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PEOPLE'S REPUBLIC OF CHINA**

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Technical directives for planning of energy internet

能源互联网规划技术导则

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Table of Contents

Foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	5
4 General requirements	6
5 Energy demand and supply forecasting	7
5.1 General requirements	7
5.2 Energy demand forecasting	8
5.3 Energy supply forecasting	9
6 Energy balance	10
6.1 General requirements	10
6.2 Total energy balance	10
6.3 Energy dynamic balance	11
7 Energy internet architecture	12
7.1 Overall architecture	12
7.2 Physical architecture	12
7.3 Information architecture	13
7.4 Communication network architecture	13
8 Energy internet planning and construction	14
8.1 General requirements	14
8.2 Planning and construction requirements	14
9 Multiple interactions	16
9.1 General requirements	16
9.2 Multi-energy complement	16
9.3 Source-network-load-storage coordination	17
10 Technical and economic analysis	18
10.1 Calculation and analysis requirements	18
10.2 Technical and economic evaluation	19
Bibliography	20

Foreword

This document was issued on 17 March 2023 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 October 2023.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 42320-2023 covers the planning of an energy internet, a network in which electricity, heat and the other carriers are planned together rather than one at a time. It runs from forecasting through to money: the demand and supply forecasts that every later step rests on, the energy balance struck both in total and dynamically over time, the architecture set out as an overall scheme and then in physical, information and communication network layers, the planning and construction requirements at each of the three levels the document recognises - park, regional and cross-regional - the multiple interactions covering horizontal multi-energy complement and vertical source-network-load-storage coordination, and the technical and economic calculation and evaluation that closes the case. The order is fixed because sizing errors compound. A demand forecast made for electricity alone, ignoring the heat that could have served part of the load, yields a total balance that looks satisfied and a dynamic balance that fails in the hours that matter, and no amount of coordination downstream recovers the capacity that was never built. Regional resources, prices, policy and environmental constraints are brought into the balance for the same reason. Written for utilities, park and district developers, design institutes and the authorities that review their schemes.

This document specifies the general requirements, energy demand and supply forecasts, energy balance, energy internet architecture, energy internet planning and construction, multiple interactions, technical and economic analysis, as well as other requirements, for planning of energy internet.

This document is applicable to works related to the planning, design and construction of energy internet.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 9237, Refrigerating systems and heat pumps - Safety and environmental

requirements

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

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

GB/T 22240, Information security technology - Classification guide for classified protection of cybersecurity

GB 29550, General safety technique conditions for gas in civil building

GB 38755, Code on security and stability for power system

GB 50015, Standard for design of building water supply and drainage

GB 50028, Code for design of city gas engineering

GB/T 51074, Code for urban heating supply planning

GB/T 51098, Code for planning of city gas

CJJ/T 34, Design code for city heating network

DL/T 5729, Technical guide for planning and design of distribution network

advanced energy technology, it supports clean and low-carbon transformation of energy, optimization of comprehensive energy utilization efficiency, and flexible and convenient access of multiple subjects.

4.2 Energy internet planning shall give priority to the use of renewable energy according to regional resource endowment and energy supply and demand characteristics, and achieve the goals of improving clean energy consumption capacity, comprehensive energy utilization rate and user energy supply quality through optimal allocation, coordination and complementarity, and efficient utilization of various energy sources.

4.3 Energy internet planning shall ADHERE TO the concept of system planning, FOLLOW the principles of "source-network-load-storage collaborative interaction, power-heating-cooling-gas multi-energy complement, and energy information deep integration", CARRY OUT overall optimization around key links such as energy production, conversion, transmission, and storage, CARRY OUT overall design in

combination with key aspects such as physical architecture, information architecture, and communication architecture, and COORDINATE the internal composition, spatial layout, and timing arrangement of each planning element, to achieve the optimal overall energy utilization efficiency.

4.4 Major cities and disaster-prone areas shall carry out disaster prevention construction of key energy supply facilities, appropriately improve construction standards, and enhance the disaster prevention and emergency support capabilities of the regional energy internet.

4.5 The technical and economic evaluation of energy internet planning shall adhere to the basic principle of "combining quantitative and qualitative evaluation, with quantitative as the main and qualitative as the supplement". Quantitative evaluation shall be based on the data information in the reasonable assumptions of the energy internet for quantitative and accurate evaluation; qualitative evaluation shall carry out a comprehensive evaluation of the energy internet.

4.6 Energy internet planning shall be incorporated into local land and space planning, with facility corridor land rationally reserved for multiple types of energy such as electricity, heat, and gas. Energy internet facilities shall be planned simultaneously with other urban and rural infrastructure, and the layout of facilities shall meet the requirements of national laws and regulations on environmental protection, soil and water conservation, and ecological environment protection.

5 Energy demand and supply forecasting

5.1 General requirements

5.1.1 Energy demand and supply forecasting, the basis of energy internet planning and design, includes forecasts for the demand and supply of energy such as electricity, heat, cold, and gas, as well as forecasts for the development of various energy sources such as coal, oil, natural gas, hydropower, solar energy, wind energy, nuclear energy, geothermal energy, biogas, and tides in the region.

5.1.2 The load development characteristic curve, which shall be determined according