

# Incorporation of Distributed Generation in Ontario

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- **Performance Standards** - effectiveness of existing standards at coordinating requirements for embedded generation and their host connected load facilities.
- **Connection Assessment & Approval Process (CAA)** - review and revise requirements and rules, trigger levels for system impact assessments due to accumulated embedded generation, and allocation of study costs.
- **Visibility** - develop effective and inexpensive means of providing real time visibility of embedded generators for effective market and system operation.

- The IESO's Connection Assessment and Approval (CAA) process is used to determine the impact of proposed new or modified connections to the IESO-controlled grid on the reliability of the integrated power system.
- Market Rules, Chapter 4, Section 6, require anyone planning to establish or modify a connection to the ICG to obtain IESO approval through the CAA process.

## IESO Connection Applicant

**Distributor** in whose distribution system a market participant or person is or intends to be connected as an embedded generator (EG) whose **generation facility** is or will be rated **greater than 10 MW**, that seeks to establish a new or modify an existing connection (Chapter 11).

## The EG proponent

- submits a System Impact Assessment application to both the *distributor* and the *IESO*
- submits a complete set of data
- submits \$20,000 deposit

## The Distributor

- submits an application to the *IESO* for a modification to the existing connection to the *IESO-controlled grid* to reflect the presence of the *embedded generation facility*
- the Application consist only of the first two pages of the SIA application form
- Carry out and submits the Connection Impact Assessment to the IESO
- Requests a Customer Impact Assessment from the Transmitter

## The IESO

- Develops a Scope of Work for the SIA in agreement with the EG proponent and the Distributor
- Enters into a SIA Agreement with the Distributor
- Assesses the performance of the EG, the impact on the IESO-controlled grid and identifies upgrades required to mitigate any negative impacts
- Receives Customer Impact Assessment from Transmitter
- Issues and publishes SIA Report
- Issue a Notification of Approval or Disapproval of Connection Proposal

## Performance Standards

- Each *embedded generator* whose *embedded generation facility* includes a *generation unit* rated at **10 MVA or higher** or whose *embedded generation facility* is comprised of *generation units* whose net output is **greater than 50 MVA** shall ensure that its equipment meets all applicable performance standards in Appendix 4.2.

## Reliability Concerns

Significant amount of generation connected to the distribution system can have a significant contribution to security of supply for Ontario customers

### Local

- Impact on voltage performance if the aggregate is lost (fuel shortage or strong wind)
- Impact on operation of voltage regulating devices when TS injects power into the ICG
- Short-circuit levels at TS
- Impact on UFLS compliance

### Global

- Transient voltage stability due to displacement of generation with full dynamic reactive capability by EG with little reactive capability
- Congestion on transmission interfaces (Bruce)

## CAA Process Issues

- EG smaller than 10 MW do not have to apply to IESO through the CAA process
- IESO has no process to evaluate the impact on the ICG reliability of significant amount of EG
- IESO cannot trigger a CIA with the transmitter
- IESO standards do not apply to generators smaller than 10 MVA

## CAA Process Modifications

- New CAA process trigger to capture large local aggregate of small EG and to allow assessment of their impact on the ICG reliability:
  - Material injection into the power system
    - \* The TS looks like a generator to the ICG
  - Significant amount of EG connected behind a TS
    - \* Could be a fixed MW amount across the Dx or a percentage of TS maximum load

## **Stakeholder Support:**

- CAA process triggers to be determined
- New EG standards to be developed
- Market Rule Changes required
- DSC changes required to support the Market Rule
- OPA's SOP to reflect reliability needs

## Proposed CAA Triggers

- Distributors are required to obtain IESO approval for embedded generators planning to establish a new or modified connection within their distribution system if
  - the generation facility is or will be rated at 10 MW or higher, or
  - the potential injection into the ICG reaches 10 MW, or
  - the total amount of embedded generation to connect behind a TS reaches 50 MW.

## Proposed Process

- Distributors conduct CIA for each EG proposal
- Distributors apply for an aggregate SIA when one trigger is met
- Distributors apply for an aggregate CIA when one trigger is met
- Distributors pay for the SIA and CIA costs
- Distributors recover costs as per OEB decisions