Overview of Revision Request Concepts and Draft Language

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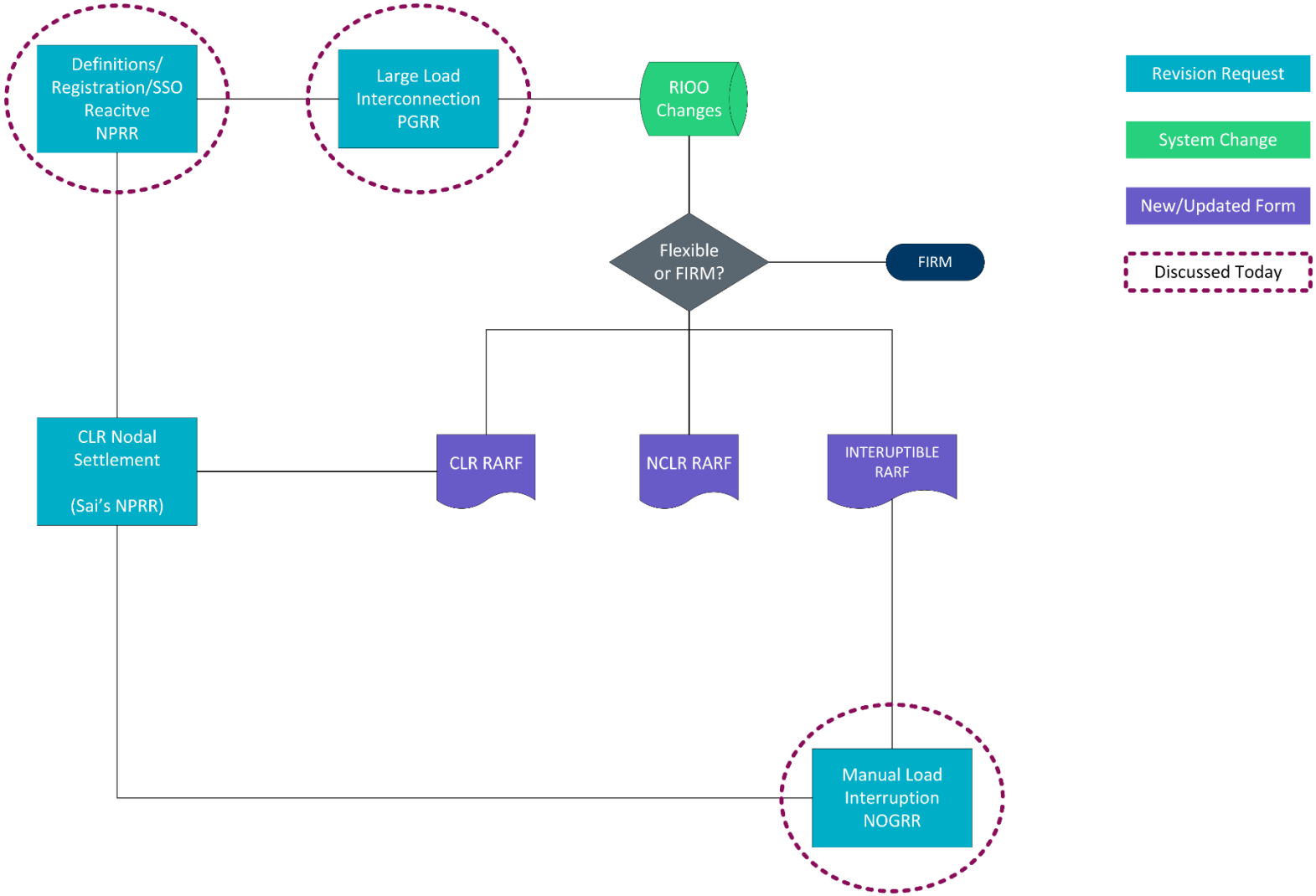
LFLTF - January 23, 2023

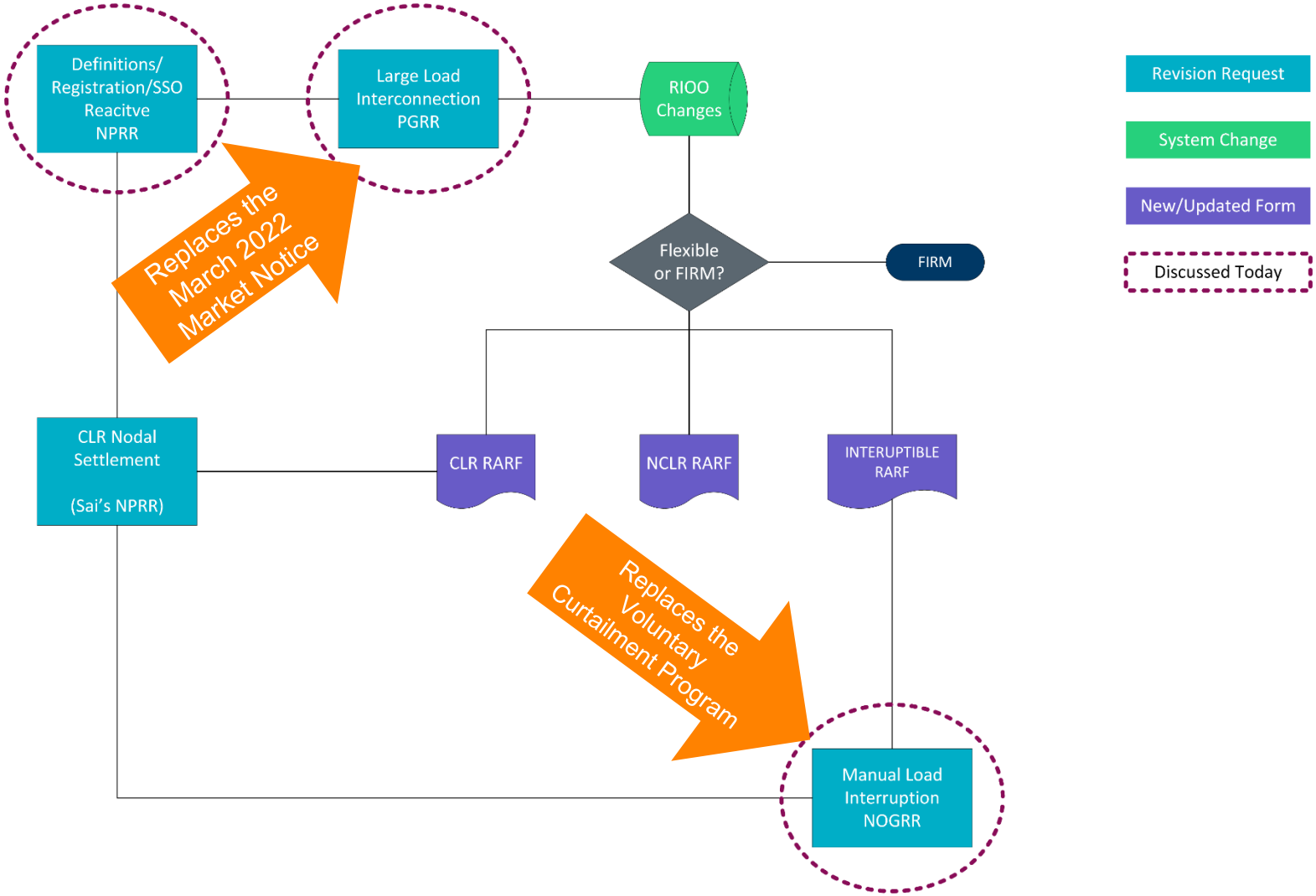
Agenda

- Overview
- Draft NPRR Review
- Draft PGRR Review
- Draft NOGRR Review
- Next Steps

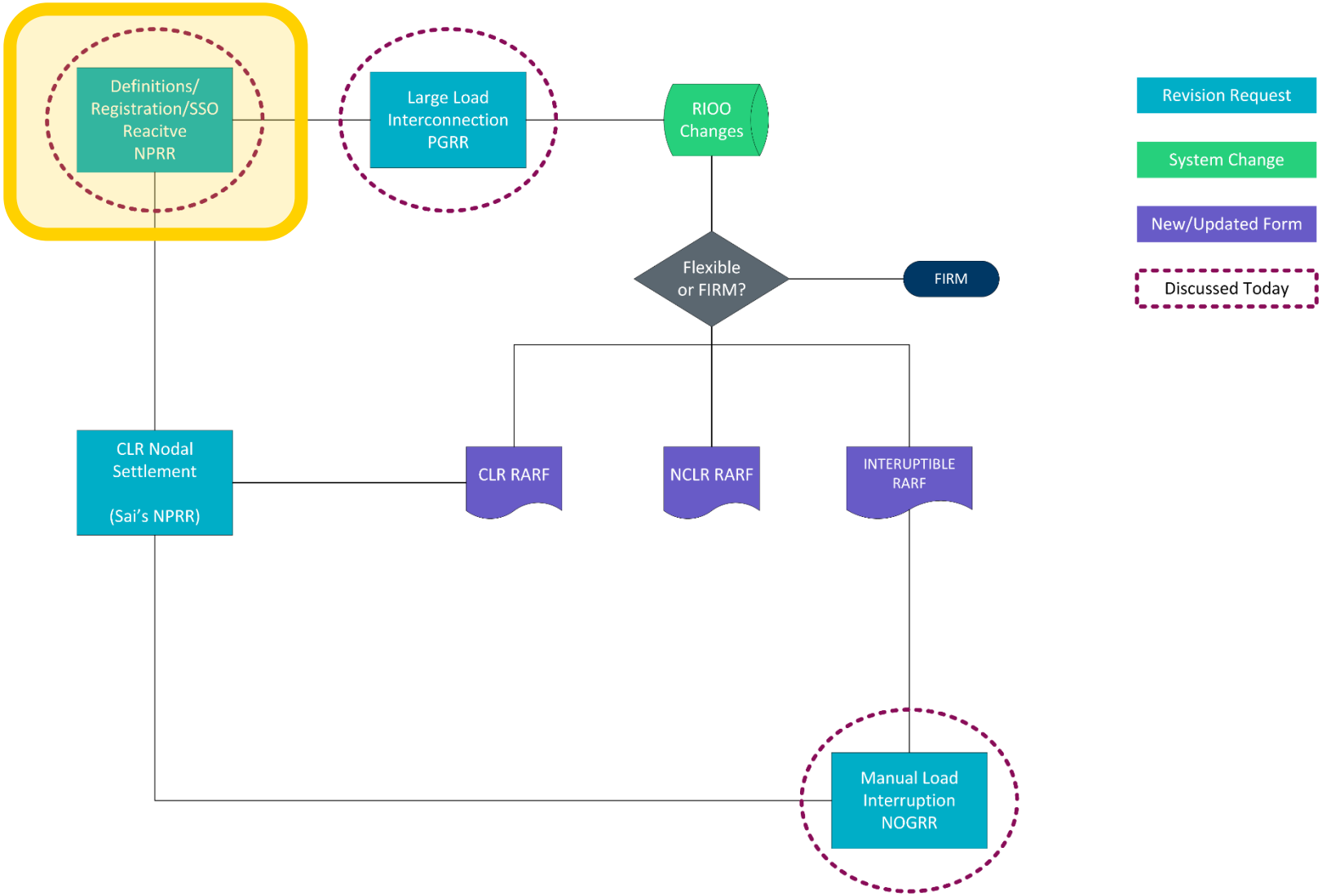
LFLTF Revision Requests – Overview



LFLTF Revision Requests – Overview



LFLTF Draft NPRR



Nodal Protocol 2.1 Definitions

CONCEPT

Add definitions for Large Load, Flexible Load, and Interruptible Load.

DRAFT LANGUAGE (NEW)

Large Load

A Load greater than or equal to 75.0 MWs behind a common point of interconnection.

Nodal Protocol 2.1 Definitions

DRAFT LANGUAGE (NEW)

Flexible Load

A Load, that has registered with ERCOT and in response to an ERCOT instruction may reduce or increase power consumption or interrupt to support system reliability or mitigate transmission constraints. Types of Flexible Loads include: a Load Resource or Interruptible Load.

Interruptible Load

A Load interconnected to the ERCOT System that has registered with ERCOT and has designated a QSE. The Load is not in SCED but is curtailable via instruction to the Load's QSE to maintain system reliability.

Nodal Protocol 2.1 Definitions

CONCEPT

Modify, reorganize, and supplement the definitions for several types of subsynchronous oscillation phenomena, as developed by the Dynamics Working Group.

- The existing definitions are reorganized to reflect that the interaction phenomena are different types of subsynchronous oscillations.
- Where appropriate, the definitions are modified to include interactions with Loads in addition to generators.
- Modify some definitions to reflect the more general category of subsynchronous oscillations instead of the narrower phenomenon of subsynchronous resonance.
- Add a definition for Subsynchronous Ferroresonance (SSFR), another interaction type.

Nodal Protocol 3.15 Voltage Support

CONCEPT

Clarify that the addition of 20 MW or more of load at a generator requires a new reactive study.

DRAFT LANGUAGE (MODIFIED)

(13) Unless specifically approved by ERCOT, no unit equipment replacement or modification at a Generation Resource shall reduce the capability of the unit below the Reactive Power requirements that applied prior to the replacement or modification. The addition of 20 MW or more load to a Generation Resource constitutes a modification to the Generation Resource and requires a new reactive study.

Nodal Protocol 3.15.3 - Generation Resource Requirements Related to Voltage Support

CONCEPT

Add a new requirement that the addition of 20 MW or more of load at a generator requires a new reactive study.

DRAFT LANGUAGE (NEW)

(9) A Generation Resource that adds 20 MW or greater of Load shall submit a new Reactive Power study.

Nodal Protocol 3.22 – Subsynchronous Oscillation

CONCEPT

- Modify, reorganize, and supplement Section 3.22 and its subsections as developed by the Dynamics Working Group.
- Rename Section 3.22 to reflect the more general label of Subsynchronous Oscillation rather than the narrower Subsynchronous Resonance.
- Generally, replace references in Section 3.22 and its subsections to subsynchronous resonance with subsynchronous oscillation throughout the section.
- Where appropriate, the Section 3.22 protocols are modified to address interactions with Large Loads in addition to generators.

Nodal Protocol 3.22 – Subsynchronous Oscillation

CONCEPT

Add an assessment in 3.22.1.3 specific for the addition of Large Loads electrically proximate to series capacitor(s).

Add new Section 3.22.1.4 to set out the SSO assessment requirements when interconnecting a Large Load.

- The assessment whether the Large Load is proximate to a series capacitor(s) and identify other vulnerabilities of the Large Load to SSO.
- If SSO vulnerabilities are identified, the Large Load shall develop SSO Countermeasures for review by the TSP and ERCOT.

Nodal Protocol 3.22 – Subsynchronous Oscillation

DRAFT LANGUAGE (NEW)

3.22.1.3 Transmission Project Assessment

(7) The TSP that owns the affected series capacitor(s) shall coordinate with ERCOT and TSP(s) interconnecting a Large Load to develop and implement SSO Countermeasures prior to the latter of the energization of the transmission project or the energization of the Large Load, if the SSO study confirms that

(a) a Large Load is vulnerable to SSO in the event of six or fewer concurrent transmission Outage, or

(b) Transformer associated with a Large Load is vulnerable to Sub-synchronous Ferroresonance (SSFR) in the event of the following:

(i) one single element outage,
(ii) one common tower outage,
(iii) two single element outages,
(iv) two common tower outages, or
(v) one single element and one common tower outages

Nodal Protocol 3.22 - Subsynchronous Oscillation

CONCEPT

Modify renumbered Section 3.22.1.5 to include requirements for the annual SSO assessments related to Large Loads and the development of SSO Countermeasures, if necessary.

Add assessment criteria in 3.22.2 to determine the vulnerability of a Large Loads to SSO interactions.

ERCOT Fee Schedule – Large Load Interconnection Study

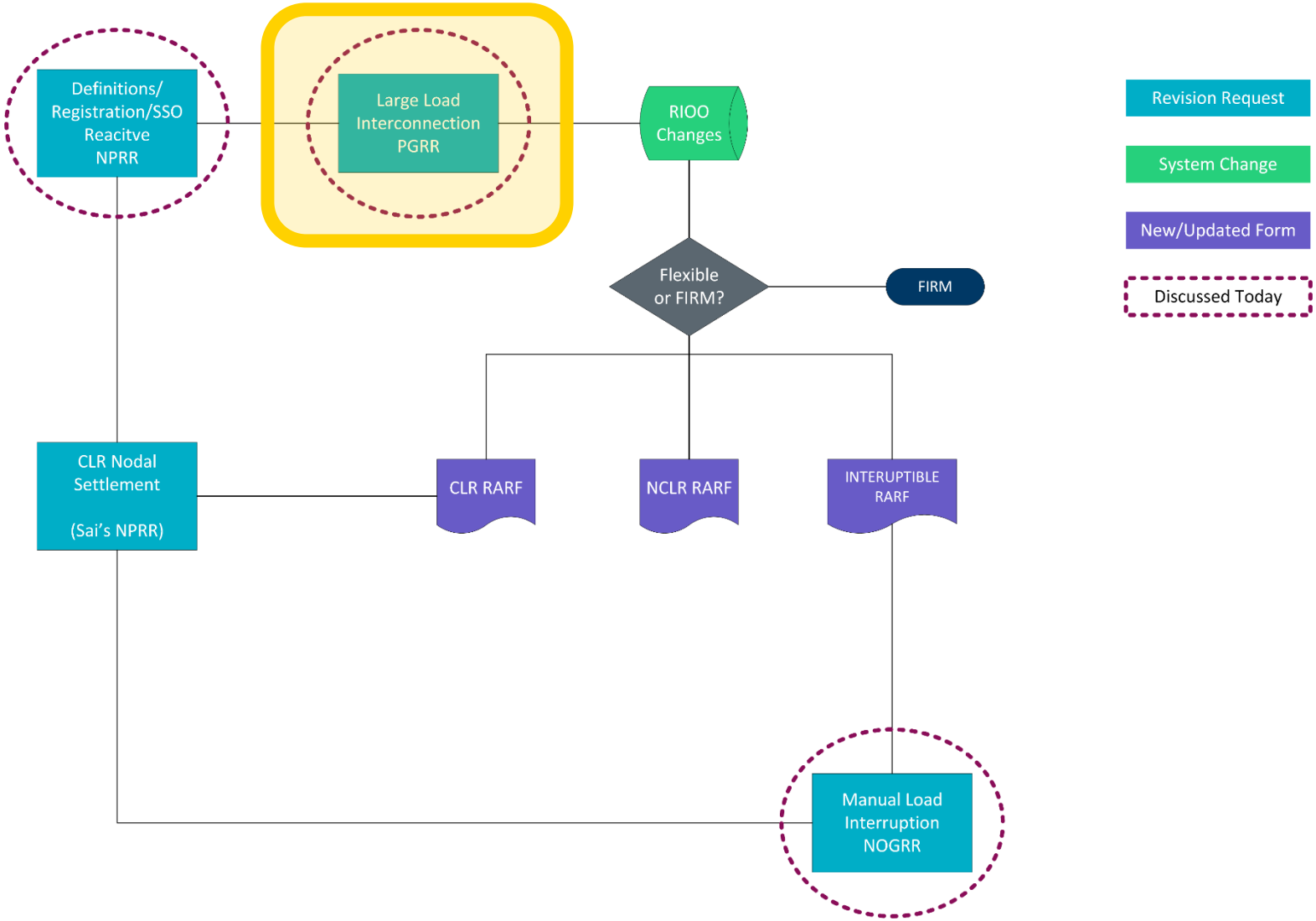
CONCEPT

Add a Large Load Interconnection Study fee to the ERCOT Fee Schedule.

DRAFT LANGUAGE (NEW)

Large Load Interconnection Study (LLIS)	NA	$14,000

LFLTF Draft PGRR



PG 4.1.1.2(1) – Reliability Performance Criteria

CONCEPT

A new requirement is added to study the loss of each Large Load as a contingency and that the system should remain stable following the contingency.

DRAFT LANGUAGE (NEW)

(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.

PG 4.1.1.2(1) – Reliability Performance Criteria

CONCEPT

A new requirement is added to study the loss of each Large Load as a contingency and that the system should remain stable following the contingency.

DRAFT LANGUAGE (MODIFIED)

The table in this section is also updated

	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, opening of a line section w/o a fault, or the outage of a Large Load	Yes	No

PG 6.6 – Modeling of Large Load Interconnection Study Loads

CONCEPT

A new section (previously reserved) is added defining the point at which a Large Load going through the new Large Load Interconnection Study (LLIS) process will be modeled in the SSWG cases

PG 6.6 – Modeling of Large Load Interconnection Study Loads

DRAFT LANGUAGE (NEW)

(1) ERCOT will include applicable Large Loads, as defined in section 8.2.1 of this Planning Guide, in the base cases created and maintained by the Steady State Working Group (SSWG) once each of the following has occurred:

(a) The interconnecting Load has posted to the online Resource Integration and Ongoing Operations (RIOO) systems all data required in the Large Load Interconnection Study (LLIS) process as described in Planning Guide Section 8.2.3;

(b) The Large Load Interconnection Study (LLIS) is completed and;

PG 6.6 – Modeling of Large Load Interconnection Study Loads

DRAFT LANGUAGE (NEW)

(c) ERCOT receives one of the following via the online RIOO system:

(i) Confirmation of an executed Facilities Extension Agreement (FEA) or an Interconnection Agreement (IA) from the Transmission Service Provider (TSP) as described in Planning Guide Section 8.4.1, and confirmation from the TSP that the Load has provided the financial security required to fund the interconnection facilities;

PG 6.6 – Modeling of Large Load Interconnection Study Loads

DRAFT LANGUAGE (NEW)

(c) ERCOT receives one of the following via the online RIOO system:

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

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

(B) The required financial security; or

PG 6.6 – Modeling of Large Load Interconnection Study Loads

DRAFT LANGUAGE (NEW)

(c) ERCOT receives one of the following via the online RIOO system:

(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.

PG 6.6 – Modeling of Large Load Interconnection Study Loads

DRAFT LANGUAGE (NEW)

(2) Upon receiving notice from ERCOT that the Large Load has met the requirements of paragraph (1) above, the interconnecting Load, via its TSP, shall provide ERCOT with the required data for inclusion in ERCOT Planning Models within 60 days. Submitting this data to ERCOT is necessary to model the Large Load in the planning cases created and maintained by ERCOT and the Steady State Working Group (SSWG), System Protection Working Group (SPWG) and the Dynamics Working Group (DWG).

(3) Once the interconnecting Load has met these requirements, ERCOT will notify the SSWG, SPWG, and DWG that the applicable Large Load will be included in the cases created and maintained by these working groups.

PG 8.2.1 – Applicability of the LLIS Process

CONCEPT

Defines the under what conditions a Large Load must go through the new Large Load interconnection process. This essentially codifies the interim Market Notice issued in March 2022.

DRAFT LANGUAGE (NEW)

(a) Any Entity proposing to interconnect a new facility to the TSP(s) system that equals or exceeds 75 MW aggregate load capacity and requests to be connected within the next 24 months from submission into the online Resource Integration and Ongoing Operations (RIOO) system as described in Section 8.2.3.

PG 8.2.1 – Applicability of the LLIS Process

DRAFT LANGUAGE (NEW)

(b) Any Entity proposing to interconnect a new facility that exceeds 75 MW aggregate load capacity and is co-located with a Generation Resource facility and requests to be connected within the next 24 months from submission into RIOO as described in Section 8.2.3.

PG 8.2.1 – Applicability of the LLIS Process

DRAFT LANGUAGE (NEW)

(c) Any Entity seeks to modify a previously or currently connected facility within the next 24 months from submission into RIOO as described in Section 8.2.3.

(i) Increasing the load to more than 75 MW aggregate load capacity or for a Large Load connected and co-located with a Generation Resource.

(ii) Increasing the load to more than 75 MW aggregate load capacity or more for a facility connected to a TSP's system.

(iii) Large Load request to move a point of interconnection to a new electrical bus on a different transmission circuit;

PG 8.2.1 – Applicability of the LLIS Process

DRAFT LANGUAGE (NEW)

(d) Any Entity seeks to modify an existing registration of a Large Load in RIOO if

(i) The modification changes a Controllable Load Resource to any other type of Flexible Load or firm load; or

(ii) The modification changes a Load Resource or Interruptible Load to a firm load

PG 8.2.2 – Submission and Validation of Project Information

CONCEPT

Defines the information that must be submitted into RIOO for a new or modified Large Load interconnection request

- Information needed to define, model, and study the Large Load
- Whether the Load will be Firm or a type of Flexible Load.

Also defines what information in RIOO must be validated by the TDSP and when the request is eligible to proceed with a LLIS.

PG 8.2.2 – Submission and Validation of Project Information

DRAFT LANGUAGE (NEW)

(1) Any Entity subject to the requirements of Section 8.2.1, Applicability, must initiate a Large Load request for a new interconnection or modification of an existing interconnection via the online Resource Integration and Ongoing Operations (RIOO) system. All required information must be submitted in RIOO for the request to be considered complete.

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

(b) A classification of the new or modified Load request as either Firm Load or Flexible Load. For Loads requesting a Flexible classification, the Entity shall further specify if the Load will be an Interruptible Load, a Load Resource, or a Controllable Load Resource.

PG 8.2.2 – Submission and Validation of Project Information

DRAFT LANGUAGE (NEW)

(2) Following a complete submission to the RIOO system by the requesting Entity, the following information must be validated by the interconnecting Transmission and/or Distribution Service Provider (TDSP).

(3) The Large Load request shall not be eligible to proceed with the Large Load Interconnection Study (LLIS) until all information in has been submitted in RIOO as described in 8.2.2 (1), validated as described in 8.2.2(2), and deemed complete by ERCOT.

PG 8.2.3 – Initiation of the LLIS

CONCEPT

- Defines the process for initiating a LLIS and paying the LLIS Fee to ERCOT.
- Establishes time limits on initiating a study and curing deficiencies after the study has been initiated. Once these limits are reached, a project will be cancelled in RIOO.
- Establishes an email list to facilitate sharing of confidential Large Load information with TSPs as required to facilitate studies. This is similar to the existing mechanism in the GINR process.

PG 8.2.3 – Initiation of the LLIS

DRAFT LANGUAGE (NEW)

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

(a) Complete and validated Large Load registration data, as defined in Section 8.2.2, in the format prescribed by ERCOT

(b) Accurate models and any other required information, as specified by the interconnecting TDSP, needed to facilitate the LLIS

(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 in the ERCOT Nodal Protocols, paid via the RIOO system

PG 8.2.3 – Initiation of the LLIS

DRAFT LANGUAGE (NEW)

(2) From initial submission of any registration information specified in 8.2.2 into RIOO, the interconnecting Load shall have 90 days to complete the registration request as specified in 8.2.2 and submit request to proceed with the LLIS as specified in paragraph (1) above. If, after the 90 days have elapsed, the interconnecting Load has not requested to proceed with the LLIS, ERCOT shall consider the Large Load Interconnection request withdrawn by the requesting Entity and shall cancel the request in RIOO.

PG 8.2.3 – Initiation of the LLIS

DRAFT LANGUAGE (NEW)

(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, the interconnecting Entity 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 may cancel the project at its sole discretion.

PG 8.2.3 – Initiation of the LLIS

DRAFT LANGUAGE (NEW)

(4) Payment of the Large Load Interconnection Fee is described in the ERCOT Fee Schedule in the ERCOT Protocols. Payment of the ERCOT LLIS Application Fee shall not affect the interconnecting Load's independent responsibility 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 TSP(s) and ERCOT. Membership to this email list will be limited to ERCOT and appropriate TSP personnel.

PG 8.3.1 – Interconnection Study Procedures

CONCEPT

- States the studies required for LLIS.
- Addresses if the Large Load is connected at Distribution.

PG 8.3.2 – LLIS Study SCOPE

CONCEPT

- Outlines the LLIS scoping process.
- Facilitates coordination among impacted TSPs and ERCOT.
- Addresses separate SSO scope, if required.
- Outlines process for finalizing study scope and steps if the scope can't be agreed upon.

PG 8.3.3 – LLIS description and methodology

CONCEPT

- Outlines the LLIS methodology
- Outlines the LLIS general reliability requirements.
- Outlines finalization of LLIS reports.

PG 8.3.4.1 – LLIS Elements (Steady State Study)

CONCEPT

- Steady State study requirements.
- Outlines the applicable reliability requirements.
- Establishes responsibilities of lead TSP.
- Introduces the new requirement to study CLRs as dispatchable Load Resources
- Introduces a new requirement to study Load Resources and Interruptible Loads as curtailable for system capacity
- Addresses Firm Loads study requirements.

PG 8.3.4.1 – LLIS Elements (Steady State Study)

DRAFT LANGUAGE (NEW)

(4) The lead TSP shall study the Load at its requested amount.

(a) For Loads that certify, via the RIOO system, intent to register as a Controllable Load Resource, the lead TSP will dispatch the Load between max and min consumption in order to resolve all system-wide capacity, basecase thermal, and post-contingency thermal violations identified in the study. 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 Interruptible Load, 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.

PG 8.3.4.1 – LLIS Elements (Steady State Study)

DRAFT LANGUAGE (NEW)

(c) If the study of the full requested Load amount results in a basecase or post-contingency **thermal violation** that exceeds the load-shed rating of the monitored element, the TSP shall limit the Load to a level that resolves the violation. The TSP shall not redispatch the Load for this type of violation.

(d) If the study of the full requested Load amount results in a basecase or post-contingency **voltage violation** other than those deemed acceptable in this Planning Guide, the TSP shall limit the Load to a level that resolves the violation. The TSP shall not redispatch the Load for this type of violation.

(5) For any Load that has not yet registered in RIOO as a type of Flexible Load, the lead TSP shall study the Load as a firm load.

PG 8.3.4.2 – LLIS Elements (Short-Circuit) 8.3.4.3 Dynamic and Transient Stability

CONCEPT

- Addresses Short Circuit requirements.
- Addresses Transient stability study requirements and method for justifying not performing this study if deemed unnecessary.

PG 8.4.1 – Interconnection agreements 8.4.2 Interconnection agreements registered as PUNs

CONCEPT

- Addresses notification to ERCOT on required agreements being executed.

PG 8.5 – LLIS Report

CONCEPT

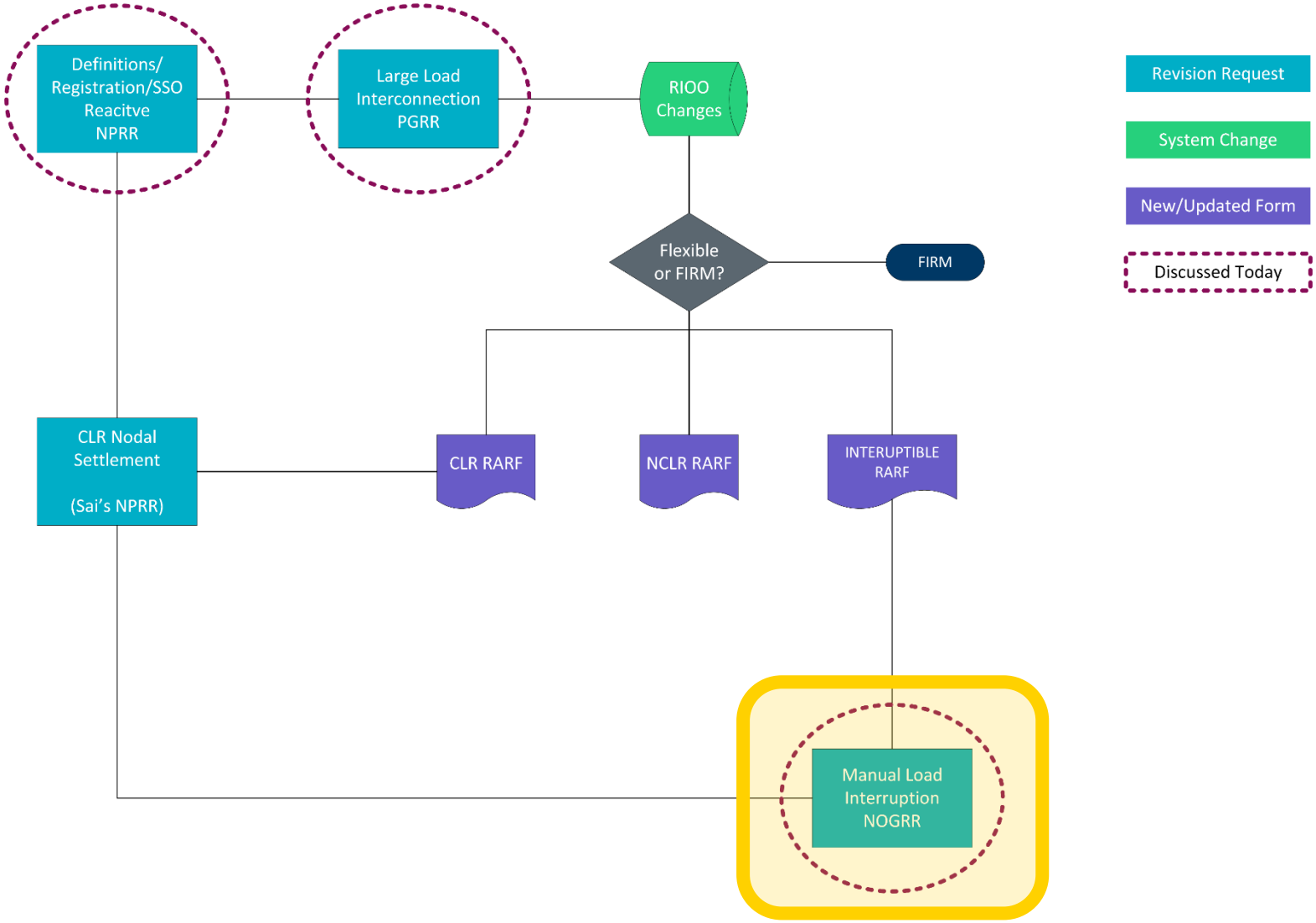
- Addresses required reports and posting of reports.
- Addresses redacting ECEII from reports.
- Addresses timing for interconnection to move forward once studies are final.
- Addresses consequences if changes are made after the study is completed.

PG 8.6 – Reviews and Approvals to submit model information

CONCEPT

- Addresses steps to modeling in Operations and Planning models once the LLIS has been completed.

LFLTF Draft NOGRR



NOG 4.5.3.1 - General Procedures Prior to EEA Operations

CONCEPT

The ERCOT direction to QSEs to shed Interruptible Loads is added to the procedures prior to entering EEA operations.

DRAFT LANGUAGE (NEW)

(e) ERCOT shall direct all QSE's with Flexible Load shed obligations to shed Interruptible Load, in blocks measured in 100 MW increments, distributed as documented in these Operating Guides in order to maintain or restore 3,100 MW of PRC within 30 minutes. The QSE with the Load curtailment will curtail only the Interruptible Load portion of Flexible Load, i.e., Flexible Load carrying Ancillary Services or ERS shall not be interrupted.

NOG 4.5.3.4 - Qualified Scheduling Entity Interruptible Load Shed Obligation

CONCEPT

Establish a new procedure for ERCOT to direct QSEs to shed Interruptible Load prior to entering EEA operations.

DRAFT LANGUAGE (NEW)

4.5.3.4 Qualified Scheduling Entity Interruptible Load Shed Obligation

(1) Each QSE shall take and direct actions to ensure that ERCOT Load shed instructions are effectuated. Each Interruptible Load shall comply with any reasonable instruction given by its QSE to effectuate Load shed obligations.

NOG 4.5.3.4 - Qualified Scheduling Entity Interruptible Load Shed Obligation

DRAFT LANGUAGE (NEW)

(2) Percentages for Interruptible Load shedding will be based on the previous quarters QSE peak Interruptible Loads, as registered with ERCOT, and will be reviewed by ERCOT and revised quarterly or as otherwise appropriate to reflect any new or changed QSE designation. ERCOT shall maintain a QSE Interruptible Load Shed Table posted on the ERCOT website that reflects each QSE's total Load shed obligation.

(3) Following ERCOT's quarterly Interruptible Load review or ERCOT's receipt of any new or changed QSE designation, ERCOT shall post any anticipated revisions to the QSE Interruptible Load Shed Table on the ERCOT website. ERCOT shall issue a Market Notice announcing the posting of the revisions at least ten days prior to the effective date of the revisions or as soon as practicable if ERCOT determines there is a need to correct the Market Notice less than ten days before the effective date.

NOG 4.5.3.5 - Transmission Operator Load Shed Obligation

CONCEPT

Renumber, rename, and modify the procedure for ERCOT to direct TOs to shed Load during EEA operations. The Load shed obligation is adjusted to remove the portion of load shed by QSEs under NOG 4.5.3.4.

DRAFT LANGUAGE (MODIFIED)

4.5.3.5 Transmission Operator Load Shed Obligation

(2) Percentages for Level 3 Load shedding will be based on the previous year's TSP peak Loads minus Interruptible Load, as reported to ERCOT, and will be reviewed by ERCOT and revised annually or as otherwise appropriate to reflect any new or changed TO designation. ERCOT shall maintain a Load Shed Table posted on the ERCOT website that reflects each TO's total Load shed obligation.

Upcoming RR Language and Next Steps

Concept – Registrations

ERCOT will be adding language to the PGRR requiring all Large Loads to register and provide basic information to ERCOT.

Information collected would include:

- Load composition (peak consumption, load type, etc.)
- Desired interconnection date
- Load classification (Firm, Interruptible, LR, CLR)

Concept – Registrations

This registration will NOT change which loads will be required to go through the Large Load Interconnection process

- Large Loads wishing to interconnect in 24 months or less will still be required to go through the Large Load Interconnection process

- Large Loads wishing to interconnect in 25 months or more may elect to utilize either the Large Load Interconnection process or the traditional Planning process

Next Steps

- Insert into PGRR RIOO submission for all Large Loads
- Finalize Market Rules review
- Complete Impact Assessment
- Post NPRRs, PGRR, NOGRR, and new RRGRR(Interruptible Load Form)
- Approve rule changes
- Implement Systems Changes
- Unbox Language and implement new rules

Next Steps continued

- Would like to post new rules and table them at PRS and ROS to be discussed at future LFLTF.
- Discuss and resolve comments.
- Vote rules ahead from PRS and ROS after LFLTF reviews.