WECC

Proposed Role of MVS in EMT Models and Local Area EMT Studies

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Context and Purpose

Context

- EMT-related needs have been raised in recent WECC technical discussions
- Including discussions with participation from multiple entities, such as CAISO

Purpose of Today's Item

- Introduce the topic at a high level
- Gauge interest from the MVS membership
- Identify whether further discussion is warranted

Background: Why EMT Matters Now

- Rapid expansion of inverter-based resources and hybrid plants
- Fast, control-driven sub-transient dynamics not captured well by RMS models
- EMT needed for
  - Fault ride-through behavior in weak grids
  - Protection interaction

Industry Gaps and Challenges

- EMT models are primarily vendor-specific and proprietary
- No standardized methodology for local area EMT studies
- Validation process for EMT models is inconsistent across utilities
- System-wide EMT simulations are not feasible, requiring boundary definition
- Generic EMT models are emerging internationally (CIGRE WG C4.60)

Why MVS Should Lead

1. Benchmarking and Validation

- MVS can define reference conditions and benchmark cases
- Utilities and vendors can compare proprietary EMT models to open standards

2. Efficiency and Transparency

- Centralizing EMT efforts within MVS avoids fragmentation
- Open forum enables utilities, OEMs, and academia to collaborate

3. Alignment with MVS Mission

- MVS already leads RMS generic model development and validation
- EMT is a natural extension of existing responsibilities

4. Industry Alignment

- International groups are developing generic EMT models
- WECC needs to keep pace with global best practices

Proposed Scope of MVS EMT Activities

1. Parameterization and Minimum Data Requirements

- Define what EMT data utilities should request from developers
- Provide RMS < -- > EMT parameter mapping guidance

2. Benchmarking & Validation Framework

- Create standard EMT test cases (faults, SCR levels, voltage dips)
- Establish performance tolerance criteria between generic and vendor EMT models

3. EMT Study Guidance

- Define scenarios requiring EMT studies
- Provide rules for determining local EMT study boundaries
- Share best practices and lessons learned from WECC members

4. Long-Term Model Development

- Collaborate with CIGRE/IEEE/EPRI
- Support development of generic EMT models for solar, wind, BESS, hybrids
- Ensure EMT and RMS generic models remain aligned

How EMT Complements RMS Work

Key Concepts:

- RMS provides system-wide stability assessment
- EMT resolves detailed fast control dynamics
- RMS and EMT must remain consistent in structure and parameters
- Generic EMT -> better RMS verification and tuning

Benefits to WECC

1. Consistency

- Unified approach for RMS and EMT modeling
- Better alignment between planning and operational studies

2. Transparency

- Open models and shared benchmarks improve cross-utility reliability

3. Industry Alignment

- WECC aligns with CIGRE/IEEE/EPRI global initiatives

4. Future-Proofing

- Preparing for large-scale EMT requirements due to high IBR penetration
- Ensuring reliability in weak-grid scenarios and GFM deployments

Proposed Timeline and Next Steps

Short-Term (3–6 months)

- Form a small EMT working group within MVS
- Gather existing EMT use cases across WECC
- Identify priority benchmark cases

Medium-Term (6–12 months)

- Draft WECC EMT Study Guidelines
- Establish RMS–EMT parameter mapping
- Develop a standard validation process

Long-Term (1–3 years)

- Participate in international EMT model standardization
- Publish WECC EMT benchmark cases and test procedures
- Build a preliminary EMT generic model library

Questions for MVS Discussion

Should MVS formally establish an EMT-focused working group?

What should be the initial scope: Study guidelines? Benchmarking? Models?

Do members support aligning with CIGRE WG C4.60 and similar efforts?

What level of involvement do utilities expect from OEMs?

Are there specific EMT cases WECC members need immediately?

Thank you

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