



Photo by Dennis Schroeder, NREL 57527

# Updating Distributed Energy Resource Interconnection Rules

## A Guide for Local Authorities

Communities everywhere are seeing an epochal shift in their energy systems, caused by exponential growth in distributed energy resources (DERs) like solar, battery storage, and electric vehicles. To ensure the electric grid remains reliable through this transition, local authorities can adopt safe and well-established interconnection standards. But enacting such standards is no small effort.

This fact sheet summarizes a recent NREL report—*A Guide to Updating Interconnection Rules and Incorporating IEEE Standard 1547*—that provides guidance and clarity for local authorities that are adopting, developing, and maintaining rules around DER interconnections, as issued by IEEE Standard 1547-2018.

### The Challenge for Local Authorities

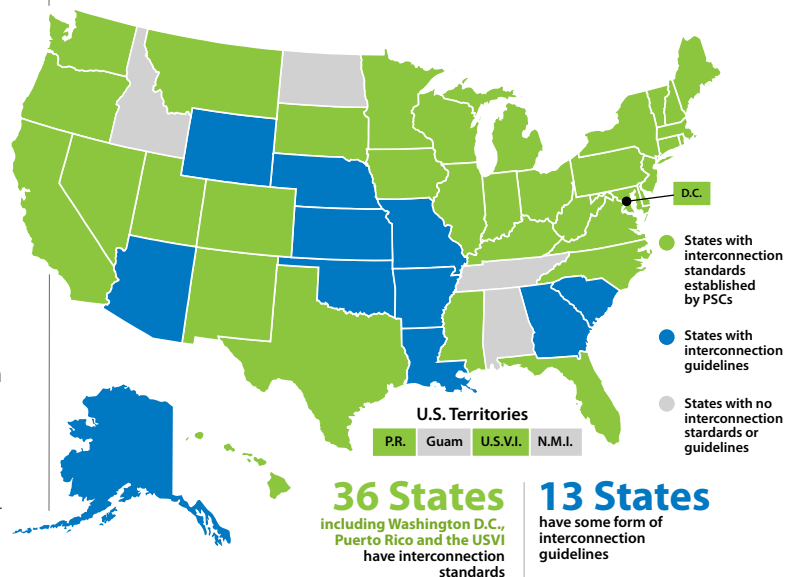
Updating electrical interconnection rules can be complicated, with stakeholder interests and technical issues often overlapping and creating confusion that raises the cost and time needed to deploy DERs. These challenges will become more acute as more DERs are interconnected and as new players, such as DER aggregators, enter the mix.

### How This Guide Can Help

*A Guide to Updating Interconnection Rules and Incorporating IEEE Standard 1547* offers a step-by-step approach to adopting recommendations from the leading industry standard for DER interconnection, IEEE 1547-2018.

This guide supports electric service regulators and local authorities, as they address process and technical concerns. The guide's steps for updating rules are summarized here.

#### Overview of State Interconnection Standards



## Step 1: Determining the Context—Stakeholders and Major Drivers

Every system is different, with different technical constraints, decision makers, power grid designs, and motivations. Step 1 is to understand site-specific circumstances, which includes two important activities:

- Determine the socioeconomic and technical contexts for updating the interconnection rule, and identify goals and expectations of stakeholders related to the rulemaking process. By understanding viewpoints, expectations, and needs of all stakeholders and the larger community, regulators can reduce back-and-forth and other misunderstandings.
- Conduct process engineering to structure the interconnection update so that key bottlenecks are identified and avoided. This includes utilizing tools and techniques to monitor, visualize, and analyze the update.

These activities set the stage for developing the actual interconnection rules to be deployed.

## Step 2: Developing the DER Interconnection Rule

In Step 2, the guide broadens the context to consider the landscape of interconnection rules—including their relation to other regulations, policy, planning, and technical requirements. At this point, local authorities strive to understand the fundamentals of DER interconnection and how such topics play into rulemaking. IEEE 1547-2018 is rich in detail—more than 200 pages of detail—which this guide condenses into several key areas of consideration for authorities, including:

- Equipment costs and installation
- Safety considerations
- Electric reliability
- Capabilities of modern power devices
- Interoperability with other systems and standards
- Device testing and certification.

With these factors influencing rule design and deployment, the guide then explains how to maintain and monitor the rule from a technical and process perspective.

## State Spotlight

Minnesota began updating its interconnection rules in 2017 by convening of a working group of stakeholders. The group organized a two-phase approach, focusing first on process, roles, and requirements, and then on specific technical capabilities. As a result of their coordinated approach, Minnesota's regulators updated their interconnection rules to become among the first states in the nation to incorporate the latest requirements of IEEE Standard 1547-2018.

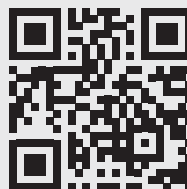
## Step 3: Maintaining and Revising the Interconnection Rule

Step 3 supports authorities once they have updated their interconnection rule. Properly planning how to revise an interconnection rule is important; frequent revisions are generally expected as DER technology evolves and new implementations emerge. Maintenance of interconnection rules involves:

- Subprocess data collection, such as tracking interconnection applications through their entire process
- Process analysis, such as visualizing and mapping the value-added and non-value-added aspects of interconnection to identify bottlenecks and delays in new interconnections
- A feedback loop, so that Steps 1 and 2 are revisited to capture changing motivations and stakeholder needs.

### Contacts

Download the guide



<https://www.nrel.gov/grid/ieee-standard-1547/>

### Learn More

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