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| RRGRR Number | [021](http://www.ercot.com/mktrules/issues/RRGRR021) | RRGRR Title | Dynamic Model Requirement for TSAT |
| Date Posted | September 18, 2019 |
| Requested Resolution  | Normal |
| Resource Registration Glossary Sections Requiring Revision  | Section 2, Resource Registration Glossary — ProtectionSection 2, Resource Registration Glossary — Miscellaneous |
| Related Documents Requiring Revision/Related Revision Requests | None |
| Revision Description | This Resource Registration Glossary Revision Request (RRGRR) adds new data requirements to the Resource Registration Glossary to account for submittal requirement fields for dynamic models required by the Transient Security Assessment Tool (TSAT) that could be implemented for ERCOT Real-Time operations.  |
| Reason for Revision |  Addresses current operational issues. Meets Strategic goals (tied to the [ERCOT Strategic Plan](http://www.ercot.com/content/wcm/lists/144926/ERCOT_Strategic_Plan_2019-2023.pdf) or directed by the ERCOT Board). Market efficiencies or enhancements Administrative Regulatory requirements Other: (explain)*(please select all that apply)* |
| Business Case | The TSAT data submittal requirements are currently described in item (4)(b)(v) of Planning Guide Section 5.7.1, All-Inclusive Generation Resource Data Requirements. The inclusion of this information into the Resource asset registration process will allow ERCOT to implement the TSAT (Powertech DSA Tool) in Real-Time operations. TSAT will calculate dynamic stability related Generic Transmission Limits (GTLs) in Real-Time and help the operators to maintain system reliability and also effectively manage the Generic Transmission Constraints (GTCs) for changing system conditions. The current process for GTL calculation involves off-line studies that are based on system condition (snapshot) that represent a worst case scenario. The recent increase in the renewable generation penetration has increased the number and the complexity of the GTCs and it is becoming difficult to manage using the current off-line study process.  |
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| Market Segment | Not applicable |

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| Proposed Guide Language Revision |

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| **RARF Tab** | **Wind** | **Solar Photovoltaic (PV)** | **Conventional Generation (Gen)** | **Combined Cycle (CC)** | **Load Resources** | **Distributed Generation** | **Notes** | **Field Name** | **Definition / Detailed Description** | **Screening Study (SS) (R, C, O, A)** | **Full Interconnect Study (FIS) (R, C, O, A)** | **Planning Model(R, C, O, A)**  | **Full Registration (R, C, O, A)**  |  |
| **Protection** |
| Protection | X | X | X | X |   |   | List | Unit Name | Unit Code as provided on the Unit Info tab. |   | R | R | R |   |
| Protection | X |   |   | X |   |   | Automatic | SITE\_CODE | Site Code as provided on the General and Site Information tab. |   |   |   | A |   |
| Protection | X | X | X | X |   |   | Automatic | Resource Name (Unit Code/Mnemonic) | Concatenated mnemonic of Resource Site Code and Unit name (e.g. CBY\_CBYG1). |   |   | A | A |   |
| Protection | X | X | X | X |   |   | cycles | Breaker Interruption Time | Time taken (in cycles) between the breaker receiving the trip signal, and the breaker contacts opening to interrupt the flow of current. |   | R | R | R |   |
| Protection | X | X | X | X |   |   | p.u. | Instantaneous Undervoltage Trip | The per unit value (below nominal) of the undervoltage relay instantaneous set point. |   | O | O | O |   |
| Protection | X | X | X | X |   |   | p.u. | Undervoltage 1 | Enter the first level undervoltage relay set point in per unit. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 1 | Enter the first level undervoltage time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | p.u. | Undervoltage 2 | Enter the second level undervoltage relay set point in per unit. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 2 | Enter the second level undervoltage time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | p.u. | Undervoltage 3 | Enter the third level undervoltage relay set point in per unit. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 3 | Enter the third level undervoltage time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | p.u. | Undervoltage 4 | Enter the fourth level undervoltage relay set point in per unit. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 4 | Enter the fourth level undervoltage time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | p.u. | Instantaneous Overvoltage Trip | The per unit value (above nominal) of the overvoltage relay instantaneous set point. |   | O | O | O |   |
| Protection | X | X | X | X |   |   | p.u. | Overvoltage 1 | Enter the first level overvoltage relay set point in per unit. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 1 | Enter the first level overvoltage relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | p.u. | Overvoltage 2 | Enter the second level overvoltage relay set point in per unit. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 2 | Enter the second level overvoltage relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | p.u. | Ovrvoltage 3 | Enter the third level overvoltage relay set point in per unit. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 3 | Enter the third level overvoltage relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | p.u. | Overvoltage 4 | Enter the fourth level overvoltage relay set point in per unit. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 4 | Enter the fourth level overvoltage relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | Hz | Instantaneous Underfrequency Trip | The per unit value (below 60Hz) of the underfrequency relay instantaneous set point. |   | O | O | O |   |
| Protection | X | X | X | X |   |   | Hz | Underfrequency 1 | Enter the first level underfrequency relay set point in Hz. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 1 | Enter the first level underfrequency relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | Hz | Underfrequency 2 | Enter the second level underfrequency relay set point in Hz. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 2 | Enter the second level underfrequency relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | Hz | Underfrequency 3 | Enter the third level underfrequency relay set point in Hz. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 3 | Enter the third level underfrequency relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | Hz | Underfrequency 4 | Enter the fourth level underfrequency relay set point in Hz. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 4 | Enter the fourth level underfrequency relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | Hz | Instantaneous Overfrequency Trip | The per unit value (above 60Hz) of the overfrequency relay instantaneous set point. |   | O | O | O |   |
| Protection | X | X | X | X |   |   | Hz | Overfrequency 1 | Enter the first level overfrequency relay set point in Hz. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 1 | Enter the first level overfrequency relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | Hz | Overfrequency 2 | Enter the second level overfrequency relay set point in Hz. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 2 | Enter the second level overfrequency relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | Hz | Overfrequency 3 | Enter the third level overfrequency relay set point in Hz. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 3 | Enter the third level overfrequency relay time delay set point.  |   | C | C | C |   |
| Protection | X | X | X | X |   |   | Hz | Overfrequency 4 | Enter the fourth level overfrequency relay set point in Hz. |   | C | C | C |   |
| Protection | X | X | X | X |   |   | sec | Time 4 | Enter the fourth level overfrequency relay time delay set point.  |   | C | C | C |   |
| Protection | X |   |   |   |   |   | Y/N | Does the resource have the manufacturer's technical document / Simulation Results / Test Results, etc. describing the turbine technology & VRT optIons purchased with turbine, if any | TURBINE VRT CAPABILITY: Ensure that VRT capability is included as part of the normal dynamic model data submitted. If yes, provide the following: (1) the PSS/E dynamic model including the settings, (2) the TSAT dynamic model including the settings and (3) technical manufacturer’s documents describing the VRT capabilities of the purchased packages. Models and documents are to be embedded in the RARF Dynamic Data tab or included in the zip file. |   | R | R | R |   |
| Protection | X |   |   |   |   |   | Y/N | Does the Resource use dynamic reactive devices (SVC/statcom, etc.) at the wind farm? - (note: capacitor/reactor banks used for conventional reactive support cannot be considered as dynamic reactive devices) - If yes, please provide supporting documentation. (manufacturer's technical document, PSS/E model, TSAT model etc.), submitted in the Dynamics Data Tab. | TURBINE VRT CAPABILITY: If yes, provide the following (1) the PSS/E dynamic model for the Dynamic Reactive Device (SVC,DVAR,STATCOM), including the settings, (2) the TSAT dynamic model for the Dynamic Reactive Device (SVC, DVAR, STATCOM), including the settings, and (3) a manufacturer's technical document describing the dynamic device and model. Models and documents are to be embedded in the RARF Dynamic Data tab or included in the zip file. |   | R | R | R |   |
| Protection | X |   |   |   |   |   | Y/N | Does the Resource have plant voltage protection? If yes, please provide supporting documentation. | TURBINE VRT CAPABILITY: Plant voltage protection is substation main power transformer and equipment protection, If yes, provide a technical description of the protection scheme and voltage settings. The documents are to be embedded in the RARF Dynamic Data tab or included in the zip file. |   | R | R | R |   |
| Protection | X |   |   |   |   |   | Y/N | Does The Resource Have Feeder Voltage Protection? If Yes, Please Provide Supporting Documentation. | TURBINE VRT CAPABILITY: Feeder voltage protection is protection on the feeder breakers, If yes, provide a technical description of the protection scheme and voltage settings. The documents are to be embedded in the RARF Dynamic Data tab or included in the zip file. |   | R | R | R |   |

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| **Miscellaneous** |
| One Line | X | X | X | X | X | X |   | Embed a PDF or CAD One Line Diagram | Include a PDF or CAD One Line Diagram of the site |   | R | R | R |   |
| One Line | X | X | X | X | X | X |   | Date One-Line Diagram last Updated | Date One-Line Diagram last Updated |   | R | R | R |   |
| Transformer Test Data | X | X | X | X |   | X |   | Transformer Test Data | Include the Transformer Test Data Report attached to the service request for the submission of this RARF, stating positive and zero sequence resistance and reactance data, winding voltages, tap information, on-load tap changing capability, ratings and winding DC resistance in Ohms per phase. |   |   |   | R |   |
| Transformer Test Data | X | X | X | X |   | X |   | Date transformer test Data last Updated | Date transformer test Data last Updated |   |   |   | R |   |
| PSCAD Model | X | X | X | X |   |   |   | Embed a PSCAD Model (if applicable) | PSCAD Model for SSO studies as may be required by ERCOT. |   | C | C | C |   |
| PSCAD Model | X | X | X | X |   |   |   | Date PSCAD Model last Updated | Date PSCAD Model last Updated |   | C | C | C |   |
| Dynamic Data | X | X | X | X |   |   |   | Embed Dynamic Data  | Model data (in current PSS/E format utilized by the DWG), with appropriate values provided for all model parameters, test reports that support the model data based on field/commissioning tests (if available), model libraries in .dll or .obj file format (if using user defined models not included in the PSS/E standard model library), and model documentation/user guides (if using user defined models not included in the PSS/E standard model library). Refer to DWG Procedure Manual for requirements. |   | R | R | R |   |
| Dynamic Data | X | X | X | X |   |   |   | Date Dynamic Data last Updated | Date Dynamic Data last Updated |   | R | R | R |   |
| Dynamic Data | X | X | X | X |   |   |   | Embed TSAT Dynamic Data  | Model data (in current standard PSS/E library model format utilized by the DWG and supported by TSAT), with appropriate values provided for all model parameters, test reports that support the model data based on field/commissioning tests (if available), model libraries in TSAT UDM or .dll file format if using user defined models not included in the TSAT standard model library - the TSAT UDM or .dll shall be able to read the PSS/E format data, and model documentation/user guides if using user defined models not included in the TSAT standard model library.  |   |  | R | R |  |
| Dynamic Data | X | X | X | X |   |   |   | Date TSAT Dynamic Data last Updated | Date TSAT Dynamic Data last Updated |   |  | R | R |   |