Update to MA TSRG: IEEE 1547-2018 Adoption Subgroup

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Current Subgroup Progress on Glide Path

- Phase I:
  - Bulk System Support Planned for Completion by December 2020
    - Recommended Ride Through Category Selection, frequency droop, trip settings
  - Major Discussions of most items complete
  - Brief Communications Discussion scheduled to start November
- Phase II:
  - Identifying Hurdles to Full DER functionality adoption (DER voltage regulation functions such as Volt/VAR)
  - Hurdles can include but are not limited to: Lack of accurate DER models
- Phase III:
  - Full Adoption of Advanced Functions – Discussions to come.

The Glide Path: Building a House and Solid Foundation

Phase 1: Foundation – DER Participation in Bulk System Events

- Fault Response & Ride Through Category Selection
- Voltage & Frequency Trip settings Selection
- Frequency-droop Selections
- Understanding Distribution System Impacts of Bulk Grid Support Functionality
  - Islanding Risk Increase
  - Fault Detection Concerns
- Power Quality Requirements for DERs
- Basic Communication Recommendations for Interoperability
- Most advanced functions turned OFF

Phase 2: Identify & Overcome Hurdles to High-Penetration DERs & Advanced Function Adoption

* Attain Adequate DER Models

* Gain experience with advanced inverter functions & their benefits

* etc.

*Test utilization of advanced functions

Phase 3: Fully Adopt Advanced Functions

*Select Defaults for Grid Benefits

*Use Advanced Functions to Improve Grid Performance

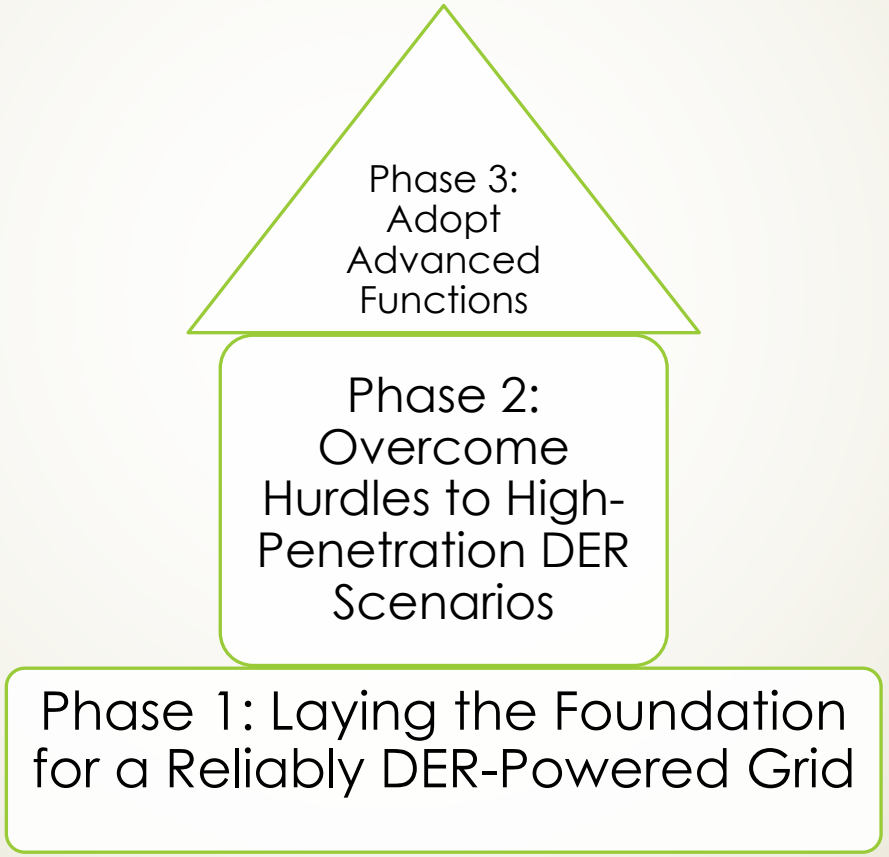
*etc.

Adopt Advanced Functions

Overcome Hurdles to High-Penetration DER Scenarios

Laying the Foundation for a Reliably DER-Powered Grid

The Glide Path: Building a House and Solid Foundation



Recent Discussions

- Voltage Trip Settings – these impact:
  - Risk of islanding screens
  - Arc flash (safety)
  - Bulk system stability (possibility of blackouts)
  - Power Quality
- Category Selection – this impacts:
  - Bulk system stability (possibility of blackouts)
  - DER behavior during faulted conditions (and how we protect the system around them)
  - Rate-of-change-of-frequency ride through – impacts islanding risk
- Frequency Droop
  - Can improve bulk system stability
  - Can increase islanding risk
- Glide Path to full adoption (house analogy)
  - When DERs may/shall meet IEEE 1547-2018
  - Settings required & legacy devices
    - Foundational (Phase I) items need to be complete before this guidance can be provided

Excel Sheet – Power Quality Recommendations

IEEE 1547-2018 Adoption Subgroup Summary

- Power Quality, Enter Service, RPA complete
- Expected December Completion:
  - Abnormal Conditions Categories (I, II, III)
  - Frequency Droop Settings
  - Voltage Trip Settings
  - Frequency Trip Settings
- Voltage regulation discussion (Clause 5) will begin Oct 7th
- Glide Path / Hurdles to full implementation / Phase II, III adoption milestones, dates, & needs under discussion
- A brief on communications is expected Nov 4th

Questions?