SPECIFICATION
FOR

CUSTOMER GENERATION
ON THE DISTRIBUTION SYSTEM

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REFERENCE DRAWINGS:

REFERENCE STANDARDS:

Public Utility Commission of Texas Substantive Rules §25.211 and §25.212
CenterPoint Energy Primary Service Specification 600-007-231-458
CNP Service Standards
IEEE 1547

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1.0 SCOPE AND DEFINITIONS

1.1 This specification states the requirements and procedures for safe and effective connection and operation of customer-owned generating facilities on the CenterPoint Energy ("CNP") Electric Distribution System. It is emphasized that the requirements outlined in this specification are general and may not cover all details in specific cases. The customer shall discuss project plans with CNP, execute an Interconnection Agreement, and receive approvals before installing devices.

1.2 Pursuant to the Public Utility Commission of Texas ("PUCT") Substantive Rule §25.211(c)(3), the term "Customer" is "any entity interconnected to the company's utility system for the purpose of receiving or exporting electric power from or to the company's utility system."

1.3 The term "CNP System" is used in this specification to refer to the CNP Electric Distribution System. Pursuant to PUCT Substantive Rule §25.211(c)(5) and (10), if the installation's capacity is more than ten MW, CNP may require the installation be split into multiple points of interconnection, or recommend connection to the Transmission System.

1.4 Pursuant to PUCT Substantive Rule §25.211(c)(7), the term "Interconnection Agreement" is "the standard form of agreement, which has been approved by the commission. The interconnection agreement sets forth the contractual conditions under which a company and a customer agree that one or more facilities may be interconnected with the company's utility system."

1.5 The term "installed electric generating facilities kW rated capacity" is the electric generator(s) kVA or kW on the generator nameplate calculated at 100% power factor irrespective of any kW limit imposed by the prime mover rating, control system setting or protection setting. For example, 1600 kW @ 80% PF (2000 kVA) rated capacity on the generator nameplate is calculated at 100 % power factor to be 2000 kW.

1.6 Pursuant to PUCT Substantive Rule §25.212(g), closed-transition switching has specific requirements. CNP defines closed-transition switching as operation of generation that is paralleled with the CNP system for a period of time and is operated separately from the CNP system either before or after such period of parallel operation.

2.0 POLICY ON CUSTOMER GENERATION

2.1 It is the policy of CNP to permit any Customer to operate their generating facilities in parallel with the CNP System, provided that the Customer's generating facilities meet the requirements of this specification.

2.1.1 Customers operating generating facilities in parallel with CNP shall meet the operation requirements of PUCT Substantive Rules §25.211 and §25.212.

2.1.2 Any Customer desiring to operate their facility in parallel with the CNP System must do so without adversely affecting other customers, utilities, or CNP devices or personnel.

2.1.3 Certain protective devices, such as circuit breakers, reclosers, and relays, specified by CNP shall be installed by the Customer at the location where the Customer desires to operate generating facilities in parallel with the CNP System.

2.1.4 Customers receiving primary metered service at 12 kV or 35 kV (phase-to-phase) shall also meet the requirements of the latest version of the Primary Service Specification 600-007-231-458.

2.1.5 Pursuant to PUCT Substantive Rule §25.212(f), in the event that standards for a specific unit or facility are not set out in the rule, CNP and the Customer may interconnect a facility using mutually agreed upon technical standards.

2.2 Three-phase and single-phase Customer generating facilities may be connected in parallel with the CNP System, if the requirements of this specification are met and the appropriate approvals are obtained as outlined under "Approval" (Article 3.0) of this specification.

2.2.1 Where multiple generating facilities are connected to the CNP System through a single point of common coupling, the sum of the nameplate ratings of the generating facilities will be used.

2.2.2 Any Customer found operating unapproved generating facilities in parallel with the CNP System, or operating approved generating facilities with required protective devices disconnected or bypassed will be required to immediately disconnect their generating facilities from the CNP System. The Customer will not be allowed to reconnect the generating facilities, until the appropriate review and approval from CNP has been obtained and a signed Interconnection Agreement executed.

2.3 CNP will not assume any responsibility for the protection of the Customer's electrical system.

2.4 Any Customer desiring parallel operation with CNP shall sign an Interconnection Agreement with CNP, prior to parallel operation, specifying the terms and conditions under which the interconnection shall take place.

2.5 According to PUCT Substantive Rule §25.211(h), certain aspects of secondary network systems create technical difficulties that may make interconnection more costly to implement. In instances where Customers request interconnection to a secondary network system, CNP and the Customer shall use best reasonable efforts to complete the interconnection, in accordance with the PUCT rule and IEEE 1547. More details are provided in the PUCT's rule.

2.6 Pursuant to PUCT Substantive Rule §25.211(n), the owner of a distributed generating facility that is interconnected shall report to CNP any change in ownership of the facility and the cessation of operations of a facility within 14 days of such change.

3.0 APPROVAL

3.1 The Customer shall complete, sign, and submit the standard form approved by the PUCT for an application for interconnection and parallel operation ("the Application") with the CNP System to the CNP-designated distributed generation contact person. CNP will use this data to simulate and evaluate the impact of the Customer generating facilities on the CNP System during normal operating conditions and in the event of a disturbance on the CNP System. Any situations that do not meet required system operating conditions shall be corrected by the Customer before interconnection will be approved. If there are changes to the project, an application revision will be required. An additional study fee may also be required.

3.2 In addition to the information requested in the Application, the Customer shall submit the following.

3.2.1 The data listed in the Application and study fees addendum.

3.2.2 A detailed electrical system one-line diagram showing the generating facilities, transformers, circuit breakers, disconnect switches and protective relays with respect to the CNP meter.

3.2.3 A detailed site plan showing the locations of the generating facilities disconnect device and interconnect disconnect device with respect to the point of common coupling.

3.2.4 Outline drawings and instruction books, if applicable, of the disconnect switch that isolates the generating facilities from the CNP System.

3.2.5 Manufacturer's operating data, such as time-current and time-voltage curves, on the protection relays.

3.2.6 Generating facilities' electrical parameters, to include the installed electric generating facilities kW or MW rated capacity.

3.2.7 Manufacturer/technical information for any equipment necessary for the interconnection study.

3.3 Prior to interconnection of the Customer's generating facilities, CNP shall inspect the Customer's facility and witness the Customer's testing of the protective devices associated with the interconnection.

3.3.1 The information on the installed nameplate(s) of the electric generating facilities must match the information provided in the Application.

3.4 The Customer shall not commence parallel operation of their generating facilities with the CNP System until final written approval has been given by CNP.

3.5 Any modifications made by the Customer to their facility that may affect the CNP System must be approved by CNP prior to implementation.

4.0 GENERAL OPERATING REQUIREMENTS

4.1 CNP's System primary voltages are 12.47 kV and 34.5 kV depending on the geographic location of the Customer's facility. The Customer shall contact the CNP-designated distributed generation contact person for information on the specific circuit that will serve their generating facility.

4.1.1 CNP may change the primary voltage of the circuit serving a Customer generating facility. Customers interconnected directly to the CNP System at primary voltage shall make modifications to their facilities to be able to reconnect to the CNP System. The Customer shall be responsible for all costs associated with this reconnection.

4.1.2 Customers interconnected to the CNP System secondary voltages, which is 4 kV and below, may also be subjected to reconnection costs, depending on the service voltage and the generating facility size.

4.2 The interconnection of the Customer's generating facilities with the CNP System shall not cause any reduction in the quality of service being provided to other customers. In order to eliminate undesirable interference due to the Customer's parallel generating facilities with the CNP System, the following criteria shall be met by the Customer's generating devices:

4.2.1 Pursuant to PUCT Substantive Rule §25.212(c)(1), the Customer shall operate its generating facilities in such a manner that the voltage levels on the CNP System are in the same range as if the generating facilities were not connected to the CNP System. The Customer shall provide an automatic method of disconnecting the generating facilities from the CNP System if a sustained voltage deviation in excess of +5.0% or –10 % from nominal voltage persists for more than 30 seconds, or a deviation in excess of +10% or –30% from nominal voltage persists for more than ten cycles. The interrupting device's auxiliary contacts shall change state in the required time after the voltage deviation is initiated. The Customer may reconnect when the CNP System voltage and frequency return to normal range and the CNP System is stabilized.

4.2.2 The Customer shall not cause voltage fluctuations on the CNP System in excess of plus or minus 3% as measured at the point of common coupling with the CNP System.

4.2.3 The total distortion factor of CNP's sinusoidal voltage wave as a result of harmonics introduced by the Customer's generating facilities shall not exceed 5% of the fundamental 60 Hz frequency nor 3% of the fundamental for any individual harmonic when measured at the point of common coupling with the CNP System. The total distortion factor is the square root of the sum of the squares of all harmonics to the square of the fundamental.

4.2.4 After its initial cut-in, CNP may periodically monitor the point of common coupling with the CNP System. If the distortion factor measured exceeds the limits specified above, the Customer shall take corrective measures to reduce the impact of harmonics onto the CNP System. If the Customer fails to do so, the Customer shall disconnect the generating facilities from the CNP System.

4.2.5 Pursuant to PUCT Substantive Rule §25.212(c)(3), the operating frequency of the Customer's generating facilities shall not deviate more than +0.5 Hertz (Hz) or –0.7 Hz from a 60 Hz base, measured at the point of common coupling. The Customer shall automatically disconnect the generating facilities from the CNP System within 15 cycles if this frequency tolerance cannot be maintained. The interrupting device's auxiliary contacts shall change state in the required time after the frequency deviation is initiated. The Customer may reconnect when the CNP system voltage and frequency return to normal range and the system is stabilized.

4.2.6 The power factor of the Customer's generating facilities shall be between 0.90 lagging to 0.90 leading at the generating facilities' terminals at all times. The Customer shall correct the generating facilities' power factor to meet this criterion.

4.2.7 The Customer shall be responsible for disconnecting the generating facilities from the CNP facilities due to an outage caused by short circuits or grounds on the CNP circuit serving the Customer's generating facilities, pursuant to PUCT Substantive Rule §25.212(c).

4.2.8 The Customer shall provide negative and zero sequence current protections of their generating facilities.

4.3 The Customer shall properly synchronize their generating facilities with the CNP System, as per IEEE 1547.

4.4 CNP shall approve all protective devices the Customer installs for distributed generation to prevent the energization of a de-energized CNP circuit.

4.5 For generation that is paralleled with the grid for 100 milliseconds or less (closed-transition switching), CNP does not require a communication channel for transfer tripping of the Customer's main breaker, provided that the Customer complies with the following:

4.5.1 Disable any mode in the automatic transfer switch (ATS) that would allow paralleling for more than 100 milliseconds.

4.5.2 Provide a test report completed by a relay testing agent that confirms that closed-transition is limited to 100 milliseconds and a failure scheme is in place and was tested.

4.5.3 In the supplemental terms and conditions that are attached to the Interconnection Agreement, describe the 100 milliseconds closed-transition operation and failure scheme.

4.5.4 Provide control wiring drawings that document the closed-transition and failure scheme.

4.5.5 Demonstrate the above requirements during the on-site distributed generation (DG) inspection by CNP.

4.5.6 Submit a commissioning test report that documents the on-site testing.

4.6 For generation that is paralleled with the grid for more than 100 milliseconds and when the Customer's installed electric generating facilities kW or MW rated capacity is in excess of 2 MW or as determined to be necessary by CNP's DG study for facilities under 2 MW, CNP requires a communication channel for transfer tripping of the Customer's main breaker or generator breaker for the purpose of separating the generation from the grid. This equipment is to be installed at the Customer's expense when determined to be necessary by CNP's DG interconnection study. The channel shall be a part of the relay protection scheme and shall be from the Customer's site to the CNP-designated substation.

4.6.1 CNP will design and specify the necessary relay devices. The components to be installed at the CNP-designated substation will be installed by CNP. The components to be installed at the Customer's site shall be installed and maintained by the Customer.

4.7 For generation that is paralleled with the grid for more than 100 milliseconds and when the Customer's installed electric generating facilities kW or MW rated capacity is in excess of 2 MW or as determined to be necessary by CNP's DG study for facilities under 2 MW, CNP requires:

4.7.1 Voltage transformers and a relaying scheme at the CNP-designated substation to be installed by CNP at the Customer's expense to protect against the Customer's generating facilities feeding a transmission fault.

4.7.2 A communication channel for transfer tripping of the Customer's main breaker, as specified in Article 4.6 of this specification will be required at the Customer's expense.

4.7.3 Communication options will be evaluated on a case by case basis.

4.8 CNP reserves the right to disconnect the Customer at their point of service from the CNP System for any of the following reasons:

4.8.1 During system emergencies.

4.8.2 To facilitate maintenance, test, or repair of CNP facilities. When there is a planned outage, CNP will give the Customer seven business days prior written notice of the service interruption, due to routine maintenance, repairs, or modifications.

4.8.3 The Customer's generating facilities interfere with operation of other customers' facilities or with the operation of the CNP System.

4.8.4 Inspection of the Customer's generating facilities or protective devices reveals a hazardous condition.

4.8.5 A lack of scheduled maintenance or maintenance records for the Customer's generating facilities and protective devices, as referenced in the Interconnection Agreement and specified in Article 4.12 of this specification.

4.8.6 The Customer's protective devices do not comply with this specification.

4.8.7 The Customer modifies the generating facilities or protective devices without receiving CNP approval for the modification.

4.8.8 A valid Agreement is required by PUCT Substantive Rules §25.211(e)(1) and §25.211(e)(5). Pursuant to PUCT Substantive Rule §25.211(e)(1), upon expiration or termination of the Agreement with the Customer, in accordance with the terms of the Agreement, CNP may disconnect the Customer's generating facilities. Pursuant to PUCT Substantive Rule §25.211(e)(5), the Customer must execute an Agreement on the forms prescribed by the PUCT. CNP may disconnect the Customer's generating facility if the Agreement has not been received and executed.

4.8.9 The communications channel or the protective relay for transfer trip is not functional.

4.9 In the event of an outage to the affected CNP circuit serving the Customer, immediate restoration may not be possible from an adjacent circuit.

4.9.1 Per the Application, the Customer shall inform CNP, if they are participating in ERCOT's Emergency Response Service ("ERS") program.

4.10 CNP reserves the right to de-energize and block the Customer's breaker from closing if a section of the circuit connected to the Customer's generation facility is field switched to another circuit that has no operable transfer trip protection.

4.11 All costs resulting from future additional protective relaying requirements shall be borne by the Customer.

4.12 To ensure safe and reliable operation when operating in parallel with the CNP system, the Customer has the sole responsibility for the routine maintenance of their protective devices and generating facilities.

4.12.1 CNP reserves the right to verify the calibration and operation of the Customer's protective devices. Verification shall include the tripping of the circuit breakers by manually closing the protective relay contacts.

4.12.2 The Customer must maintain their equipment upon initial commissioning and each year thereafter.

4.12.3 The Customer must maintain complete test and maintenance records for each location and provide test and maintenance records to CNP upon request.

4.12.4 Failure of the Customer to provide proper routine maintenance or maintenance records shall result in the Customer being disconnected, as specified in Article 4.8 of this specification.

5.0 SPECIFIC REQUIREMENTS - THREE-PHASE GENERATORS

5.1 Customers who desire to install and operate three-phase generating facilities in parallel with the CNP System are required to install certain protective devices. The purpose of these devices is to promptly remove the Customer's generating facilities from the CNP System whenever a fault or abnormal event occurs, so as to protect the general public and CNP personnel and facilities from injury or damage due to fault or load currents produced.

5.2 Protective devices at the Customer's location shall be owned, operated, and maintained by the Customer.

5.2.1 The installation, inspection, and testing of protective devices shall be approved by CNP.

5.2.2 The set points of all relays used to isolate the Customer's generating facilities from the CNP System in the event of a system disturbance shall be approved by CNP.

5.2.3 The Customer has the sole responsibility for the routine maintenance of their protective devices and generating facilities, as specified in Article 4.12 of this specification.

5.3 The Customer's generating facilities shall not be connected in parallel with the CNP System through the customer-owned transformers protected by high side fuses for installed electric generating facilities kW or MW rated capacity over 2 MW.

5.4 It is CNP's practice to automatically reclose the substation circuit breakers instantaneously, which is 10 to 15 cycles, after they have tripped. Instantaneous reclosing of three-phase line reclosers located between the CNP substation and the Customer's generating facilities is also practiced. The Customer shall ensure that their generating facilities are automatically disconnected from the CNP System prior to the CNP substation breaker or line reclosers automatic reclose.

5.4.1 The Customer's breakers or reclosers shall not automatically reclose after tripping. The Customer may reconnect when the utility system voltage and frequency return to normal range and the system is stabilized, as specified in Articles 4.2.1 and 4.2.5 of this specification.

5.5 The Customer's main and generating facilities' circuit breakers and reclosers shall be three-phase devices with electronic or electromechanical control. Hydraulically controlled breakers and reclosers shall not be used.

5.5.1 The symmetrical current interrupting capability shall be greater than the maximum future system fault duty as specified by CNP.

5.5.2 The Customer's generating facilities' breakers shall be equipped with a breaker failure relay scheme that will trip their main breaker in the event the generating facilities' breaker fails to trip within ten (10) cycles after receiving an initial trip signal from the appropriate relays.

5.6 The Customer's generating facilities shall be separable from the CNP System by a visible break disconnecting device.

5.6.1 If the Customer is interconnected directly to the primary distribution system, which is 12.47 kV or 34.5 kV primary metered customers, CNP will install a three-phase gang-operated load break disconnecting device or three single-phase blade disconnects to separate the Customer's generating facilities from the CNP System.

5.6.2 If the Customer is interconnected to the secondary distribution system, which is 4kV and below, the Customer shall install a visible break, blade disconnecting device either at the point of service or the generating facilities to separate the Customer's generating facilities from the CNP System. This disconnecting device shall be readily accessible to CNP personnel at all times. The disconnecting device shall be capable of being locked by CNP to keep the switch in the open position.

6.0 SPECIFIC REQUIREMENTS - SINGLE-PHASE GENERATORS

6.1 The Customer will be allowed to install and operate single-phase generating facilities that are 50 kW or less in parallel with the CNP System at most locations on the radial distribution system if they meet the requirements of this specification. Depending on the point of connection to the CNP System, single-phase generating facilities larger than 50 kW may be allowed.

6.2 The Customer shall install a manual disconnecting visible blade safety switch device that will provide a visible opening between the CNP System and the Customer's generating facilities. The visible blade safety switch device shall be readily accessible to CNP personnel at all times. The disconnecting device shall be capable of being locked by CNP to keep the switch in the open position.

6.3 It is CNP's practice to automatically reclose the substation circuit breakers instantaneously, which is 10 to 15 cycles, after they have tripped. Instantaneous reclosing of three-phase line reclosers located between the CNP substation and the customer's generating facilities is also practiced. The Customer shall ensure that their generating facilities are automatically disconnected from the CNP System prior to the CNP substation breaker or line reclosers automatic reclose.

6.4 The Customer's generating facilities' controls shall be equipped with a line voltage sensing relay or contactor that will prevent the generating facilities from being connected to a de-energized CNP circuit.

7.0 INDUCTION GENERATORS AND INVERTER SYSTEMS

7.1 The power factor correction devices for induction generating facilities or power inverters shall be approved by CNP.

7.2 The step-switched capacitors for induction generating facilities or the other techniques to bring voltage fluctuations to acceptable levels for induction generating facilities shall be approved by CNP.

7.3 For inverter systems, the Customer shall provide a one-line diagram showing the relationship of the generating facilities tied into a breaker or breakers in the electrical panel and the CNP meter location. The AC disconnect switch shall be between the inverter and electrical panel and must be a lockable, external handle, visible and readily accessible disconnect switch and typically installed within ten feet of the CNP meter. If the AC disconnect switch is installed more than ten feet of the CNP meter, a weather-resistant, easily read placard must be installed within ten feet from the CNP meter, clearly identifying the location of the AC disconnect switch.

7.4 The Customer shall provide manufacturer specifics for the inverter and disconnect switch. The inverter specification sheet shall show that the anti-islanding protection has been certified by IEEE 1547 or UL 1741. Otherwise, the Customer shall test the inverter pursuant to PUCT requirements, as specified in Articles 4.2.1 and 4.2.5 of this specification. CNP shall receive notice and be present for the inverter testing.

7.5 If the Customer using an inverter for parallel generating facilities causes any reduction in the quality of service provided to other utility customers due to harmonics, the Customer shall install filtering devices to cause the harmonic output of the Customer's inverter to an acceptable level.

8.0 REVENUE METERING

8.1 The revenue metering for the Customer's generating facility shall be as determined by CNP.

8.2 Actual metering arrangements must conform with PUCT-approved tariff requirements, which are subject to revision.

8.3 The revenue meter shall be installed by CNP after all documentation and inspections are completed and approved.

8.4 The Customer is responsible for resolving billing issues with their retail electric provider.

8.4.1 Commercial meters establish a demand based on import of kW and kVAr.