

IEEE 2030.7-Rev Update

Working Group to Revise IEEE Std 2030.7 for the Specification of Microgrid Controllers

Highlights

- IEEE Std 2030.7-2017, an important standard that sets the technical specifications and functional requirements for microgrid controllers, is scheduled to become inactive December 2027.
- IEEE standards have a ten-year life cycle. Active standards must undergo a revision process at least every ten years to remain in active status.
- Under the sponsorship of the IEEE PES, Transmission and Distribution Committee, authorization to revise the standard – IEEE 2030.7-Rev – was approved by the IEEE Standards Association on March 27, 2025.
- This Advisory reviews this process and the importance of continuance of IEEE Std 2030.7-2017 as microgrids continue to proliferate across utilities, independent operators, and commercial facilities.
- Co-ops are invited to participate in the IEEE 2030.7-Rev Working Group by contacting Ravindra Singh, the NRECA Primary Representative at Ravindra.Singh@nreca.coop.

Introduction

The policy of the IEEE Standards Association is for standards to be reaffirmed every ten years or become inactive. IEEE Std 2030.7-2017 will become inactive in December 2027. Under the sponsorship of the IEEE PES, Transmission and Distribution Committee, authorization to update and reaffirm the standard – IEEE 2030.7-Rev – was approved by the IEEE Standards Association on March 27, 2025.

The proposed revision aims to update the technical specifications and requirements for microgrid controllers taking into account developments that have occurred around distributed energy resources (DER; generation, storage and load) technologies since the standard was approved (2017), as well as controller requirements in applications such as distributed energy resources management systems (DERMS; IEEE Std 2030.11-2021), fast charging stations (IEEE Std 2030.13-2024), and virtual power plants (VPP; IEEE Std P2030.14).

The proposed revision will include a series of Annexes on topics of interest to the members of the working group. Among these are utility microgrids (networked) and energy management systems for data centers as microgrids.

The specifications of the controller are set in the context of an integrated grid interoperability model (IEEE Std 2030.4-2023). This model defines the interactions of the controller with the grid environment, namely

with the DER and other generation assets, transmission and distribution system operators and electricity markets and regulators.

A major enhancement in this revision is the addition of **Annex E – Data Center Energy Management Systems**, which examines data centers with controller functions and capabilities required to maintain reliable operation under dynamic grid and load conditions. The revision also acknowledges the need to expand clauses related to power exchange with the grid as data centers scale in size and complexity.

The Project Authorization Request (PAR) reaffirms the purpose of IEEE Std 2030.7 to define the functional requirements and interfaces of the Microgrid Energy Management System (MEMS), so microgrid controllers can operate autonomously or grid-connected, support seamless transitions, and maintain interoperability through modular, platform-independent interfaces. As microgrids continue to proliferate across utilities, independent operators, and commercial facilities, **the standard is more timely and necessary than ever.**

What is the IEEE 2030.7-Rev Working Group?

The IEEE 2030.7-Rev Working Group (WG) focus on revising IEEE Standard for the Specification of Microgrid Controllers. A key element of microgrid operation is the Microgrid Energy Management System (MEMS). It includes the control functions that define the microgrid as a system that can manage itself, and operate autonomously or grid connected, and seamlessly connect to and disconnect from the main distribution grid for the exchange of power and the supply of ancillary services. The scope of this standard is to address the technical issues and challenges associated with the proper operation of the MEMS that are common to all microgrids, regardless of topology, configuration, or jurisdiction, and to present the control approaches required from the distribution system operator and the microgrid operator.

The IEEE 2030.7-Rev WG is updating the existing standard for developments that have occurred in the design and deployment of DER and microgrid technologies since the standard was approved and published in 2017.

What has changed?

- Microgrids have grown dramatically in size and complexity, with addition of data center loads now approaching or exceeding 500 MW and planned at over 1 GW.
- On-site generation and large, fast-changing data centers with unique load dynamics and uptime requirements are being developed, creating new control and coordination challenges.
- Interactive microgrids require clearer guidance on power exchange behavior with the grid, especially at higher power levels.
- Advances in storage technologies and fast acting controls now play a vital role in data-center resilience, requiring the standard to reflect current capabilities and expectations.

- The industry's shift toward modular, interoperable control architectures has accelerated, making it necessary to refresh MEMS interface and interoperability guidance.
- Cybersecurity expectations for mission critical microgrids have evolved significantly, prompting the need for updated functional requirements for the data exchanges which require secure communications.
- The rapid expansion of commercial and industrial microgrids has increased the number of vendors and architectures, reinforcing the need for a common functional baseline.

Purpose of IEEE Std 2030.7

The reason for establishing a standard for the microgrid controller is to enable interoperability of the individual asset and component controllers needed to operate the microgrid through cohesive and platform-independent interfaces. This approach allows for flexibility and customization of components and control algorithms to be deployed without limiting potential functionality and without sacrificing "plug-and-play."

Microgrid components and operational solutions exist in different configurations with different implementations. Regardless of the configuration and implementation and the type of equipment and software used (commercial or custom), components should be interoperable and have interfaces that comply with the generic functional specifications defined for the microgrid controller in the standard. The standardization focuses on defining functions and interface configurations that allow modularity and interoperability of the controller functions. It defines those functions that need to be standardized and those that can remain proprietary, while enabling interoperability with various DER interfaces within the microgrid boundaries, allowing interaction with the electric power system. It facilitates wide adoption of controller functions by vendors and utilities. The standard is functionality-driven and focuses on a modular approach that enables potential future expansion and features.

What is the impact on cooperatives?

Electric cooperatives will feel the effects of the IEEE 2030.7 revision as larger, faster-changing data centers are planned in their service territories and apply for interconnection on their systems, bringing new expectations for coordination, protection, and power-exchange management:

- Co-ops will experience increased requests for interconnections with microgrids as local power sources are used to meet critical loads in times of constraints on transmission systems and capacity limitations from power supplied from markets, and as islanding becomes necessary for resiliency of critical loads.
- Co-ops will need to plan for larger, more complex microgrids that may operate at power levels once seen only on the utility side of the meter.
- Co-ops will encounter large, fast-changing data centers that require tighter coordination on protection, reliability, and operational protocols.
- On-site generation and highly variable data-center loads will place new demands on co-op planning, forecasting, and system operations practices.
- Co-ops will need to prepare for more dynamic behind-the-meter generation and load behavior, which places new expectations on communication and interoperability with customer-sited controllers.

- Updated MEMS interoperability requirements will support smoother integration of diverse DER technologies across co-op territories.
- The addition of Annex E gives co-ops a framework for working with data center operators who require high reliability, rapid response times, and predictable grid interactions.

What do cooperatives need to know or do about it?

- Clearer guidance on power exchange behavior will help co-ops manage protection, reliability, and operational boundaries as high power microgrids interact more dynamically with the distribution system.
- Co-ops can benefit by:
 - Understanding that larger, more complex microgrids including data centers will require closer coordination on protection, operations, and power-exchange limits.
 - Engaging early with the revision process, so the updated standard reflects practical needs in rural and member-owned systems.
 - Tracking the new Annex E guidance, as data centers introduce fast load swings and strict reliability requirements that directly affect distribution operations.
- Co-ops may need to update interconnection practices and operational protocols as the standard strengthens requirements for MEMS functions and grid-exchange behavior.

How to Join IEEE 2030.7-Rev Working Group

NRECA will continue its on-going participation in IEEE 2030.7-Rev Working Group (WG) activities, as well as traditional involvement with other standards working groups, sharing the information with our co-op network as appropriate and useful, and representing members' interests in the research and forums.

In addition, any co-op that would like to join and participate in the IEEE 2030.7-Rev Working Group is invited to contact Ravindra Singh, the NRECA Primary Representative and lead for the Task Force for Annex E – Data Center Energy Management Systems at Ravindra.Singh@nreca.coop.

Contact for Questions

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