket No. 17-12-03RE07, the C&LM MUCT is used as the basis of the NWS BCA framework, and further modified to accommodate the unique nature of NWSs (i.e., includes location-specific distribution impacts, ensure incrementality to avoid double-counting).** The Process Monitor believes this is consistent with the Decision in Docket No. 17-12-03RE07 and will support a robust assessment of NWS Process bids.

While the C&LM framework includes the Total Resource Cost ("TRC") and Modified Utility Cost Test ("MUCT") as secondary tests[2], a secondary test is not included in the NWS BCA framework. The EDCs may still choose to perform other benefit-cost analyses for informational purposes; however, this is outside of the formal NWS BCA framework.

Discount Rate

As directed by the Department of Energy and Environmental Protection ("DEEP") the utilities use a nominal discount rate of 3.0 percent (with a 2 percent inflation rate), which was based on 30-year U.S. Treasury Bonds at the time of the decision.[3]

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[1] The primary cost-effectiveness test used for the C&LM programs is the Connecticut Efficiency Test ("CTET"). Adopted in 2022, it is a Modified Utility Cost Test that incorporates avoided GHG benefits, avoided heating oil and propane costs, and additional utility systems benefits associated with reduced arrearages, collection costs, debt-write-offs, and administrative costs. See: Department of Energy and Environmental Protection. April 2022. *Updates to Connecticut Conservation and Load Management Cost Effectiveness Testing*. Available on-line at: https://portal.ct.gov/-/media/DEEP/energy/ConserLoadMgmt/Attachment-B---Cost-Effectiveness-Testing-Update.pdf

[2] The TRC test is used as the primary test for the Home Energy Solutions – Income Eligible ("HES-IE") program and includes the components in the MUCT plus non-energy impacts related to reduced collections and arrearage costs.

[3] Department of Energy and Environmental Protection. Revised December 18, 2018. Rationale for Discount Rate to be Applied in Connecticut's Conservation and Load Management Plans. Available on-line at: https://app.box.com/s/zv7bcoe283tjvppnt853ojmwfa89zahg/file/392409855086

Application

The CT NWS BCA test compares the present value of total benefits and total costs associated with the proposed NWS solution over the useful life of the investment to determine net benefits/cost (in dollars). Benefit values are based on marginal avoided costs, in addition to other quantifiable benefits, and represent energy/cost savings as determined through engineering and evaluation studies.

Cost values reflect costs to the utility or ratepayers from implementing the program (including the shareholder incentive). Customer co-pays are not included; however, it is assumed that any customer co-pay related to energy efficiency, customer-sited storage, or other solutions is equal to, and offset by, a direct customer benefit that is also excluded from cost-effectiveness test.

The approach and methodologies in the Reference Manual should be used by all project proponents for a consistent assessment of the benefit and costs of proposed options. Bids will include detailed inputs and outputs for each quantified benefit and cost stream. These will be reviewed by the Process Monitor, who will provide its assessment and recommendations to PURA for consideration.

BCA Components

Table 1 on the following page provides an overview of the benefit and cost components for the Connecticut NWS BCA Framework.

The components have been categorized as Tier 1 and Tier 2. Tier 1 components (green) have a larger overall impact on the cost-effectiveness results and are the primary focus of the methodology phase. Tier 2 components (blue), while still important, are less impactful and are also more challenging to quantify; however, their value should still be captured as part of the overall BCA framework. Finally, we recommend that some of the Tier 2 societal impacts (light blue) be included but addressed qualitatively (Q).

The table also includes a comparison of the benefit and cost components that are included in the TRC and CTET currently used to assess C&LM programs.

Table 1: Benefits and cost components for the Connecticut NWS BCA Framework.

Category	Impact		NWS BCA	MUCT	TRC
Bulk System Impacts	Energy	Benefit or Cost	✓	✓	✓
	Capacity	Benefit or Cost	✓	✓	✓
	Market Price Effects	Benefit	✓	✓	✓
	Ancillary Services	Benefit or Cost	✓		
	Transmission Capacity	Benefit or Cost	✓	✓	✓
Distribution System Impacts *(location specific)*	Distribution Capacity	Benefit or Cost	✓	✓	✓
	Distribution O&M[4]	Benefit or Cost	✓	✓	✓
	Reliability	Benefit or Cost	✓/Q[5]	✓	✓
Non-Wire Solution	Utility/Solution Cost[6]	Cost	✓	✓	✓
	Utility Performance Incentive[7]	Cost	✓	✓	✓
Other Resource Impacts	Natural Gas	Benefit	✓	✓	✓
	Oil and Propane	Benefit	✓	✓	✓
Societal Impacts	Non-Embedded GHGs	Benefit	✓	✓	✓
	Public Health	Benefit	✓/Q[8]		
	Economic and Jobs	Benefit	Q		
	Resilience	Benefit	Q		
	Energy Security	Benefit	Q		

[4] Distribution O&M refers to incremental upstream distribution system costs and/or benefits incurred as a result of having the NWS connected to the grid. This is distinct and non-duplicative of operations and maintenance costs directly related to the NWS project.
[5] Reliability is more a more challenging component to quantify and therefore considered a Tier 2 impact for the BCA. However, minimum levels of reliability will be a mandatory requirement for any NWS and therefore a qualitative discussion and/or ranking should be included in the framework.
[6] Utility/Solution Costs include program costs for the NWS test and the CTET; the TRC includes program and customer costs.
[7] Including the Utility Performance Incentive as an impact requires a circular calculation and therefore will be ignored in practice. The PI will only exist if there are net benefits and will be calculated as 25% of the achieved net benefits. However, including it then lowers the net benefits, which in turn lowers the PI. Any NWS with higher net benefits will still produce higher net benefits than another solution after subtracting the societal cost tied to the PI.
[8] NOx avoided societal costs net of compliance costs will be quantified while other public health benefits (e.g., reduced healthcare costs, more broadly) may be addressed qualitatively.

Approach to Wholesale Market Impacts

Non-Wires Solutions providers may or may not choose to participate in wholesale or retail markets depending on the nature of the resource and business case. If they are an active participant in the ISO-NE energy market, Forward Capacity Market ("FCM"), and/or ancillary market, these revenue streams must be accounted for in order to avoid double-counting benefits.

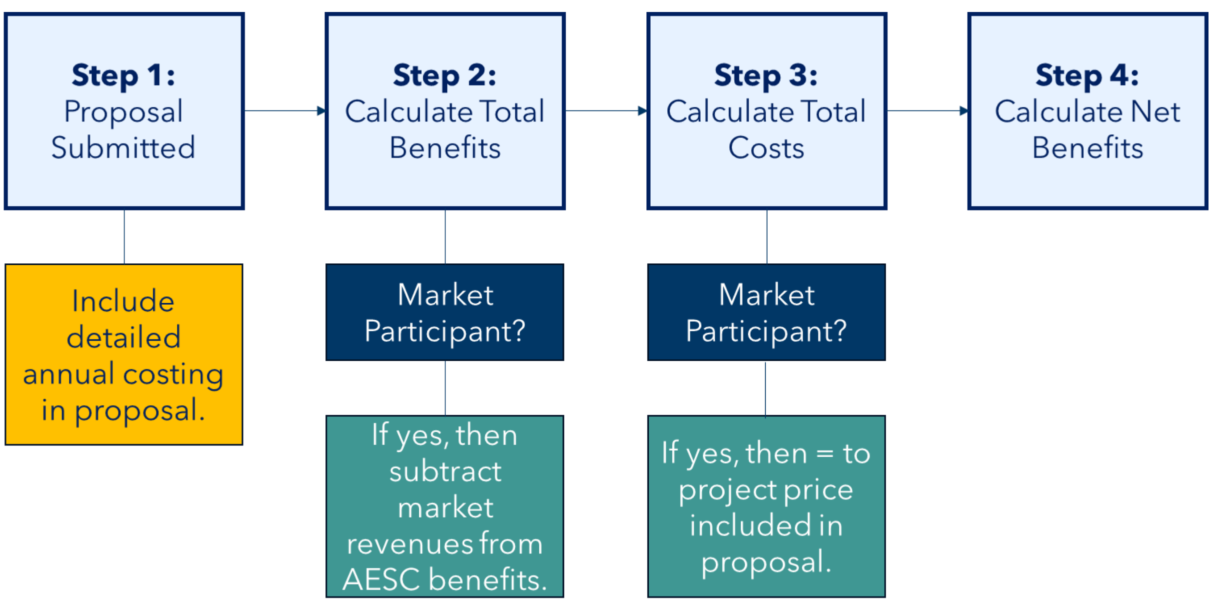
The following outlines an approach for addressing NWSs that participate and earn revenue from wholesale markets.

- **Step 1:** Proponents will be required to submit a detailed costing proposal as part of the bid process. This includes an annual breakdown of expected revenue streams from each anticipated market and will act as a screen for passive resources (i.e., not participating in wholesale markets) and market participants (i.e., those expecting to earn revenue from a market(s).

- **Step 2:** Total benefits are calculated using the methodologies included in this NWS BCA Reference Document, using the Avoided Energy Supply Cost ("AESC") study values as proxy for the energy, capacity, DRIPE, and ancillary upstream benefits. If a project intends to participate in the market, then any anticipated market revenue, as outlined in the bid, are subtracted from the corresponding benefit stream (i.e., total project benefits are equal to gross benefits minus market revenues).

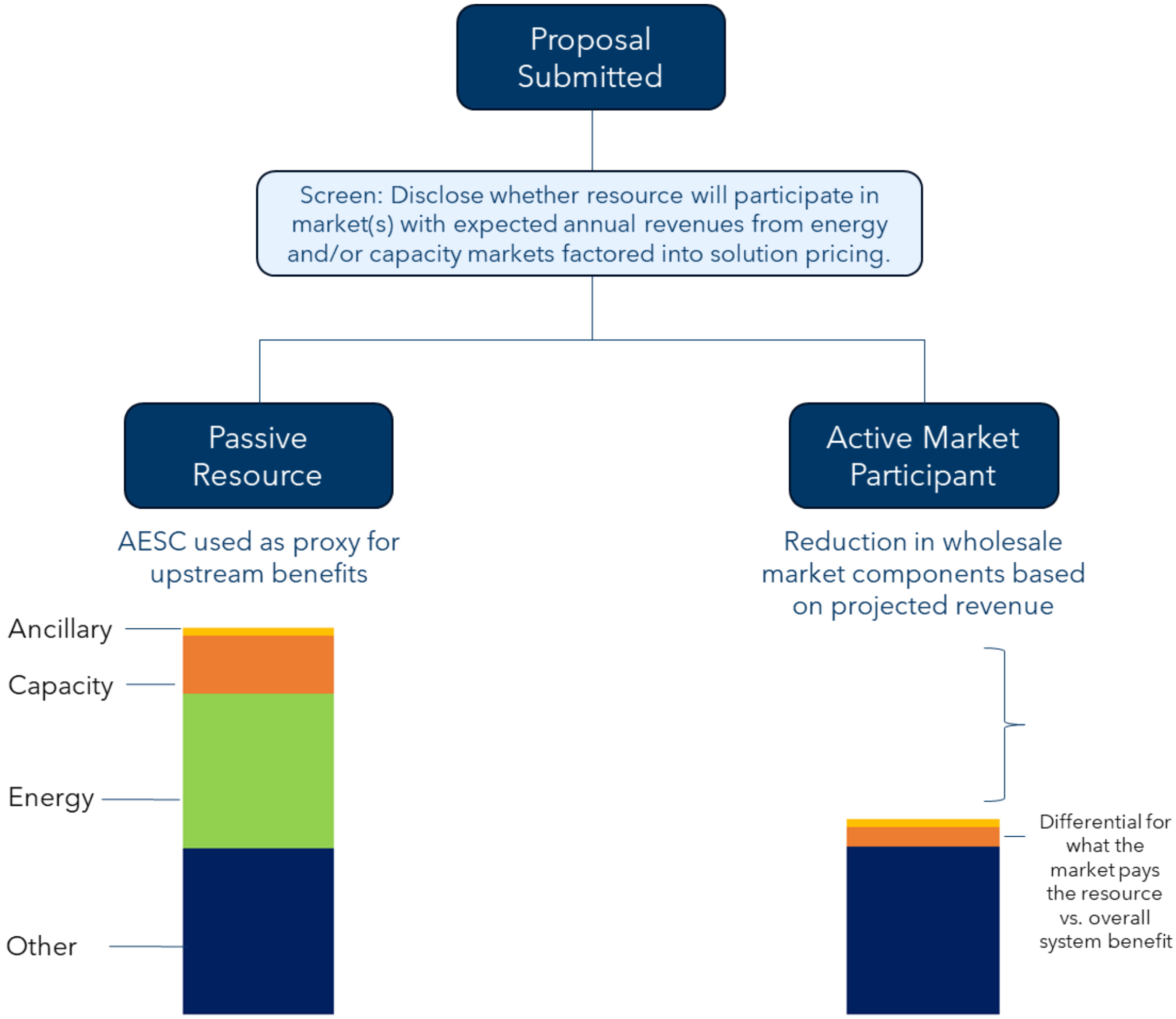
- **Step 3**: Calculate total costs.

- **Step 4:** Net benefits are calculated using **actual** project benefits compared to total project costs.



To note, in cases where projects have the same net benefits, then the net price or the projects' benefit-to-cost ratios (i.e., net of expected market revenues) are to be considered.

The following is an alternative visualization of the benefit streams associated with wholesale market impacts, depending on resource type.



Methodologies

The following methodologies calculate the total impact of each component in real dollars. Total Benefits will be equal to the sum of the net present value (NPV) of each benefit component over the life of the NWS, and total costs will be the sum of the NPV of each cost component.

Total NPV Benefits are then compared to Total NPV Costs to assess net benefits. The MUCT will establish the benefit-to-cost ratio by dividing Total NPV Benefits by Total NPV Costs.

Bulk System Impacts

Energy

Component Type: Quantitative benefit or cost.

Definition & Rationale: Non-wire solutions (NWS) might change the magnitude of energy (i.e., kWh) that a distribution company procures through the ISO-NE wholesale energy market, which could result in a net increase or decrease in energy costs. Hourly Locational Marginal Prices (LMPs) specific to the Connecticut zone are an appropriate proxy for the marginal value of the state's avoided/increased energy use.

Data Sources & Assumptions:

Inputs	Source
Generation Profile(s)	Annual 8760 forecasted load shape provided by the project proponent, identifying, and incorporating a technology degradation rate
Hourly Marginal Energy Costs	AESC
Wholesale Risk Premium	AESC
Marginal Line Loss Factors	AESC and Distribution Companies
Annual RPS Compliance Costs	AESC

Notes:

- The energy component includes the Regional Greenhouse Gas Initiative (“RGGI”) and NOx and SOx regulatory compliance costs, a wholesale risk premium, and line losses.
- The NWS's location, whether in front of the meter (FTM) or behind the meter (BTM), will impact how line losses are applied to the energy impact. The electricity generated by customer-sited DG resources reduces the amount of energy that would otherwise be distributed through the distribution network. Any surplus energy exported back to the grid is assumed to be distributed within the distribution network. Therefore, the avoided distribution line losses apply only to the behind-the-meter or self-consumed portion of the energy produced by the

distributed energy resource. If the energy is exported to the distribution or transmission grid, appropriate derates should be applied to the line loss factors.

- Line loss benefits are calculated at the margin. Marginal losses have been estimated to be approximately 1.5 times average losses.[9]
- Renewable Portfolio Standard (RPS) compliance costs are proportional to retail sales. Reductions in retail sales through behind-the-meter consumption reduce RPS compliance costs, while electricity exported back to the grid does not. Therefore, the NWS's location, whether in front of the meter (FTM) or behind the meter (BTM), will impact the RPS compliance requirements for the distribution utility.

Capacity

Component Type: Quantitative benefit or cost.

Definition & Rationale: The reduction or increase in a distribution company's capacity payment obligation resulting from a decrease or increase in system demand (i.e., kW) that is coincident with the annual ISO-NE system peak. The value of capacity is determined by the ISO-NE Forward Capacity Market (FCM) and adjusted to reflect variation between the Forward Capacity Auction (FCA) clearing price and the actual cost of capacity procured through the market.

Data Sources & Assumptions

Inputs	Sources
Forecasted Capacity Prices	AESC
Effective Charge-Rate (by zone)	ISO-NE FCM Net Regional Clearing Price and Effective Charge-Rate Forecast.
Wholesale Risk Premium	AESC
Reserve Margin	AESC
Line Losses	AESC and Distribution Companies

Notes:

- To accurately calculate the average capacity contribution of a Non-Wires Solution the focus is on performance during the peak hours of the ISO New England (ISO-NE) system. This involves using the hourly ISO-NE system load profiles from the Avoided Energy Supply Component (AESC) study. These load profiles are instrumental in pinpointing the peak hours for each year, reflecting the impact of electrification in transportation and heating on the system's peak demand.

[9] Regulatory Assistant Project. 2011. Valuing the Contribution of Energy Efficiency to Avoided Marginal Line Losses and Reserve Requirements.

- The ISO-NE Forward Capacity Auction (FCA) sets the capacity price three years in advance of the capacity need; therefore, the actual cost at the time of delivery can differ from the auction's clearing price. The "effective charge rate" is a predictive factor for the variance between these future auction prices and the actual prices at which capacity is procured. However, effective charge rate forecasts are typically short-term. To develop long-term forecasts, it is recommended that a trend between the near-term effective charge forecasts and the FCA prices be established and then extrapolated to estimate capacity prices over the lifetime of the solution.

Market Price Effects

Component Type: Quantitative benefit or cost.

Definition & Rationale: The electricity generated or consumed by an NWS changes the energy and capacity procured through the wholesale electricity and natural gas markets. This change in demand results in a shift in market clearing prices, and this price shift, also called Demand Reduction Induced Price Effects (DRIPE)—may be passed on to market participants and their customers.

This component includes the impact of a shift in energy prices (Energy DRIPE), capacity prices (Capacity DRIPE), and the indirect price impacts between gas and electricity prices (Electric-to-Gas-to-Electric or Cross-DRIPE). It includes only the DRIPE impact on Connecticut ratepayers, not the impacts to the entire ISO-NE load.

Data Sources & Assumptions

Inputs	Sources
Gross Energy DRIPE Forecast	AESC
Price and Demand Elasticity	AESC
Uncleared Capacity DRIPE Forecast	AESC
E-G-E DRIPE Coefficients	AESC
Reserve Margin	AESC
Line Losses	AESC and Distribution Companies

Ancillary Services

Component Type: Quantitative benefit or cost.

Definition & Rationale: This component represents an increase or decrease in ancillary services that are procured through the market in order to maintain grid stability. It is assumed that any increase or decrease in wholesale load due to NWS production will increase or decrease the ancillary services and load obligation charges that are assessed to Connecticut load serving entities, resulting in either an increase or decrease in costs.

Ancillary Services impacts include changes in charges levied on wholesale load obligations (i.e., First and Second Contingency, Forward and Real-Time Reserves, Regulation, Inadvertent energy, net Commitments Period Compensation (NCPC), Auction Revenue Rights (ARP) revenues, NEPOOL expenses, etc.).

Data Sources & Assumptions:

Inputs	Source
Net Change in Energy	Provided by the project proponent, identifying, and incorporating a technology degradation rate.
Load Obligation Charges	ISO-NE Wholesale Load Cost Reports.
Line Loss Factors	AESC and Distribution Companies

Transmission Charges

Component Type: Quantitative benefit or cost.

Definition & Rationale: This includes both Regional Network Service ("RNS") charges and Local Network Services ("LNS") charges, which are collected to cover the cost of upgrading and maintaining regional bulk transmission infrastructure and localized facilities. These charges are assessed monthly based on a utility's coincident peak demand with the peak load hour on the system. Therefore, any reduction in monthly coincident peak load attributable to an NWS resource would decrease the RNS and LNS charges assessed to a utility and, ultimately, ratepayers (i.e., avoided transmission charges). An NWS resource also has the potential to increase demand during the peak hour, thus increasing the charges assessed to a utility (i.e., a cost rather than a benefit).

Data Sources & Assumptions

Inputs	Sources
Historic RNS Charges	ISO-NE Load Cost Reports
Historic LNS Charges	Utility data request; docket filings
Regional Network Load	ISO-NE RNL Reports
Line Losses	AESC and Distribution Companies

Distribution System Impacts

Distribution Capacity

Component Type: Quantitative benefit or cost.

Definition & Rationale: An NWS resource has the potential to avoid or defer capacity-related investments on the distribution system (e.g., substations or circuits), if the project reduces load during hours associated with reliability concerns. These capacity deficiencies are highly locational. Conversely, the NSW resource may introduce additional capacity-related investments on the distribution system.

Methodology: The distribution capacity impact is equivalent to the deferral value of the NWS(s) based on the Real Economic Carrying Charge, which shapes the deferral capacity value over the life of the asset and adjusts that with inflation. This location-specific value will be provided by the utility and will include deferred capital expenditures, deferred O&M, and deferred taxes over the expected contract term.

Distribution Operation & Maintenance

Component Type: Quantitative benefit or cost.

Definition & Rationale: There are costs associated with maintaining safe and reliable operation of distribution facilities (e.g., maintaining substations, poles and wire as well as replacement of portions of the system over time). These variable costs are partially a function of the volume of energy that is transferred through the system. This component may be a benefit if the NWS project decreases costs associated with infrastructure maintenance and/or replacement, or a cost if increased investment in distribution system O&M – beyond the deferred upgrade directly associated with the NWS – is incurred as a result of the NWS.

Methodology: This location(s)-specific value will be provided by the utility.

Distribution Voltage

Component Type: Quantitative benefit or cost.

Definition & Rationale: This component refers to voltage regulation, which is required to ensure reliable electricity flow throughout the distribution system at an acceptable range in order to match real and reactive power production with demand.[10] An NWS resource may provide a benefit if it helps address a voltage issue or a cost if adding the NWS project negatively impacts voltage regulation. This component should not take into account impacts already accounted for under the ancillary services or distribution capacity components.

Methodology: This location(s)-specific value will be provided by the utility.

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[10] Adapted from the NESP *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources* (August 2020)

Reliability

Component Type: Quantitative or qualitative benefit or cost.

Definition & Rationale: As noted in the NESP *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*: "The U.S. Department of Energy defines reliability as the ability of the system or its components to withstand instability, uncontrolled events, cascading failures, or unanticipated loss of system components (DOE 2017c, page 4-1)." Reliability is defined here as the relative value of reducing the probability and duration of system events, and the value will be a function of the availability of capacity and infrastructure conditions. To note, this component should not double-count impacts accounted for under the Resilience component.

Data Sources & Assumptions

Inputs	Sources
Probability of a System Outage	Utility
Average Annual Outage Duration	System Average Interruption Duration Index (SAIDI) prepared by the utilities
Value of Lost Load:	EPRI, Utility Data, AESC

As a result of Docket No. 24-08-08: NWS Initiation Phase's Final Decision issued on December 18, 2024, the Process Monitor and the EDCs will collaborate and submit a modified methodology for calculating the reliability and resilience components of this BCA reference manual to align with the RE08 Decision. No later than June 17, 2025, the Process Monitor shall submit the updated reference manual as a motion for Authority review and approval in this proceeding.

Non-Wires Solution

Utility/Solution Cost

Component Type: Quantitative cost.

Definition & Rationale: Adding an NWS resource to the distribution system results in project and program related costs. This cost component includes 1) the capital cost for the NWS project, 2) annual O&M project-related costs, and 3) program administrator and financing incentive costs related to administration, incentives (e.g., for participating in DR events), metering, billing, collections interconnection costs (that are not reimbursed), evaluation, and other program-related costs.

Methodology: User-defined inputs provided by the project proponent. Anticipated revenues from each wholesale and retail market stream will be presented in the bid pricing proposal.

Utility Performance Incentive

Component Type: Quantitative cost.

Definition & Rationale: As outlined in the Decision and Design Document, utilities may earn a shareholder incentive for NWSs in the form of a Shared Savings Incentive. Ratepayers will receive 75 percent of the projected net benefits over the asset(s)' lifetime and the utility may collect the remainder. These earning represent a program delivery cost and will be added to the total cost of the NWS project at the end. In other words, the performance incentive is not treated as an upfront cost, for the purposes of screening to quantify the net benefits but it is included to reflect the net benefits accruing to ratepayers and society.[11]

Methodology: User-defined inputs as per the methodology outlined in the Decision and Design Document.

[11] Note that any solution with higher net benefits than another solution will still produce higher net benefits following subtraction of the ratepayer costs tied to the Utility Performance Incentive.

Other Resource Impacts

Natural Gas

Component Type: Quantitative benefit.

Definition & Rationale: This benefit component represents avoided fuel costs associated with the on-site use of natural gas – i.e., a reduction or displacement in the use of natural gas-fired equipment in homes and buildings. This includes commodity, storage, and distribution costs.

Data Sources & Assumptions:

Inputs	Sources
Net change in natural gas consumption	Provided by the project proponent
Natural gas costs	AESC

Oil & Propane

Component Type: Quantitative benefit.

Definition & Rationale: This benefit component represents avoided fuel costs associated with the on-site use of heating oil and propane – i.e., a reduction or displacement in the use of other fossil fuel-fired equipment in homes and buildings. This includes commodity, storage, and transportation/delivery costs.

Data Sources & Assumptions:

Inputs	Sources
Net change in oil or propane consumption	Provided by the project proponent
Oil and propane costs	AESC

Water

Component Type: Qualitative benefit.

Definition & Rationale: This component refers to avoided water consumption and the related cost savings. This will be primarily relevant for energy efficiency measures and are not likely to be significant. A project proponent may speak to the potential water savings benefits associated with the NWS resource.

Societal Impacts

Non-Embedded GHGs

Component Type: Quantitative benefit.

Definition & Rationale: While avoided GHG program compliance costs from the Regional Greenhouse Gas Initiative ("RGGI") are embedded in the avoided energy component (i.e., in the wholesale energy price), there may also be additional, non-embedded GHG benefits (i.e., externality benefits) associated with reduced GHG emissions provided the marginal resource is a fossil fuel-fired generator. This benefit component includes carbon dioxide ("CO_2") emissions but does not include avoided methane emissions given challenges to accurately quantify upstream savings and U.S. federal government efforts to reduce upstream methane emissions through a proposed rule for new and existing facilities.

Data Sources & Assumptions:

Inputs	Sources
Societal Cost of Carbon (1.5% discount rate scenario)	AESC
RGGI Allowance Price Forecast	AESC
Generation Profile(s)	Average 8760 forecasted load shape over the solution's lifetime, provided by the project proponent, identifying, and incorporating a technology degradation rate
Marginal Emission Rates	AESC
Line Losses	AESC and Distribution Companies

Notes:

- The AESC study includes two approaches for calculating the value of avoided carbon emissions – a marginal abatement cost test and the Social Cost of Carbon (SCC). The SCC method and forecast in the AESC is recommended give challenges related to establishing marginal abatement projections at a regional perspective.

Public Health

Component Type: Quantitative and qualitative benefits.

Definition & Rationale: This component includes both quantitative and qualitative benefits. In terms of quantitative benefits, while avoided nitric oxide/nitrogen dioxide ("NO_x") environmental program compliance costs are embedded in the avoided energy component (i.e., in the wholesale energy price), there are additional non-embedded NO_x benefits (i.e., externality benefits) from avoided fossil fuel generation which support better health outcomes. This component does not include sulfur dioxide ("SO_2") or particulate matter – both of which are excluded from the AESC study, which assumes all coal-fired generation is off-line by 2025.

In terms of qualitative benefits, a project proponent may speak to the reduced healthcare costs, more broadly, from reduced emissions from fossil fuel-fired generation.

Data Sources & Assumptions:

Inputs	Sources
Price per short ton NO_x	AESC
Marginal emissions rate for NO_x	AESC
Generation Profile(s)	Average 8760 forecasted load shape over the solution's lifetime, provided by the project proponent, identifying, and incorporating a technology degradation rate
Wholesale Risk Premium	AESC
Line Losses	AESC and Distribution Companies

Notes:

- The most recent AESC study assumes no embedded NOx prices in the wholesale energy cost projections since New England states are exempt from the CSAPR program and state specific regulations (e.g., in Connecticut) are unlikely to be binding. Therefore, unlike the societal GHG benefit, the externality benefit from avoided NOx is equal to the total price per short ton in the AESC study with no adjustment. This should be revisited should program requirements change.

Economic and Jobs

Component Type: Qualitative benefits.

Definition & Rationale: There are macroeconomic benefits associated with investing in new NWS projects in Connecticut. These include direct, indirect, and induced impacts related to GDP and employment as well as fiscal benefits, which occur during the construction/implementation of an NWS and over the lifetime of the resource. These benefits are resource and context specific. A project proponent may speak to the potential economic and jobs benefits associated with the NWS resource.

Resilience

Component Type: Qualitative benefit.

Definition & Rationale: Resilience services are defined here as the ability of an NWS resource to provide back-up power to a customer or area on the distribution grid in the event that utility electricity services are lost and support rapid recovery from the event. In addition, an NWS may provide broader distribution system benefit, for example black start or ramping capabilities. While resilience services may have significant value to a customer and the distribution system, it is highly context specific. A project proponent may speak to the potential resilience benefit of the NWS resource.

As a result of Docket No. 24-08-08: NWS Initiation Phase's Final Decision issued on December 18, 2024, the Process Monitor and the EDCs will collaborate and submit a modified methodology for calculating the reliability and resilience components of this BCA reference manual to align with the RE08 Decision. No later than June 17, 2025, the Process Monitor shall submit the updated reference manual as a motion for Authority review and approval in this proceeding.

Energy Security

Component Type: Qualitative benefit.

Definition & Rationale: This benefit component (or benefit/cost in the case of storage), relates to reduced reliance on fuel and/or energy imports from outside of the state, region, or country, which increases energy independence.[12] A project proponent may qualitatively speak to the potential for improved energy security from the NWS project; ensuring that they are not double-counting utility system reliability.

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[12] Adapted from the NESP *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources* (August 2020)

“NO DISCLAIMERS” POLICY

This report was prepared by Dunsky Energy + Climate Advisors, an independent firm focused on the clean energy transition and committed to quality, integrity and unbiased analysis and counsel. Our findings and recommendations are based on the best information available at the time the work was conducted as well as our experts' professional judgment.
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