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AGS-ESR Overview/Test Scenarios + Features and Overview of the Updated DMView and PMView Versions with AGS-ESR Test Capability

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Outline

- Advanced Grid Support – Energy Storage Resource (AGS-ESR) Overview
- AGS-ESR Modeling Considerations
- Overview of DMView Update and Usage
- Overview of PMView Update and Usage
- Additional Tools

AGS-ESR – Dates and Updated Requirement Information

- Effective date for the approved NOGRR272 and PGRR121: December 1, 2025
- Key requirements relevant to AGS-ESR Requirements
  - Planning Guide Section 6.2(5)(c): Model Quality Test
  - Nodal Operating Guide Section 2.14: Operating Requirements
  - DWG Procedure Manual
    - Updated language, especially for mixed-technology types: section 3.1.5
    - Test setups + required results: section 3.1.5.10
    - Model Quality Test (MQT) specification and performance guidelines: sections 3.1.5.11 – 3.1.5.15
    - Updated Unit Model Validation (UMV) language: section 3.1.6

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ERCOT DWG Procedure Manual[1] Section 3.1.5

Some tests are specific to Advanced Grid Support Energy Storage Resources (AGS-ESR), while other tests are specific to Resources required to comply under the "Preferred" ride through curves of Nodal Operating Guide 2.9.1.1. For mixed facilities (those consisting of AGS-ESR and non-AGS-ESR, or alternatively, those consisting of units subject to "Legacy" and units subject to "Preferred" requirements) only the portion of the facility subject to the new requirement will be evaluated under the new performance requirements, however the entire facility must be tested under all applicable requirements. ERCOT will review terminal quantity plots as well as POI quantity plots to confirm capability.

Language regarding AGS-ESR technologies

Updated Test Table

List of Applicable Tests

Applicable Technologies	Models	Tests and Sections	Notes
Synchronous Machines (incl. transmission-level synchronous condensers)	PSS/e (and TSAT, and PSCAD if utilizing a UDM in PSS/e model)	1. Flat-start, 3.1.5.2 2. Small volt. disturbance, 3.1.5.3 3. Large volt. disturbance, 3.1.5.6 4. Small frequency disturbance, 3.1.5.7	
IBRs, WGRs, and IBTEs (all non AGS-ESR) (Resources that include a synchronous condenser would also run these tests.)	PSS/e and PSCAD (and TSAT if utilizing a UDM PSS/e model)	1. Flat-start, 3.1.5.2 2. Small volt. disturbance, 3.1.5.3 3. Small frequency disturbance, 3.1.5.7 4. Large voltage dist.: a. LVRT Test†, 3.1.5.4 b. HVRT Test‡, 3.1.5.5 5. System Strength, 3.1.5.8 6. Phase Angle Jump, 3.1.5.9	Phase Angle Jump is only required in PSCAD (not in PSS/e and TSAT)
AGS-ESR* (Energy storage with Advanced Grid Support)	PSS/e and PSCAD (and TSAT if utilizing a UDM PSS/e model)	1. Flat-start, 3.1.5.2 2. AGS Small volt. disturbance, 3.1.5.11 3. AGS Frequency change and inertia response , 3.1.5.12 4. Large voltage dist.: a. LVRT Test†, 3.1.5.4 b. HVRT Test‡, 3.1.5.5 5. AGS System Strength,3.1.5.13 6. AGS Phase Angle Jump, 3.1.5.14 7. AGS Loss of synchronous machine, 3.1.5.15	All tests, except Phase Angle Jump, are required in both PSS/e and PSCAD (and TSAT, if UDM).

[1]source: https://www.ercot.com/files/docs/2025/06/06/DWG-Procedure-Manual-Revision-24-ROS.docx

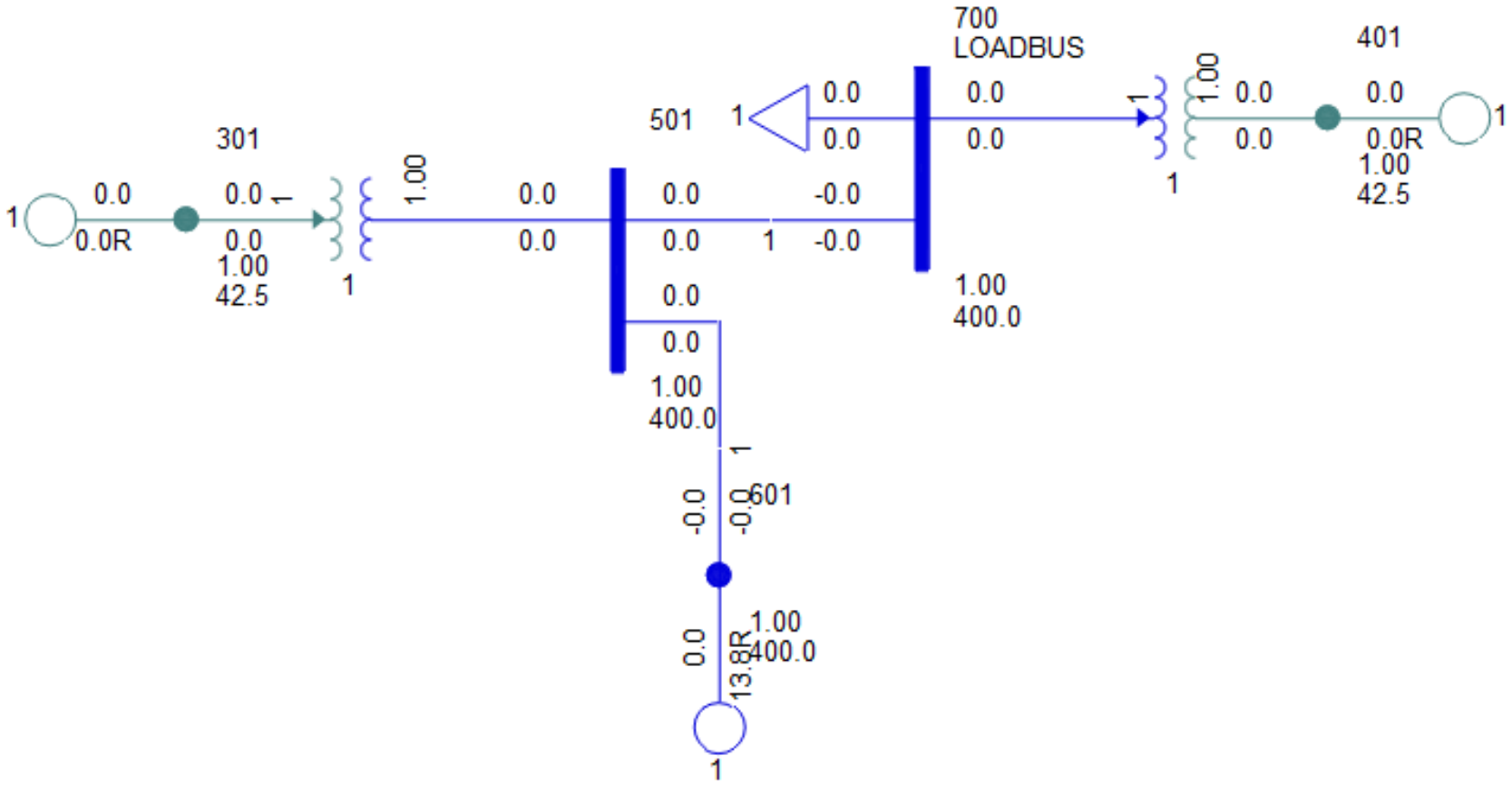
PSS/e Version 35 to Version 36 Transition

- DWG procedure manual section 3.1.1 summarizes the current transition from PSS/e version 35 to version 36
  - Version 36 compatible models need to be provided by IEs/REs prior to 06/01/2026, “earlier is better”
  - Version 35 compatible models need to be provided until the full transition to a v36 flat start case build is complete

- Applicability to AGS-ESR
  - There are no GFM library/generic models available in PSS/e v35
  - Because of this, ERCOT may allow flexibility regarding the use of v35 User Defined Models (UDMs) for FIS/additional studies during this transition period as we are aware of the possibility of a later switch to a v36 generic model
    - This could result in discrepancies between v35 UDM and v36 implementations
    - TSAT model submission considerations need to be taken into account for meeting the QSA requirements
    - ERCOT and the relevant TSP will ensure good correspondence between the UDM and the v36 generic model responses in order to be acceptable

Overview of DMView Update and Usage

DMView v3.5 Setup - Example



Overview of DMView Update and Usage

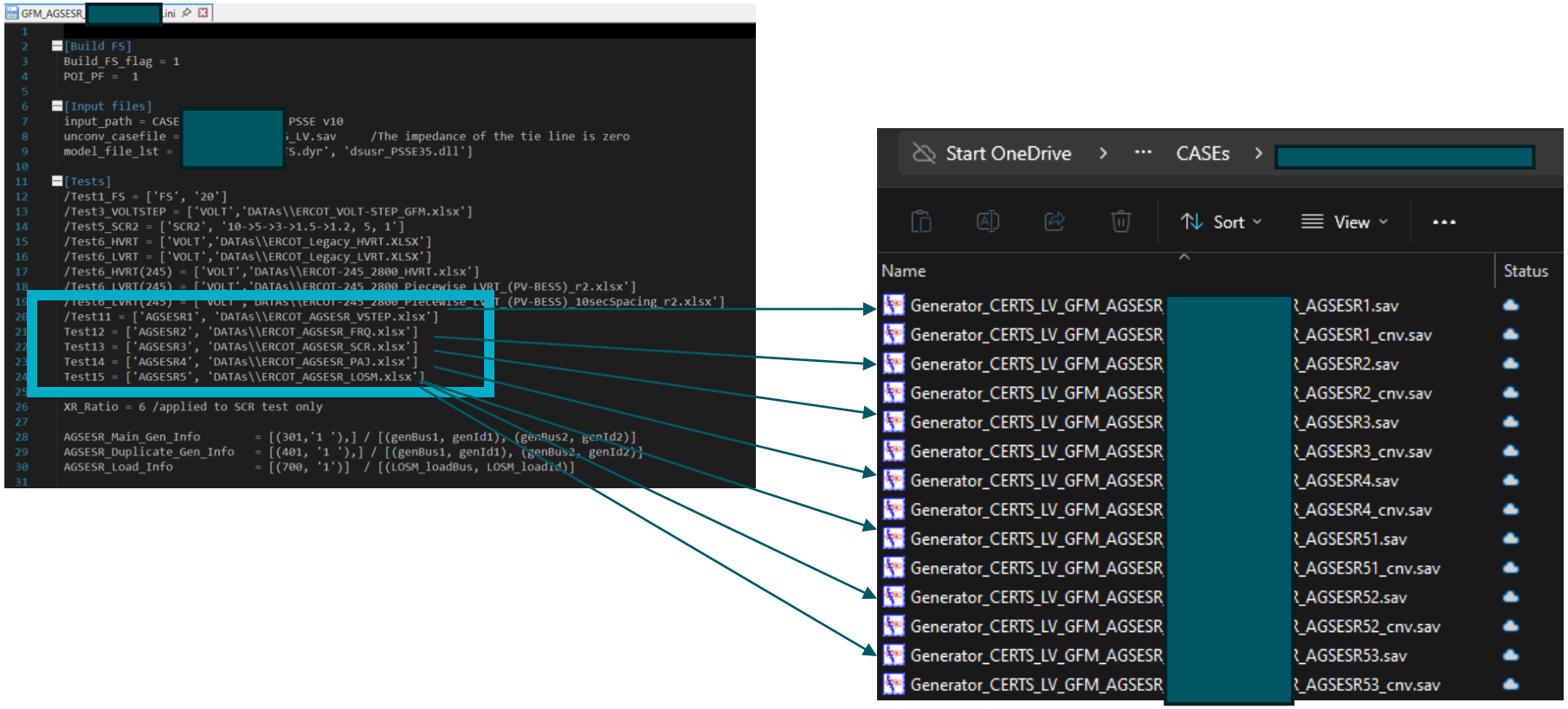
- INI file configuration

GFM_AGSESR[redacted].ini

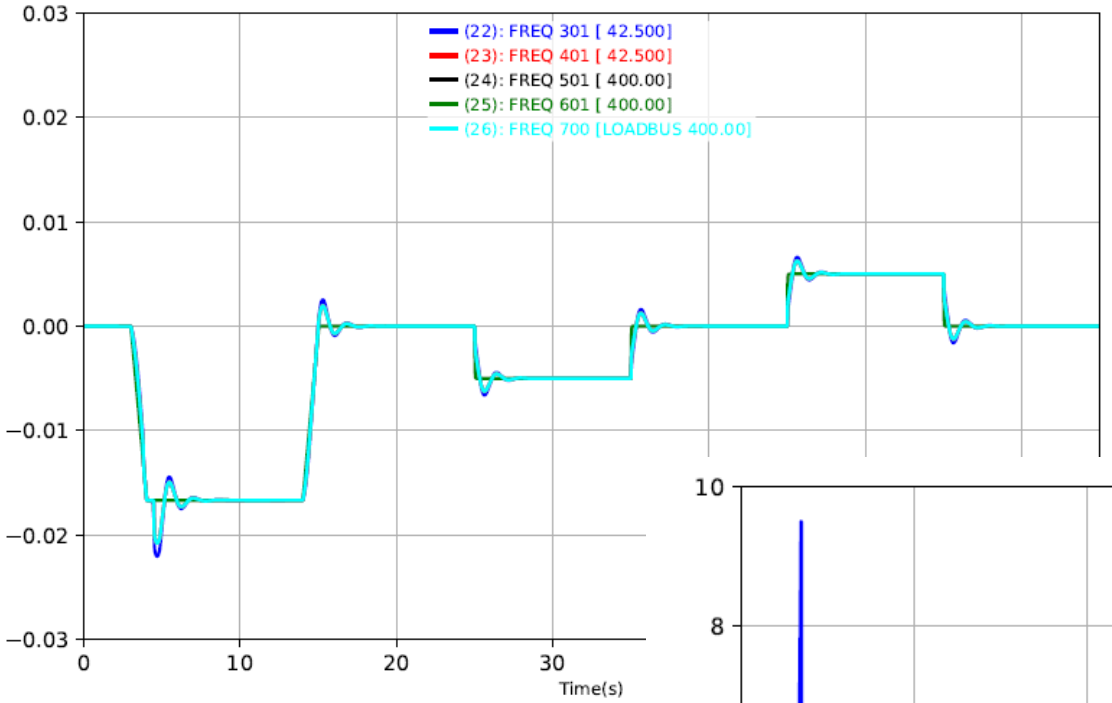
```
[Build FS]
Build_FS_flag = 1
POI_PF =  1

[Input files]
input_path = CASEs\GFM E-STATCOM PSSE v10
unconv_casefile = Generator_CERTS_LV.sav     /The impedance of the tie line is zero
model_file_lst = ['Generator_CERTS.dyr', 'dsusr_PSSE35.dll']

[Tests]
/Test1_FS = ['FS', '20']
/Test3_VOLTSTEP = ['VOLT','DATAs\\ERCOT_VOLT-STEP_GFM.xlsx']
/Test5_SCR2 = ['SCR2', '10->5->3->1.5->1.2, 5, 1']
/Test6_HVRT = ['VOLT','DATAs\\ERCOT_Legacy_HVRT.XLSX']
/Test6_LVRT = ['VOLT','DATAs\\ERCOT_Legacy_LVRT.XLSX']
/Test6_HVRT(245) = ['VOLT','DATAs\\ERCOT-245_2800_HVRT.xlsx']
/Test6_LVRT(245) = ['VOLT','DATAs\\ERCOT-245_2800_Piecewise_LVRT_(PV-BESS)_r2.xlsx']
/Test6_LVRT(245) = ['VOLT','DATAs\\ERCOT-245_2800_Piecewise_LVRT_(PV-BESS)_10secSpacing_r2.xlsx']
Test11 = ['AGSESR1', 'DATAs\\ERCOT_AGSESR_VSTEP.xlsx']
Test12 = ['AGSESR2', 'DATAs\\ERCOT_AGSESR_FRQ.xlsx']
Test13 = ['AGSESR3', 'DATAs\\ERCOT_AGSESR_SCR.xlsx']
Test14 = ['AGSESR4', 'DATAs\\ERCOT_AGSESR_PAJ.xlsx']
Test15 = ['AGSESR5', 'DATAs\\ERCOT_AGSESR_LOSM.xlsx']

XR_Ratio = 6

AGSESR_Main_Gen_Info        = [(301,'1 '),] / [(genBus1, genId1), (genBus2, genId2)]
AGSESR_Duplicate_Gen_Info   = [(401, '1 '),] / [(genBus1, genId1), (genBus2, genId2)]
AGSESR_Load_Info            = [(700, '1')]  / [(LOSM_loadBus, LOSM_loadId)]
```

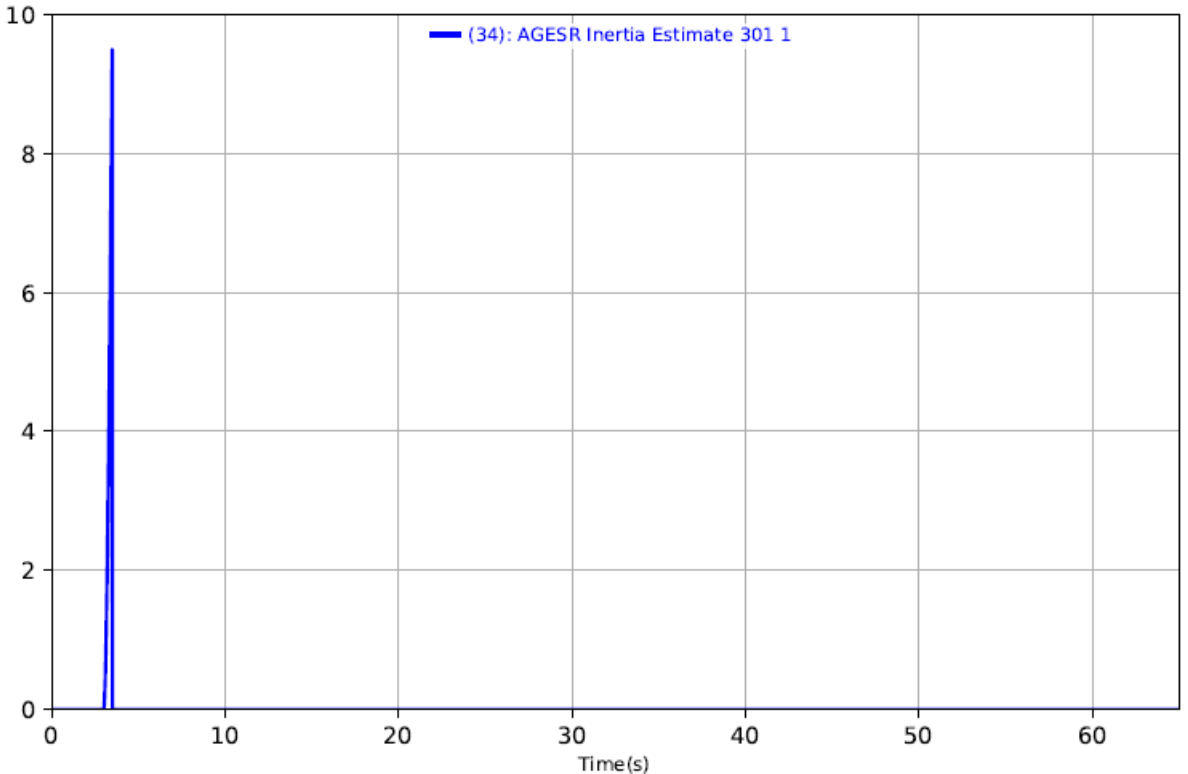
Overview of DMView Update and Usage

- Case Files



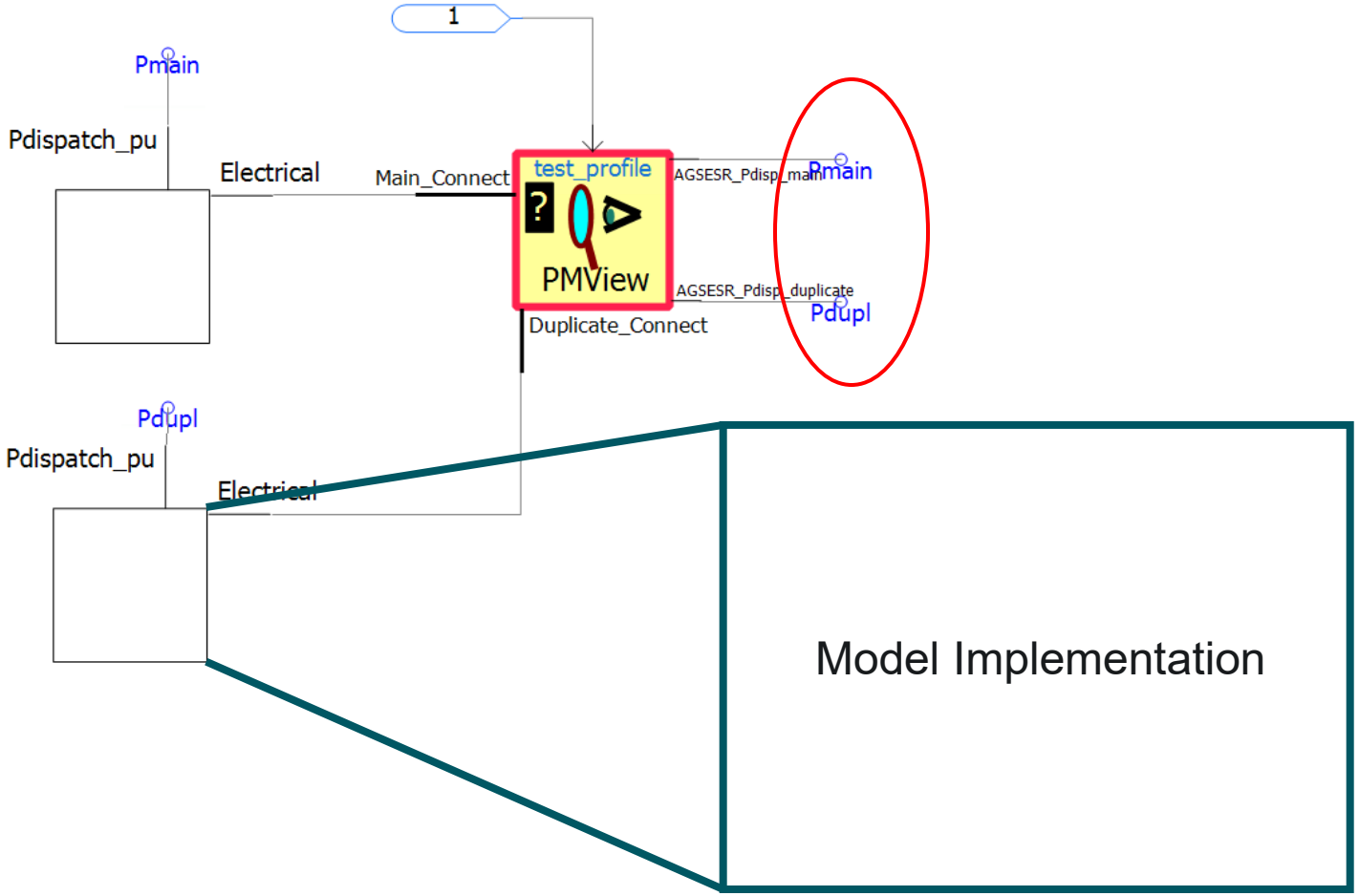
Overview of DMView Update and Usage





Overview of PMView Update and Usage

PMView v3.5 Setup - Example



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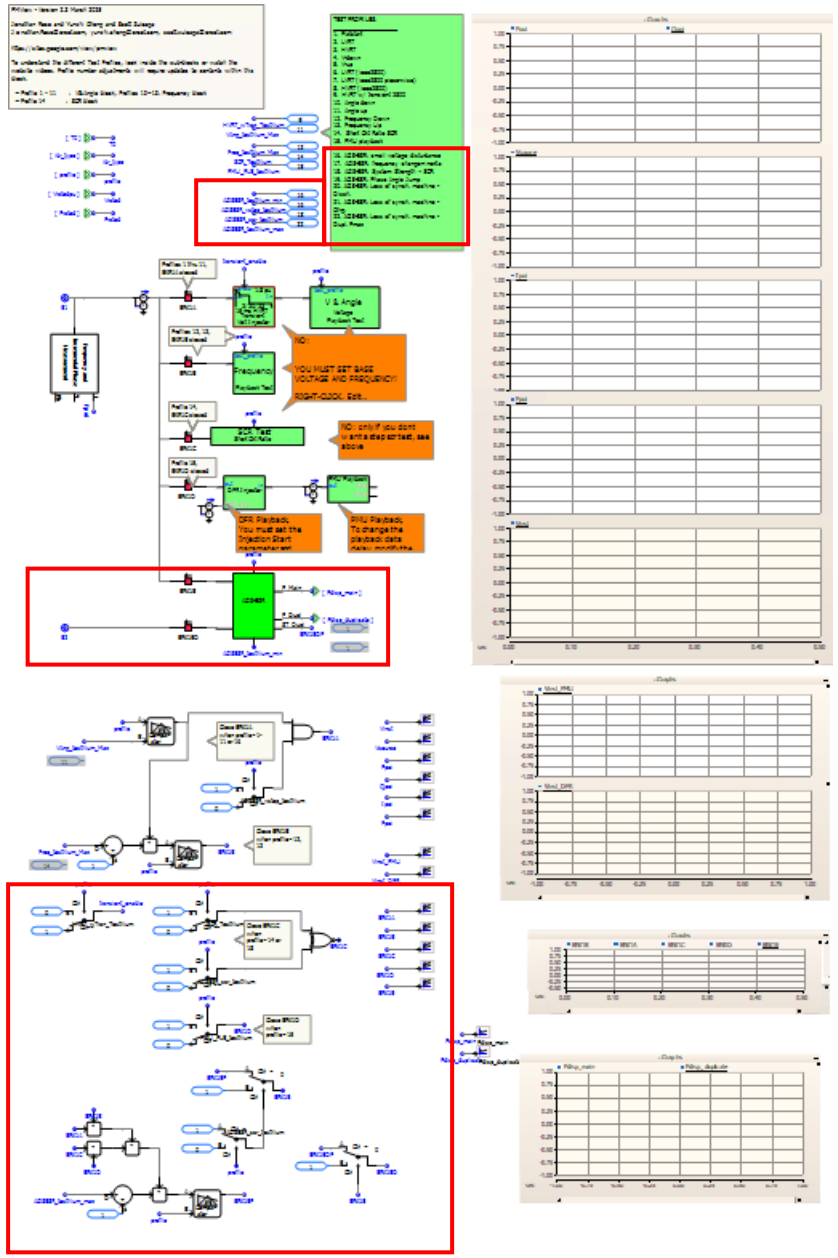
Overview of PMView Update and Usage



Additional PSCAD Automation + Plotting

- These are being used internally, possible external release based on interest and additional considerations:
  - automateMQT_savePlots*.py -> automates PSCAD, combines each simulation's .out files into a csv (convenient for HD space + *you* can easily plot with another tool)
  - agsesr_plots*.py (plots POI + specified AGS-ESR quantities)
  - agsesr_plots_*_pscadPsseOverlay.py (plots PSS/e – PSCAD overlays)

Example Plots

Thank you!

Comments or questions?

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