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**Technical specification for energy online monitoring
of energy consumption units**

用能单位能耗在线监测技术要求

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Technical specification for energy online monitoring of energy consumption units

1 Scope

This Standard stipulates the principle, monitoring scope and content, basic structure and composition, technical requirements, commissioning, operation and maintenance for energy online monitoring of energy consumption units.

This Standard applies to the energy online monitoring works that are carried out by energy consumption units.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB 4943.1, Information technology equipment - Safety - Part 1: General requirements

GB/T 9254, Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement

GB 17167, General principle for equipping and managing of the measuring instrument of energy in organization of energy using

GB/T 17618, Information technology equipment - Immunity characteristics - Limits and methods of measurement

GB 17859, Classified criteria for security protection of computer information system

GB/T 20271, Information security technology - Common security techniques requirement for information system

GB/T 20279, Information security technology - Security technical requirements of network and terminal separation products

GB/T 22239, Information security technology - Baseline for classified protection of cybersecurity

The planning, layout and design of the energy online monitoring of energy consumption units shall lay emphasis on systematism, and carry out scientific planning and overall planning in accordance with the relevant requirements of national energy conservation management and the needs of its own energy management and information development.

4.3 Reliability

The energy online monitoring of energy consumption units shall be comprehensively considered from the aspects of system structure, technical measures, equipment selection, installation verification, to ensure that the system operates stably and is easy to maintain and manage.

4.4 Normalization

The energy online monitoring of energy consumption units shall comply with the requirements of relevant laws, regulations, standards, to strengthen resource integration, and achieve coordinated docking and data sharing.

4.5 Advancement

The energy online monitoring of energy consumption units shall make full use of existing advanced and mature technologies, and consider compatibility with other information systems, reserve upgrade and expansion interfaces, to ensure long-term effective operation.

5 Monitoring scope and content

5.1 Monitoring scope

The energy online monitoring of energy consumption units shall reflect the characteristics of its energy consumption, perform online monitoring of the entire energy consumption process of purchase, storage, processing conversion, transportation and distribution, and terminal use, and cover the key nodes of energy in and out, distribution, and utilization, and key energy consumption equipment.

5.2 Monitoring content

The core contents of energy online monitoring of energy consumption units are energy procurement, transmission and consumption related data, which can be divided into the following two categories:

- a) consumption and state parameter of various energy and energy-delivering materials;
- b) relevant parameters of energy consumption equipment/ units/ systems.

7 Technical requirements

7.1 General requirements

7.1.1 The implementation of energy online monitoring shall not change the integrity of the original energy-consuming equipment, nor shall it affect the normal operation of the original energy-consuming equipment.

7.1.2 The energy consumption unit shall select an appropriate configuration scheme, and carry out energy online monitoring, according to its own basic conditions, actual needs, maintenance and input costs, and the like,

7.1.3 The hardware equipment shall follow the principles of easy installation, easy maintenance, and high reliability. An integrated structure can be adopted to meet the installation environmental conditions. It shall have better capacity of resisting disturbance and reasonable monitoring sensitivity; the monitoring result shall have better reliability, repeatability and reasonable accuracy.

7.1.4 The software system shall have a good man-machine interface; it shall be simple to operate, and easy to use; it shall support various functions of data access and management, and has scalability and secondary development functions; it shall adapt to the continuous development of energy online monitoring, operation and management.

7.1.5 The communication network shall make full use of the existing network resources, and select the communication medium and networking method according to the size of the energy consumption unit and the environmental conditions.

7.1.6 The data transmission shall be provided with a checking and verification mechanism, and shall have a fault recovery function, and support the breakpoint resuming, so as to ensure the accuracy and integrity of the data transmission.

7.1.7 Information technology equipment security, information security, and electromagnetic compatibility shall comply with the requirements of relevant standards such as GB 4943.1, GB 17859, GB/T 20271, GB/T 22239, GB/T 9254, GB/T 17618.

7.2 Energy measuring instrument

7.2.1 Equipment

The equipment of the energy measuring instrument shall be upgraded with intelligent instruments based on compliance with relevant national and industry

7.3.1 Configuration

The selection and quantity of the energy data acquisition gateway shall be reasonably configured according to various factors such as the type, quantity and location distribution of the to-be-connected energy measuring instrument.

7.3.2 Interface

The energy data acquisition gateway shall have upstream and downstream interfaces. The downstream interface can be connected to the energy measuring instrument; the upstream interface can communicate with the energy monitoring and management terminal equipment. In addition, it shall have a verification interface to facilitate regular verification on site.

7.3.3 Installation

The energy data acquisition gateway should be installed in the local control cabinet nearby; under the condition that the communication distance and the number of physical connection points are acceptable, access the multi-interval and multiple types of energy measuring instruments to the maximum extent.

7.3.4 Data acquisition, storage and transmission

7.3.4.1 The energy data acquisition gateway shall automatically acquire the original table code data of the energy measuring instruments, and add the time tag to the data and cache it locally. The data freezing time can be set, such as storing no less than 7d of hourly table code data. The energy data acquisition gateway shall have a power failure data retention function.

7.3.4.2 The energy data acquisition gateway shall exchange data with the energy monitoring and management terminal equipment in the form of active reporting or passive reading in accordance with the timing cycle. The timing data acquisition cycle shall be set rationally by the energy consumption unit according to the transmission period that is specified by the superior management platform and the specific requirements of its own energy management and application.

7.3.5 Timing

The energy data acquisition gateway shall have the function of timing with the energy monitoring and management terminal equipment; its own clock punctuality capability shall not be less than 1 s/24h.

7.3.6 Fault judgment

The energy data acquisition gateway shall have the function of reading and setting the configuration information of the energy measuring instrument, and can identify the measurement error of the original table code of the energy

7.4.2.4 The energy monitoring and management terminal equipment performs analysis and calculation, and generates basic energy consumption data for analysis. The calculation formula shall be verified by verification.

7.4.3 Data storage and management

7.4.3.1 The energy monitoring and management terminal equipment shall store and manage the energy consumption-related data in different categories. Configure dedicated data storage space; respectively establish real-time database and historical database; provide reliable data storage and backup means to facilitate export. The historical data retention period is not less than 5 years.

7.4.3.2 The energy monitoring and management terminal equipment shall have the functions of data display, query and statistical analysis.

7.4.4 Data upload

7.4.4.1 According to the requirements of the relevant management department, the energy monitoring and management terminal equipment shall add the coding information, perform data packaging, and transmit the formatted data to the superior management platform, in accordance with the transmission regulations of different superior management platforms, such as upload time, frequency, format.

7.4.4.2 The energy monitoring and management terminal equipment shall be able to receive the downloading analysis model, parameter configuration, data call and other control commands that are downloaded from the superior management platform, and complete the data customization and upload according to the requirements of the superior management platform.

7.4.5 Information security

The energy monitoring and management terminal equipment shall adopt cross-regional security protection measures for information exchange, including:

- a) Before accessing the external network, perform security isolation through the security isolation gateway; the security isolation gateway shall meet the technical requirements of GB/T 20279 for network and terminal isolation products;
- b) The platform connection shall adopt the unified CA digital certification certificate which is certified by the state.

7.4.6 Timing

The energy monitoring and management terminal equipment shall have the function of timing with the satellite timing system, and periodically broadcast

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