CENTERPOINT ENERGY
NEW/EXISTING TRANSMISSION CUSTOMERS
TECHNICAL EVALUATION OF LOAD INTERCONNECTION REQUESTS

Obtain the following data from the customer:

Reset Form

Date Submitted ________________

Type of interconnection study requested: (Choose from the following)

☐ New Load Customer ☐ Existing Customer Adding Load

Customer Information:

Customer/Company: ______________________________

Street Address: ______________________________

City, State Zip: ______________________________

Contact Name: ______________________________

Contact Phone Number: ______________________________

Contact Email: ______________________________

Substation Information: (Provide address for substation site, if known)

Street Address: ______________________________

City, State Zip: ______________________________

General location of customer's new/additional load: (Attach a sketch for the site)

Proposed Load Addition Coordinates (In Decimal Degrees or Degrees, Minutes, Seconds Format:

Latitude: ______________________ Longitude: ______________________

Study Information:

*Values in blue are calculated

* CenterPoint Energy may consider connecting a customer at 345 kV based on factors such as study results, MW size of the customer facility and/or customer location in proximity to available 345 kV transmission lines.

** ERCOT requires a stability study to be performed for any load >=75 MW. Therefore, a dynamic load model and/or PSCAD model representing the actual load behavior shall be submitted at the time of LDRF submission.

*** No Study would be started until all the required data is submitted. The study timeline starts once all the data including working dynamic load model data is received and validated by High Voltage Planning Department.

NERC Dynamic Load Modeling Technical Reference Document

NERC Load Modeling Composition Technical Reference Document

PSSE Composite Load Model Manual PSSE Composite Load Model in *.dyr Format

a. Amount of transmission or distribution load transferred from existing substation ____________ to new location, if any, ________ MVA ______ p.f. ________ MW*

b. Peak load at the existing ____________ sub (excluding the load transferred) ________ MVA ______ p.f. ________ MW* __________ MVAr*

c. Amount of self-serve load at existing ____________ sub, ________ MVA ______ p.f. ________ MW* __________ MVAr*

d. Amount of self-serve generation at new substation, if any, __________ MW, and amount of self-serve load ________ MVA ______ p.f. ________ MW* ________ MVAr*

e. Provide the new/additional expected substation load growth per year (MVA, p.f.) Provide p.f. as measured at the transmission voltage (high side) delivery point **(>= 0.95 p.f. is required)**

*Values in blue are calculated

Year	Month	Load (MVA)	P.F.	**TOTAL** Load at Substation			
				MVA*	MW*	MVAr*	P.F.
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0
				0	0	0	0

Note: Existing and transferred load is included in the TOTAL Load Calculation Above.

f. Planned in-service date for new load: ____________________

g. Estimated study completion date: ____________________ Min. ______ Weeks

h. Select one of the following types of 138 kV interconnection substation customer intends to build. See Pages 5-6 for various substation configurations.

* Note: CEHE does not allow more than 6 breakers in a full loop configuration. If the customer anticipates that, there would be more than 6 breakers, then the customer shall convert the station to a Breaker-and-a-Half configuration.

i. Load Type:

j. Load profile (annual load variation, summer/winter peaking, day/night peaking)

k. Load characteristics (i.e., large motor, lighting, etc.)

l. Load Ramp rates (Start-up, shut-down, accelerating, and decelerating ramp rates. Include time it takes for each step of the ramp rate)

m. Load Trip settings and Recovery settings (Provide under voltage, over voltage, under frequency, over frequency and/or any other trip/recovery settings at which the load would drop and/or reconnect)

(Rev. December 18, 2024)

Data for Motor Starting Study

Instructions: Fill in each row completely.
(NEC 430-7(b) Locked Rotor Code Letter or Locked Rotor Current must be supplied.)

Table 430.7(B) **Locked-Rotor Indicating Code Letters**

Code Letter	Kilovolt-Amperes per Horsepower with Locked Rotor	Code Letter	Kilovolt-Amperes per Horsepower with Locked Rotor	Code Letter	Kilovolt-Amperes per Horsepower with Locked Rotor
A	0–3.14	H	6.3–7.09	P	12.5–13.99
B	3.15–3.54	J	7.1–7.99	R	14.0–15.99
C	3.55–3.99	K	8.0–8.99	S	16.0–17.99
D	4.0–4.49	L	9.0–9.99	T	18.0–19.99
E	4.5–4.99	M	10.0–11.19	U	20.0–22.39
F	5.0–5.59	N	11.2–12.49	V	22.4 and up
G	5.6–6.29				

Induction Motor Data

Motor #	Motor Type	Starting Method	HP	Voltage (kV)	Code	Locked Rotor (Amps)	# of Starts	Per Period
1	Induction Motor							
2	Induction Motor							
3	Induction Motor							
4	Induction Motor							
5	Induction Motor							
6	Induction Motor							
7	Induction Motor							
8	Induction Motor							
9	Induction Motor							
10	Induction Motor							

Synchronous Motor Data

Motor #	Motor Type	Starting Method	HP	Voltage (kV)	Code	Locked Rotor (Amps)	# of Starts	Per Period
1	Synchronous	None						
	None							
2	Synchronous	None						
	None							
3	Synchronous	None						
	None							
4	Synchronous	None						
	None							
5	Synchronous	None						
	None							

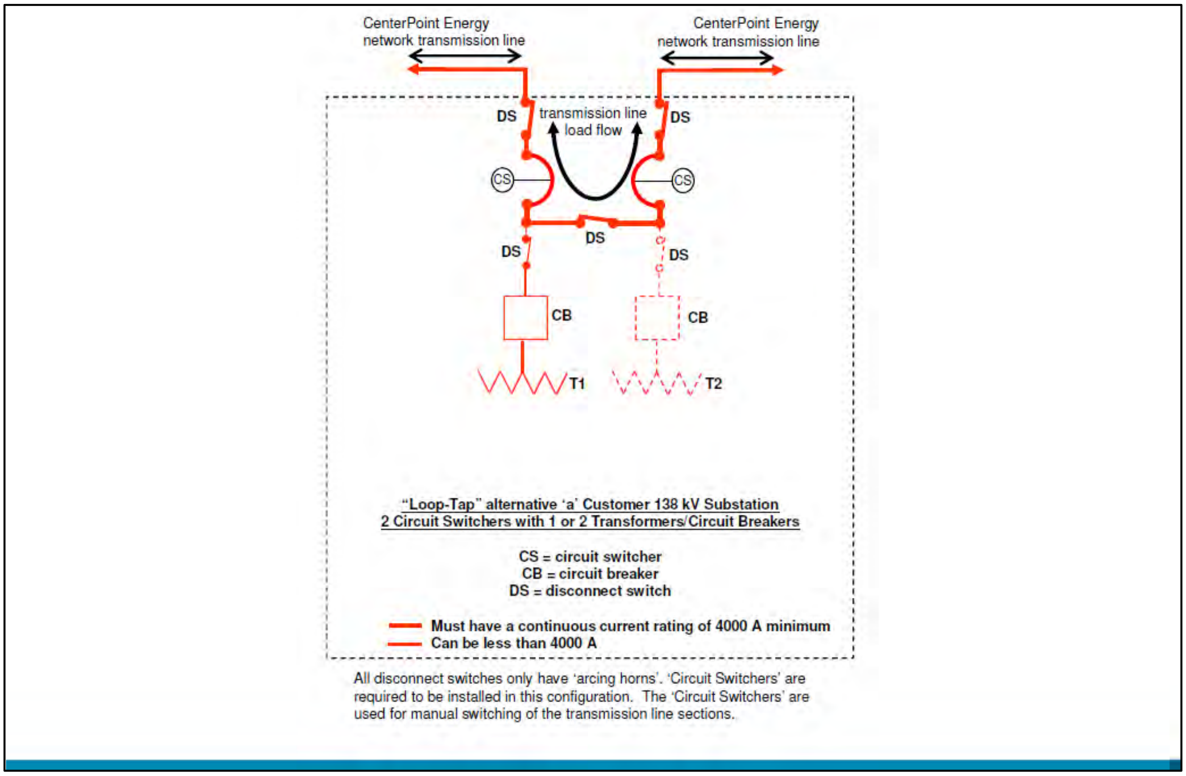


Figure 1: "Loop-Tap" Alternative 'a' Diagram

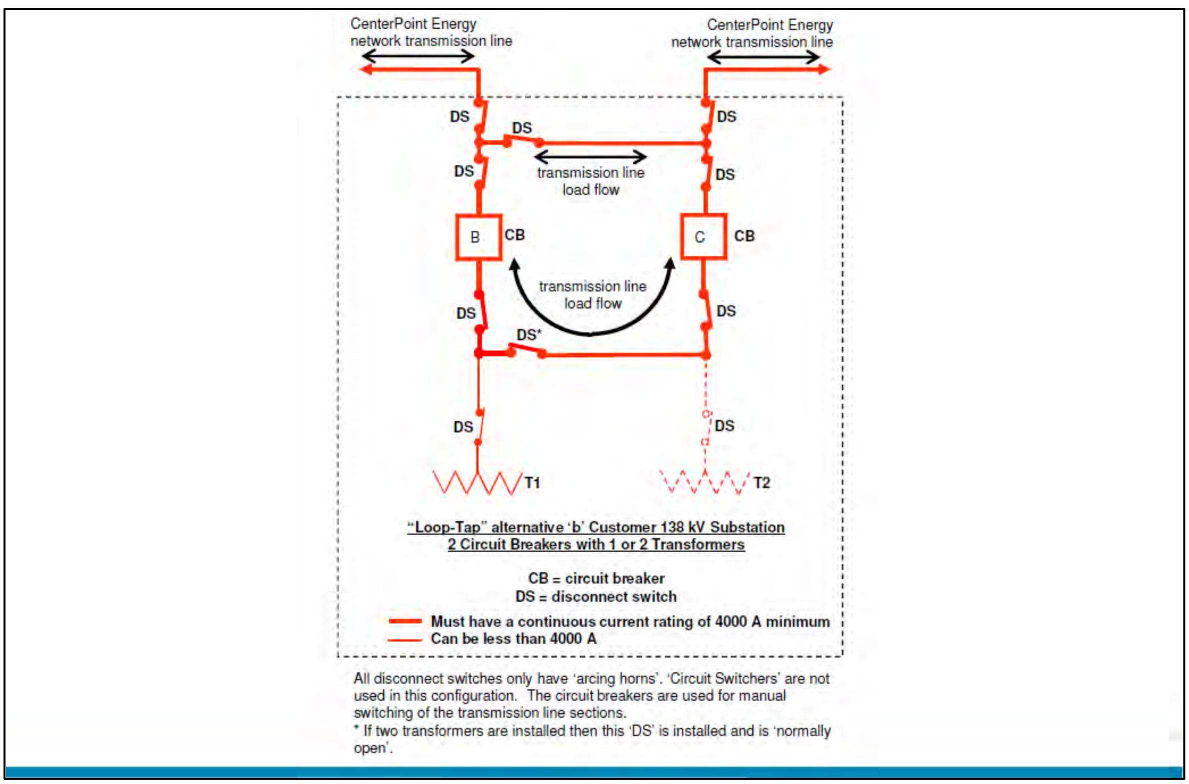


Figure 2: "Loop-Tap" Alternative 'b' Diagram

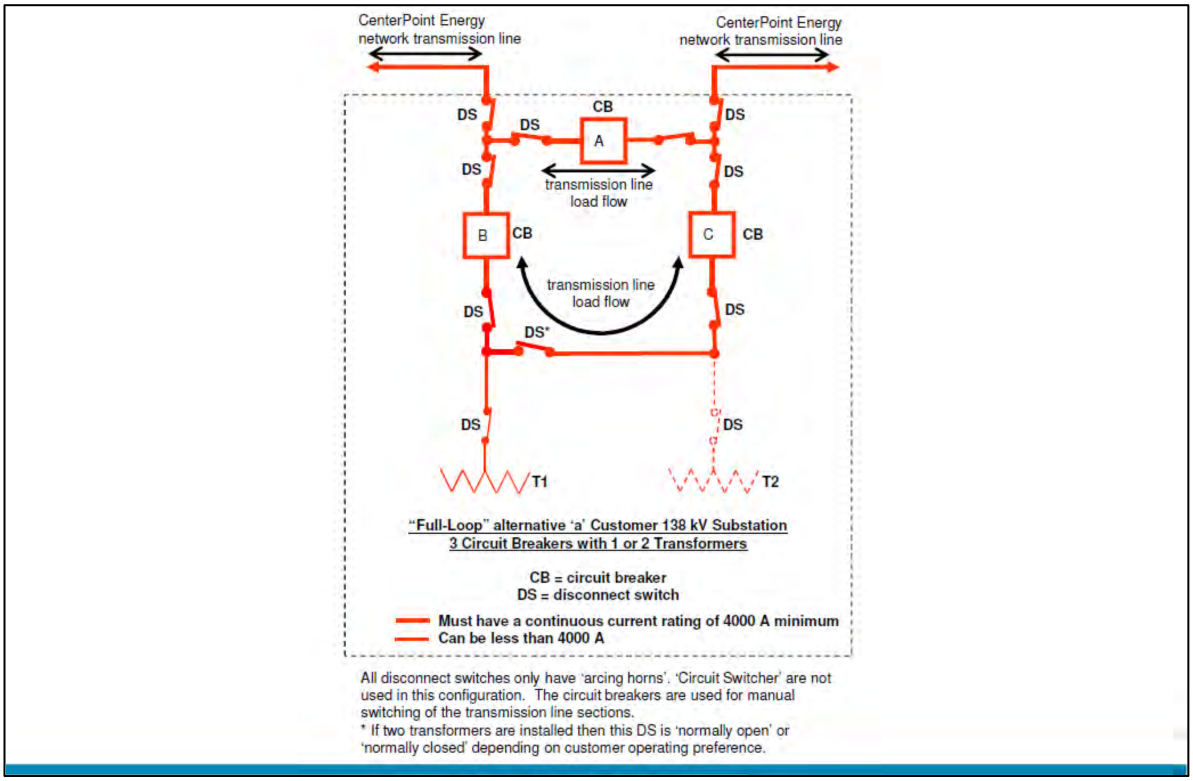


Figure 3: "Full-Loop" Alternative 'a' Diagram

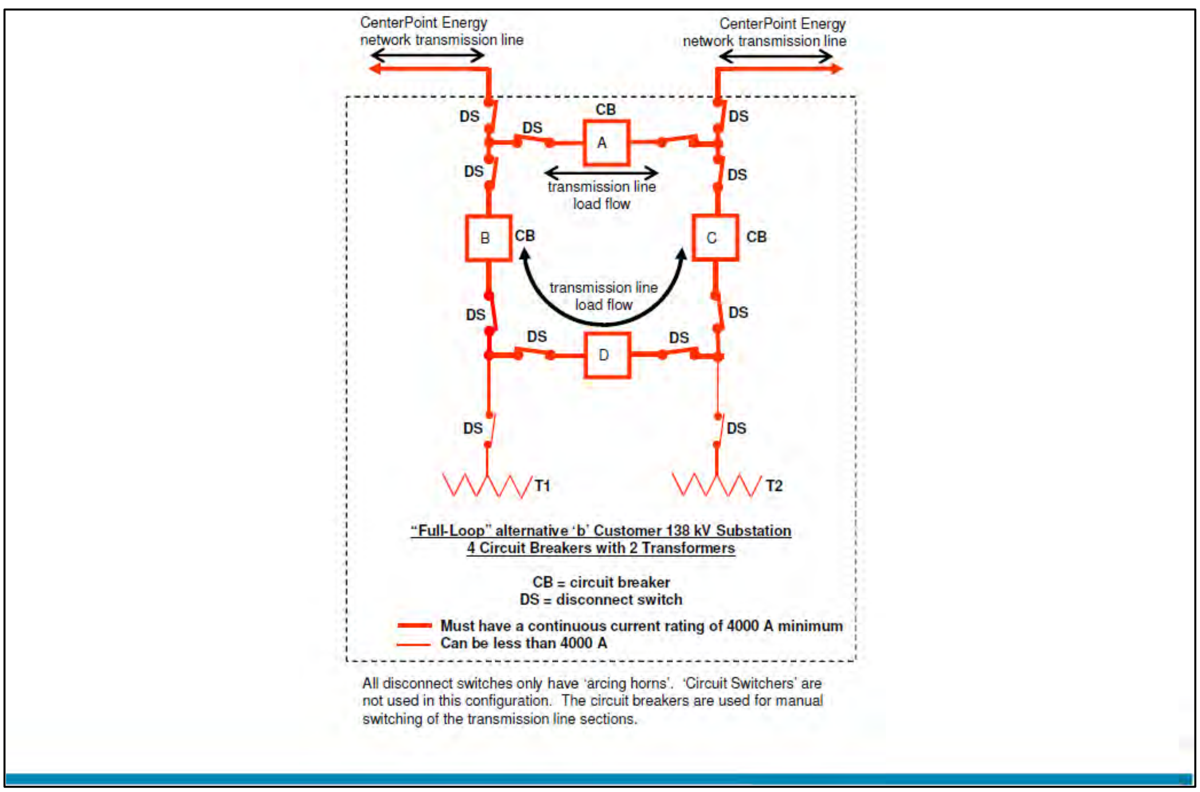


Figure 4: "Full-Loop" Alternative 'b' Diagram

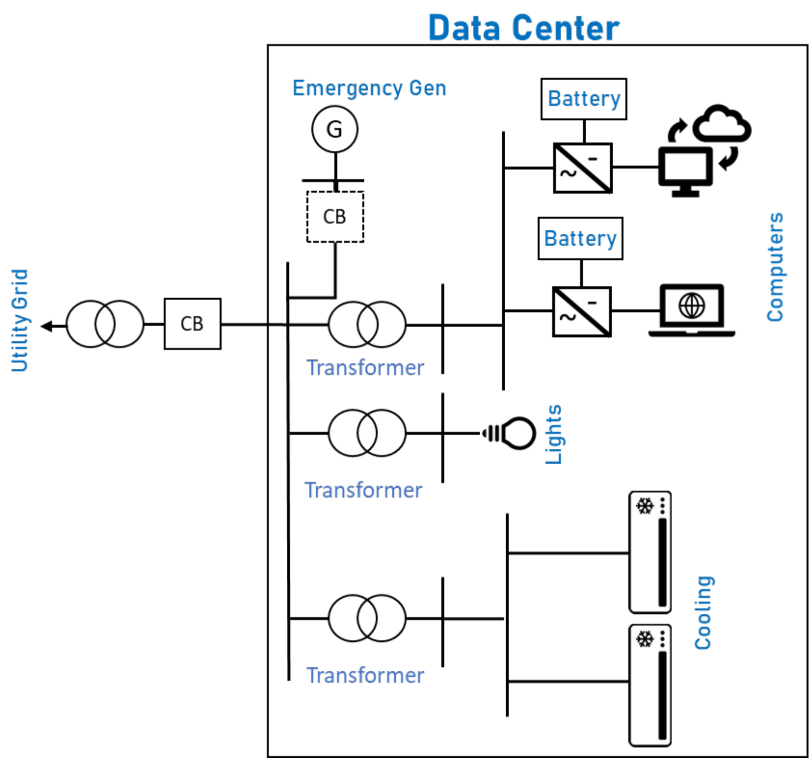
Data Center Information Collection

Why Do We Need Information on Data Centers?

Transmission planning simulation studies help transmission planners identify reliability challenges in the power system and then devise mitigation measures to address these. A key consideration for such simulation studies is to model the active and reactive power demand of consumer loads during grid voltage and/or frequency disturbances with a reasonable degree of accuracy. Since data centers/computation facilities are significantly large loads, transmission planners need to understand some aspects of such facilities to model them adequately for these studies.

What Information Do We Need from Data Center Owners?

For the purposes of data center modeling in transmission studies, we expect that the information we seek is non-intrusive and non-proprietary. For the context of the data requirements in the diagram below. This is diagram just for the sake of illustration and does not represent any particular data center layout. Based on this diagram, the following questions are of interest to us. Answers may be specific to individual data centers (that may remain unidentified), or typical of a number of data centers.



Based on the schematic s above, the following questions are of interest to us. Answers may be specific to individual data centers (that may remain unidentified), or typical of a number of data centers.

Reset Form

1. What is the rated total MW consumption of your data center, including IT equipment, power distribution, and cooling?

2. What is the percentage of the computing/server load, the lighting load, the power distribution losses, and the cooling load of the total MW consumption of the data center? What is the overall data center power factor?

    a. Does the percentage change during different seasons and different times of the day? If yes, a gross estimate like Summer Day/ Summer Night and Winter Day/Winter Night would help.

3. If the data center has some form of forced cooling system, what is this comprised of?
    - ☐ Computer Room Air Conditioners (CRACs) with internal compressors
    - ☐ Computer Room Air Handlers (CRAHs) supplied with chilled water.
    - ☐ Air-Handling Units (AHUs) dedicated to the data center space
    - ☐ Other (please describe below)

4. Are the motor-driven components of the cooling systems driven by:
    - ☐ Single-speed motors that are operated across the line (Motors connected directly to the AC supply)
    - ☐ Motors controlled by variable/adjustable speed drives or electronically commutated motors (ECMs)
    - ☐ Other methods (please specify)

5. At what voltage sag levels and durations below which, the components within the data center disconnect from the grid?
   a. Voltage sag level/duration at which the computer/server load disconnects from the utility system (these may transfer to a local UPS)?
   b. Voltage sag level/duration at which the cooling load disconnects from the system (these may transfer to an emergency generator or local power source)?
   c. Are the voltage sags measured on a per phase basis for the disconnection action or are these measured as rms considering the 3 phases?
6. At what voltage swell levels and durations above which, the components within the data center disconnect from the grid?
   a. Voltage swell level/duration at which the computer/server load disconnects from the utility system (these may transfer to a local UPS)?
   b. Voltage swell level/duration at which the cooling load disconnects from the system (these may transfer to an emergency generator or local power source)?

c. Are the voltage swells measured on a per phase basis for the disconnection action or are these measured as rms considering the 3 phases?

7. Are there any frequency thresholds below and above which the data center computer/server load may disconnect from the system?

8. If the loads disconnect from the utility grid, how do they reconnect back when the voltage and frequency returns to normal values?
   a. Do they reconnect immediately when the voltage and frequency recovers to certain levels. Please specify the voltage and frequency levels.

   b. Do they reconnect with a delay when the voltage and frequency recovers to certain levels. Please specify the voltage and frequency levels and delays.

   c. Do you reconnect manually?

   d. Do they reconnect with a ramp as or after voltage and frequency recovers to a certain level, please specify the voltage and frequency levels and ramp rate at which these loads get reconnected back (if it’s in steps please approximately provide information on how that happens).

9. Is there a backup system to supply the data center in the event of disconnection from the grid?
    a. What is the size of the data center Emergency Generator(EG) and Battery Energy Storage(BESS) in relation to the data center load
    b. Can the EG and BESS be dispatched to support the entire/partial load during system events? If so, for how many hours?
    c. Can the Data center be Islanded with only the EG and BESS in event of a planned or unplanned disconnection from grid?
    d. Can the Data Center participate on demand side management in a grid emergency or as an ancillary service?
    e. How much of the server farm load could be picked up by or redistributed to redundant server sites across the world?

f. In the event of a data center being tripped offline, how much of that load would they transfer somewhere else?

g. How fast can this load transfer be done?

How Does the Information Align with the Composite Load Model and Help Transmission Planning?

Questions 1 through 4 in the questionnaire allow a transmission planner to assign MWs of load in our transmission planning models to the different components of the composite load model used in transmission planning studies. This allows transmission planners to understand the response of loads to changes in voltages and frequency and how that response affects the utility grid voltage and frequency.

Questions 5 through 9 allow transmission planners to understand if certain voltage/frequency disturbances can cause the loads at the data center to disconnect from the utility grid and the manner they connect back. This information is important because if a large load like a data center disconnects/reconnects it can cause voltage and frequency changes that is consequential for transmission reliability assessment.