ERCOT Interconnection Process:

Generation Entity Winter Weather Preparedness Workshop.

Oct 28, 2024

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Manager, Resource Integration

ERCOT Interconnection Process

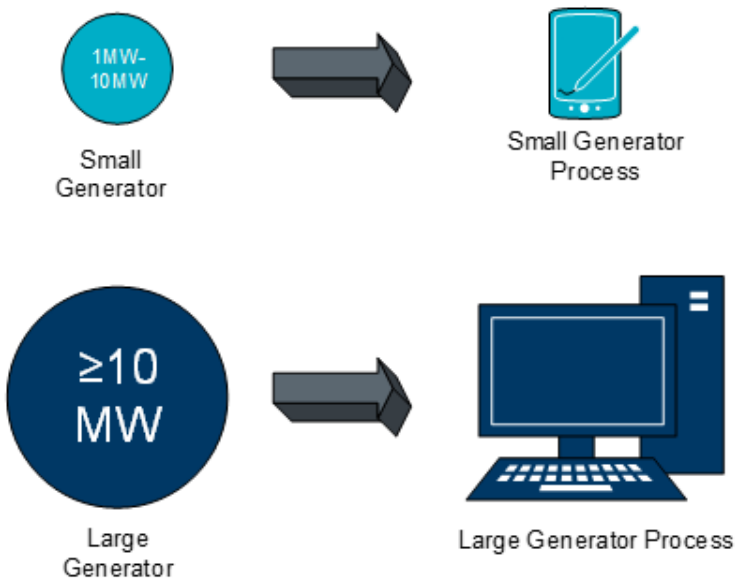
ERCOT Interconnection process slightly different than most of the country

- Not a Queue, each project moves on its own, but may seem like a queue at crunch points where staff limitations are pronounced.
- Deliverability not guaranteed. Only “Driveway” is built during Interconnection Process, “Highway” determined through Planning Process.
- “Connect and Manage” process where generation is connected and managed by congestion management during real time operations.
- Studies are done to ensure reliability, but not to build transmission.

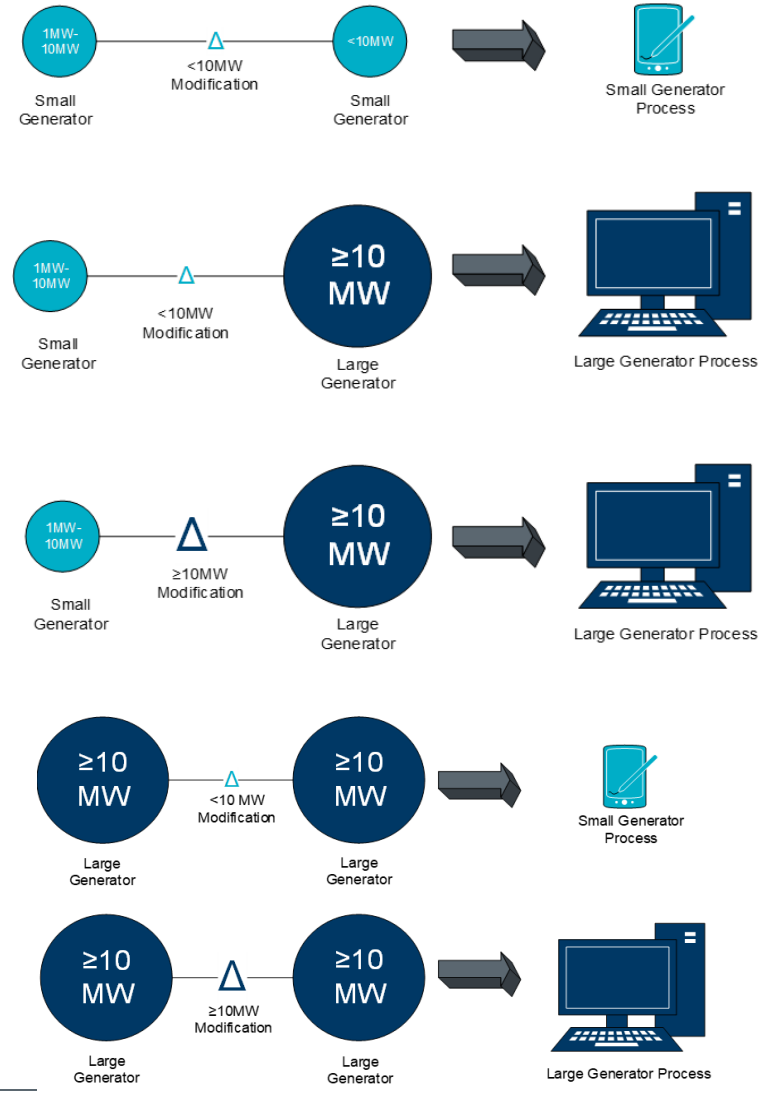
ERCOT process is 18 to 30 months for Large Generation (>=10 MW) and 8 to 12 months for Small Generation (<10 MW) not including construction/supply delays.

Planning Guide Section 5 Small/Large Interconnections

New Units



Changes to Existing Units



Resource Interconnection Process – Large Generation

Stage 1: Interconnection Request Application to Quarterly Stability Assessment

Stage 2: Registration and Modeling

Stage 3: Energization, Synchronization and Commissioning

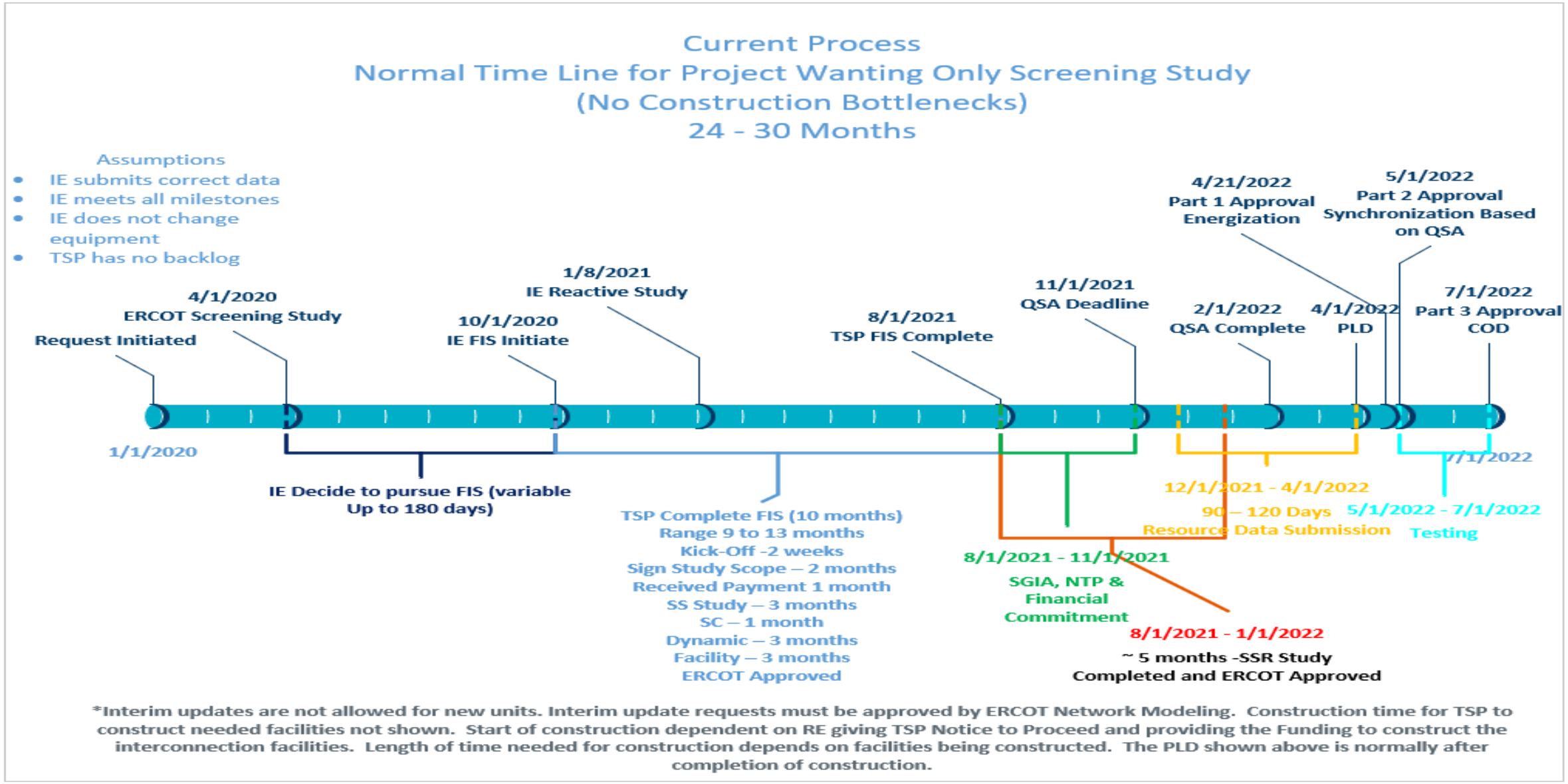
Figure 1: Generation Resource Interconnection Process Flow

- GINR Application and Fees
- Security Screening Study
- Full Interconnection Studies
- Subsynchronous Resonance Study
- Standard Gen. Interconnection Agreement
- Resource Integration and On-Going Operations data submittal
- Compliance with Operational Standards
- Reactive Study

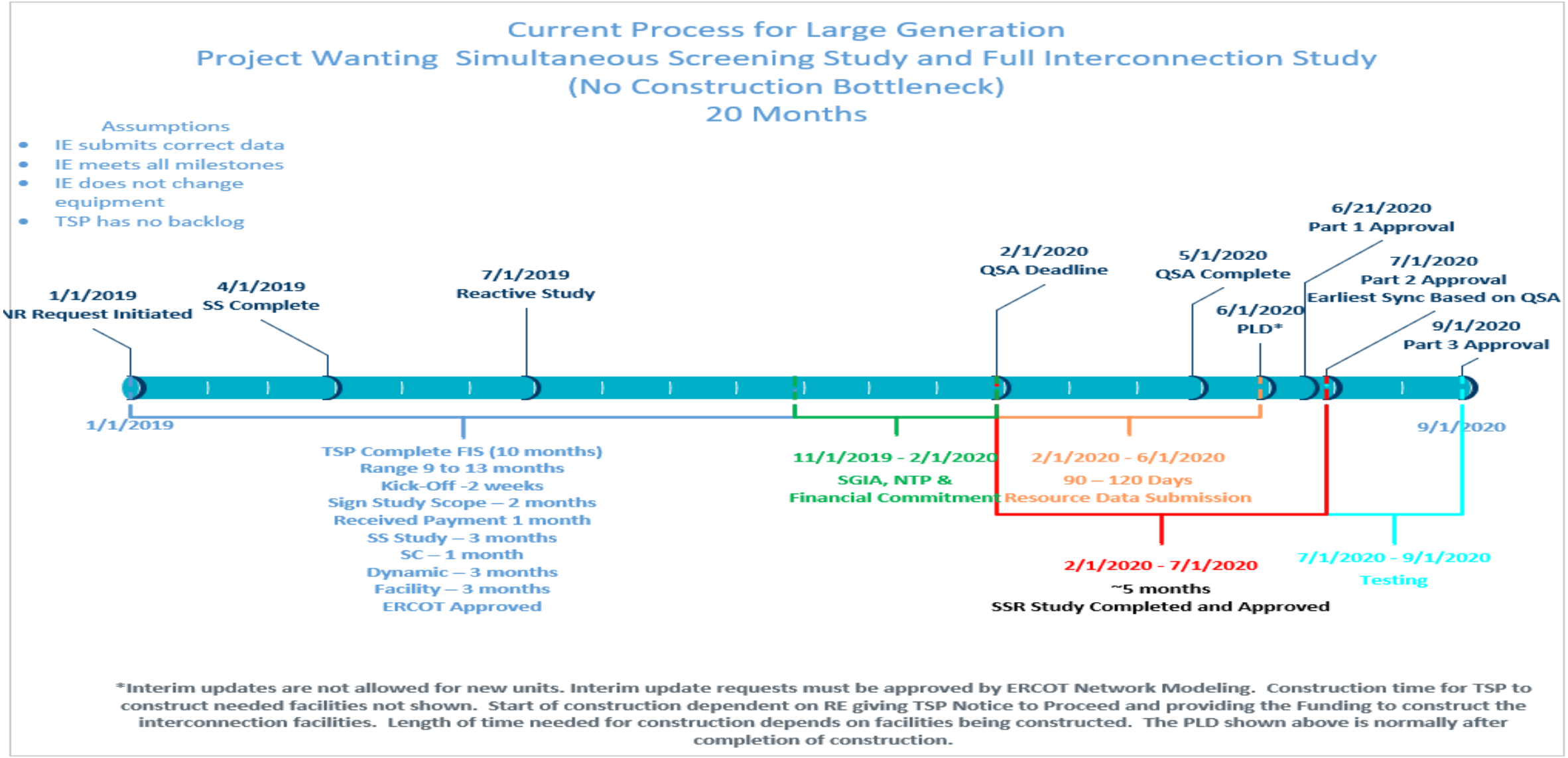
- RE Registration
- Resource Integration and On-Going Operations data submittal
- ERCOT Polled-Settlement Meters and ESI ID Requirements
- Telemetry and ICCP Requirements

- TSP: 1: Request to Energize POI
- Commissioning Plan Template
- New Generator Commissioning Checklist
- 1: Request to Energize
- 2: Request for Initial Synchronization
- 3: Request to Commission a Resource
- Reactive Capability & Performance

Large Generation Timeline for Screening Study only

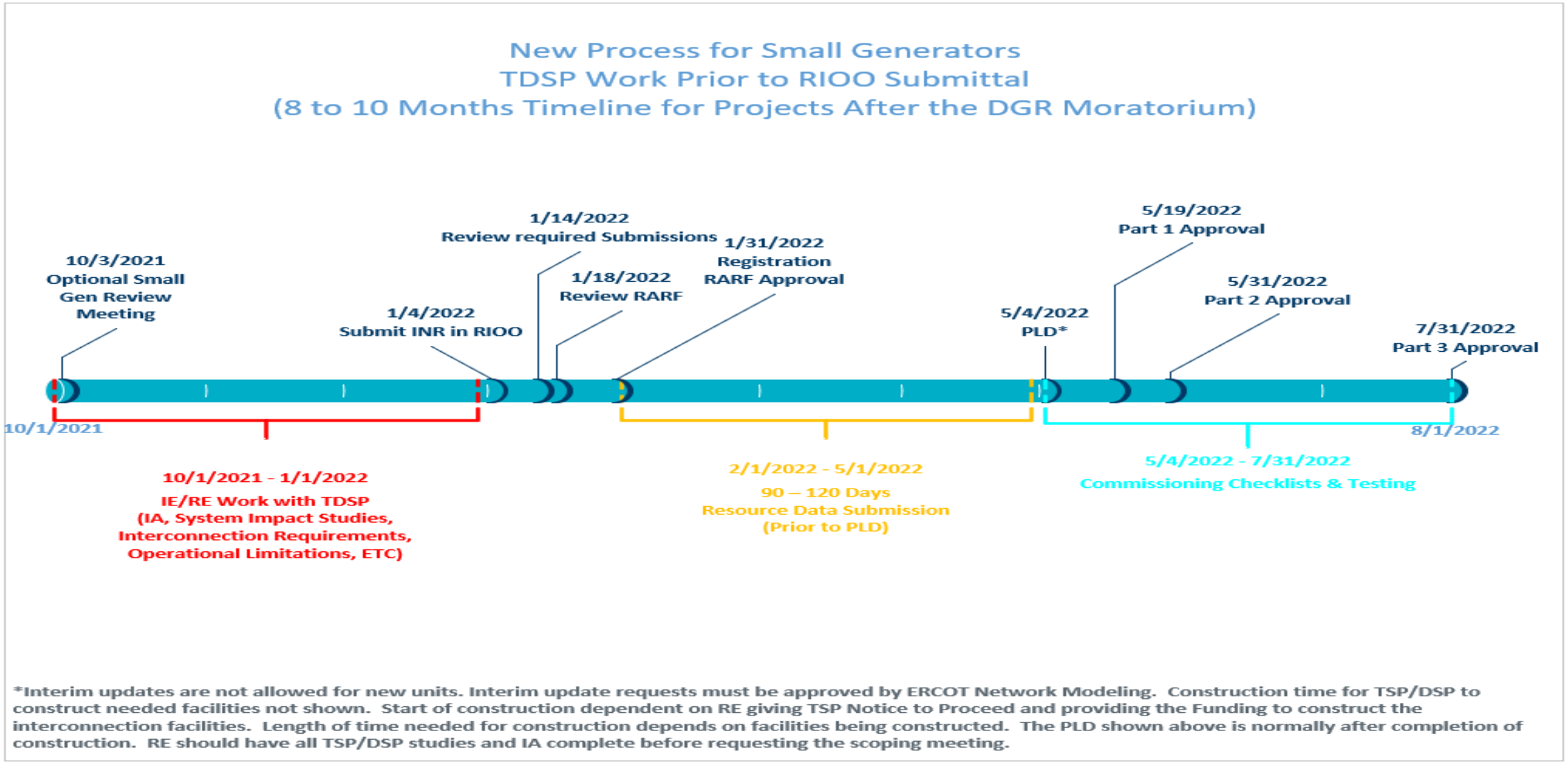


Large Generation Timeline Simultaneous SS and FIS



*Interim updates are not allowed for new units. Interim update requests must be approved by ERCOT Network Modeling. Construction time for TSP to construct needed facilities not shown. Start of construction dependent on RE giving TSP Notice to Proceed and providing the Funding to construct the interconnection facilities. Length of time needed for construction depends on facilities being constructed. The PLD shown above is normally after completion of construction.

Small Generation Timeline



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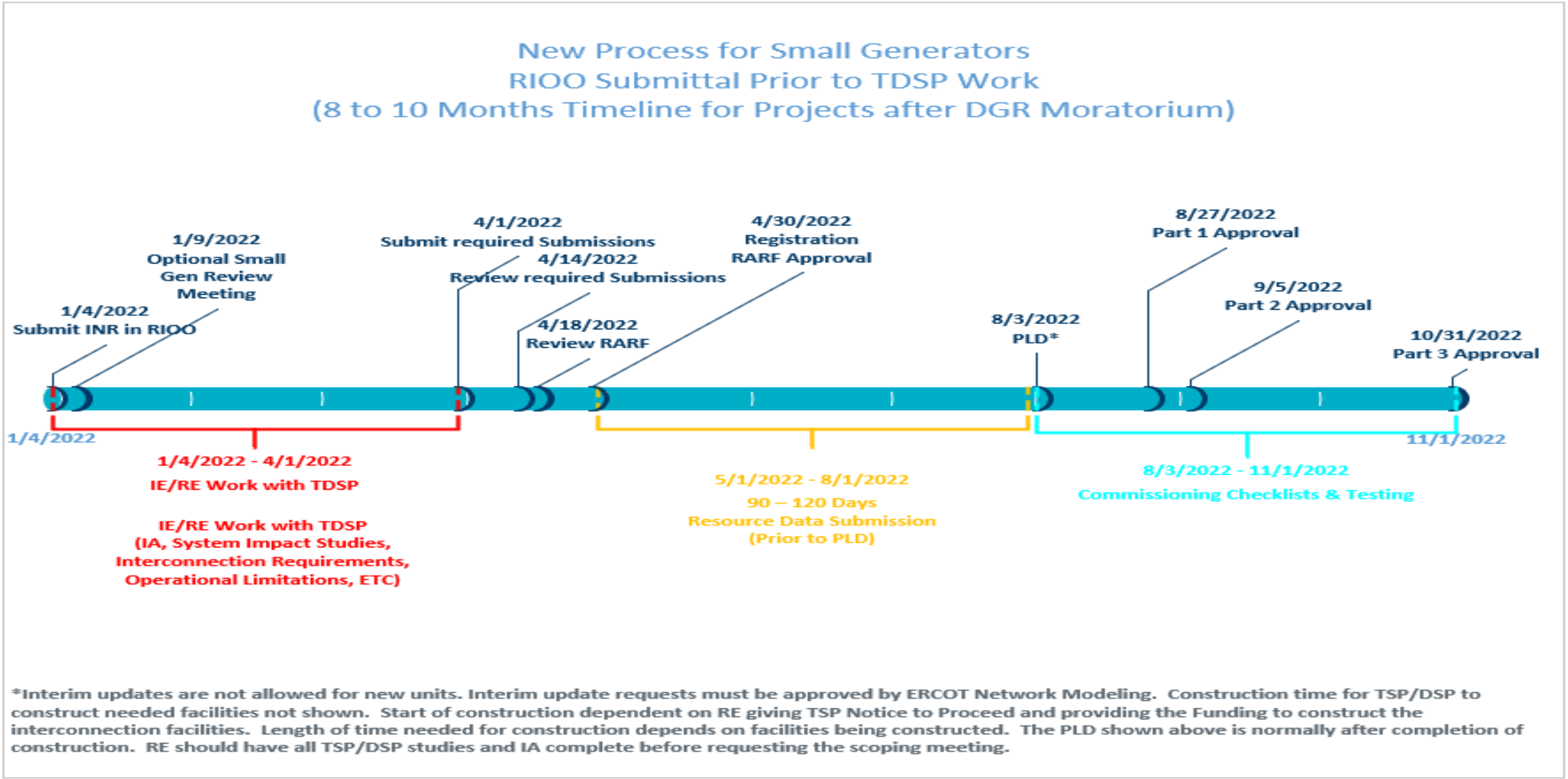
Small Generation Timeline



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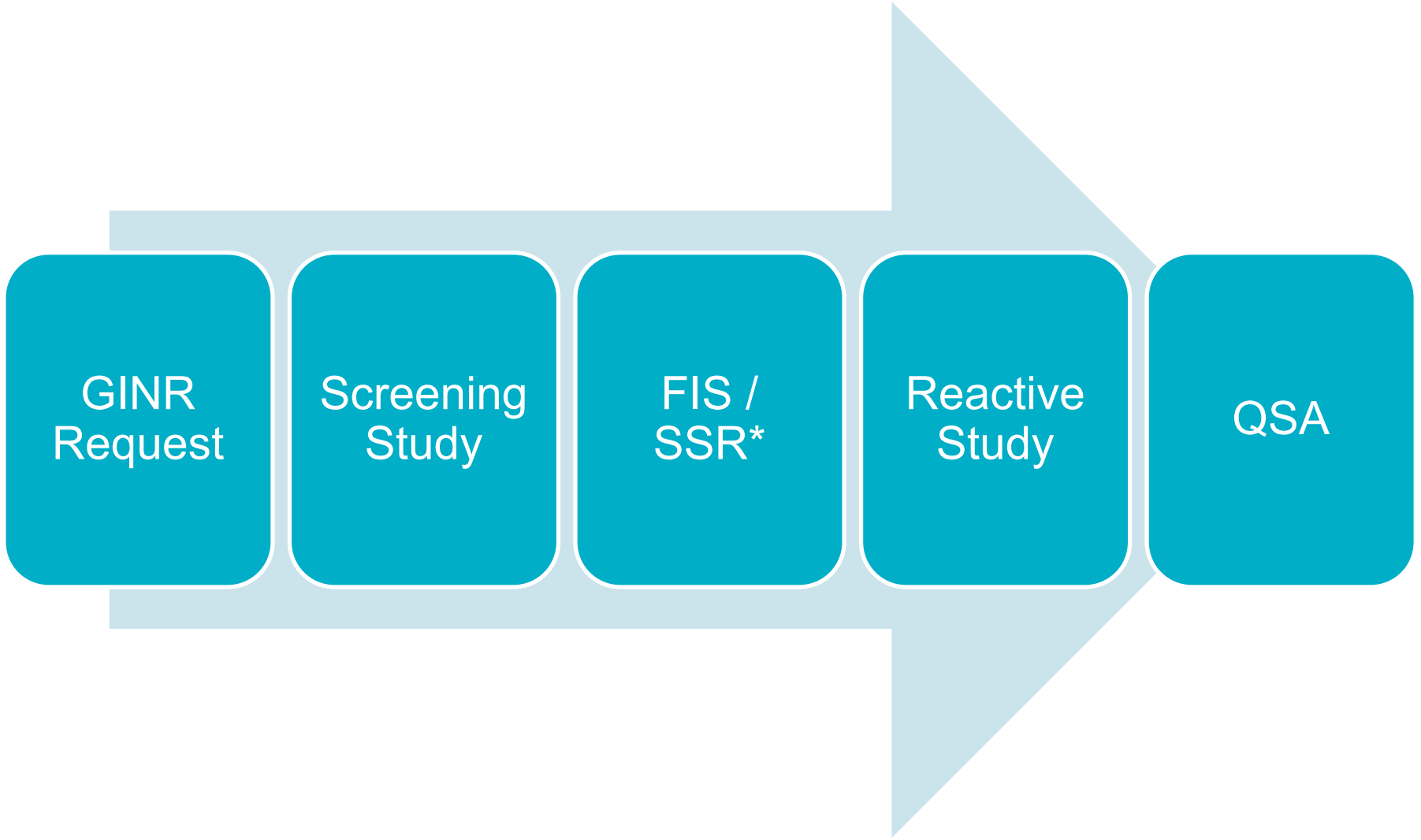
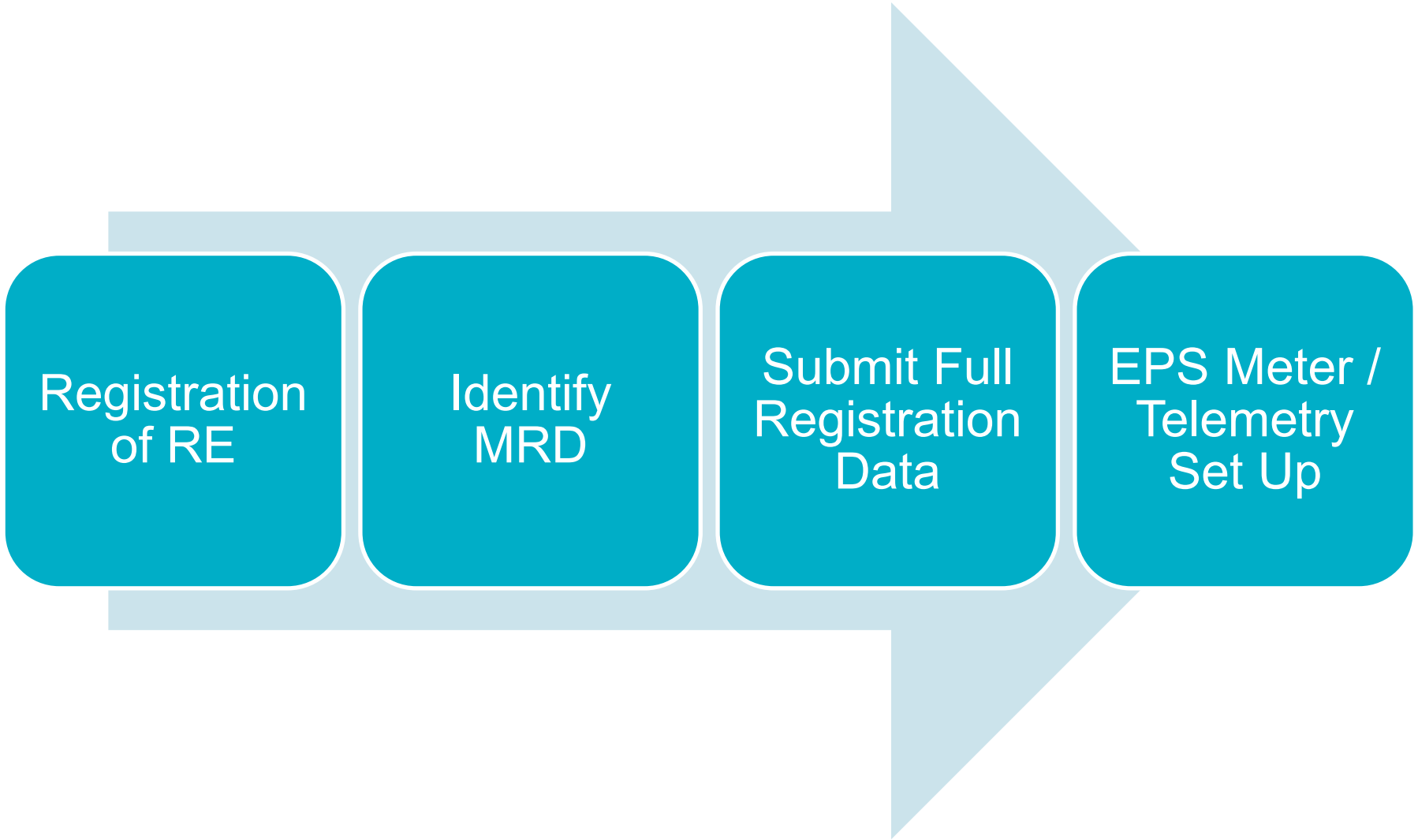
STAGE 1 – Generation Interconnection Request Application to QSA



STAGE 2: Resource Registration and Modeling Milestones



Stage 2: Registration and Modeling

The Resource Integration and Ongoing Operations – Interconnection Services (RIOO-IS) is the application used to contain the generator and associated equipment modeling data needed for ERCOT systems. The contents of RIOO-IS are governed by the Resource Registration Glossary. Each field in RIOO-IS must be submitted at certain times during Stage 1, 2 and 3 as indicated by the following columns in the Glossary:

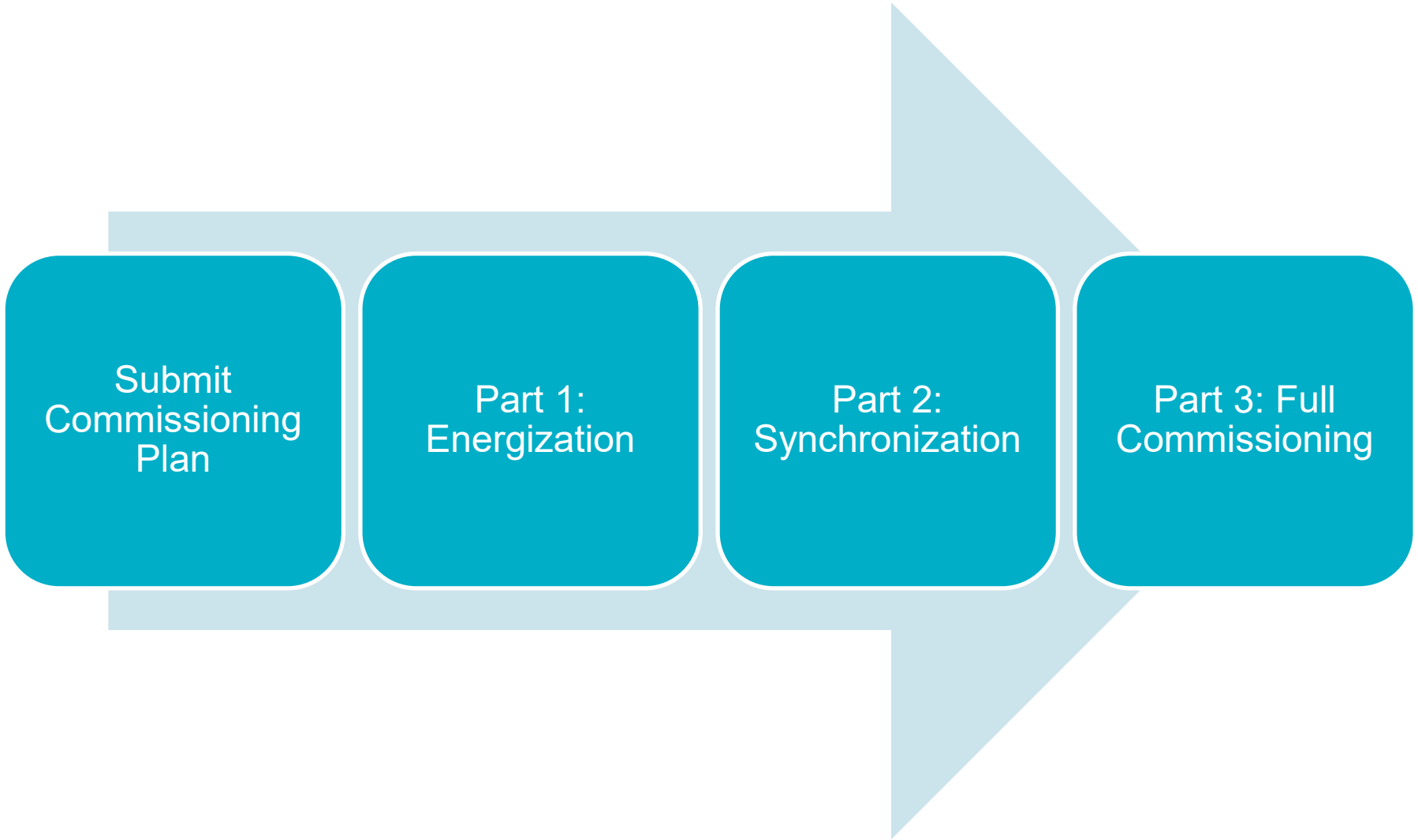
- Full Interconnection Study (FIS)
- Planning Model (to meet PG 6.9)
- Full Registration

The first Resource Data is due at FIS. This data is then expanded for the Planning Model. At Full Registration, all Resource data must be submitted in RIOO-IS. **The RE should reach out to ERCOT at least 30 days prior to the deadline for their Production Load Date (PLD) to allow for calls and review of the resource data.**

For Full Registration, Resource data must be submitted **at least 15 days** prior to the ***Deadline for Model Change Submit Before*** date for the desired PLD. **Data submitted within 15 days of the deadline may not get processed in time to be included in the desired PLD!**

Once the data has reached the Production Load Date (PLD) where the generator(s) are modeled in the Network Operations Model and preparing for energization, the RE shall use RIOO-Resource Services (RIOO-RS) to submit any changes to that data.

Stage 3: Resource Commissioning Milestones



STAGE 3: Energization, Synchronization and Commissioning

ERCOT New Generator Commissioning Checklist

The three-part ERCOT New Generator Commissioning Checklist is designed to coordinate the energization, synchronization, and commissioning of a new or modified generator once all qualification measures have been met to the satisfaction of ERCOT.

- Part 1: Request for Energization of Resource Entity Equipment
- Part 2: Request for Initial Synchronization (up to 20 MVA, > 20 MVA)
  - IRR Curtailment Test
  - Reactive Power Capability Test
  - Voltage Support Service (VSS) Test (Calculated)
  - Automatic Voltage Regulator (AVR) Test
  - Primary Frequency Response (PFR) Test
  - Power System Stabilizer (PSS) Test
- Part 3: Request to Commission a Resource
  - Resources requesting commercial operation outside of the Summer and Winter seasons do not need to submit a declaration of weather preparedness for Part 3 Approval.
  - Those new resources can be declared together with other existing resources during the May 1 – Jun 1 and Nov 1 – Dec 1 semi-annual declaration of weather preparedness submittal windows.

  Generator has now completed the interconnection process.

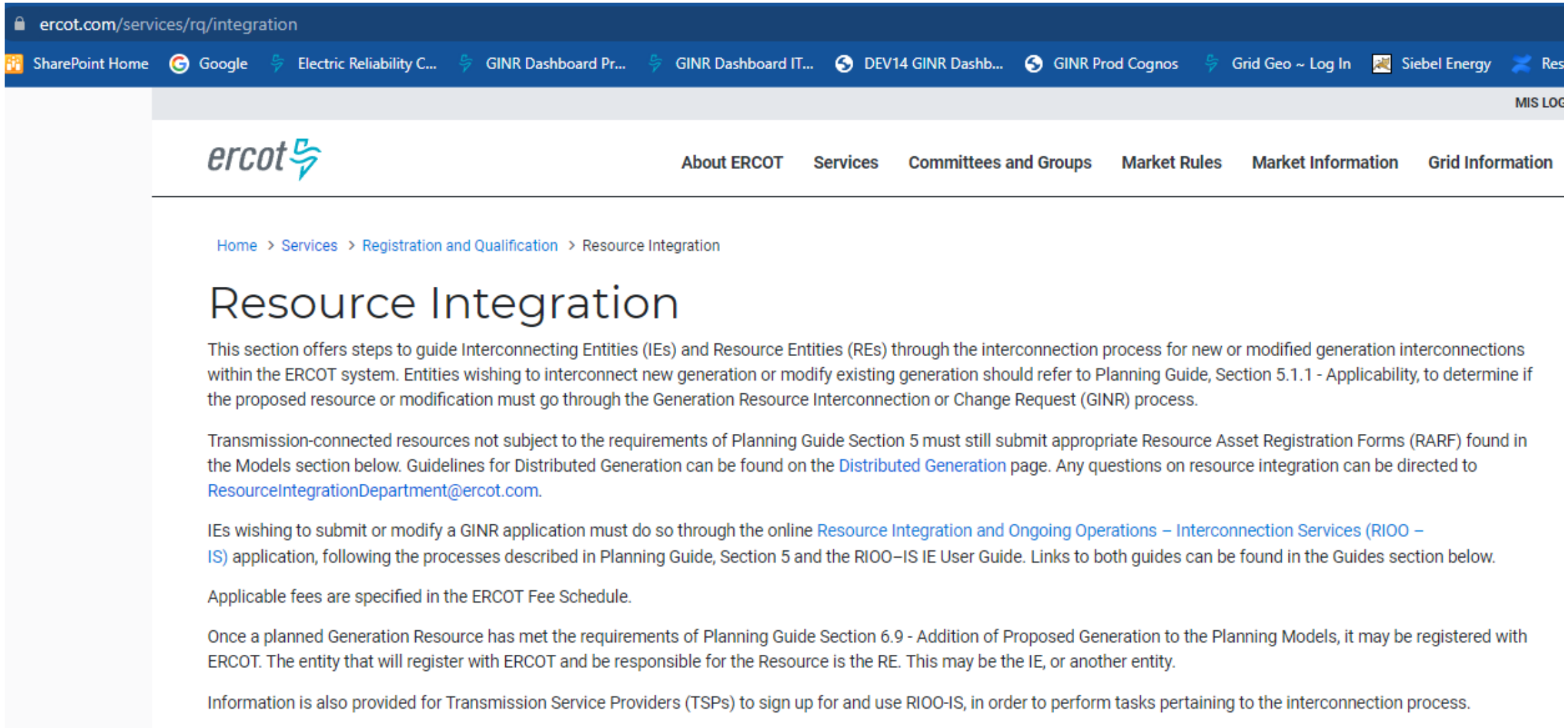
Small Generation Process

The Small Generation process is governed by Planning Guide Section 5.4.

RIOO-IS Small Generation Initial Application Checks:

- One-line diagram (Need the Load Transformer name on the One-Line)
- Valid Load/Load Transformer information in RIOO-IS to describe where it is connected
- Site Photos, .kmz files, and/or Maps
- Proof of Site Control
- Signed Declaration of Department of Defense (DOD) Notification
- Payment for Small Gen application
- System Impact Study – Conducted by TDSP (Operating Guide Section 2.9 [VRT], Operating Guide Section 2.6 and 2.9 [FRT and VRT] and Planning Guide Section 5.4.2)
- Resource Data Submission – Entered into RIOO by IE/RE
  - Include the TDSP Station Name and Code for the Resource Site Name/Code
  - All Operation Limitations should be reflected
  - Include Load Resource INR if BESS (Until ESR data entry is created)

Resource Integration page



Resource Interconnection Handbook

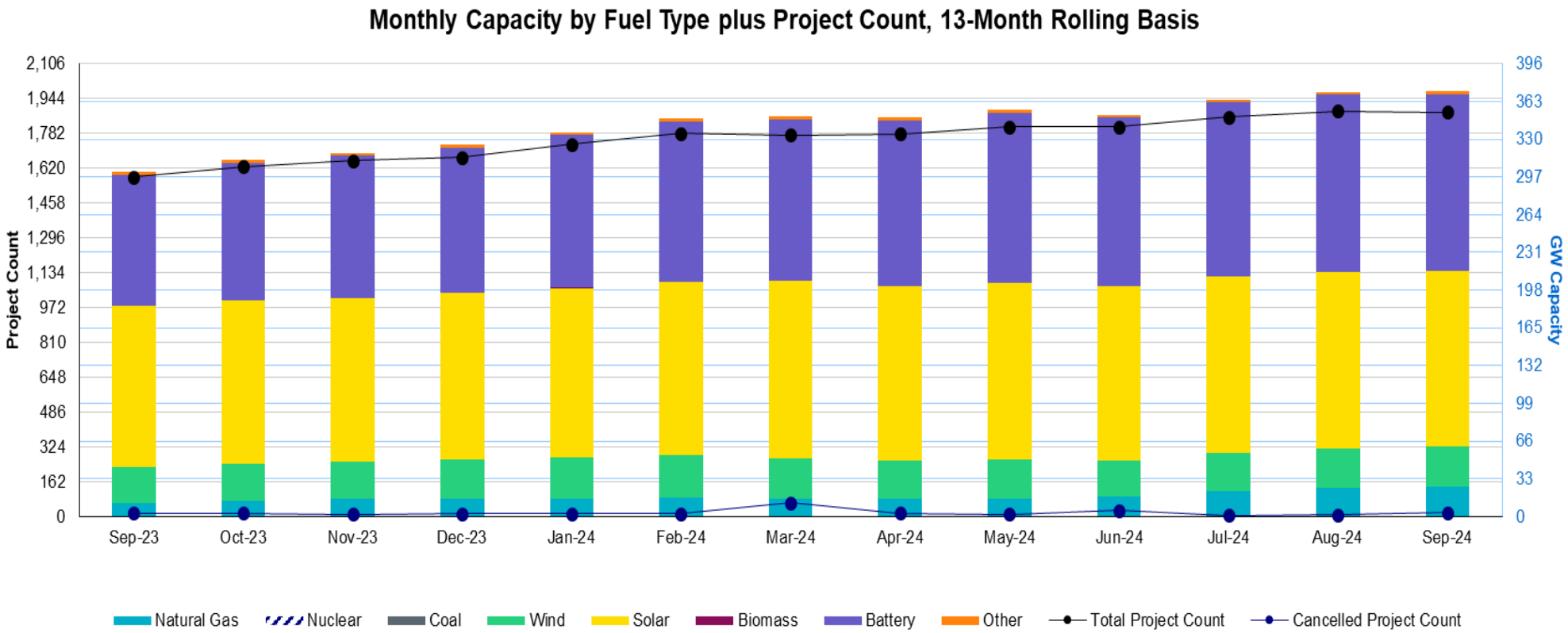
Guides

Model Quality Guide Assists REs/IEs submit stability models per Planning Guide Section 6.2, including the new Model Quality Testing requirements. Also includes the UDM Model Guideline and PSCAD Model Guideline.	Aug 12, 2022 - zip - 1.6 MB
Self Limiting Facilities In the Interconnection Process This document describes the process to submit Self-Limiting Facilities in the Generation Resource Interconnection or Change Request (GINR) Process prior to full implementation of NPRR1026.	Mar 30, 2021 - docx - 161.6 KB
Planning Guide Section 5, Generation Resource Interconnection or Change Request (GINR), defines the requirements and processes used to facilitate new or modified generation interconnections.	
Resource Interconnection Handbook Provides an overview of the Generation Interconnection or Change Request (GINR) process that Interconnecting Entities/Resource Entities must follow in order to add new generation/modify existing generation connected to the ERCOT Transmission Grid	Jun 21, 2022 - docx - 1.4 MB

Generation Interconnection Requests

1,881 active generation interconnection requests totaling 372 GW as of September 30th, 2024
(Solar 154 GW, Wind 35 GW, Gas 26 GW, and Battery 154 GW)

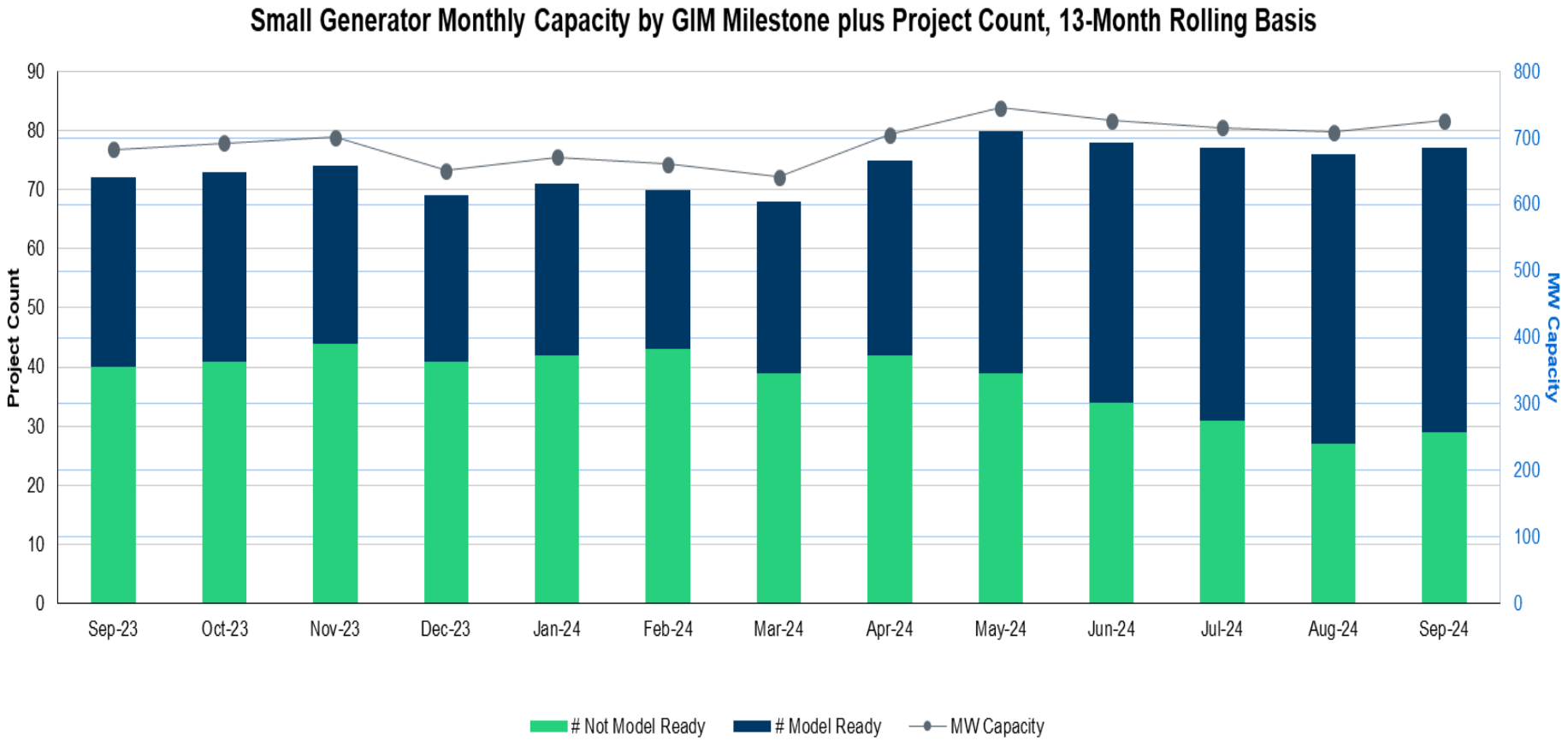
(Excludes capacity associated with projects designated as Inactive per Planning Guide Section 5.7.6)



A break-out by zone can be found in the monthly Generator Interconnection Status (GIS) reports available on the ERCOT Resource Adequacy Page: http://www.ercot.com/gridinfo/resource

Generation Interconnection Requests

Small Gen- 29 projects Not Model Ready, 48 projects Model Ready



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Questions?