

Vulnerability Assessment and System Hardening (VASH) Consultation

AMPCO Comments on Complete Vulnerability Assessment and System Hardening Report (VASH Report) & VASH Toolkit

The Ontario Energy Board (OEB) launched the VASH project on June 27, 2024 in relation to OEB's Distribution Sector Resiliency, Responsiveness, and Cost Efficiency (DRRCE) initiative.

The VASH project was launched to develop policies and a framework to address the following three electricity distributor activities identified in the Minister's November 2023 Letter of Direction:

- Incorporate climate resiliency into their asset and investment planning activities.
- Engage in a regular assessment of the vulnerabilities in their distribution system and operations in the event of severe weather.
- Prioritize value for customers when investing in system enhancements for resilience purposes

Guidehouse Canada Ltd. was retained as a consultant to assist the OEB in developing an approach, standard vulnerability assessment methodology and to include system hardening into distributor system planning processes

On July 31, 2025, the OEB issued a draft version of the complete VASH Report for stakeholder comment including a draft version of the VASH Toolkit, which provides resources to help electricity distributors identify parts of their system most vulnerable to extreme weather and assess system hardening options using an objective benefit-cost framework. These documents incorporate feedback from six stakeholder meetings and written comments received on the first iteration of the Report issued on December 17, 2024. AMPCO provided its first round of comments on January 21, 2025.

The proposed VASH Framework includes the following elements: Vulnerability Assessment (VA), guidance on incorporating Value of Lost Load (VOLL) into a standardized Benefit-Cost Analysis (BCA) for VASH, and guidance on embedding these elements into the Distribution System Plan (DSP).

AMPCO makes the following comments on the OEB's July 31, 2025 VASH Report.

General Comments

AMPCO generally supports the OEB's draft version of the complete VASH Report. It is responsive to the Minister's Directive, it includes a scan of leading jurisdictions, it incorporates

many of the earlier comments from stakeholders on the first draft, and it maintains two options for distributors to conduct VAs and BCAs: the Custom Option and the Generic Option. The Custom Option permits distributors to file a customized VA and BCA as part of their DSP whereas, the Generic Option uses the structured VASH Framework developed by the OEB with the accompanying Vulnerability Assessment and System Hardening Toolkit (VASH Toolkit). This approach appropriately takes into account the diversity of Ontario distributors.

Criticality and Value of Lost Load (VOLL) Inputs

The OEB has determined that the Interruption Costs Estimated (ICE) Calculator¹ is a low-cost and efficient option for many distributors to develop VOLL estimates to support system hardening project BCAs in lieu of conducting a provincial custom study which would consume considerable research effort and development time. The ICE calculator is a publicly available source widely used across North America, and it provides VOLL estimates in \$/outage by outage duration and customer class.

The OEB used the ICE Calculator 1.0 to conduct its comparison analysis. The OEB expects that distributors will derive project and baseline VOLLs from the ICE Calculator, specifying outage durations and customer class counts, in the absence of custom distributor-specific VOLL studies. In May 2025, LBNL published an ICE Calculator 2.0 containing updates to its survey model. The OEB proposes that Distributors may use either ICE Calculator 1.0 or 2.0 at their discretion.

AMPCO supports the use of the ICE Calculator to develop VOLL estimates but AMPCO does not support Distributors choosing whether to use the ICE Calculator 1.0 or 2.0.

The ICE Calculator 1.0 version was officially retired in April 2025 and the ICE Calculator 2.0 is the current active calculator.

ICE 2.0 uses an updated modeling and survey methodology that provides more accurate results and it can analyze a wider range of outage durations, from momentary blips to 24-hour disruptions. Further, it includes data from thousands of customers across 24 distinct U.S. utility distribution service territories, offering a broader and more consistent geographic reach. ICE 1.0 was developed in 2009 based on 15 independent power interruption cost surveys conducted by 10 electric utilities between 1989 and 2012. ICE 2.0 was developed in 2025 through a national initiative based on a consistent set of power interruption cost surveys and 11 surveying efforts conducted across 24 electric utility service territories between 2022 and 2024.²

A May 2025 LBNL Memorandum compares customer power interruption costs estimated using the recently updated ICE 2.0 to the original ICE 1.0. The Memorandum states “Overall,

¹ Lawrence Berkeley National Laboratory (LBNL) and Resource Innovations, Inc, ICE Calculator, 2025

² [LBNL ICE Calculator 2.0](#)

residential power interruption costs estimated using ICE 2.0 are lower than ICE 1.0 for the shortest duration power interruptions (interruptions lasting less than ~90 minutes), but higher for longer duration power interruptions. Interruption costs for non-residential costs are similar for shorter duration interruptions, but the ICE 2.0 estimates are 50-75% lower than ICE 1.0 for interruptions lasting 10 or more hours.³

In consideration of the above updates and lower interruption costs estimated, AMPCO submits the OEB should require Distributors to only use ICE 2.0. This will allow for meaningful relative comparability across Distributors.

VASH Framework and DSP Implementation

AMPCO reiterates its earlier comments that the Vulnerability Assessment is just one of many inputs to a utility's distribution system planning process and the Vulnerability Assessment needs to be considered in the context of all other asset management process inputs and specific utility conditions and should not automatically be given elevated significance as a planning cost driver. In other words, the Vulnerability Assessment, when incorporated into a utility's distribution system planning, should be considered and evaluated together with other inputs to determine the most appropriate and beneficial investment priorities.⁴

³ [Comparison_ICE_2.0_vs_1.0_May2025](#)

⁴ AMPCO_Comments_VASH_20250123 p. 2