Business & Technology Advisory

June 2020

IEEE Standard 1547.1-2020 Approved

Now Available to the Public

Key Highlights

- IEEE 1547.1-2020, the Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces, has now been approved and published.
- This standard complements the base standard IEEE 1547-2018, which specifies set up and performance requirements for DER Interconnections. IEEE 1547.1-2020 sets forth how to test and verify that systems will perform as expected.
- Cooperatives will need to understand the Standard and determine how to best implement it for their operations.

What has changed?

IEEE 1547.1-2020 is the Standard Conformance Test Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces, otherwise known simply as *Dot 1* or *the Testing Standard*. It is a companion standard to the base standard of IEEE 1547-2018, which is the Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces. The base standard tells us how the systems need to be set up and perform, and the considerations that go into this. Dot 1 tells us how to test and verify that the systems will perform as expected.

What is the impact on cooperatives?

Testing under this latest revision to Dot 1 lines up with the requirements outlined by the base standard. Because the base standard itself is much broader and more comprehensive than the original standard published in 2003, the test standard likewise had to become more complex and comprehensive to cover the full range of possibilities. As one measure, the original Dot 1 (published in 2005) was 63 pages. This revised and updated edition is approximately 280 pages.

Components of this new Standard include:

- **Clauses 1-4:** The first four clauses apply to both manufacturers and co-ops (approximately 16 pages);

  Co-ops should review the first four clauses for an overview of the standard including Scope, Purpose and Limitations. Definitions, Abbreviations and General Requirements are included here as well.

These clauses include requirements for Product Information, Test Reports, Testing Equipment Requirements, and requirements for Intentional Island-Capable DER and Devices.

- **Clause 5 – Type Tests Section:** The section on Type Tests is primarily for manufacturers and is over 100 pages. It can also be useful in understanding how equipment should function under laboratory conditions.

- **Clause 6 – Interoperability Tests** (approximately 5 pages) applies mainly to manufacturers, but can also be used with installed equipment.

  The main purpose of the Interoperability Tests is to ensure that signals sent through the DER communication interface are acted on properly. Such tests may be carried out independently or in conjunction with functional testing covered in Clauses 5.4 - 5.15.

- **Clause 7 – Production Tests** is exclusively for manufacturers. Production Tests require the use of a recognized testing agency to perform trip tests.

- **Clause 8 – DER Evaluations and Commissioning Tests** (80 pages) deals directly with the topic of greatest interest to co-ops, since it deals directly with DER units that are (or will be) deployed on distribution systems. The section includes:

  - Description of four different basic systems and specification of all the tests needed to complete design and commissioning for each system. The categories are broad enough that one of them will likely cover any potential co-op scenario, from basic systems interfaced at member services to production type facilities, such as solar farms.

  - Description of verification processes, DER design evaluations, and as-built evaluations.

  - Description of Basic and Detailed commissioning tests.

  - A checklist and other testing and/or design and evaluation procedures required for all connected DER and related equipment. The Reference Point of Applicability (RPA) is key here, which is the location where the interconnection and interoperability performance requirements in IEEE 1547-2018 apply.

  - Identification of four types of increasingly complex DER connections with tables for each different type of test or check to be performed for the particular type of connection. The simplest type is that of a Point of Connection (PoC) Unit, where a DER connects directly to the Electric Power System (EPS) and the PoC is the RPA. The most complex is one is comparable to a large solar farm spread out over many acres and using many DER units, requiring supplemental devices compliant with IEEE 1547-2018.

- **Clause 9** briefly lists some criteria under which periodic retesting may be considered.

- **The balance of the standard** is composed of ten annexes and consists of approximately 40 pages.

Note that co-ops have some flexibility in implementation. Not every part of the standard will apply in every case, but co-ops will want to implement as much of it as reasonably possible to ensure effective operation of DER at minimal inconvenience to their members.

What do cooperatives need to know or do?

In addition to general familiarity with the standard, co-ops will need to plan for how they will handle commissioning testing. As outlined in the article Revision of IEEE Standard 1547.1 (Proposed Changes to IEEE-P1547.1_January-2019), co-ops will need to think seriously about how they want to handle this requirement. Commissioning tests have always been applied to newly installed DER systems to some degree, but the new base standard has increased the complexity to an extent that merits additional consideration. For some co-ops, additional training or equipment may be needed. For others with high DER activity, personnel who previously were able to handle this work as part of their regular workload may need assistance due to increased time requirements for commissioning tests. It may also be that some of the testing previously done in-house will now need to be contracted out.

The co-op itself may determine which tests apply to specific cases. Authorities Governing Interconnection Requirements (AGIRs, as defined in the base standard) may also recommend or require specific tests for some situations.

Summary

Regardless of how the co-op chooses to handle commissioning tests, the new standard requires more numerous and detailed tests than had been the case. The new standard gives manufacturers of DER one and one-half years (18 months) from date of publication before these tests and adherence to IEEE 1547-2018 itself are mandatory – roughly October, 2022. That is considered by the subcommittee to be adequate time from publication of the standard for manufacturers to conform and have a Nationally Recognized Testing Laboratory (NRTL), such as Underwriters Laboratories (UL), certify that their equipment is in compliance with the new requirements. The standard can be purchased from the IEEE Standards Association at the IEEE Standards Store.

Co-ops are encouraged to use the time prior to the compliance date to prepare and consider how they will implement this standard.

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