

ICS 13.020.20
CCS A 00



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

GB/T 43651-2024

**Smart community infrastructure - Measurement methods for the
quality of thermal power infrastructure and requirements for
plant operations and management**

智慧城市基础设施 火电站基础设施质量评价方法和运营维护要求

(English Translation)

Issued on: March 15, 2024

Implemented on: March 15, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface
Introduction
1 Scope
2 Normative references
3 Terms and Definitions
4 Evaluation of the Quality of Thermal Power Plant Infrastructure (QTPI) during the Operation Phase
4.1 Quality of Thermal Power Plant Infrastructure (QTPI)
4.2 Quality of Thermal Power Plant Infrastructure (QTPI) Elements
4.3 Evaluation indicators
5 Thermal power plant infrastructure operation and maintenance
5.1 General
5.2 Measurement
5.3 Data Control
5.4 Analysis
5.5 Risk response and prevention
5.6 Operational Control
5.7 Comprehensive Management
Appendix A (Informative) Thermal Power Plant Infrastructure Quality Evaluation Index System
Appendix B (Informative) Example of life cycle cost calculation for thermal power plant infrastructure quality
Appendix C (Informative) Thermal Power Plant Infrastructure Operation Control Intelligent Module Options and Application Scenarios
Appendix D (Informative) Reference Scheme for Self-improvement of Intelligent Management of Thermal Power Plant Infrastructure
Appendix E (Informative) Chinese and English comparison table of terms and indicators for quality of thermal power plant infrastructure
Reference

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents"

Drafting.

This document is modified to adopt ISO 37160:2020 "Smart city infrastructure - Power infrastructure - Thermal power station infrastructure quality assessment" Methods and operation and maintenance requirements.

This document has the following structural adjustments compared to ISO 37160:2020.

--- Appendix B corresponds to Appendix A in ISO 37160:2020.

The following editorial changes were made to this document.

- a) To coordinate with the existing standards, the name of the standard is changed to "Smart City Infrastructure Thermal Power Plant Infrastructure Quality Evaluation Method and Operation Guidelines" Operation and maintenance requirements";
- b) Some contents in the introduction were deleted to adapt to my country's current energy policy and sustainable low-carbon development goals;
- c) Deleted Note 2 of 3.2;
- d) Note 1 of 4.1 is deleted, because the Chinese expression does not refer to the English abbreviation;
- e) Delete the English abbreviations in Figures 1 and 2, because the Chinese description does not involve the English abbreviations;
- f) Added Appendix A (Informative) "Quality Evaluation Index System for Thermal Power Plant Infrastructure" and added the following table after Table 1 to Table 10 in 4.3 Notes to indicate the corresponding positions of detailed information of each indicator in Appendix A;
- g) The currency unit in Appendix B has been modified to be RMB "yuan";
- h) Added Appendix C (informative) "Options and application scenarios of intelligent modules for operation and control of thermal power plant infrastructure";
- i) Added Appendix D (informative) "Reference Scheme for Self-improvement of Intelligent Management of Thermal Power Plant Infrastructure";
- j) Added Appendix E (Informative) "Chinese and English Comparison Table of Terms and Indicators for Thermal Power Plant Infrastructure Quality".

This document was proposed and coordinated by the National Technical Committee for Urban Sustainable Development Standardization (SAC/TC567).

Introduction

Urban infrastructure is the foundation for urban activities. The digitalization and innovation of infrastructure support and promote urban operations.

The refinement and gridding of management will further enhance the smart construction and sustainable development of cities.

Under the background requirements of "new infrastructure", "new power system" and the development of energy digitalization and intelligence, energy infrastructure plays a key role in "new infrastructure".

It is of vital importance. Sufficient and stable power supply is needed to maintain urban economic development and daily life. New power infrastructure includes 5G the "digital infrastructure" represented by the construction of information infrastructure such as industrial Internet, big data, artificial intelligence, and cloud computing, and the traditional energy the digital transformation and upgrading of infrastructure is called "infrastructure digitization". This document is based on the demand for safe and stable power supply, and strengthens the energy infrastructure.

The coordinated connection between infrastructure construction and the application of digital technologies in smart cities is promoted, and the integration of traditional power infrastructure and digital intelligent technologies is strengthened.

Energy network and information security assurance capabilities are crucial to promoting the development of the digital economy and the green, low-carbon, circular economy, and are also essential for high-quality energy.

Provide effective support for development.

infrastructure, QTPI), and proposes requirements to guide operation and management activities to maintain and improve its quality, so as to achieve energy conservation in the medium and long term.

The quality of the infrastructure of thermal power plants during their operation phase is ensured by the goals of energy security, environmental protection, safety and economic efficiency.

The social cost of environmental impact, the cost of taking environmental protection measures, and the effectiveness of these measures should be fully considered in the operation and management of power plants.

The goal is to reduce the environmental impact of emissions (such as greenhouse gases (GHG)) associated with coal-fired power plant infrastructure and other global issues.

Maintain and improve the effective operation of energy infrastructure such as thermal power plants throughout their life cycle, and promote the in-depth application of digital technology in design, procurement, construction, and it will improve the comprehensive utilization efficiency of basic resources and reduce their operating costs through the whole life cycle of equipment, installation, operation and maintenance.

This document aims to promote the United Nations Sustainable Development Goals,

including Goal 7 (affordable and clean energy), Goal 11 (sustainable cities), and communities), SDG 13 (climate action), SDG 14 (marine environment) and SDG 15 (terrestrial life), which are expected to be achieved through appropriate operational and management measures.

management measures to maintain and improve the quality of thermal power plant infrastructure (QTPI), so that society can achieve more sustainable development.

The construction of new energy infrastructure will release the value potential of energy data elements, promote energy conservation and efficiency improvement, and coordinate the planning of smart city construction.

It provides a certain reference for building a clean, low-carbon, safe and efficient energy system and has guiding significance.

Smart city infrastructure Thermal power plant infrastructure quality Evaluation methods and operation and maintenance requirements

1 Scope

This document describes the evaluation method for the quality of thermal power plant infrastructure (QTPI) and specifies the requirements for operation and maintenance.

This document is applicable to operators of thermal power plants with a total capacity of 100MW or more, as well as those who intend to maintain and improve the basic Stakeholders of facility quality (QTPI). Operators of thermal power plants with other capacity units shall use this as a reference.

2 Normative references

This document has no normative references.

3 Terms and definitions

The following terms and definitions apply to this document.

A unit (3.2) or power station (3.3) that uses oil, natural gas, coal or biomass as fuel to generate electricity.

Unit

A set of equipment needed to operate a generator.

Note: This may include generators, (steam) turbines, boilers and balancing equipment (auxiliary equipment), etc.

Power plant