

“DER Ride Through”

DER Ride Through and Trip Settings and IEEE standard 1547-2018

Includes Problem/Opportunity Statement

Issue Source

PJM

Stakeholder Group Assignment

The work is technical, and will require full-day workshops with stakeholders that cannot be done as part of the existing Standing Committee meetings. Additionally, it will be helpful to have a separate listserv and website for document sharing. Therefore, the work will be assigned to a new Task Force reporting to the Planning Committee, under the name *DER Ride Through Task Force*.

Electrical safety and reliability, especially on the distribution system, are the first priority of this Task Force.

Key Work Activities

1. Review and provide education on the new IEEE 1547 – 2018 standard, specifically the portion of the standard that details new Category I, Category II, and Category III voltage and frequency ride through and trip settings.
2. Convene technical workshop(s) to discuss and debate the merits of Category I, Category II, or Category III and the adjustable trip settings therein.
3. Identify areas and promote understanding of the differences between retail distribution system realities with regard to DER ride through activities and wholesale DER ride through activities and impacts.
4. Promote understanding of activities, processes and initiatives underway or contemplated in other jurisdictions. To the extent available, informational updates on implementation progress within PJM and elsewhere will be provided. The Task Force will invite distribution utilities and state/local regulators to present wherever possible.
5. Develop technical recommendations addressing the implementation of DER ride through and trip provisions of IEEE 1547-2018 to be applied to wholesale DER interconnecting under FERC jurisdiction¹.
 - a. For the purposes of this effort, Distributed Energy Resource (DER) means a generation resource or electric energy storage resource connected to radial distribution at voltage < 50 kV.

¹ FERC has jurisdiction over DER interconnections in two circumstances: 1) a DER that is interconnecting to a distribution facility over which there is prior FERC-jurisdictional service in order to make wholesale sales into the PJM markets (18 U.S.C. § 824(b); or 2) a Qualifying Facility (“QF”), as that term is defined in the Public Utility Regulatory Policy Act of 1978, interconnecting to the distribution system, that seeks to make wholesale sales into the PJM markets. For more detail see <http://www.pjm.com/-/media/committees-groups/committees/mrc/20160617-special/20160617-item-03-jurisdictional-over-interconnection-of-generation-onto-distribution-facilities.ashx>

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- b. PJM does not intend any changes to ride through or trip requirements for existing generators. The Task Force will need to consider what this means for the replacement of equipment (for example, inverters) at existing generators.
6. Produce a technical findings document that may be provided to local jurisdictions for informational purposes as such jurisdictions and electric distribution companies explore ways to implement the ride through and trip provisions of IEEE 1547-2018.
7. Given the results of Activities 1-6, identify if any changes to the PJM manuals, or other applicable PJM governing documents are warranted.

Expected Deliverables

1. Develop technical recommendations addressing the implementation of the ride through and trip provisions of IEEE 1547-2018 to be applied to wholesale DER interconnecting under FERC jurisdiction.
 - a. While PJM's goal is to specify a single PJM-wide IEEE 1547-2018 profile consisting of an abnormal voltage and frequency performance category and specified trip setting boundaries, if adjusted from the defaults. It is probably more practical to focus on identifying minimum acceptable ride through and trip times for wholesale DER. The Task Force will also need to consider options should this goal be unable to be realized.
2. For DER interconnecting under state jurisdiction, the task force may consider limiting the scope to providing recommendations for consideration for minimum acceptable ride-through and trip times, and defer to distribution utilities on the specific implementation and/or performance category.
3. Develop a technical profile² implementing the ride through and trip provisions of IEEE 1547-2018. If it is determined by the appropriate committees that manual language is warranted, it will be subject to stakeholder process endorsement.
4. Produce a Technical document, including the above technical profile, and also describe results of the process, as well as present any justifications and conclusions to the Planning Committee for consideration of inclusion in any PJM governing document(s).
5. The resulting technical document deliverable may be provided to States, local regulators, and utilities for informational purposes to inform state and local jurisdictions of the process PJM has initiated and may be used as a data point in its efforts to address the appropriate implementation of the new IEEE 1547-2018 standard for DER interconnecting under state jurisdiction.
 - a. The objective is to foster "coordination" of the Bulk Electric System activities with any state retail distribution activities, as required by the standard, to the best extent possible, and where applicable³. This PJM document will include the stakeholder-endorsed technical profile, as

² The technical profile consists of a list of settings that inverter manufacturer can load on all inverters targeted for sale and adoption in the PJM territory.

³ E.g., see IEEE standard 1547-2018, clause 6.4.1, Mandatory Voltage Tripping Requirements. "Area EPS operators may specify values within the specified range subject to the limitations on voltage trip settings specified by the regional reliability coordinator."

reference, however the PJM Technical guidance document itself will not be subject to stakeholder process endorsement. In producing this technical guidance document, stakeholders will have an opportunity to provide initial input, review drafts, and provide comments.

- b. PJM will publish a 'best practice' document. Stakeholders will have an opportunity to provide initial input, review drafts, and provide comments on this 'best practice' document.

Decision-Making Method

Tier 1, consensus (unanimity) on a single proposal for ride through and trip provisions for DER.

Out of Scope Items

- The differences between Retail DER (e.g., net metered solar) and Wholesale DER will be discussed during the development of the DER Ride Through Guidance Document that ultimately may be provided to state and local regulators for informational purposes. However, DER that interconnects under state jurisdiction, including but not limited to, net metered DER and wholesale DER interconnecting to distribution lines not subject to a FERC Tariff, are not subject to or bound by any resulting PJM initiatives, rules, or activities developed under this process. Therefore, this Task Force cannot make any PJM rules that are applicable to retail DER.
- Provisions of IEEE 1547-2018 other than ride through and trip parameters under abnormal conditions are out of scope. This includes other functions like voltage control or reactive power capability, communications, and ramp limits.
- Ride through and trip settings for generators connecting to BES transmission lines, to lines of voltage > 50 kV, or to meshed⁴ subtransmission lines.

Expected Duration of Work Timeline

Completion is targeted for Q3 2019, with a start date of November 2018.. The timeline will be reviewed and extended as necessary.

Priority Level: High – Medium

- Not an immediate risk to reliability, but growing rapidly as more and more DER connect to the power system.
- With publication of IEEE 1547-2018 revision, state and local implementation, including ride through requirements, is expected in 2019 and 2020.

Timing: Mid-Term

- IEEE 1547-2018 recently finalized, but testing certification for mass-market inverters is not expected to be ready until 2021

⁴ "Meshed" subtransmission facilities, also referred to as "networked" subtransmission, are subtransmission facilities that are not operated radially—that is, they are operated with a connection to the bulk power system on more than one end, similar to high-voltage transmission facilities.

Meeting Frequency: Quarterly or less often with monthly or twice-monthly phone calls

- Technical workshops envisioned to be quarterly or less frequently.

Start Date	Priority Level	Timing	Meeting Frequency
	<input type="checkbox"/> High <input type="checkbox"/> Medium <input type="checkbox"/> Low	<input type="checkbox"/> Immediate <input type="checkbox"/> Near Term <input type="checkbox"/> Far Term	<input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Quarterly