# China to Advance Energy Conservation, Carbon Reduction

**Policy Express**

By TANG Zhexiao

China is committed to advancing high-standard, high-quality energy conservation and carbon reduction, according to a guideline jointly issued by the General Office of the Communist Party of China Central Committee and the General Office of the State Council.

Identifying five key areas for driving energy conservation and carbon reduction, the guideline underscores that efforts shall be integrated into all aspects and the entire process of economic and social development.

In the energy green transition, the document proposes strict control over fossil fuel consumption and refined management of the installed capacity and power output of coal-fired power units.

CHN ENERGY Guohua's HG14 Project located in Dongying, Shandong province. (PHOTO: XINHUA)

Unreasonable growth of energy consumption will be curbed, non-fossil energy and new energy storage sectors scaled up, and the development of new power systems accelerated. Innovative business models including direct green power access and smart microgrids will be encouraged to boost green electricity consumption.

Technological innovation is the core pillar for advancing energy conservation and carbon reduction.

The guideline backs the application of digital, intelligent and green technologies to upgrade traditional industries. It also calls for accelerated growth of advanced manufacturing, high-tech industries and modern service industries, alongside cultivation of green and low-carbon sectors.

In addition, it highlights greater technological innovation and wider application of high-efficiency, energy-saving equipment.

Priority will be given to popularizing advanced, applicable facilities such as high-efficiency boilers, permanent magnet motors, high-performance refrigeration systems, green lighting equipment and high-temperature heat pumps.

The development of green transportation infrastructure will be stepped up, as well as smart facilities and equipment at transportation hubs and expressways. Energy-saving and low-carbon transport vehicles, electric and hydrogen heavy-duty trucks, and green-fueled vessels will be promoted.

The green transformation of digital infrastructure is a major focus. The guideline pushes forward energy-saving and low-carbon retrofits for computing power facilities, communication base stations, data centers and other infrastructure, supporting the development of green, low-carbon, intensive and recyclable computing facilities.

International dialogue and practical cooperation on energy conservation and carbon reduction will be deepened, and bilateral and multilateral technical collaboration strengthened. The plan also includes learning from global advanced practices.

# National Standards Define Development of Emerging Tech

By TANG Zhexiao

China recently issued a batch of important national standards, ranging from emerging industries to ecological and environmental protection fields.

In the emerging technology sector, the State Administration for Market Regulation (SAMR) has released 18 national standards, covering key areas including intelligent connected vehicles, semiconductor devices, brain-computer interfaces (BCI), and BeiDou navigation chips. The standards are primed to propel the high-quality development of cutting-edge technologies.

According to documents from the National Standardization Administration, the national standard "GB/T 47346-2026" for information technology — BCI visual evoked potential data coding and decoding will become effective on October 1 this year.

In the BCI clinical research ward of the Second Affiliated Hospital of Chongqing Medical University, a patient receives rehabilitation treatment through "mind control." (PHOTO: XINHUA)

To reinforce power consumption safety, eight national standards have been issued for products including lithium-ion batteries, portable power supplies, and industrial power supply systems. Furthermore, 19 national standards related to electromagnetism, nanotechnology, communications and electroacoustic equipment and materials were launched to facilitate the safe and orderly development of relevant industries.

In the manufacturing sector, SAMR released 14 national standards, including those for intelligent ships and marine methanol-fueled engines, which cover ship design and construction, power systems, and safety protection. These standards aim to promote the safe, intelligent, and green development of China's shipbuilding industry.

Meanwhile, in response to the application and industrial development of new materials, 10 national standards for new materials, including silicon carbide single crystals and carbon fiber-reinforced composites, now have clearly defined technical requirements and testing methods.

In the field of ecological and environmental protection, two mandatory national standards on energy efficiency for products such as electric washing machines, washer-dryers, and air blowers have been issued, which play a vital role in promoting energy and water conservation and advancing green and sustainable development.

In addition, three national standards on greenhouse gas emissions accounting and reporting have been introduced, providing technical support for greenhouse gas emissions management.

# Building Smart Shield Against Natural Disasters

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Xu pointed out that the field of disaster prevention and mitigation for major infrastructure currently faces several urgent challenges: limited understanding of cascading multi-disaster mechanisms, lack of advanced big data-driven monitoring systems, and constraints in effective emergency response.

"Faced with shared needs of disaster prevention and mitigation, it is only natural for China and Pakistan to establish a cooperation platform," Muhammad said. He added that the joint lab was founded against this backdrop, with the goal of enhancing disaster management capabilities through sci-tech innovation and knowledge sharing.

***Consolidating the foundation of cooperation***

As early as 2014, the two sides conducted joint research on viscoelastic damping and resilience enhancement technology for post-earthquake structures, and completed Pakistan's first viscoelastic civil damping project at Vison High School.

"These early collaborations laid a solid foundation for the expansion of partner institutions and ongoing academic and technical exchanges between the two sides," Muhammad said.

"Since the establishment of the joint lab, the two sides have developed a regular exchange mechanism, leading to deeper cooperation in areas such as joint R&D, talent cultivation, standard formulation, and the promotion of applicable technologies," Chen Zhongfan, professor of Southeast University, said.

"The joint lab provides world-class facilities and cutting-edge technologies, helping us move toward a higher level of smart disaster prevention," Shahzada said. Through this platform, he secured an open fund project and is currently developing a construction guideline for stone masonry structures in Pakistan.

"Looking ahead, we plan to further promote the localization and implementation of Chinese technical standards, jointly formulate standards for seismic resistance, flood control, and smart monitoring, and facilitate the pilot application of Chinese technologies in major projects in Pakistan," Xu said.

***Planting friendship trees***

In September 2023, during the Chinese team's visit to Pakistan, both sides jointly planted three saplings on the campus of the International Islamic University in Islamabad.

"Today, the saplings we planted have grown, just as the fruits of our cooperation continue to multiply," Chen said. "By the time we see these 'friendship trees' again, our collaboration will have reached a new height."

The joint lab is cultivating more interdisciplinary technical talent in the field of smart disaster prevention for the two sides.

"As the host institution of the joint lab, we use smart disaster prevention as an entry point to deeply integrate civil disaster prevention and mitigation with multiple disciplines such as AI, big data, and information management," said Guo Tong, head of the School of Civil Engineering at Southeast University. "This provides the joint lab with a cutting-edge interdisciplinary theoretical and technical environment, as well as comprehensive support for talent cultivation."

Shah, a survivor of the earthquake 20 years ago, is studying smart disaster prevention technology at Southeast University. "After completing my master's degree this year, I plan to pursue my PhD here," Shah said. "In the future, I hope to apply the knowledge I have gained here in disaster prevention and mitigation efforts in my hometown."

**Case Study**

# Intelligent Mining Sparks Hegang Revival

By TANG Zhexiao & ZHU Hong

It's quiet at the world's largest intelligent graphite mine, where all-electric unmanned mining trucks travel steadily along the stepped mine roads, automatically handling loading, unloading and intelligent obstacle avoidance — all free of mechanical noises and human intervention.

That's the scene at the Yunshan Graphite Mining Area in Luobei county, Hegang city, Heilongjiang province, where 5G connectivity covers the entire open-pit mine like an invisible net.

A few kilometers away, in the smart control center, dozens of large screens display real-time data on mining, crushing, mineral processing and transportation. With the click of a mouse, operators ensure the entire mine operates like clockwork from this compact command hub.

This mining area is now undergoing a silent technological revolution, driving the former "coal city" to accelerate its integration into strategic emerging industries such as new energy, new materials and aerospace.

***Intelligent reshaping of production methods***

"In the past, mine production scheduling relied heavily on manual driving. Now, we can maintain stable mine operations from the dispatch center, with higher production efficiency and more reliable safety," said Yu Yuxing, general manager of Longxing Graphite Development Co., Ltd., a subsidiary of China Minmetals Corporation.

Equipped with a complete "5G + Industrial Internet" system, the Yunshan Graphite Mine has pivoted to full-process digitalization and intelligence, covering ore body modeling, directional blasting, mineral processing and deep processing. Real-time data transmitted to the backend is mined and analyzed by AI systems, enabling technicians to make decisions and issue instructions more efficiently and scientifically.

Currently, the Yunshan Graphite Mine is the world's largest intelligent graphite mine in terms of both single-reserve volume and production scale, with an annual capacity of six million tonnes. Many of its innovative achievements have been recognized with national and provincial-level awards.

The transformation in production methods reflects a shift in the city's development philosophy. Hegang sees intelligence as the core of the graphite industry's transformation, integrating digital transformation and smart mine construction into its overall industrial development plan.

According to an official from the Hegang Municipal Bureau of Industry and Information Technology, the city has rolled out dedicated policies to support digital transformation, guided enterprises in building smart workshops, and helped them secure nearly 100 million RMB from national and provincial subsidies and incentive funds.

***Promoting green transformation***

Inside the production workshops, graphite purification equipment operates quietly, pipelines are neatly arranged, and dust is barely visible — reflecting Hegang's commitment to green development.

As a carbon allotrope, graphite boasts lubricity, electrical conductivity, corrosion resistance and high-temperature resistance. It is a premium mineral resource in China and plays a crucial role in the development of high-tech industries.

"Graphite undergoes a remarkable transformation here, evolving from ordinary refined powder into high-end materials, with the entire process complying with green and environmental protection requirements," said Sun Nuo, technical director of China Minmetals (Heilongjiang) Graphite Industry Co., Ltd.

As one of China's largest graphite industry clusters, the Luobei Graphite Industrial Park implements unified collection, centralized treatment and standard-compliant discharge of all wastewater and solid waste, allowing enterprises to focus fully on production without environmental concerns.

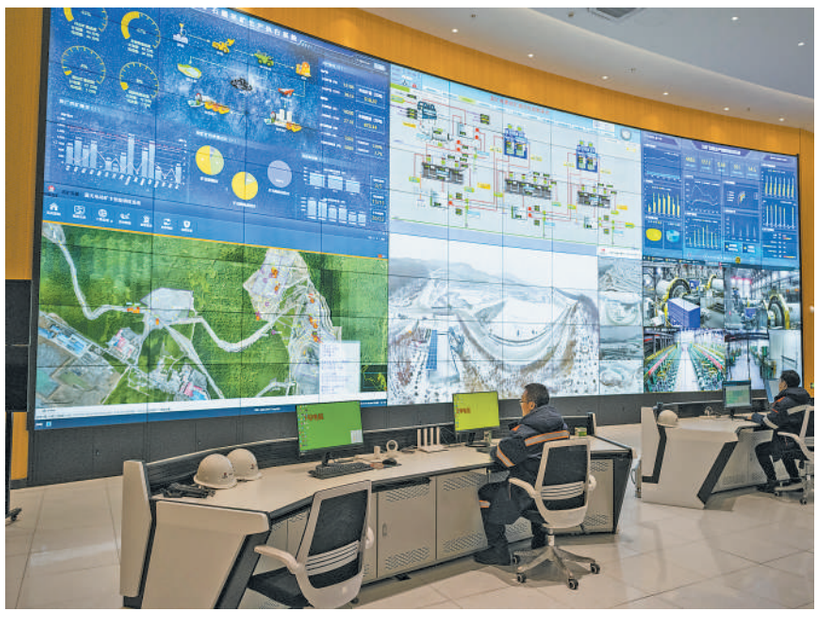
Building on this foundation, Hegang has continued to promote the integration of graphite resources and the popularization of green technologies. In 2019, China Minmetals Corporation built the country's first green zero-carbon industrial demonstration park, where clean energy is widely applied, transportation systems operate in a low-carbon manner, and mining and transportation processes are fully electrified.

Currently, the Yunshan Graphite Mine has reserves exceeding 1.5 billion tonnes, making it the world's largest single-crystalline graphite mine in terms of resource scale. At the end of 2025, the mine was successfully designated as a national green mine.

Home to 37 graphite enterprises, the city has a production capacity of 6.5 million tonnes of annual ore mining, 1.1 million tonnes of refined graphite powder, and 540,000 tonnes of deep-processed products.

Expanding its product lineup beyond traditional refined graphite powder, Hegang now offers high-value-added products such as ultra-high-purity graphite and high-performance anode materials, having built a complete industrial chain for new energy materials.

Hegang currently supplies more than 80 percent of the natural graphite raw materials used for anode production in China. The city plays a pivotal role in safeguarding the national new energy materials industry and its supply chains, as well as mitigating external resource shocks.



Staff work at the intelligent control center of China Minmetals (Heilongjiang) Graphite Industry Co., Ltd. in Luobei county, Hegang city. (PHOTO: XINHUA)