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**Short-circuit current calculation for renewable energy power
stations and connection systems - Part 3**

新能源场站及接入系统短路电流计算 第3部分：储能电站

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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 part 3 of GB/T 44659 "Calculation of short-circuit current of new energy stations and access systems". GB/T 44659 has been published. The following parts.

1. Wind power generation;

2. Photovoltaic power generation;

3. Energy storage power station. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed by the China Electricity Council. This document is under the jurisdiction of the National Technical Committee for Standardization of Short-Circuit Current Calculation (SAC/TC424). This document was drafted by: China Electric Power Research Institute Co., Ltd., State Grid Corporation of China, Tianjin University, State Grid Corporation of China East China Branch, North China Electric Power University, Guangdong Power Grid Co., Ltd., State Grid Henan Electric Power Company Economic and Technical Research Institute, State Grid Fujian Electric

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For short-circuit faults in new energy stations and access systems, it is necessary to refine the model and method for calculating short-circuit current in new energy stations. In order to improve the calculation accuracy, due to the differences in equipment characteristics and station structures of wind power, photovoltaic and energy storage, the short-circuit calculation methods of each need to be calculated separately. Therefore, GB/T 44659 "Calculation of short-circuit current of new energy stations and access systems" was compiled. Divided into components.

1. Wind power generation. The purpose is to clarify the calculation method of short-circuit current of wind farms and access systems.
2. Photovoltaic power generation. The purpose is to clarify the calculation method of short-circuit current of photovoltaic power stations and access systems.
3. Energy Storage Power Station. The purpose is to clarify the calculation method of short-circuit current of energy storage power station and access system. Short-circuit current calculation of new energy stations and access systems Part

1 Scope

Part 3 of China's national standard for calculating short-circuit currents in renewable generation stations and their connection systems. This part completes the series with the treatment of the connection system and the network beyond the plant - the collector grid, the substation and the interface with the transmission system. That boundary is where the problem becomes practical rather than theoretical. A wind or solar plant is a network in its own right, with dozens of inverters connected through kilometres of medium voltage cable, and the fault current seen at a point within it depends on how many inverters contribute through what impedance. Meanwhile the transmission planner needs a single equivalent for the whole plant. Producing an equivalent that is valid for the studies it will be used in, rather than merely convenient, is what this part has to specify.

This document specifies the short-circuit current calculation model and method for energy

storage power stations and access systems. This document is applicable to electrochemical energy storage devices connected to 10(6)kV and above AC networks, where the converter has current source characteristics. Calculate the short-circuit current of the power station. Flywheel, superconducting electromagnetic, supercapacitor and other types of energy storage power stations and access systems connected to the grid through power electronic converters The short-circuit current calculation is carried out as a reference.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB/T 15544.1 Calculation of short-circuit current in three-phase AC systems Part

3 Terms, definitions and symbols

3.1 Terms and Definitions The terms and definitions defined in GB/T 15544.1, GB/T 34120, GB 38755, DL/T 2528 and the following apply to this document.

3.1.1 The sum of the rated capacities of all energy storage converters in the energy storage system.

3.2 Notation

3.2.1 The formulas in this document may be calculated using nominal values or relative values. When using nominal values for calculation, the legal measurement units shall be used. The following symbols apply to this document. a. Complex number operators c Voltage coefficient IN Rated current of the energy storage system converter converted to the grid-connected port (effective value) "k Initial value of the AC component of the three-phase short-circuit current k Steady-state value of the AC component of the three-phase short-circuit current kBESS Steady-state output current of the energy storage system and static VAR generator (if any) during three-phase short circuit