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| --- | --- | --- | --- |
| PGRR Number | [111](https://www.ercot.com/mktrules/issues/PGRR111) | PGRR Title | Related to NPRR1191, Registration, Interconnection, and Operation of Customers with Large Loads; Information Required of Customers with Loads 25 MW or Greater |
| Date  | October 16, 2023 |

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| **Submitter’s Information** |
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| Cell Number | 918-284-8702 |
| Market Segment | Investor-Owned Utility (IOU) |

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| Comments |

AEP offers the following initial comments on Planning Guide Revision Request (PGRR) 111 and anticipates submitting additional comments following discussion in Large Flexible Load Task Force (LFLTF) work sessions. AEP proposes modifications to Section 9.2.1, Applicability of the Large Load Interconnection Study Process, to specify the applicability provisions more clearly, particularly related to modification of an existing Load Facility.

AEP seeks clarification about the intent and application of proposed Section 9.5.1, Interconnection Agreement for Large Loads not Co-Located with a Generation Resource Facility Registered as a Private Use Network.

AEP suggests adding a requirement in Section 9.6, Initial Energization and Continuing Operations for Large Loads, to ensure that Demand increases are approved and posted in RIOO.

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| Revised Cover Page Language |

None

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| Proposed Guide Language Revision |

## 2.1 DEFINITIONS

Load Commissioning Plan

A schedule for connecting a Load, in the format prescribed by ERCOT, detailing dates, cumulative peak Demand amounts, and required transmission upgrades from the Initial Energization date up to the final amount of peak Demand.

**4.1.1.2 Reliability Performance Criteria**

(1) The following reliability performance criteria (summarized in Table 1, ERCOT-specific Reliability Performance Criteria, below) shall be applicable to planning analyses in the ERCOT Region:

(a) With all Facilities in their normal state, following a common tower outage with or without a single line-to-ground fault, all Facilities shall be within their applicable Ratings, the ERCOT System shall remain stable with no cascading or uncontrolled Islanding, and there shall be no non-consequential Load loss;

(b) With all Facilities in their normal state, following an outage of a Direct Current Tie (DC Tie) Resource or DC Tie Load with or without a single line-to-ground fault, all Facilities shall be within their applicable Ratings, the ERCOT System shall remain stable with no cascading or uncontrolled Islanding, and there shall be no non-consequential Load loss;

(c) With all Facilities in their normal state, following an outage of a Large Load with or without a three-phase fault, all Facilities shall be within their applicable Ratings, and the ERCOT System shall remain stable with no cascading or uncontrolled Islanding. There shall be no non-consequential Load loss.

(d) With any single generating unit unavailable, followed by Manual System Adjustments, followed by a common tower outage, opening of a line section without a fault, or outage of a DC Tie Resource or DC Tie Load with or without a single line-to-ground fault, all Facilities shall be within their applicable Ratings, the ERCOT System shall remain stable with no cascading or uncontrolled Islanding, and there shall be no non-consequential Load loss;

(e) With any single transformer, with the high voltage winding operated at 300 kV or above and low voltage winding operated at 100 kV or above unavailable, followed by Manual System Adjustments, followed by a common tower outage, or the contingency loss of a single generating unit, transmission circuit, opening of a line section without a fault, transformer, shunt device, FACTS device, or DC Tie Resource or DC Tie Load with or without a single line-to-ground fault, all Facilities shall be within their applicable Ratings, the ERCOT System shall remain stable with no cascading or uncontrolled Islanding, and there shall be no non-consequential Load loss. An operational solution may be planned on a permanent basis to resolve a performance deficiency under this condition; and

(f) With any single DC Tie Resource or DC Tie Load unavailable, followed by Manual System Adjustments, followed by a common tower outage, or the contingency loss of a single generating unit, transmission circuit, transformer, shunt device, FACTS device, or DC Tie Resource or DC Tie Load, with or without a single line-to-ground fault, all Facilities shall be within their applicable Ratings, the ERCOT System shall remain stable with no cascading or uncontrolled Islanding, and there shall be no non-consequential Load loss. An operational solution may be planned on a permanent basis to resolve a performance deficiency under this condition.

| **Initial Condition** | **Event** | **Facilities within Applicable Ratings and System Stable with No Cascading or Uncontrolled Outages** | **Non-consequential Load Loss Allowed** |
| --- | --- | --- | --- |
| 1 | Normal System | Common tower outage, DC Tie Resource outage, DC Tie Load outage, or the outage of a Large Load | Yes | No |
| 2 | Unavailability of a generating unit, followed by Manual System Adjustments | Common tower outage, DC Tie Resource outage, or DC Tie Load outage | Yes | No |
| 3 | Unavailability of a transformer with the high voltage winding operated at 300 kV or above and low voltage winding operated at 100 kV or above, followed by Manual System Adjustments | Common tower outage; orContingency loss of one of the following:1. Generating unit;2. Transmission circuit;3. Transformer;4. Shunt device; 5. FACTS device; or6. DC Tie Resource or DC Tie Load | Yes | No |
| 4 | Unavailability of a DC Tie Resource or DC Tie Load, followed by Manual System Adjustments | Common tower outage; orContingency loss of one of the following:1. Generating unit;2. Transmission circuit;3. Transformer;4. Shunt device; 5. FACTS device; or6. DC Tie Resource or DC Tie Load | Yes | No |

Table 1: ERCOT-specific Reliability Performance Criteria

(2) ERCOT and the TSPs shall endeavor to resolve any performance deficiencies as appropriate. If a Transmission Facility improvement is required to meet the criteria in this Section 4.1.1.2, but the improvement cannot be implemented in time to resolve the performance deficiency, an interim solution may be used to resolve the deficiency until the improvement has been implemented.

(a) A Remedial Action Scheme (RAS) shall not be planned to resolve a planning criteria performance deficiency unless it is expected that system conditions will change such that the RAS will no longer be needed within the next five years.

**5.2.10 Required Interconnection Equipment**

(1) Each Generation Resource interconnected at transmission voltage to the ERCOT System must be connected behind a disconnect device that is under the remote control of the applicable TO and can be operated remotely to comply with an instruction from ERCOT.

***5.3.5 ERCOT Quarterly Stability Assessment***

(1) ERCOT shall conduct a stability assessment every three months to assess the impact of planned large generators connecting to the ERCOT System. The assessment shall also assess the impact of applicable Large Loads.

(a) For large generators with planned Initial Synchronization in the period under study, the assessment shall derive the conditions to be studied with consideration given to the results of the FIS stability studies.

(b) For Large Loads meeting the requirements of paragraph (5) below, the assessment shall derive the conditions to be studied with consideration given to the results of the LLIS stability studies.

(c) ERCOT may study conditions other than those identified in the FIS or LLIS stability studies.

(2) Large generators that are not included in the assessment as described in this Section as result of the IE failing to meet the prerequisites by the deadlines as listed in the table below will not be eligible for Initial Synchronization during that three-month period. Large Loads subject to the requirements of paragraph (5) below that are not included in the assessment as described in this Section as result of the ILLE failing to meet the prerequisites by the deadlines as listed in the table below will not be eligible for Initial Energization during that three-month period. The timeline for the quarterly stability assessment shall be in accordance with the following table:

|  |  |  |
| --- | --- | --- |
| **Generator Initial Synchronization or Large Load Initial Energization Date** | **Last Day for an IE or ILLE to meet prerequisites as listed in paragraph (4) below** | **Completion of Quarterly Stability Assessment** |
| Upcoming January, February, March | Prior August 1 | End of October |
| Upcoming April, May, June | Prior November 1 | End of January |
| Upcoming July, August, September | Prior February 1 | End of April |
| Upcoming October, November, December | Prior May 1 | End of July |

(3) If the last day for an IE or ILLE to meet prerequisites or if completion of the quarterly stability assessment as shown in the above table falls on a weekend or holiday, the deadline will extend to the next Business Day.

(4) Prerequisites to be satisfied prior to the large generator being included in the quarterly stability assessment:

(a) The generator has met the requirements of Section 6.9, Addition of Proposed Generation to the Planning Models.

(b) The IE has provided all generator data in accordance with the Resource Registration Glossary, Planning Model column, including but not limited to steady state, system protection and stability models.

(i) The dynamic data model will be reviewed by ERCOT prior to the quarterly stability assessment and shall be submitted by the IE 30 days before the quarterly stability assessment deadline. If this review cannot be completed prior to the quarterly stability assessment deadline, ERCOT may refuse to allow Initial Synchronization of the Generation Resource or Settlement Only Generator (SOG) in the three-month period associated with the quarterly stability assessment deadline. ERCOT shall include the Generation Resource or SOG in the next quarterly stability assessment period provided that the review of the dynamic data model has been completed prior to the next quarterly stability assessment’s deadline.

(c) The following elements must be complete:

(i) FIS studies;

(ii) Reactive Power Study; and

(iii) System improvements or mitigation plans that were identified in these studies as required to meet the operational standards established in the Protocols, Planning Guide, Nodal Operating Guides, and Other Binding Documents prior to synchronizing the generator.

(d) The data used in the studies identified in paragraph (4)(c) above is consistent with data submitted by the IE as required by Section 6.9.

(5) Large Loads subject to the Large Load Interconnection Study (LLIS) process per the criteria in Section 9.2.1, Applicability of the Large Load Interconnection Study Process, shall be studied in the quarterly stability assessment under the following conditions:

(a) The results of the stability study required the inclusion of the Large Load in a quarterly stability assessment as described in paragraph (7) of Section 9.3.4.3; or

(b) The LLIS study scope required inclusion of the Large Load in a quarterly stability assessment due to potential impact on one or more Generic Transmission Constraints (GTCs) as described in paragraph (6) of Section 9.3.2.

(6) Prerequisites to be satisfied prior to an applicable Large Load being included in the quarterly stability assessment:

(a) The Large Load has met the requirements of Section 6.6, Modeling of Large Loads.

(b) The ILLE, via its interconnecting TSP, has provided all necessary modeling data, including but not limited to steady state, system protection and stability models.

(i) The dynamic data model will be reviewed by ERCOT prior to the quarterly stability assessment and shall be submitted by the interconnecting TSP 30 days before the quarterly stability assessment deadline. If this review cannot be completed prior to the quarterly stability assessment deadline, ERCOT may refuse to allow Initial Energization in the three-month period associated with the quarterly stability assessment deadline. ERCOT shall include the Large Load in the next quarterly stability assessment period provided that the review of the dynamic data model has been completed prior to the next quarterly stability assessment’s deadline.

(c) The following elements must be complete and approved by ERCOT:

(i) Reactive Power Study, if required according to Protocol Section 3.15, Voltage Support; and

(ii) System improvements or mitigation plans that were identified in the required interconnection studies as required to meet the operational standards established in the Protocols, Planning Guide, Nodal Operating Guides, and Other Binding Documents prior to Initial Energization.

(d) The data used in the studies identified in paragraph (6)(c) above is consistent with data submitted by the Large Load as required by Section 6.6.

(7) At any time following the inclusion of a large generator or applicable Large Load in a stability assessment, but before the Initial Synchronization of the generator or Initial Energization of the Large Load, if ERCOT determines, in its sole discretion, that the generator or Large Load no longer meets the prerequisites described in paragraphs (4) and (6) above, or that an IE or ILLE has made a change to the design of the generator or Large Load that could have a material impact on ERCOT System stability, then ERCOT may refuse to allow Initial Synchronization of the generator or Initial Energization of the Large Load. ERCOT shall include the generator or Large Load in the next quarterly stability assessment period that commences after identification of the material change or after the generator or Large Load meets the prerequisites specified in paragraphs (4) and (6) above, as applicable. If ERCOT determines, in its sole discretion, that the change to the design of the generator or Large Load would not have a material impact on ERCOT System stability, then ERCOT may allow Initial Synchronization of the generator or Initial Energization of the Large Load due to this change.

(8) ERCOT shall post to the MIS Secure Area a report summarizing the results of the quarterly stability assessment within ten Business Days of completion.

**6.1 Steady-State Model Development**

(1) To adequately simulate steady-state system conditions, it is necessary to establish and maintain steady-state data and simulation ready study cases in accordance with the ERCOT Steady State Working Group Procedure Manual. These case models, known as steady-state base cases, shall contain appropriate equipment characteristics and system data, and shall represent projected system conditions that provide a starting point for each required season and year.

(a) The Annual Planning Model base cases, which represent the annual peak load conditions, as prescribed in Protocol Section 3.10.2, Annual Planning Model, shall be developed annually, updated on a biannual basis, and may be updated as needed on an interim basis. Each Annual Planning Model base case, biannual updates, and off-cycle updates shall be posted on the Market Information System (MIS) Secure Area to ensure availability of the most accurate steady-state base cases.

(b) Additional steady-state base cases, such as seasonal base cases, shall also be developed annually, updated on a biannual basis, and may also be updated as needed on an interim basis. These derivative base cases, biannual updates, and off-cycle updates shall be posted on MIS Secure Area to ensure availability of the most accurate steady-state base cases.

(c) Off-cycle updates not associated with the biannual update shall be posted in a timely manner and include:

 (i) Corrections to significant errors discovered in modeling or major changes in operation configuration that affect the steady-state base cases; or

(ii) A significant change in the scope or timing of a transmission project or the development of a new transmission project that impacts either of the next two summer base cases.

(d) Off-cycle updates that are posted as described in paragraphs (1)(a) through (c) above shall be in the form of a Power System Simulator for Engineering (PSS/E) formatted incremental change file.

(e) All steady-state base cases and incremental change files on the MIS Secure Area shall be available for use by Market Participants.

(f) The ERCOT Steady State Working Group Procedure Manual describes each base case that is required to be built. The schedule for posting all steady-state base cases shall be made available on the MIS Secure Area.

(2) Transmission Service Providers (TSPs) and ERCOT shall develop the steady-state base cases. The steady-state base cases are derived from the Network Operations Model to ensure consistency of key characteristics, including Ratings, impedance and connectivity for Transmission Facilities that are common between the Network Operations Model and each steady-state base case. Minor differences between the models will occur for several reasons. For example:

(a) The Network Operations Model is converted from a “breaker, switch, and AC line segment” convention to an equivalent steady-state base case “bus and branch” convention. This conversion reduces the number of breakers/switches that may be included in the steady-state base case model and may combine buses separated by breakers/switches in the Network Operations Model.

(b) Additional detailed modeling may be added to the converted Network Operations Model for planning purposes.

(c) Future projects are added to the converted Network Operations Model that do not exist in the Network Operations Model past the model build date used to extract a snapshot from the Network Operations Model.

(3) Using the Network Model Management System (NMMS), ERCOT and TSPs shall create steady state models that represent current and planned system conditions from the following data elements:

(a) Each TSP, or its Designated Agent, shall provide its respective transmission network steady-state model data, including load data.

(b) Each TSP, or its Designated Agent, shall not include the impact of energy sources connected to the Distribution System that are registered with ERCOT and required to provide telemetry including, but not limited to, Distribution Generation Resources (DGRs), Distribution Energy Storage Resources (DESRs), or Settlement Only Distribution Generators (SODGs) in its submitted Load data as negative loads or as embedded reductions in the submitted load forecast.

(c) Each TSP, or its Designated Agent, shall include the impact of energy sources connected to the Distribution System that are not registered with ERCOT in its submitted Load data. The methodology used shall be consistent across all TSPs and described in the ERCOT Steady State Working Group Procedure Manual.

(d) ERCOT shall utilize the latest available Resource Entity and Private Use Network model data submitted to ERCOT by the Resource Entity and the Private Use Network owners through the Resource Registration process for Resource Entities.

(e) ERCOT shall utilize proposed Generation Resource model data provided by the Interconnecting Entity (IE) during the generation interconnection process in accordance with Section 5, Generator Interconnection or Modification.

(f) ERCOT shall determine the operating state of Generation Resources (MW, MVAr) using a security-constrained economic dispatch tool.

(g) ERCOT shall determine the import/export levels of asynchronous transmission interconnections based on historical data.

(h) Consumption levels for Large Loads in the SSWG base cases will be determined based on their registration type as a Controllable Load Resource (CLR), a Load Resource, a Registered Curtailable Load (RCL), or a firm Load.

**6.6 Modeling of Large Loads**

***6.6.1 Modeling of Large Loads Not Co-Located with a Generation Resource***

(1) The interconnecting TSP shall model a new Large Load, a modification to an existing Large Load, or an increase to an existing Load such that it becomes a Large Load in the base cases created and maintained by the Steady State Working Group (SSWG) upon signing a binding interconnection agreement with the Customer.

(a) The interconnecting TSP shall not add the Load to the base cases prior to the execution of an agreement.

(b) The amount of Load added to the base cases shall reflect the amount of peak Demand and timeline of the agreement.

(c) For Large Loads that have provided a Load Commissioning Plan to ERCOT or a schedule of requested Load to the interconnecting TSP, the amount of Load modeled shall be consistent with the amount of peak Demand and timeline specified in these documents.

(2) For Large Loads evaluated through the Large Load Interconnection Study (LLIS) process detailed in Section 9, the interconnecting TSP shall not model the Large Load in any SSWG base cases until the following conditions have been met:

(a) ERCOT has communicated the completion of the LLIS as described in paragraph (7) of Section 9.4;

(b) ERCOT receives one of the following:

(i) Confirmation of an executed interconnection agreement as described in Section 9.5.1, and confirmation from the TSP that the Load has provided the financial security required to fund the interconnection facilities;

(ii) A public, financially binding agreement between the ILLE and the TSP for the construction of the Large Load interconnection facilities along with:

(A) A written notice from the TSP that the ILLE has provided notice to proceed with the construction of the interconnection; and

(B) The required financial security; or

(iii) A letter from a duly authorized official from a Municipally Owned Utility (MOU) or Electric Cooperative (EC) confirming the Entity’s intent to construct and operate applicable Large Load and interconnect such Large Load to its transmission system; and

(c) The ILLE has furnished an updated Load Commissioning Plan as prescribed in Section 9.5.3.

***6.6.2*** ***Modeling of Large Loads Co-Located with an Existing Generation Resource***

(1) The addition of a Large Load to an existing Generation Resource is considered a material modification of the Resource Registration as described in paragraph (8) of Section 6.8.2. The Resource Entity shall update the Resource Registration data to reflect the new or increased Load.

(2) ERCOT will model the Large Load once all applicable requirements of Section 6.9 have been satisfied.

(3) If the Large Load was evaluated via the LLIS process, the following conditions must also be met in addition to paragraph (2) above.

(a) ERCOT has communicated the completion of the LLIS as described in paragraph (7) of Section 9.4;

(b) All required interconnection agreements have been executed and acknowledged by all parties as prescribed in Section 9.5.2; and

(c) The ILLE has furnished an updated Load Commissioning Plan as prescribed in Section 9.5.3.

***6.6.3 Modeling of Large Loads Co-Located with a Proposed Generation Resource***

(1) A Large Load co-located with a proposed Generation Resource shall be included in the data provided by the IE during the Resource Registration process.

(2) ERCOT will model the Large Load once all applicable requirements of Section 6.9 have been satisfied.

(3) If the Large Load was evaluated via the LLIS process, the following conditions must also be met in addition to paragraph (2) above.

(a) ERCOT has communicated the completion of the LLIS as described in paragraph (7) of Section 9.4;

(b) All required interconnection agreements have been executed and acknowledged by all parties as prescribed in Section 9.5.2; and

(c) The ILLE has furnished an updated Load Commissioning Plan as prescribed in Section 9.5.3.

***6.6.4 Representation of Large Load in the Network Operations Model***

(1) Each Large Load shall be represented by a separate Load point in the ERCOT Network Operations Model. No other Loads shall be included in this Load point.

***7.1 Planning Data and Information***

(1) The information available on the ERCOT website or applicable Market Information System (MIS) (i.e., Secure or Certified Areas) includes, but is not limited to, planning information pertaining to the following:

(a) Long-term planning;

(b) Regional transmission planning;

(c) Steady state data;

(d) Resource integration;

(e) Case studies and files used in planning;

(f) Model information; and

(g) Data and information available to specific groups of Market Participants.

(i) Market Participants with a nondisclosure agreement with ERCOT have designated sections on the MIS that allow access to the certified posting of group information.

(ii) Market Participants may access the artifacts posted for their respective groups on the MIS Secure Area.

(2) The list below includes both data set and designated MIS classification of the available planning data and information. Where the information is classified as “Certified,” the appropriate Market Participant category or group is also indicated. Information classified as “Public” is available on the ERCOT website.

| **Data Set** | **Classification** |
| --- | --- |
| Aggregated Wind Output | Public |
| Annual Planning Model Data Submittal Schedule | Secure |
| Demand and Energy Monthly Reports | Secure |
| Dynamic Data Information | Certified (all Transmission Service Providers (TSPs)) |
| Economic Studies of Transmission Projects for New Generation | Secure |
| ERCOT Long-Term System Assessment (LTSA) (except for Protected Information)  | Secure |
| ERCOT LTSA | Certified (all TSPs) |
| ERCOT Steady State Planning Contingency Files | Secure |
| ERCOT System Operating Limit (SOL) Methodology | Public |
| Generation Data Forms | Secure |
| Generator Interconnection Status (GIS) Report | Public |
| Geomagnetically-Induced Current ([GIC) Flow Information](https://mis.ercot.com/secure/data-products/grid/regional-planning?id=PG3-953-M) | Secure |
| Geomagnetic Disturbance (GMD) Vulnerability Assessment Postings (except for Protected Information) | Secure |
| GMD Vulnerability Assessment Postings | Certified (all TSPs) |
| Documents Initiating a Generation Interconnection or Change Request (GINR) | Certified (all TSPs) |
| GINR Security Screening Studies and Supporting Documents | Secure |
| Sub-synchronous Oscillation Studies and Supporting Documents | Certified (all TSPs) |
| Full Interconnection Study (FIS): Steady-State, System Protection, Stability, and Facility Studies and Supporting Documents (except for Protected Information) | Secure |
| FIS: Draft Steady-State, System Protection, Stability, and Facility Studies and Supporting Documents | Certified (all TSPs) |
| LLIS: Steady-State, Stability, and Facility Studies and Supporting Documents | Certified (all TSPs) |
| Independent Market Monitor (IMM) and Topology Processor Supporting Documents | Certified (all TSPs) |
| Performance, Disturbance, Compliance Working Group (PDCWG) Group Documents and Project Files | Certified (PDCWG members) |
| Public Generation Information | Public |
| Remedial Action Plan (RAP) Review Cases | Certified (all TSPs) |
| Resource Registration Data | Certified (all TSPs) |
| Regional Planning Group Projects | Secure |
| Regional Transmission Plan Postings (except for Protected Information) | Secure |
| Regional Transmission Plan Postings | Certified (all TSPs) |
| Seasonal Voltage Profile Studies | Certified (all TSPs) |
| Special Planning Studies (except for Protected Information) | Secure |
| Special Planning Studies | Certified (all TSPs) |
| Steady State Power Flow Base Cases | Secure |
| Steady State Power Flow Case Data | Certified (all TSPs) |
| Steady State Topology Processor Files | Secure |
| Steady State Transmission Project and Information Tracking (TPIT) Procedures | Secure |
| System Protection Short Circuit Data | Secure |
| Transient Stability Screening Study for ERCOT System | Certified (all TSPs) |
| TSP Planning Criteria and Procedures | Secure |
| Voltage Stability Screening Study for ERCOT System | Certified (all TSPs) |

**9** **Large Load additions at new or existing INTERCONNECTION(S)**

**9.1** **Introduction**

(1) This Section defines the requirements and processes used to facilitate new or modified Large Load interconnections with the ERCOT System. This process will be referred to as the Large Load Interconnection Study (LLIS) process. The requirements are designed to:

(a) Facilitate studies to identify potential system limitations and determine facilities needed to interconnect new or modify an existing Large Load to the ERCOT network;

(b) Facilitate orderly and organized Large Load interconnections, while allowing ERCOT to determine whether the interconnection of the proposed Large Load would comply with North American Electric Reliability Corporation (NERC) Reliability Standards, ERCOT Protocols, ERCOT Planning and Operating Guides, TSP criteria, and any Applicable Legal Authority (ALA);

(c) Specify the communications required between interconnecting Loads, Distribution Service Providers (DSPs), Transmission Service Providers (TSPs), and ERCOT;

(d) Provide the best information on future Large Load additions for use in identifying, forecasting, and analyzing short- and long-range ERCOT capabilities, demands, and reserves; and

(e) Provide ERCOT accurate data about new and modified Large Load to ensure that ERCOT and stakeholders have the information necessary for planning purposes.

9.2 General Provisions

***9.2.1*** ***Applicability of the Large Load Interconnection Study Process***

(1) Any request to interconnect or modify a Load Facility that meets the following criteria shall be subject to the Large Load Interconnection Study (LLIS) process:

(a) The request has an Initial Energization date within 24 months from the date information is first submitted in the online Resource Integration and Ongoing Operations (RIOO) system as described in Paragraph (1) of Section 9.2.2; and

(b) The request is for one or more of the following:

(i) A new Large Load not co-located with a Generation Resource;

(ii) A new Large Load co-located with a Generation Resource;

(iii) A modification of any existing Load Facility co-located or not co-located that increases the aggregate peak Demand of the Facility by 75 MW or more; or

(iv) A modification of an existing Large Load that changes or adds a Point of Interconnection or Service Delivery Point to a different electrical bus on a different electrical circuit of 75 MW or more.

(2) Any of the following modifications to the registration type of a Large Load may require a new LLIS to be performed prior to the change becoming effective. ERCOT shall, in consultation with the applicable TSP(s), determine whether a new LLIS is required and notify the Interconnecting Large Load Entity (ILLE) within ten Business Days following the submission of a registration change in RIOO:

(a) The conversion of a Controllable Load Resource (CLR) to a Load Resource, Registered Curtailable Load (RCL), or firm Load; or

(b) The conversion of a Load Resource or RCL to a firm Load.

(3) A Customer with a Load that otherwise meets the applicability criteria in paragraph (1)(b) above but has a proposed Initial Energization date greater than 24 months from the date of registration in the online RIOO system is not required to proceed through the LLIS process if the interconnecting TSP includes the Load in the next available Regional Transmission Plan cases, as prescribed by Section 3.1.4, or in a Regional Planning Group submission, as described in Section 3.1.5, and those processes are sufficient to ensure the reliable interconnection of the Load.

(4) A customer with a Load that does not meet the applicability criteria in paragraphs (1) and (2) above may elect to proceed through the LLIS process in lieu of the alternative options listed in paragraph (3) above and shall indicate this decision in RIOO.

(5) All Large Loads shall be subject to the requirements of Section 9.6 of this Planning Guide.

9.2.2 Submission of Large Load Project Information

(1) Any Entity subject to the requirements of Section 9.2.1, Applicability, must initiate a request for a new Large Load interconnection or modification of an existing interconnection via the online Resource Integration and Ongoing Operations (RIOO) system. The required information will include:

(a) Information, of the type and in the format prescribed by ERCOT, needed to fully define, model, and study the Load request;

(b) A preliminary Load Commissioning Plan; and

(c) A classification of the new or modified Load request as a Controllable Load Resource (CLR), a Load Resource, a Registered Curtailable Load (RCL), or a firm Load.

(2) The ILLE shall not be eligible to proceed with the Large Load Interconnection Study (LLIS) until all information has been submitted in RIOO as described in paragraph (1) above and deemed complete by both ERCOT and the interconnecting TSP.

(3) The ILLE shall update the information submitted in paragraph (1) above within five Business Days of a material change that occurs at any time prior to Initial Energization. ERCOT and the interconnecting TSP shall determine if the change impacts any assumptions underlying the studies required in Section 9.3 and may, in their sole discretion, require any impacted studies be restarted.

9.2.3 Initiation of the Large Load Interconnection Study (LLIS)

(1) To initiate an LLIS, the ILLE must submit each of the following:

(a) Complete and validated Large Load registration data, as defined in paragraph (1) of Section 9.2.2;

(b) Accurate models and any other required information, as specified by the interconnecting TSP;

(c) A request to proceed with the LLIS made through the online RIOO system; and

(d) The LLIS Application Fee as described in the ERCOT Fee Schedule, paid via the RIOO system.

(2) From initial submission of any registration information specified in Section 9.2.2 into RIOO, the ILLE shall have 90 days to complete the registration request and submit a request to proceed with the LLIS as specified in paragraph (1) above. If, after the 90 days have elapsed, the ILLE has not requested to proceed with the LLIS, ERCOT shall consider the Large Load Interconnection request withdrawn by the ILLE and shall cancel the request in RIOO.

(3) If, after the submission of the request to proceed with the LLIS as detailed in paragraph (1)(c) above, any of the items required for the LLIS are not submitted or are deemed not acceptable by ERCOT and/or the interconnecting TSP, the ILLE shall submit any omitted data and resolve and resubmit any deficient data within 60 days. If, after 60 days have elapsed, the deficiencies remain unresolved, the LLIS will be considered incomplete and ERCOT, at its sole discretion, may cancel the project.

(4) Payment of the Large Load Interconnection Fee is described in the ERCOT Fee Schedule in the Protocols. Payment of the ERCOT LLIS Application Fee shall not affect the independent responsibility of the ILLE to pay for interconnection studies conducted by the TSP or for any DSP studies.

(5) ERCOT shall manage a confidential email list (Transmission Owner Load Interconnection) to facilitate communication of confidential Large Load-related information among TSPs and ERCOT. Membership to this email list will be limited to ERCOT and appropriate TSP personnel.

**9.2.4 Required Interconnection Equipment**

(1) Each Large Load interconnected at transmission voltage to the ERCOT System shall be connected behind one or more disconnect devices such that the Large Load may be interrupted without interrupting other Customers. The disconnect devices shall be under the remote control of the applicable TO and able to be operated remotely to comply with an instruction from ERCOT.

9.3 Interconnection Study Procedures for Large Loads

(1) The provisions in this Section establish the procedures for conducting a Large Load Interconnection Study (LLIS) for new or modified Large Loads, as defined by Section 9.2.2, Applicability.

9.3.1 Large Load Interconnection Study

(1) An LLIS consists of the set of steady-state, stability, short-circuit and/or other relevant studies that are necessary to determine the reliability impact of a Large Load interconnection on affected Transmission Facilities and identify the Transmission Facilities that are needed to reliably interconnect the new or modified Large Load to the ERCOT System.

(2) During the LLIS, the interconnecting TSP shall be the lead TSP unless otherwise designated by ERCOT during the study scoping process detailed in Section 9.3.2.

(3) For an interconnection request involving a Large Load interconnecting at distribution voltage, the LLIS shall evaluate only the proposed Load’s transmission-level impacts, if any. The affected DSP shall provide the lead TSP with all information concerning the DSP's facilities or the proposed load interconnection as may be requested by the TSP to complete any one or more studies.

9.3.2 Large Load Interconnection Study Scoping Process

(1) Within five Business Days from the date a request to proceed with the LLIS is submitted in RIOO by the ILLE as described in paragraph (1) of Section 9.2.3, both ERCOT and the interconnecting Transmission Service Provider (TSP) shall validate that the information entered by the ILLE is complete. Upon TSP validation, the interconnecting TSP shall also schedule a kick-off meeting with ERCOT and the ILLE to occur soon thereafter.

(a) For co-located or TSP-connected Large Load interconnections where the certificated DSP and interconnecting TSP are the same entity, the interconnecting TSP must confirm, via the RIOO system, that the Load information entered by the ILLE is correct.

(b) For co-located or TSP-connected Large Load interconnections where the certificated DSP is a different entity than the interconnecting TSP, the TSP shall provide the identity of the certificated DSP in RIOO so ERCOT can coordinate the interconnection process with the certificated DSP. The certificated DSP must then confirm, via the RIOO system, that the Load information entered by the ILLE is correct.

(2) ERCOT will notify all other TSPs of the LLIS request via the online RIOO system. Each TSP shall determine if it should participate in the LLIS.

(3) Each TSP desiring to participate in the LLIS shall promptly notify the lead TSP. The lead TSP must include all interested TSP(s) in the LLIS to the extent such involvement is reasonable. In some cases, it may be necessary for the ILLE to execute study agreements with multiple TSP(s).

(4) At the LLIS kickoff meeting, the ILLE will present the proposed project, and the lead TSP will facilitate a general discussion of the preliminary study scope of work for the LLIS.

(5) Any reactive studies required under Protocol Section 3.15 or SSO studies required under Protocol Section 3.22.1.4, Large Load Interconnection Assessment, shall be scoped simultaneously with the LLIS but do not need to be included as part of the LLIS.

(6) ERCOT shall specify during the scoping process if the Large Load is required to be included in a quarterly stability assessment due potential impact on one or more Generic Transmission Constraints (GTCs). The requirement for inclusion of the Large Load in the quarterly stability assessment may be independent of the results of the stability study. ERCOT shall have sole discretion to make this determination.

(7) The lead TSP will develop a preliminary LLIS study scope within Business Days following the kickoff meeting.

(a) The study scope must include all study elements required by Section 9.3.4, LLIS element, unless ERCOT and the TSP(s) determine that one or more studies are unnecessary.

(b) The study scope shall specify the base cases and study scenarios that will be used in each LLIS element.

(c) The study scope shall specify if the Large Load is required to be included in the quarterly stability assessment per paragraph (6) above.

(8) The TSP(s) shall submit the preliminary study scope via the online RIOO system. The online RIOO system will notify ERCOT and other TSP(s) of the availability of the study scope for review and comment. Impacted TSPs may provide comments on the initial study scope via RIOO within three Business Days of posting.

(9) Upon closing of the comment period described in paragraph (8) above, the lead TSP shall, within three Business Days, submit a final study scope via RIOO that addresses submitted comments to the extent possible. If the affected TSPs cannot reach agreement on one or more aspects of the study scope, ERCOT shall resolve any remaining dispute(s).

(10) ERCOT will have three Business Days to approve the final study scope or return the scope to the lead TSP with comments. The lead TSP shall address ERCOT comments and resubmit according to paragraph (9) above.

9.3.3 Large Load Interconnection Study Description and Methodology

(1) The primary purpose of the LLIS is to determine the amount of Load that may be interconnected by the ILLE’s desired Initial Energization date while maintaining the reliability of the ERCOT System and ensuring compliance with all North American Electric Reliability Corporation (NERC) Reliability Standards, Protocols, this Planning Guide, and the Operating Guides. The LLIS will also identify transmission improvements needed to serve the full requested Load amount.

(2) The LLIS consists of a series of distinct study elements. The specific elements included in a particular LLIS will be stated in the LLIS scope.

(3) Each proposed Large Load interconnection that requires a separate physical transmission interconnection will be treated as an individual study to be analyzed separately from all other such requests unless otherwise agreed by the interconnecting load and TSP(s) in the interconnection study agreement.

(4) The LLIS process includes developing and analyzing various computer model simulations of the existing and proposed ERCOT transmission system. The results from these simulations will be utilized by the TSP(s) to determine the impact of the proposed interconnection.

(5) The study shall include an analysis demonstrating the adequate reliability of any temporary interconnection configurations.

9.3.4 Large Load Interconnection Study Elements

9.3.4.1 Steady-State Analysis

(1) The steady-state interconnection study base case shall be created from the most recently approved Steady State Working Group (SSWG) base case appropriate for the desired Initial Energization date of the Load. The lead TSP(s) or ERCOT may remove any future (currently nonexistent) facility from the steady-state interconnection study base case if either determines that the facility may significantly affect the interconnection study results and the facility has not already undergone appropriate review by the Regional Planning Group (RPG). In addition, ERCOT and the lead TSP(s) may include other publicly disclosed projects in the steady-state interconnection study base case. The lead TSP(s) shall include in the LLIS study report a list of the Large Load interconnection requests that were included in the study base case. Modifications to the SSWG base case made as part of the study assumptions shall be documented in the LLIS report.

(2) The lead TSP(s) shall perform contingency analyses as required by the NERC Reliability Standards, ERCOT Nodal Protocols, this Planning Guide, and the Operating Guides to identify any additional facilities that may be necessary to ensure that results of the system performance conform to these standards. The study shall identify any system limitations that would prevent the ILLE from achieving the requested load. If the LLIS identifies transmission limitations, the lead TSP(s) shall identify potential transmission system improvements necessary to achieve the requested Load.

(a) When studying the Maintenance Outage Reliability Criteria per Section 4.1.1.8 of this Planning Guide, the lead TSP(s) shall perform a steady-state analysis using the system Load level defined in the SSWG Procedure Manual. This Load percentage qualifies as an off-peak case. The lead TSP(s) shall also study any additional scenarios under Section 4.1.1.8 where the addition of the Large Load might impact system reliability.

(3) The lead TSP is responsible for completing an analysis of any contingency events or Outages that could result in a violation of the NERC Reliability Standards, Protocols, this Planning Guide, and the Operating Guides, regardless which TSP owns the facilities involved. The results of this analysis will be shared with TSP(s) that have facilities identified with planning criteria violations, and those affected TSP(s) will be responsible for evaluating the validity of the anticipated violations.

(4) The lead TSP shall study the Load at its full requested amount for the purpose of identifying additional facilities that may be needed to ensure system performance conforms to the standards established in the NERC Reliability Standards, ERCOT Nodal Protocols, this Planning Guide, and the Operating Guides.

(5) The lead TSP shall further study the Load according to its registration type, as submitted in RIOO, for the purpose of determining the amount of Load that may be reliably connected by the ILLE’s desired Initial Energization date.

(a) For Loads that certify, via the RIOO system, intent to register as a Controllable Load Resource (CLR), the lead TSP will dispatch the Load between maximum and minimum consumption, as defined in RIOO, to resolve all system-wide capacity, base case thermal, and post-contingency thermal violations identified in the study that do not exceed the load-shed rating of the monitored element. This re-dispatch shall be reported in the study results and shall not be considered as load shed.

(b) For Loads that certify, via the RIOO system, intent to register as a Load Resource or Registered Curtailable Load (RCL), the lead TSP will study the Load at both full requested consumption and at 0 MW of consumption for all system-wide capacity violations identified in the study. This dispatch to 0 MW shall be reported in the study results and shall not be considered as load shed.

(6) Upon completion of the steady-state study as described in paragraphs (4) and (5) above, the lead TSP shall identify the amount of load that may be reliably connected by the ILLE’s desired Initial Energization date.

(a) For Loads studied in paragraph (5)(a) above, the lead TSP may identify the maximum amount of peak demand such that all applicable constraints are resolved.

(b) For Loads studied in paragraph (5)(b) above, the lead TSP may identify the maximum amount of peak demand such that all applicable constraints are resolved and that does not result in any base case thermal, and post-contingency thermal violations.

(c) No Load, regardless of registration type, shall be allowed to connect at a level of peak demand that results in one or more base case or post-contingency thermal violations that exceeds the load-shed rating of the monitored element.

(d) No Load, regardless of registration type, shall be allowed to connect at a level of peak demand that results in a base case or post-contingency voltage violation other than those deemed acceptable in this Planning Guide.

9.3.4.2 System Protection (Short-Circuit) Analysis

(1) The LLIS study scope will identify available short-circuit fault duty at substations in the study area. The study report shall include the technical rationale if the short circuit study is not performed.

(2) The lead TSP will determine the maximum available fault currents at the interconnection substation for determining switching device interrupting capabilities and protective relay settings.

9.3.4.3 Dynamic and Transient Stability (Load Stability, Voltage) Analysis

(1) The lead TSP shall provide a written justification in place of the study report for ERCOT review if a stability study is deemed unnecessary. ERCOT, in its sole discretion, may reject the justification and require a stability study be performed. The lead TSP shall perform a stability study for any Load connecting behind one or more existing Generic Transmission Constraints.

(2) The stability study shall include Large Loads that have signed a binding interconnection agreement with the applicable TSP at the amount approved by an LLIS.

(3) Stability study cases shall be based upon the latest approved SSWG cases consistent with the most recently approved Dynamics Working Group (DWG) stability database. The initial transmission configuration of the study area shall be identical to the configuration used in the corresponding steady-state studies. Any previously identified transmission improvements that will not be in service before Initial Energization shall be removed from the stability study base case for the study.

(4) Transient stability studies will analyze the performance of the ERCOT System in terms of angular stability, voltage stability, and excessive frequency excursions. Additional studies may include small signal stability or critical clearing time analyses. Such studies should incorporate reasonable and conservative assumptions regarding impacted facility operating conditions.

(5) All stability studies shall be performed in accordance with NERC Reliability Standards, Protocols, this Planning Guide, and the Operating Guides. The stability study portion of the LLIS shall document any instability identified through the performance of the study.

(6) If the lead TSP identifies instability (other than instability identified for extreme events) in the stability portion of the LLIS, the TSP shall investigate alternative solutions, including transmission improvements, to mitigate the instability. The TSP shall implement the mitigation before the Initial Energization of the Large Load in accordance with Protocol Section 3.11.4, Regional Planning Group Project Review Process. If the mitigation cannot be implemented prior to the desired Large Load Energization date, the TSP shall identify the appropriate operating limit.

(7) If the lead TSP identifies instability (other than instability identified for extreme events) in the stability assessment portion of the LLIS, the Large Load shall be included in a quarterly stability assessment prior to Initial Energization. The TSP shall note this requirement in the study report. ERCOT, in its sole discretion, may waive the requirements of this paragraph if deemed unnecessary after review of the study results.

9.4 LLIS Report and Follow-up

(1) For each of the LLIS study elements, the lead TSP shall submit to ERCOT a preliminary study report via the RIOO system. The report shall include a description of the study methodology and assumptions, findings, and recommendations. The report shall also identify the amount of load that may be reliably interconnected by the ILLE’s desired Initial Energization date per the criteria in Section 9.3.4. The lead TSP may include additional information in the study report and may combine multiple LLIS study elements into a single report.

(2) ERCOT shall review the preliminary study report and provide to the lead TSP within ten Business Days any questions, comments, and proposed revisions necessary to ensure the report complies with the requirements in Section 9.3. Additionally, other TSPs may provide questions, comments, and proposed revisions during this review period. All feedback shall be provided to the lead TSP in writing.

(3) If, after considering the feedback received from ERCOT and other TSPs, ERCOT or the lead TSP determines additional study is required, the lead TSP shall promptly perform the additional study and submit an updated preliminary study report for review as described in paragraph (1) above.

(4) If no additional study is required as described in paragraph (3) above, the lead TSP shall prepare a final LLIS study report that incorporates all feedback received in paragraph (2) above, to the extent practical, within Business Days.

(5) Once complete, the lead TSP shall post the final report for the LLIS study element(s) to the MIS Certified Area for TSPs only.

(6) The LLIS is deemed complete when final reports have been posted for all LLIS study elements. Upon completion of the LLIS, ERCOT shall determine the amount of Load approved to interconnect by the Initial Energization date. This amount shall be informed by the most limiting amount identified by the lead TSP from among all the LLIS study elements as described in paragraph (1) above. Further, ERCOT may consider transmission upgrades with in-service dates within the two-year study period and may grant approval for the interconnection of additional Load amounts identified in the LLIS that is conditioned on such upgrades becoming operational.

(7) ERCOT shall communicate the completion of the LLIS and the amount(s) of Load approved in paragraph (6) to the ILLE and all TSPs within three Business Days.

(8) The lead TSP may provide a redacted copy of the final report for each LLIS study element to the ILLE upon request. The redacted report(s) shall conform with Nodal Protocols Section 1.3.

(9) Following the communication of the completion of the LLIS by ERCOT as described in paragraph (7) above, the ILLE may execute a binding interconnection agreement with the applicable TSP. Once executed, the ILLE shall provide evidence of such agreement to ERCOT as prescribed in Section 9.5.

(10) If a material change that impacts one or more LLIS study assumptions occurs before the requirements of Section 9.5, Interconnection Agreements and Responsibilities, have been met, ERCOT and the lead TSP may require one or more LLIS study elements be updated. ERCOT and the lead TSP shall have sole discretion to determine if a change impacts any LLIS study assumptions and to require a modification of the study. Any modification of the study report shall be treated as a preliminary study and reviewed according to paragraph (1) above.

(11) If the ILLE has not satisfied the requirements of Section 9.5, Interconnection Agreements and Responsibilities, within 180 days after the communication of the completion of the LLIS by ERCOT as described in paragraph (7) above, ERCOT and the interconnecting TSP shall consider the project cancelled.

***9.5*** ***Interconnection Agreements and Responsibilities***

9.5.1 Interconnection Agreement for Large Loads not Co-Located with a Generation Resource Facility Registered as a Private Use Network

(1) As a condition for obtaining retail electric service, an Interconnecting Large Load Entity (ILLE) for a Large Load not co-located with a Generation Resource Facility registered as a Private Use Network (PUN) must notify ERCOT that all interconnection agreements or equivalent service extension agreements required by the interconnecting TSP(s) have been executed.

(a) The interconnecting TSP(s) shall acknowledge the execution of any necessary agreements to ERCOT within ten Business Days of execution.

9.5.2 Interconnection Agreement for Large Loads Co-Located with one or more Generation Resource Facilities Registered as a Private Use Network

(1) As a condition for obtaining retail electric service, an ILLE for a Large Load co-located with one or more Generation Resource Facilities registered as a PUN must:

(a) Notify ERCOT that all interconnection agreements or equivalent service extension agreements required by the interconnecting TSP(s) have been executed.

(i) The interconnecting TSP(s) shall acknowledge the execution of any necessary agreements to ERCOT within ten Business Days of execution.

(b) Notify ERCOT that a formal co-location agreement with the Resource Entity has been executed.

(i) The Resource Entity shall acknowledge the execution of such agreement to ERCOT within ten Business Days of execution.

(2) If required by the interconnecting TSP, the Resource Entity shall execute a new Standard Generation Interconnection Agreement (SGIA) or any necessary amendments to an existing SGIA with the interconnecting TSP prior to the Initial Energization of the Large Load. The Resource Entity and interconnecting TSP shall each acknowledge any new or amended SGIA to ERCOT within ten Business Days of execution. If no new or amended SGIA is required, the interconnecting TSP shall notify ERCOT in writing.

9.5.3 Update of the Load Commissioning Plan

(1) Upon execution of any required agreements prescribed in Sections 9.5.1 or 9.5.2, the ILLE shall update the Load Commissioning Plan to reflect the lesser of the amount of peak Demand approved by ERCOT in Section 9.4 or the amount of peak Demand in the executed interconnection agreement.

(2) If one or more levels of Demand in the Load Commissioning Plan are contingent on one or more transmission upgrade projects considered per paragraph (6) of Section 9.4, those transmission projects shall be identified in the updated Load Commissioning Plan submitted in paragraph (1) above.

9.6 Initial Energization and Continuing Operations for Large Loads

(1) Each Interconnecting Large Load Entity (ILLE) shall meet the conditions established by ERCOT before proceeding to Initial Energization. These conditions may include, but are not limited to:

(a) Validation that the Load has been properly modeled in accordance with Section 6.6;

(b) Demonstration that the Large Load will not violate operational standards established in the Protocols, Planning Guide, Nodal Operating Guides, and Other Binding Documents;

(c) Completion of the requirements of Planning Guide Section 5.3.5, ERCOT Quarterly Stability Assessment, if applicable;

(d) Completion and approval of any required Subsynchronous Oscillation (SSO) studies, SSO Mitigation Plan, SSO Protection, and SSO monitoring, if required; and

(e) Submission of an updated Load Commissioning Plan.

(2) Any new Large Load that has certified, via the RIOO system, intent to register as a Controllable Load Resource (CLR) or a Load Resource that is not controllable shall limit its Demand to no greater than ten MW from Initial Energization until after the Resource Commissioning Date.

(3) During continuing operations:

(a) A Large Load shall not exceed any limits on peak Demand established by ERCOT or the interconnecting TSP.

(b) A Large Load that has an approved amount of peak Demand that is conditioned on one or more transmission upgrades becoming operational shall not increase Demand to that level until ERCOT has confirmed in writing that such upgrades are operational and the Demand increase is approved and posted in RIOO.

(c) Any ILLE required to create a Load Commissioning Plan per Section 9 of this Planning Guide, shall maintain the Load Commissioning Plan for two years after Initial Energization. During this maintenance period, the ILLE shall update the Load Commissioning Plan within five Business Days of a material change.

(d) Pursuant to paragraph (7) of Section 6.2, the owner of the Large Load shall provide updated dynamics data to ERCOT when required.