Relay Protection in the 14th Five-Year Plan Phase



Overview

It seeks to coordinate measures to improve national energy security and achieve carbon peaking by 2030 and carbon neutrality by 2060 to ensure a high-quality economic and social development.

Key Takeaways

Relay protection is a key component of China's 14th Five-Year Plan for modern energy systems, ensuring grid reliability, safety, and support for low-carbon energy integration.

Policy Context

The 14th Five-Year Plan (2021–2025) emphasizes the modernization of China's energy system, focusing on energy security, low-carbon transformation, and improved network reliability. The plan calls for enhanced energy network security management, strengthened risk and emergency management, and accelerated adoption of green and flexible energy sources. Within this framework, relay protection systems are critical for safeguarding high-voltage equipment, transmission lines, and power generation facilities, ensuring stable operation as renewable energy penetration increases.

Technical Role of Relay Protection



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Protective relays are devices designed to detect abnormal conditions, such as faults or overloads, and automatically trip circuit breakers to prevent equipment damage and maintain system stability. They are essential for: Preventing cascading failures in transmission and distribution networksProtecting personnel and the public during abnormal network eventsSupporting integration of variable renewable energy by maintaining grid stability Relay systems can be electromechanical, static/analog, or microprocessor-based, each with different functionality, lifespan, and maintenance requirements. Microprocessor relays, while highly multifunctional, have higher failure rates and shorter operational life, necessitating careful replacement planning during the 14th Five-Year Plan phase.

Maintenance and Reliability

The plan aligns with best practices for installation, commissioning, and preventive maintenance of protective relays. Key measures include: Protection System Maintenance Programs (PSMPs) to ensure compliance with reliability standardsTime-based and performance-based maintenance intervals to prevent failuresComprehensive testing and commissioning of new and existing relaysCorrective procedures for unresolved maintenance issues These practices are designed to minimize operational risks and ensure that relay systems function reliably, particularly as the grid incorporates more renewable and flexible energy sources. Integration with Energy ModernizationRelay protection is integral to achieving the 14th Five-Year Plan's goals of: Enhanced grid security in key cities and core areasSupport for flexible power supply and demand-side responseFacilitation of low-carbon energy adoption, including wind, solar, and energy storage systems By maintaining robust relay protection, China can reduce the risk of blackouts, improve system resilience, and support the transition to a highly electrified, low-carbon energy system.

Conclusion

In the 14th Five-Year Plan phase, relay protection systems are both a technical necessity and a strategic enabler. They ensure safe, reliable, and flexible operation of the power grid while supporting national objectives for energy security, low-carbon transformation, and modernization of the electricity network.

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Article Content

PRC-005-6

Identify which maintenance method (time-based, performance-based per PRC-005 Attachment A, or a combination) is used to address each Protection System, Automatic Reclosing, and Sudden

14th Five-Year Modern Energy System Planning "14th

Risks are intertwined, and energy security guarantee in the "14th Five-Year Plan" period will enter a solid foundation, enhance advantages, and make up for shortcomings

14th Five-Year Plan: Modern Energy System Planning (2021-2025)

It seeks to coordinate measures to improve national energy security and achieve carbon peaking by 2030 and carbon neutrality by 2060 to ensure a high-quality economic and social development. It

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To promote high-quality development during the “14th Five-Year Plan” period, we must root ourselves in the new stage of development, implement the new development concept, and build the new

The 14th Five-Year Plan of the People s Republic of China Fostering ...

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CSET Original Translation: China''s 14th Five-Year Plan

The following document is China''s 14th Five-Year Plan, covering the years 2021-2025, as passed by the Chinese parliament, the National People''s Congress, in March 2021.

THE OUTLINE OF THE 14TH FIVE-YEAR PLAN FOR ECONOMIC

ironmental protection constitute formidable and long-term challenges, and weak links remain in the safeguards for people''s wellbeing and social governance. In implementing the national rejuvenation

Basic protection relay knowledge

Selectivity Selectivity is a mandatory requirement for all protection, but the importance of it depends on the application. For example, unselective protection operation during a medium voltage network fault

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China released the “14th Five-Year Plan for a Modern Energy System”

Despite the plan''s emphasis on energy security concerns, the plan highlights the Paris climate agreement, the net-zero targets of over 130 countries, and positions China''s 2030 and 2060

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THE 14TH FIVE-YEAR PLAN AND LONG-RANGE OBJECTIVES

Power systems Build pumped-storage hydroelectric plants in Tongcheng, Pan''an, Tai''an (phase II), Hunyuan, Zhuanghe, Anhua, Guiyang, and Nanning; Implement energy storage demonstration

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Although the Five-Year Plan contains relatively few quantitative targets, it details a vast array of near-term PRC economic, trade, S&T, defense, political, social, cultural, environmental, and other policy

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China''s 14th Five-Year Plan delivers remarkable results

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Towards carbon neutrality and China''s 14th Five-Year Plan: Clean

China''s 14th Five-Year Plan and the post-pandemic recovery present an important opportunity to accelerate the transformation to a carbon-neutral economy. Against this background,

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