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

GB/T 46545.1-2025

**Technical specification for site selection of underground
compressed air energy storage - Part 1: Site selection within
saline aquifers**

压缩空气地下储能选址技术规范 第1部分：咸水层储能选址

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting. This document is Part 1 of GB/T 46545 "Technical Specification for Site Selection of Compressed Air Underground Energy Storage". GB/T 46545 has been published. The following section.

1.Site selection for saline aquifer energy storage. Please note that some content in this document may involve patents, and the issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the Ministry of Natural Resources of the People's Republic of China. This document is under the jurisdiction of the National Technical Committee on Standardization of Natural Resources and Territorial Spatial Planning (SAC/TC93). This document was drafted by: China Geological Environment Monitoring Institute, Beijing Jufengguang Technology Co., Ltd., Beijing Normal University, and China Geological Science. Institute of Geophysics, Chinese Academy of Sciences, Hubei University of Technology, Wuhan Institute of Rock and Soil Mechanics, Shandong University of Science and Technology, Shandong Provincial Bureau of Geology and Mineral Resources Exploration and Development, Shandong The Second Hydrogeological and Engineering Geological Team of Shandong Provincial Bureau of Geology and Mineral Resources (Shandong Lubei Geological Engineering Exploration Institute), and the Safety and Environmental Protection Technology Research Institute of China National Petroleum Corporation Research Institute Co., Ltd., China National Petroleum Corporation Exploration and Development Research Institute, China Natural Resources Economics Research Institute, Changsha University of Science and Technology

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With the acceleration of energy structure transformation and renewable energy development, large-scale underground energy storage is inevitable for achieving carbon peaking and carbon neutrality. Demand. Currently recognized large-scale compressed air energy storage construction mainly focuses on utilizing deep underground spaces, such as aquifers, salt caverns, and artificial sites. Underground storage facilities. GB/T 46545 "Technical Specification for Site Selection of Compressed Air Underground Energy Storage" aims to accelerate the development of large-scale energy storage technology and promote the realization of "dual" energy storage. To achieve carbon neutrality targets, standardize the site selection process, fully leverage the scale advantages of underground energy storage, and improve its feasibility and effectiveness. Considering different... The differences in type-based site selection methods mean that GB/T 46545 is proposed to consist of three parts.

- 1.Site Selection for Saline Aquifer Energy Storage. The purpose is to standardize the methods and technologies for site selection of saline aquifers for compressed air underground energy storage.
- 2.Site Selection for Salt Cavern Energy Storage. The purpose is to standardize the methods and technologies for site selection of compressed air underground energy storage and salt cavern energy storage.
- 3.Site Selection for Artificial Cavern Energy Storage. The purpose is to standardize the methods and procedures for site selection of artificial cavern energy storage for compressed air underground storage. technology. With the "Groundwater Management Regulations" imposing stricter requirements on groundwater extraction permits, saline aquifers, due to their high mineralization, are considered unusable. Gas storage layers that meet policy and engineering requirements. Utilizing saline aquifers for large-scale underground compressed air energy storage holds immense potential, with the target being... The scientific site selection of saline aquifers has a crucial impact on the feasibility and effectiveness of underground energy storage. This is to promote large-scale utilization of saline aquifers for research and development. This document is formulated for work in the field of underground compressed air energy storage. Technical Specifications for Site Selection of Compressed Air Underground Energy Storage Part

1 Scope

GB/T 46545.1-2025 is the Chinese national standard covering choosing a saline aquifer to store compressed air in - the porosity and permeability of the reservoir, the caprock that must hold the pressure through thousands of cycles, the cushion gas and the monitoring of a store nobody can see. Part 1 of the series, first edition, under the Ministry of Natural Resources, in force from 1 April 2026. It was issued on 2 December 2025 and has been in force since 1 April 2026, as a first edition. The document is under the responsibility of the Ministry of Natural Resources. This page is published from the official record of the 2025 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the general requirements for site selection of compressed air energy storage spaces using underground saline aquifers, as well as the requirements for energy storage demand assessment. Specific requirements for pricing, exploration and evaluation of target areas, detailed investigation and evaluation of key target areas, determination of site selection schemes, and report preparation. This document applies to the site selection of compressed air energy storage projects in saline aquifer gas storage spaces, but not to environmental impact assessments or project construction. Requirements for facility construction.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included. For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies. This document.

GB/T 11615 Specification for Geological Exploration of Geothermal Resources

GB/T 14157 Hydrogeological Terminology

GB/T 23561.8 Methods for determining the physical and mechanical properties of coal and rock-Part

3 Terms and Definitions

The terms and definitions defined in GB/T 14157 and the following terms and definitions apply to this document.

3.1 An energy storage system that utilizes underground cavities and voids as compressed air storage space.

3.2 caprock The non-permeable or low-permeability strata overlying the gas reservoir that prevent the upward migration of fluids from the gas reservoir.

3.3 Enclosed entrapment Geological structures that prevent the diffusion and migration of fluids and allow them to accumulate.

3.4 Further investigation revealed that potential gas storage sites could serve as compressed air energy storage facilities that meet energy storage requirements.

8 Methods for determining the deformation parameters of coal and rock

GB/T 28912 Method for determining the relative permeability of two-phase fluids in rocks

GB/T 29171 Determination of capillary pressure curves in rocks

GB/T 36072 Detection of Active Faults DZ/T 0172 Technical Standard for Vertical Seismic Profiling Method SY/T 5748 Method for determining gas breakthrough pressure in rocks