

Information documents are not authoritative. Information documents are for information purposes only and are intended to provide guidance. In the event of any discrepancy between an information document and any authoritative document¹ in effect, the authoritative document governs.

1 Purpose

This information document relates to all authoritative documents that use the term bulk electric system, including:

- CIP-002-AB-5.1, *Cyber Security – BES Cyber System Categorization* (“CIP-002-AB-5.1”);
- CIP-003-AB-5, *Cyber Security – Security Management Controls* (“CIP-003-AB-5”);
- CIP-004-AB-5.1, *Cyber Security – Personnel & Training* (“CIP-004-AB-5.1”);
- CIP-005-AB-5, *Cyber Security – Electronic Security Perimeter(s)* (“CIP-005-AB-5”);
- CIP-006-AB-5, *Cyber Security Physical Security of BES Cyber Systems* (“CIP-006-AB-5”);
- CIP-007-AB-5, *Cyber Security – System Security Management* (“CIP-007-AB-5”);
- CIP-008-AB-5, *Cyber Security – Incident Reporting and Response Planning* (“CIP-008-AB-5”);
- CIP-009-AB-5, *Cyber Security – Recovery Plans for BES Cyber Systems* (“CIP-009-AB-5”);
- CIP-010-AB-1, *Cyber Security – Configuration Change Management and Vulnerability Assessments* (“CIP-010-AB-1”);
- CIP-011-AB-1, *Cyber Security – Information Protection*;
- CIP-014-AB-2, *Physical Security*;
- COM-001-AB1-1.1, *Telecommunications*;
- EOP-001-AB1-2.1b, *Emergency Operations Planning*;
- EOP-003-AB1-1, *Load Shedding Plans*;
- EOP-004-AB-2, *Event Reporting*;
- EOP-006-AB-2, *System Restoration Coordination*;
- EOP-008-AB-1, *Loss of Control Centre Functionality*;
- FAC-008-AB-3, *Facility Ratings* (“FAC-008-AB-3”);
- FAC-010-AB1-2.1, *System Operating Limits Methodology for the Planning Horizon*;
- FAC-011-AB-2, *System Operating Limits Methodology for the Operations Horizon*;
- FAC-014-AB1-2, *Establish and Communicate System Operating Limits*;
- IRO-002-AB-5, *Reliability Coordinator Monitoring and Analysis*;
- IRO-005-AB1-3.1a, *Reliability Coordination Current Day Operations*;
- IRO-006-AB-5, *Reliability Coordination – Transmission Loading Relief*;

¹ “Authoritative documents” is the general name given by the AESO to categories of documents made by the AESO under the authority of the *Electric Utilities Act* and associated regulations, and that contain binding legal requirements for either market participants or the AESO, or both. Authoritative documents include: the ISO rules, the reliability standards, and the ISO tariff.

- PER-003-AB-1, *Operations Personnel Credentials*;
- PER-005-AB-2, *Operations Personnel Training*;
- PRC-001-AB3-1.1(ii), *Protection System Coordination* (“PRC-001-AB3-1.1(ii)”);
- PRC-002-AB-2, *Disturbance Monitoring and Reporting Requirements*;
- PRC-004-AB2-1, *Analysis and Mitigation of Transmission and Generation Protection System Misoperation*;
- PRC-005-AB1-6, *Protection System, Automatic Reclosing and Sudden Pressure Relaying Maintenance*;
- PRC-023-AB-2, *Transmission Relay Loadability*;
- PRC-025-AB-2, *Generator Load Reliability* (“PRC-025-AB-2”); and
- VAR-501-WECC-AB-1, *Power System Stabilizer* (“VAR-501-WECC-AB-1”).

The purpose of this information document is to help clarify to stakeholders the meaning of the defined term bulk electric system.

2 Direct Connections

2.1 Switchyards

Pursuant to the defined term bulk electric system items (iv), (v), and (vi), a responsible entity is to consider all system elements within a switchyard when assessing whether a switchyard is directly connected to transmission facilities energized at 100 kV or higher.

2.2 Generating Units

In several of the above listed reliability standards,² the Applicability sections refer to generating units and aggregated generating facilities that are directly connected to the bulk electric system. Any generating unit or aggregated generating facility that is part of the bulk electric system is considered directly connected to the bulk electric system.

In addition, any generating unit or aggregated generating facility that receives system access service through a switchyard, which contains one or more system elements energized at 100 kV or higher, is considered directly connected to the bulk electric system.

3 Radial Circuit Examples

The examples provided in this section illustrate application of item (ii) of the bulk electric system definition, which relates to radial circuits.

² This includes the applicability sections for the following reliability standards: CIP-002-AB-5.1, CIP-003-AB-5, CIP-004-AB-5.1, CIP-005-AB-5, CIP-006-AB-5, CIP-007-AB-5, CIP-008-AB-5, CIP-009-AB-5, CIP-010-AB-1, CIP-011-AB-1, FAC-008-AB-3, PRC-001-AB3-1.1(ii), PRC-025-AB-2, and VAR-501-WECC-AB-1.

3.1 Load facilities only

Figure 1 shows an example of a radial circuit and load facilities that are connected to the radial circuit. Pursuant to item (ii), these are not considered part of the bulk electric system definition.

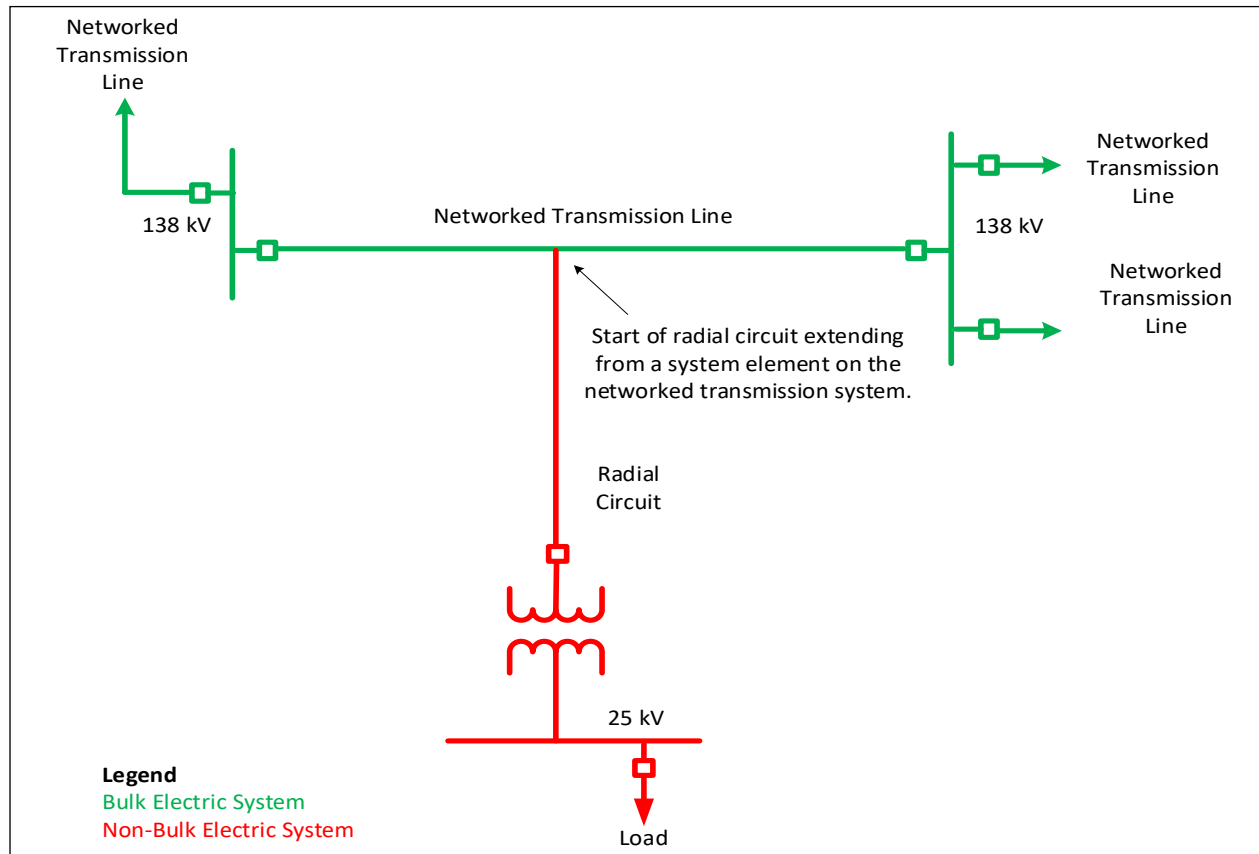


Figure 1 – Radial Circuit with Load Facilities Connected

3.2 Load Facilities and Generating Resources

- (a) load facilities and generating resources which have a maximum authorized real power less than 18 MW and a combined maximum authorized real power less than 67.5 MW

Figure 2 below shows an example of load facilities and transmission-connected generating resources that are connected to the radial circuit, referred to as Example A. Pursuant to item (ii), these are not considered part of the bulk electric system definition.

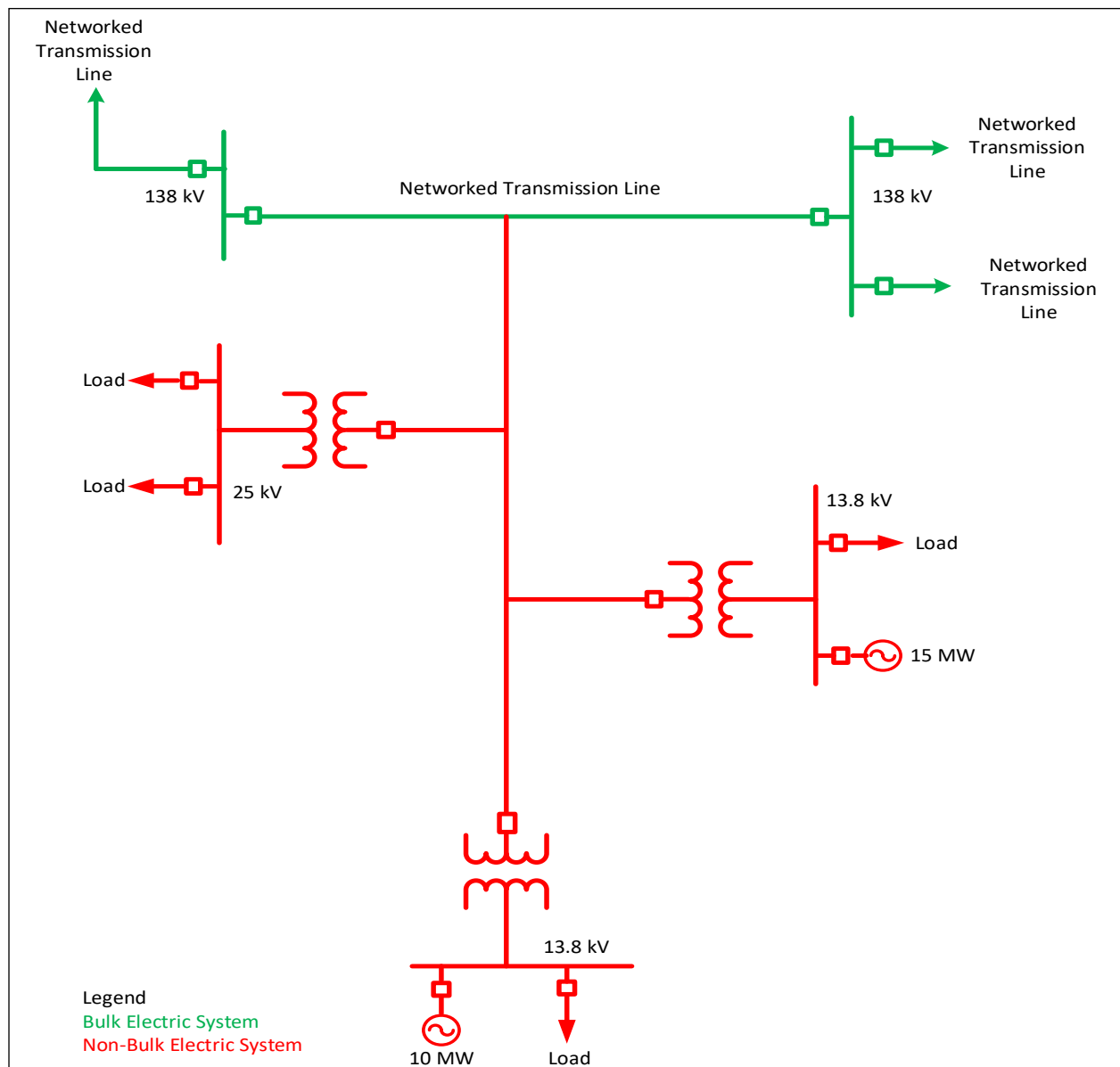


Figure 2 – Example A: Radial Circuit with Load Facilities and Generating Resources Connected

(b) load facilities and a generating unit that has a maximum authorized real power greater than 18 MW, and the combined maximum authorized real power of all generating resources is less than 67.5 MW

Figure 3 shows an example of load facilities and generating resources that are connected to the radial circuit, referred to as Example B. Pursuant to item (ii), the radial circuit and the transmission-connected generating unit with a maximum authorized real power of 20 MW are considered part of the bulk electric system; however, the load facilities and the transmission-connected generating unit with a maximum authorized real power of 10 MW are not.

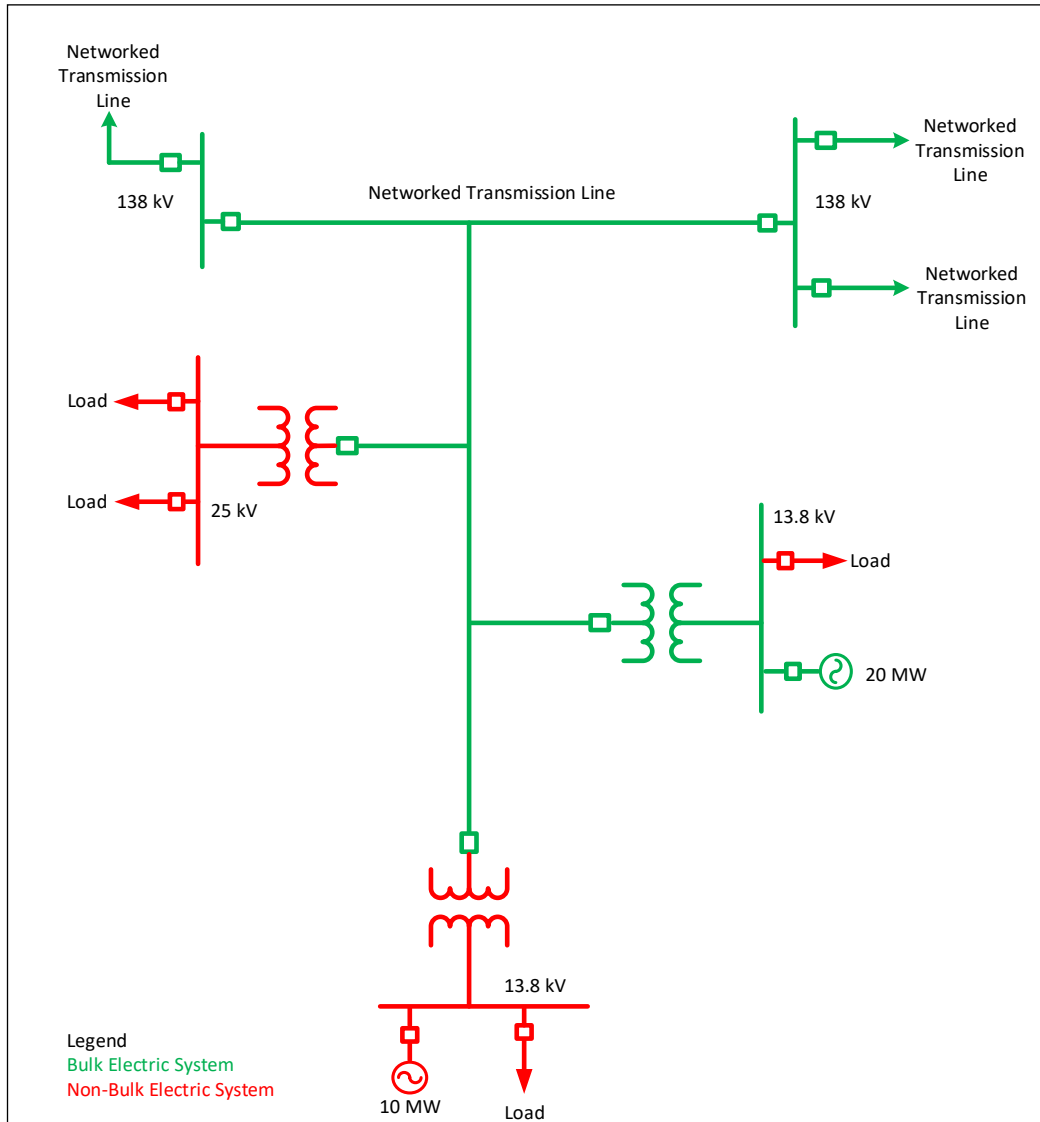


Figure 3 – Example B: Radial Circuit with Load Facilities and Generating Resources Connected

(c) load facilities, a distribution-connected generating unit that has a rating greater than 18 MW, and a transmission-connected generating unit that has a maximum authorized real power less than 18 MW

Figure 4 shows an example of load facilities, a distribution-connected generating unit, and a transmission-connected generating unit connected to a radial circuit, referred to as Example C. In this example, the generating unit, rated at 19 MW, is connected to an electric distribution system; and the generating unit with a maximum authorized real power of 10 MW is connected to the transmission system. Pursuant to item (ii), the radial circuit and all connecting facilities are not considered part of the bulk electric system.

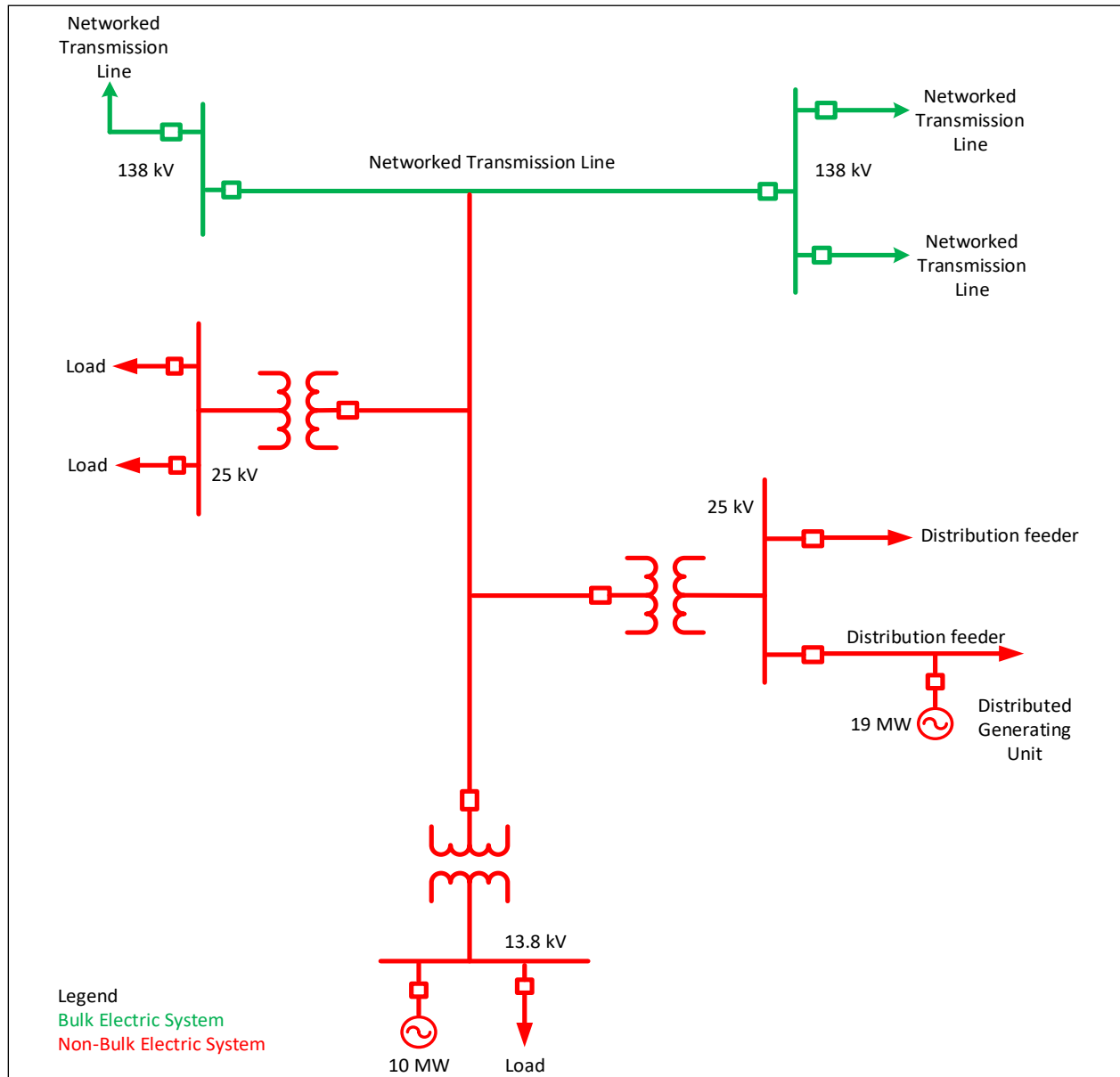


Figure 4 – Example C: Radial circuit with Load Facilities and Generating Resources Connected

(d) load facilities and a transmission-connected aggregated generating facility that has a maximum authorized real power greater than 67.5 MW

Figure 5 shows an example of load facilities and a transmission-connected aggregated generating facility with a maximum authorized real power of 80 MW connected to a radial circuit, referred to as Example D. Pursuant to item (ii), this radial circuit and all system elements from the collector bus of the aggregated generating facility to the transmission facilities are considered part of the bulk electric system. However, pursuant to item (v), the generating units and the collector system feeders are not considered part of the bulk electric system.

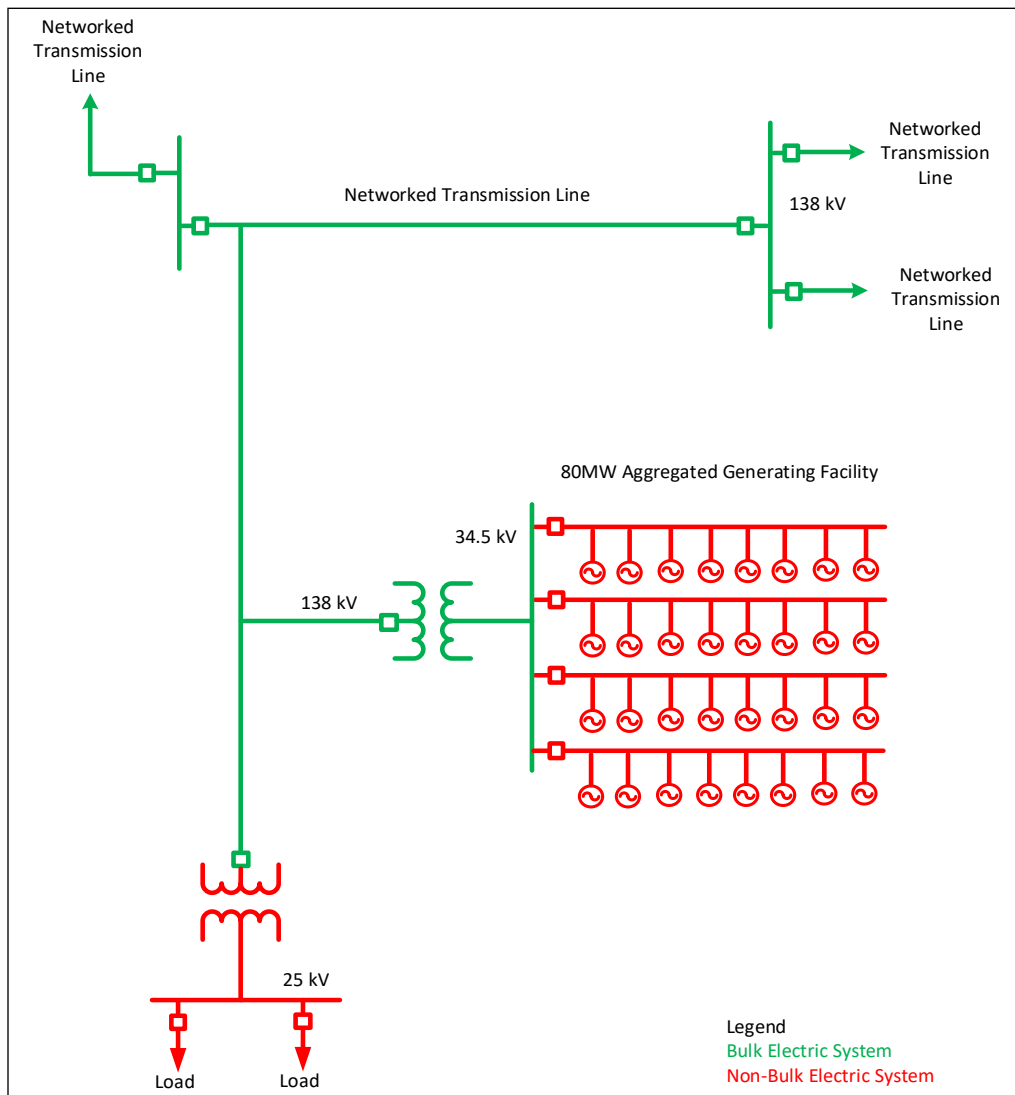


Figure 5 – Example D: Radial Circuit with Load Facilities and Generating Resources Connected

(e) load facilities and generating units that have a combined maximum authorized real power greater than 67.5 MW

Figure 6 shows load facilities and transmission-connected generating units with a combined maximum authorized real power of 70 MW connected to a radial circuit, referred to as Example E. Pursuant to items (ii) and (iv), the radial circuit, 20 MW generating unit and all system elements from the terminal of the 20 MW generating unit to the transmission facilities energized at 100 kV or higher are considered part of the bulk electric system. However, pursuant to items (iv) and (vi), the remaining generating units are not considered part of the bulk electric system.

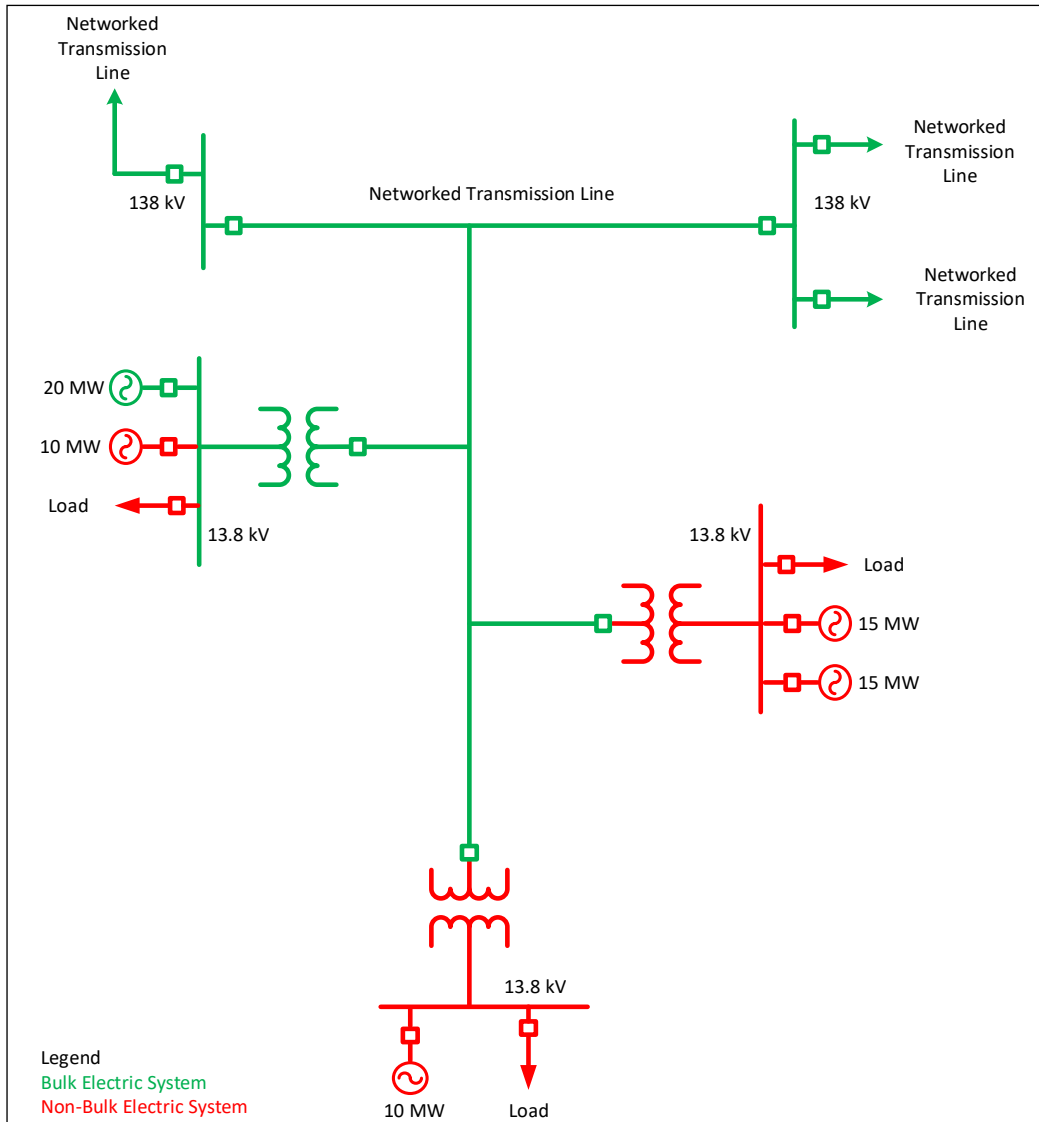


Figure 6 – Example E: Radial Circuit with Load Facilities and Generating Resources Connected

4 Industrial Complex and Power Plant Examples

The examples provided in this section illustrate application of items (iv) and (v) of the bulk electric system definition.

(a) industrial complex with individual generating units that have a maximum authorized real power greater than 18 MW

Figure 7 shows an example of an industrial complex that has 3 generating units with a combined maximum authorized real power of 60 MW, comprised of 2 generating units that each have a maximum authorized real power of 25 MW, and 1 generating unit with a maximum authorized real power of 10 MW.

Pursuant to items (iv) and (vi), the 2 generating units with a maximum authorized real power of 25 MW and the system elements from the terminal of each generating unit to the transmission facilities energized at 100 kV or higher are considered part of the bulk electric system. However, the 10 MW generating unit and the connection between the terminal of the 10 MW generating unit to the transmission facilities energized at 100 kV or higher are not considered part of the bulk electric system.

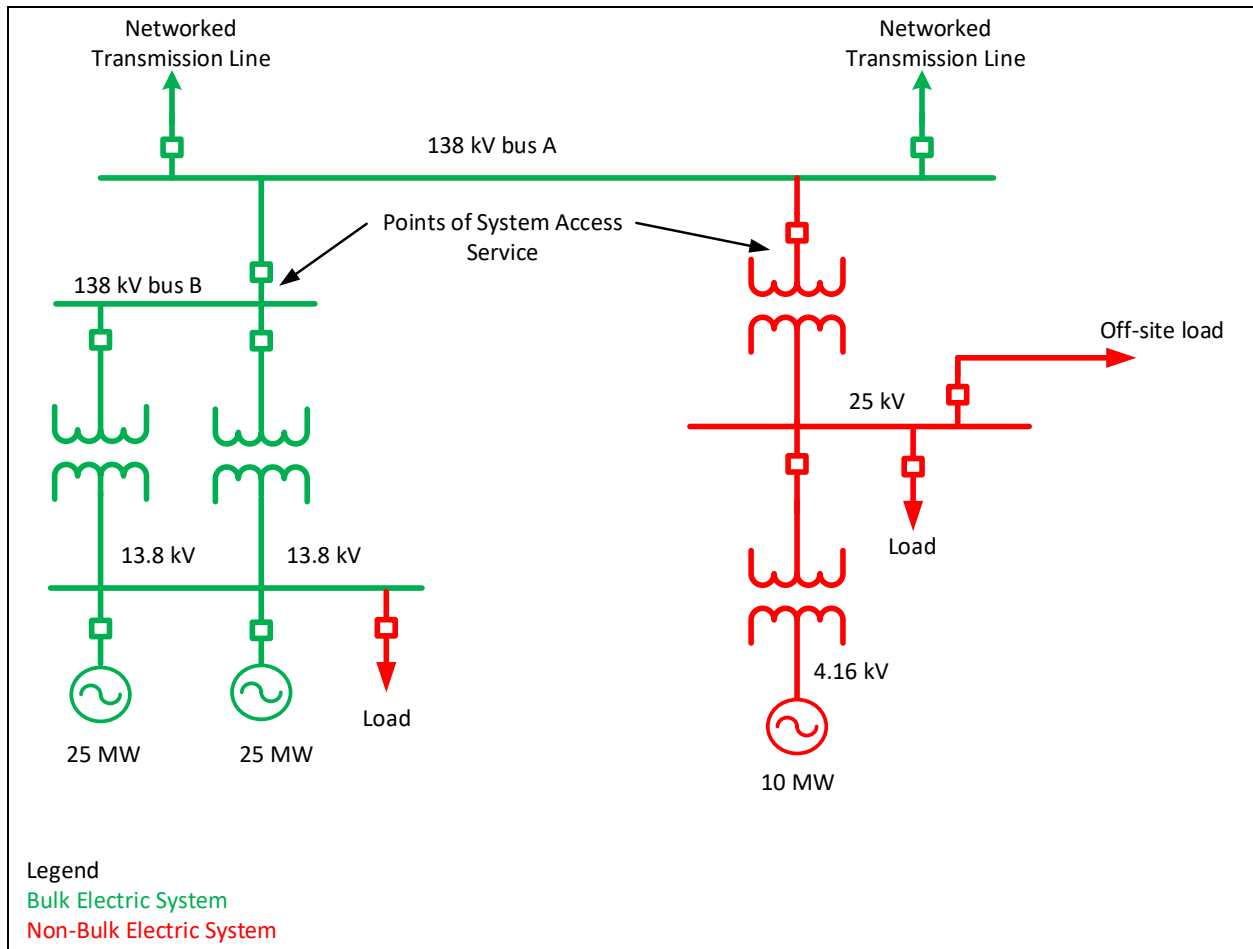


Figure 7 – Industrial Complex with Generating Resources with a Combined Maximum Authorized Real Power <67.5 MW

(b) industrial complex with generating units that have a combined maximum authorized real power greater than 67.5 MW

Figure 8 shows an example of an industrial complex that has 3 generating units with a combined maximum authorized real power of 70 MW. Pursuant to item (vi), the generating units and the system elements from the terminal of each generating unit to transmission facilities energized at 100 kV or higher and the connection between 138 kV bus A and 138 kV bus B are considered part of the bulk electric system.

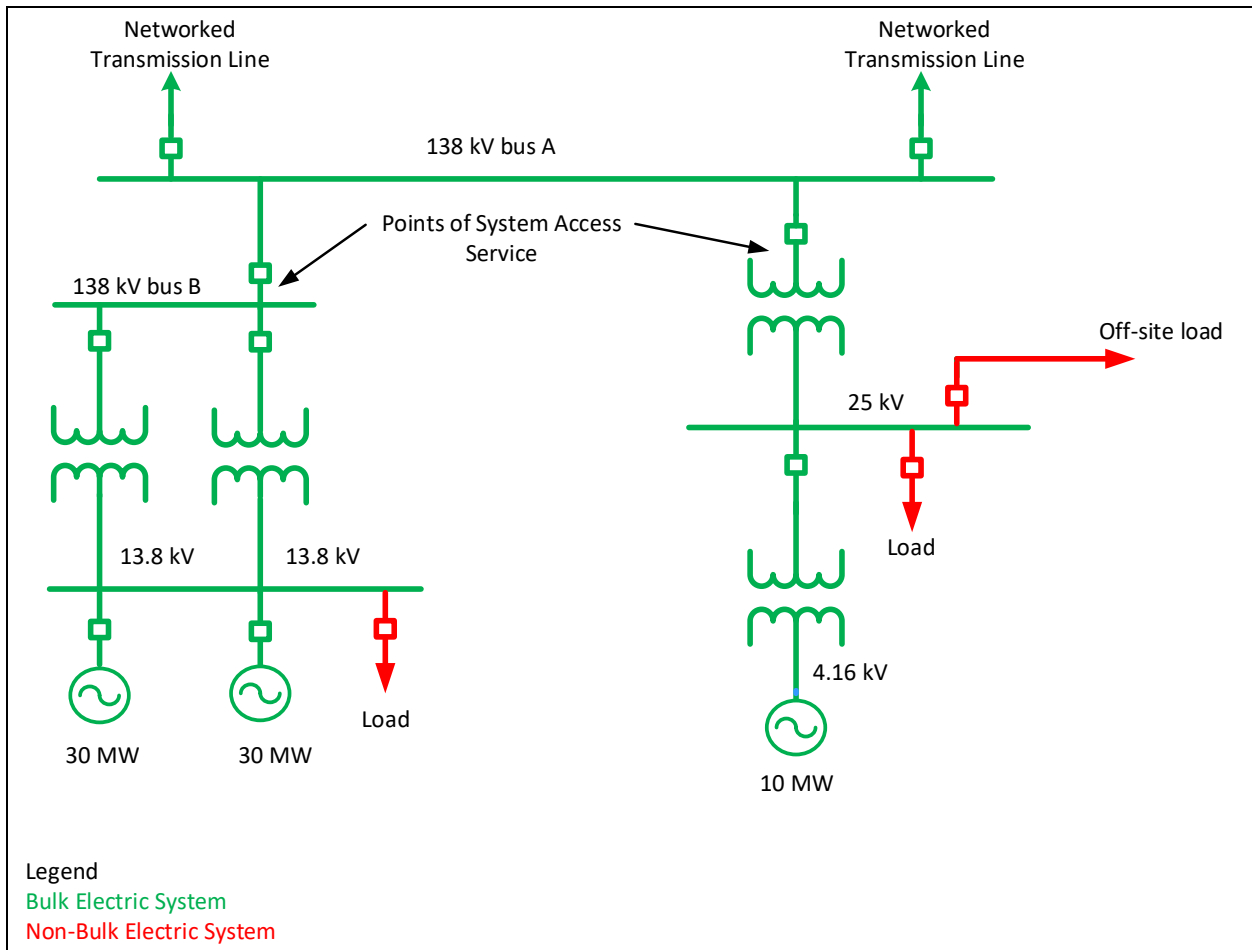


Figure 8 – Industrial Complex with Generating Resources with a Combined Maximum Authorized Real Power >67.5 MW

(c) industrial complex or power plant with generating units that have a combined maximum authorized real power greater than 67.5 MW and 69 kV transmission lines that either serve on-site loads or are not part of the interconnected electric system.

Figure 9 shows an example of an industrial complex or power plant that has 3 generating units with a combined maximum authorized real power of 145 MW where system access service is provided through a common switchyard that is directly connected to transmission facilities energized at 138 kV. Pursuant to item (vi), the generating units and the system elements from the terminal of each generating unit to transmission facilities energized at 100 kV or higher are considered part of the bulk electric system.

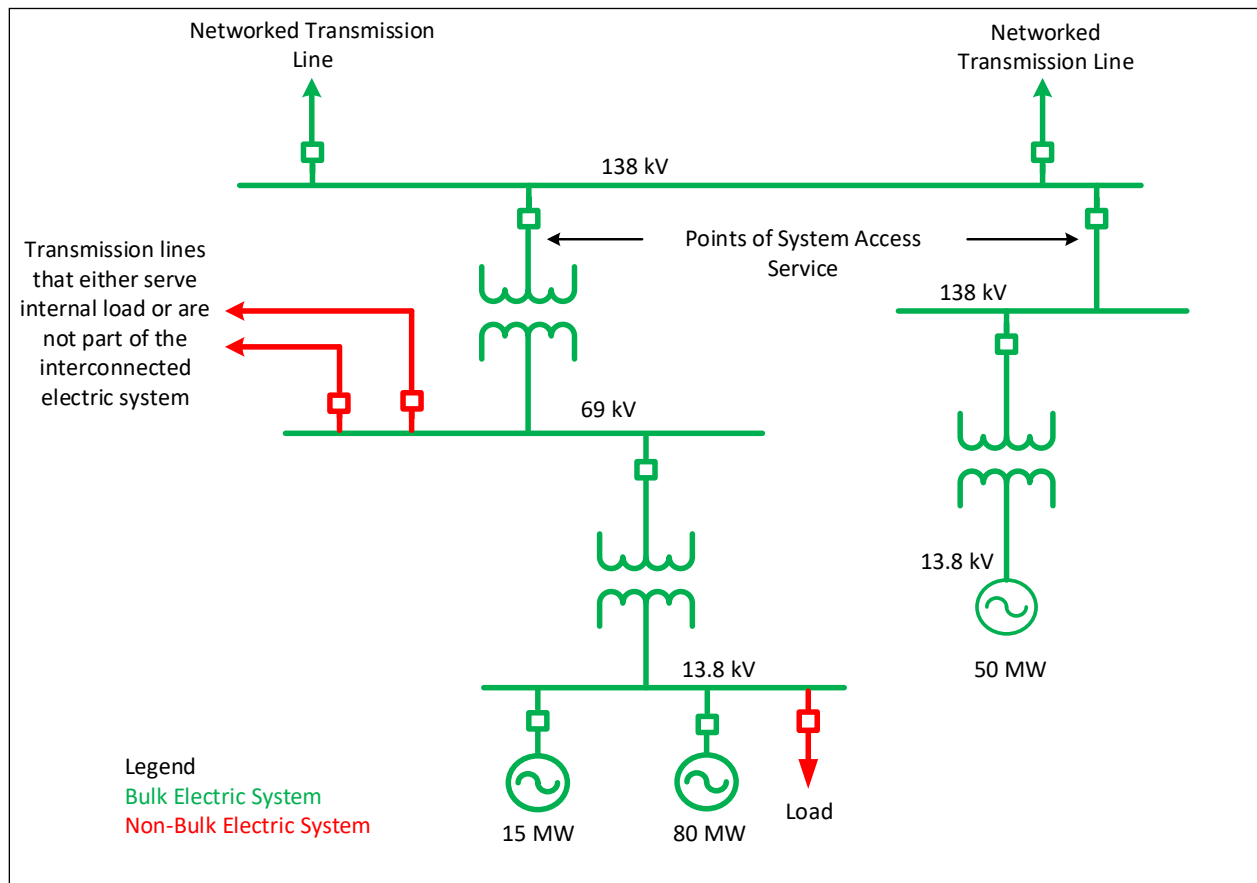


Figure 9 – Industrial Complex or Power Plant with 69 kV Transmission Lines that Serve Internal Load or are Not Part of the Interconnected Electric System

- (d) industrial complex with generating units that have a combined maximum authorized real power greater than 67.5 MW, 69 kV transmission lines serving on-site load, and a ring bus between the generating units and transmission facilities energized at 100 kV or higher

Figure 10 below shows an example of an industrial complex that has 2 generating units with a combined maximum authorized real power of 160 MW where system access service is provided through a common switchyard that is directly connected to transmission facilities energized at 240 kV.

Pursuant to item (vi), the generating units and the system elements that are normally capable of carrying electric energy from the terminal of each generating unit to transmission facilities energized at 100 kV or higher are considered part of the bulk electric system.

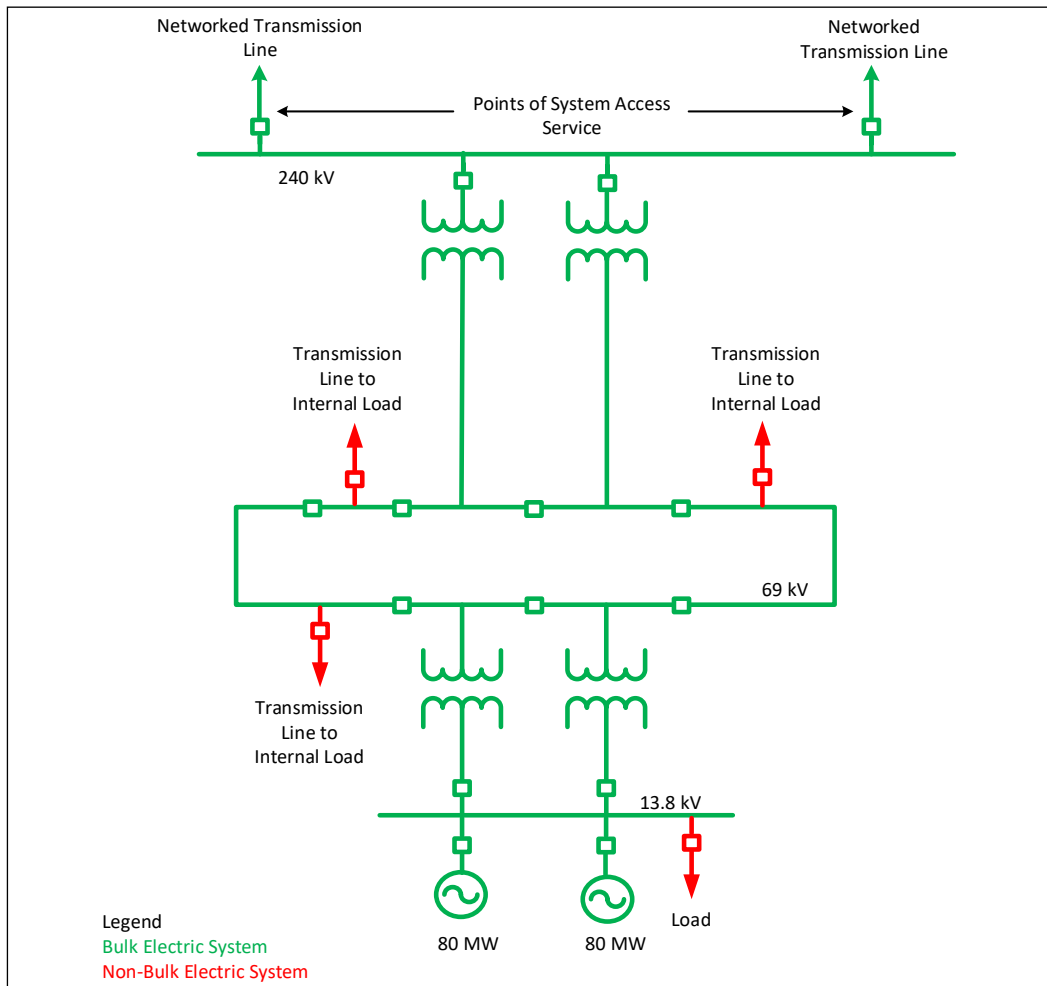


Figure 10 – Industrial Complex with Generating Resources Connected to Transmission Facilities \geq 100 kV through a 69 kV Ring Bus

(e) power plant with generating units that have a combined maximum authorized real power greater than 67.5 MW, that connect through a common switchyard with transmission facilities that are energized at 100 kV or higher

Figure 11 below shows an example of a power plant that has 2 generating units with a combined maximum authorized real power of 250 MW where system access service is provided through a common switchyard that is directly connected to transmission facilities energized at 240 kV.

Pursuant to item (vi), the generating units and the system elements that are normally capable of carrying electric energy from the terminal of each generating unit to transmission facilities energized at 100 kV or higher are considered part of the bulk electric system.

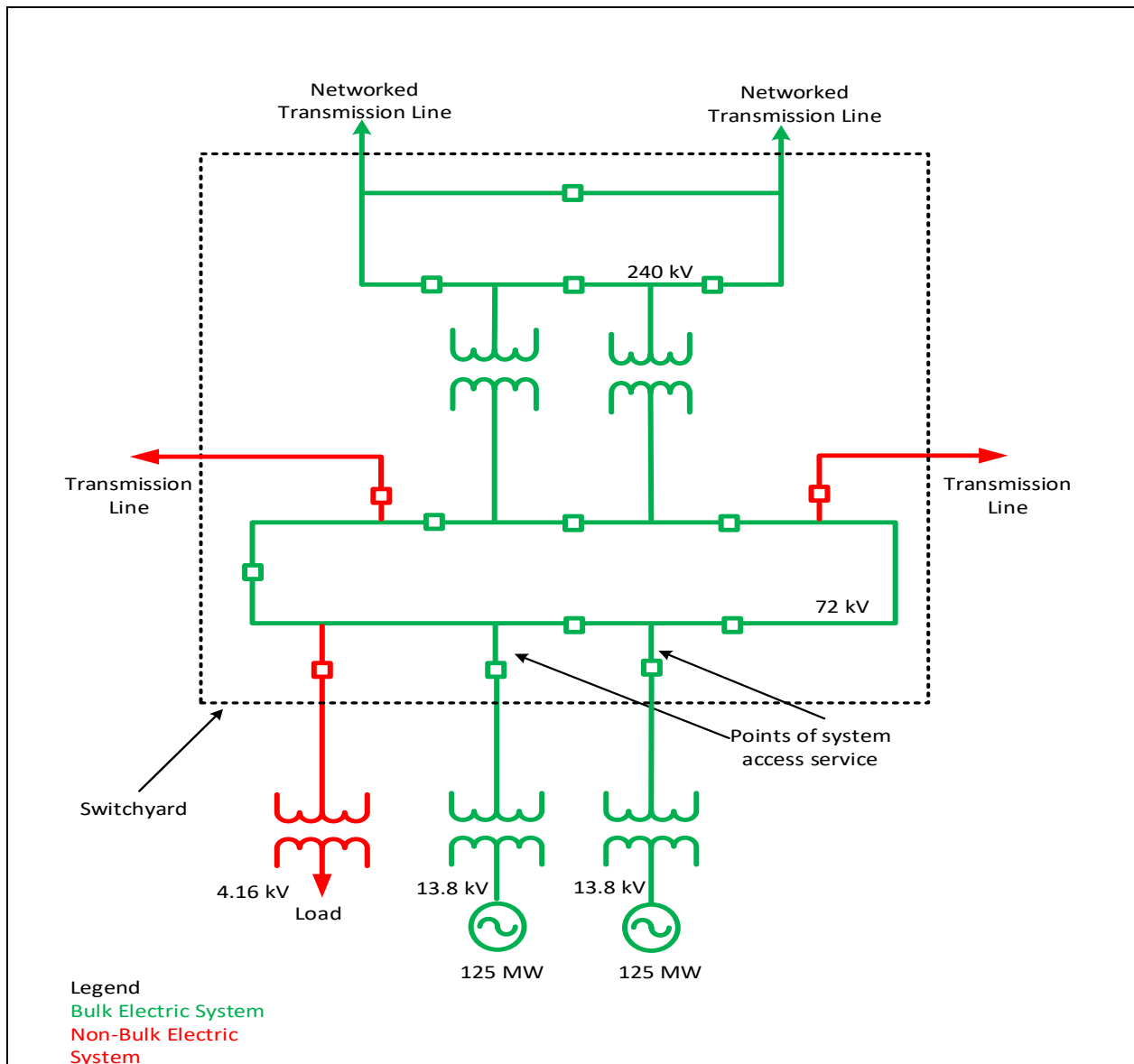


Figure 11 – Power Plant with Generating Resources Connected to Transmission Facilities ≥ 100 kV through a 72 kV Ring Bus

Revision History

Posting Date	Description of Change
2021-03-19	Modified subsection 3.2 to improve clarity regarding the generating unit connections shown in the figures. Fixed formatting errors.
2021-01-27	<p>Addition of section 2 and a related example (Figure 11) to assist legal owners of generating units and aggregated generating facilities determine if their facilities are part of the bulk electric system. Change to low voltage on Example 5 to better reflect typical voltage for the example.</p> <p>Editorial changes to align with AESO drafting principles.</p>
2020-09-01	Initial Release