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GB 38755-2019

Code on security and stability for power system

电力系统安全稳定导则

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Foreword

All technical contents of this standard are mandatory. This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard replaces DL755-2001 "Guidelines for Safety and Stability of Power Systems". This standard is proposed and

managed by the National Energy Administration. The previous versions of the standards replaced by this standard are.

In 1981, at the beginning of the comprehensive construction of the national economic infrastructure at the time of the reform and opening up, China's power grid stability and destruction accidents were frequent. Situation and the bias of "heavy power generation but light power supply" in the development of the power grid, the former Ministry of Electric Power Industry formulated the first edition of the "Guidelines for the Safety and Stability of Power Systems" [(81) Dianzi Zi No. 109], for the first time, standardized guidelines for the correct handling of power system safety and economy, reasonable construction and grid operation then. After the promulgation and implementation of the `` Guidelines for the Safety and Stability of Electric Power Systems '', China's power system safety and stability level has reached a new level, and the number of stable damages has been stabilized. It rapidly decreased from 19 times per year between 1970 and 1980 to

0.2 times per year during the Ninth Five-Year Plan period. In.2001, according to the needs of the comprehensive development stage of the 500kV inter-provincial interconnection in the national economy and the power industry, the safety and stability standards were appropriately raised. In addition, new requirements have been put forward in the areas of stable calculation and stable management, and they have become a mandatory standard for the industry. DL755-2001 "Power System Security After the promulgation of the Stability Guidelines, it has further promoted the healthy development of regional networking, and the reliability of power supply has been continuously improved. In the U.S., Canada, Brazil, At the same time that large-scale power outages have occurred in India and other countries, the rapid development of China's power grid has basically eliminated the stability of the power system. And large-scale power outages. According to the actual development of China's power system, the National Energy Administration commissioned the National Technical Committee for Standardization of Grid Operation and Control to organize grid companies. Industry, power generation enterprises, power users, power planning and survey design, scientific research and other units, summarized DL755-2001 This standard was developed on the basis of the experience of the Guidelines.This standard focuses on and solves the problem of large-scale continuous development of new energy with the development of UHV power grids. Grid-connected, UHV AC and DC power grids are gradually formed, the system capacity continues to expand, new energy installations continue to increase, and the grid pattern and power supply structure occur Major changes, profound changes in the characteristics of the power grid, and new challenges to the safe and stable operation of the power system. The development and publication of this standard will Strongly support the new requirements of the national energy strategic transformation on the power system, ensure the safe, stable, and economic operation of the power grid and grid-connected power plants, and promote The normal order of progress in China's social and economic development, industrial and agricultural production, and people's lives is guaranteed by reliable electricity. Safety and Stability Guidelines for Power Systems

1 Scope

GB 38755-2019 is the Chinese national standard on code on security and stability for power system, in the field of electrical engineering. It carries no /T suffix, which in the Chinese system means compliance is mandatory: a product or a practice within its scope has to meet it to be lawfully made, sold or carried out in China. It was issued on 31 December 2019 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 July 2020. Classification: ICS 29.020, CCS F21. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This standard specifies the basic requirements for ensuring the safe and stable operation of the power system, the safety and stability standards for the power system, and the safety and stability of the power system. Computational analysis, and safe and stable work management of power systems. This standard applies to power systems with a voltage level of 220kV and above. Power systems below 220kV (including distributed power) Reference execution.

2 Terms and definitions

The following terms and definitions apply to this document.

2.1 Power system security and safety analysis The ability of the power system to withstand disturbances (such as sudden loss of power system components, or short-circuit faults) during operation.

Note 1. Characterized by two characteristics.

a) the power system can withstand transient processes caused by disturbances and transition to an acceptable operating condition;

b) Under the new operating conditions, various constraints are met.

Note 2. Security analysis is divided into static security analysis and dynamic security analysis. The static safety analysis assumes that the power system is directly transferred from static before disturbance to disturbance The other static state, which does not consider the intermediate transient process, is used to check whether various constraints are satisfied after the disturbance. Research on Dynamic Security Analysis The ability of the power system to maintain stability during the transition from a static state before disturbance to another static state after disturbance.

2.2 Power systemstability The ability of the power system to maintain stable operation after being disturbed.

Note. Power system stability can be divided into three categories. power angle stability, voltage stability, and frequency stability. See Appendix A for specific classification.

2.2.1 Power angle stability The ability of synchronous generators in synchronous interconnected power systems to maintain synchronous operation after being disturbed.

Note. The power angle instability is caused by insufficient synchronous torque or damping torque. Insufficient synchronous torque results in non-periodic instability, while insufficient damping torque causes oscillation instability. Power angle stability can be further divided into static power angle stability, transient power angle stability, and dynamic power angle stability.

2.2.1.1 Steady-staterotoranglestability The ability of the power system to automatically return to the initial operating state after the power system is subjected to small disturbances without aperiodic step loss of power angle.

2.2.1.2 Transient work angle stability After the power system is greatly disturbed, each synchronous generator maintains synchronous operation and transitions to the new or restored to the original steady-state operation mode. ability.

Note. Usually refers to keeping the power angle of the first and second swings without losing step.