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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 42322-2023

**Energy internet system - Interconnection of active distribution
network**

能源互联网系统 主动配电网的互联

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Foreword

This document was issued on 17 March 2023 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 October 2023.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 42322-2023 describes how an active distribution network connects to everything now hanging off it and to the wider energy internet around it. General requirements come first:

the planning, design, operational control and information exchange of the network have to be coordinated with the energy internet architecture rather than bolted onto it afterwards. Physical interconnection is then taken point by point, covering the grid structure itself, distributed resources, microgrids, electric vehicle charging and battery swap infrastructure, energy storage, and end users. Information interconnection follows with the data exchanged with each of them, the communication modes, and the security protection around those links, and a closing clause deals with cyber-physical fusion, where measurement, analysis, decision and control are treated as one system rather than a network with monitoring attached. Informative annexes give typical AC and DC interconnection arrangements and the DC-side grid structure for a medium-voltage network. A feeder designed for power flowing one way starts behaving badly once storage, rooftop generation and fast chargers all sit on it, and each of those speaks a different protocol; without an agreed interconnection scheme the operator loses both control of the power flow and sight of what is happening. For distribution utilities, the designers of active distribution schemes, and the vendors of the resources connecting to them.

This document specifies the general requirements for the interconnection of active distribution

network, as well as the requirements for the physical interconnection, information interconnection and cyber-physical fusion of active distribution network under the energy internet system.

This document is applicable to the planning, design and operation control of the active distribution network under the energy internet system.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only

versions with a specified date are applicable to this document. In terms of references without a

specified date, the latest version (including all the modifications) is applicable to this document.

GB/T 12325 Power Quality - Deviation of Supply Voltage

GB/T 14549 Quality of Electric Energy Supply - Harmonics in Public Supply Network

GB/T 15543 Power Quality - Three-phase Voltage Unbalance

GB/T 22239 Information Security Technology - Baseline for Classified Protection of

Cybersecurity

GB/T 24337 Power Quality - Interharmonics in Public Supply Network

GB/T 29328 Specific Configuration of Power Supply and Self-emergency Power Supply for Important Power Users

GB/T 33589 Technical Requirements for Connecting Microgrid to Power System

GB/T 33593 Technical Requirements for Grid Connection of Distributed Resources

GB/T 36278 Technical Code for Electric Vehicle Charging / Battery Swap Infrastructure Interconnecting to Distribution Network

GB/T 36547 Technical Rule for Electrochemical Energy Storage System Connected to Power

Grid

NOTE: 110 kV ~ 35 kV power grid is a high-voltage distribution network, 10 (20, 6) kV power

grid is a medium-voltage distribution network, and 220 / 380 V power grid is a low-voltage distribution network.

3.3 active distribution network

Active distribution network is a distribution network that internally contains distributed power,

energy storage and demand response resources, and with the capabilities of flexible topology,

active control and operation management.

3.4 distributed resources

Distributed resources are the power supply that is connected to the power grid with a voltage

level of 35 kV and below, and located near the user, and mainly consumed locally at a voltage

level of 35 kV and below.

NOTE 1: including synchronous generator, asynchronous generator, converter and other types of

power supplies.

NOTE 2: including solar energy, natural gas, biomass energy, wind energy, water energy,

hydrogen

energy, geothermal energy, ocean energy, comprehensive utilization of resources for power generation (including coal-mine gas for power generation) and energy storage, etc.

[source: GB/T 33593-2017, 3.1, modified]

3.5 microgrid

Microgrid is a small-size power supply network composed of distributed power generation, power load, monitoring, protection and automation devices (including energy storage devices

when necessary) and can basically achieve internal balance of electric power and energy.

NOTE: microgrid is divided into grid-connected microgrid and independent microgrid.

[source: GB/T 33589-2017, 3.2, modified]

3.6 cyber-physical systems

Cyber-physical systems are systems constructed by integrating advanced perception, computation, communication, control and other information technologies and automatic control

technologies, so that humans, machines, objects, the environment, information and other elements are mutually mapping, timely interacting and efficiently collaborating in the physical

space and cyberspace.

4 General Requirements

4.1 The active distribution network is an important constituent part of the energy internet system.

Its planning, design, operation control and information interaction shall be coordinated with the

architecture of the energy internet, so as to support the interconnection of energy and information.

4.2 The planning and design of the active distribution network shall adhere to the concept of

user-oriented power supply reliability, so as to satisfy safe, efficient and flexible power transmission and distribution.