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IEEE Guide for Conducting Distribution Impact Studies for Distributed Resource Interconnection

IEEE Standards Coordinating Committee 21

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IEEE Standards Coordinating Committee 21 on
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IEEE
3 Park Avenue
New York, NY 10016-5997
USA

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IEEE Guide for Conducting Distribution Impact Studies for Distributed Resource Interconnection

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Abstract: IEEE Std 1547.7™ is part of the IEEE 1547™ series of standards. Whereas IEEE Std 1547™-2003 provides mandatory requirements for the interconnection of distributed resources (DR) with electric power systems (EPS), this guide does not presume the interconnection is IEEE 1547™ compliant. Further, this guide does not interpret IEEE Std 1547™ or other standards in the IEEE 1547™ series, and this guide does not provide additional requirements or recommended practices related to the other IEEE 1547™ documents. However, DR interconnection may contribute to resultant conditions that could exceed what was normally planned for and built into the distribution system. This guide provides alternative approaches and good practices for engineering studies of the potential impacts of a DR or aggregate DR interconnected to the electric power distribution system. This guide describes criteria, scope, and extent for those engineering studies. Study scope and extent are described as functions of identifiable characteristics of the DR, the EPS, and the interconnection. The intent includes promoting impact study consistency while helping identify only those studies that should be performed based on technically transparent criteria for the DR interconnection.

Keywords: distributed energy resources, distributed generation, distributed power, distributed resources, distribution grid, distribution system, electric power systems, energy storage, federal utility grid, fuel cells, grid interconnection requirements and specifications, IEEE 1547.7™, interconnection, microturbines, national, photovoltaic power systems, public utility commission, regulations, renewable energy, rulemaking, regional, utility grid, utility grid dispersed generation

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Introduction

This introduction is not part of IEEE Std 1547.7™-2013, IEEE Guide for Conducting Distribution Impact Studies for Distributed Resource Interconnection.

With the advent of IEEE Std 1547™-2003, modern interconnection equipment has made great gains by having universal interconnection and test requirements focused at the point of common coupling. Additionally, since the adoption of IEEE Std 1547™, there has been significant experience gained related to inter-related technology systems and operational concepts to properly integrate distributed resources (DR) into electric power systems (EPS). Traditionally, however, utility electric power systems were not designed to accommodate active generation and storage at the distribution level. The addition of DR to an EPS will change the system and its response in some manner. Increased adoption of distributed resources throughout distribution systems often results in the need to perform a distribution system impact study. This guide provides a common technical platform based on engineering knowledge to address study methods for performing DR-EPS impact studies. This document includes an overview of general considerations, operational considerations, configuration considerations, preliminary review criteria, conventional and special impact studies methodologies, tools and technical issues, data requirements, and examples of mitigation techniques. A sample methodology for using the guide is also provided. The intended audience will gain a common technical understanding as well as an increased understanding of the potential impacts of DR interconnection. The guide addresses engineering studies from a technical perspective rather than a regulatory perspective. This document establishes guidance including multiple approaches (alternatives/choices) using engineering studies based on engineering best practices, including engineering characteristics, engineering studies methodologies, and engineering parameter criteria to understand and use the engineering studies results.

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1. Overview

1.1 Scope

This guide describes criteria, scope, and extent for engineering studies of the impact on area electric power systems of a distributed resource (DR) or aggregate distributed resource interconnected to an area electric power distribution system.

1.2 Purpose

The creation of IEEE Std 1547™-2003 has led to the increased adoption of DR throughout distribution systems.[1,2] This document describes a methodology for performing engineering studies of the potential impact of a DR interconnected to an area electric power distribution system. Study scope and extent are described as functions of identifiable characteristics of the DR, the area electric power system, and the interconnection. Criteria are described for determining the necessity of impact mitigation.

Establishment of this guide allows DR owners, interconnection contractors, area electric distribution power system owners and operators, and regulatory bodies to have a described methodology for when distribution

[1] IEEE publications are available from The Institute of Electrical and Electronics Engineers, 445 Hoes Lane, Piscataway, NJ 08854, USA (http://standards.ieee.org/).
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