



Distribution Point-of-Delivery Interconnection Process Guideline

Distribution Circuit Breaker Addition

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**Distribution Point-of-Delivery Interconnection Process Guideline - Distribution
Circuit Breaker Addition**

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1.0 Introduction

1.1 Purpose

This guideline defines the process by which a Distribution Facility Owner (DFO) can evaluate and support the addition of a new distribution feeder circuit breaker at a Point of Delivery (POD) Substation and is intended to provide a uniform and consistent approach for the justification of such circuit breaker additions.

This guideline is intended solely for the purpose of supporting the AESO's customer interconnection process to arrive at proposed interconnection concepts that are optimized on a technical and economic basis. It will not in any way address or determine the AESO's facility cost allocation between system and customer, nor will it be used in any way as a guideline in applying the AESO approved tariffs and investment policy.

This guideline is intended to facilitate documentation of the project need and the evaluation done to support the need, in alignment with the interconnection process. The interconnection process has a requirement for AESO endorsement and AEUB approval of the project need.

1.2 Application of Guideline

This guideline applies only to the addition of distribution feeder circuit breakers within an existing POD substation at a voltage level of 25kV or lower. It is suggested that this guideline be used in conjunction with the AESO documents: Interconnection Process Guideline-Standards of Service; Interconnection Process Guideline-Drivers of Need; Interconnection Process Guideline-Economic Evaluation.

1.3 Modifications

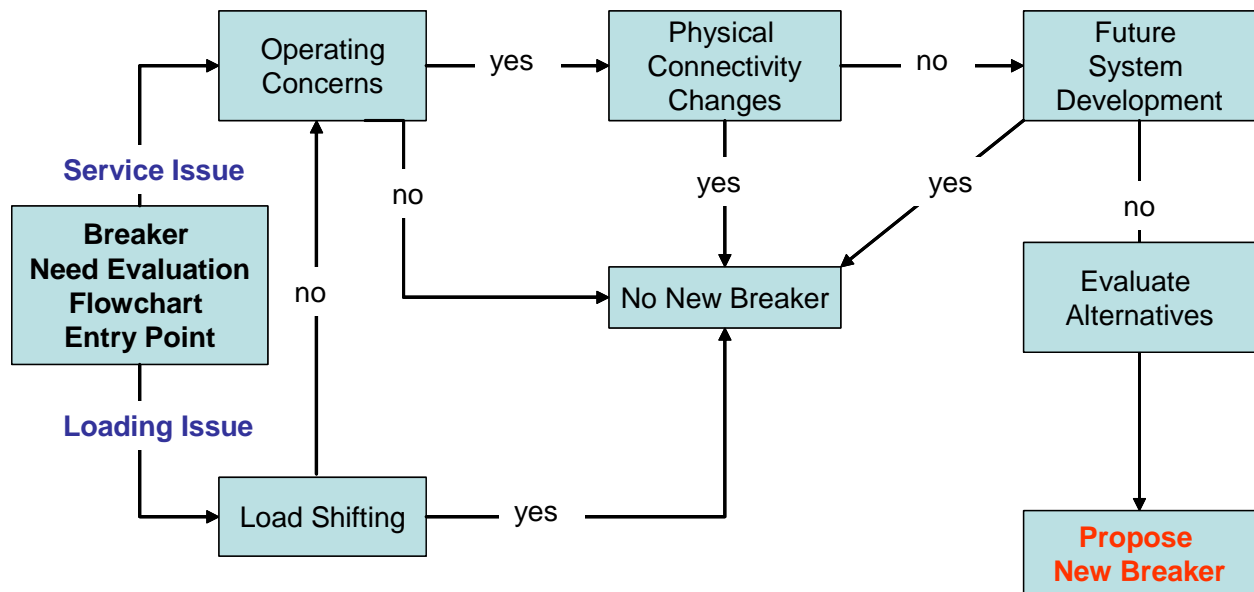
In respect to this guideline the AESO will:

- a) seek and consider the input and feedback of affected parties prior to making changes or additions to the guideline;
- b) make and manage all changes to this guideline;
- c) make this guideline publicly available via the AESO website;
- d) periodically and within five (5) years of the effective date shown on the cover page review this guideline.

2.0 Circuit Breaker Addition Need Evaluation Flowchart

In order to facilitate the application of this guideline, a “decision tree” format has been developed as shown in Figure 2-1. The various flowchart components are defined in Section 3.0 along with guidance and suggestions for content to facilitate the articulation of need. Wherever applicable, references will be made to other supporting AESO standards and guideline documents.

Figure 2-1 Circuit Breaker Need Evaluation Flowchart



3.0 Circuit Breaker Addition - Guide to Flowchart Components

3.1 Entry Point

Generally, the need for a new breaker is driven by a concern around the quality of service on a feeder or the extent to which a feeder is loaded. Therefore, the entry points to the flowchart can be considered to be either a service issue or a loading issue.

3.1.1 Service Issue

A service issue occurs when an existing feeder(s) cannot function in a safe, reliable and effective manner. Typical service issues may include, but are not limited to, reliability concerns, protection coordination difficulties, power quality complaints, inefficient system operation, or non compliance with industry or utility standards. Further elaboration of service issues can be found in the AESO Interconnection Process Guideline-Drivers of Need and the AESO Interconnection Process Guideline-Standards of Service.

3.1.2 Loading Issue

A loading issue occurs when the load on an existing feeder exceeds or is forecast to exceed a level where supply voltage cannot be maintained or where the distribution utility's contingency restoration practice (e.g. N-1) cannot be met. A loading issue may become a service issue if feeder load cannot be sufficiently reduced. Further elaboration of loading issues can be found in the AESO Interconnection Process Guideline-Drivers of Need and the AESO Interconnection Process Guideline-Standards of Service.

3.2 Operational Concerns

Operating concerns include the factors which impact the safe and reliable operation of the feeder. These would include protection coordination difficulties, physical condition of facilities, length of feeder and feeder configuration, length of switching time, number of customers connected, CSA voltage criteria, motor starting difficulties, power quality issues, and feeder loading. Operational concerns may be present for both service and loading issues. Further elaboration of operational concerns can be found in the AESO Interconnection Process Guideline-Drivers of Need and the AESO Interconnection Process Guideline-Standards of Service.

3.3 Physical Connectivity Changes

Physical connectivity changes refers to the alternative measures that can be taken to mitigate the operational concerns. Examples of possible physical connectivity changes include installation of reclosers thereby reducing feeder exposure, improved line maintenance practices, and line or tap re-build or relocation, etc.

3.4 Future System Development

Future system development within the area may negate the requirement for a new circuit breaker. The impact of a proposed substation, new line, future system re-configuration, automation of the distribution system etc. should be taken into account if planned to occur within a reasonable timeframe (less than two years).

3.5 Load Shifting

Load shifting involves the re-arrangement of normally open points to transfer line segments or taps to adjacent feeders thereby reducing the exposure of sensitive or critical customers to operationally high risk lines and provide a more equalized feeder load sharing configuration.

Careful consideration must go into load shifting as there are optimal normally open points on the distribution system that are determined by:

- Evaluation of distribution losses
- Reliability issues
- Service level requirements to sensitive and/or large customers
- Proximity to service centers to facilitate restoration

3.6 Evaluate Alternatives

As a final check before recommending a new breaker addition, all feasible alternatives (including the “do nothing option”) should be reviewed and documented with respect to cost, technical viability, and customer impact. Cost comparison of the various alternatives should be consistent with the methodology as outlined in the AESO Interconnection Process Guideline-Economic Evaluation.

4.0 Circuit Breaker Addition Need Evaluation Process

The circuit breaker need evaluation should follow the steps as outlined sections 2.0 and 3.0.

The application to the AESO for endorsement of a new circuit breaker should include supporting documentation based on the various components of need demonstrating the logic applied leading to the conclusion that a new circuit breaker is required and justified.

Table 4-1 can be used to facilitate capturing the applicable documentation.

Table 4-1 Circuit Breaker Addition Evaluation Table

Need Trigger	Flowchart Component	Documentation
Service Issue		Describe the issue
	Operating Concerns	Explain the operational problems associated with this issue. If applicable, include reliability statistics, customer service complaints, system configuration constraints or any other documentation which can support the need for the breaker. Reference the AESO Interconnection Process Guideline-Drivers of Need and the AESO Interconnection Process Guideline-Standards of Service.
	Physical Connectivity Changes	Explain why there is no opportunity to re-arrange the circuit configuration to avoid having to install a new breaker.
	Future System Development	Explain why no planned future system development can influence the need for the breaker.
	Evaluate Alternatives	Describe the alternatives considered, their cost, technical feasibility, and customer impact. Cost comparisons should follow methodology as outlined in the AESO Interconnection Process Guideline - Economic Evaluation.
	Propose New Breaker	Explain how the addition of the new breaker addresses the current concern and quantify future benefits. Why is this alternative superior to the other alternatives considered?
Loading Issue		Describe the issue.
	Load Shifting	Explain why load shifting is not a viable option.
	Operating Concerns	Explain the operational problems associated with this issue. If applicable, include reliability statistics, customer service complaints, system configuration constraints or any other documentation which can support the need for the breaker. Reference the AESO Interconnection Process Guideline-Drivers of Need and the AESO Interconnection Process Guideline-Standards of Service.
	Physical Connectivity Changes	Explain why there is no opportunity to re-arrange the circuit configuration to avoid having to install a new breaker.

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	Future System Development	Explain why no planned future system development can influence the need for the breaker.
	Evaluate Alternatives	Describe the alternatives considered, their cost, technical feasibility, and customer impact. Cost comparisons should follow methodology as outlined in the AESO Interconnection Process Guideline - Economic Evaluation
	Propose New Breaker	Explain how the addition of the new breaker addresses the current concern and quantify future benefits. Why is this alternative superior to the other alternatives considered?