ONTARIO ENERGY BOARD

Benefit-Cost Analysis Framework for Addressing Electricity System Needs

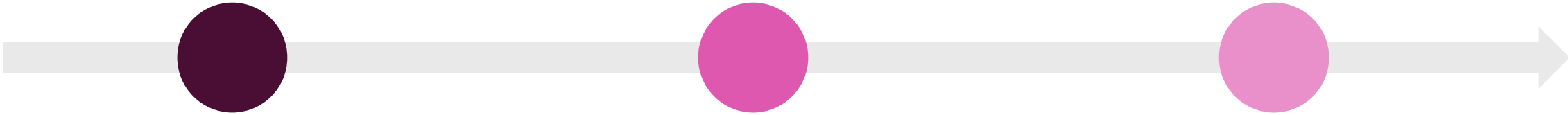
EB-2023-0125: Final Phase One Webinar and Walkthrough

Agenda

- Today's session is to close out the development of Phase One and provide an example-based walkthrough of the final Phase One Benefit-Cost Analysis (BCA) Framework.
  - As part of Phase One, a Distribution System Test (DST) and a simplified Energy System Test (EST) were developed for electricity distributor use.

- The structure of today's one-hour session is as follows:
  1. OEB staff introduction (10 minutes)
  2. BCA Framework walkthrough by Guidehouse (40 minutes)
  3. Stakeholder questions and answers (10 minutes)

BCA Framework development



October 2023

Project Plan

Outlined project plan to develop Phase One of the BCA Framework

Received written feedback from 10 stakeholders on the Project Plan & approach

January 2024

Draft BCA

Sought feedback on the draft Phase One BCA Framework

Received written feedback from 17 stakeholders

May 2024

Final BCA

Phase One BCA Framework published on May 16, 2024

Stakeholder walkthrough June 20, 2024

Key updates based on stakeholder feedback

Cost threshold for BCA Framework applicability

Required when the projected cost of the proposed solution to an electricity system need **exceeds the materiality threshold** of an electricity distributor.

Mandatory when the projected capital cost of the proposed solution to an electricity system need **exceeds $2 million**.

BCA Framework effectiveness date

- Effective for all rate applications seeking approval for the **2026 rate year and onward**.
- Applications starting with the 2026 rate year are expected to be consistent with the BCA Framework.

- **Effective now for all new project planning activities, including new projects and projects in early stages**.
- Expectation that all applications filed in 2026 should be consistent with the BCA Framework.
- Distributors filing rate applications in 2024 or 2025 are encouraged to use the BCA Framework, particularly for applications requesting funding for an NWS.

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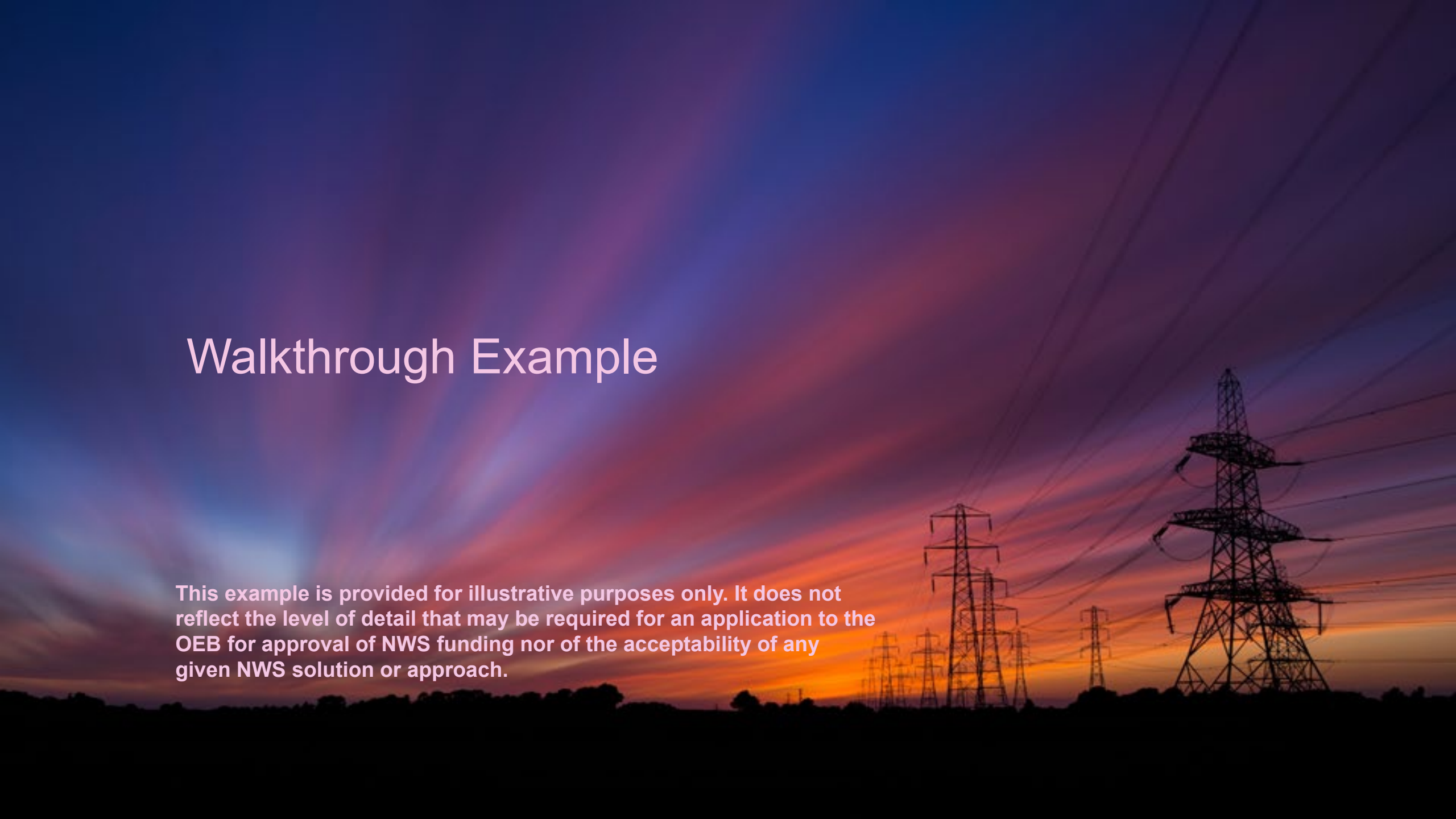

Walkthrough Example

This example is provided for illustrative purposes only. It does not reflect the level of detail that may be required for an application to the OEB for approval of NWS funding nor of the acceptability of any given NWS solution or approach.

Guidehouse

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Benefit-Cost Analysis Framework

Summary Webinar

2024-06-20

Agenda

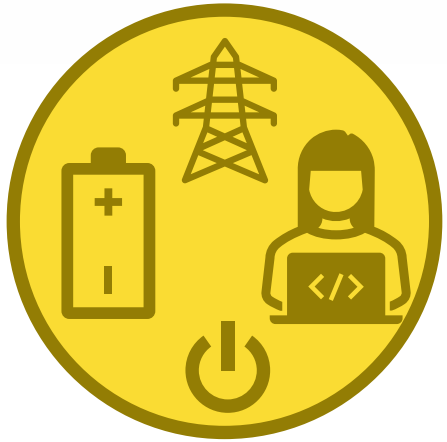
1. Critical Points to Remember
2. Structure of BCA Submission
3. Illustrative Summary Example

Critical Points To Remember

Critical Points to Remember

Show Your Work, Cite Your Sources, and Flag the Risks.

Remember the Perspective of the Test



Consider the Fixed Cost of Market Transformation

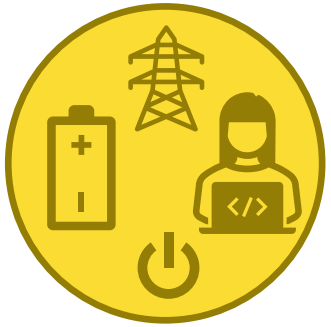
Show Your Work, Cite Your Sources, and Flag the Risks.

It is good practice in conducting a BCA to ensure that your work is:

- **Traceable.** All inputs include specific sourcing (e.g., “Source: Internal utility data” is insufficient). Links should be provided to all publicly available sources, and descriptions provided of proprietary or confidential source data and documents.
- **Transparent.** High quality work will be accompanied by workbooks or code snippets that demonstrate the transformations applied to inputs to develop the estimated outputs.
- **Reproducible.** Workbooks or code snippets are most useful when accompanied by text or comments describing the logical flow. Workbooks should use formulas to preserve a chain of continuity between outputs and inputs.

Remember the Perspective of the Test

- The perspective of the Distribution Service Test is one that seeks to optimize the long-term net distribution service benefits to the customers receiving service from a given electricity distributor, as a group.
- Consideration of the perspective of the test should be the primary determinant of whether (and how) to include a cost or a benefit in the analysis.



Consider the Fixed Cost of Market Transformation

- Distributors have been deploying poles and wires for a hundred years. Deploying distributed energy resources (DERs) as non-wires solutions (NWS) is new.
- When considering what costs to include in the BCA, **think carefully about whether that cost truly is an expense related to the specific NWS under consideration, or whether it is an overhead or capital cost associated with enabling the deployment of NWS**.
- The costs of enabling infrastructure to manage and control DERs deployed as NWS should be excluded from BCA costs unless they can be demonstrated as being unique for the given project.
- Distributors must still demonstrate the need for, and prudency of, these (enabling/market transformation) investments per the OEB's filing requirements for rate applications.

Structure of a BCA

Structure of BCA

1. Description of Need
2. Alternatives Considered
3. Cost Effectiveness Test
    a) DST Benefits
    b) DST Costs
    c) EST Benefits & Costs (optional)
4. Qualitative Considerations
    a) Distribution Service Benefits
    b) Distribution Service Costs
    c) Energy System Benefits & Costs (optional)
5. Outcome
6. Risks and Mitigation

Prior to producing a BCA distributors should conduct a pre-assessment to identify whether there is a reasonable expectation that an NWS may be a viable approach.

Illustrative Summary Example

Although similar to the first example published with the draft BCA Framework, some details have been changed to help illustrate the critical points noted above.

Example Summary. Transformer Station Deferral.

Driver of Need 	Increasing density, hotter summers exacerbated by an urban microclimate is accelerating growth of summer peak demand at one of the distributor's transformer stations (TS).
Alternatives Considered 	Expand TS by 2026 for $60 million or procure demand response (DR) from large non-residential customers and defer expansion by 5 years (per current demand forecast).
Cost-Effectiveness Test 	The net present value (NPV) of TS expansion deferral to customers is estimated to be approximately $11.3M and the incremental cost of acquiring and enabling the DR is approximately $3.6M, resulting in a net Distribution Service benefit of approximately $7.7M
Qualitative Considerations 	Demand forecast risk is asymmetric; if demand growth slows or flattens, the increase in net benefits is much greater than the decrease in net benefits if demand growth accelerates. Provides an opportunity to test newly acquired systems designed for NWS control and asset monitoring.
Outcome Risks & Mitigation 	The positive net benefits and qualitative considerations indicate that the NWS option should be selected. The distributor has identified key load forecast, participant enrolment, and technical risks and committed to developing more formal mitigation plans.

Driver of Need – Transformer Station Capacity

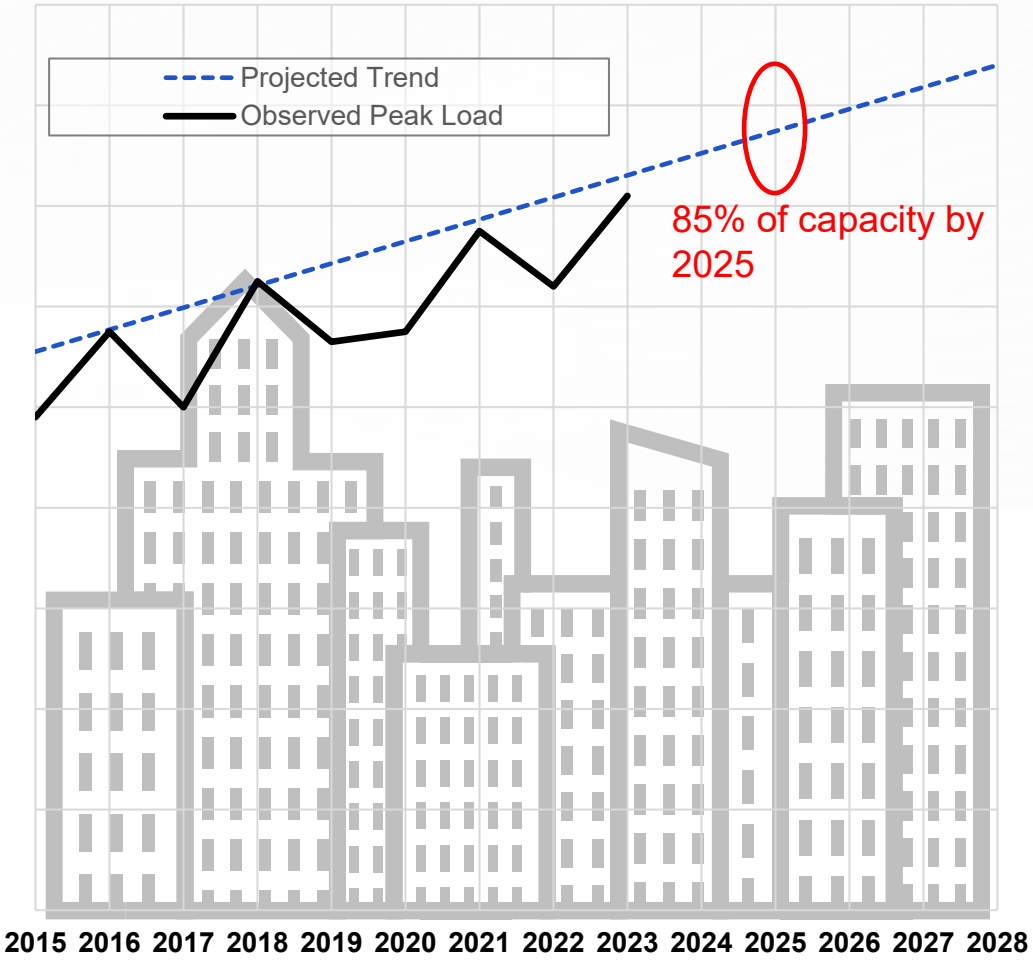
New Build Load Growth Requires TS Expansion

Load Characteristics

- Summer-peaking asset. Peaks weather-driven (cooling loads).
- TS load profile driven by large non-residential urban building loads (late afternoon peak).
- Load growth driven by new build (larger buildings) and densification.

Asset Characteristics

- Projected to reach 85% of loading by 2025
- Reference case: expansion of TS in 2026 to accommodate growth.
- Challenges of urban location make expansion costly



Alternatives Considered

Doing nothing would result in busses at the TS being loaded at 90% or more by 2025, making it unable to connect new customers without an unacceptable risk of failure under peak conditions.

Doing nothing could compromise reliability. **The system need is non-discretionary.**

Expand TS
(Traditional Infrastructure Solution)

The traditional infrastructure solution: acquire new buildings, install new transformers, breakers, tie switchgear, etc. Must be in place by 2026. Urban location means elevated labour and real estate costs.

Estimated capital cost of expansion: $60 million.

Deploy Demand Response
(Non-Wires Solution)

Asset load is weather-driven, can be reasonably accurately predicted day-of and so is suitable for DR.

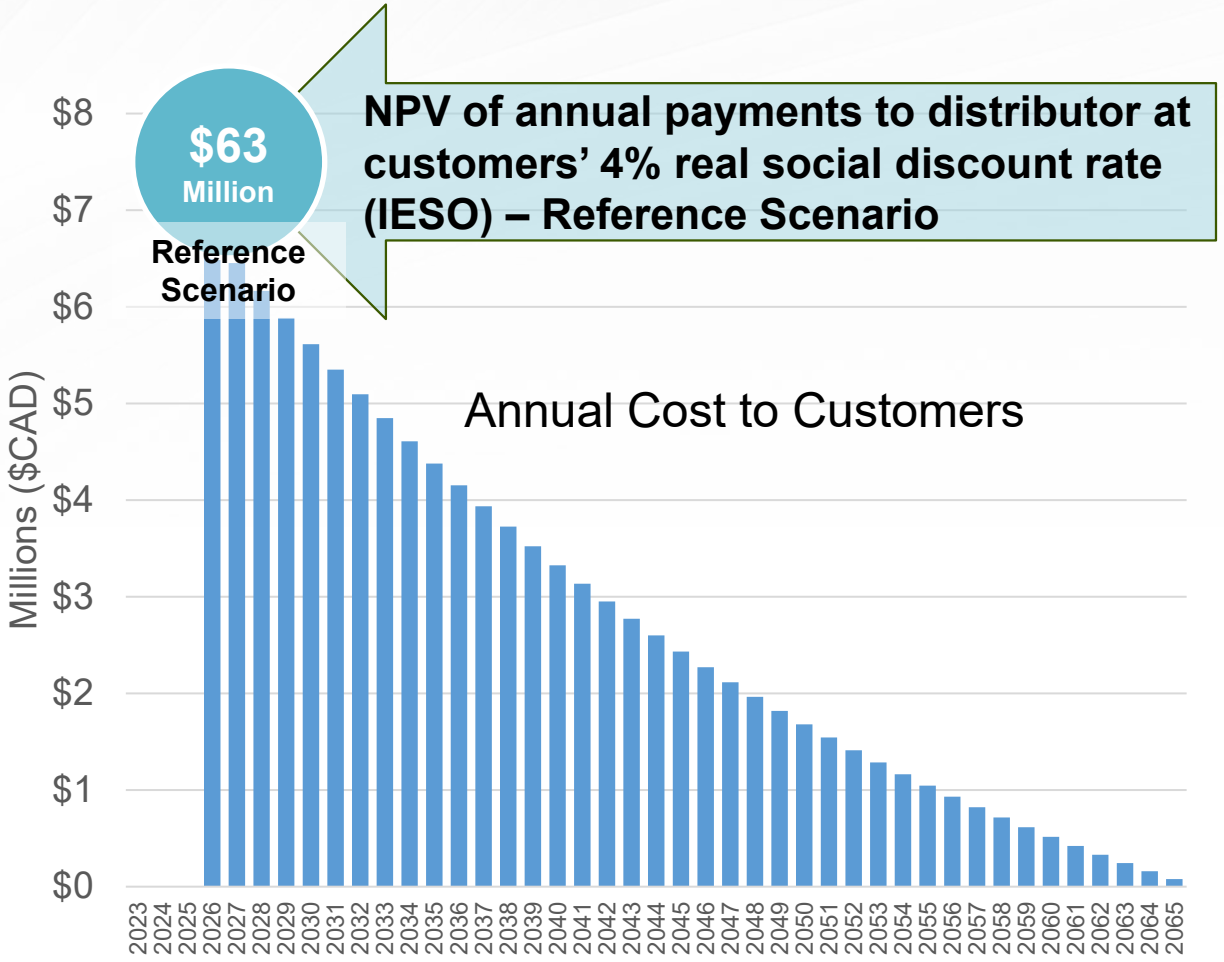
The demand forecast shows that 10 MW of capacity would be sufficient to defer infrastructure investment by 5 years.

Research indicates that incentive and all admin costs for procuring 10 MW of capacity would be ~$4.5 million.

As a non-discretionary need, the traditional infrastructure solution is the reference scenario against which the NWS benefits and costs are evaluated.

Distribution Service Test Benefit (1/2)

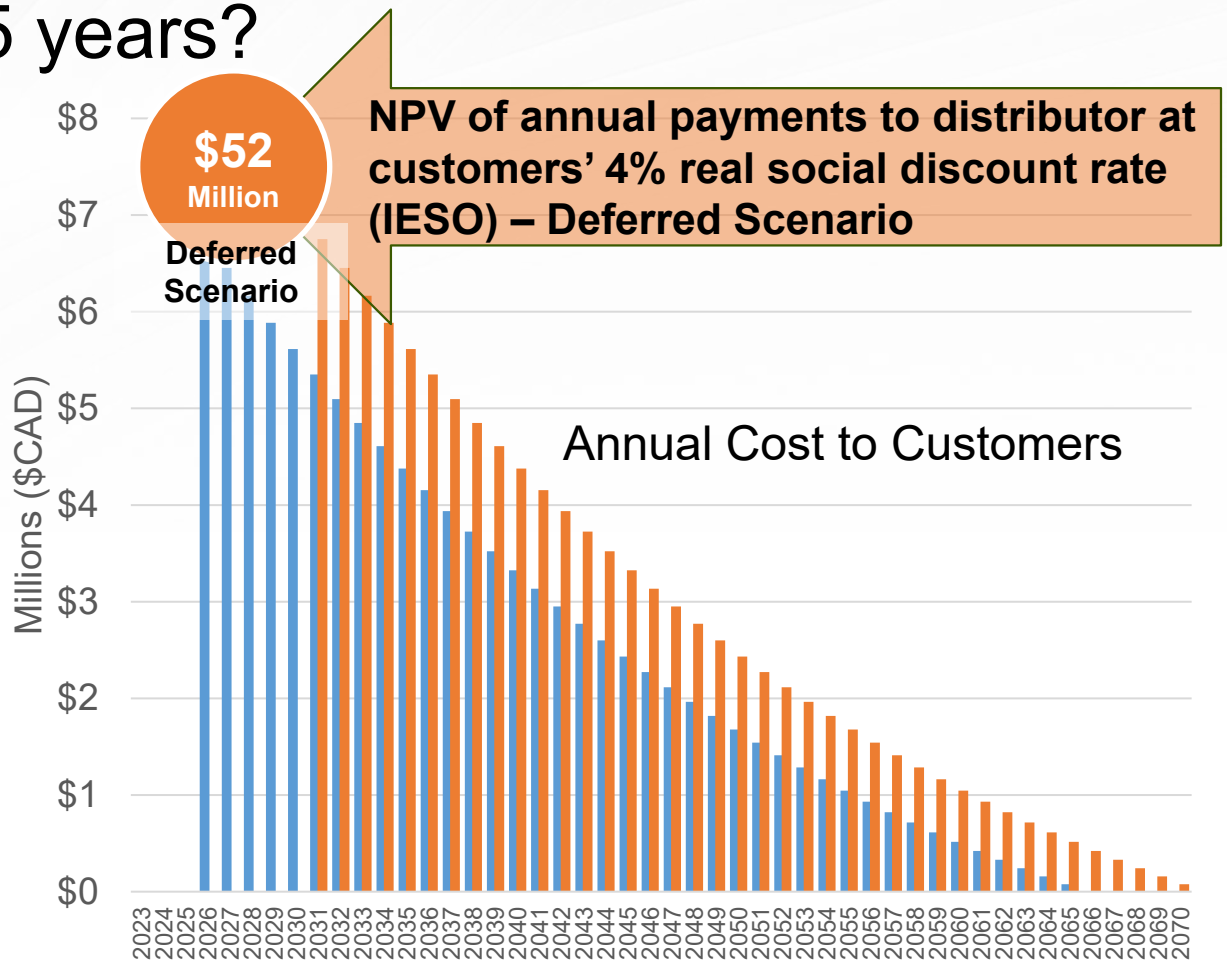
What is the cost of the reference scenario to customers?



- The principal cost to customers of the infrastructure is present value (PV) of distributor's annual revenue requirement for the $60 capital expenditure.
- The distributor calculates its annual revenue requirement as a function of its OEB-allowed return on equity (ROE), debt/equity ratio, etc.
- The PV in 2023 of the stream of payments made by customers to the distributor through their rates to ensure TS expansion by 2026 is ~$63 million.

Distribution Service Test Benefit (2/2)

What is the benefit to customers of deferring the reference scenario by 5 years?



Deferring the reference scenario infrastructure investment pushes back in time the start of the annual stream of payments customers must make to the distributor through rates.

Deferral drives benefit:

Distribution Service Test Costs (1/2)

Carefully consider which costs to include…

NWS Acquisition Costs

- Availability Payments.
- Marketing Costs
- Enrollment Costs
- Program-Specific Equipment Costs

OM&A Costs

- Performance Payments.
- Administrative Costs
- Project Management Costs
- Evaluation, Measurement, and Verification Costs

PV of NWS costs for 5-year deferral = $3.6 million

Distribution Service Test Costs (2/2)

… and which costs to exclude.

Example 1: NWS-Enabling Infrastructure

In order to be able to dispatch DERs as NWS, the distributor must acquire and implement an Advanced Distribution Management System (ADMS).

Although this NWS cannot be implemented without an ADMS, the ADMS would be acquired even if this NWS was not being considered, as it would be necessary for many other future NWS implementations.

This capital cost should be excluded from the BCA.

Example 2: FTEs Supporting NWS Implementation

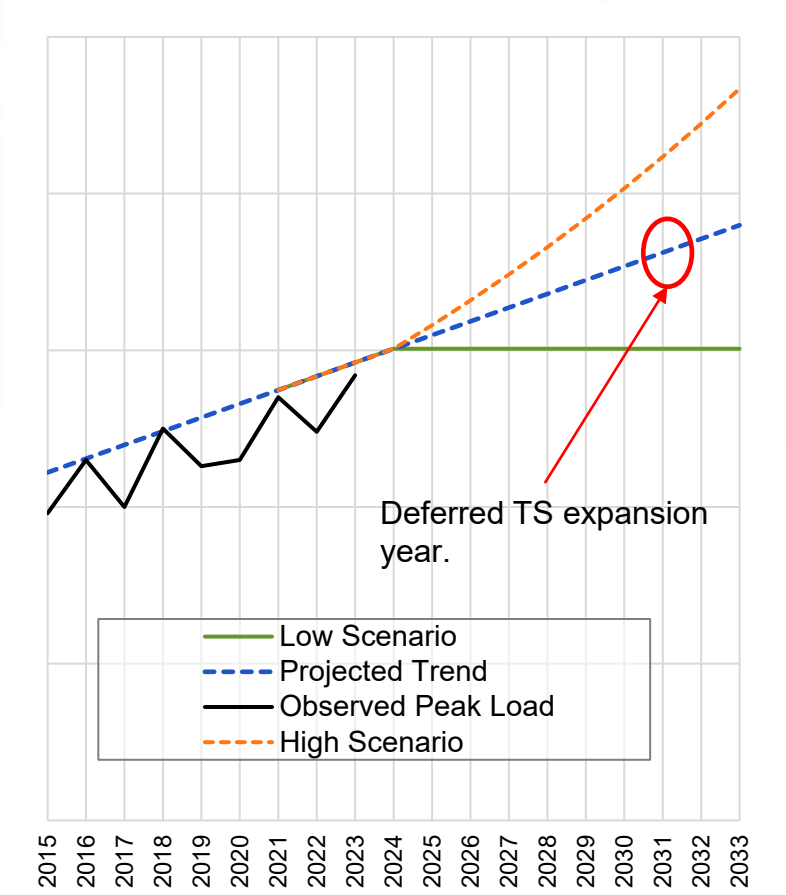
Carefully consider what project management and staffing costs are truly incremental for the specific NWS.

If the staffing need for implementing and managing the NWS acquisition, implementation, and management is approximately the same as that required for the infrastructure investment, and no incremental hiring is required, it may be appropriate to exclude some admin and PM costs.

Only incremental personnel costs over the period of analysis should be included in the BCA

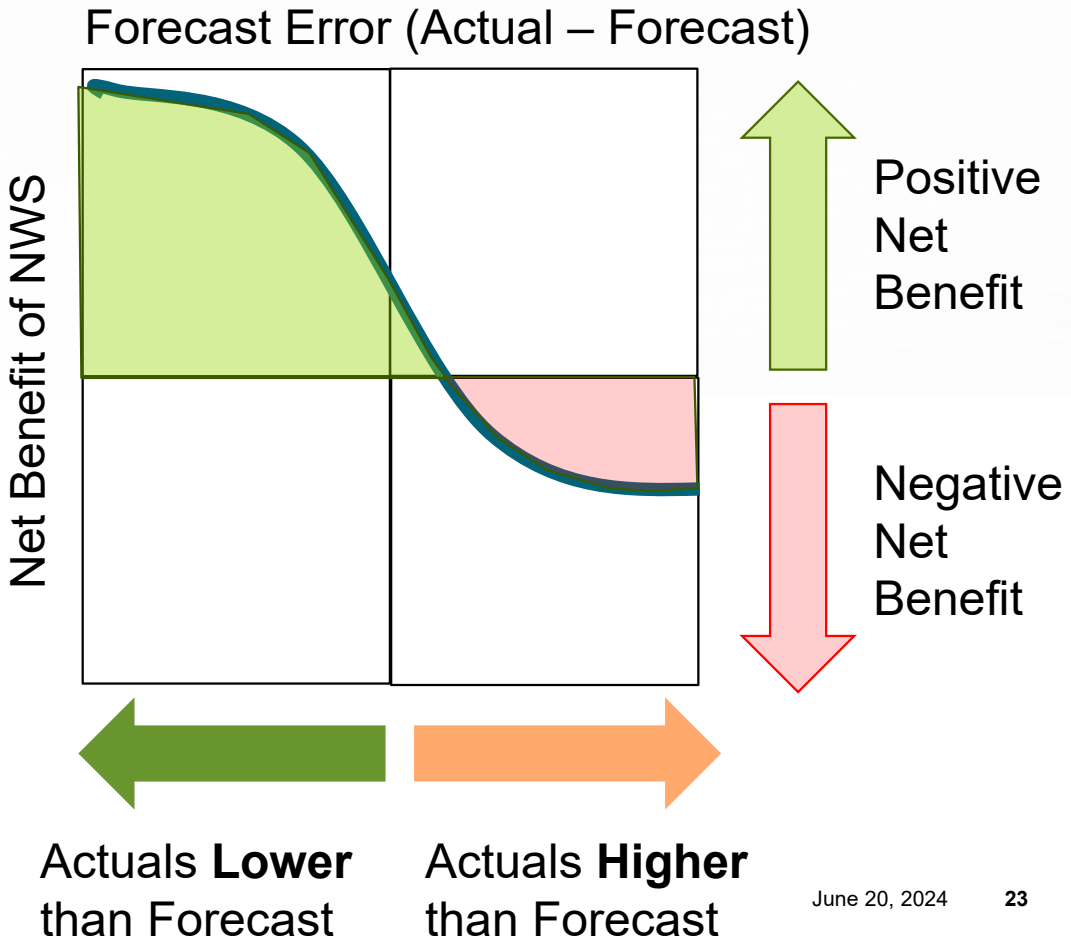
Qualitative Considerations (1/2)

The peak demand forecast is uncertain



The incremental **benefits** if the forecast is too high are much higher than the incremental **costs** if the forecast is too low.

The consequences of forecast error are not symmetric – if growth is lower than expected, value of NWS grows significantly.



Qualitative Considerations 2/2

The NWS provides additional opportunities to develop future demand-side opportunities and reduces construction-related traffic disruptions.

Develop Future Demand-Side Opportunities

- The utility plans to use the project to **deepen relationships with key large customers** and develop a better understanding of energy management capabilities and constraints.
- This information can **provide valuable intelligence for developing DR as an NWS in other parts of its territory** and improve the accuracy of its spatial demand forecast.

Reduce Traffic Disruptions

- Ongoing work to develop public transit has resulted in economic hardship for local businesses and disruptions to residents.
- TS expansion would exacerbate this and could result in constraints from city council that could increase construction costs.
- Deferring construction by five years will reduce disruption to the area and preserve good will toward the utility.

Outcome

The BCA indicates that proceeding with the proposed DR NWS is more cost-effective than making an infrastructure investment.

- **The Distribution Service Test estimates significant net benefits of proceeding with the NWS.**
  - The costs estimates used to derive the estimated net benefits are robust and aligned with those of comparable projects.
  - The sources of these data are identified and are credible firms.
  - The methods used to derive estimated benefit and cost value streams are aligned with best practice and the guidance of the BCA Framework.
- **Qualitative analysis by the utility has identified important but difficult-to-quantify benefits as part of the BCA.**
  - The utility has provided capsule case studies of asset forecasts that have under- or over-forecast peak demand to qualitatively describe the uncertainty
  - The utility has shared a detailed table of future opportunities for consideration, and a summary of news reporting on traffic concerns in the region of the existing TS

Risks and Mitigation

The utility has identified the risks of most concern and provided a formal mitigation plan to minimize erosion of net distribution service benefits.

Risk	Mitigation Plan
1. **Participant Acquisition Risk.** Risk of insufficient customers enrolling.	*Customer Research & Contingency Funding*. The utility has presented interview and survey data from customers assessing willingness to accept and compared anticipated incentives and design against programs deployed in other jurisdictions. The utility has identified contingency funding in case a sign-up bonus is required.
2. **Technology Risk.** Risk that customer dispatch and monitoring technology fails to perform.	*Testing & Quality Control (QC) Plan.* The utility has defined a robust testing protocol to ensure that a) peak conditions can be accurately targeted, and b) customers curtail when dispatched.
3. **Load Forecast Risk.** Risk associated with load forecast uncertainty.	Addressed in qualitative considerations
Etc.	

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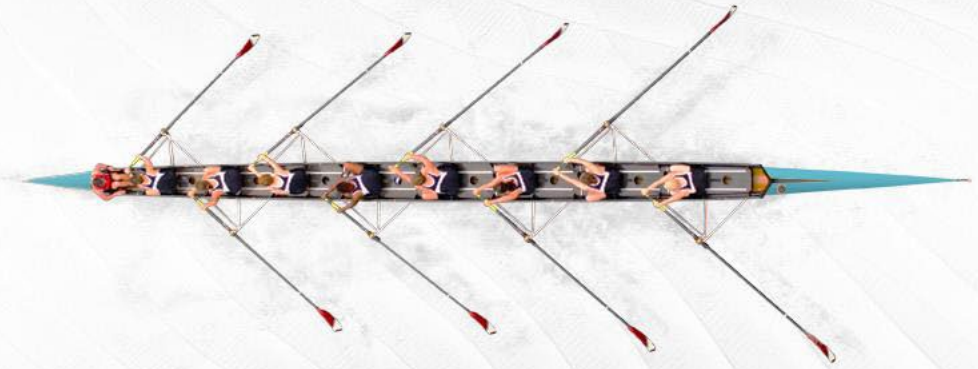

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Outwit *Complexity*

Path forward and next steps

- **Cost Awards:** A Notice of Hearing for Cost Awards for Phase One BCA Framework stakeholder activities is forthcoming.

- **References:** Development of Phase One of the BCA Framework is now complete. Reference to the BCA Framework has already been included in the OEB's recently issued Non-Wires Solutions Guidelines for Electricity Distributors.

- **Next Steps:** The OEB will kick-off Phase Two in its Q2 2024/2025 fiscal year, which will involve refinement of the Energy System Test, and possible consideration of societal impacts. The OEB is going to undertake internal activities in 2024 to support the development of Phase Two of the BCA. Stakeholders can expect a draft Phase Two Framework to be released in mid-to-late 2025.