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MOD-026-2 and ERCOT model review process

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Outline:

- Impacts to ERCOT
- ERCOT's model review process
- Common model issues and how to avoid

Key Takeaways

- An updated DWG Procedure Manual was recently approved and posted
- ERCOT has several model requirements. Helpful recommendations are included in this presentation.

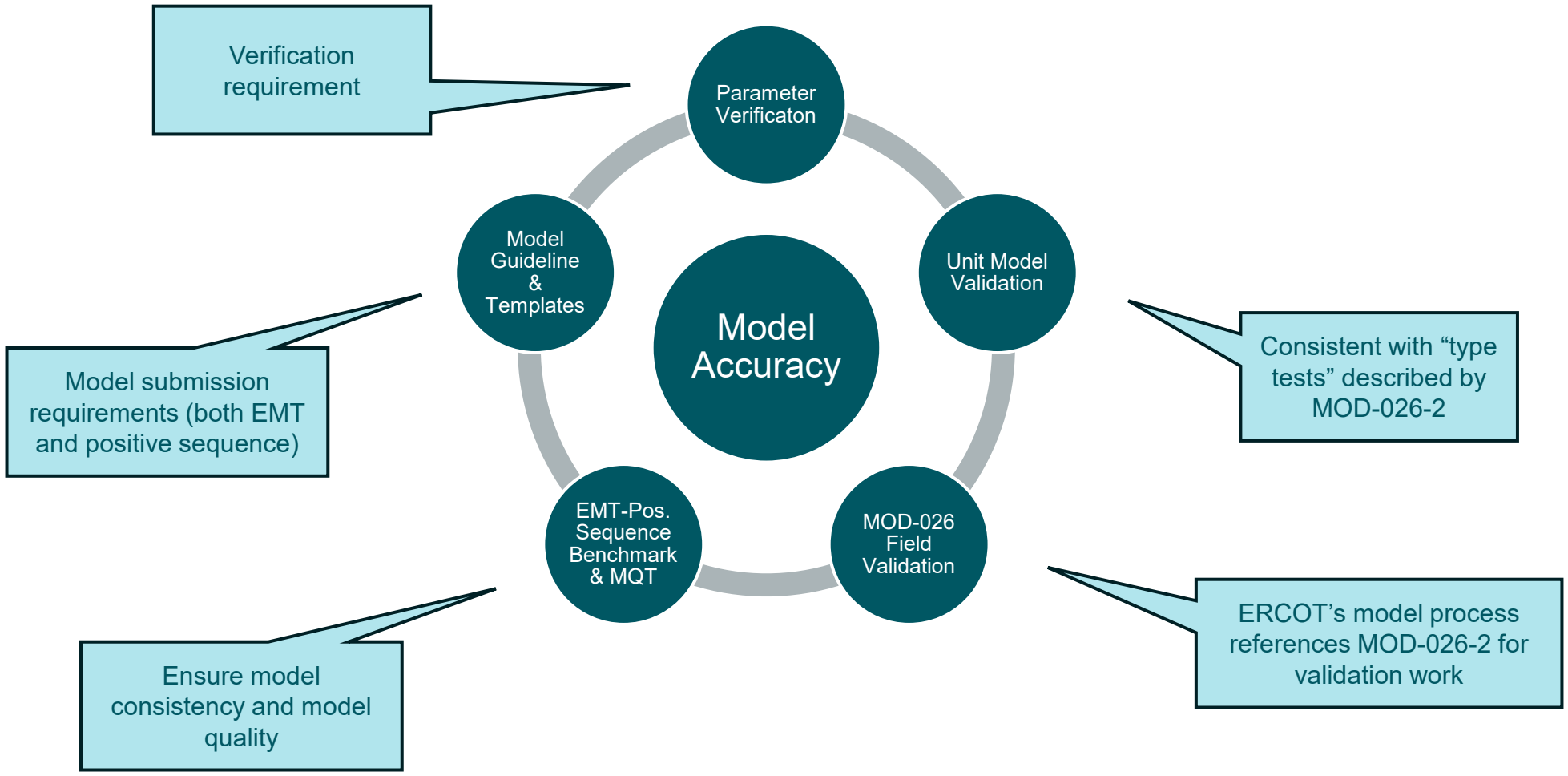
MOD-026-2 Impacts to ERCOT

Market rule impacts:

- ERCOT already implemented many of the broad requirements
  - PGRR-085 (approved 2/9/2021) added EMT model requirements as well as Verification and type testing requirements
  - ERCOT has been requiring EMT models of IBRs since 2015

- In 2026, ERCOT, in collaboration with DWG TSPs, conducted a review of R1 of MOD-026-2 and updated the DWG Procedure Manual
  - 7/9/2026, the new DWG Procedure Manual was posted
    - This update focuses on R1, which is the only requirement directly involving the Planning Coordinator (ERCOT)
    - (Transmission Planners (e.g. TSPs) are the responsible entity for R5 and R7.)

Background: Ensuring Accurate Models



ERCOT’s existing model process algins well with MOD-026-2.

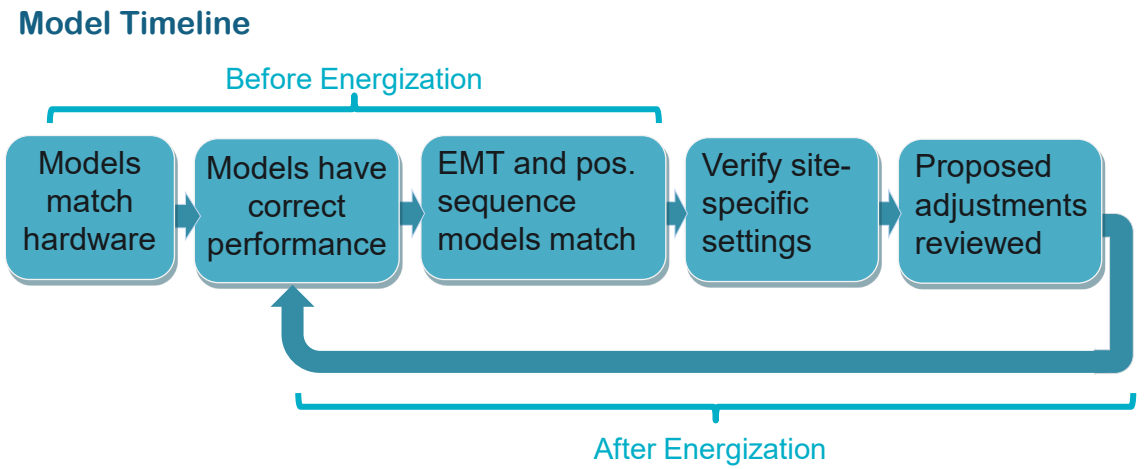
Reference: Planning Guide 5.5, 6.2, and the DWG Procedure Manual.

ERCOT's model process

- Model reviews initially happen before energization. Prior to entering QSA, ERCOT reviews planned facility models in detail, checking performance and model quality.

- After energization, owners must verify model accuracy.

- Before proposing a field adjustment, IBR facility owners must submit a Planning Guide 5.5(6) review request. ERCOT & TSPs determine if the proposal can proceed or requires further study.



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Model Milestones

The Model Quality Guide contains a handy timeline and other flowcharts.

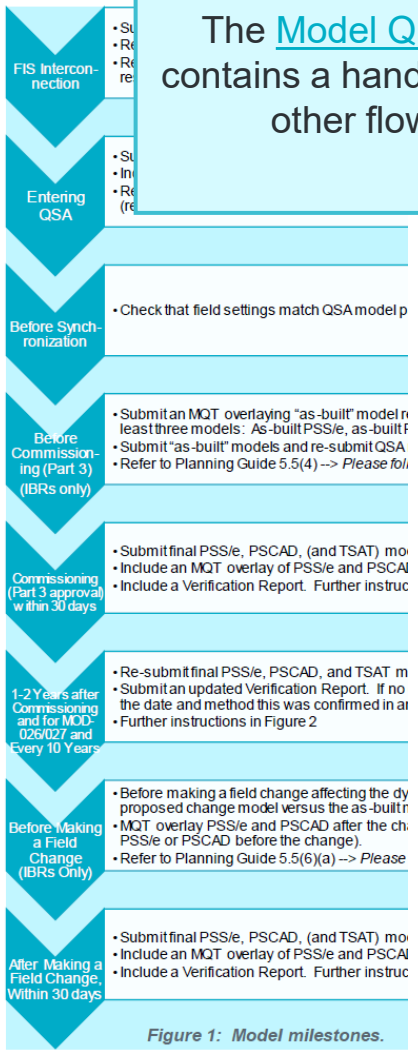

Figure 1: Model milestones.

Key deadlines:

- Full dynamic model packages submitted to RIOO-IS 45 days before the QSA deadline.
- Online IBRs wanting to make a field adjustment affecting dynamic response need to make a Planning Guide 5.5(6) submission to ERCOT to request prior approval.
- For commissioning resources, final models and Verification report are required within 30 days of receiving Part 3 commercial operations approval per Planning Guide 5.5(5).
- Updated dynamic models and a Verification report are required submitted to RIOO-RS within 30 days of changing a field setting of an online Resource.
- An updated submission is required in 12 to 24 months and every 10 years thereafter per Planning Guide 5.5(6)(c).

The Model Quality Guide has lots of helpful information on preparing a complete model submission.

Top 5 Reasons for a Model Rejection

1. Model Quality Test (MQT) didn't include the Preferred VRT curves.
2. Model aggregation doesn't match RIOO-RS registration.
3. PSS/e user-defined model (UDM) is missing files for PSS/e version 35 and version 36
4. Missing Template
5. PSS/e, TSAT and PSCAD models must match in the MQT overlay plots.

Notes:

1. Preferred VRT curves are in the DWG Procedure Manual Section 3.1.5. MQTs performed for IBRs must contain (below run for leading & lagging initial power factor):
   (1) Legacy LVRT curve, (2) Voltage Dip curve (derived from the Preferred LVRT), (3) Preferred HVRT curve, and if trips for preferred HVRT, (4) Legacy HVRT curve
2. Check unit names and sizes in RIOO-RS match the PSS/e and TSAT models. OEMs generally do not know how the plant is aggregated.
   The PSCAD model is not required to have the same aggregation (sometimes a different aggregation is more precise for PSCAD modeling.)
3. UDM models: Separate DLL files are required for PSS/e version 35 and PSS/e version 36.
4. Blank Templates are downloadable from: https://www.ercot.com/services/rq/re
5. Models must display a close match in the different software platforms.
   If proposing a field adjustment, per PG 5.5(6) also overlay the old model before the adjustment (either PSS/e or PSCAD).
   If submitting a pre-commissioning model per PG 5.5(4), also overlay the QSA PSS/e model.

Reminder: MOD-026-2 model submissions must meet ERCOT Planning Guide and DWG Procedure Manual requirements. Submit model updates to both ERCOT (via RIOO) and your Interconnecting TSP.

Recap, 9/12/2025 Presentation at IBRWG:
Ensuring Accurate Models During Interconnection

Background:

- Developers sometimes submit idealistic Power Plant Controller (PPC) models for FIS studies
- Later, when PPC vendor selected, models show that the site is unable to pass MQT test requirements
    - (For solar and battery facilities, PPC vendor is often different from the solar/battery inverter manufacturer.)

Solution:

- Submit realistic PPC models
- Select a PPC vendor early and ensure that the PPC-inverter combination can meet MQT requirements
- Select a PPC vendor that has validated PSCAD models readily available

Recap, RIGW Presentation – Operational AVR/PFR tests

Background:

- Facilities sometimes have difficulty passing the Automatic Voltage Regulation / Primary Frequency Response commissioning tests
- Facility technicians perform excessive control tuning during commissioning to try to and pass the tests. This tuning negatively impacts MQT, causing ERCOT to reject the updated models once submitted.

- Solution:
  - Owner can easily simulate AVR/PFR performance during the planning phase
    - Test scenarios vary from the MQT tests. Refer:
      https://www.ercot.com/files/docs/2020/12/30/IRR_AVR_testing_expectations_12302020.docx
      https://www.ercot.com/files/docs/2020/12/30/ERCOT_AVR_PSS_Test_Guideline_for_Conventional_Generators_v1.0.docx

Tips for Interconnection Modeling

- Starting Full Interconnection Study (FIS):
  1. Use a realistic power plant controller (PPC) model. Select a PPC vendor early if possible
  2. Check that the PPC-Inverter combination can pass MQT and pass commissioning tests (AVR, PFR)
     - It is easy to check AVR, PFR capability in simulations however few developers do this early in the interconnection process

- Entering QSA:
  1. Check that latest models again pass MQT, AVR, PFR, especially after incorporating updates from reactive power study or after selecting a PPC vendor

- During commissioning:
  1. Caution when making significant control adjustments. Technicians coordinate with engineering to avoid negative MQT impacts.
  2. Prepare to submit final models and Verification (due within 30 days of ERCOT approving commissioning / COD).

- During full operations:
  1. Document carefully all settings and models.

  → Sometimes there is miscommunication between engineers and OEMs about what is the latest field settings, causing incorrect model submissions. Don't rely on the OEMs to know the field settings, especially after field tuning or if the PPC vendor is different.

Thank you!

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