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

GB/T 44638-2024

**Specification for the interaction between the energy internet
and electric vehicles**

能源互联网与电动汽车互动规范

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1 Scope

GB/T 44638-2024 specifies how electric vehicles and the energy internet interact: vehicle-to-grid in the broad sense, covering not only discharging back to the network but the whole set of interactions by which a fleet of parked cars becomes a controllable resource. China has the largest EV fleet in the world and the strongest interest in using it, which is what puts this standard where it is. The document sets out the interaction architecture and the roles of the vehicle, the charging equipment, the operator platform, the aggregator and the grid, the interaction modes covering orderly charging, demand response, peak shaving and bidirectional discharge, the information model and the data exchanged at each interface, the control and scheduling requirements and their timing, the requirements on the vehicle and on the charging equipment for each mode, the metering and settlement requirements, and the safety and information security requirements. For a charging operator, an aggregator, a utility or a carmaker in China, this is the frame the interaction is designed to.

This document specifies the general requirements, interaction requirements, energy interaction, information interaction, business interaction and verification methods for the interaction between energy internet and electric vehicle. This document is applicable to the planning, construction and operation of the interaction between energy internet and electric

vehicle.

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 17859 Classified Criteria for Security Protection of Computer Information System

GB/T 19596 Terminology of Electric Vehicles

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

GB/T 22240 Information Security Technology - Classification Guide for Classified Protection of Cybersecurity

GB/T 32960.3 Technical Specifications of Remote Service and Management System for Electric Vehicles - Part 3: Communication Protocol and Data Format

GB/T 40855 Technical Requirements and Test Methods for Cybersecurity of Remote Service and Management System for Electric Vehicles

GB/Z 41237-2022 Energy Internet System - Terms

IEC 61970 (all parts) Energy Management System Application Program Interface (EMS-API)

3 Terms and Definitions

The terms and definitions defined in GB/T 19596 and GB/Z 41237-2022, and the following are applicable to this document.

4 General Requirements

4.1 The typical architecture of the interaction between energy internet and electric vehicle is shown in Appendix A.

4.2 The energy interaction between energy internet and electric vehicle shall be able to participate in energy transaction, demand response, distributed power sources and microgrid interaction, peak shifting and valley filling, grid frequency regulation, voltage regulation, power regulation and power support, etc.

4.3 The information interaction between energy internet and electric vehicle shall have the ability to interact between the device layer and the information layer, between the

information layer and the application layer, and between application layer system platforms, and have the ability to store, process and analyze information.

4.4 The business interaction between energy internet and electric vehicle shall include the following business interaction scenarios: the application for electricity use of charging and discharging facilities, the operation and maintenance of charging and discharging facilities, the orderly charging and battery swapping services between energy internet and electric vehicle, the orderly discharge services, energy transaction, demand response, information push and analysis services, etc.

4.5 The interaction between energy internet and electric vehicle shall on the premise of safety and controllability, improve social, economic and environmental benefits, and meanwhile, ensure the safety of people, equipment, information, etc.

4.6 Before electric vehicles are connected to the energy internet, electric vehicle users and energy internet operators and managers shall sign a grid-connected dispatching agreement or an energy internet and electric vehicle interaction contract with the energy internet platform in accordance with the principles of real-time monitoring, unified dispatching, hierarchical management and energy efficiency optimization.

4.7 The interaction between energy internet and electric vehicle shall give priority to the local utilization of distributed new energy on the basis of satisfying the interaction demands of electric vehicle users.

5 Interaction Requirements

5.1 The interested parties participating in the interaction between energy internet and electric vehicle may include local power supply departments, charging and discharging facility operators, third-party energy management service providers and other energy internet operators and managers, electric vehicle charging and discharging facilities, and electric vehicle users.

5.2 Local power supply departments, charging and discharging facility operators, third-party energy management service providers and other operators and managers shall have the ability to implement information interaction and operation control with the interactive system.

5.3 The local power supply department shall issue regulation and control instructions to the interactive system in accordance with the grid operation status, demand forecast of charging, forecast of discharge ability, and load forecast, etc., based on the grid-connected dispatching agreement or the energy internet and electric vehicle interaction contract.

5.4 Charging and discharging facility operators may operate and manage the interactive system and shall have the ability to guide and regulate electric vehicle users' behavior of participating in energy internet interaction.

5.5 The third-party energy management service providers shall be responsible for the aggregation, management, monitoring and dispatching of charging and discharging facilities within the scope of business, and provide charging and discharging facilities and electric vehicle users with technical means and transaction platforms for intercommunication with the interactive system, power grid operation and dispatching institution, and shall have a communication mechanism for reporting fault information.

5.6 As the interface device for electric vehicles to access the energy internet, electric vehicle charging and discharging facilities shall provide support for electric vehicle users to access the energy internet and interact with the energy internet.

5.7 Electric vehicle users may voluntarily participate in the interaction between energy internet and electric vehicle in accordance with their own demands and perform charging and discharging operations on electric vehicles through the services provided by the charging and discharging facility operators and managers.

6.1 General Requirements

6.1.1 The energy interaction between energy internet and electric vehicle shall rely on interactive units with communication, monitoring, analysis and decision-making, and control functions, as well as electric vehicle charging and discharging facilities. Based on the interactive system, energy interaction for orderly charging and battery swapping services, orderly discharge services, demand response, emergency support and other business demands shall be formed to ensure the economic and efficient operation of the energy internet. The typical application scenario of the interaction is shown in Appendix B.

6.1.2 The energy interaction between energy internet and electric vehicle shall rely on information interaction, be based on the load forecast of the energy internet, while taking into account the charging and battery swapping demands, and discharge ability, combined with energy market transaction information, and following the principles of local consumption priority, wide-area interconnection and coordination, and source-grid-load-storage integrated operation.

7.1 General Requirements

7.1.1 The information interaction between energy internet and electric vehicle refers to the data intercommunication and sharing between the business roles and functional entities in the interactive system through standardized interfaces and communication modes under the principles of timeliness, security, effectiveness and flexibility, and the collaborative support of energy and business interaction between energy internet and electric vehicle. The typical interaction information is shown in Appendix C.

7.1.2 Information interaction can achieve the collection of basic information and status information, and control information interaction of electric vehicle charging and discharging