



BY EMAIL AND WEB POSTING

March 2, 2023

**TO: All Licensed Electricity Distributors
All Participants in Consultation Process EB-2021-0307
All Other Interested Parties**

**RE: Amendments to Reporting and Record-keeping Requirements
Reliability and Power Quality Review – OEB File No. EB-2021-0307**

The Ontario Energy Board (OEB) is making improvements to the Reporting and Record-keeping Requirements (RRR) for electricity distributors as part of its ongoing [Reliability and Power Quality Review \(RPQR\)](#) consultation.

The RPQR is expected to develop a comprehensive regulatory framework for reliability and power quality in the Ontario electricity sector. The OEB established the RPQR working group to provide advice and technical input. The initial phase of the RPQR focuses on enhancing and improving the reliability data reporting by electricity distributors.

On November 21, 2022, the OEB issued a [letter](#) that announced amendments to reliability reporting as part of the initial phase of the RPQR consultation. The November 21st letter introduced amendments to existing definitions for loss of supply, major event and interruption cause codes and a new requirement of sub-cause codes for interruption reporting.

Following the release of the November 21st letter, the RPQR working group continued discussions regarding loss of supply and major events as well as looking at further details regarding interruption cause codes. Today, the OEB is announcing further RRR amendments arising from those discussions, which include: (i) a record-keeping requirement to provide a breakdown of the sub-cause code 5.1 (Equipment Failure) by asset category, (ii) the removal of the fixed percentage approach for major event determination, and (iii) the addition of cause code reporting examples. The change to major event determination comes into effect immediately. All other amendments come into effect on January 1, 2024.

These amendments, which will increase consistency in reporting and provide greater insight into reliability across the sector, are made with support from the RPQR working group. These changes are also expected to assist electricity distributors in making informed investment decisions and supporting them in rate applications. Today's amendments are also important to building the foundation for future phases of the RPQR that will focus on encouraging continuous improvement in distributors' performance.

A summary of amendments related to each topic area is provided below. The actual amendments are set out in Appendices A and B to this letter.

Record-keeping: Equipment Failure Breakdown by Asset Category

In its November 21st letter, the OEB added sub-cause codes to the RRR which will come into force on January 1, 2024. In its discussions, the RPQR working group suggested adding a further breakdown to sub-cause code 5.1 (Equipment Failure) by asset category as a record-keeping requirement. RPQR working group noted that such information would allow electricity distributors to identify asset category that causes more interruptions and make informed investment decisions.

The OEB agrees that a breakdown of equipment failure by asset category will provide greater insight into the root causes of interruptions and assist electricity distributors in developing effective investment plans. Based on the input provided by the RPQR working group, the OEB understands that many electricity distributors already track interruptions by asset category and filed such information in their rate applications.

Given that asset categories used by each distributor can vary, the OEB is allowing electricity distributors to develop asset categories based on their current asset management process and capital expenditure plans. For electricity distributors who are currently recording such information, the OEB expects that these electricity distributors will at a minimum, maintain their current level of granularity when recording interruptions by asset category.

This requirement will come into effect on January 1, 2024, along with the sub-cause codes.

Simplification of the Approach to Determining a Major Event

Currently, electricity distributors follow one of the following three approaches to determine whether an interruption qualifies as a major event under section 2.1.4.2 of the RRR. The three approaches are:

- a) The IEEE Standard 1366 approach
- b) The IEEE Standard 1366 approach, using a two-day rolling average
- c) The fixed percentage approach (i.e., 10% of customers affected)

It became evident, from both OEB staff assessments of distributors' major event filings and the RPQR working group discussions, that the fixed percentage approach results in very different Major Event qualifications compared to the IEEE 1366 approaches. This, in turn, leads to inconsistent reporting among electricity distributors.

As a result, the OEB is removing the fixed percentage approach as an option for determining whether an event qualifies as a major event from section 2.1.4.2 of the RRR. The removal of the fixed percentage approach will ensure greater consistency in how electricity distributors determine and report on major events, as well as greater consistency in reporting on SAIDI and SAIFI¹ reliability measure, which are reporting on reliability impacted by major events.

This amendment will come into effect immediately.

Examples of Cause Codes

The OEB is providing examples for each cause code, which are attached as Appendix B to this letter. The examples are intended to provide electricity distributors with a better understanding of the cause codes and ensure greater consistency in reporting by electricity distributors. Many of the examples are consistent with the ones developed by Service Continuity Committee (SCC) established by Electricity Canada to allow for an easier adoption by electricity distributors who are currently using the SCC cause codes.

Appendix B also includes minor changes to some definitions of cause codes. Members of the RPQR working group supported those revisions.

If you have any questions regarding this letter, please contact Industry Relations at IndustryRelations@oeb.ca

Yours truly,

Brian Hewson
Vice President
Consumer Protection and Industry Performance

¹ SAIDI and SAIFI are System Average Interruption Duration Index & System Average Interruption Frequency Index, respectively.

Attachments:

Appendix A — Amendments to the Electricity Reporting and Record-keeping Requirements

Appendix B — Cause Code Reporting Including Examples

APPENDIX A

Amendments to Section 2.1.4.2 and Section 2.3 of the Electricity Reporting and Record-keeping Requirements

March 2, 2023

Note: Black underlined text indicates additions to the RRR and strikethrough text indicates deletions from the RRR.

Section 2.1.4.2 will be revised as follows:

2.1.4.2 Reporting on System Reliability Indicators

A distributor is required to monitor the reliability index information monthly and report for each month of the year. The following definitions apply for the purposes of monitoring and reporting on each of the system reliability indicators set out below:

Definitions:

- 4) “Major Event” is defined as an event that is beyond the control of the distributor and is:
 - a) unforeseeable;
 - b) unpredictable;
 - c) unpreventable; or
 - d) unavoidable.

Such events disrupt normal business operations and occur so infrequently that it would be uneconomical to take them into account when designing and operating the distribution system. Distributors should only report events that cause exceptional and/or extensive damage to assets, take significantly longer than usual to repair and affect a substantial number of customers.

“Beyond the control of the distributor” means events that include, but are not limited to, force majeure events and Loss of Supply events.

When assessing whether a substantial number of customers were affected and whether it took significantly longer to restore service than normal, distributors shall follow the Canadian Electricity Association’s Major Event Determination Reference Guide. As set out in the Guide, distributors shall use one of the following approaches:

- a) The IEEE Standard 1366 approach (preferred method);

- b) The IEEE Standard 1366 approach, using a two-day rolling average; or
- c) ~~The fixed percentage approach (i.e., 10% of customers affected).~~

Distributors shall include all interruptions that were caused or impacted by the Major Event but exclude those that are unrelated to the event itself. For example, if a storm only impacted a portion of the distributor's service area and resulted in a Major Event, interruptions in other portions of the distributor's service areas should not be recorded under the same Major Event, unless the restoration time of these interruptions were impacted by the storm.

The distributor should include a scheduled interruption that started before the start time of the Major Event, or if it was directly related to the Major Event (such as the interruption was scheduled in order to repair/restore the interruptions caused by the Major Event). Distributors shall not include a scheduled interruption that started after the start time of a Major Event.

Note: Generally, distributors should not report a Major Event if the root cause of the event is unknown, a fallen tree or tree branch during normal weather or environment conditions, animal contact, a scheduled interruption, equipment failure or human element.

If the distributor is of the opinion that an event, caused by any of the root causes listed above, should be considered a Major Event due to special circumstances, it should seek the OEB's guidance before reporting the interruptions under the Major Event category.

2.3 Record Keeping

This record-keeping requirement will come into effect on January 1, 2024.

2.3.14 A distributor shall maintain and provide at such times as may be requested by the OEB, records on interruptions recorded under cause code 5.1 (Equipment Failure) by asset category. The asset category could include and is not limited to poles, transformers, overhead conductor and underground cables (for example, Equipment Failure –Transformer).

The distributor shall, for each asset category, record the following data:

- a) Name of the asset category that caused the Equipment Failure interruption; and
- b) Number of interruptions that occurred as a result of the Equipment Failure interruption; and
- c) Number of customer interruptions that occurred as a result of the Equipment Failure interruption; and
- d) Number of customer-hours of interruptions that occurred as a result of the Equipment Failure interruption.

APPENDIX B

CAUSE CODE REPORTING INCLUDING EXAMPLES

Section 2.1.4.2.5 of the Electricity Reporting and Record Keeping Requirements (RRR)

March 2, 2023

Note: Black underlined text indicates additions to the RRR and strikethrough text indicates deletions from the RRR.

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	<u>Examples</u>
0		Unknown	Interruption with no apparent cause. If the interruption was caused by equipment failure and the distributor cannot determine the root cause of the failure, the interruption should be reported under <u>cause</u> code 5 (<u>cause</u> code 5.1).	
1		Scheduled	Interruption due to disconnection at a selected time for the purpose of construction or maintenance. Scheduled interruption initiated by transmitter or host distributor should be reported under <u>cause</u> code 2. Secondary interruption that must be initiated in order to repair and/or restore a previous interruption or	

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	<u>Examples</u>
			<p>interruption initiated to allow for staged restorations <u>Any additional interruption taken to allow for staged restorations</u> should be reported under the root cause of the previous interruption. For example, if the distributor needs to interrupt load to switch a section of overhead line back into service following a car accident, this interruption should be attributed to <u>cause code 9</u> (or <u>cause code 9.2</u>).</p>	
	1.1	Non-distributor activities	<p>Interruption required to safely perform activity that is unrelated to the distributor's distribution system (i.e., road/bridge/building construction and movement of very large items, like buildings and bridge trusses, etc).</p>	<ul style="list-style-type: none"> ○ <u>Scheduled interruption to isolate a feeder section for third-party telecommunication attachments.</u> ○ <u>Interruptions required to relocate a feeder due to road widening.</u> ○ <u>Road/bridge/building construction and movement of very large items, like buildings and bridge trusses, etc.</u>
	1.2	Distributor activities	<p>Interruption required to allow the distributor to safely perform construction or maintenance activity.</p> <p>This includes a scheduled interruption for new builds or upgrade activities</p>	<ul style="list-style-type: none"> ○ <u>Scheduled interruption to repair or replace a leaking transformer.</u> ○ <u>Secondary interruption which must be taken in order to repair and/or reinstate equipment back into</u>

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	<u>Examples</u>
			(for example, replacing a pole-mounted transformer, removing equipment), maintaining the distributor's distribution system and trimming trees.	<p><u>normal configuration after a previously restored customer interruption.</u></p> <ul style="list-style-type: none"> ○ <u>A scheduled interruption for new builds or upgrade activities, such as replacing a pole-mounted transformer and removing equipment.</u> ○ <u>A scheduled interruption for maintaining the distributor's distribution system such as trimming trees.</u> ○ <u>After restoring an interruption caused by a storm, the distributor may decide to defer some non-urgent repairs to a later date, which can be a few weeks or months later. The interruptions scheduled to perform these non-urgent repairs should be reported under cause code 1.2.</u>
2		Loss of Supply	Interruption due to problems associated with the distribution system owned and/or operated by another distributor, and/or in the transmission	

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	Examples
			system. This cause code includes interruptions caused by transmitter or host distributor scheduled interruption.	
	2.1	Loss of Supply Transmission	Problems in the transmission system or assets owned and maintained by the transmitter.	<ul style="list-style-type: none"> ○ <u>A failure or mis-operation of 27.6 or 44 kV¹ feeder breaker owned by a transmitter interrupted the distributors who are connected to this feeder.</u> ○ <u>Scheduled interruption due to the maintenance work on the transmission equipment.</u>
	2.2	Loss of Supply Distribution	Problems associated with the distribution system owned and/or operated by another distributor.	<ul style="list-style-type: none"> ○ <u>A tree branch fell on an overhead distribution line owned by a host distributor and caused an interruption to the downstream distributor. The downstream distributor will report this interruption under cause code 2.2.</u> ○ <u>A tree branch fell on an overhead distribution line located outside of the distributor's service area and</u>

¹ For the purpose of cause code reporting, interruptions caused by issues with transmitter owned station feeder breakers, which are operated at distribution voltage levels of 50 kilovolts or less as defined in the Distribution System Code, are reported under Loss of Supply Transmission (cause code 2.1)

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	Examples
				<u>tripped the feeder breaker. The opening of the feeder breaker caused a loss of supply to the distributor.</u>
3		Tree Contacts	Interruption caused by faults resulting from tree contact with energized circuits under normal environment and weather conditions. <u>except for the interruptions under the conditions described under cause code 6. Fallen tree or tree branches on customer owned line or equipment should be reported under cause code 9 (cause code 9.4).</u>	
	3.1	Fallen tree on right-of-way	Entire or major portion of, or major trunk of a tree, where the base of the tree situated on distribution right-of-way or public right-of-way, that falls on an energized line or other distribution system equipment.	<ul style="list-style-type: none"> ○ <u>A major portion of a tree, located on public right-of-way, fell and broke a piece of distribution equipment resulting in an interruption. This event occurred when the wind speed at the time would not meet the criteria for adverse weather conditions (cause code 6.</u>
	3.2	Broken branch/tree growth/untrimmed tree	Branch breaks from tree and strikes lines or equipment, or tree growth causes damage to lines or equipment.	<ul style="list-style-type: none"> ○ <u>A tree branch keeps brushing a distribution line and eventually caused the protection to lockout resulting in an interruption. This</u>

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	<u>Examples</u>
				<p><u>event occurred when the wind speed at the time would not meet criteria for adverse weather conditions (cause code 6).</u></p> <ul style="list-style-type: none"> ○ <u>Branch breaks away from tree and struck lines or equipment resulting in an interruption. This event occurred when the wind speed at the time would not meet criteria for adverse weather conditions (cause code 6).</u> ○ <u>Tree growth caused damage to lines or equipment resulting in an interruption.</u>
	3.3	Fallen tree off right-of-way	Entire or major portion of, or major trunk of a tree, where the base of the tree situated off distribution right-of-way or public right-of-way, that falls on an energized line or other distribution system equipment.	<ul style="list-style-type: none"> ○ <u>A tree, where the base of the tree was located on a customer's property, fell on a distributor owned line or equipment. This event occurred when the wind speed at the time would not meet criteria for adverse weather conditions (cause code 6).</u>
4		Lightning	The lightning category includes all interruptions caused by lightning. This may be by a direct strike	<ul style="list-style-type: none"> ○ <u>A tree contact that damages equipment and causes an interruption to power due to a</u>

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	<u>Examples</u>
			contacting the wires or another piece of equipment, or by a lightning-induced flashover of the wires or to another piece of equipment.	<u>lightning strike is coded as lightning.</u>
5		Equipment Failure	<p>Interruption resulting from the failure of distributor-owned equipment due to deterioration, insufficient maintenance or defective equipment/material.</p> <p>Customer interruptions caused by DER equipment failure shall be reported under <u>cause code 5 (cause code 5.2)</u> if the DER is owned by the distributor.</p> <p>Scheduled interruption to repair/replace deteriorated equipment should be reported under <u>cause code 1 (cause code 1.2)</u>.</p> <p>If the deteriorated equipment did not fail, however its condition required immediate interruption to repair/replace, the interruption should be reported under <u>cause code 5 (cause code 5.1)</u>.</p>	
	5.1	Equipment failure	Any failure of distribution equipment resulting from deterioration or improper maintenance of the	○ <u>An insulator burned out and caused an interruption.</u>

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	Examples
			distribution equipment.	<ul style="list-style-type: none"> ○ <u>A crossarm brace bolt broke and resulting in an interruption.</u> ○ <u>Corrosion caused a transformer oil leak resulting in an interruption.</u> ○ <u>Moisture entered a transformer and caused an interruption.</u> ○ <u>The interruption was caused by equipment failure but the root cause of the equipment failure is unknown.</u>
	5.2	Distributed Energy Resource (DER)* Failure	<p>Any failure of a distributor-owned DER facility.</p> <p>Any failure of a customer-owned DER facility should be reported under <u>cause code 9 (cause code 9.5)</u></p>	<ul style="list-style-type: none"> ○ <u>An interruption due to distributor-owned energy storage that failed to mitigate a power quality issue on the feeder as designed.</u>
	5.3	Defective equipment/material	<p>Equipment/material was flawed in some way at the time of installation, which resulted in its failure substantially before expected end-of-life (for example, a manufacturer assembly defect or poor design of the equipment/material).</p>	<ul style="list-style-type: none"> ○ <u>A manufacturer assembly defect or poor design of the equipment/material caused an interruption.</u>
6		Adverse Weather	Interruption resulting from severe rain, ice storms, heavy snow, severe	

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	<u>Examples</u>
			<p>windstorm (~90 kilometres an hour <u>or greater</u>), extreme temperatures, freezing rain, frost, hail or other extreme weather conditions (exclusive of <u>cause code 4</u>). Adverse weather includes but is not limited to the following conditions:</p> <ul style="list-style-type: none"> • Severe windstorm greater than 90 kilometres an hour of ~90 kilometres an hour or greater. • Rain at zero degrees Celsius, resulting in freezing rain accumulating on conductors. • Ice or snow buildup on distribution equipment/lines. 	
	6.1	Tree contact weather	<p>Fallen tree or tree branches due to adverse weather conditions.</p> <p>This cause code includes interruptions caused by equipment breakage as a result of fallen tree/tree branches.</p>	<ul style="list-style-type: none"> ○ <u>Severe windstorm caused tree branches to touch overhead lines causing protection to lockout.</u> ○ <u>Severe windstorm caused trees to fall damaging a piece of distribution equipment.</u>
	6.2	Equipment breakage	<p>Equipment breakage or temporary malfunction due to adverse weather conditions <u>that do not fall under cause code 6.1.</u></p>	<ul style="list-style-type: none"> ○ <u>Ice formed on distribution lines during rainfalls, weight forced lines to collapse resulting in an interruption.</u>

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	Examples
				<ul style="list-style-type: none"> ○ <u>Severe windstorm broke a distribution pole.</u>
	6.3	Other Adverse Weather	Interruption caused by adverse weather but did not involve tree contact or equipment breakage.	
7		Adverse Environment	Interruption due to distributor equipment being subject to abnormal environments, such as salt spray, industrial contamination, humidity, corrosion, vibration, fire or flooding.	<ul style="list-style-type: none"> ○ <u>Salt spray corroded the connections causing an interruption.</u> ○ <u>Forest fire required that power be interrupted.</u> ○ <u>When flood waters (except for flood cause by watermain break) create a path between live and grounded parts causing a flashover, or when flood waters physically disrupt distribution facility to cause an interruption.</u>
8		Human Element	<p>Interruption due to the interface of distributor staff with the distribution system.</p> <p>Only interruptions caused by distributor staff should be reported under this cause code, including improper protection settings, improper</p>	<ul style="list-style-type: none"> ○ <u>A technician opened the wrong switching device causing an interruption to occur.</u> ○ <u>An incorrect size of a fuse for a primary circuit was used resulting in an electrical failure and interruption.</u>

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	<u>Examples</u>
			system operation and improper construction & installation.	<ul style="list-style-type: none"> ○ <u>Incorrect design schema used for mounting a pole transformer, eventually resulting in an interruption.</u> ○ <u>During construction, an electrical cable was accidentally cut by a distributor staff resulting in an interruption.</u> ○ <u>Commissioning activities caused an unplanned interruption.</u> ○ <u>Field workers performed maintenance according to incorrect record or label resulting in an interruption.</u> ○ <u>Acting on the distributor's behalf, contractors accidentally damaged a transformer and caused an interruption.</u>
	8.1	Distributed Energy Resource (DER)	<p>Interruption caused by improper connection and/or improper operation of DERs by the distributor.</p> <p>If the DER is not owned by the distributor, and the DER has been</p>	

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	<u>Examples</u>
			operated improperly by the customer or a third party, it should be reported under <u>cause code</u> 9 (<u>cause code</u> 9.5).	
	8.2	Other Human Element	Any other interruptions caused by distributor staff or contractors acting on the distributor's behalf.	
9		Foreign Interference	Interruption caused by external factors, such as those caused by customer equipment, DERs not owned by distributors, animals, vehicles, dig-ins, vandalism, sabotage, foreign objects and cybersecurity events.	
	9.1	Wildlife	Interruption caused by contact with any form of wildlife.	○ <u>Raccoon damaged a circuit breaker.</u>
	9.2	Vehicle	Motor vehicle accidents, which impacted distributor infrastructure.	○ <u>A vehicle crashed into a distribution pole and caused an interruption.</u>
	9.3	Dig-in	Interruption caused by contact with underground infrastructure (e.g., conductor in conduit, transformers in underground vaults) due to non-distributor excavation, whether a locate was provided or not.	○ <u>A customer used an auger and dug down and cut a cable, taken out several houses' electricity supply.</u>

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	Examples
	9.4	Customer equipment	Failure or improper operation of electrical equipment not owned by distributors (excluding DER equipment) that caused interruption to one or more customers. Fallen tree or tree branches on customer-owned line or equipment shall be reported under this cause.	<ul style="list-style-type: none"> ○ <u>A customer-owned equipment failure caused an interruption to other customers supplied on the same feeder/feeder section.</u>
	9.5	Distributed Energy Resource (DER)	Failure or improper operation of DER facilities not owned/operated by distributors.	<ul style="list-style-type: none"> ○ <u>A customer owned DER's protection didn't operate as designed to isolate a fault in the DER facility and interrupted other customers supplied on the same feeder/feeder section.</u>
	9.6	<u>Human Other</u> (non-distributor staff)	Interruption caused by the act of a person other than distributor staff <u>or other foreign interference</u> . Including interruptions caused by agricultural or construction equipment, trespassing by non-distributor staff (e.g., when theft of copper occurs at a station), sabotage, terrorism, cybersecurity event, balloons, kites, sneakers, foreign object, etc.	<ul style="list-style-type: none"> ○ <u>Homeowner cut tree in their yard and it fell on distribution lines, interrupting both their power and their neighbours power.</u> ○ <u>Vandals broke into pad-mounted transformer and damaged it.</u> ○ <u>When flood waters caused by watermain break created a path between live and grounded parts causing a flashover, or when flood waters physically disrupted</u>

Primary Cause Code	Sub-Cause Code	Cause Code Name	Description	<u>Examples</u>
				<u>distribution facility to cause an interruption.</u> <ul style="list-style-type: none"> ○ <u>A theft of copper at a station caused an interruption.</u>

* For the purpose of reliability reporting, DERs include embedded generation facilities and storage facilities.