

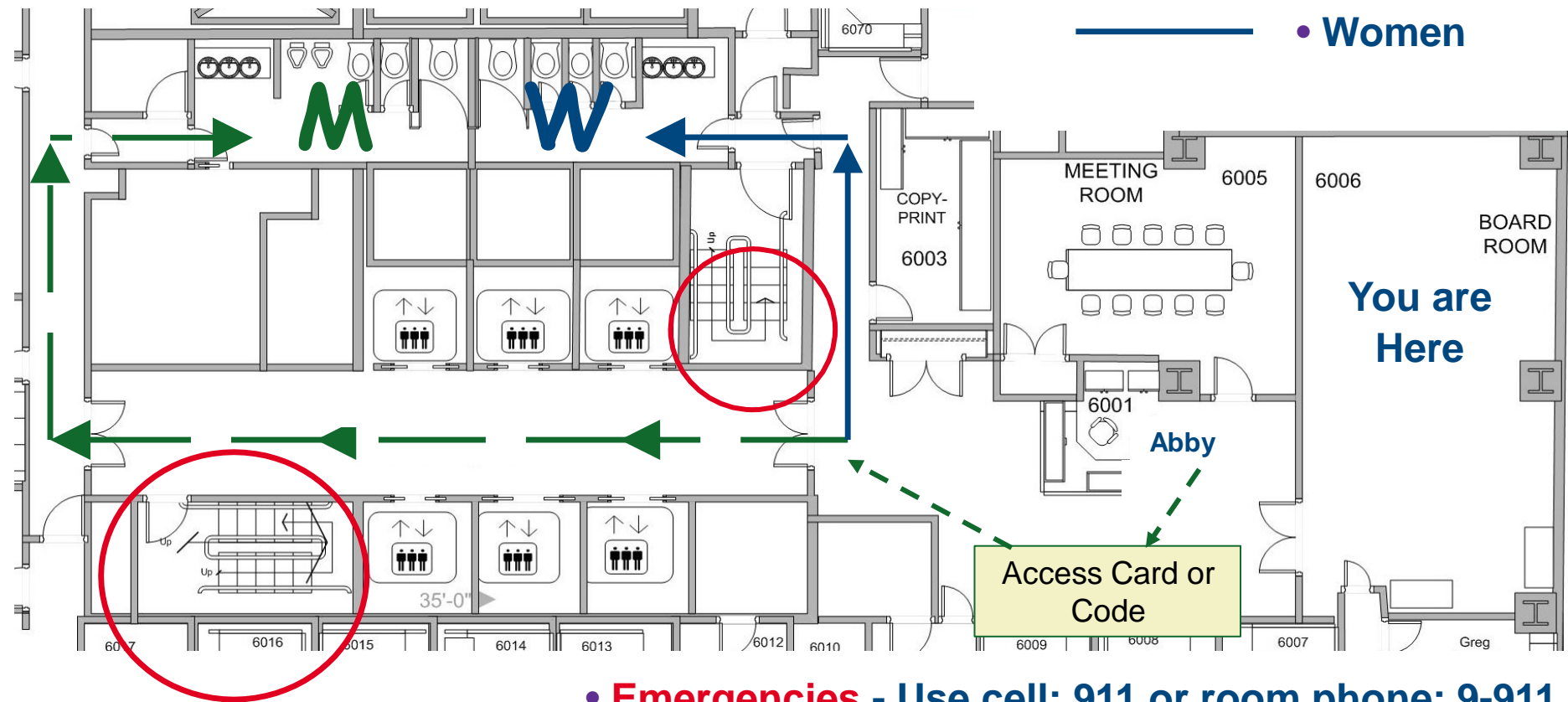
# **FAC-008-AB-3 Update Technical Workgroup Meeting**

October 14, 2016

October 14, 2016

Public for technical work group session only

# Housekeeping



**EMERGENCY EXIT**  
Then follow facilitators  
instructions

- **Emergencies** - Use cell: 911 or room phone: 9-911
- **BP Centre:** 6th Floor, 2nd St. SW and 4th Ave. SW
- **Muster Point** – Livingston Place

# Agenda

1. Welcome, introductions, safety
2. Disclaimer
3. FAC-008-AB-3 Overview
  - (a) Proposed definitions
  - (b) Applicability and effective dates
  - (c) Content differences from NERC FAC-008-3
  - (d) Q&A session
- Coffee break -
4. Review previous Technical Work Group questions in the context of new FAC-008-AB-3 draft
5. Q&A session

The information and examples contained in this presentation are for information purposes only. While the AESO strives to make the information contained in this presentation as timely and accurate as possible, the AESO makes no claims, promises, or guarantees about the accuracy, completeness or adequacy of the information contained in this presentation, and expressly disclaims liability for errors or omissions. As such, any reliance placed on the information contained herein is at the reader's sole risk.

The following terms are currently defined for use in the ISO rules and are proposed to be adopted for use in the reliability standards:

- “**normal rating**” means, as determined by the **legal owner** of the equipment or facility, the **equipment rating** or the **facility rating** that the equipment or facility can sustain on a continuous basis.
- “**emergency rating**” means, as determined by the **legal owner** of the equipment or facility, the **equipment rating** or the **facility rating** that the equipment or facility can sustain for a specified period, and takes into account the physical or safety limits of the equipment or facility and assumes acceptable loss of equipment or facility life during the period.

# Proposed Defined Terms

The following terms are currently defined for use in the ISO rules and are proposed to be adopted for use in the reliability standards:

- “**equipment rating**” means, as determined by the **legal owner** of the equipment, as applicable, the maximum and minimum voltage, current, frequency, **real power**, **reactive power** and **apparent power** limit of individual equipment under the following conditions: (i) steady state, (ii) short-circuit, and (iii) transient.
- “**facility rating**” means, as determined by the **legal owner** of the facility, the most limiting applicable **equipment rating** of the individual equipment that comprises the facility.

Proposed amended reliability standard definition:

- “**system operating limit**” means the value, expressed in MW, MVar, A, Hz or kV, that satisfies the most limiting of the following ratings and limits, as applicable pre- and post-**contingency**, for a specified system configuration:
  - (i) **equipment ratings**;
  - (ii) **facility ratings**;
  - (iii) transient stability limits;
  - (iv) voltage stability limits; and
  - (v) system voltage limits.

- (a) the **legal owner** of a **transmission facility** that has a nominal voltage rating of 69 kV and above, with the following exclusions and inclusions:
- (i) Exclusions: a transformer that has a secondary terminal, not a tertiary terminal, operated at less than 50 kV (note that this exception does not apply to a transformer that has a secondary terminal operated at more than 50 kV and a tertiary terminal operated at less than 50 kV), except those transformers described in (ii), below;
  - (ii) Inclusions: any **generating unit** step-up transformer and any transformer connected to a **blackstart resource**.



- (b) the **legal owner** of a **generating unit** that:
  - (i) is not part of an **aggregated generating facility**;
  - (ii) has a **maximum authorized real power** rating greater than 4.5 MW; and
  - (iii) is directly connected to the **transmission system** or to **transmission facilities** within the City of Medicine Hat;
- (c) the **legal owner** of an **aggregated generating facility** that:
  - (i) has a **maximum authorized real power** rating greater than 4.5 MW; and
  - (ii) is directly connected to the **transmission system** or to **transmission facilities** within the City of Medicine Hat.

- On the first day of the month following four (4) full calendar quarters (January 1, April 1, July 1 or October 1) after Commission approval, where the transmission facility, generating unit or aggregated generating facility is commissioned on or after [Commission approval date]; and
- On the first day of the month following eight (8) full calendar quarters (January 1, April 1, July 1 or October 1) after Commission approval, where the transmission facility, generating unit or aggregated generating facility is commissioned prior to [Commission approval date].

- AESO reviewed the industry to seek guidance on how FAC-008 was implemented in other areas.
  - NERC, WECC and Midwest Reliability Organization (MRO)
  - MRO has a standard application guideline
- FAC-008-AB-3 is largely consistent with the original wording of NERC FAC-008-3.

# Content Differences from NERC FAC-008-3: Added Ratings



- Emergency Ratings

- Requirements R3.4.2.1 and R3.4.2.2 establish standard times for emergency ratings for both transformers and transmission lines in Alberta.
  - R3.4.2.1 the **emergency ratings** for equipment comprising power transformers must be specified for a thirty (30) minute and a next three point five (3.5) hour duration; and
  - R3.4.2.2 the **emergency ratings** for transmission lines must be specified for a ten (10) minute duration.

# Content Differences from NERC FAC-008-3: Added Ratings



- **Seasonal Ratings**

- Requirements R2.2(e) and R3.2(e) establish standardized dates for legal owners to determine equipment ratings during summer and winter season operations.
  - where summer is defined as May 1<sup>st</sup> at 12:01 AM Mountain Time to October 31<sup>st</sup> at 12:00 midnight Mountain Time; and
  - winter is defined as November 1<sup>st</sup> at 12:01 AM Mountain Time to April 30<sup>th</sup> at 12:00 midnight Mountain Time.

# Content Differences from NERC FAC-008-3: Submission of Facility Ratings



- Remove requirements R7 and R8
  - Requests for all facility data, including ratings, are made by the AESO pursuant to Section 502.15 of the ISO rules, *Reporting Facility Modelling Data*.

# Content Differences from NERC FAC-008-3: Step-Up Transformer a Distinct Facility



- Requirement R1(b)
  - Replaced “high side terminals of the main step-up transformer” with “step up transformer” to identify the step-up transformer as a distinct facility.
  - It is necessary for step-up transformers to be rated separately, in order to ensure that the AESO receives appropriate rating information.

# Content Differences from NERC FAC-008-3: Methodology vs Method



- Requirements R2.1, R2.2, R3.1 and R3.2
  - The term “methodology” is proposed to be replaced with the term “method” for clarity. As the methodology for determining the “facility ratings” is based on the method used to establish the “equipment ratings”.



# Questions on FAC-008-AB-3 content

- Q&A
- Break

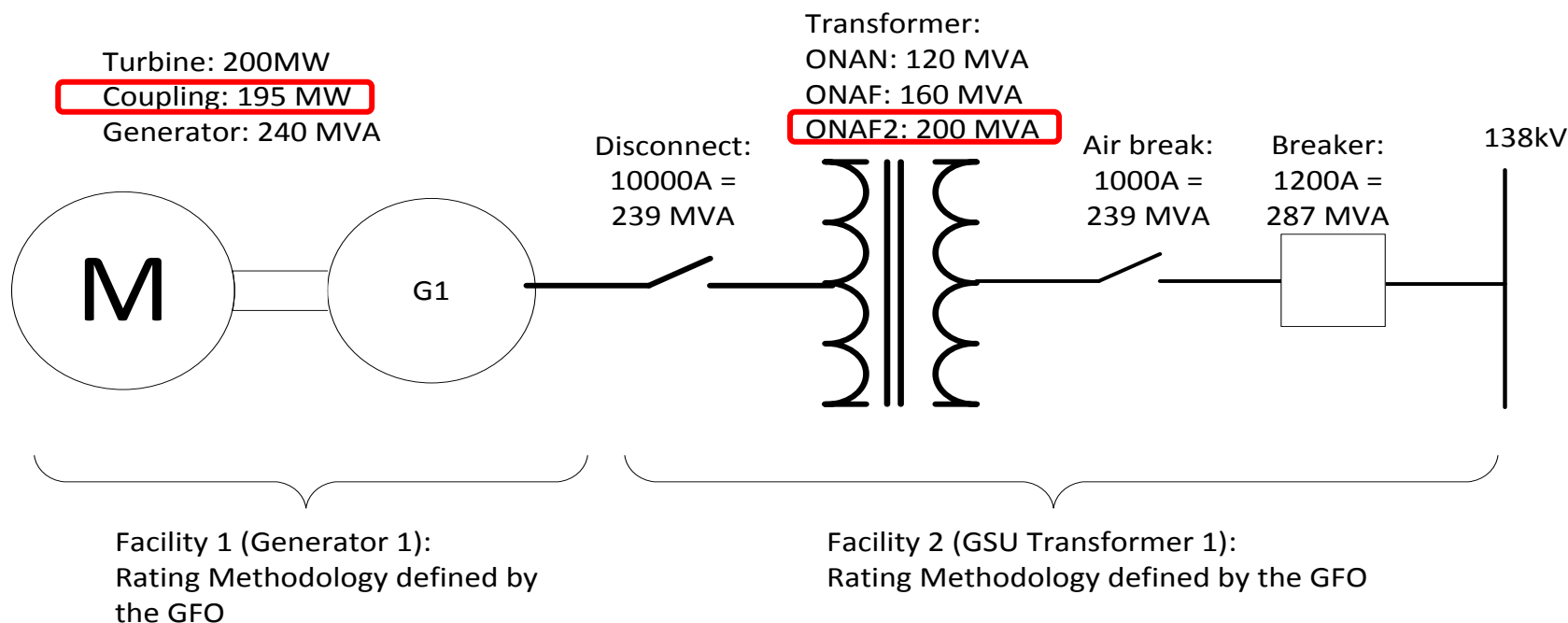
# Review of Facilities and Facility Ratings

- In the context of FAC-008-AB-3, a facility is a collection of equipment that makes up an element as described in Information Document #2010-001R, *Facility Modelling Data*
  - Same level of granularity as Project Data Update Packages (PDUPs) that the AESO currently receives including:
    - Transformers
    - Line Segments
    - Series Compensation
    - Shunt Compensation
    - Machines & Aggregated Generating Units

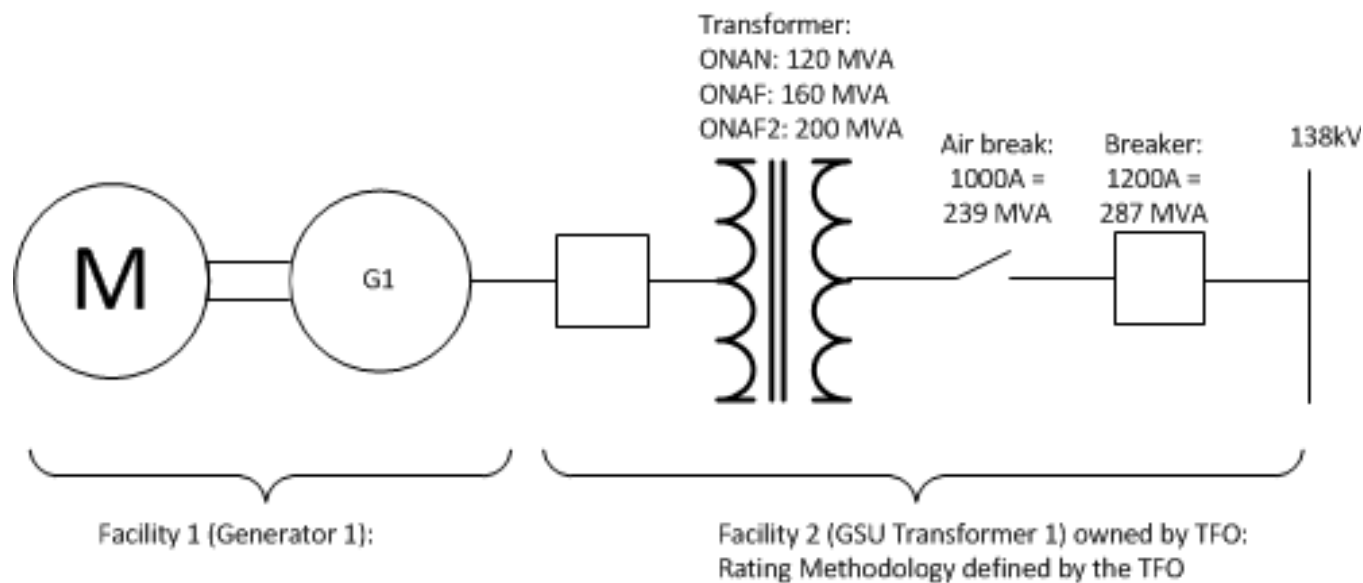
All facilities must include associated terminal devices such as conductors, relay protective devices, terminal equipment, connecting buses, etc.

# Facility Examples for Application of FAC-008

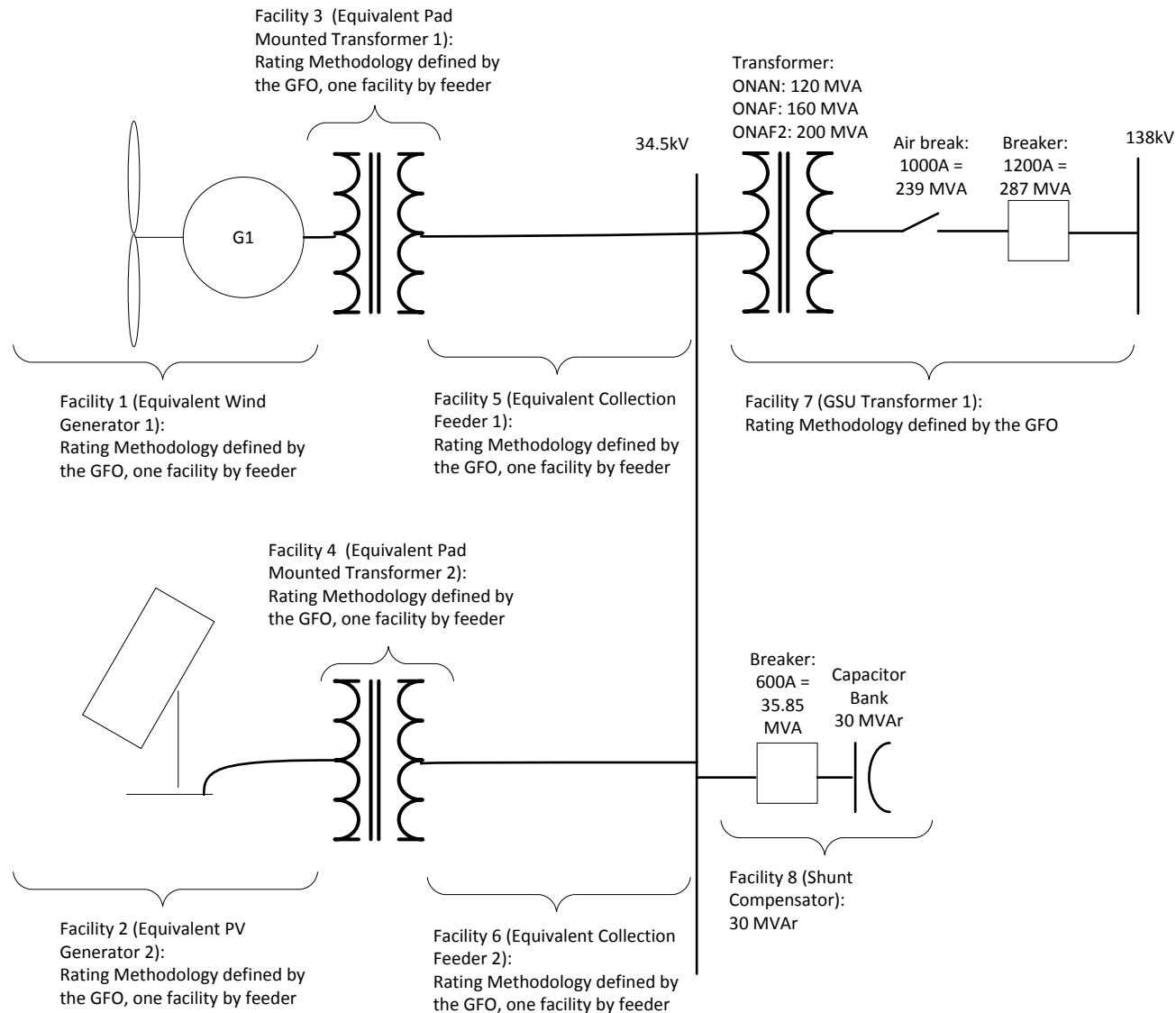
## Example 1a – GFO owns the generating unit and the step-up transformer



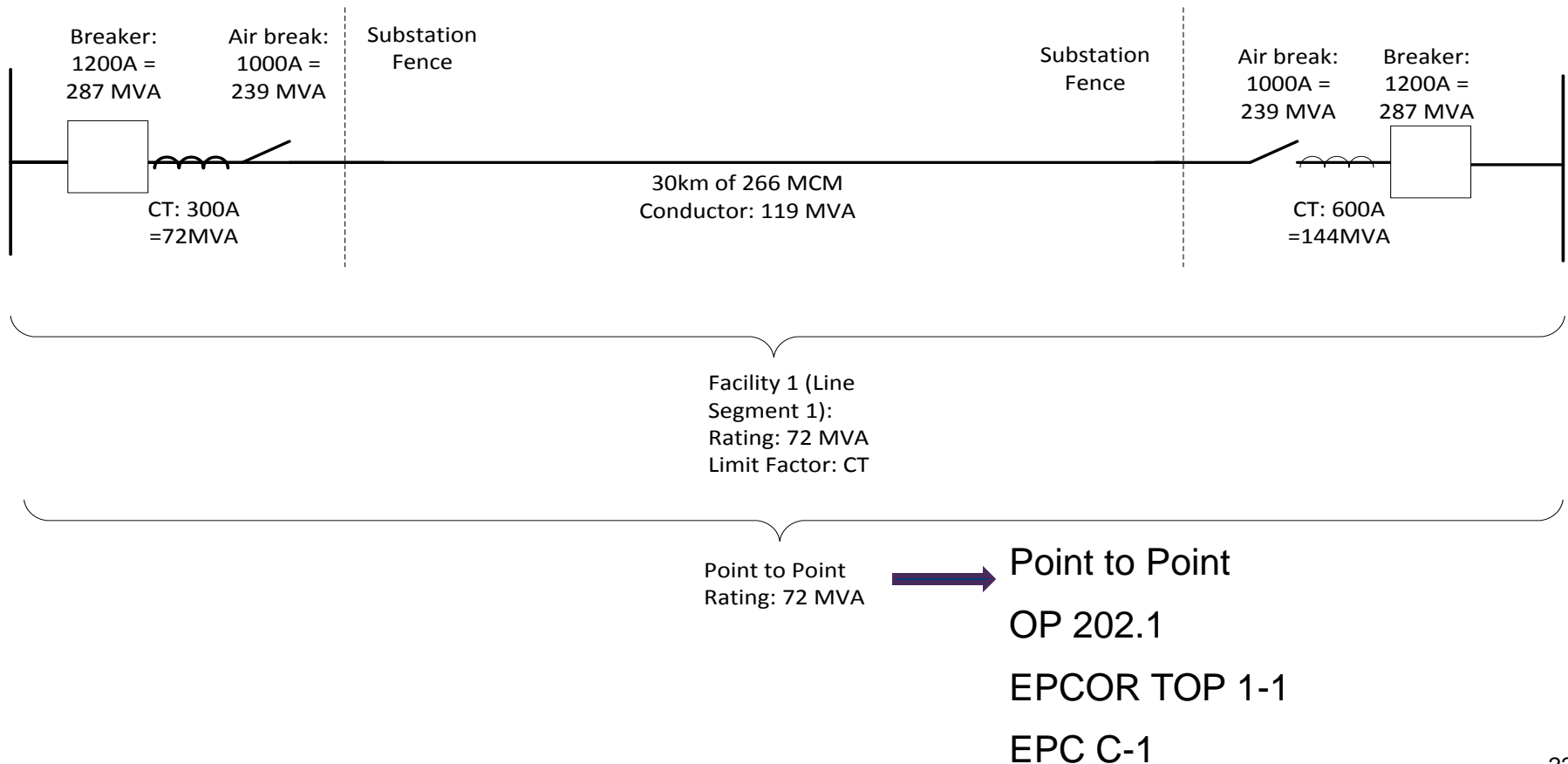
# Example 1b: GSU Owned by TFO



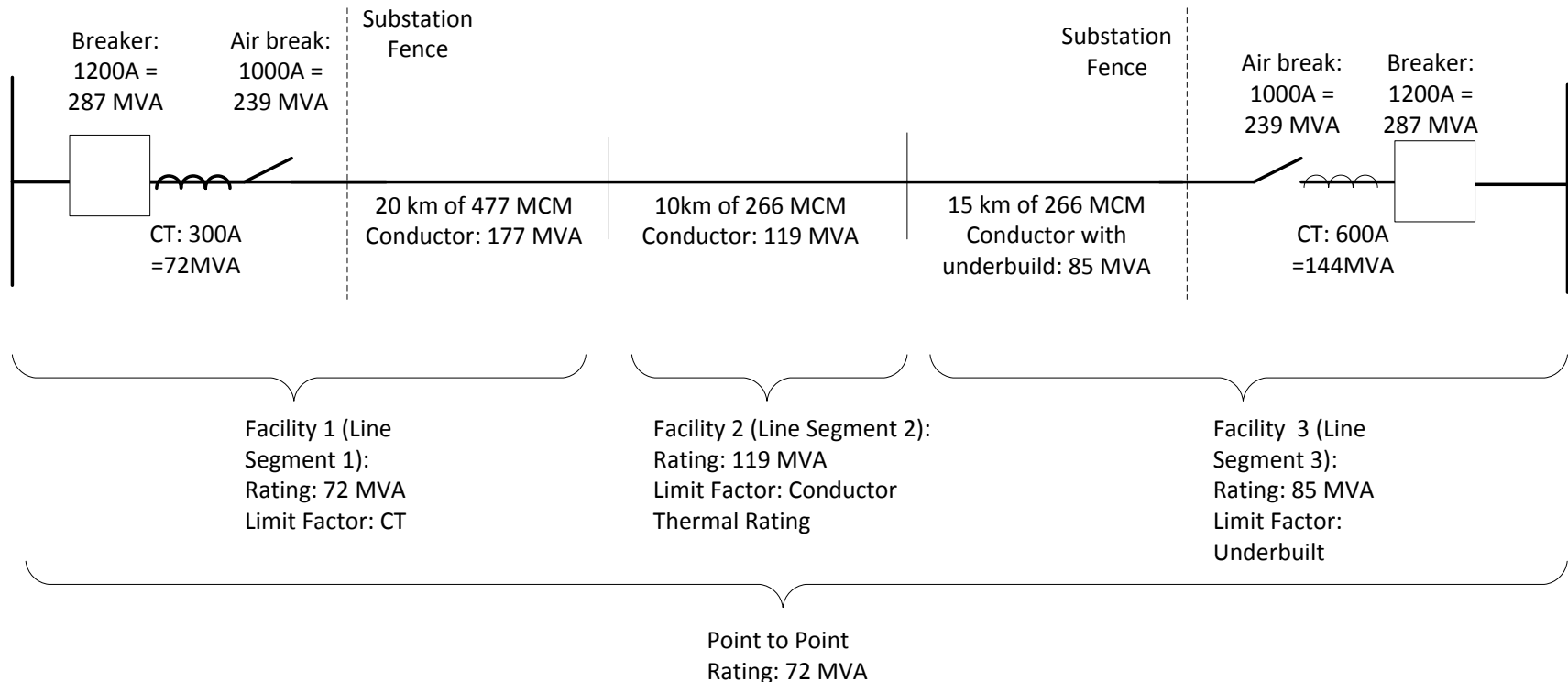
# Example 1c: Aggregated Generation Facility



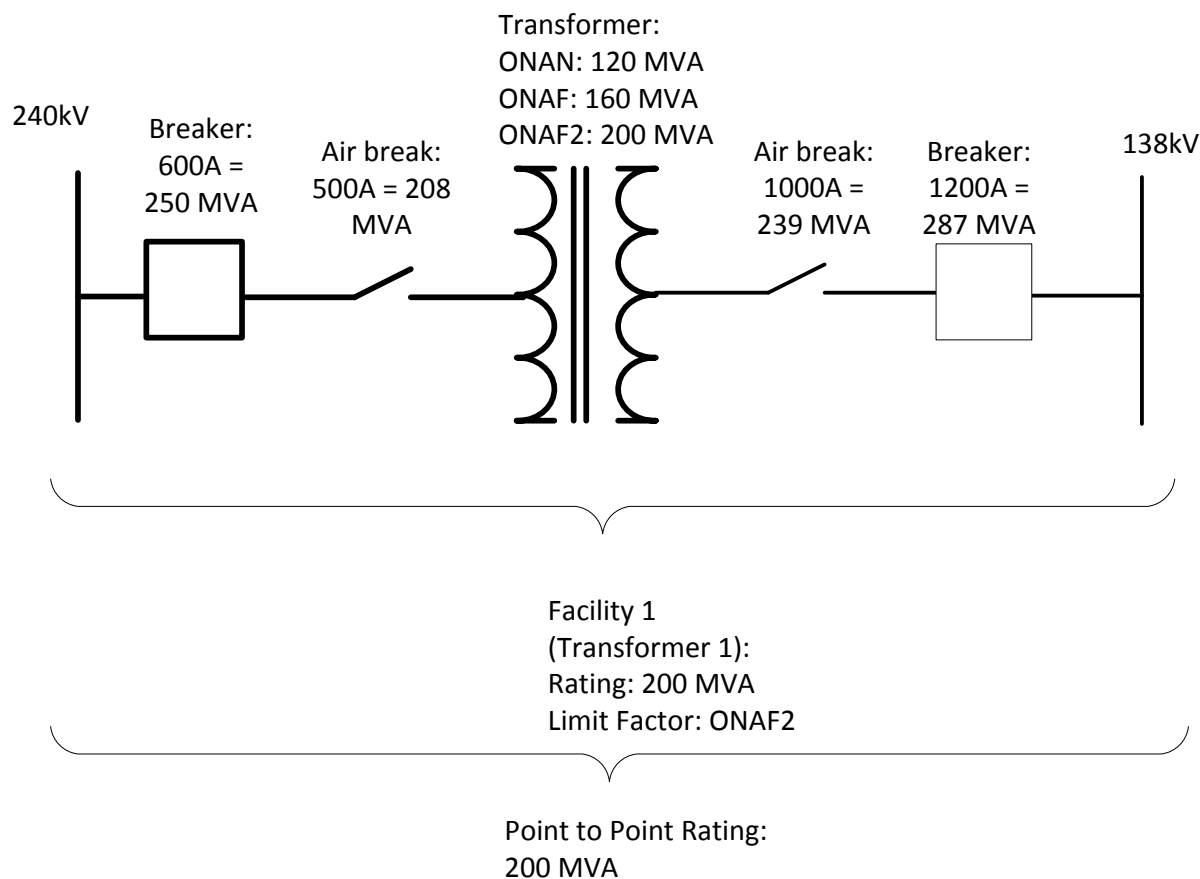
# Example 2a: Transmission Line with Single Line Segment



# Example 2b: Transmission Line with Multiple Line Segments

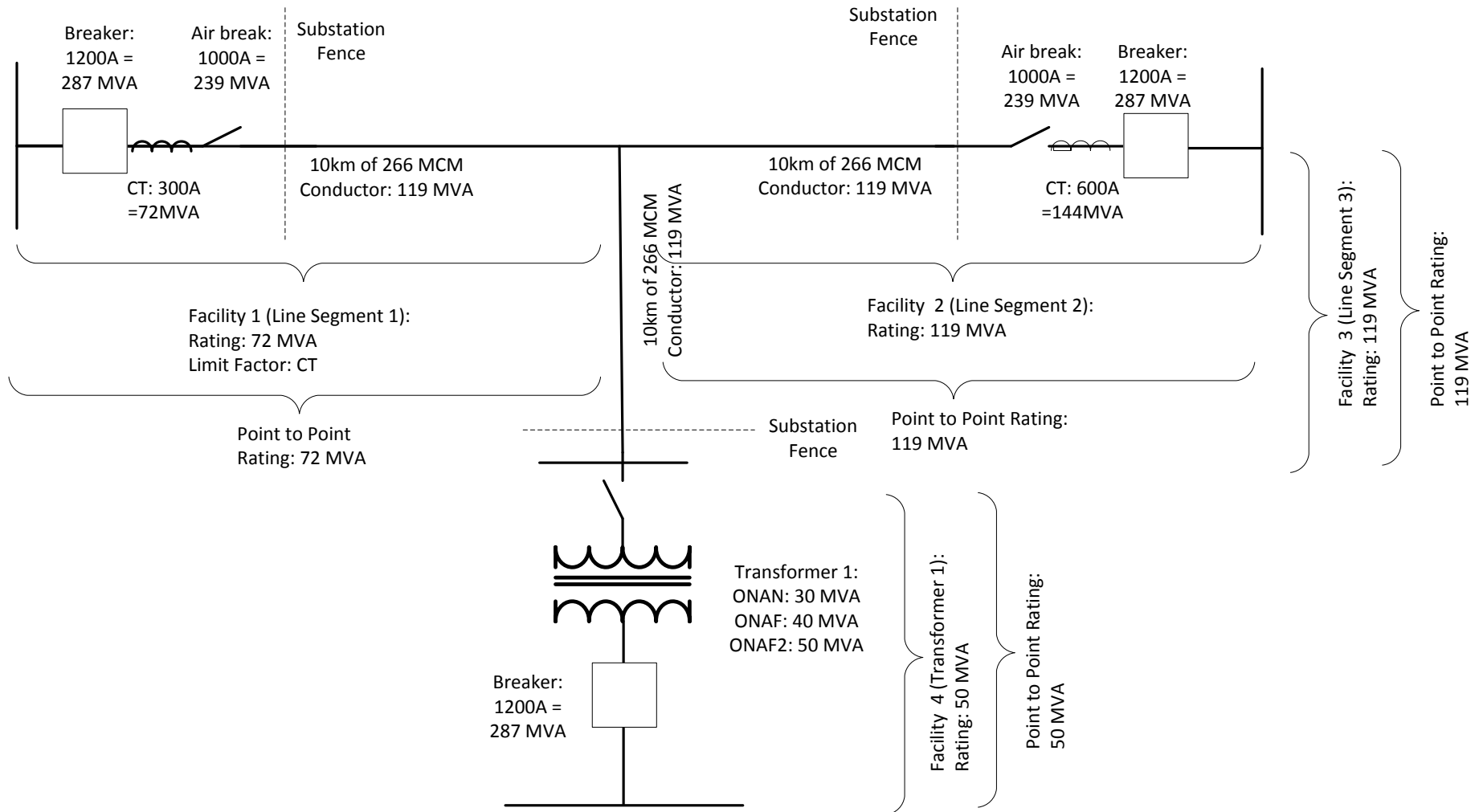


# Example 3: Transformer

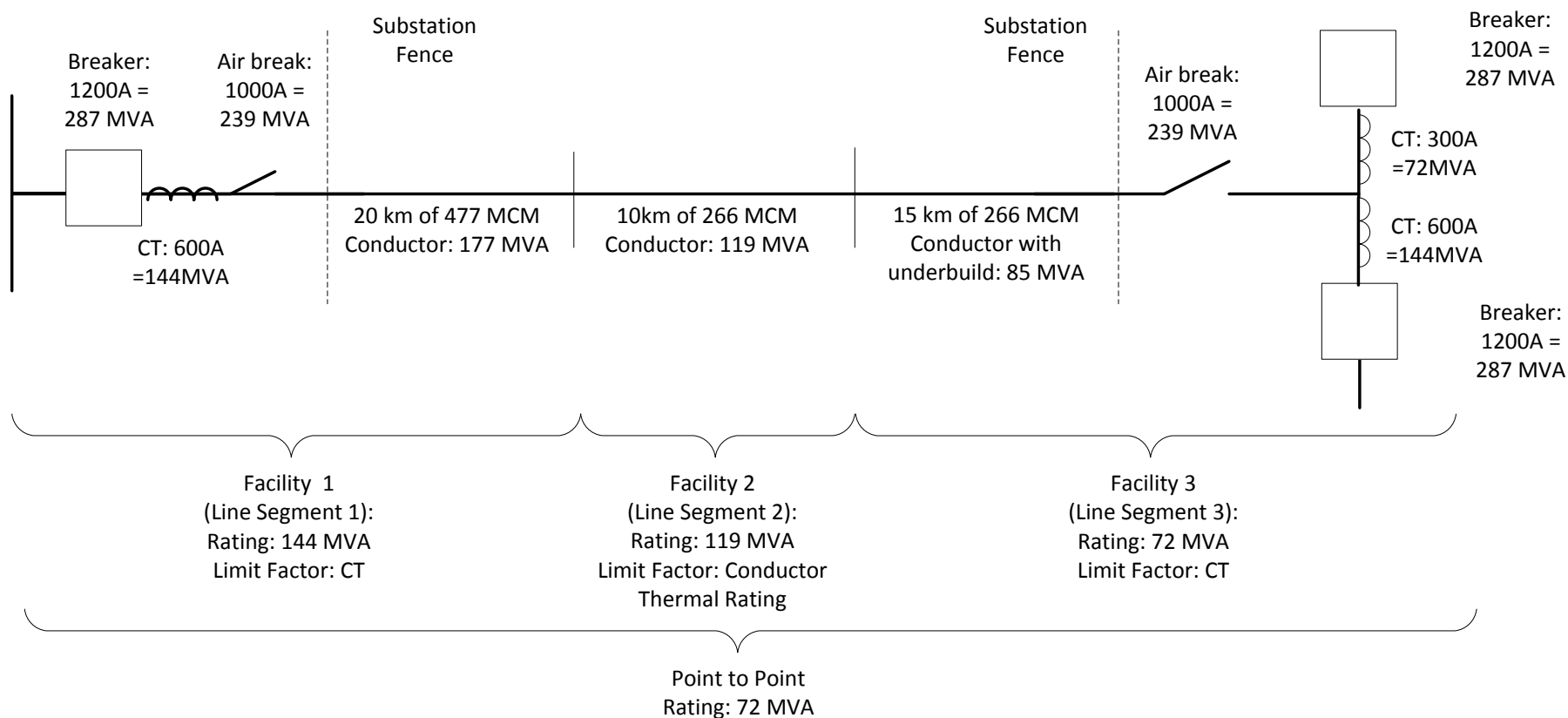




# Example 4: T-Tap POD



# Example 5: Shared Equipment



# Previous Technical Work Group Question



- *In the work group meeting, it was confirmed that FAC-008 would also cover “Voltage Ratings”. Could the AESO give an example of a facility which has a Voltage Rating? Is a bus in a substation such a facility? Is the Maximum Continuous Operating Voltage (MCOV) of a bus considered as a “Facility Voltage Rating”?*

# Questions?

- Q&A