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Ontario Energy Board
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August 25, 2025

EB-2024-0199 - Vulnerability Assessment and System Hardening Project
Pollution Probe Comments

Dear Mr Murray:

The Ontario Energy Board (OEB) initiated a consultation to advance the OEB's Vulnerability Assessment and System Hardening (VASH) project. On July 31, 2025 the OEB released a draft VASH Report and related toolkits, which includes resources designed to assist distributors in their preparation of VASH analyses. The draft VASH Report and VASH toolkits take into consideration feedback on the previous draft report and toolkit, based on written comments and feedback at the VASH stakeholder meetings. Pollution Probe participated in the stakeholder sessions and provided feedback on previous VASH Framework documents issued by the OEB.

The origins of the VASH project can be traced to the OEB's 2023 Improving Distribution Sector Resilience, Responsiveness and Cost Efficiency report, which was prepared in response to a request from the Minister of Energy. Furthermore, a Minister Directive was issued to the OEB on June 11, 2025, to support implementation of *Energy for Generations - Ontario's Integrated Energy Plan*, reinforcing the importance of considering frequent and extreme weather impacts on energy infrastructure resilience and encourages the OEB to support electricity distributors in integrating these considerations into their planning frameworks and processes.

The VASH project is intended to address these directives by equipping distributors with tools and methodologies to identify parts of their systems that are most vulnerable to extreme weather and to evaluate system hardening options based on an objective benefit-cost framework that prioritizes value for customers. The VASH Report outlines how distributors are expected to integrate climate resiliency into their asset and investment planning. The objective is to support decision-making so that at-risk assets are appropriately identified and that projects proposed to improve resilience of infrastructure to climate-related vulnerabilities are cost-effective when assessed by reference to value that customers put on electricity service.

As noted previously, Pollution Probe supports the OEB proposed approach to offer two options for distributors to conduct vulnerability assessments and benefit-cost analyses:

1. **Custom Option:** Allows distributors to develop tailored assessments and analyses using proprietary tools, provided they meet specific criteria, including reliance on climate projection data, asset-based approaches, and quantitative analysis of key inputs.
2. **Generic Option:** Utilizes the structured VASH Framework and Toolkit developed by the OEB, simplifying the process through standardized methodologies and guidance on sourcing input data.

Pollution Probe agrees that this dual-path approach accommodates the diversity of Ontario distributors by providing a baseline option and opportunities for variations where appropriate. It is anticipated that the majority of distributors will likely use the Generic Option. The OEB indicates that a Custom Option must adhere to the principles identified by the OEB. The principles are very broad, so it is also important that any Custom Option deliver a similar or better level of assessment and targeted outcomes when considered against those intended by the Generic Option. This requirement would help ensure that any proposed Custom Option provides the same intended value and does not dilute the outcomes. Applying the Custom Option should result in the same or better level of assessment and protection as applying the Generic Option.

Best practice elements from Custom Option approaches leveraged by distributors can be reviewed during the regular VASH (annual or as defined by the OEB) review and considered for potential inclusion in the Generic Option, where appropriate. This helps build in a needed continuous improvement loop, given that best practices are expected to evolve at a rapid pace in the future. Over time, it would be valuable to include an assessment of the effectiveness of mitigation plans and the actual costs and benefits compared to those forecasted in the distributor plans. Pollution Probe notes that the OEB identified that approach being used in New York as part of the industry scan. This approach could be phased in over time once distributors become more familiar with application of the VASH Framework.

The OEB notes that vulnerability assessment and system hardening will be incorporated into the Filing Requirements for Electricity Distribution Rate Applications (Filing Requirements), effective for applications filed in 2026 for 2027 distribution rates. More specifically, changes to the filing requirements are expected to be effective for applications filed in 2026 for 2027 distribution rates on a best-efforts basis and will become mandatory commencing with applications for 2028 distribution rates, aligning with the expectations set out in the Directive to the OEB. Given the time required to prepare and file the rate applications, it will be important to ensure that changes to the Filing Requirements enable sufficient time for

distributors to include any new requirements in their filings. Also, given that this is a new approach for many distributors, additional guidance may be required after the OEB has had an opportunity to review the first year or two of applications satisfying these new requirements.

The OEB is aware that there is variation across distributors on asset (failure) assessment and how each distributor prioritizes actions and related costs in their Distribution System Plan and related budgets. It will not be surprising to see a similar variation across distributors in their vulnerability assessments and plan prioritisation for asset hardening. In the end, the distributors are responsible for planning and managing their systems within the approvals and requirements set by the OEB. The proposed VASH Framework provides the flexibility needed for distributors to make these trade-offs, while ensuring an overall consistent approach. The VASH Framework ensures baseline consideration is applied by distributors in developing their Distribution System Plans and that areas of risk are prioritised and addressed, as appropriate.

As previously noted, Pollution Probe agrees with the five key objectives identified by the OEB:

- **It should be simple** and can be repeated by any distributor with the underlying data, methodology, and outputs easily understandable.
- **It should be appropriately granular** and provide specific predictions of the susceptibility of a given set of physical assets in a given location to a range of resiliency factors for the purposes of distribution system planning.
- **It must support the efficiency of its review process.** In combination with other evidence, the Vulnerability Assessment should yield sufficient and clear analysis that generates transparency, allows for efficient and effective adjudicative processes, and drives greater focus on the outcomes of vulnerability assessments rather than on the dissection of methods used to arrive at those outcomes.
- **It must support the effectiveness** of its review process by supporting appropriate consistency and generating confidence in the robustness of planning and the reasonableness of rate consequences of any actions or investments proposed in response to the assessment. It should also appropriately balance the benefits of structuring distributors' analysis with a degree of consistency while recognizing that distributors themselves are those who bear the ultimate responsibility for managing their assets.
- **It must take into account the diversity of Ontario distributors'** size, location, and capabilities. This includes appropriately balancing the benefits of standardization while accommodating variation among distributors.

The VASH Report notes that the OEB expects that distributors will derive project and baseline values of lost load (VOLLs) from the ICE Calculator, specifying outage durations and customer class counts, in the absence of custom distributor-specific VOLL studies. Given the comparable

analysis done by the OEB, the ICE Calculator appears to be a reasonable tool for this purpose. The OEB is likely aware that Phase 1 of the ICE 2.0 initiative was released in May 2025 and Phases 2 and 3 are underway¹. The ICE calculator was developed over 15 years ago and updates are meant to reflect more up-to-date information. Differences in the power interruption costs estimated by ICE 2.0 and ICE 1.0 are due to two main factors: (1) their respective sources of and methods to collect customer interruption cost information and (2) the resulting Customer Damage Functions (CDFs) that were developed. A summary table has been provided to show the primary differences between ICE 1.0 and ICE 2.0².

	ICE 1.0	ICE 2.0
Surveys Conducted (Years)	<ul style="list-style-type: none"> 1989-2012 	<ul style="list-style-type: none"> 2022-2024
Survey Approach	<ul style="list-style-type: none"> Administered independently Information on sample designs and recruitment procedures not available Different surveys with different questions 	<ul style="list-style-type: none"> LBNL/Resource Innovations (RI) administered in a fully coordinated manner Consistent sample designs and recruitment procedures Identical set of survey questions One-and-one-half-bound dichotomous choice contingent valuation (residential)
Geographic Coverage	<ul style="list-style-type: none"> 15 distinct surveying efforts conducted across 10 utility service territories Mostly conducted in western and southeastern U.S. 	<ul style="list-style-type: none"> 11 distinct survey activities conducted across 24 utility service territories Eastern and midwestern U.S. as well as the Pacific Northwest (future phases will additional regional representation)
Interruption Durations Considered	<ul style="list-style-type: none"> Varied and generally limited to 12 hrs or less 	<ul style="list-style-type: none"> Momentary (lasting up to 5 min), 2 hrs, 8 hrs, and 24 hrs
Customer Damage Functions	<ul style="list-style-type: none"> Residential Small non-residential Medium/large non-residential 	<ul style="list-style-type: none"> Residential Non-residential

The OEB will need to consider the appropriateness of using the ICE 1.0 or ICE 2.0 approach and if the filing requirements begin with using the ICE 1.0 model, appropriate timing will need to be considered for the transition to ICE 2.0 in the future. From an implementation and consistency point of view, it is typically more efficient to migrate to the approach and toolset that is intended for the longer term, rather than breaking implementation into different phases. Issues could also arise if a utility initially uses the ICE 1.0 calculator and then shifts to ICE 2.0 for a future rate application. Information and prioritisation integrated into a distributor's Distribution

¹ Additional information available at [ICE Calculator](#) and a webinar on the changes is available at [Release of Updated ICE Calculator: Phase 1 Peter Larsen, Joe Eto, and Kristina LaCommare - Berkeley Lab George Jiang and Chris Ramee - Resource Innovations, Inc. August 4, 2025.](#)

² Source: [ICE 2.0 vs 1.0 Comparison May2025](#)

System Plan based on the use of ICE 1.0 may be different from those that could result from use of ICE 2.0. Distributors that find themselves in that situation would need to document the changes in prioritisation and plans based on the differences flowing from the change in toolset.

Pollution Probe has reviewed the Draft VASH Toolkit and example toolkits circulated with the VASH Report and has not proposed specific edits at this time. As noted above, it will be important to get user feedback through real use of the toolset in a timely manner and also to review the results from application for 2027 rates and eventually for 2028 rate applications when the requirement become mandatory. Application of the VASH Framework should result in an evolution over time in a distributor's Distribution System Plan. Including documented VASH considerations and prioritisation in the Distribution System Plan enables the ability to consider those factors as investment plan are updated. It is recommended that a review of the VASH Framework and toolkit use be planned for approximately one year following implementation. Additional future reviews can also be planned, but a one-year review would validate that the Framework is enabling the intended outcomes, identify potential gaps and also enable opportunities for overall improvement. This timing could also align with an update to the industry scan if industry best practices have evolved significantly over that period.

Pollution Probe supports the importance of this project and the OEB's objectives to mitigate future system impacts through systematic and cost-effective approaches to mitigate these risks and impacts. Pollution Probe appreciates participating in this important project and if there are any questions on the comments above, please do not hesitate to reach out to the undersigned.

Respectfully submitted on behalf of Pollution Probe.



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