

CGN

Corporate Social Responsibility Report

2022



About This Report

This is the 12th corporate social responsibility (CSR) report issued by China General Nuclear Power Corporation in China since the CGN Corporate Social Responsibility Report 2011 was first released in 2012. In our annual CSR report, we disclose our CSR philosophy and practices in detail to stakeholders, and communicate and interact with them to jointly drive the sustainable development of the Group and the society.

Reporting Period

This Report covers the period from January 1, 2022 to December 31, 2022. To make the report comparable and forward-looking, some contents are extended to previous years or referred to later years.

Reporting Scope

The Report covers China General Nuclear Power Corporation and its subsidiaries and branches.

Compilation Conformance

- Guidelines to the State-owned Enterprises Directly under the Central Government on Fulfilling Corporate Social Responsibilities issued by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC)
- GRI Sustainability Reporting Standards (GRI Standards) issued by Global Sustainability Standard Board (GSSB)
- Guidance on Social Responsibility (ISO 26000:2010) issued by International Organization for Standardization (ISO)
- GB/T 36001-2015 Guidance on Social Responsibility Reporting
- The 2030 Agenda for Sustainable Development by the United Nations

Data Sources

All the data and information disclosed in the Report come from the official documents of the Group or the documents and reports officially issued by external organizations, which is reviewed by the relevant departments. Statistics in relation to our business in China do not include that of Taiwan Province.

Reliability Assurance

The Group assures that the report is free of false record, misleading statement or major omission.

Reference

For better expression and readability, China General Nuclear Power Corporation and its subsidiaries are referred to as "CGN", "the Group", or "we" for short in this report. CGN's subsidiaries are referred to as follows respectively: CGN Power Co., Ltd. is referred to as "CGNP", China Nuclear Power Operations Co., Ltd. is referred to as "CGN Operations", China Nuclear Power Engineering Co., Ltd. is referred to as "CGN Engineering", China Nuclear Power Design Co., Ltd. (Shenzhen) is referred to as "CGN Design Institute", China Nuclear Power Technology Research Institute is referred to as "CGN Research Institute", Suzhou Nuclear Power Research Institute is referred to as "CGN Suzhou Institute", Daya Bay Nuclear Power Operations and Management Co., Ltd. is referred to as "DNMC", Yangjiang Nuclear Power Co., Ltd. is referred to as "YJNPC", Fujian Ningde Nuclear Power Co., Ltd. is referred to as "NDNPC", Liaoning Hongyanhe Nuclear Power Co., Ltd. is referred to as "HYHNPC", Guangxi Fangchenggang Nuclear Power Co., Ltd. is referred to as "FCGNPC", Taishan Nuclear Power Joint Venture Co., Ltd. is referred to as "TNPJVC", CGN Huizhou Nuclear Power Co., Ltd. is referred to as "HZNPC", CGN Cangnan Nuclear Power Co., Ltd. is referred to as "CNNPC", CGN Lufeng Nuclear Power Co., Ltd. "LFNPC", CGNPC Uranium Resources Co., Ltd. is referred to as "CGNPC Uranium", CGN New Energy Holdings Co., Ltd. is referred to as "CGN New Energy", CGN Energy International Holdings Co., Ltd. is referred to as "CGN Energy International", CGN Nuclear Technology Development Co., Ltd. is referred to as "CGN Nuclear Technology", Shanghai Engineering Science & Technology Co., Ltd is referred to as "Shanghai Technology", Beijing Guangli Nuclear System Engineering Co., Ltd is referred to as "Guangli Nuclear", CGN Environment Protection Industry Co., Ltd. is referred to as "CGN Environment Protection", CGN Capital Holdings Co., Ltd. is referred to as "CGN Capital", and CGN Services Group Co., Ltd. is referred to as "CGN Services". Names of CGN's branches are in the form of "Region Name + Branch" and names of nuclear power bases are in the form of "Region Name + Nuclear Base".

Report Access

The report is available in both Chinese and English. In case of discrepancy, the Chinese version shall prevail. You can download the electronic report from our website www.cgnpc.com.cn. If you have any questions or suggestions about the report, you can contact us (see the back cover of the Report).

Contents

Message from the Chairman	003	Corporate Governance	021
CSR Feature	005	Sustainability Management	025
About CGN	017		

Safe Operations 029

Safety Management	031
Quality Projects	034
Operational Safety	039
Occupational Health	043

Innovation-driven Development 045

Reform and Innovation	047
Independent Innovation	049
Digital Transformation	054
IPR Protection	057
Contribution to the Industry	058

Green and Low-Carbon Development 059

Environmental Management	061
Tackling Climate Change	062
Protection of Clear Water and Sky	065
Resources Conservation	068
Environmental Services	069
Biodiversity Conservation	069

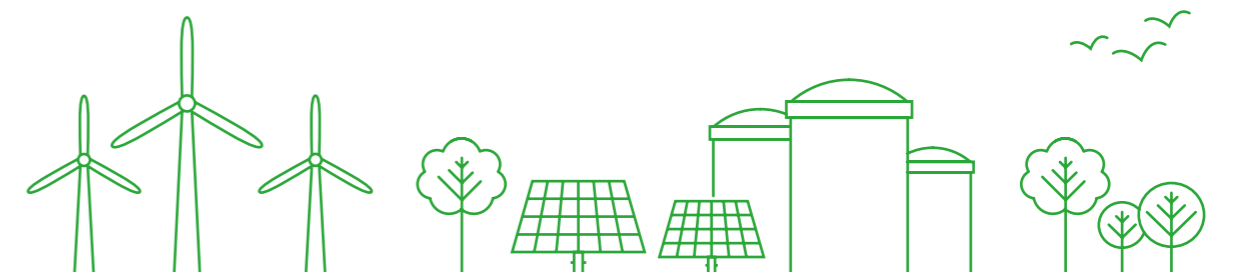
Employee Development 073

Employee Rights	075
Employee Growth	077
Employee Care	081

Harmonious Community 087

Rural Vitalization	089
Community Development	093
Energy Science Popularization	095
Corporate Philanthropy	097
Win-win Cooperation	099

Outlook	103
Performance Data	104
GRI Standards Content Index	107



Message from the Chairman

The year 2022 marked a milestone in the history of the Party and the country. The 20th CPC National Congress was successfully convened, drawing up a grand blueprint for comprehensively building a modern socialist country. Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era and with the goal of studying and publicizing the guiding principles of the 20th CPC National Congress, CGN is committed to implementing the decisions and arrangements of the CPC Central Committee and the State Council and meeting the requirements of the State-owned Assets Supervision and Administration Commission of the State Council (SASAC). As a result, we have forged ahead to strive for high-quality development and nuclear safety by upholding the pioneering spirit and innovation. As of the end of 2022, CGN's assets totaled RMB 912.7 billion, with businesses covering 16 countries and regions around the world and a total installed capacity for clean energy of 77 GW. We had been rated A in the business performance assessment by SASAC for nine consecutive years and "Double A" in term assessment for three consecutive terms. Leveraging our role as the vanguard for implementing new development philosophy, pursuing innovation-driven development and implementing major national strategies among central SOEs, we have made great contributions to stabilizing the economy, ensuring growth and promoting development.

Ensuring nuclear safety to maintain industry-leading production and operation

CGN is committed to the fundamental principle of "safety first, quality foremost and, pursuing excellence." While implementing the work style of "Strict Compliance, Prudent Decision-making, Detail-oriented and Fact-based Approach", we continue to improve work safety performance. In accordance with the requirements of the CPC Central Committee, the State Council and other higher authorities and under the leadership of the Party Committee of CGN, we made comprehensive power supply plans of the highest and strictest standards, and completed a wide range of major power supply tasks during the 20th CPC National Congress and Beijing 2022 Winter Olympic and Paralympics. In 2022, CGN had 26 in-service nuclear power units in stable operation, 79.2% of NPPs achieved the world's advanced level in WANO indicators and the average capacity factor of CPR units reached 93.6%, a world-advanced level in WANO indicators for the 5th consecutive year. Unit 1 of LingAo Nuclear Power Plant had been running safely for around 6,000 days, shattering world records. After four years of preparation, Daya Bay Nuclear Power Base first unveiled the Chinese Technical Specification, marking that China had embarked on a path of independent development of its Generation II nuclear power technologies. Unit 6 of Hongyanhe NPP was put into operation. CGN's ninth nuclear power base, Lufeng NPP, started construction. The batch construction of 7 Hualong One units was on the agenda (Unit 3 of Fangchenggang NPP was put into commercial operation on March 25, 2023). Jiazi project in Shanwei, the largest offshore wind power project of grid parity in China, started operation. CGN's Edra Melaka Power Plant (EMPP) in Malaysia, the largest natural gas generation project in Southeast Asia, finished construction. The South China Atomic Energy Science and Technology Innovation Center started construction. To conclude, we have made great strides in the construction of major projects.

Leveraging the multiplier effect to achieve independent technological innovation

We deepen the reform across the board to unleash the internal driving force for business development. Meanwhile, we push forward the innovation-driven development strategy and enhance the drivers of independent innovation, collaborative innovation, technological and institutional innovation, advancing toward the goal of becoming a world-class clean energy group. In 2022, CGN continued to advance the "1+4+X" reform, as part of the three-year action plan for SOE reform, in a targeted, dynamic and effective manner and with emphasis on actual effects. As a result, all tasks were completed, a number of institutional obstacles removed, the management system reshaped and the market-oriented development mechanism promoted, injecting strong impetus for high-quality development. Besides, we have intensified our efforts to build CGN into a cradle for original advanced nuclear technologies and accelerated the construction of two regional innovation centers: the South China Atomic Energy Science and Technology Innovation Center and the Yangtze River Delta Emerging Industry Technology Innovation Center. In the meantime, we have initiated the establishment of a joint R&D center for equipment localization, organized 87 upstream and downstream partners and deployed 81 independent R&D tasks, thus taking the initiative firmly in our hand for nuclear energy development. We also have cultivated seven national-, provincial-, and municipal-level "little giant" specialized and sophisticated enterprises, to accelerate independent innovation.

Fulfilling our responsibility and mission and highlighting our exemplary role in CSR performance

We give full play to our role as the main driver for national clean energy development. We continue to promote the high-quality development of clean energy, contributing to China's goal of carbon peak and carbon neutrality. Meanwhile, we make full use of our industrial edges to promote rural vitalization in all respects through targeted assistance and based on an approach to increasing their confidence and helping them acquire knowledge and skills, which demonstrates CGN's strong sense of responsibility as a central SOE. Taking the mission of "Developing clean energy to benefit mankind," we work to develop premium nuclear power and lead the development of the new energy sector so as to provide safe, reliable, clean and efficient energy for the society. In 2022, CGN generated 301.663 TWh of on-grid electricity, equivalent to the reduction of 81.815 million tons of standard coal consumption and 223 million tons of CO2 emissions or the increase of 610,600 hectares of afforestation area, contributing to the goals of carbon peak and carbon neutrality and mitigating climate change. In 2022, we continued the deep integration between industrial development and rural vitalization, and adopted the EBI technology for special waste treatment to address the landfill leachate overflow in Leye. The EBI Agricultural Products Preservation Industry Development Project in Baize was selected to be in the first batch of typical cases of social assistance by the National Rural Revitalization Administration. The Phase I of the CGN wind power project in Leye distributed its first dividends of RMB 4.58 million to 63 villages. On average, each village's collective income increased by over RMB 70,000. The project was voted among the best practices of the Third Call of Global Solicitation on Best Poverty Reduction Practices. CGN has been rated "Excellent" in the evaluation of SOEs for paired-up assistance for four consecutive years.

Enhancing Party leadership and Party building

We study, publicize and implement the guiding principles of the 20th CPC National Congress, strengthen political guidance and loyalty to the Party, develop Party leadership and Party building, work to improve the quality of our Party building work, and safeguard the high-quality development of CGN. Since the success of the 20th CPC National Congress, all subsidiaries of CGN have made it a major political task at present and in the future to study, publicize and implement the guiding principles of the Congress. In 2022, meetings were convened and speeches given by executives, experts and scholars at major construction sites on a regular basis, to popularize and explain the guiding principles of the 20th CPC National Congress among the employees. We work to promote full and rigorous Party self-governance unceasingly. In 2022, the Party organizations of CGN were committed to rigorous self-governance and the spirit of self-reform, achieving fresh results in building a clean government and anti-corruption campaign. CGN's Party organizations strengthened the Party's political construction and "two upholds" (to uphold Comrade Xi Jinping's core position on the CPC Central Committee and in the Party as a whole and uphold the Central Committee's authority and its centralized, unified leadership). They fulfilled responsibilities to rule and govern the Party according to law and improved the supervision mechanism against corruption. Officials were well educated to avoid slipping into corruption. We rolled out political inspections and enhanced the performance of inspections and rectifications.

The year 2023 kicks off efforts to implement the decisions of the 20th CPC National Congress, and is a crucial year for implementing the 14th Five-Year Plan. Therefore a great job throughout the year is of great significance. Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, we will fully implement the guiding principles of the 20th CPC National Congress and carry out high-quality education sessions to develop a deep understanding of the decisive significance of establishing Comrade Xi Jinping's core position on the CPC Central Committee and in the Party as a whole and establishing the guiding role of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era; become more conscious of the need to maintain political integrity, think in big-picture terms, follow the leadership core, and keep in alignment with the central Party leadership; stay confident in the path, theory, system, and culture of socialism with Chinese characteristics; and uphold Comrade Xi Jinping's core position on the CPC Central Committee and in the Party as a whole and uphold the Central Committee's authority and its centralized, unified leadership. We will follow the arrangement of the Central Economic Work Conference, seek progress while maintaining stability to apply the new development philosophy and build the new development paradigm. We will forge ahead with our goals and tasks with fortitude and resilience and build CGN into a world-class enterprise of high-quality development, contributing more to the Chinese modernization.

Yang Changli

Party Secretary and Chairman
China General Nuclear Power Corporation



Continuing the founding spirit of the People's Republic of China, the Communist Party of China (CPC) remains even more vigorous after a century of existence. As a clean energy group led by the Party, CGN followed the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era and its main task to set the stage for the upcoming 20th CPC National Congress. After the Congress, we earnestly studied, publicized and implemented its guiding principles, and continued to consolidate and build on the outcomes of the National Party Building Conference of SOEs and those of the Party history education campaign. By doing so, we endeavor to strengthen the Party leadership and Party building across the board and to pursue Party-led high-quality development, so that we can give full play to our role as the mainstay of the country, and contribute to the development of socialism with Chinese characteristics in the new era.

Acting on the Party spirit

and building up CGN strengths

CGN works to implement the major decisions and coordinated plans of the CPC Central Committee and the SASAC, and makes it a political imperative to study, publicize and implement the guiding principles of the 20th CPC National Congress (hereafter referred to as the Guiding Principles) hereafter. Yang Changli, Party Secretary and Chairman of CGN, set "Six Standards" for the implementation of the Guiding Principles on all fronts and made it a driving force for better business practice.



Learning the Guiding Principles

- After the 20th CPC National Congress was convened, the Party Committee of CGN convened four meetings, including two learning sessions for the central theory learning group, to communicate the Guiding Principles.
- We held a meeting to mobilize about 1,500 participants composed of executives and middle management of secondary and tertiary subsidiaries.
- We posted the Work Plan on Learning and Implementing the Guiding Principles of the 20th CPC National Congress and organized special workshops to educate employees.
- The Party Committee of our 24 subsidiaries promptly organized central theory learning groups and special workshops to learn the Guiding Principles.



Formulating working plans

- We formed a leading group responsible for communicating the Guiding Principles and four guidance groups and set up a leading group office and four tour guidance groups. We nailed down 48 working plans for the Group and 38 for subsidiaries with clear division of responsibilities to advance the learning, communication and implementation of the Guiding Principles in a coordinated way.



Supervising the implementation work

- The four tour guidance groups earnestly performed their duties of "assessment," "participation" and "examination": assessing subsidiaries' working plans, participating in Party branch meetings, and conducting at least one on-site survey in each subsidiary, to effectively provide targeted supervision.



Communicating the Guiding Principles

- To communicate the Guiding Principles, we launched special columns on stream media, for instance on newspapers, websites, electronic bulletin boards and mobile applications, to report on concrete actions, typical cases, results of innovations in learning, publicizing and implementing the Guiding Principles and upbeat mentality of CGN employees.



Mobilizing Party organizations

- Under the Party leadership, CGN's Party member groups and Communist Youth League member groups unveiled a comic series on Internet platforms, and organized a quiz on the Guiding Principles and a theme reading on the 20th CPC National Congress, among other learning activities with distinct features, attracting a wide range of employees to learn and practice the Guiding Principles.



Fulfilling tasks and goals

- Party organizations at all levels, acting on the Guiding Principles, not only fulfilled their annual tasks, but made plans for the long term. They are striving for excellence to realize high-quality development.

22

Party lectures given by leaders of the Party Committee of CGN at Party branches

644

Learning sessions under the "top-of-the-agenda" mechanism at the Party Committees of CGN and secondary subsidiaries

100%

Scale of mobilization and coverage of the theory-learning of the Guiding Principles



Case Practicing investigation-based learning

We innovatively practiced investigation-based learning, under which a three-step model took effect to integrate learning, investigation and practice, and adhered to a problem-oriented approach to surmounting the obstacles. Leaders of the Party Committee not only explained the Guiding Principles to frontline workers, but conducted in-depth investigations to seek solutions to the CGN's development bottlenecks and implement the Guiding Principles in a down-to-earth manner.



Yang Changli, Party Secretary and Chairman of CGN, gives a Party lecture on the Guiding Principles during his visit to Fangchenggang NPP, Guangxi



Gao Ligang, Deputy Party Secretary and President of CGN, gives a Party lecture on the Guiding Principles during his visit to HYNPC.



Li Li, Deputy Party Secretary of CGN, gives a Party lecture on the Guiding Principles during her visit to CGN Operations



Shi Bing, Member of the Standing Committee of the Party Committee and Vice President of CGN, gives a Party lecture on the Guiding Principles during his visit to LFNPC.



Cheng Yongping, Member of the Standing Committee of the Party Committee and Secretary of the Discipline Inspection Commission of CGN, gives a Party lecture on the Guiding Principles for all cadres responsible for discipline inspection.



Pang Songtao, Member of the Standing Committee of the Party Committee and Vice President of CGN, gives a Party lecture on the Guiding Principles during his visit to CGN Suzhou Institute.



He Haibin, Member of the Standing Committee of the Party Committee and Chief Accountant of CGN, gives a Party lecture on the Guiding Principles during his visit to CGN Services.



Guo Limin, Member of the Standing Committee of the Party Committee and Vice President of CGN, gives a Party lecture on the Guiding Principles during his visit to CGN Engineering.



Li Yilun, Member of the Standing Committee of the Party Committee and Vice President of CGN, gives a Party lecture on the Guiding Principles to domestic and international subsidiaries engaged in new energy and technology-based environmental protection industries.



A letter to the Party



CGN will bear in mind that SOEs are the backbone of the Party in leading and strengthening the country. Guided by the Guiding Principles and with a thorough understanding of national strategies, we will advance the construction of major scientific research infrastructure and demonstration projects, facilitate the delivery of major projects on the ground, consolidate the achievements of reform and make new strides in reform, development and Party building. While taking concrete actions to build us into a world-class clean energy group, we will continue to promote and implement the Guiding Principles in the Group.

—**Yang Changli,**
Party Secretary and Chairman of CGN



The success of the 20th CPC National Congress sounded the bangle for us to charge forward in the new journey and the new era. We will dedicate more to scientific research to develop a digital control system that is safer, stronger and more reliable for major national projects, safeguarding nuclear power plants.

—**Sun Yongbin,**
Project Director of FirmSys, the "central nervous system" of nuclear power plants in China

The 20th CPC National Congress and its report rallied the Chinese people to strive for further progress. Party members of CGN watched the Congress live via different channels and burst into applause from time to time while listening to Xi Jinping's report. After the Congress kicked off, CGN's Party members shared their thoughts based on realities.



General Secretary Xi Jinping's report is really inspiring! Nuclear power independence is the inevitable choice for China to build up strength, independence and innovation in science and technology. Hualong One is the 3rd-generation nuclear power technology that China enjoys intellectual property. It has helped the upgrading of the Chinese nuclear power manufacturing sector, supporting the overall development of China's nuclear power sector. To fulfill the goals of carbon peak and carbon neutrality, we will build a batch of Hualong One nuclear power plants to supply safe and stable clean energy for China's social and economic development.

—**Wang Xin,**
Chief Architect of Hualong One



In this new era, central SOE employees should align personal dreams with the needs of national development and go to where the country most needs us. Husab Mine is a model project under the Belt and Road Initiative, as well as China's largest investment project in Africa. It's my honor to have been working here in the past decade. I will preserve fortitude and resilience in my work to make Husab Mine the "ballast" of China's nuclear power vessel.

—**Zhang Huaifeng,**
Mining Department of CGN Swakop Uranium

Enhancing Party leadership

at the primary level

Improving the Party's fundamental institutions

- We formulated working rules for the Party Committee and its Standing Committee and established a tenure system for delegates to the Party congress.
- We issued an outline of actions for pursuing Party-led high-quality development and advanced six major actions on political leadership, sheer patriotism, effective governance, team building, organizational foundation and disciplinary rules, thus facilitating the mutual reinforcement between and integration of Party building and business development.
- We sorted and prepared documents and materials needed and made sound arrangements for the evaluation conducted by the SASAC Party Committee on our performance of Party building responsibilities, as per the 24 key points raised for central SOEs.

Building Party's primary-level organizations

- We convened the first Party congress of CGN, and realized the goal of "deliberating and adopting a report, electing capable leaders, demonstrating a good working style and setting an example for the primary level". We convened the conference of all directly affiliated Party members, embarking on a new journey toward building CGN into a first-class central SOE.
- To address imperatives and grave challenges, we gathered and posted 1,078 task forces of Party members and 215 teams to frontlines.

The primary level is what underpins the vitality and work of the Party. CGN gives priority to the Party's fundamental institutions, organizations and teams to lay solid foundation for Party building. By doing so, the leading role of Party building can be leveraged to the maximum extent and the Party branches at primary level will be strong enough to support the whole Party.

Building primary-level Party teams

- In 2022, we recruited 207 new Party members and gave 3,035 Party lectures, with 320,000 participants.
- We selected 10 youth role models of CGN and a batch of model employees, including the "Great Artisan" Chen Yongwei. Moreover, 40 individuals and teams won the provincial May Fourth awards.
- We made sure the Party building leads the team building. We organized a Guiding Principles education event themed with "Setting the Stage for the 20th CPC National Congress, Following the Party and Forging Ahead on a New Journey" and implemented the Youth Marxist Cultivation project for the young employees.

Amplifying Party's voices

- The Party Secretary published two signed articles on Study Times, and CGN was reported by CCTV four times and covered by mainstream media including People's Daily and Xinhua News Agency for over 6,000 times.
- We assembled more than ten thousand volunteers in 300 environmental awareness events themed with "green development underpinned by carbon peak and carbon neutrality" in 20 provincial regions at home and abroad, which received over 150 million views on the Internet.

Case CGN convenes its first Party congress

CGN held its first Party congress on April 16-18, 2022 in Shenzhen. The event reviewed CGN's achievements in reform and development and Party building since the 19th CPC National Congress, and nailed down the guiding principles, goals, overall requirements and main tasks for the next five years. The congress elected members of the First Party Committee and Discipline Inspection Committee of CGN, and realized the goal of "deliberating and adopting a report, electing capable leaders, demonstrating a good working style and setting an example for the primary level". On behalf of over 15,000 Party members and nearly 45,000 employees, 140 delegates from CGN's Party organizations gathered together to offer suggestions on the Company's reform and development and Party building.



⊙ Yang Changli delivers a report on the congress entitled "Keeping in mind Xi's remarks for the new era and working tirelessly to build CGN into a world-class clean energy group"

Case The Party Committee of companies directly affiliated with CGN convenes a plenary session of Party members

On November 19, 2022, to study, publicize and implement the guiding principles of the 20th CPC National Congress and facilitate the implementation of major decisions of the 20th CPC National Congress, the Party Committee of companies directly affiliated with CGN convened a plenary session of Party members in Shenzhen. At the meeting, Yang Changli delivered a report entitled

"Following unwaveringly the guidance of the CPC 20th National Congress, and work together to build a first-class SOE headquarters at an earlier date." In strict compliance with the election rules, the congress elected new members of the Party Committee of CGN and passed the resolution on the report on the work of the Party Committee.



Case Building a strong Party and facilitating the integration of Party building and business development

With a focus on nuclear security, the Party Committee of NDNPC designated areas that are the responsibilities of Party members, set up task forces and volunteer teams of Party members, launched an action to correct misconduct around Party members, and thus formed a new model of integrating Party building with business development. Taking the approach of top-level design by the Party Committee followed by pilot schemes at Party branch and revision and promotion, NDNPC imbued discipline, management, targets and strengths into Party building projects, involving over 12,000 participants. In the third outage of Unit 4 of NDNPC, the low water maintenance team and valve maintenance team made outstanding achievements, setting the company record with the shortest low-water maintenance duration in the outage and the shortest window for four major international benchmarking plans. The radiographic testing efficiency increased by 26% year on year and the in-service inspection efficiency by 20% compared to 2021.



Conducting full and rigorous Party governance

We will never stop improving Party conduct, promoting integrity, and combating corruption. With a thorough understanding of the CPC Central Committee's overall requirements on conducting full and rigorous Party governance, we put discipline and rules before everything else and strive for in-depth Party administration and a clean and positive political environment.

Carrying out inspection and supervising rectification

To strengthen inspection and rectification, we formulated the Procedure for Inspection and Rectification and Rules of Assessing Inspection and Rectification, and established a mechanism to review the materials required for both actions. We complied the Report on the Assessment of Internal Inspection and Rectification and encouraged the functional departments at the headquarters to strengthen the application of inspection results.

Optimizing the discipline inspection policies

- We revised the Regulations on the Punishment for Employee Misconducts and compiled the Rules of the Implementation of Penalties, which have been strictly put into effect.
- We complied and revised more than 20 discipline inspection documents to improve the inspection system built on the Working Rules for the Discipline Inspection Committee. We unveiled a plan to improve the quality of disciplinary reviews and standardized the management of such work carried out by our subsidiaries.

Fostering a culture of integrity

- We launched the discipline education month and held anti-corruption meetings.
- We organized Party committees, discipline inspection committees and primary-level Party organizations of subsidiaries to carry out moral education, with over 170 lectures given to 6,943 participants, covering 891 primary-level Party branches.
- We gave Party lectures on integrity to participants of youth training workshops, and encouraged them to have a correct view of the exercise of power, perform their duties and meet the Party standards.
- The secretaries of the discipline inspection committees of our subsidiaries held 271 talks with young officials on integrity, to instill in them the requirements for integrity.

100%

Coverage of anti-corruption policies and procedures among business partners

100%

Proportion of employees who received anti-corruption training

100%

Coverage of corruption risk assessment at operation units



Case CGN holds the first plenary session of the anti-corruption group on improving Party conduct, promoting integrity and fighting corruption

On November 7, 2022, CGN convened its first plenary session of the anti-corruption group on improving Party conduct, promoting integrity and fighting corruption in CGN Headquarters Building. The session reviewed and approved the operating rules for the anti-corruption group, discussed the evolving dynamics it faced and assigned key tasks for the next year. Cheng Yongping, Member of the Standing Committee of the Party Committee of CGN, Secretary of the Discipline Inspection Committee and head of the anti-corruption group, presided over the session and put forward specific requirements for the group's follow-up work.



CSR Feature Writing a New Chapter of High-quality Development and Striving Forward in the New Journey Toward Chinese Modernization

The report to the 20th CPC National Congress underscores that "To build a modern socialist country in all respects, we must, first and foremost, pursue high-quality development." As a participant in and a witness to the great changes in the first decade of the new era, CGN has always been breathing the same air as the people, and sharing the same future with the country. Under the strong leadership of the CPC Central Committee with comrade Xi Jinping at its core, CGN has been applying the new development philosophy featuring innovation, coordination, green, sharing and inclusiveness, and takes the initiative to fit into the new development paradigm. CGN will stick to its strategic position and shoulder more responsibilities, making greater contributions to the Chinese modernization with high-quality development.

Striving for innovation-driven development by scaling the summit of science and technology

Innovation is the primary driving force of development. Over the past decade, CGN has been committed to innovation-driven development. Oriented toward the four aspects stressed by the CPC Central Committee, namely, the global frontiers of science and technology, national economic development, the major needs of the country, and the health and safety of the people, the Group has established a "three-in-one" technological innovation model, nine national R&D platforms and a number of scientific research platforms and facilities including several provincial/ministerial and Group-level ones. We have been steadily pushing for self-reliance in technological innovation in energy science, and yielded such achievements as Hualong One, FirmSys and electron-beam irradiation technology. CGN will continue to scale the summit of science and technology and contribute to China's greater self-reliance and strength in science and technology and modernization.

Hualong One is the fruit of China's independent, integrated and institutional innovation. As one of the 3rd-generation nuclear power plant models highly recognized by the global market, Hualong One passed EUR and GDA certificates and is now being installed in many of our plants.

CGN's self-developed digital nuclear grade control platform FirmSys is the first of its kind in China. It ensures safe and stable operation of China's nuclear power units.

The world-leading electron beam technology co-developed by CGN and Tsinghua University is applied in 10 areas and 17 demonstration projects, enabling many projects to be the first in the country in their specialized area.



Case Hualong One certified by GDA

At 9:00 a.m. BST on February 7, 2022, UK Office for Nuclear Regulation (ONR) and the Environment Agency (EA) issued a joint statement to confirm Hualong One's certification by the General Design Assessment (GDA) and issued Design Acceptance Confirmation (DAC) and Statement of Design Acceptability (SoDA) to Hualong One on the same day.



Advancing coordinated development and steady operation

Over the past decade, CGN has been sticking to its strategic position, optimizing its industrial layout and building a "6+1" industrial system. The Group has been committed to cultivating strategic emerging industries while growing its main businesses and enhancing internal and external coordination and cooperation. As a result, CGN has achieved stable operation of higher quality and become one of the most reliable forces of the Party and the country.

Nuclear power

We work vigorously to develop the nuclear power industry with a commitment to the principle of "developing nuclear power in an active, safe and orderly manner." With a responsible attitude to the Party, the country and the people, we put nuclear security before everything else by securing the six key fronts of nuclear power plants over safety, quality, schedule, investment, technology and pollution and predicting and control risks to guarantee definite nuclear security. In the past decade, CGN launched 20 nuclear power units and started the batch construction of nuclear power plants and their collective management. By the end of 2022, 7 Hualong One units of CGN had been in construction, among which the Unit 3 of Fangchenggang NPP started commercial operation on March 25, 2023, and 26 in-service nuclear power units in safety operation, delivering safe and clean power to the society.

Wind power

CGN boasts both onshore and offshore wind turbines. Our offshore operating capacity of wind power registered 3.66 GW, accounting for over 10% of the market share, with many firsts in the sector: we participated in the construction of the first large-scale offshore wind power project in China and developed and built offshore wind turbines that were the first to meet the "10 km, 10m" standard. On June 29, 2022, China's first gigawatt-level onshore wind power base, – the CGN Hinggan League Phase I Project – was connected to the grid.

Solar power

We work to expand the scale of solar power projects and own industry-leading capacities of project operation and maintenance and R&D. We leverage the strength of solar thermal technology, with the largest scale of "solar thermal+" projects in the industry. In 2018, China's first large-scale commercial trough-type solar thermal demonstration project, CGN Qinghai Delingha 50MW trough solar thermal project, was put into operation, making China the 8th country with large-scale solar thermal technology.

Over the past decade, CGN has been working to meet local needs with its expertise and integrate into the state strategy of regional development at a faster pace. The Group has been strengthening strategic cooperation with local governments, enterprises along the industrial chain and high energy load enterprises to form new patterns for mutual development, and grasping the opportunity to integrate its own development into the new develop paradigm, thereby achieving high-quality development while serving the country.

Case Unit 6 of Hongyanhe NPP put into commercial operation

On June 23, 2022, subsequent to the successful 168-hour trial, Unit 6 of Hongyanhe NPP, Liaoning, was officially ready for commercial operation, after which the six units of Hongyanhe NPP Phase I and Phase II were fully put into operation. Hongyanhe NPP then emerged as a nuclear power plant of the largest in-service installed capacity at home.



Case A multi-functional large-scale clean energy base built with Maoming Municipal Government

On July 7, 2022, CGN signed a strategic cooperation agreement with Maoming Municipal Government. Gao Ligang, Deputy Party Secretary and President of CGN, showed up at the event and witnessed the signing of the agreement. According to the agreement, CGN shall give full play to the advantages of the entire clean energy industry chain and build a multi-functional large-scale clean energy base in Maoming by launching comprehensive projects that combine the strengths of wind power, PV power, pumped storage and new chemical energy storage there, thereby contributing to its high-quality development.



Pursuing green development to jointly build a beautiful China

As a central SOE in the clean energy sector, CGN takes the initiative to align its business with China's drive to meet its carbon peak and carbon neutrality goals. The Group leverages its demonstration and leading roles as a main force of the clean energy industry to develop such clean energy sources as nuclear power, wind power and solar power, and acts upon the philosophy that "Green waters and lush mountains are invaluable assets," contributing to Chinese

modernization based on harmonious coexistence between man and nature.

As a world-leading clean energy supplier and service provider, by the end of 2022, CGN had 6 nuclear power bases in operation and 3 under construction and over 500 new energy stations, which are drivers for China's transition to green, low-carbon energy.

30

Provincial regions covered with new energy projects

10,000+

In-service wind turbines

10.13 GW

Installed solar power capacity



Case "The Backbone of a Rising China: Central SOEs"



In the CGN episode of the documentary series "The Backbone of a Rising China: Central SOEs" produced by the SASAC, Li Li, Deputy Party Secretary of CGN, introduced the development history of CGN, the significance of its brand concept, CGN's achievements in sustainable high-quality development and the stories of frontline employees. The documentary shored up CGN's brand influence.

20+

Mainstream media including People's Daily, Xuexi Qiangguo and SASAC Platform

100

Posts and retweets

51

million Views



Scan the QR code to watch the documentary on CGN

Case The first nuclear-powered heating project in Northeast China

To fulfill China's goal of carbon peak and carbon neutrality, HYHNPC has been bolstering the application of nuclear power and nuclear-powered heating projects in neighboring residential neighborhoods. On November 1, 2022, HYHNPC's nuclear-powered heating demonstration project officially kicked off. It was the first one in Northeast China and benefits nearly 20,000 residents in Hongyanhe Town, Wafangdian, Dalian. It is estimated that the project each year will reduce the consumption of standard coal by 5,726 tons, CO2 by 14,100 tons, soot by 209 tons, SO2 by 60 tons, NOx by 85 tons and cinder by 2,621 tons. That will have remarkable environmental benefits and can effectively improve the atmosphere around heating areas.



👉 The heating system can keep the temperature in the classrooms of Honghe Middle School around 26°C.

Opening up to integrate into the Belt and Road Initiative

While focusing on domestic business, CGN is also tapping into international markets and integrating into the Belt and Road Initiative (BRI) with high-quality cooperation projects. Over the past decade, CGN has developed a global network of offshore new energy business, holding 46 projects and leading central SOEs with its tremendous installed electric capacity and 13.25 GW of total installed capacity of offshore holding companies.



Case CGN's power plant in Malaysia starts commercial operation

On March 31, 2022, CGN's Edra Melaka Power Plant (EMPP) in Malaysia started commercial operation. With the world's most advanced and efficient gas fire technology, EMPP is equipped with combined cycle generators, with over 60% generation efficiency that can supply 10% of the total power demand of 4 million households in Peninsular Malaysia with stable supply of clean electricity. During the construction period of EMPP, we created over 25,00 jobs for locals, brought expertise to facilitate local industrial and community growth and offered equipment procurement and technical services for Malaysian subcontractors and supplier, contributing to the development of Malaysia.



Sharing development fruits with the people

CGN keeps in mind President Xi's instruction that "The people's aspiration for a better life is what we are striving for." Committed to "driving local economic growth and benefiting local people with high-quality projects," we actively promote the development of project areas, and share development achievements with local communities by improving the community environment and eliminating community poverty.

Over the past decade, by leveraging its role as the mainstay of the country among central SOEs and its development advantages, CGN has been exploring approaches to targeted poverty alleviation and rural vitalization with its own characteristics and vigorously implementing step-by-step measures to achieve both of them. The Group has done a great job in consolidating and building on the achievements in poverty alleviation so as to promote rural vitalization and build a beautiful countryside. CGN has been rated as "Excellent" in the assessment of SOEs' targeted assistance for four consecutive years.



Case CGN's EBI technology for food preservation project chosen as a best practice by the National Rural Revitalization Administration

In November, 2022, CGN's EBI technology for preservation of agricultural products project stood out from over 300 targeted poverty assistance projects launched by central SOEs, and was chosen by the National Rural Revitalization Administration as a best practice, together with five other practices of central SOE in providing targeted assistance.

CGN built and put into operation China's first EBI food preservation center for agricultural products in the source of origin in Baise, Guangxi, which serves farmers within 200 km. The technology helps lengthen the preservation period of kiwifruit from 40 days to over 100 and reduce the rate of mango rotting during storage by 30% to 50%, so that farmers can have a bigger the sales window and earn more income.



The past decade in data

RMB 31 billion
Total investment in technological innovation

9
National R&D platforms built

185
National scientific research projects launched

2
Second prizes of National Science and Technology Award

480+
Science and technology awards at or above provincial and ministerial levels and issued by national groups

1,150
International, national and industry standards compiled and revised

Innovation

17%
Compound annual growth rate

A
Rated by SASAC for 9 consecutive years

5.4 times
Growth of the installed capacity compared to 10 years ago

20
Nuclear power units in operation

5
Consecutive years CPR units had scored high in WANO performance indicators in terms of the average capacity factor

Coordinated development

77 GW
Global installed capacity for clean energy

2,036.5 TWh
Electricity generated

29.38 GW
Total capacity of in-service nuclear power units

1,686 million tons
Total CO₂ emissions reduced equivalent

35.15 GW
Total installed capacity for new energy at home

4,582,100 hectares
Afforestation area created equivalent

Green development

International business

46
New energy projects held worldwide

16
Countries and regions covered

13.25 GW
Total installed electricity capacity of offshore holding companies

No. 1
Among central SOEs in terms of total installed capacity of offshore holding companies and installed electricity capacity

Social contributions

RMB 510 million
Spent on rural vitalization and poverty alleviation

26
"Egret Classes" set up for education assistance

110,000+
Rural households in counties benefiting from CGN's targeted assistance

RMB 170 million
Spent on counties receiving targeted assistance

2,526
Students benefited

"Excellent"
in the assessment of SOEs targeted assistance for four consecutive years

Note: The above is the cumulative data from 2013 to 2022.

About CGN

Company Profile

China General Nuclear Power Group (CGN) is headquartered in Shenzhen, Guangdong Province and is a central SOE controlled by the State-owned Assets Supervision and Administration Commission of the State Council(SASAC). Committed to "developing clean energy to benefit mankind", CGN upholds the working style of Strict compliance, prudent decision-making, detail-oriented, and fact-based approach and strives to create a "6+1" industrial layout covering nuclear power, nuclear fuel, new energies, non-power nuclear technology, digitization, tech-based environmental protection, and industrial finance. The Group has three Hong Kong listed companies and two mainland listed companies.

Listed companies

- CGN Power 01816.HK; 003816.SZ
- CGN Mining 01164.HK
- CGN New Energy 01811.HK
- CGN Nuclear Technology 000881.SZ

Status in the industry

- among China's Top 500 Brands
- among top 100 multinational companies of China



The "6+1" Industrial Layout

Nuclear power

A key pillar business

- ⊙ A number of core products represented by Hualong One.
- ⊙ **27** in-service units with an installed capacity of **30.56 GW**, accounting for **54%** of China's total.
- ⊙ **7** nuclear power units under construction at home with a total installed **7.2 GW**, accounting for **30%** of China's total.
- ⊙ On-grid power generation from nuclear power in 2022: **198.375 TWh**.

*Note: Data was collected by the end of March 2023. Unit 3 of Fangchenggang NPP was put into commercial operation on March 25, 2023.

Nuclear fuel

A pillar for the development of nuclear energy sector

- ⊙ The total uranium resources under control can meet the 30-year refueling demand of **30** gigawatt-level nuclear power units.
- ⊙ The controlled production capacity exceeds **4,600 tons** each year, ranking among the **top four in the world**.
- ⊙ The Husab Mine CGN holds in Namibia is the largest open-pit uranium mine in the world and its uranium reserve is **the third largest**.

New energies

A key pillar business

- ⊙ **550** new energy projects in China with a total installed capacity of **35.1498 GW**, **60.046 Twh** of on-grid power generated from new energy.
- ⊙ **46** new energy projects outside China with a total installed capacity of **13.25 GW**, providing clean electricity to **15** countries and regions with **50 TWh** of on-grid power generated from new energy.

Non-power nuclear technology

A pillar business

- ⊙ "The "Hemei" electron beam technology for special waste treatment is the first of its kind at home and has reached the world-advanced level, currently used in over **10** demonstration projects for environmental governance.
- ⊙ A total of **500** sets of electron accelerators have been produced, the products are exported to nearly **10** countries including the Republic of Korea, Thailand, Malaysia and India.
- ⊙ **15** electron beam irradiation centers in China, equipped with **60** electron accelerators (sets) with a total power of **4,632 kW**.

Tech-based environmental protection

A priority business

- ⊙ **790,000 tons** of daily water supply and drainage capacity, "digital+" products applied in the demonstration projects in Jinxi, Jiangxi.
- ⊙ **24,000 tons** of hazardous solid waste treated each year, "gasification +" plasma gasification technology applied in Wuxi.
- ⊙ **18.48 million m³** of biogas and **120,000 tons** of organic fertilizer produced each year.

Digitization

A priority pillar-to-be business

- ⊙ Building core products such as nuclear power digital instrument & control system (DCS), special instrument control system and high-end industrial control system to achieve greater self-reliance and strength in science and technology.
- ⊙ The FirmSys, our home-grown "central nervous system" of nuclear power plants, is world-advanced, and even world-leading in some key technologies.
- ⊙ A demonstration project for the digital transformation of nuclear industry is being carried out, so is a visualization project of eight key equipment in nuclear power plants to improve nuclear security.

Industrial finance

A "booster" to industrial development

- ⊙ Adhering to CGN's strategic position in terms of industrial finance, becoming a "booster" to industrial development, an incubator for emerging businesses, an accelerator for technological innovation and an magnifier for capital appreciation to underpin the high-quality development of CGN's six businesses in the real economy.
- ⊙ Leading-edge research on new technologies, industry patterns and modes and development opportunities around the clean energy sector.

Overseas business development

Distribution of Overseas Holding Projects

Operating subsidiary or region	Number of projects	Installed capacity (MWh)
Edra Power Holdings Sdn Bhd	9	7,293.8
CGN Korea Energy	8	2,165.1
CGN Europe Energy	18	2,337.5
CGN Brazil Energy	10	1,444.8
Namibia	1	12

Our 2022

Comprehensive Cost Investment

Financial assets

RMB **912.7** billion

Total assets

15 %

Ratio of overseas assets

Safety investment

8

Enterprises that have completed work safety performance inspection

7,585

Emergency drills

Human resources

44,576

Employees in total

3,075

Employees by localized recruitment of international projects

Social relations

RMB **55.5112** million

Rural vitalization investment

RMB **46.5974** million

Total global donation

RMB **15.1** billion

Total tax payment

RMB **2.82** million

Total overseas donations

Working Style

Strict Compliance	Prudent decision-making	Detail-oriented	Fact-based Approach
<p>Strict Compliance</p> <ul style="list-style-type: none"> > Always work with strictness > Prudent attitude > Strict implementation > Stringent discipline 	<p>Prudent decision-making</p> <ul style="list-style-type: none"> > Prudent decision-making > Cautious operations 	<p>Detail-oriented</p> <ul style="list-style-type: none"> > Considerate > Careful 	<p>Fact-based Approach</p> <ul style="list-style-type: none"> > Down-to-earth > Fact-based approach > Do practical work > Seek actual effects

Comprehensive Value Creation

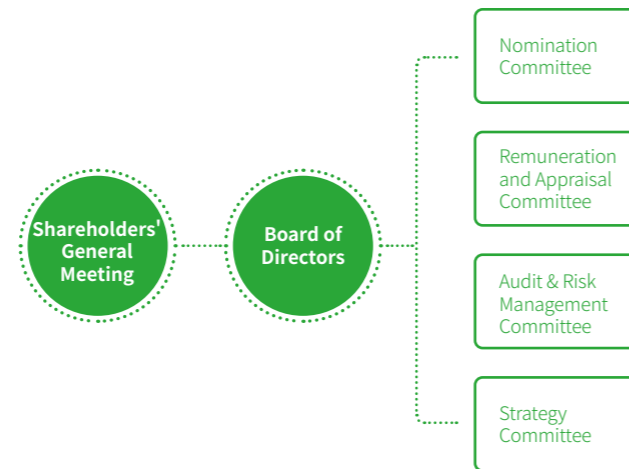
While creating business value, CGN also attaches importance to the creation of environmental value and social value.

Value creation	Stakeholders
<p>Business performance</p> <ul style="list-style-type: none"> Operating income: RMB 137 billion Overseas operating income: RMB 34.2 billion Ratio of overseas operating income: 25% Rated A in the business performance assessment by SASAC for nine consecutive years and "Double A" in term assessment for three consecutive terms. 	Shareholders and employees
<p>Safety performance</p> <ul style="list-style-type: none"> 79.2% of NPPs achieved the world's advanced level in WANO indicators, and the average capacity factor of CPR units reached 93.6%, a world-advanced level in WANO indicators for the 5th consecutive year Number of level-1 or above incidents defined in the International Nuclear and Radiological Event Scale: 0 Safety accident rate per million man hours: 0 	Employees and contractor employees
<p>Environmental performance</p> <ul style="list-style-type: none"> On-grid power generated from clean energy: 301.663 TWh On-grid power generated from clean energy equivalent to reduction of 81.815 million tons of standard coal consumption On-grid power generated from clean energy equivalent to the reduction of 223 million tons of carbon dioxide emissions 	All
<p>Employee development</p> <ul style="list-style-type: none"> Proportion of female employees: 16.76% Total employee training hours: 2.808 million hours Average training hours per employee: 141 Employee training coverage: 74% 	Employees
<p>Community development</p> <ul style="list-style-type: none"> Primary-level cadres on rural vitalization trained in total: 1,543 participants Training opportunities offered for rural vitalization pioneers: 1,175 Specialized and technical personnel trained: 1,131 participants 	Communities

Corporate Governance

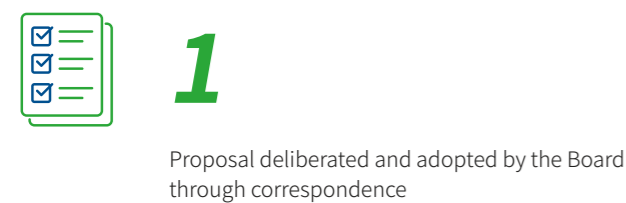
Board of Directors

In accordance with Chinese laws and regulations such as the Company Law, the Board of Directors of CGN has fully implemented the national requirements on the central SOE governance. We further regulate the development of the Board and continuously improve its standardized and efficient operation. Under the Board, there are four specialized committees: Nomination Committee, Remuneration and Appraisal Committee, Audit & Risk Management Committee, and Strategy Committee. They will give full play to their expertise and advantages to effectively support the decision-making of the Board.



Board operation

In 2022, confronted with the COVID-19 pandemic and the complex situation at home and abroad, the Board of Directors of CGN actively played the role in laying down strategies, making decisions, and guarding against risks, effectively guiding the Group to contribute to China's energy security and transition, and stabilize the fundamentals of the economy.



Highlights of 2022

Formulating strategies

The Strategy Committee considered the annual PBA (Plan-Budget-Assessment) plan, regularly reviewed the implementation of the annual strategic focus and tasks, and supervised the effective execution of the strategic plan.

Making decisions

Aimed at building a world-class enterprise with "excellent products and brand, leading edge in innovation, and modern governance," the Board made decisions on 30 major matters throughout the year.

Preventing risks

The Board urged the management to keep enhancing the control of the top 20 risks, in order to lay a foundation for stable, sound business development. It also stressed the importance of post-investment evaluation, listened to the report on the post-investment evaluation of projects approved by the Board since 2014, and urged the formation of closed-loop management.

Board composition

According to the Articles of Association, three directors of the Group underwent changes in 2022.

As of the end of 2022

The Board of Directors consisted of **8** directors

of whom, there are **6** directors recommended by the SASAC

including **3** outside directors

1 director is recommended by Guangdong Hengjian Investment Holding Co, Ltd.

1 employee director

The Board members are as follows



Yang Changli
Chairman



Gao Ligang
Director and President



Li Li
Director



Wang Hongjun
Director



Ma Li
Outside director



Bi Yaxiong
Outside director



Xu Haihe
Outside director



Huang Xiaofei
Employee director

Note: All of the positions above were effective as of the end of April 2023, and the Secretary of the Board of Directors is Fang Chunfa.

Management Team

In strict accordance with the requirements of relevant national laws and regulations, we have established a standardized management system to promote the Group's sustainable development through scientific and effective decision-making.



Yang Changli
Secretary of the Party Committee and Chairman



Gao Ligang
Deputy Secretary of the Party Committee, Director and President



Li Li
Deputy Secretary of the Party Committee, Director



Shi Bing
Member of the Standing Committee of the Party Committee, Vice President



Cheng Yongping
Member of the Standing Committee of the Party Committee, Secretary of the Discipline Inspection Commission



Pang Songtao
Member of the Standing Committee of the Party Committee, Vice President



He Haibin
Member of the Standing Committee of the Party Committee, Chief Accountant

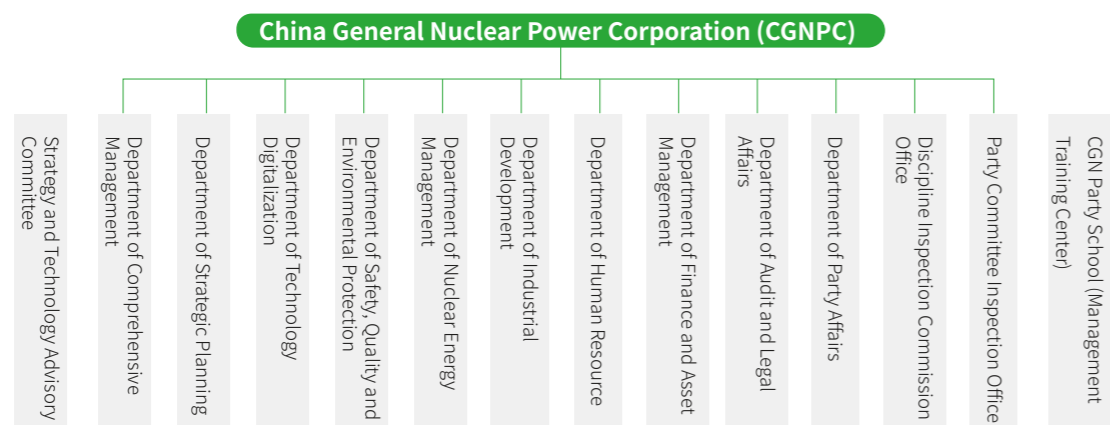


Guo Limin
Member of the Standing Committee of the Party Committee, Vice President



Li Yilun
Member of the Standing Committee of the Party Committee, Vice President

Governance Structure



Compliance Management

The year of 2022 was the "Year of Strengthened Compliance Management" and CGN fully carried out all tasks by following the principles of comprehensive coverage, strengthened accountability, synergies, collaboration, independence, and objectivity. We continuously beefed up compliance management, improved organizational systems and operating mechanisms, further promoted the IT-based management in compliance management and the in-depth integration of compliance management and business, thus vigorously guaranteeing compliance in business operation.

Improving overseas business compliance

We insist that compliance work should serve business needs. Research is conducted on anti-corruption and compliance laws in host countries and regions and based on the research results, we have published the Summary of Clean and Compliant Operation Practices of Multinational Corporations in Developed Countries, thus providing support for overseas clean and compliant operations.

Actively cultivating the compliance culture

We have launched a column for law popularization, and published more than 30 postings on various compliance topics for all employees to read. We also offer over 30 training programs on compliance for personnel in key areas, high-risk positions, etc., raising employees' awareness of compliance.

Case The 2022 Annual Procurement Work Conference

On February 24, 2022, the CGN annual Procurement Work Conference was held in Shenzhen's CGN Headquarters Building. The meeting comprehensively reviewed the work of centralized procurement, e-mall application, supplier management in 2021, and made key work arrangements and set targets for procurement work in 2022. Shi Bing, Member of the Standing Committee of the Party Committee, and Vice President, attended and addressed the meeting, emphasizing that the requirements of "compliance, cost reduction, efficiency improvement and supply guarantee" are essentially to safeguard nuclear security, and the procurement work should effectively serve nuclear security and the Group's high-quality development.



292

Internal audits conducted



Honors

5

Achievements in compliance management won the Grand Prize in the Recommendation Meeting for Compliance Management Achievements of Power Enterprises.

3

Papers submitted by CGN employees were rated excellent at the First Forum for the Rule of Law and Compliance of China's Power Enterprises.

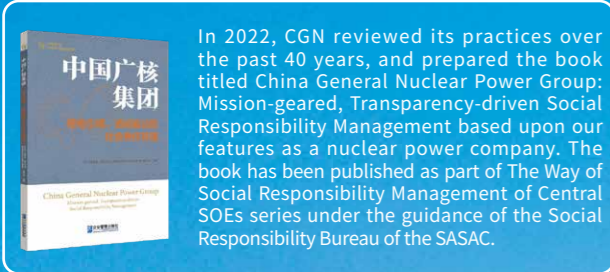
Risk Management

CGN has established an enterprise risk management (ERM) system featuring "centralized leadership and hierarchical management," including strategies, organizational systems, and information systems of risk management. Among them, the ERM organizational system includes two levels: the Group and subsidiaries. The CGN Board of Directors is responsible for Group-wide ERM, while each subsidiary assumes responsibility for their own ERM work, and has established their own organizational system for risk management.

In 2022, CGN actively responded to internal and external challenges and opportunities, focusing on formulating a series of countermeasures in the fields of safe and stable operation of nuclear power plants, power sales, control of ongoing construction projects, and finance, effectively preventing major risks.

Sustainability Management

CGN regards the fulfillment of corporate social responsibility (CSR) as the gene of high-quality growth, adheres to the corporate mission of "developing clean energy to benefit mankind," and integrates the CSR philosophy into corporate strategies, operations and management. We thus instill the CSR philosophy among employees and live up to it in concrete actions, to achieve sustainable development together with society.



CGN has created a unique model of mission-gearred and transparent-driven CSR management model (also known as the NICER model). The NICER model is the fruit of CGN's CSR practices over the years. It is intended to strengthen the CSR culture, strategy, organization and management, promote more targeted and effective CSR practices in such areas as Nuclear Security, Influence Expansion, Community Engagement and Environmental Sustainability, and keep enhancing transparent Responsibility Communication with all sectors of society. More pragmatic CSR actions will lead to higher-quality, more efficient, equitable, sustainable and secure growth.

Sustainability Strategy

Opportunities and challenges

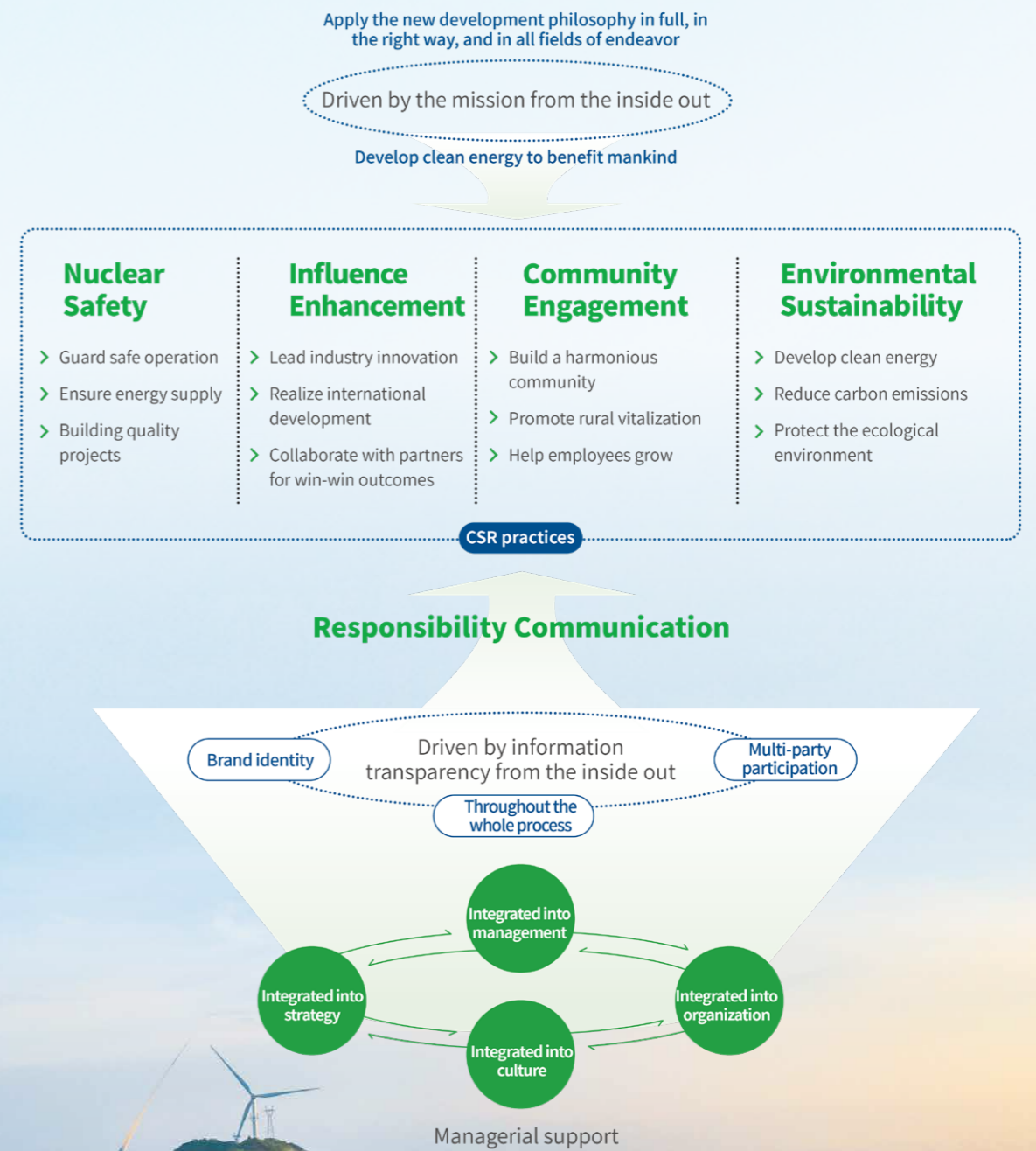
- Promote the effective upgrading in quality and rational growth in quantity of the economy on the theme of high-quality development.
- Make coordinated efforts to reduce carbon emissions and pollution, become greener, and boost growth, and continue to prioritize environmental protection and pursue resource-efficient, intensive and low-carbon growth.
- Actively and steadily move toward the carbon peak and carbon neutrality goals, and gradually shift toward the system of controlling both the amount and intensity of carbon emissions.
- Pursue safe and orderly nuclear power development as required in the National Development Plan on the Modern Energy System during the 14th Five-Year Plan Period.

Clean energy plus strategy

- Promote layout optimization, structural adjustment and efficient coordination of factors with clean energy at the center and under the guidance of integration.
- Develop core technologies and core products on the basis of localization. Promote the rapid replication of core competencies with the support of specialization.
- Allocate factors more efficiently in a market-oriented way to enhance market competitiveness and stimulate momentum and vitality.
- Expand development space through internationalization and enhance global resource allocation capacity and international influence.



CGN's NICER CSR management model

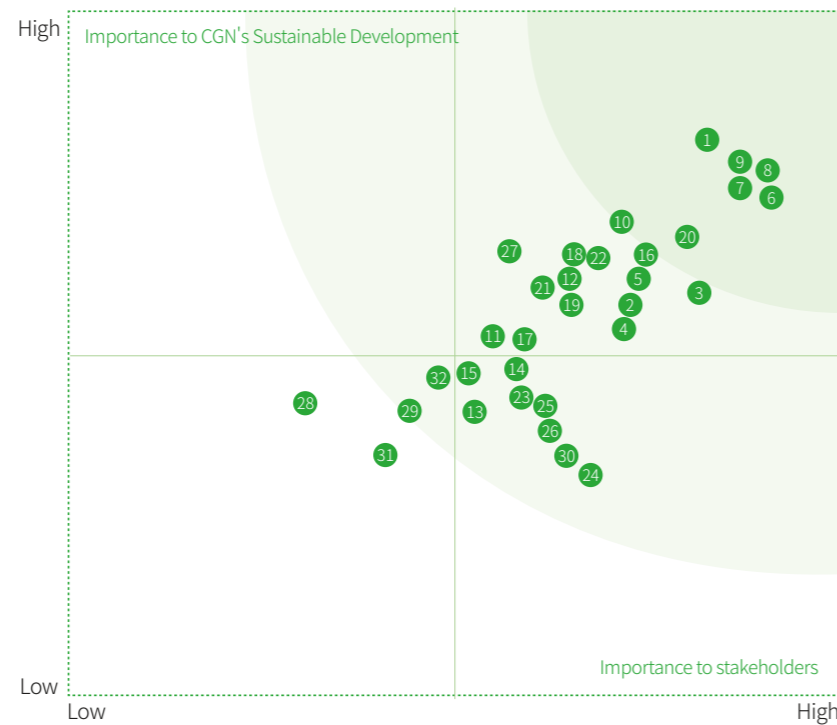


Materiality Management

In order to better understand the expectations and demands of stakeholders, we conducted a questionnaire survey on stakeholders following the material topic analysis process, and collected 9,044 valid copies of the questionnaire in 2022. We screened out key material topics over "importance to stakeholders" and "importance to CGN's sustainable development", and provided key disclosure of these topics in the report.

As the highest decision-making body for economic, environmental and social issues, the Board of Directors is responsible for identifying and managing the various issues and their impact, and authorizes relevant administrative departments in accordance with the CGN Governance and Authorization Regulations and the CGN Management and Authorization Regulations on the daily management of sustainability operations. We adhere to the reporting and review procedures, and guide the centralized management departments to conduct review to improve the quality and efficiency of the reporting of topics.

Materiality matrix



- | | |
|---|---|
| 1 Party building | 17 Tackling climate change |
| 2 Compliant operation | 18 Energy Management and energy conservation and emission reduction |
| 3 Risk management | 19 Resource conservation |
| 4 Anti-corruption | 20 Waste management |
| 5 Sustainability management | 21 Biodiversity conservation |
| 6 Safety management | 22 Environmental services |
| 7 Engineering quality and safety | 23 Talent attraction |
| 8 Safe operation | 24 Protection of employee rights |
| 9 Personnel safety and health | 25 Employee development |
| 10 Network security | 26 Employee care |
| 11 Technological innovation system | 27 Rural vitalization |
| 12 Key technical breakthroughs | 28 Community engagement |
| 13 Digital transformation | 29 Transparent communication |
| 14 Deepening reform and management innovation | 30 Corporate philanthropy |
| 15 Participation in industry standard development | 31 Responsible supply chain |
| 16 Environmental management | 32 Multi party cooperation |

Stakeholder Engagement

Stakeholders	Expectations and Demands	Communication and Response
Government	<ul style="list-style-type: none"> Compliant operation Ensuring nuclear safety Optimizing energy mix Maintaining and increasing the value of state-owned assets Abiding by laws and paying taxes according to law 	<ul style="list-style-type: none"> Implementing national energy policies Improving corporate governance Subject to regulatory review Reporting regularly
Shareholders	<ul style="list-style-type: none"> Continuous and stable returns Transparent information 	<ul style="list-style-type: none"> Sound business Information disclosure
Customers	<ul style="list-style-type: none"> Fair and transparent operational environment Stable supply of clean energy 	<ul style="list-style-type: none"> Improving operation management Actively coordinating grid dispatching Strengthening communication
Partners	<ul style="list-style-type: none"> Fair partnership Building a responsible supply chain 	<ul style="list-style-type: none"> Open cooperation and win-win development Transparent procurement
Employees	<ul style="list-style-type: none"> Compensation and benefits Health and safety Career development Employee care 	<ul style="list-style-type: none"> Ensuring the basic rights of employees Protecting employees' occupational health and safety Providing abundant staff training opportunities and formulating scientific development mechanism Carrying out employee care and cultural activities
Environment	<ul style="list-style-type: none"> Tackling climate change Waste management Biodiversity conservation 	<ul style="list-style-type: none"> Promoting clean energy development Continuously optimizing environmental management Protecting biodiversity Developing environmental protection industry and services
Communities	<ul style="list-style-type: none"> Engaging in community development Transparent communication Charity 	<ul style="list-style-type: none"> Driving economic development and creating jobs Active and transparent communication Continuously carrying out charitable activities and helping the poor and people in distress
Media	<ul style="list-style-type: none"> Transparent and open information 	<ul style="list-style-type: none"> Transparent information disclosure Regular communication



Safe Operations



Contributions to UN SDGs



Call of the New Era

We will thoroughly advance the energy revolution. Coal will be used in a cleaner and more efficient way, and greater efforts will be made to explore and develop petroleum and natural gas, discover more untapped reserves, and increase production. We will speed up the planning and development of a system for new energy sources, properly balance hydropower development and ecological conservation, and develop nuclear power in an active, safe, and orderly manner. We will strengthen our systems for energy production, supply, storage, and marketing to ensure energy security.

— Report to the 20th CPC National Congress
by General Secretary Xi Jinping

CGN's Actions

Safety is the basis of corporate development. Thoroughly implementing President Xi Jinping's key instructions on nuclear safety and work safety, CGN adheres to the principle of "nuclear safety is our overriding priority" and has established the goal of "zero injuries, zero quality defects and zero violations." We promote various actions to ensure a safe workplace, strongly supporting our high-quality corporate development.

79.2%

Ratio of units achieving the world's advanced level (the world's top quartile) in WANO indicators

93.6%

Average capacity factor of in-service CPR units, achieving the world's advanced level in WANO for the 5th consecutive year

6000 days

Unit 1 of LingAo NPP had secured safe operations for 6,000 days, the longest among generating units of the same type in the world



Safety Management

Safety is the lifeline of the Company. Upholding the philosophy that "nuclear safety is our overriding priority", we always adhere to the basic principle of "safety first, quality foremost and pursuit of excellence." We continuously improve safety

management and emergency response capabilities to ensure safe operations while building a culture that values and promotes nuclear safety.

Improving the safety management system

In strict accordance with the Nuclear Safety Law, and other applicable laws, regulations, guidelines and standards, we continue to improve the SQE management system with responsibility implementation at the core, and strengthen supervision, so as to genuinely improve the level of safety management.

- ### Special actions
- ▶ To implement the Action Plan for Improving the Safety and Quality of the Nuclear Power Industry jointly issued by five ministries/commissions, CGN has set up a task force and formulated 83 actions targeting improvement in five key aspects. Also, each nuclear power subsidiary has made its own implementation plan, with 835 improvement measures formed in total. All these actions were completed as planned in 2022.
 - ▶ Meanwhile, we finished the tasks of the Three-year Action Plan for Rectification of Work Safety Hazards on schedule, and formulated 2,303 procedures and 89 standards. Each subsidiary had rectified all the issues included in the three-year action plan.

- ### Safety standardization
- ▶ We further promote the standardization of nuclear power safety technology, the visualization of outage safety standards, and the standardization of offshore wind power. For nuclear power engineering, standard safety management guidelines (trial) have been prepared for 23 operations including lifting and flaw detection, etc., to unify and standardize work safety management requirements. In terms of nuclear power outage, more than 200 visualization catalogues of safety standards have been formulated and applied in each round of outage. To guide offshore wind power SQE management, we have prepared the Manual on Standardization and International Benchmark Evaluation of Offshore Wind Power SQE (1st Edition) based on the DNV safety and sustainability rating system as well as global best practices and corporate management experience.

- ### SQE supervision optimization
- ▶ CGN explores a regulatory mode that upholds principles while coordinating services. The first meeting of the Company's Safety Committee in 2022 deliberated on and approved the Implementation Plan for the Inspection of Work Safety Responsibility Performance in 2022 to complete the performance inspection of eight subsidiaries as planned, and urged all subsidiaries to fulfill their safety responsibilities and improve the level of work safety management.

Case Ministry of Ecology and Environment conducts safety inspection on LFNPC

The inspection team of the Ministry of Ecology and Environment (National Nuclear Safety Administration) visited LFNPC on August 3, 2022. Guo Limin, Member of the Standing Committee of the Party Committee and Vice President of CGN, said that CGN released the CGN Management Outline for Nuclear Power Engineering Construction at the beginning of 2022 to support the project owners to assume the overall responsibility for safety stipulated in the Nuclear Safety Law and the overall management and supervision responsibilities in six major aspects of engineering construction. LFNPC should have a correct view of performance and work to give its Hualong One project a good start, thus contributing to the Group's high-quality development and to Guangdong's social and economic development as well.

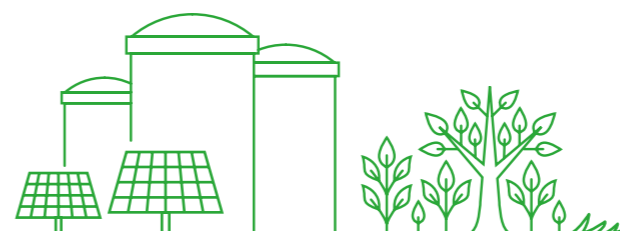


Enhancing emergency response

As the last shield of nuclear safety, nuclear emergency response is a crucial guarantee for the sustainable and sound development of the nuclear energy industry. Always attaching great importance to nuclear emergency response management, CGN continuously improves its nuclear emergency response systems, methods and capacity to enhance emergency response and ensure rapid response under any circumstances.

- ### 01 Emergency response system
- ▶ FCGNPC's updated version of the Emergency Response Plan for In-site Nuclear Accidents includes Units 3& 4 of Fangchenggang NPP into the nuclear emergency response system, making it CGN's first nuclear emergency response plan for Hualong One.
- ### 02 Emergency measures
- ▶ The Group's emergency command center has been renovated. It now consists four major functional modules, namely, emergency command, technical support, emergency decision-making and comprehensive support, making the nuclear accident emergency command system more IT-empowered and modernized.
 - ▶ We carry out the model design of nuclear emergency response organization and core capacity building of core posts at Daya Bay Nuclear Power Plant, to improve the nuclear emergency response capabilities of NPPs.

- ### 03 Emergency response capacity
- ▶ To implement the important instructions made by President Xi Jinping on flood control and disaster relief, we improve our ability to command, coordinate, and respond to nuclear accidents and other emergencies so that we are well-prepared for any possible flood and other natural disasters.
 - ▶ We have launched a number of drills to improve our emergency response capacity, such as the emergency drill to respond to the super typhoon Mulan and the joint emergency drill for the spent fuel transportation project.



Case FCGNPC conducts an integrated emergency drill

On June 29, 2022, FCGNPC carried out the first pre-loading on-site integrated emergency drill for Unit 3. The drill simulated that the auxiliary transformer of Unit 3 was lost due to power grid failure, and the trip of the protection action of the main transformer caused Unit 3 to lose all off-site AC power and enter the emergency standby state. The emergency response was activated, but subsequent multiple intertwined equipment failures overlapped, making the situation worse and escalating it to the degree of severity. The drill carried out emergency response activities such as emergency command and decision-making, and the application of response procedures, which verified FCGNPC's emergency response capacity in a nuclear accident.

Building a safety-conscious culture

CGN has built an all-encompassing safety-conscious culture that involves every employee, led by senior management and advanced by key employees. Accordingly, we carry out themed safety education and exchanges of various kinds to call on all employees to follow the work style featuring "strict compliance, prudent decision making, detail-oriented, and fact-based approach" to ensure nuclear safety.

Top-down safety inspection

Under the leadership of the Party Committee, CGN has carried out work safety inspections of the nuclear power bases for three consecutive years, demonstrating the Group's determination to focus on nuclear safety and eliminate potential hazards, so as to further implement safety measures and improve the nuclear power safety performance.

Precautionary education on safety for all

We organize all staff to watch the Cautionary Tales of Nuclear Power Safety and Quality. Meanwhile, the precautionary education meeting on nuclear safety chaired by leaders responsible for safety, is held to raise the staff's awareness of the extreme importance of nuclear power safety and quality.

Joint campaigns for nuclear safety

CGN's nuclear power subsidiaries jointly launch campaigns with nuclear and radiation supervision stations to promote nuclear safety culture among units and teams. Through face-to-face exchanges, we disseminate the concept of nuclear safety supervision and make case studies to strengthen the understanding of nuclear safety.

Case The Work Safety Month campaigns widely launched

June 2022 marked the 21st national Work Safety Month. All subsidiaries of CGN launched activities to popularize the Work Safety Law, call on the "first responsible person" to abide by the law and fulfill their responsibilities, and advocate the concept of safe development to build consensus on it.



Focusing on business risks, CGN Engineering called on all business centers, project departments, and contractors, etc. to organize safety awareness activities on the construction sites led by the "top leader".



DNMC carried out the "Safety Consulting Day" campaign, where safety supervisors were there solving problems for operators through on-site office meetings, risk challenge meetings, etc.



During the fifth outage of the Unit 3 of Ningde NPP, CGN Suzhou Institute introduced a new safety education method, inviting team members instead of the person in charge to share safety tips, which greatly improved the initiative of employees.

6

Nuclear power units under construction in China

2

Nuclear power units under construction overseas

7.2 GW

Installed capacity in total

SQE management of all CGN's projects under construction has reached the international advanced level

* Note: The data are as of the end of March 2023. Unit 3 of Fangchenggang NPP was put into commercial operation on March 25, 2023.

Quality Projects

The construction quality of units is of great importance for the safe and efficient operation of the unit after it is put into operation. Adhering to the lifecycle project quality management, CGN runs the nuclear power quality assurance system and improves the project management mechanism to facilitate the construction of key projects and ensure project quality that underpins the safe operations in the long term.

Quality management

Focusing on the key issues and major difficulties in quality management, CGN promotes the implementation of various quality management measures and advanced construction technologies to strengthen the quality management throughout the entire industry chain, so as to ensure the safe, efficient and steady project construction.

Fulfilling management responsibilities

In the Management Outline for Nuclear Power Engineering Construction, we further clarify the responsibilities of the Group, project owners, construction units and supervision units, hold the project owners accountable for nuclear safety and efficiently coordinate and align the project construction teams with the same goal.

Standardizing on-site supervision

We have issued the Measures for Operation and Management of Quality Supervisors of CGN's Nuclear Power Projects to standardize the work methods and requirements of on-site quality supervisors and improve the efficiency and effectiveness of project construction supervision.

Adopting advanced construction technologies

Advanced construction technologies such as modular construction and automatic welding have been utilized in nuclear power projects, as a way to improve project quality through technology. The advanced modular construction and design technology for Hualong One was applied for the first time in the SG module of Unit 2 of Taipingling NPP in Huizhou. The technology can reduce the incidence of cross construction, and improve construction efficiency.

Honors

The 1GW Wind Farm Development for Rural Revitalization in Horqin right front banner of Hinggan league Phase I was awarded the silver winner of the IPMA Global Project Excellence Award, which was the first international project management award in China's new energy industry.



The Offshore Wind Farm Project in Nanpeng Island, Yangjiang, was in the first batch to win the National Quality Project Award 2022-2023 by China Association

Key projects



© Fangchenggang Nuclear Power Plant

Nuclear power projects

- ▶ Unit 6 of Hongyanhe NPP was put into commercial operation, with 6 units reaching their full capacity.
- ▶ Unit 3 of Fangchenggang NPP achieved milestones including hot testing, fuel loading and critical testing in 2022, and was put into commercial operation on March 25, 2023.
- ▶ The construction of Unit 5 and 6 of Lufeng NPP got approval from the government, and Unit 5 has already been under construction.
- ▶ Unit 2 of Taipingling NPP, Huizhou and Unit 1 of San'ao NPP, Zhejiang completed dome hoisting.

Nuclear fuel projects

- ▶ The first 68 sets of products from the nuclear fuel assembly plant co-funded by CGNPC Uranium and Kazatomprom were delivered.
- ▶ CGN Advanced Fuel Development Center entered into the process equipment installation and debugging phase.

New energy projects

- ▶ The capacity of projects started construction at home in 2022 reached 7.4 GW, and the newly added capacity in operation was 7.21 GW, a year-on-year increase of 46.6% and 77.3% respectively.
- ▶ The installed capacity of new overseas projects in operation or under construction exceeded 2 GW. Edra Melaka Power Plant (EMPP) in Malaysia was put into full operation, becoming the largest gas-fired plant with low-carbon combined cycle gas turbines in Southeast Asia .

Other projects

- ▶ The Radiation Sterilization Demonstration Base in Central China was put into operation, with an annual sterilization capacity of 20,000 tons.
- ▶ The landfill leachate treatment project in Leye County, Guangxi was completed and put into operation, which is the first full quantitative electron beams treatment of landfill leachate base built and operated independently by CGN.
- ▶ The Wuxi Plasma-based Waste Gasification Melting Treatment Technology Demonstration Project has completed technological upgrading to achieve stable production with over 85% capacity.

Case The construction of Unit 5 and 6 of Lufeng NPP approved by the State Council

The construction of Units 5 and 6 of Lufeng NPP was approved by the State Council on April 20, 2022. Both units adopt the "Hualong One" nuclear power technology, the capacity of each single unit reaching 1,200 MW. Unit 5 of Lufeng NPP started construction on September 8, 2022.



Case China's first marine ranching project connected to the grid for power generation

On November 25, 2022, the first batch of units of CGN's 304 MW offshore wind power project in Laizhou, Shandong Province, were connected to the grid, making it the first experimental project on the integrated development of offshore wind and fish farms in China. As a pilot project of "offshore cage + offshore wind power," "deep-sea culture + sea fishing" and the integrated development model of marine ranching, deep-sea culture and offshore wind power, the project has created a model of "blue energy + offshore ranch" for Shandong Province and even for the whole country.



Case China's largest offshore wind farm of grid parity put into operation

On December 20, 2022, the last unit of the 400MW offshore wind power project in Jiazi II, Shanwei was connected to the grid, marking that CGN's 900MW offshore wind farm in Jiazi, Shanwei achieved full-capacity power generation and that China's largest offshore wind farm of grid parity and the 1.4 GW offshore wind power project in the shallow water

area of Shanwei was completed and put into full operation. The base can provide more than 4.5 TWh of clean power to Guangdong Province annually, equivalent to the reduction of about 1,450,000 tons of standard coal consumption and about 3,500,000 tons of carbon dioxide emissions, as well as an increase of about 9,000 hectares of afforestation.



Keeping in mind national priorities and pursuing national rejuvenation

Unit 1 of CGN's San'ao NPP has a dome

At 14:07 on November 3, 2022, Unit 1 of CGN's San'ao NPP, Zhejiang, completed dome hoisting, which marked the transition from the civil construction phase to the assembly phase.

Threading the "embroidery needle" with the crane

The dome, located at the top of the nuclear island, is a key part of the fourth safety barrier of the nuclear power plant. It weighs 238.5 tons and has a diameter of 45 meters, with an area of 4 standard basketball courts combined, while the steel plate is only about 6 mm thick and the ratio of the dome's diameter to the steel plate thickness is 7500:1. The hoisting work needs to overcome the challenges of deflection under the influence of wind as well as expansion and contraction under temperature change. The dome is to be hoisted to an altitude of 70 meters and then docked with the nuclear island cylinder through a welding root face of only 1-3 mm, which requires extremely high hoisting control accuracy.

"It's like using a crane to thread an embroidery needle. We have set up circular and radial limiting device and guide pillars, etc. in the cylinder to firmly 'lock in' the dome from the four directions to finally ensure accurate dome hoisting," said Zhong Hongjin, senior engineer in charge of civil construction of the nuclear island.

Improving efficiency with new technologies

CGN actively applies new technologies and processes at construction sites. In the dome assembly process, the project team applied for the first time the nuclear-class mechanized welding process to the nuclear power field, the working efficiency of which is 4 times that of traditional manual arc welding, with 100% in the radiographic test results. The integral hoisting technology was adopted in the dome hoisting, and intelligent nuclear power construction technologies such as BIM (Building Information Modeling) 3D modeling and simulation animation are used to ensure millimeter-level docking at one go.

The successful hoisting of the dome proves the progress of China's independent third-generation nuclear power technology project, as well as the precondition and basis for the mass construction of "Hualong One".



Operational Safety

CGN continues to strengthen safe operations and risk prevention capabilities, making every effort to ensure the safe operation of nuclear power plants and new energy projects, so as to provide safe, stable and reliable power for economic and social development.

NPP operation

In 2022, CGN put one nuclear power unit into commercial operation and all the 26 in-service nuclear power units maintained safe and stable operations.

Fleet management

01

CGN has established a standardized, specialized and intensive fleet management system to provide strong support for safe and efficient management.

Specialized management

Based on the characteristics of NPP management, we pool the quality resources from NPPs and specialized companies to form peer groups (PGs) in several functional fields. Each PG is composed of professional technical managers of CGN Power, NPPs and specialized companies. PGs mainly focus on cross-organizational coordination and management in terms of sharing, exchanges, problem-driven development, and capacity building. They gather professional workforces to solve common technical problems, and promote and apply new tools, technologies and good practices, aiming to enhance professional capabilities in every field and help NPPs excel.

Standardized management

Based on the OPST model (Operation Standard Management System) in core areas, we have developed uniform organizational management system, technical standards and procedures, job qualifications and authorized training system, and operation management tools.

Intensive management

Through intensive management, such as resources allocation optimization, effective operation of centralized platforms, and information sharing, we continue to improve the economic performance of nuclear power units and maximize their overall value. A tendering center is in place to standardize and promote IT application in tendering/bidding management and spare parts management. We make full use of big data to improve management efficiency and gradually expand the scope of centralized procurement to cover more spare parts and public materials. We allocate resources in a holistic manner, and improve our bargaining power in centralized procurement while optimizing procurement channels to significantly increase cost effectiveness.

26

In-service nuclear power units

89.7%

Average capacity factor of in-service units

79.2%

Ratio of units achieving world's advanced level (the world's top quartile) in WANO indicators

76.9%

Ratio of units achieving the world's excellent level (the world's top decile) in WANO indicators

93.6%

Average capacity factor of CPR units, achieving advanced level in WANO for the fifth consecutive year

6000 days

As of March 16, 2023, Unit 1 of Ling'ao NPP had been in safe operation for 6,000 consecutive days, setting a record for the longest period of continuous safe operation for a unit of the same type in the world.

Outage management

02

NPP outage management implements measures such as "visualization of safety standards" and "quantification of quality standards" to ensure the safety, quality of outage while continuing to shorten the construction period. In particular, in 14 rounds of outage, we had zero safety accidents and zero quality accidents, accounting for 73.7% of the total; in 15 rounds of outage, we achieved zero safety accidents, accounting for 78.9%; and in 18 rounds of outage, we achieved zero quality accidents and zero rework, accounting for 94.7%.

Equipment management

03

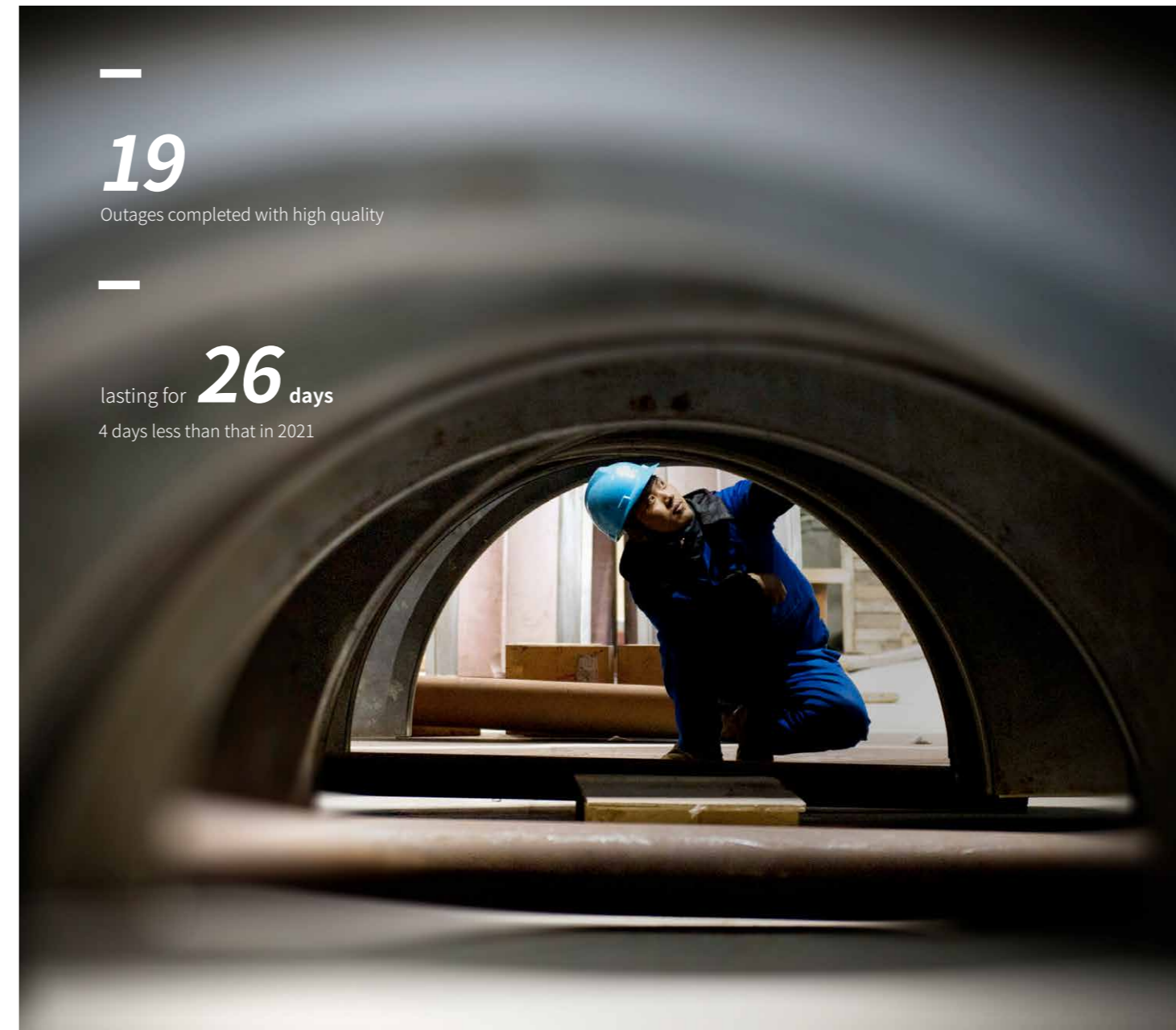
CGN adopts the "8 plus 1" approach for major equipment management with "defect elimination, improvement, and value creation" at the core, and has performed well in relevant indicators. In 2022, the forced loss rate of units in multiple plants was 0.11%, the best record ever, and that caused by major equipment was 0.02%, continuing to maintain high stability. Remarkable results were achieved in the improvement of cold sources. Fifteen large-scale marine life intrusions were resisted throughout 2022, and more than 3,000 tons of marine life and debris were intercepted and salvaged, with zero unplanned shutdown or load reduction events occurred due to cold source accidents.

19

Outages completed with high quality

26 days

lasting for 4 days less than that in 2021



Case The "Personnel Status Checking System" realizes intelligent human error management

In April 2022, Unit 2 Ling'ao NPP launched the first homegrown personnel status checking system in China during the 17th outage, which was also the first technology we had in the field of state reliability checking and active early warning for NPP personnel. The system uses the technology of super-perception heart rate detection, that is, collecting facial data by using the HD camera to analyze the heart rate while taking into consideration the influence of blood flow on facial skin tissue. The system then can generate four sub-indicators of fatigue, stress, emotion and health with the help of the modeling based on the data of nearly 1,000 persons collected in the early theoretical research by the team, so as to rule out any possible hidden human errors.



97%+

Equipment availability rate of domestic new energy units

98%

Availability rate of overseas wind and solar energy units for the first time

New-energy project operations

To enhance work safety, the new energy sector has established an integrated management system with a hierarchical management and control model to improve the autonomous and standardized management. In 2022, the issues on the list of the three-year action plan on SQE were all rectified, meeting the target of "three zeros" in SQE management.



The Sea Wind Safety Team of Xuanwu Offshore Wind Farm in Shanwei won the honorary title "Excellent Unit in Developing National Youth Model Posts for Work safety in Guangdong 2022."

CGN Europe Energy received the gold award from the prestigious Royal Society for the Prevention of Accident (RoSAP), for the third consecutive year.

CGN New Energy Guizhou won the 12th National Excellent Unit for Equipment Management from China Association of Plant Engineering (CAPE).

The Dongling Wind Farm in Zhongshan, Guangxi, one of CGN's projects, won the Excellent Team of the Cup of Safety & Health in China.

Embarking on a new journey with a concerted effort



"大国工匠"陈永伟 以匠心守护核电之芯

A nuclear power plant with a fortress-like shell, in many people's eyes, is a large, complex and mysterious system. As GNC's chief maintenance technician, Chen Yongwei, works in the deepest part of the "fortress," responsible for the maintenance and measurement of more than 10,000 instrument panels of the nuclear power plant. Repairing an instrument is like performing surgery on the nerves of the brain; it is not only complex but also requires a high degree of precision.

Encouraged by an email

In July 2009, Chen Yongwei joined the Instrument and Computer Department of CGN Operations, after graduation from Zhejiang University. "I was deeply impressed by an email from my master shortly after I was onboard." Chen recalled that his master asked him a question which he found easy and quickly gave an answer to. The next day, he received an email from the master, and the correct answer was way different from his. The young and proud Chen was embarrassed and humbled, so he kept this email as a reminder: to study hard on various technical problems.

Since then, Chen Yongwei has developed a working habit of being rigorous and meticulous. He once noticed a minor data error, which was from the counter of the NPP's main control room for calculating boron supplement solutions. "A slight data error may cause a major safety accident, and I must figure out how it works."

The counter, though very small, involved over 20 submenus. In order to figure out each of them, he searched for relevant information and analyzed the operation logic of each count. And he finally drew each submenu and setting panel in the technical report to serve as a detailed technical reference for future equipment operation and maintenance.

Devoted into technological research

The reactor protection and control system, which protects the integrity of the nuclear safety shield, is the nervous system of the brain of a NPP. The core water level transmitter is a "coolant" measuring tool for the heart of the NPP, the key replacement technology of which, or "vacuum pumping and liquid filling technology," was then mastered by foreigners. And the maintenance was extremely complex, requiring extremely high techniques and 67 irreversible processes. In particular, the vacuum pumping requires a stainless steel capillary tube, with 20 meters long and an aperture of 2 mm, to work 24/7 nonstop until the vacuum degree is less than 0.02 mbar. Any failure in these steps would lead to disastrous results and equipment damage. The cost of each maintenance was extremely high, and a single replacement would cost RMB 1 million.

Chen Yongwei and his project team, after repeated exploration, calculation and experimentation, finally mastered this core technology. Besides, they made bold innovations and improvements in capillary tube reuse technology and double-pump vacuum pumping technology, which have been applied eight times in Daya Bay NPP and Lingao NPP.



⊕ A health corner/station at the workplace to provide health services for employees

Occupational Health

CGN attaches great importance to the safety and health of its employees. Abiding by Chinese laws and relevant regulations, such as, the Law on Prevention and Control of Occupational Diseases, and in response to the Healthy China Action Plan (2020-2030), CGN has established a sound occupational

health management system to better protect employees from occupational hazards. We also provide physical and mental health services for all employees to ensure their physical and mental wellness.

Physical health

Keeping occupational hazards under strict control

- ◉ We work to ensure that the occupational disease protection facilities are designed, built and put into use simultaneously with the main body of the project concerned, to control occupational hazards from the source. Each nuclear power plant strengthens control of radiation sources during construction, and uses materials with minimal activation products. After putting into operation, they will immediately set up task forces for managing radiation sources, and apply the latest shield models to control on-site radiation levels.
- ◉ Always following the ALARA (as low as reasonably achievable) principle, we monitor and effectively control employees' personal radiation doses in real time through the radiation work permit system and the personal dose control system, to ensure that it is always under the target. In 2022, the average annual collective dose of units in operation decreased for the third consecutive year, 5.5% lower compared with that of 2021.

Strengthening supervision over contractors' occupational health management

- ◉ We encourage our subsidiaries with better occupational health management to gradually integrate their occupational health management system with that of contractors, thereby to better regulate the latter, expand its coverage and increase its protection.
- ◉ Each nuclear power plant uses the Occupational Health Monitoring System independently developed by CGN for comprehensive occupational health management of employees (including contractors) exposed to occupational hazards, review their occupational health examination results based on their actual exposure and safety management requirement, and digitize the occupational health monitoring process.

Providing health management services for all

- ◉ We organize 1-2 physical examinations for all staff at medical institutions every year, and a health record is kept for each employee. We also engage physicians to explain to employees and track medical examination reports, and continue to follow up the health status of employees.
- ◉ One-on-one health services are provided for more than 430 employees in core positions, including health record management, physical examination management, major disease screening, high-risk chronic disease management, health intervention and tracking, as well as effect evaluation.
- ◉ We offered 179 medical assistances for severely ill employees in 2022 to help improve treatment efficiency and save employees' lives.
- ◉ We provided more than 2,000 medical examinations to the retirees, and organized more than 400 doctor visits for them in 2022.
- ◉ We organized 11 health science popularization activities in 2022 to raise employees' awareness of health.

Certification

All subsidiaries (except newly established ones) have obtained the certification of the ISO 45001 occupational health and safety management systems

<p>0</p> <p>Occupational disease incidence rate</p>	<p>4</p> <p>Subsidiaries awarded the Excellent Case of Healthy Enterprise Development by the National Health Commission of the People's Republic of China</p>
<p>5</p> <p>Subsidiaries awarded the Featured Case of National Health Enterprise Development 2022 by China Enterprise Confederation and China Enterprise Directors Association</p>	

Mental health

CGN offers EAP (Employee Assistance Program) counseling to all employees around the clock at home and abroad. A psychological state census has been covering 30,235 participants within the Group. We also raise awareness of mental health through multiple channels. Over 100 science popularization articles are posted. At the 5th Psychological Care campaign launched on May 25, 2022, Li Li, Deputy Party Secretary of CGN issued the initiative of Psychological Care to Warm the World, calling on employees to maintain an optimistic attitude, build harmonious relationships, and create self-value.

16,000+

Participants in the 5th Psychological Care campaign launched on May 25

Case Online EAP counseling lectures

On March 9, 2022, CGN held an online EAP lecture on "Fighting COVID-19 in a Science-based Way and with Positive Mentality". Yang Zhongxing, a guest lecturer for the EMBA program of Tsinghua University was invited to give the lecture for more than 700 employees. Mr. Yang made a thorough explanation over the psychological adjustment skills to help employees properly adjust their psychological state at home during the epidemic.



Innovation-driven Development

Contributions to UN SDGs



Call of the New Era

Education, science and technology, and human resources are the foundational and strategic pillars for building a modern socialist country in all respects. We must regard science and technology as our primary productive force, talent as our primary resource, and innovation as our primary driver of growth. We will fully implement the strategy for invigorating China through science and education, the workforce development strategy, and the innovation-driven development strategy. We will open up new areas and new arenas in development and steadily foster new growth drivers and new strengths.

— Report to the 20th CPC National Congress by General Secretary Xi Jinping

CGN's Actions

To pursue technological innovation, CGN strives to build itself as a source of original technology, and continuously optimizes the technological innovation mechanism. The Group promotes new breakthroughs in key projects, and accelerates the improvement of innovation capabilities and levels in non-nuclear industries, making great efforts to achieve good results in technological innovation.

RMB **5.16** billion
Investment in R&D activities

10,124
S&T personnel

1,221
Patents obtained in 2022

Reform and Innovation

Born and thriving as a result of reform, CGN has always been regarding reform and innovation as a key driver of corporate development at all phases since its establishment. We have implemented the "1+4 +X" reform in a precise, dynamic and efficient manner and up to the standard, completed all tasks

Improving governance efficiency

We put into practice the guiding principles from General Secretary Xi Jinping that we must adhere to the Party leadership over SOEs, develop a modern enterprise system and treat it as the direction of SOE reform. Highlighting the fundamental guidance of the Articles of Association, we work to build a governance system with the Articles of Association at the core and establish a more mature and stable modern SOE system with Chinese characteristics. Thus, we have significantly improve the efficiency of corporate governance.

Integrating Party leadership into corporate governance

We have issued the Guidelines for the Articles of Association of CGN, and urged our subsidiaries at all levels to include Party building in the Articles of Association and integrate Party leadership into corporate governance. Meanwhile, we have formulated lists of major business and management matters to be considered and decided by the Party committees, improved the rules of procedure for the meeting of Party committees, and refined their powers, responsibilities and ways of exercising power, so as to ensure Party leadership within a reasonable range.

Strengthening the building of Boards of Directors of subsidiaries

We have formulated seven criteria for subsidiaries to have their Board of Directors, and all the 56 subsidiaries meeting the criteria have had their own board, with external directors in the majority. The Board chair of eligible tier-2 subsidiaries serves concurrently as Party secretary and legal representative. We also have removed the Board of Directors of 173 ineligible subsidiaries and stressed their responsibilities as market players. Besides, we hire full-time professional external directors to shoulder their due responsibilities and form a well-structured team of external directors with diverse backgrounds.

Exercising the power of Board of Directors

CGN clarifies the six powers of 19 important subsidiaries' Boards of Directors with the principle of "one policy for one industry and one policy for one company." Efforts are made to improve the system of "one article of association, three tables, three rules and one mechanism" to realize the institutionalized and standardized corporate governance. The 5-2-1 support system for full-time directors' performance* was established, to effectively improve the directors' ability to perform their duties.

* Note: The "5-2-1" support system for full-time directors' performance refers to 5 dimensions: five key tasks for improving directors' ability to perform their duties, including strengthening policy guidance, establishing contact channels, improving director reporting mechanisms, improving assessment, and strengthening business training; two main bodies: distinguishing the differentiated responsibilities of the two main bodies of HQ departments (shareholders) and subsidiaries where they serve as directors to clarify the management and support responsibilities of HQ and the service and guarantee responsibilities of the subsidiaries to external directors; and one integrated service: creating an integrated support system for external directors and supervisors to perform their duties in a comprehensive and coordinated manner.

of the three-year action plan for SOE reform with high-quality outcomes, and removed a number of institutional obstacles. As a result, we have reshaped our management system and enhanced the market-oriented mechanism, injecting a strong driving force into high-quality development.

Consolidating the foundation for high-quality development

To serve national strategies, CGN has built a "6+1" industrial layout to cover every industry with at least one subsidiary, so as to promote the integration and upgrading of industries with advantages and consolidate the industrial foundation for high-quality development during the 14th Five-Year Plan period.

Developing the "6+1" industrial layout

We systematically plan the industrial layout to develop a mix of industries with nuclear energy at the core. So far we have formed the "6+1" industrial layout, covering nuclear energy, nuclear fuel, new energies, non-power nuclear technology, digitization, tech-based environmental protection, and industrial finance, with at least one subsidiary in each industry.

Clarifying the relationship between property rights and management

We have formulated and put into effect the Working Plan for Clarifying the Relationship between Property Rights and Management to solve long-standing problems related to mutual trusteeship of assets and unequal rights and responsibilities between industrial platforms, and build a property rights system that matches the "6+1" industrial layout, so that both property rights, responsibilities and rights are clarified.

Establishing a scientific and efficient investment system

We optimize investment classification and clarify the main investment responsibilities of industrial subsidiaries at source to ensure the quality of investment portfolio. Focusing on main business, we optimize the requirements of return on investment by category, and channel resources to meet national strategic development needs, and develop industries in the real economy and major scientific research projects, etc.



Stimulating talent vitality

Following the laws of the market-oriented economy and corporate development, we continue advancing the three institutional reforms represented by the tenure system and contract-based management to promote and deepen team building. The promotion and demotion rate has increased by more than five times, which remarkably improved vitality and efficiency.

Case Reform of the annual salary scheme for managerial personnel

Shanghai Engineering Science & Technology Co., Ltd. launched the "800m horse race" reform of the annual salary scheme for managerial personnel and introduced sufficient competition mechanisms regardless of the seniority and grade. After the reform, the annual salary of managerial personnel is strongly linked with his/her yearly contribution to the established goals, thus truly widening the income gap of managerial personnel, stimulate them to think over the development path of the company independently and take the initiative to undertake key tasks. The reform was included as a typical case by the SASAC.

Case A two-dimensional "horse racing" mechanism

CGN New Energy introduced a two-dimensional evaluation mechanism consisting performance points and evaluation scores in the annual assessment of its branches. Performance points reflect each branch's value contribution to the company's overall performance. The bigger, faster-growing and more competitive would have higher performance points, while the assessment score shows the performance in annual assessment indicators – the better the performance, the higher the score. At the end of each year, all branches would be ranked and given an annual star rating in the two dimensions, to keep them under reasonable, necessary pressure.

Improving the income distribution mechanism

The payroll is closely related with the economic benefits and labor productivity of the Company, and personal pay is strongly related with one's job value and performance, less with one's title or grade. To promote medium- and long-term incentives, CGN has introduced the "1+8" medium- and long-term incentive toolbox to cover 2,078 core employees in 54 eligible subsidiaries.

Promoting the tenure system and contract-based management

CGN's 139 subsidiaries at all levels introduced the tenure system and contract-based management in August 2021. We also strictly follow the "Double 70" requirements with rigid assessment and enforcement. Since 2022, 179 bottom-ranking or incompetent managerial personnel have been transferred or demoted, accounting for 8.8%, a five-fold increase from 2019.

Promoting market-oriented talent selection

CGN has selected outstanding young staff by means of open competition for three consecutive years. The proportion of Party committee members in managerial positions under 45 in the subsidiaries has increased from 15% to 25%, and that of those under 40 in our subsidiaries has exceeded 50%. We continue to select and recruit talents by means of open competition and over half of the vacancies at positions of HQ department heads and the middle level or below management positions of subsidiaries are up for open competition. We institutionalize and standardize "the exit of employees," and try to build the "employee buffer pool" and a points system for renewing labor contracts. Since 2022, we have fired 850 employees in the market-oriented way, accounting for 1.9 percent, a 6.5-fold increase from 2019.

Independent Innovation

Sticking to innovation-driven development, CGN deepens the reform of scientific research systems and mechanisms to respond to the crackdown of some Western countries. We continue to focus on the frontiers of global science and technology and focus on economic development, the country's major needs and people's health, make every effort to strengthen independent innovation, master core technologies, and play our leading role as a central SOE in technological innovation.

50+

CGN won 50+ science and technology awards at the provincial/ministerial level and from national industry associations.

Honors:

The "Key Theory, Technology and Application of Advanced Nuclear Detection Signal Processing" project won the first prize of Sichuan Province Science and Technology Progress Award.

The project "Research and Application of Key Technologies for Multi-level Intelligent Operation Control of Large-scale New Energy Power Stations" won the first prize of Gansu Province Science and Technology Progress Award 2021.

The project "Key Technology and Application of Dense Storage of Spent Fuel Pool in Gigawatt-level Commercial NPPs" won the first prize of Shenzhen Science and Technology Progress Award.

The project "Engineering Application of Laser Decontamination Technology in Radioactive Decontamination of Nuclear Facilities" won the first prize of Energy Innovation Award by China Energy Research Society (CERS).

"The Application of Electron Beam Technology in Sewage Treatment" and "The Role of Radiation Sterilization Technology in COVID-19 Prevention and Control" were voted among the "Top Ten Events in the Field of Nuclear Technology" by China Atomic Energy Authority.

Improving the technological innovation mechanism

CGN is doing well and gaining traction in technological innovation as it is evolving from a "responder" to a "creator" of original technology, from a task taker to a question raiser which has the ability and appeal to pool external quality resources.

Building an technological innovation system featuring "one center and two circles"

To seize the strategic initiative, CGN focuses on its own core capacity building, and has optimized the positioning and division of responsibilities of subordinate scientific research institutions to form a cascade layout. We strengthen opening up and cooperation to build both tight and loose friend circles as well as a big network of businesses, universities, research institutes and users with a small few at the core.

Optimizing the technological innovation management mechanism

CGN implements the project and team-based operation and selects seven strategic commanders with powers to build teams, allocate resources and decide technical routes. Key milestones are set for incentives and constraints, whilst more efforts are targeted at further improving the R&D investment mechanism and the technological achievements commercialization mechanism.

RMB **5.16** billion Investment in R&D activities

10,124 S&T personnel

49

State-recognized specialists

Building a source of original technology

Based in Guangdong Province, CGN is committed to building itself as a source of original technology in the field of advanced nuclear energy. Focusing on the frontiers of global nuclear technology, CGN accelerates the development of innovative demonstration projects, and makes some key and core technological breakthroughs to seize strategic initiatives.

CGN also speeds up the construction of two major regional innovation centers, namely the South China Atomic Energy Science and Technology Innovation Center and the Yangtze River Delta Emerging Industry Technology Innovation Center, with the aim to build them into technological innovation hubs.

Case The Advanced Nuclear Energy R & D Base starts construction

The South China Atomic Energy Science and Technology Innovation Center (the South Center) is a major scientific research infrastructure and innovation platform built by CGN in the Guangdong-Hong Kong-Macao Greater Bay Area in response to demands of the new situation. To meet national strategic needs and embracing the global sci-tech frontiers, the center focuses on advanced nuclear energy technologies and technological innovations such as the 4th-generation reactor and advanced nuclear fuel. CGN strives to

build the South Center into an important comprehensive scientific research base for China's nuclear research and technology development and a world-class nuclear energy technological innovation hub, so as to fuel the high-quality development of the nuclear energy industry. The Advanced Nuclear Energy R&D Base of the South Center started construction on Ma'an Island in Zhongshan, Guangdong, on December 28, 2022, marking the start of the engineering construction phase.



Key R&D achievements:

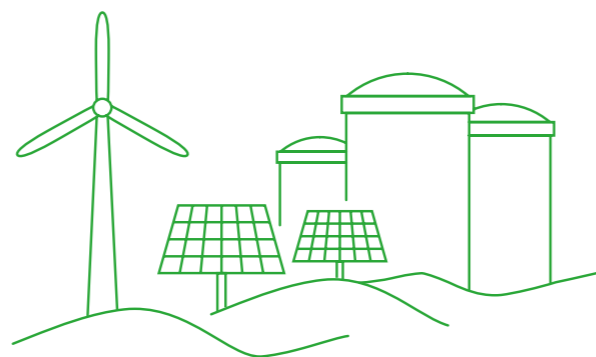
Hualong One

- ▶ With independent intellectual property rights, its safety indicators and technical performance reaches the advanced level of the international 3rd-generation nuclear power technology, and it is one of the 3rd-generation NPP models widely accepted in the global nuclear power market.
- ▶ It's developed in line with the latest safety requirements in China and the world, with a single-unit layout, nominal power of 1.2 GW, and is safe and efficient.
- ▶ It passed the Generic Design Assessment (GDA) in January 2022 and obtained the European User Requirement (EUR) certification in October 2020, laying important conditions for the nuclear power technology to enter the European electricity market.
- ▶ CGN's projects under construction in China: Unit 4 of Fangchenggang NPP in Guangxi, Unit 1 and 2 of Taipingling NPP in Guangdong, Unit 1 and 2 of San'ao NPP in Zhejiang, and Unit 5 of Lufeng NPP in Guangdong.



FirmSys

- ▶ It is China's first nuclear-class distributed control system (DCS) with proprietary intellectual property rights and world-leading key technical indicators as well.
- ▶ It is an achievement of the National High-tech R&D Program (863 Program) and other major scientific and technological programs, and won the first prize of Beijing Science and Technology Progress Award.
- ▶ It has been mass-applied in NPPs under construction to save construction costs, which indicates that China has entered the stage of industrial application of home-grown nuclear-class DCS, "the central nervous system" of NPPs.



Smart robotics for nuclear power plants

- ▶ Focusing on the operation and maintenance of NPPs under operation and the need for building new intelligent nuclear power reactors, we conduct research in core technologies in key fields, and develop robots for special operations to make nuclear power plants safer, more economical, user-friendly and intelligent, and meet the urgent demand for intelligent robots in China's nuclear power sector.
- ▶ We boast nearly 100 robot products used in nuclear island's main equipment overhaul, fuel assembly operation and repair, conventional island and cooling source system maintenance, nuclear emergency detection and operation, etc. Many of them are the first of their kind in the country and even the world.
- ▶ We have built world-leading sci-tech facilities and an open R&D system and test platform covering core processes such as the R&D of smart robots for nuclear power plants, key technology research, test and verification.

Case Wukong, the non-drawing rotor robot for the examination and maintenance of generators

The R&D project for "the non-drawing rotor robot for the examination and maintenance of generators" was approved in 2018. Wang Jiantao named the robot "Wukong" after the legendary Monkey King, hoping that it could detect and solve problems within generators like Monkey King sneaking into the belly of Princess Iron Fan with ease.

Wukong 3.0 was launched in May 2022 with the support of NDNPC and the Ningde NPP Project Department of CGN Operations. During the fifth outage of Unit 3 of Ningde NPP in the early morning of May 21, "Wukong" moved around in the "belly" of the generator and completed its first amazing application. The successful application of "Wukong" can reduce multiple high-risk operations including rotor drawing, improve the essential safety of generator maintenance, and provide conditions for better and shorter outages.



🕒 R&D team for non-drawing rotor robot for the examination and maintenance of generators

Hemei

- ▶ In collaboration with Tsinghua University, we have developed a special electronic accelerator and irradiation reactor for sewage treatment, which can efficiently degrade pollutants that are hard to treat by conventional methods, while achieving efficient disinfection and sterilization.
- ▶ Featuring wide application, fast reaction, strong degradation capacity, high treatment efficiency, low user cost, and excellent water quality etc., it has unique advantages against refractory organic pollutants, and can be applied to the treatment of industrial wastewater, domestic wastewater, slightly polluted drinking water and so on.
- ▶ We were the chief editor of the Technical Specification of Electron Beam Treatment of Wastewater from Medical Institutions (T/CNS 88-2022), which was China's first technical specification of its kind and came into effect on April 1, 2023.

Case CGN Nuclear Technology wins the bid for China's first demonstration project of electron beam treatment of urban wastewater

On June 15, 2022, CGN Nuclear Technology won the bid for China's first demonstration project of electron beam treatment of urban wastewater located in Wenjiang District, Chengdu, with a daily treatment capacity of 10,000 m³. It marked another breakthrough in the application of "Hemei" electron beam treatment technology of special waste.

The technology can provide a new and effective solution for raising the standard of urban wastewater treatment. Wastewater treated by it can meet the requirements of the Class III water area standard of the Environmental Quality Standards for Surface Water (GB3838-2002) in main water quality indicators, and meet the discharge standard of urban sewage treatment plants of the Sichuan Minjiang River and Tuojiang River Basin Water Pollution Discharge Standards (DB51/2311-2016) in other indicators.



🕒 A rendering of China's first demonstration project of electron beam treatment of urban wastewater

Digital Transformation

Guided by its development strategy, CGN has carried out the digitalization project (also known as the 818 Project): including 18 digitization actions in the eight fields of digital business management, digital nuclear energy, digital new energy, digital nuclear fuel, digital nuclear technology, digital environmental protection, digital finance and digital industries, based on data governance and on the basic platform of the CGN industrial network and with cybersecurity guarantee, thus boosting high-quality development through digital transformation.

Top-level design > We have completed the top-level design of digital transformation, released a special implementation plan for digital transformation, and promoted the "6+1" industries to formulate a special action plan for the implementation of industrial transformation to serve as the guidance for digital development. Also, we have improved the basic supporting mechanisms such as digital internal transactions, service catalogues, special digital scientific research and talent training sequences to facilitate effective and coordinated digital transformation.

Data governance > We have constructed a framework for data governance consisting of four beams and eight pillars, and formed the top-level design for the blueprint of data governance structure. The "1+9+N" data governance system has been further improved to include a data asset catalogue composed of 19 first-level catalogues and 56 second-level ones. Based on the human resources data governance pilot demonstration project, we demonstrate the use of data governance and lay a solid foundation for subsequent data governance work.

Process redesign > We have finished organizational adjustments as planned, and advanced the process redesign project to ensure full accessibility to all business management data. Systematic process redesign consolidated the results of modern enterprise system and organizational reform.

Industry transformation > Focusing on difficulties and pain points of business, we urge each industry to sort out the top-level designs and closed-loop scenarios for their transformation and upgrading. We have constructed 158 digital transformation scenarios using the scenario methodology, 33 of which participated in the digital scenario innovation competition held by the SASAC and 45 of which were planned to be implemented in 2023 to create a number of typical demonstration scenarios such as the production command center and smart warehousing. Also, we facilitate the development of core products and capabilities of digital industries, and have released digital products such as Lu'an Health Code and FirmSys Conferencing System.

Case CGN holds a special promotion meeting on digital transformation of industries to promote deep integration of informatization and industrialization

On April 15, 2022, CGN held a special promotion meeting on digital transformation of industries at the CGN Headquarters Building in Shenzhen. After introducing topics such as the special promotion plan for digital transformation of industries and the introduction of methods for building digital transformation scenarios, the meeting made special arrangements on the goals, methods, paths, and organization of digital transformation in various industries, to leverage the role of massive industrial data and rich scenarios and further promote the deep integration of industry and digital technology. Pang Songtao, Member of the Standing Committee of the Party Committee, Vice President of CGN and Deputy Director of CGN Cyberspace Affairs Commission, attended the meeting and delivered a speech.



Embarking on a new journey with a concerted effort

Nuclear power innovation through hard work

If there is no conditions, we just create one. If this path is a dead end, we just seek for another one. The difficulties must be overcome!
—Wang Ting, Deputy Director of the Reactor Engineering Software Research Institute of CGN Research Institute

Wang Ting was the leader of the reactor core design and safety analysis of Hualong One during the certification of Generic Design Assessment (GDA). Over her 18 years of working experience in the field of nuclear power technology, she has been committed to developing proprietary nuclear power safety analysis technology and contributing to China's greater self-reliance and strength in nuclear power science and technology at an earlier date.

Advancing software localization

In 2019, Wang Ting left the field of safety analysis where she had been working for more than a decade and embarked on a new journey of software localization. In charge of a new team and encountered with new problems, Wang Ting improved the software team's capabilities primarily in three aspects: knowledge broadening, capacity upgrading and skills exchange. During software R&D, she strictly reviewed over 1,000 R&D reports, which guaranteed the quality of software development and laid a foundation for software application. And the software R&D team developed fast under her leadership.

Rising up to new challenges following the export of Hualong One

After Hualong One entered overseas markets, in order to pass the Generic Design Assessment (GDA), Wang Ting led the software team to set up five working groups covering both the front office and the back office, internal affairs and external affairs, and enforced strict risk control and project management. Despite the huge workload, everything went well according to plan thanks to such measures as rigorous planning, clarifying responsibilities, and closed-loop operations. Software localization has, under the leadership of Wang Ting, achieved remarkable results, which has greatly supported the R&D of CGN models.



Empowering business with intelligent and digital technology

Digital technology is a leading force in the world's technology and industrial revolution. CGN actively explores effective ways to empower industries with technology, and integrates the building of a world-class demonstration enterprise with the acceleration of digital transformation to practice digital innovation and development with concrete actions.

Building unattended power plants with intelligent O&M

CGN New Energy built a Nature+ intelligent operation and maintenance system for new energy power plants based on the operation data of new energy power generation equipment, to transform the O&M management mode of new energy power plants to an intensive and digital one and build unattended power plants to improve the efficiency of O&M management. The equipment condition is checked using the UAV-based integrated intelligent inspection system and the equipment status management prioritizes the prevention of any failure, with the help of the early warning system of new energy equipment and the experience of technical experts, so as to effectively improve the safety level of the O&M management of power generation equipment.

CGN New Energy builds a Nature+ intelligent operation and maintenance system to build unattended power plants



Employees use mobile APP to find engineering operation information

Smart project construction

In May 2022, the "Smart Construction Site" system developed by CGN Engineering was put into use at the Taipingling NPP. Based on the big data platform, the system realizes the integration of Internet and construction site to help achieve real-time, comprehensive and intelligent monitoring and management of key elements of project construction, including "people, machines, raw materials, methods and environment," so as to advance the high-quality construction of the Taipingling NPP.

With digital access control, the staff can complete the review of admission data of more than 300 people in only 2 hours per day, shortening the time needed for approving the admission of workers to 3 days. Meanwhile, when checking scaffolding operations, employees can quickly find relevant operating standards on the mobile APP, and enter data about potential hazards just by uploading pictures and checking a few boxes. And the administrative links involved are reduced from 5 to 2, and efficiency is up by more than 50%.

Improving work quality and efficiency with RPA

In December 2022, RPA (Robotic Process Automation) was introduced to DNMC and HZNPC. It is a business process automation technology based on software robots and AI. It can work 24 hours a day and finish tasks with precision and quickly to save a lot of labor costs.

In addition to automatically completing repetitive tasks, the DNMC also equips RPA with logical judgments to enable it to prevent risks caused by human error. It was put into trial use in low-code development platforms, RPA robot platforms and IoT platforms in 2022.

95%

accuracy in spare parts data identification

7000

Nearly 7,000 entries of spare parts data entered since the trial operation of the project

The Taipingling NPP has put into use the intelligent RPA spare parts coding robot to extract spare part data from EOMM and equipment drawings with dual OCR (optical character recognition) technology. The previous test data shows that the RPA technology increases the execution efficiency of spare parts data entry by about 5 times, compared with that of manual input.





Panoramic view of Hongyanhe NPP

IPR Protection

Always attaching great importance to the protection of intellectual property rights (IPR), CGN strictly implements important documents such as the Outline for Building an Intellectual Property Power (2021-2035) and the Guiding Opinions on Promoting the High-Quality Development of Intellectual Property Work of Central SOEs. The Group has,

based on its IPR management status quo, formulated the CGN Regulations on the Management of Proprietary Technology and upgraded the CGN Intellectual Property Management Policy to better regulate the creation, use, protection and management of intellectual property rights.

2

China Patent Silver Awards granted

15

China Patent Excellence Awards granted

772

Utility model patents obtained

434

Invention patents obtained

15

Appearance design patents obtained

CGN Research Institute won 33 national scientific research projects and 16 science and technology awards at or above the provincial and ministerial levels. It won the title of National Enterprise with Intellectual Property Advantage and the Guangdong Provincial Government Quality Award. It has published 115 SCI and EI papers.

Contribution to the Industry

CGN actively participates in the formulation and development of industry standards, strengthens cooperation and exchanges in industry standards at home and abroad, and collaborates with Chinese and overseas universities, scientific research institutes and upstream and downstream enterprises to solve technical problems such as nuclear power O&M technology and high-end special-purpose maintenance in the field of spare parts localization, so as to promote the development of the industry.

100+

Industry standards released

13

New industry standards compiled with CGN as the chief editor

The International Demonstration Base for the Construction and Implementation of ISO Corrosion Control Engineering Life-Cycle Standardization System was launched at Taipingling NPP Base and CGN Suzhou Institute respectively

Case The Industry Alliance for Independent Development of and Innovation in Nuclear Power Plant Operation and Maintenance Technology and Spare Parts

The Industry Alliance for Independent Development of and Innovation in Nuclear Power Plant Operation and Maintenance Technology and Spare Parts was initiated by CGN Operations in cooperation with relevant scientific research institutes and enterprises in China. It aims to develop high-end special maintenance, and tackle bottlenecks and common technical problems facing China's independent development of nuclear power plant operation and maintenance technology and spare parts. Since its establishment, the alliance has undertaken 19 independent R&D projects, set up 17 national, local artisan studios and those at the HQ and company levels, and established the Independent Innovation and Technology Research Center for Nuclear Power Plant Spare Parts, the first government-level research and innovation platform in the field of nuclear power plant operation. By promoting in-depth integration between governments, businesses, universities and research institutes, it works to ensure the safety and stability of the industrial chain and supply chain in the field of nuclear power plant operation and maintenance.



Green and Low-Carbon Development



Contributions to UN SDGs



Call of the New Era

Nature provides the basic conditions for human survival and development. Respecting, adapting to, and protecting nature is essential for building China into a modern socialist country in all respects. We must uphold and act on the principle that lucid waters and lush mountains are invaluable assets, and we must remember to maintain harmony between humanity and nature when planning our development.

Report to the 20th CPC National Congress by General Secretary Xi Jinping

CGN's Actions

CGN actively serves the Beautiful China Initiative. Seizing the historic opportunities arising in the pursuit of high-quality development in the new era and leveraging our demonstration and leading advantages as a national key player in clean energy, we contribute to the national reform of energy structure and promote green development with technological innovation, proving that "lucid waters and lush mountains are invaluable assets" with concrete actions.

On-grid power generated from clean energy equivalent to the reduction of

81.815

million tons of standard coal consumption

On-grid power generated from clean energy equivalent to the reduction of

223

million tons of carbon dioxide emissions

Major environmental pollution and ecological damage incident

0



Environmental Management

CGN strictly abides by laws and regulations such as the *Environmental Protection Law of the People's Republic of China* and fully implements the important decisions and arrangements of the CPC Central Committee and the State Council on ecological conservation and environmental protection, such as the *Opinions on Strengthening Eco-environmental Protection and Pollution Prevention and Control*. We adhere to the environmental management guideline of "prioritizing pollution prevention; technology first in driving energy conservation and emissions reduction; full participation in reducing emissions; and development in harmony with nature for the benefit of humanity" to continuously improve the environmental management system and effect.

Major environmental pollution and ecological damage incident

0



Certification

All CGN power plants have been certified by ISO 14001 environmental management system.

Case Effectively controlling environmental risks in engineering construction by the *Outline of Environmental Management in the Engineering Construction Phase*

LFNPC developed the *Outline of Environmental Management in the Engineering Construction Phase* to effectively control environmental risks in engineering construction and fill the gap in the top-level design of the environmental management system for ongoing nuclear power projects. The Outline lists effective measures for wastewater with sludge and grit, or with added medicines during commissioning generated from construction and commissioning activities in engineering construction, so as to ensure compliance with national or local emissions standards and the aggregate discharge quota of key water pollutants.

Environmental management guidelines

Prioritizing pollution prevention

Taking preventive measures such as front-end control to protect the environment from pollution

Technology first in driving energy conservation and emissions reduction

Prioritizing the use of technological means to reduce the consumption of resources or energy

Full participation in reducing emissions

Calling on every employee to continuously reduce emissions of pollutants

Development in harmony with nature for the benefit of humanity

Coordinating effort in economic growth and environmental protection, to achieve harmonious coexistence between man and nature for the benefit of future generations

Tackling Climate Change

In response to the global climate crisis, CGN gives play to its demonstration and leading advantages as a high-tech enterprise and clean energy enterprise and takes the initiative to serve China's decarbonization initiative while pursuing corporate development. We promote the development of nuclear energy

projects actively, advance the construction of new energy bases vigorously, and the development of offshore wind power projects steadily, contributing to China's 30·60 Decarbonization Goal (to peak carbon dioxide emissions by 2030 and achieve carbon neutrality by 2060).

Setting objectives to clarify the work route toward China's 30·60 Decarbonization Goal

According to requirements of the *Guidance on Promoting High-quality Development of Central SOEs in Achieving the Carbon Peak and Carbon Neutrality* by the SASAC, CGN has formulated the *Action Plan for Carbon Peak and Carbon Neutrality and the Action Plan for Energy Conservation and Carbon Reduction*. In terms of energy conservation and carbon reduction, we have established a basic principle featuring "overall plans, tailored policies based on classification, conservation first, carbon reduction at source, innovation as the driver, and technology as

the leading force," to push forward the implementation of key tasks in key areas.

In 2022, CGN focused on the improvement in management, assessment, evaluation, and system certification of energy conservation and carbon reduction to further conserve the Group's energy and provide strong guarantees for green and sustainable development.



Initiating policies and the energy efficiency evaluation system

We have developed sound administrative policies on energy conservation and carbon reduction, strictly implemented the energy conservation reporting system, and urged key energy-consuming secondary subsidiaries to get the certification of the GB/T23331 energy management system.



Establishing an energy conservation assessment and evaluation system

We have assessed energy conservation effects and carried out an "energy leader" review. A scientific, systematic, applicable, and operable energy conservation evaluation system for various industrial fields is established to guide and supervise all practices on energy conservation.



Improving energy efficiency evaluation standards

We have led the project on the methods and indicators of measuring the energy-saving effect, and conducted prospective research on energy conservation and efficiency evaluation in nuclear power, new energy, environmental protection, and other industries, so as to standardize the monitoring and statistics of indicators of energy conservation and eco-environmental protection.



Improving the energy performance and management system

We have developed various control plans (including objectives, energy indicators, and action plans) and tracked the operational status of the energy management system. Efficient operation of the system has been ensured through the integrated external review of quality, environment, occupational health, information security, and energy management.

Taking multiple measures to move toward China's 30·60 Decarbonization Goal

Centered on China's 30·60 Decarbonization Goal, CGN acts to build a clean energy development pattern in which nuclear energy and new energy go together, and actively reduces carbon emissions during its operation.

Developing clean energy to reduce carbon emissions

CGN seizes new opportunities for clean energy development, and plans green, low-carbon, and high-quality development from strategic and tactical levels, so as to facilitate China's and even the world's transition to low-carbon energy.

Case CGN Hinggan League Phase I Project, China's first gigawatt-level onshore wind power base, connected to the grid for power generation

On June 29, 2022, the 1000MW Phase I project of CGN Hinggan League 3GW Wind Power Plant was connected to the grid for power generation, which marked the official launch of China's first gigawatt-level onshore wind power base. Li Yilun, Member of the Standing Committee of the CGN Party Committee and Vice President, stated at the start-up meeting that based on "voluntary participation under government guidance," CGN integrated regional resources, connected the upstream and downstream of the industrial chain, and developed "one park, one college, one area, and two plants" to form a sustainable development model under which new energy projects stimulate regional economy and improve living standards and livelihoods. Throughout its life cycle, the wind power base is expected to pay more than RMB 5 billion in tax to Hinggan League and provide a new path for economic and social development and rural vitalization.



Nuclear power

As the largest nuclear power enterprise in China and the third in the world, CGN actively develops safe, controllable, green, low-carbon, cost-effective, and highly efficient nuclear power. Meanwhile, we explore and continuously promote the comprehensive utilization of nuclear energy, strive to expand its application scenarios, and help society save energy and reduce emissions.

New energy

We take the new energy industry as a pillar, work actively for the sustainable, high-quality, and progressive development of new energy businesses at home and abroad, and support the development of wind power and solar power storage projects. By the end of 2022, CGN had 341 wind power projects with an installed capacity of 24,724.45 MW, across 25 provincial regions in China, and 195 solar power projects with an installed capacity of 10,178.87 MW, across 29 provincial regions in China.

On-grid power generated by clean energy
301.663 TWh

On-grid power generated by nuclear power
198,375 GWh

On-grid power generated by wind power
56,588 GWh

On-grid power generated by solar power
12,505 GWh

On-grid power generated from clean energy equivalent to the reduction of
81.815 million tons of standard coal

Continuing green operations to reduce carbon emissions

In response to China's policies on energy conservation and emissions reduction, CGN strengthens energy management in each production unit, conducts whole-process diagnosis and evaluation of energy efficiency and consumption for old factories, stations, and equipment, and has formulated customized plans for energy-saving transformation for each plant. In living quarters and office areas, we accelerate to replace old products and equipment with energy-saving and low-carbon ones and advance the substitution of energy-consuming facilities in batches. All subsidiaries save energy and reduce energy consumption through multiple practical measures to "reduce pollution and carbon emissions and enhance efficiency."

Comprehensive energy consumption per RMB 10,000 output value (ton of standard coal)

2020	0.1643
2021	0.1486
2022	0.1424

Green production

DNMC adopts multiple energy-saving measures, such as improving the operation of major energy-consuming equipment during outages and thermal shutdown, replacing energy-intensive equipment and inefficient split air conditioners, and upgrading lights in the main plant. In 2022, DNMC's comprehensive energy consumption per RMB 10,000 of output value decreased by 4.2% year on year.

According to the catalogue of eliminated energy-intensive and outdated electromechanical equipment (products), CGN Engineering organizes all projects under construction to check the inventory, replace electromechanical equipment that failed to meet requirements, use LED lighting fixtures in all projects, and specify energy efficiency requirements in equipment procurement.

Green property management service

The CGN Building Property Project has obtained the three-star green property certification in Shenzhen, the highest level in the city, in the green property management project evaluation organized by the Housing and Construction Bureau of Shenzhen Municipality, setting a benchmark for "green property" management.

The green area and clean area of nuclear power bases under management by the Shenzhen Nuclear Power Service Landscape Company, a subsidiary of CGN Services, total 2.2 and 3.2 million square meters respectively, which is equivalent to approximately 21,700 tons of carbon sequestration and reduction of 8,000 tons of standard coal that can be neutralized throughout the year.

Green office

Restaurants in all nuclear power bases actively replace gas and oil with electricity, and have seen a significant year-on-year decrease in the consumption of domestic water, electricity, and oil. LFNPC has replaced all fluorescent lamps in office spaces with energy-saving LEDs, and installed AI-assisted lights in public areas which can "turn on whenever a person approaches and off when no one is there," to advocate electricity conservation.

Green travel

CGN Building and nuclear power bases in Daya Bay, Yangjiang, Taishan, Lufeng, Huizhou, Ningde, Cangnan, Fangchenggang, etc. have installed 124 charging piles, improved the infrastructure construction of parking lots in office areas, and advocated low-carbon transportation.

CGN Services has put 108 new energy vehicles into use, saving about 570,000 liters of fuel per year and reducing about 1,540 tons of carbon emissions.



Putting new energy vehicles into use

Protection of Clear Water and Sky

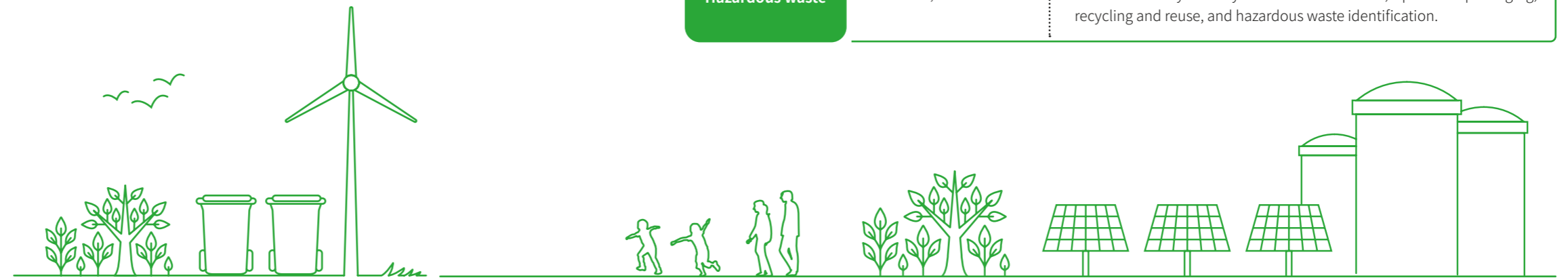
CGN abides by Chinese laws and regulations governing environmental protection, such as the *Environmental Protection Law* and the *Law on the Promotion of Circular Economy*, and embeds the concept of green and low-carbon sustainable development into its production and operation. We have a sound radioactive waste treatment mechanism and control radioactive pollution in the whole operation process. We also actively help with the national environmental monitoring system to control the discharge/emission of solid, gaseous and liquid waste (Three Wastes).



Radioactive waste management

In strict accordance with laws and regulations such as the *Law on Prevention and Control of Radioactive Contamination*, *Regulation on Safety Management of Radioactive Waste*, and *Administrative Regulation on Safe Transportation of Radioactive Substances*, CGN has formed a set of systematic and efficient radioactive waste control and treatment mechanisms. We also strengthen safety management of radioactive waste to reduce its impact.

Nonradioactive waste management

In strict accordance with the *Law on Prevention and Control of Water Pollution*, the *Law on the Prevention and Control of Atmospheric Pollution*, and the *Law on Prevention and Control of Environmental Pollution by Solid Waste*, CGN has formulated *CGN Hazardous Waste Management Standards* and other policies, and supervises their implementation. Through the supervision of nonradioactive waste collection, transportation and treatment, we keep improving the control and treatment mechanism, enhance the targeted control measures, and reduce adverse environmental impacts.



Type	Content	Control and disposal measures
 Non-hazardous waste	Including construction waste, kitchen waste, used office supplies, etc.	We classify and recycle waste by category and use specialized equipment for harmless treatment. After on-site classification and storage, we entrust qualified and technically capable units to transport and dispose of waste, and keep an eye on solid waste during off-site transportation. Thus, we can ensure compliance of solid waste production, transfer, storage, transportation and disposal.
 Hazardous waste	Including waste mineral oil, spent organic solvents, used batteries, etc.	We set targets for reducing the volume of solid waste generated and set up special groups in pilot power plants. Plans are developed and implemented from three aspects of source control, process control, and result feedback, and through methods like manufacturer recycling, environmentally friendly material substitution, optimized packaging, recycling and reuse, and hazardous waste identification.



Environmental monitoring

According to regulatory requirements, the operators of nuclear power plants (NPPs) and the provincial departments of ecology and environment in the project regions should monitor the gaseous and liquid effluents in NPPs and the peripheral environment. Through systems such as KRT (a plant

radiation monitoring system) and KRS (a plant radiation and meteorological monitoring system) within NPPs, we regularly evaluate the environmental level in and around NPPs to ensure zero impact on the peripheral environment during their construction and operation.

Monitoring scope

- The monitoring scope usually covers the area within 30 km around the plant sites, in particular within the 10 km radius of the sites. The monitoring station locations of the two systems supplement each other, to make sure there is at least one land-based monitoring station in all 16 directions around the sites.

Monitoring content

- Environmental gamma radiation level in air, aerosol, iodine, tritium-in-air and Carbon-14, including sampling, monitoring and analysis of samples such as rain water, surface water, groundwater, drinking water, soil, sediment, organism etc.

Monitoring results

- There are no abnormal environmental radiation levels in the surroundings of all operating nuclear power plants since their operation compared to the background data before.
- There is no change in the population of land and marine creatures within the scope, and no adverse impact on the environment.
- The air absorbed dose rate is within the fluctuation of local background radiation level.



Daya Bay Nuclear Power Plant

Resources Conservation

CGN adheres to the guideline of "prevention first, energy conservation and consumption reduction," strictly complies with environmental laws and regulations, and reduces resource and energy consumption through front-end prevention and select technical means.

Water resources management

CGN highly values the conservation and protection of water resources. We adopt advanced water-saving technologies, reclaimed water reuse, and other methods to ensure sustainable water supply and efficient water use and reduce water consumption and waste.



Water-efficient equipment

Each project site is equipped with water-efficient equipment to reduce water waste.



Wastewater treatment

Domestic wastewater treatment stations conduct advanced wastewater treatment in plants to meet reuse standards.



Reclaimed water reuse

Wastewater treatment and supporting facilities are renovated and reclaimed water is used for road dust control and greening.



Seawater desalination

An internationally advanced seawater desalination system is adopted to supply production and domestic water which fully meets the national hygiene standards for drinking water.

HYHNPC

- Domestic wastewater treatment station ED3 is capable of sewage treatment and advanced treatment of reclaimed water.
- Advanced treated seawater is used for landscaping and production.
- The seawater treated by the seawater desalination system is used for production and domestic purposes at power plants.

NDNPC

- The water supplied by domestic wastewater treatment stations meets the needs of flushing in office buildings, and greening and road dust control at plants.
- Wastewater reuse and in-plant recycling treatment have been achieved.

DNMC

- A *Proposal on Water Conservation and Protection* is published to call for people to conserve water resources and the water environments.
- The water-saving flushing valves and other tools are used to increase the water utilization rate.

Use efficiency of nuclear fuel

The use efficiency of nuclear fuel is an important indicator to measure the resource utilization and consumption of nuclear power enterprises. CGN continues to develop technologies that can increase the nuclear fuel utilization rate and improve fuel management. After continuous improvement, most units have a 18-month refueling cycle, which significantly reduces the number of outages and effectively improves the unit availability and the nuclear fuel utilization rate.

Technologies for a higher fuel utilization rate

We collaborate with scientific research institutions in nuclear fuel R&D, and continuously improve fuel cycling and refueling models, to reduce refueling frequency and improve nuclear fuel utilization.

Better fuel management

Some NPPs use new fuel assemblies with different enrichment levels to improve resource efficiency and reduce plants' cost.

Total water consumption

72,286,400 tons

Environmental Services

Environmental progress is inseparable from technological innovation and R&D. CGN Environment Protection emphasizes promoting technological R&D in five sectors: NPP environmental services, water supply and drainage, treatment of hazardous solid waste, water environment treatment, and comprehensive utilization of biomass. We are committed to solving industrial pain points and difficulties. Through introduction, digestion, absorption and re-innovation of foreign technologies, integrated innovation, independent R&D, and joint development, we make breakthrough in core technologies, develop core products, and create technological value.

In 2022, CGN Environment Protection created several application scenarios for core technologies, focusing on expanding the application scenarios for its three core technologies: "electrooxidation +," "plasma +," and "digitalization +." For industrial wastewater highly difficult to degrade, the company implemented several demonstration projects such as the discharge of medium- and low-level uranium-containing wastewater and the zero-discharge industrial park project.

Case "Low maintenance – short process water treatment" technology and equipment wins the first prize for environmental science and technology progress

CGN's "low maintenance - short process water treatment" technology and equipment were awarded the First Prize of 2022 Environmental Science and Technology Progress by the China Association of Environmental Protection Industry. Experts reviewed and evaluated that the technology has a mature system, is highly innovative and world-leading, and provides efficient and practical solutions for decentralized water treatment projects.



Case "The smart control system for high-quality drinking water" included in the Catalogue of Guangdong Scientific and Technological Achievements

The "smart control system for high-quality drinking water" developed by CGN Environment Protection adopts the NB-IoT module and blockchain data transmission and storage coupling technology to comprehensively ensure and improve the safety of high-quality drinking water. Expert reviews find it highly innovative, and believe that it has broad practical prospects, and reaches the international advanced level. It is included in the Catalogue of Guangdong Scientific and Technological Achievements.



Biodiversity Conservation

Upholding the vision of a community with a shared future for mankind, CGN proposes the principle of "symbiosis, mutualism and regeneration" for eco-friendly nuclear power and develops the unique four-step (avoidance, reduction, mitigation and compensation) approach to conserve biodiversity, and ensure the harmonious co-existence of project sites and surrounding natural environments.

avoidance Science-based planning to avoid impact

By prioritizing "avoidance" throughout the project lifecycle, we strive to minimize negative disturbances to biodiversity. Especially for projects involving key areas of biodiversity conservation, we strictly identify and respect the red line, and bypass it in a science-based way, to minimize impacts on the biological habitat and species diversity within the construction area.

reduction

Comprehensive conservation to reduce disturbances

We keep on monitoring the ecological environment and biodiversity in our production and operation, constantly improve radioactive waste management, and take targeted measures to protect terrestrial and marine species.

mitigation

Producing clean energy to mitigate climate change

We cope with climate change, develop our advantages, and promote the energy structure to be clean and low-carbon by developing clean energy. Meanwhile, we adopt innovation management, reduce energy consumption in our operations, and improve the energy efficiency to mitigate the potential risks of climate change on biodiversity.

compensation

Ecological restoration and compensation to increase species abundance

During project construction and operations, we actively restore the ecological environment through artificial restoration, technical restoration, vegetation compensation, and animal compensation, to ensure that local biodiversity is not declining, but even increases in abundance.

Case Protecting egrets

FCGNPC, together with the Ecology and Environment Bureau of Fangchenggang City, organized a volunteer team to Yulu Park in Hongsha village, to clean the park environment and facilities. They also set up egret feeding places, egret rescue and contact stations, and road signs leading to egret habitats, and distributed posters themed on egret conservation, calling on more people to join in egret protection.



Case Protecting mangroves

CGN Research Institute has participated in the Mangrove Ecological Restoration Project in Baguang Village, Dapeng New District, Shenzhen since 2016. It cultivates mangroves every year, and keeps building an environmental volunteer brand. The institute contributes to preventing the spread of land non-point source pollutants to coastal zones and algal blooms caused by offshore eutrophication to guard the safety of NPPs.



Case Protecting the migratory passage of 289 bird species

CGN Lake Khanka Wind Farm is located in the Fengmi Hill Tree Farm in the south of Chongshi Village, Zhiyi Town, Mishan City, Heilongjiang Province. Every spring and autumn, there are 289 bird species stopping over here on their migration. CGN New Energy uses drones during its patrol to check whether the transmission towers are well equipped with bird deterrents, to prevent bird nesting here which might threaten their safety. Additionally, operating and maintenance personnel is responsible for protecting birds and trees during their inspections. They would keep a blanket in the vehicle and use it to wrap up injured birds and protect them from secondary damage on bumpy roads.



© Lake Khanka Wind Farm project

Case Protecting Hartmann's mountain zebras

Before the launch of the Husab Uranium Mine Project, we carefully assessed and researched the movement routes and rest areas of the key protected animal Hartmann's mountain zebras. We reduced project interference by setting up fences and reserving passages. Meanwhile, we keep monitoring during the operation to ensure that mining activities and construction have no negative impact on zebras.



© Panoramic view of Husab Uranium Mine Project

Case 7,246,000 portunus trituberculatus released to the sea

On May 29, 2022, CGN Rudong H8 Offshore Wind Power Project in Jiangsu released 7,246,000 portunus trituberculatus at Rudong Liubu Fishing Port Wharf into the sea for the first time. The expert group checked the size and quantity of and tested drug residues in released crabs, and inspected the water environment to ensure the release quality. This release promoted portunus trituberculatus to rapidly restore in the surrounding sea area of the wind farm and produced significant ecological, social, and economic benefits.



Scan the QR code for

"Bird Protection" original video
CGN's entry Bird Protection won the first prize in the "Bird Protection" original video competition on bilibili.com.

图说

The most beautiful eco-friendly NPPs

Committed to building China's "most beautiful eco-friendly nuclear power plants," we continuously consolidate the institutional foundation for biodiversity conservation and management and carry out biodiversity protection practices to form species-rich ecosystems on the land and surrounding waters of nuclear power bases. Taking Daya Bay Nuclear Power Base as an example, it is home to more than 200 species of wild animals and plants, painting a beautiful picture of harmonious coexistence between man and nature.



←←←←←

Egrets and corals in Daya Bay Nuclear Power Plant

→→→→→

Dolphins in Yangjiang Nuclear Power Plant



→→→→→

Blooming flowers in Hongyanhe Nuclear Power Plant



←←←←←

Otus lettia in Ningde Nuclear Power Plant

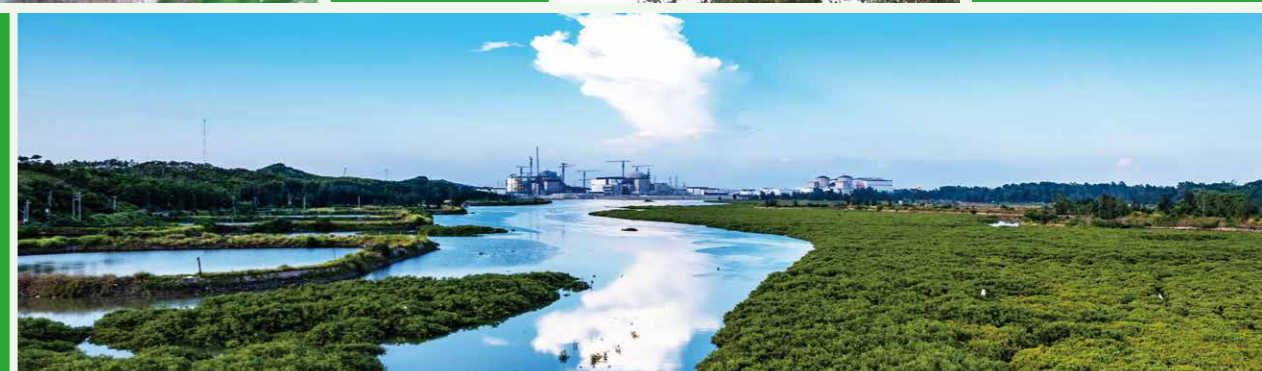


←←←←←

Black-eared kites flying over in Taishan Nuclear Power Plant

→→→→→

Mangroves in Fangchenggang Nuclear Power Plant





Employee Development



Contributions to UN SDGs



Call of the New Era

"Cultivating a large workforce of high-quality talent who have both integrity and professional competence is of critical importance to the long-term development of China and the Chinese nation. A wealth of talent is vital to the success of a great cause. We should follow the principle of the Party managing talent, and we should respect work, knowledge, talent, and creativity. We will adopt more proactive, open, and effective policies on talent and encourage our talent to love the Party, dedicate themselves to the country and contribute to its cause, and serve the people."

Report to the 20th CPC National Congress by General Secretary Xi Jinping

CGN's Actions

Employees are a big asset of an enterprise, and what keep it going. CGN has firmly established the philosophy of strengthening the enterprise through talent cultivation, and continue to improve the talent training system in line with the principle of people first. We work to create an active and fair workplace to help unleash employees' potential so that they can grow together with the Group.

44,576

Employees in total

2,808

million
Total employee training hours

141

Training hours per employee



Employee Rights

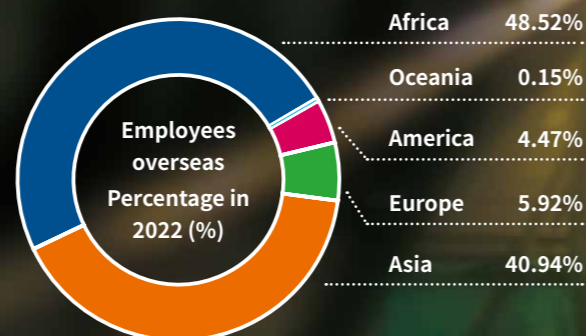
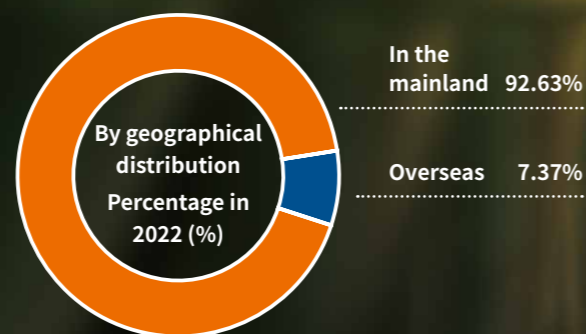
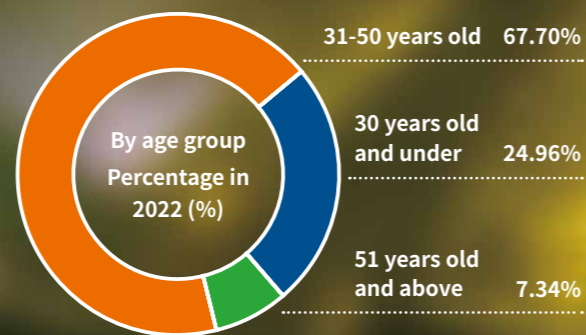
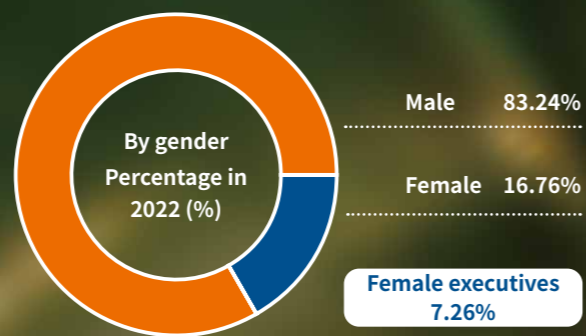
CGN respects and safeguards employees' lawful rights, including the right to equal employment, the right to fair payment, and the right to democratic communication, etc., and actively build harmonious and stable employment relations.

Workplace diversity

Complying with all the internationally recognized policies related to human rights stated in the UN's *Universal Declaration of Human Rights*, International Human Rights Conventions and ILO (International Labour Organization) Core Conventions, and the principle of open, fair and just employment, we provide equal employment and career development opportunities for employees regardless of their nationality, race, gender, age, religion and cultural background. We also prohibit illegal labor practices such as child labor or forced labor, and are committed to building an equal and inclusive workplace to attract outstanding talents.

Overseas, we uphold localized employment, fully respect various religious and cultural practices, and promote the harmonious development of CGN with employees from diverse cultural backgrounds. For international projects, we have employed a total of 3,075 local employees, 3,000 of whom are employed by CGN Energy International in Malaysia, France, Brazil, Egypt, Bangladesh and other countries.

Basic information of employees



Rights protection

CGN resolutely safeguards the basic rights and interests of employees, and strictly abides by laws and regulations such as the *Labor Law and the Labor Contract Law* as well as labor employment policies of host countries. In line with national and local social insurance mechanisms, we offer employees social insurances, including pension, medical insurance, unemployment insurance, work-related injury insurance, and maternity insurance, as well as supplementary medical insurances and paid leaves.

100%

Labor contract signing rate

100%

Social insurance coverage rate

1,741

Employees who have taken the parental leave

Note: Parental leave includes maternity, paternity and breastfeeding leave.

Compensation and benefits

We constantly improve the incentive system. A standardized and rational pay raise mechanism is in place. Employees are primarily evaluated as per their responsibility, ability and performance. Meanwhile, we clarify the concept of value creation, and ensure that employees receive fair returns after assuming work responsibilities and creating value, to fully boost employees' enthusiasm for work.

Democratic management

CGN prepared and issued the *Guidelines on the Operation of the Workers' Congress* to regulate the organization and actions of the Congress in each subsidiary and ensure its functions and powers are effectively exercised. All our subsidiaries have ensured that matters of great concern to the employees were all discussed at these meetings, and all employee proposals were proceeded. At the same time, we value communication with employees, regularly organize face-to-face talks between employees and managers at different levels, and extensively collect employee opinions through the General Manager's Mailbox. For problems and concerns reported by the employees, measures will be taken to follow up their rectification by category.

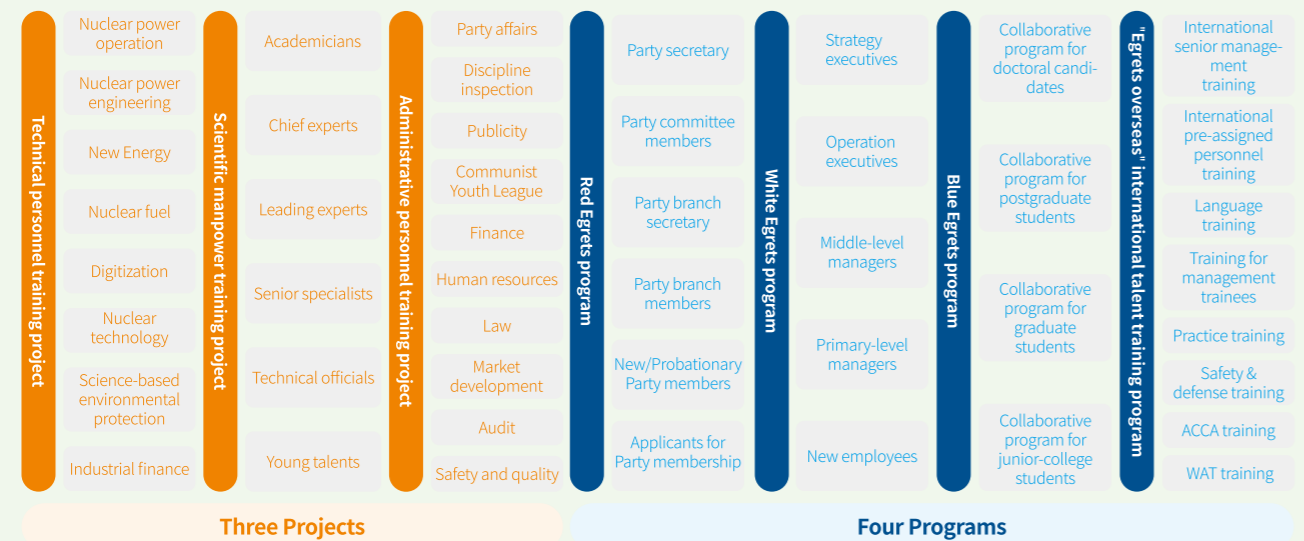
Employee Growth

Upholding the philosophy that "talent development proceeds corporate development" and based upon strategic development needs, CGN have established an across-the-board, whole-process and all-round talent training system covering "three programs" and "four projects," and kept creating training

ways and enhancing our competence of training. Focusing on building various talent pools including managerial personnel and those who are competent in scientific research, skills personnel and Party building specialists, we aim to provide a talent pipeline to power high-quality corporate growth.



Talent Development Proceeds Corporate Development Across-the-board, Whole-process and All-round Talent Training



CGN's Talent Training System

White Egret Program

This program tackles the pains and difficulties facing new hires, newly promoted managers at all levels, and management trainees at all levels in their transitional and probationary periods, and covers multiple stages of career based on the core skillsets required for managers at all levels. It was awarded the Best Training Program for Chinese Enterprises and the Best Practice of Talent Development in China.

Sub-program	Object	Sessions held
White Egret - Hatching Program	Accelerate employees' shift into new roles	1 session
White Egret - Run-up Program	Improve newly-appointed primary-level managers' management ability	8 sessions
White Egret - Wing-spreading Program	Improve newly-promoted middle-level managers' management ability	6 sessions

Series of training programs for managers of CGN – White Egret Program

Sub-program	Training recipients
White Egret - Hatching Program	New hires (through campus recruitment and other recruitment channels)
White Egret - Feathering Program	High potential talents at the primary-level positions
White Egret - Run-up Program	Newly-promoted primary-level managers
White Egret - Flapping Flapping Program	Middle-level high potential talents
White Egret - Wing-spreading Program	Newly-promoted middle-level managers
White Egret - Taking-off Program	Medium and long term reserve
White Egret - Flying Program	Senior management reserve
White Egret - Hovering Program	Newly-promoted senior operation executives



Red Egret Program

CGN resolutely implements the general requirements on the Party building in the new era raised by the CPC Central Committee and the SASAC Party Committee. In accordance with the arrangement of the CGN Party Committee, we have launched the Red Egret Program to provide training opportunities for cadres who are Party members. Through systematic, standardized, institutionalized, time-sensitive and characteristic training projects, the primary-level Party cadres have effectively improved their sense of duty and ability to perform duties, bringing a strong talent guarantee for CGN's high-quality Party building.

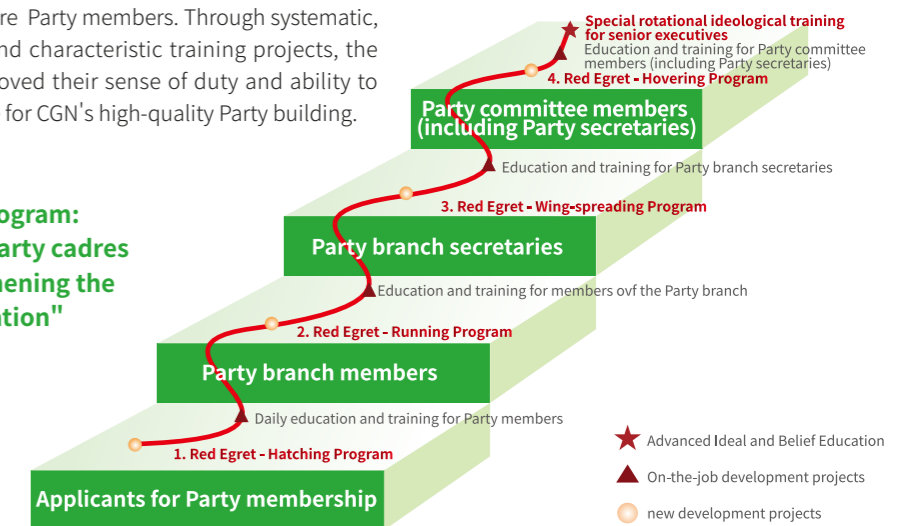
254

Training sessions in 2022

Red Egret Program: Training of Party cadres for "strengthening the Party foundation"

11,324

Participants





Employee honors

We provide employees with a cradle for realizing their dreams. Great achievements have been continuously made by employees of different positions in their specialty fields, which was widely recognized by all walks of life.

Honors

Gan Jianquan of CGN New Energy was awarded the title of National Outstanding Communist Youth League Member.

Yu Chao of CGN Research Institute was awarded the title of Good Youngster of Guangdong.

Li Qinglei of CGN Operations was awarded the title of National Young Skilled Expert.

Wang Hao of CGN Engineering was awarded the title of Outstanding Communist Youth League Member of Guangdong.

Zhou Chuangbin of CGN Engineering was awarded the title of Craftsman of South Canton.

Wang Qi of FCGNPC was awarded the title of Model Worker of Guangxi Zhuang Autonomous Region.

Wu Jiong of FCGNPC was awarded the title of Craftsman of Guangxi.

Chen Peng of DNMC was awarded the title of Young Skilled Specialist of Shenzhen.

Wang Guowei of Shanghai Engineering Science & Technology Co., Ltd. was awarded the title of Craftsman of Shanghai.

Case ACCA Session 1 graduation ceremony & session 2 opening ceremony held

On July 6, 2022, the session 1 graduation ceremony and the session 2 opening ceremony of the "Egret Across Ocean Program" ACCA training program were held in the CGN Headquarters building. He Haibin, member of the Standing Committee of the Party Committee and Chief Accountant of the Group, attended and addressed the event. He highly recognized the achievements of the first session of the ACCA training program, and hoped participants to maintain self-confidence and self-discipline, be longtermist and aim high.



Embarking on a new journey with a concerted effort

Growing from a young apprentice to a senior operator within 7 years

In 2009, Yu Zhaodong joined DNMC after graduation from university. Going through hardship on the site of the power plant, Yu walked around every corner and bore each equipment, layout and function properties in mind, for frequently checking whether there was any problem in the plant. In 2016, he was awarded the license of senior operators responsible for main control room with the highest score.

Within just 7 years, Yu transformed from a young apprentice to a senior operator of the main control room. It was said that he was a born high achiever, but what underlies his achievements is his assiduous endeavor of learning and exercising. Actually, the learning materials piled up on the desk and all the nights he spent practicing operation of the main control simulator are testimony of his hard work. In 2020, Yu ranked first again in the Vocational Skills Competition for Guangdong NPP Main Control Operators, with the highest total score in the written test and the hands-on operation.



Yu Zhaodong, Employee of DNMC

Zero operation mistake for 13 years

As a NPP master control operator, Yu Zhaodong always reminds himself that as he is the last "goalkeeper" of the nuclear power unit: he is not only accountable for the overall guarantee of the unit's security, but also obliged to calmly deal with the "emergency" of the unit. The morning shift on December 3, 2017 coincided with the key upturn overhaul stage of DNMC's nuclear power unit. As the main control operator for Unit 1 overhaul, Yu kept various key points and risks in mind. At 14:00 on the same day, when the No. 2 steam generator began to turn water into steam, Yu noticed no significant change in the water level curve, and immediately stopped the operation. When he found that the local valve was not opened, he instantly reported the failure to the overhaul headquarters and suspended the water turning, thus avoiding the occurrence of insufficient water supply to the steam generator.

Over the past 13 years, he has "made friends with" nuclear power equipment, operated with zero deviation and managed to properly deal with the transient of the unit many times. What keeps him calm and cool at crucial moments is year after year of devotion and research.

Yu Zhaodong has shared his systemic learning method with many colleagues and has been awarded the titles of CGN's Best Master of the Year and DNMC's Excellent On-site Master of the Year.

Befriending nuclear energy equipment

"Only by constantly perfecting techniques with the mentality of making friends with on-site equipment can we understand their different characters." Always believing so, Yu Zhaodong has made great efforts to polish up skills and implemented the work style of "strict compliance, prudent decision-making, detail-oriented and fact-based approach", safeguarding nuclear security for over 10 years.

Employee Care

CGN is committed to creating a comfortable harbor for employees. While facilitating employees' career development, we have launched a variety of employee care activities to provide a warm and comfortable workplace, striving to enhance employees' sense of safety, happiness and belonging.

"Serving the People with Concrete Actions" campaign

All subsidiaries of CGN continued to promote the "Serving the People with Concrete Actions" campaign. With focus on the most pressing concerns of the employees, concrete, effective measures are taken to truly meet the needs of employees, and create a good working and living environment for them, so that they could work with better vigor and spirit.

Care and greetings

Retirement ceremonies

In 2022, all our subsidiaries successively carried out activities to acknowledge the retirees and their contribution.



◎ Farewell Party for Chen Xiongchao at Yangjiang Nuclear Power Plant

Employee care during the COVID-19 lockdown

In September 2022, during the COVID-19 lockdown, DNMC specially established a care group and opened a hotline, which dealt with hundreds of requests made by employees in home quarantine. A total of 186 Party branch secretaries each held one-on-one talks with employees every day, totaling more than 44,000 talks. We show genuine care for employees in our concrete actions.



◎ CGN Youth Squad rushes to help the fight against COVID-19 in Shenzhen

Comfortable work

The "Cool Summer" campaign

From July, a lasting heat wave hit many parts of China. Labor unions at all levels of the CGN carried out the "Cool Summer" campaign and distributed green bean soup, refreshing tea, beverages and salt pills to front-line employees at production, overhaul, engineering, scientific research sites. Shuttle buses were also provided in the manufacturing area, to solve the outdoor commuting problem under the scorching sun.



Summer camps

From July 2022, the CGN Labor Union, the Communist Youth League Committee and our subsidiaries carried out a series of summer camp activities to teach scientific knowledge of clean energy to employees' children. The activities effectively alleviated employees' burden of child care during the summer holiday, and popularized clean energy knowledge among youngsters, and spread the philosophy of green and eco-friendly development. It also inspired them to become spokespersons of clean energy and practitioners of green and low-carbon lifestyles.



Services for overhaul technicians

"You are in charge of the overhaul and we take care of your family." During the fourth overhaul of Unit 4 of Ningde Nuclear Power Plant in 2022, 18 Party member service teams offered services to lighten the burden on staff working on site, covering business lines such as spare parts, tools, processes, operations, maintenance, training, logistics, etc.



Work-life balance

Makeshift lounge for employee recreation

On May 12, 2022, the Huizhou Project Department of CGN Engineering officially put into use a makeshift lounge for employee recreation. It is equipped with sports equipment, a multi-functional room, a chess room, a yoga and dance studio and more than 1,000 books, providing staff with a place for communication, exercise and learning.



"Health Cup" sports activities

In 2022, NDNPC carried out the third "Health Cup" sport event for its maintenance staff, including five sports: basketball, tennis, badminton, table tennis and billiards. From July to September, a sports theme was set every half month, which fully inspired the enthusiasm of employees.



969

Concrete actions done to address the concerns and benefit the employees

336

Employees received assistance with the housing problem

259

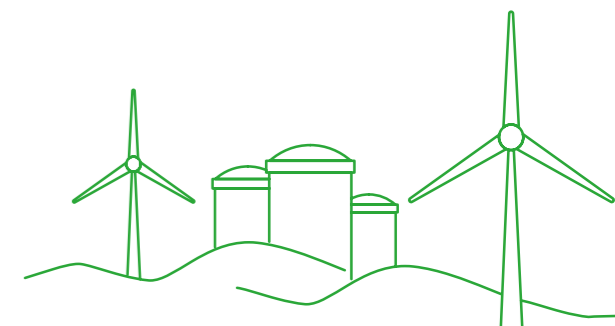
Employees received assistance with the enrolment of their children to school or kindergarten

1,219

Employees received sympathy gifts from the Company

105,262

Employees took part in cultural, sports and leisure activities



Keeping in mind national priorities and pursuing national rejuvenation

Serving young people and rallying their force

According to the report to the 20th CPC National Congress, we should become the confidants, advocates, and guiders for young people. CGN has taken the initiative to plan and make targeted efforts to "serve young people with concrete actions," effectively solve their most pressing concerns, provide help and support for their

growth, and actively promote them to be the new era's great young generation, a generation with ideals, a sense of responsibility, grit, and dedication. As they endeavor to build CGN into a world-class clean energy group, their youth and vitality will bloom in full splendor.



⊙ "A Cup of Coffee with the Chairman" site

Face to face with young employees as good confidants

We actively listen to the voices of young employees and organize activities for them to have face-to-face communication with the management. We also set up a communication platform for the young employees so that the management can keep abreast what young employees are thinking and help them solve real-life problems.

"A Cup of Coffee with the Chairman"

By having face-to-face conversations with young employees and sharing stories of personal growth and struggle, the Party secretary and chairman of YJNPC responded to the young people's concern and expressed high expectations for their growth.

Serving and guiding young employees' growth

As President Xi Jinping stressed, "China's young people of today are living in a remarkable time. They have an incomparably broad stage on which to display their full talents, and they have incomparably bright prospects of realizing their dreams." CGN and our subsidiaries actively carried out diversified training activities to enhance the capability and quality of young employees and help them grow and progress at faster speed.



A lecture given by CAE academician on the spirit of the "Two Bombs, One Satellite" program

On December 9, 2022, the Communist Youth League of CGN hosted a youth innovation forum where Academician Du Xiangwan, former vice president of the Chinese Academy of Engineering and deputy director of the National Energy Administration Advisory Expert Committee, was invited to give a lecture titled The "Two Bombs and One Satellite" Program and the Spirit of Scientists for young scientists and technology workers, and encouraged them to inherit and carry forward the spirit of scientists, and strive to be a pioneer force on the journey toward the great rejuvenation of the Chinese nation.

Proactively addressing problems facing young employees

The Communist Youth League committees at all levels of CGN have made efforts to tackle "the most pressing concerns" such as marriage, housing and talent subsidies, and actively addressed the worries of young employees, and let them truly feel the genuine care of the company.

A singles mingling party for CGN employees

On days like May 20th and the Qixi Festival popular among young people in 2022, the Communist Youth League committees of CGN at all levels organized more than 30 online and offline parties for the singles. In romantic settings, intimate interactive games were designed, a love declaration session included, and a database of singletons established, with the aim to expand the social network of young employees, and help singletons find their significant half.



Corporate culture

Corporate culture is the soul of an enterprise and the inexhaustible driving force of its innovative development. Through various activities such as culture building, communication and interaction, CGN actively transmits its values and positive energy to enhance corporate cohesiveness and influence.

70+

Corporate cultural activities held in 2022

8,000

Employees involved

Case "Red-nuclear memory" cultural forum

On July 27, 2022, as Unit 6 of HYHNPC was about to put into operation and start commercial operation, HYHNPC held a forum themed on "Red-nuclear Memory." The Forum, divided into three chapters including "Startup", "Struggle" and "Harvest," invited those who participated in and witnessed different important stages and milestones of the HYH Project to share their precious memories and touching stories of HYH, and review the changes of the times in the development of HYHNPC.



Case LFNPC's idea-sharing sessions

By mobilizing the inner drive of employees, LFNPC launched the brand event of LFNPC's idea-sharing sessions, to tell the stories of LFNPC and make its voice heard through a series of activities such as commemorative exhibitions of project

commencement, open lectures given by Party secretaries, and story sharing among young employees. By doing so, cohesiveness, bonds and affection of the team have been enhanced, giving the team members a fresh new look.



Intercultural integration

Adhering to localized recruitment, CGN creates an inclusive and diverse corporate culture for employees around the world. We fully respect different religious and cultural customs, actively learn about overseas excellent cultures while promoting Chinese traditional culture and CGN's corporate culture overseas. Through a series of colorful cultural activities, we have promoted cultural integration, injected momentum into the harmonious corporate development, and enhanced the sense of belonging among employees in project countries.

Case Folk customs of Brazil's "June and July festivals"

On July 15, 2022, CGN Brazil Energy, a subsidiary of CGN Energy International, celebrated the famous harvest festival in northeastern Brazil at its headquarters. With a span from June to July, people sang and danced at the festival to share the joy of the corn harvest. CGN Brazil Energy hang colorful flags in their offices, handed out straw hats, corn cakes, Quentão (red wine hot drinks), peanut sugar, etc. Besides, fun games, dancing and the best country costume selection were also organized.



Case Promoting Chinese culture overseas

In April 2022, with the theme of "In Pursuit of Excellence Hand in Hand," CGN Swacop Uranium organized an event to promote Chinese culture, attracting nearly 1,000 local people. The event consisted of four parts, namely, traditional martial arts, potting, bowling and Chinese cuisine, showcasing the long history and profoundness of Chinese culture.



Case Namibian Mining Games

From November 25 to 26, 2022, CGN Swacop Uranium hosted the 2022 Namibian Mining Games at Vineta Stadium in Swakopmund, attracting the participation of more than 1,500 people of 13 mining companies in Namibia.



Case "Lonely Warrior" sung by French pupils at CGN wind farm

In December 2022, CGN Europe Energy, a subsidiary of CGN Energy International, held an Open Day at the Normandy wind farm in France. More than 40 pupils from Ecole Primaire Publique le Clos Perrine paid visited the wind turbines, learned clean energy knowledge, and sang jointly the hit song "Lonely Warrior" of the FIFA World Cup Qatar 2022.

Scan the QR code for music videos





Harmonious Community



Contributions to UN SDGs

Call of the New Era

"We must strive to realize, safeguard, and advance the fundamental interests of all our people. To this end, we must do everything within our capacity to resolve the most practical problems that are of the greatest and most direct concern to the people. We will stay engaged with our people and their communities, adopt more measures that deliver real benefits to the people and win their approval, and work hard to resolve the pressing difficulties and problems that concern them most. We will improve the basic public services system to raise public service standards and make public services more balanced and accessible, so as to achieve solid progress in promoting common prosperity."

Report to the 20th CPC National Congress by General Secretary Xi Jinping

CGN's Actions

In response to General Secretary Xi Jinping's instructions on consolidating and expanding the achievements made in poverty alleviation to promote rural vitalization in all respects, CGN actively assumes its responsibility as a central SOE, and has made solid progress in promoting rural vitalization. While achieving its business development, CGN also actively gives back to society and promotes industry progress. Together with stakeholders, we strive to build a harmonious and better society.

RMB **46.5974**
million
Total global donation

11,659
Participants of volunteer activities in 2022

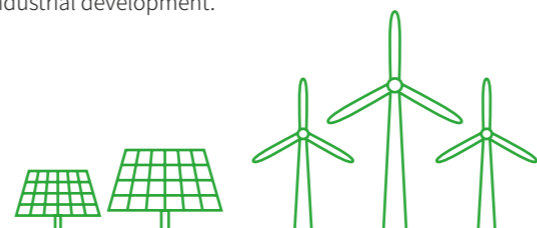
103,618
Hours of volunteer service and social welfare activities

Rural Vitalization

Shouldering the major political responsibility of rural vitalization, CGN has always followed the requirement that even though the poor counties have been lifted out of poverty, the responsibilities, policies, assistance, and supervision shall continue. Specifically, we continue our projects for rural vitalization in five aspects: the industrial development, ecological progress, talent cultivation, consumption of products from areas that have been lifted out of poverty and village-level assistance, as a part of our efforts to consolidate and expand the achievements made in poverty alleviation and advancing rural vitalization in all respects.

Supporting the industrial development

CGN leverages its industrial and technological advantages to continuously operate existing industrial assistance projects and create a market-based assistance model for industrial chains. We fully leverage our advantages in energy, nuclear technology, tech-based environmental protection to implement industrial projects, striving to promote deep integration of rural vitalization and industrial development.



Snapshot of CGN providing assistance



☉ Sewage treatment project of domestic waste landfill in Leye



☉ Landscape of a flower field at the wind farm of CGN Wind Power Project in Leye



☉ Tea processing factory in Longhuai Village



☉ CGN 40MW agrivoltaic-farming project in Pingxiang County



☉ CGN fishery-solar power plant in Dangtu, Anhui



☉ Chinese snake gourd planting base in Wudongcheng Village

Guangxi Environmental protection industry

With its technological innovation advantages in nuclear technology, CGN has adopted the electron beam for special waste treatment to upgrade the sewage treatment system of the domestic waste landfill in Leye, effectively solving the ecological and environmental problems such as the landfill's gap in harmless disposal capacity and the risk of landfill leachate overflow.

Achievement

- ☉ After the project is officially completed and put into operation, the domestic waste landfill in Leye will realize the full and compliant discharge of landfill leachate.

Guangxi Wind power + ecological tourism

The CGN wind power assistance project in Leye, Guangxi has established the goal that facilities for environmental protection and water conservation are designed, built and put into use simultaneously with the main body of the project concerned, and formed a new model of industrial assistance and ecological tourism. We have created a flower field at the wind farm, improved rural landscape, added public welfare positions, and set up local specialty sales points, to promote local employment and increase income.

Achievements

- ☉ The Phase I of the CGN wind power project in Leye distributed its first dividends of RMB 4.58 million to 63 villages.
- ☉ On average, each village's collective income increased by over RMB 70,000.
- ☉ The project was voted among the best practices of the "Third Call of Global Solicitation on Best Poverty Reduction Practices."

Guangxi A demonstration model for rural vitalization

In Longhuai Village, Lingyun County, we have developed pillar industries of mulberry planting and sericulture and pekoe tea planting, cocoon and silk floss processing projects, "silkworm rooms for winter" projects, and the village digitization project. In Banhong Village, Leye County, we have built a demonstration base for the kiwifruit industry, and employed digital and intelligent technologies to extend the kiwi industrial chain.

Achievements

- ☉ Longhuai Village's collective economic income exceeded RMB 250,000.
- ☉ Banhong Village was awarded the title of Excellent Pilot Village for Rural Vitalization and Reform in Autonomous Regions and was included into the 12th batch of national demonstration villages and towns for the "One Village, One Product" initiative.

Hebei Agrivoltaic farming

CGN New Energy has funded a 40MW agrivoltaic farming project in Pingxiang County, Hebei Province. Solar panels are installed at the idle space on the roof of greenhouses to improve the land utilization rate so that greenhouses can be used for farming and energy generation simultaneously.

Achievements

- ☉ In 2022, the annual income of 48 greenhouses amounted to RMB 1.4 million.
- ☉ The dwarf sorghum planted outside greenhouses yielded an annual output of 193 tons, with an income of RMB 482,500.

Anhui Hybrid fishery-solar system

CGN New Energy also runs a 260MW fishery-solar power plant in Taibai, Dangtu County. Piles are erected to raise the bracket so that solar panels can take in sunlight above the water and generate electricity, while aquaculture is going on under the water. It is an example of solar power and agriculture drawing on each other's strengths.

Achievements

- ☉ The output value per unit area has been increased.
- ☉ More local job opportunities have been created.

Hubei Specialty industries

CGN has been helping Wudongcheng Village, Baisha Town, Yangxin County, Huangshi City to capitalize on its advantageous resources for industrial development since 2015 and to make it a "township of ramie in China." At the same time, we help it develop industries such as shrimp farming in paddy fields, Chinese medicinal herbs, solar power generation, opened shoe factories and hired villagers to increase their income. So far we have built a 160KW solar farm, 500 mu of ramie base, 300 mu of traditional Chinese medicinal herb base, and 150 mu of snakegourd planting base.

Achievements

- ☉ Wudongcheng Village can generate over RMB 600,000 of income every year.
- ☉ More than 100 villagers have got jobs and increased income, with a total annual labor income of over RMB 3 million, bringing nearly RMB 250,000 of income to the village collective every year.

In 2022

RMB **55,511,200**

invested in rural vitalization in total

RMB **370**

million invested in the Phase II of the CGN wind power demonstration project in Leye and the forestry-solar complementary centralized photovoltaic project in Luosha

RMB **32.79**

million invested in 16 assistance projects in targeted counties

RMB **100**

million + donated for rural vitalization, disaster relief, etc.

Honors

CGN has been rated "Excellent" in the performance assessment of central SOEs in providing targeted assistance for four consecutive years

CGN's EBI Technology for Preservation of Agricultural Products Facilitating Rural Industrial Development was selected as a best practice by The National Rural Revitalization Administration

Promoting talent cultivation

Building the Egret Class brand

CGN actively develops the Egret Class program for education support, and keeps promoting it to more areas. In 2022, we spent RMB 5.4 million supporting the "Egret Class" program for ethnic minorities, which had been opened in ten schools in five provincial regions, and benefited 2,513 students. We also advanced the Rainbow Project of Egret Class program at Lanjin Primary School in Lingyun County and Xieli Primary School in Leye County, to provide assistance to the left-behind children. The project has benefited 241 students so far, including 175 students in school. We also assisted Lanjin Primary School in carrying out the "Smart Chinese" subject development project, and the pilot class have leaped to the top of the town in academic performance.

Case The "Smart Chinese" project empowers rural talent cultivation

Most of the students in Lanjin Primary School are Yao people, and are not good at *Putonghua* (mandarin) as they speak dialects with their family since the childhood. In response, CGN Operations and Beijing Normal University jointly launched the "Smart Chinese" project in the school. The project aims to train two seed teachers as well as several Chinese-language teachers, who later can then help improve the school's Chinese teaching quality on the whole. The "211 New Teaching Method" is introduced to replace the traditional teaching method of inefficient rote. New words are integrated into further reading to help students efficiently grasp knowledge based on comprehension.

The project has been going on for two semesters, with more than 40 research and training activities carried out, and optimized 17 excellent lessons and teaching materials. The overall academic performance of pilot classes increased by 45.56% year on year. In November 2022, the average scores of the two key classes under the "Smart Chinese" project ranked second in the mid-term exams among village-level primary schools in the town.



☉ Pilot class of "Smart Chinese" project

Expanding employment channels

CGN has helped Yunbo Village, Dongping Town, Yangjiang City to establish a village-run enterprise called Yangjiang Yunxing Environmental Engineering Co., Ltd. and outsourced to it the sanitation of roads outside the Yangjiang Nuclear Power Base. The company hired eight villagers, and each of them could increase their income by nearly RMB 40,000 every year. We have built a talent station for rural vitalization, and provided skills training, "Guangdong technicians". After receiving the training, 58 villagers have obtained the low-voltage electrician qualifications. We also coordinated partner companies of YJNPC to stage a job fair in the village, and these companies together hired more than 30 villagers.



☉ Yangjiang Yunxing Environmental Engineering Co., Ltd. signs collective labor contracts with 8 new employees



Honors

YJNPC was awarded the honorary title of "Top 100 Philanthropic Enterprises in Guangdong."

The good practice of YJNPC for aiding Yunbo Village in Dongping Town, entitled *Leveraging Advantages of Geographical Proximity and Creating a New Paradigm for Rural Vitalization through Joint Contribution, Co-existence, and Shared Benefits*, was selected as a best case of "Thousands of Enterprises Helping Develop Thousands of Towns and Villages" in Guangdong Province.

In 2022

81

students from the Egret Class were admitted into undergraduate programs after the National College Entrance Examination, setting a new record

Exploring a new mode of assistance through ecological conservation

In response to local needs, CGN, based on technological innovation, actively leverages its expertise to develop demonstration projects of rural vitalization through ecological conservation, and further explore a new path with CGN characteristics that effectively integrates rural vitalization with China's 30·60 Decarbonization Goal (to peak carbon dioxide emissions by 2030 and achieve carbon neutrality by 2060).

Implementing forestry carbon sequestration projects

CGN has gratuitously helped Lingyun County develop forestry carbon sequestration resources, created the value of environmental and ecological products in a market-based way, and built a long-term and stable green economy assistance mechanism. According to the preliminary assessment, 35,000 mu of developable forest land in Lingyun County can generate carbon sequestration assets of RMB 600,000 to 1.2 million every year. In 2022, CGN conducted the first forestry carbon sequestration transaction for Lingyun County, and helped translate its ecological advantages into economic benefits.

Jin Wanbing, a Party member of CGN New Energy, was assigned by CGN to serve as a member of the Standing Committee of the Party Committee and Deputy Mayor of Leye County, Guangxi. Closely following the pioneer of great national revitalization, he has devoted himself to the rural vitalization of Leye County, the recipient of CGN's targeted assistance.

Exploring a new model of assistance through ecological conservation

After Jin Wanbing learned that Leye was faced with risks in protecting ecological environment and it was urgent to solve the problem of waste water treatment in the landfill regulating tank, he immediately communicated with the General Administration Department of CGN and CGN Nuclear Technology. After many discussions, a decision was made to establish a waste leachate project in Leye. After overcoming many difficulties, CGN Nuclear Technology finally completed the waste leachate treatment project and put it into operation on November 21, 2022, making new contributions to the ecological progress of Leye.

Working hard to fulfill duties and achieve fruitful results

During Jin's tenure at Leye, the Phases I and II of CGN wind power project achieved full-capacity operation and were connected to the grid on January 24 and October 14, 2022, respectively. Meanwhile, the advance dividends of RMB 4.58 million were wired to 63 village collective accounts. The ground centralized solar power project achieved full-capacity operation and was connected to the grid on September 30. CGN wind power project in Leye was also selected as the best practice in the "Third Call of Global Solicitation on Best Poverty Reduction Practices." The project of EBI technology for preservation of agricultural products was selected as a best practice by The National Rural Revitalization Administration, as one of the six best practices of central SOEs subject to the SASAC.

Embarking on a new journey with a concerted effort

Helping Leye build a green assistance project across the industrial chain

"Over more than a year, I have traveled eight towns and villages of 2,633 square kilometers in Leye County. I always worked with local cadres to take targeted steps to consolidate the achievements of poverty alleviation and advance rural vitalization in all respects. Together we managed to control several outbreaks of COVID-19, and went to various investment promotion venues..."



☉ Jin Wanbing, a CGN employee seconded to Leye County

Community Development

In line with the philosophy of "boosting local economy and benefiting local people through project development," CGN never forgets to give back to society and facilitate the development of surrounding communities, thus achieving deep integration between project development and surrounding communities. We strive to build harmonious communities while continuously providing clean electricity.

Improving infrastructure

CNNPC and the Cangnan county government has signed a supplementary agreement on transportation project cooperation to support the construction of local Lingsha Highway, National Highway 228 and other roads.

FCGNPC has actively coordinated cooperation units, applied for project funds, conducted on-site investigation and demonstration, initiated supplier negotiations, determined installation plans, and eventually installed 21 pillar-type LED solar streetlights on the main roads of Dapo Community in Guangpo Town.

CGN has invested more than RMB 700,000 and coordinated support funds of RMB 8 million to upgrade farmland, roads and bridges in Wudongcheng Village, Huangshi City according to high standards, giving the rural roads a fresh new look.



Streetlights donation and lighting ceremony in Dapo Community, Guangpo Town, Fangchenggang City

Addressing water supply problems

CNNPC has cooperated with 17 local Party organizations, construction companies, and supervision parties in Cangnan to establish a joint Party committee of San'ao NPP and develop the water supply project, to solve the problem of unreliable drinking water for 62,000 people in mountainous areas.

The Party branch of the DNMC Engineering Reconstruction Department and the Lanjin Primary School in Lingyun County launched an online donation, outreach and exchange event themed "Mother Cellar" to solve the water problem through voluntary fundraising, donation and other forms. The "Mother Cellar" project has been carried out for 15 consecutive years, solving the domestic-water problem for more than 2,200 people of nearly 550 households.

Supporting educational development

HZNPC has established the HZNPC Charity Fund to provide assistance for teachers and students. For example, it repaired the football field and outdoor lighting systems, funded the opening of reading rooms and Egret multifunctional classrooms for Huangbu Middle School, and provided teaching computer equipment for rural schools nearby. The volunteers also popularized nuclear power knowledge and concepts about ecological conservation, thus promoting public communication.

Edra Power Holdings Sdn Bhd, a subsidiary of CGN Energy International, launched a student aid program in Malaysia in 2005. By donating funds and essential goods, it aims to reduce the burden of impoverished families. As of the end of 2022, the Edra Student Aid Program had benefited 28,000 students in Southeast Asia, with a total donation of over MYR 3.85 million (over RMB 5 million) in scholarships.



Edra Student Aid Program in primary schools in Kedah, Malaysia

Case The CGN Youth Squad rushes to Shenzhen overnight to help the COVID-19 fight

In March 2022, Shenzhen had a severe outbreak of COVID-19. On March 13, in active response to the call of the Shenzhen Municipal Party Committee and Government, CGN selected 18 outstanding young employees to form a squad, and sent them to join the Youth Against COVID-19 Campaign organized by Shenzhen Municipal Committee of the Communist Youth League. They rushed overnight to support the frontline battle against the epidemic in the lockdown areas. For 14 consecutive days, they wore airtight protective clothing on every day, organized residents to queue for code scanning and nucleic acid testing. They even once delivered 15,000 kilograms of radish to the residents overnight. They excellently completed volunteer services, and once again demonstrated the strong sense of responsibility of the youth of CGN in the battle.

18 members of the Youth Squad awarded the title of Young Pioneers of Battle against COVID-19 by CGN



CGN Youth Squad rushes overnight to help fight the COVID-19 pandemic

Keeping in mind national priorities and pursuing national rejuvenation

Achieving win-win and mutual integration through localized development of Husab Uranium Mine

The Husab Uranium Mine is located in the Namib Desert of central western Namibia. For many years, CGN has been actively building a "community of shared future" between project construction and African economic, social, environmental, and cultural development, and sharing development achievements with the local community.

Supporting the development of small and medium-sized enterprises

Attaching great importance to local sustainable development, the Husab Uranium Mine has taken multiple measures to support local small and medium-sized enterprises to participate in operational services. For example, it strongly encourages local enterprises to bid for its procurement projects. So far its local procurement has amounted to NAD 2.93 billion.



Hage G. Geingob, President of Namibia visits Hushan Uranium Mine project

As the largest employer in Namibia's mining industry, CGN Swakop Uranium provides powerful support for the development of small and medium-sized enterprises in Namibia. I am really gratified. I hope that the company can strengthen cooperation with the government to bring greater benefits to Namibia.

—Hage G. Geingob, President of Namibia

CGN Swakop Uranium's contract came at the right time. It saved our machine repair factory and our livelihood. CGN Swakop Uranium has indeed promoted the development of local SMEs. Although the economy was depressed due to the COVID-19 impact, many SMEs survived thanks to the help of CGN Swakop Uranium.

—Auto-Fix, a local small and medium-sized enterprise

Promoting employment and development

Among the about 1,700 permanent employees of CGN Swakop Uranium, 96% are local employees, and 12% are female, far above the industry average. CGN Swakop Uranium has invested over NAD 200 million in local employee training and skills enhancement.



Employees of local mechanical repair shops providing vehicle rust prevention services in Namibia

Serving surrounding communities

The Husab Uranium Mine has invested in the construction of a 21 km mine road, which was praised by the President of Namibia as a highway leading to modernization in barren hills and mountains. The company has donated more than NAD 2 million of anti-epidemic supplies, including oxygen, Oxygen concentrator, beds, masks, and disinfectant, to Namibian hospitals, government agencies and vulnerable groups.



21 km mine road invested and constructed in Namibia

Energy Science Popularization

From August 7 to November 30, 2022, CGN launched a science popularization activity on clean energy with 10,000 volunteers under the theme of "Green Development for China's 30·60 Decarbonization Goal." During the four months, CGN planned and held over 300 science popularization activities with ten sub-themes to mobilize public participation, and promote green and low-carbon lifestyles, thus gathering the magnificent force to achieve China's 30·60 Decarbonization Goal.

Ten sub-themes of energy science popularization activities

- Into Bases and Bookstores
- Into Communities
- Into Science and Technology Museums
- Into Campus
- Into Scenic Areas
- Into Countryside
- Into Parks
- Youth Talk on China's 30-60 Decarbonization Goal
- Children in Action
- Global Energy Science Popularization Tour

Honors

CGN was rated as an excellent organization for the 2022 National Science Popularization Day.

Six clean energy bases were awarded the title of National Science Popularization Education Base by the China Association for Science and Technology. ^①

Four science popularization activities were selected as excellent activities for 2022 National Science Popularization Day. ^②

①: Including: Daya Bay Nuclear Power Base, Yangjiang Nuclear Power Base, Ningde Nuclear Power Base, Hongyanhe Nuclear Power Base, Taishan Nuclear Power Base, and Modou Mountain New Energy Base

②: Including: The Lecture on Natural Energy Powering Nature with the theme of "Green Development for China's 30·60 Decarbonization Goal, CGN's Massive Clean Energy Science Popularization on the campus of Southwest University of Science and Technology, Online Tour of CGN Yangjiang Nuclear Power Base as part of the "Innoland" National Youth Science Festival, and "Flying Dreams Together" CGN Egret Class Summer Camp



August 7

The 10th CGN Open Day was held with the theme of "Green Development for China's 30·60 Decarbonization Goal." It was held simultaneously at all clean energy bases of CGN and major bookstores in cities such as Shenzhen, Beijing, Suzhou, and Shenyang. The launch ceremony of CGN's Massive Clean Energy Science Popularization Campaign was held at the Central Shenzhen Book Mall.



August 16

CGN held the 2022 CGN Egret Class Summer Camp at Fangchenggang NPP, Guangxi. Lectures on the nuclear energy science and nuclear safety culture, and immersive visits enabled children from the mountains to understand the role of clean energy and green low-carbon technologies in improving the ecological environment, thus cultivating a sense of harmonious coexistence between humans and nature.



September 14

A science popularization team, formed by the CGN Medical Technology (Mianyang) Company and China Isotope & Radiation Corporation visited the Southwest University of Science and Technology, and gave a lecture on clean energy and non-power nuclear technology and its application to more than 120 students majoring in the nuclear engineering and technology in the School of National Defense & Nuclear Science and Technology.



September 17

China Techenergy, a subsidiary of Shanghai Engineering Science & Technology Co., Ltd., jointly held a non-profit lecture on Natural Energy Powering Nature with the Beijing Science Center. The lecture and the subsequent Q&A session further enhanced the interest of 50 participants aged 6-15 in scientific knowledge and their understanding of the scientific rationality of nuclear energy.



October 1

CGN Europe Energy and the Assac Municipal Government of France jointly held an Open Day with the theme of "From Wind Farm to Windmill - 6 km Road Hiking" at Assac Wind Farm. The company set up billboards along the route to showcase the natural and cultural landscapes along the way, popularize knowledge related to wind power, and promote the concept of new energy and environmental protection.



November 3

CGN Brazil Energy, a subsidiary of CGN Energy International, launched the Open Day of Rapa Power Plant. Students majoring in engineering and machinery from Brazil's UNOPAR University were invited to visit Rapa PV Power Plant in Bahia, northeastern Brazil, to learn knowledge such as solar power generation, and appreciate the beauty of clean energy and CGN's dedication to green development.

300+

Science popularization activities organized

27

Prefecture-level cities in 18 provinces (autonomous regions and municipalities directly under the Central Government) of China and 4 continents of Asia, Europe, Africa and South America covered

5 million+

Online and offline participants

150 million

Exposures on the Internet

750+

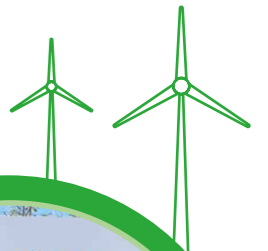
Initial reports and reprints by mainstream media

110 million+

Views attracted to the hashtag #CGN's Massive Science Popularization of Clean Energy#

200 million+

Views attracted to the hashtag #The CGN Open Day on Aug. 7#



Corporate Philanthropy

With continuous attention to the needs of the public and special groups, CGN makes full use of its own resources to carry out various volunteer activities for the elderly, left-behind children and other people in need, giving back to the society. CGN advocates the spirit of dedication with concrete actions, and assumes its corporate social responsibility and mission as a central SOE.

Serving the elderly

CGN Services has launched a "Love and Care 1+1" volunteer project for the elderly, under which 28 volunteer services such as haircuts, indoor cleaning, and home appliance repair, are delivered to the elderly, to help the retirees enjoy a peaceful life.



On the eve of the Double Ninth Festival in 2022, HYHNPC distributed gifts to the elderly aged over 80 years in 736 households in Hongyanhe Town. It also took golden wedding anniversary photos for eight couples in advance and presented the photos to them on their visit, showing HYHNPC's care for them.



Caring for left-behind children

The "Rainbow Project" for Egret Class, an education aid program, launched by the Staff of CGN General Office, carry out 12 actions in 4 series of Rainbow Class, Rainbow Student Aid, Rainbow Vision, and Rainbow Home for the left-behind children in Egret Class. Their assistance and support have comprehensively improved students' learning outcomes, living standards and psychological condition.

The "photo studio" at Lanjin Primary School set up by volunteers from the CGN Suzhou Institute takes beautiful smiling ID photos for over 50 students in Egret Class. In 2022, the volunteers honored their commitment made to the students, visited them and gave them the photos taken in 2021 and earlier that year.



LFNPC provides one-on-one assistance for left-behind children in Lanjin Primary School. In 2022, LFNPC delivered stationery, books, sport equipment, household goods and other materials to Pan Xiaoxue, Pan Qiyi, and Lan Duoduo, three primary school students in need, and its staff had several online talks with them, bringing them targeted assistance for their academic performance as well as physical and mental health, and showing them care from society.



Carrying out charitable activities

The Communist Youth League(CYL) Committee of TNPJVC, in collaboration with the CYL Committee of Chixi Town, launches a volunteer activity of "repairing circuits and eliminating potential safety hazards in rural areas". The volunteers check and identify circuit problems and address safety hazards for households in need in Tonggu Village.



Edra Power Holdings Sdn Bhd, a subsidiary of CGN Energy International, allocates 40 acres of buffer zone around the Kedah Power Plant in Malaysia to farmers to plant pineapples and other crops, which are managed by the Farmer Association in Kuala Ketil District. After the harvest, the products are sold in Penang, Alor Setar and other neighboring towns. The planting project is expected to bring an average of MYR 60,000 per cycle.

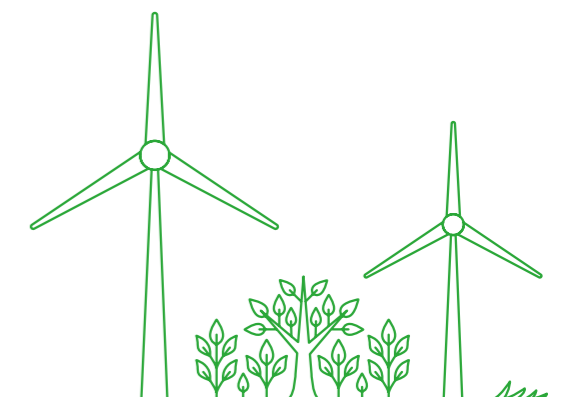


In collaboration with institutions such as the Malacca Investment Development Authority, the Machap Community Service Center, and the Women of Will, Edra Power Holdings Sdn Bhd, a subsidiary of CGN Energy International, continuously carries out multiple assistance actions for vulnerable groups, including distributing food packages to impoverished communities in Malacca and providing various assistance to vulnerable women. These actions have cumulatively benefited over 2,400 vulnerable households, including impoverished households, single mothers, and street vendors.



Case Assisting a visually impaired teenager in "chasing light"

Xiao Rong (pseudonym), an impoverished student in Dongping Town, was one of the recipients of targeted assistance from the CYL Committee of YJNPC. He dropped out of school due to visual impairment. Volunteers actively coordinated resources to help him become self-reliant. In August 2019, Xiao Rong, who had dropped out of school for nearly two years, was admitted to Massage Class 2, Guangdong Peiying Vocational and Technical School. With the encouragement and support of volunteers, teachers, and classmates, he was awarded the title of 2020-2021 Merit Student of the college. Later he also worked as a part-time masseuse to increase social practice experience. In July 2022, after completing various courses and social practice, Xiao Rong, aged 18, finally got his diploma, and had more expectations for the future.



Win-win Cooperation

CGN actively advocates win-win cooperation. In line with the principles of "extensive consultation, joint contribution and shared benefits," we strive to build a responsible supply chain, help create a sound market environment and leverage our

Building a responsible supply chain

CGN insists on open and honest procurement. Committed to achieving common growth and creating a responsible supply chain, we actively create an open and transparent market competition environment, continuously improve supplier management, and strengthen cooperation and communication with suppliers.

advantages with presence across the entire industrial chain to actively promote industry development, deepen dialogue and cooperation with stakeholders, and achieve win-win results.

Transparent and honest procurement

CGN implements open procurement whenever it should, and makes public procurement information covering all categories, all procurement methods, and the whole procurement process to subject to public supervision. We strictly follow the laws and regulations related to bidding and tendering. We work to foster an open, fair, and just market competition environment through a series of measures such as building a closed-door evaluation venue, a uniform expert database, and a wholly-digital bidding and tendering process, and ensure compliance throughout the procurement process.

Honors

Several subsidiaries of CGN were awarded the title of 2022 Demonstration Enterprises for Credit System Building in the Power Industry by China Electricity Council.

Case Holding a supplier conference for win-win cooperation in new energy

On August 18, 2022, CGN New Energy held the 2022 Supplier Conference with the theme of "Cooperation for a Bright Future." The Conference was live-streamed to the suppliers, and featured three cooperation chapters on "industrial coordination, innovative development, and safety & compliance." The suppliers were briefed on the CGN's cooperation concepts and requirements in the development of the industrial chain, technological innovation, safety, environment, and health. The Five-star and Four-star Suppliers of 2021 were acknowledged, incentivizing suppliers to continuously improve their cooperation.



Playing a leading role in the nuclear energy industrial chain

CGN works to play its role as head of modern industrial chains. We have initiated the establishment of a joint R&D center for equipment localization, organized 87 upstream and downstream partners and deployed 81 independent R&D tasks, of which 52 had been completed, and 33 had seen their technological achievements commercialized and applied, thus taking the initiative firmly in our hand for nuclear energy development. We also leverage our advantages with business presence across the industrial chain of nuclear technology application, and cultivated seven national-, provincial-, and municipal-level "little giant" specialized and sophisticated enterprises, including three national-level ones, thus contributing to the formation of a solid and powerful industrial chain.

Case CGN Engineering awarded the honorary title of 2022 National Demonstration Enterprise in Supply Chain Innovation and Application


As the main equipment buyer for CGN's nuclear power projects, CGN Engineering, centering on strategic planning, aims to play its role as head of the supply chain of nuclear power engineering construction. It actively plays a leading role in strengthening cross-industry collaboration, thus promoting the continuous improvement in overall nuclear power equipment manufacturing at home. So far, it has completed the supply of over 1.5 million sets of nuclear power equipment, and signed more than 5,500 contracts with more than 2,000 downstream suppliers, covering more than 5,000 categories of products. It is one of the most experienced, well-established, and capable enterprises in providing integrated nuclear power equipment in the world. CGN Engineering is the first enterprise in the nuclear power field to win the title of 2022 National Demonstration Enterprise in Supply Chain Innovation and Application.

Improving supplier management

CGN clarifies supplier management principles and specific requirements for supplier introduction, qualification review, performance evaluation, and supplier elimination in the *CGN Procurement Management Policy* and *CGN Supplier Management Measures*. The Tendering (Management) Center was established to coordinate effort in supplier management.

Main measures for supplier management

- Access control**
We conduct necessary and reasonable control over the access of suppliers, and strictly check the qualification and original documents of newly-approved suppliers, and effectively control the number of suppliers for each category of goods.
- Performance evaluation**
We evaluate suppliers which have completed the contracts in different dimensions, and keep a record of their misconduct, if any, or blacklist them if the circumstance is severe.
- Supplier elimination**
We irregularly sort and screen the supplier database, control the number of suppliers of products of the same category, and eliminate those which have bad annual performance evaluation results.
- Supplier status renewal**
When there is a significant change in the basic condition of suppliers or the review conclusion cannot meet the procurement requirements, we will conduct another round of supplier review. We review the qualifications of eligible suppliers for which we have continuous procurement needs to ensure their qualification status is effectively maintained.
- Behavior management**
We have established a supplier database for misconduct in the CGN e-commerce platform system, and a hierarchical punishment mechanism. For example, some suppliers may be restricted or prohibited, and those who cause serious adverse effects or behave poorly will be blacklisted across the Group or by individual companies.



Case Cooperation with the industrial chain partners to speak up for the industry and create a "win-win ecosystem"

On August 16, 2022, the Global GasTurbine Power Generation Summit hosted by CGN Energy International was held at in Kuala Lumpur in Malaysia (the main venue), Beijing and Shenzhen in China, and Paris in France, simultaneously. At the Summit, CGN Energy International, together with representatives of the industrial chain, issued the *Kuala Lumpur Declaration on Gas Turbine Power Generation*. The declaration called on all countries to actively optimize national policies on industry access, industrial chain building and technology sharing, and hoped all parties in the industry to jointly create a gas turbine power generation ecosystem with open access to technology and knowledge sharing. It also called on the whole industrial chain to seek win-win cooperation to improve energy efficiency, promote technological innovation, and realize the zero-carbon cycle of gas turbine power generation, for greater prosperity of the industry.



Ali Biju, Deputy Minister of Energy of Malaysia, delivered a speech at the summit

Strengthening external exchanges



①

On July 7

CGN participated in the 28th China Lanzhou Investment and Trade Fair

The 28th China Lanzhou Investment and Trade Fair was held in Lanzhou in a hybrid format. CGN participated in the opening ceremony and high-end forum for Silk Road cooperation and development, as well as the symposium on central SOE-local government cooperation for development.



④

On November 15

CGN hosted the 2022 China Nuclear Energy High-quality Development Conference and Shenzhen International Nuclear Energy Industry Innovation Expo

The 2022 China Nuclear Energy High-quality Development Conference and Shenzhen International Nuclear Energy Industry Innovation Expo was opened with the theme of "Nuclear Energy in the Greater Bay Area Powering the World" at Shenzhen International Convention and Exhibition Center. It was co-hosted by CGN, China Energy Research Society, and the Development and Reform Commission of Shenzhen Municipality.



⑤

On November 15

CGN participated in the 24th China High-tech Fair

At the 24th China High-tech Fair at Shenzhen International Convention and Exhibition Center, CGN showcased many technological innovations, such as HPR1000, FirmSys, nuclear power robots, new energy multi-level intelligent operation control systems, and electron accelerators. This was the 13th consecutive appearance of CGN at the Fair.



②

From August 8 to 12

CGN undertook the 29th International Conference on Nuclear Engineering

The 29th International Conference on Nuclear Engineering was held in Beijing and Shenzhen simultaneously with the theme of "Nuclear Energy Innovation Powering a Carbon Neutral Future". The Conference was co-sponsored by the Chinese Nuclear Society, the American Society of Mechanical Engineers (ASME), and the Japan Society of Mechanical Engineers (JSME), and undertaken by CGN Research Institute.

③

On September 16

CGN participated in the 19th China ASEAN Expo

The 19th China ASEAN Expo opened in Nanning, Guangxi on September 16. For twelve consecutive year, CGN has been invited to the Expo, bringing research achievements such as Hualong One (HPR1000) and new energy technology, as well as agricultural products from Leye and Lingyun in Guangxi, two destinations of CGN's assistance for rural vitalization.

⑥

From November 19 to 22

CGN participated in the 6th China-South Asia Expo

The 6th China-South Asia Expo was held in Kunming, Yunnan. CGN was invited to participate in the Expo and signed a strategic cooperation agreement with the Yunnan Provincial Government.



Outlook

Embarking on a new journey in this new era, CGN will fully implement Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era and the guiding principles of the 20th CPC National Congress. In this new stage of development, CGN will continue to fully and faithfully apply the new development philosophy on all fronts and integrate itself into the new development paradigm. In 2023, we will further strengthen Party leadership and Party building and ensure

Party building leads high-quality development

With strengthening the Party politically as our overarching principle, we will work to fulfill our founding mission, strengthen the construction of "three basics," facilitate the mutual learning between and the integration of Party building and CGN's business and encourage employees to stick to production posts and be brave in surmounting difficulties, achieving high-quality development led by high-quality Party building and making the CPC flag fly high in the front line.

Safety underpins high-quality development

We will comprehensively act upon General Secretary Xi Jinping's instructions on nuclear safety, practice the work style of "Strict Compliance, Prudent Decision-making, Detail-oriented and Fact-based Approach" and adhere to the basic principles of "safety first, quality foremost and pursuing excellence." With a focus on the cultivation of nuclear safety culture, we follow and develop the principle that "nuclear safety is our overriding priority" in practice and fulfill our work safety responsibility.

nuclear safety and sound business fundamentals. Keeping in mind that "science and technology is our primary productive force, talent our primary resource, and innovation our primary driver of growth," we will implement the innovation-driven development strategy and continue green development, contributing to building China into a modern socialist country in all respects, realizing national rejuvenation and the high-quality development of CGN.

Innovation accelerates development

We give priority to innovation and integrate resources into strategic R&D, confronting the challenges in technological innovation with tremendous prowess. We will optimize scientific research management, plan scientific research work in a science-based manner and improve the efficiency of technological innovation. New development drivers and edges will be created to boost the high-quality innovation-driven development of CGN.

Green production drives high-quality development

We will practice green, low-carbon development, give full play to our leading edge in technology, and vigorously develop large-scale wind and solar farms and offshore wind turbines. We will promote the integrated development of wind and solar energy storage and the application of advanced technologies for energy conservation and carbon reduction. Furthermore, we will facilitate the deep integration of emerging technologies and the energy industry, thereby lighting up the road to green development with scientific and technological advancement and contributing to China's goal of carbon peak and carbon neutrality.



Taishan Nuclear Power Plant

Performance Data

Safety

Performance Indicators	2020	2021	2022	
Maximum personal radiation dose at each nuclear power plant in operation	Daya Bay Nuclear Power Plant (mSv)	5.02		
	Ling Ao Nuclear Power Plant (mSv)	6.77	11.854 ¹	9.962
	Lingdong Nuclear Power Plant (mSv)	4.70		
	Units 1-6 of Yangjiang Nuclear Power Plant (mSv)	12.05	8.831	9.485
	Units 1-5 of Hongyanhe Nuclear Power Plant (mSv)	6.43	5.983	7.996
	Units 1-4 of Ningde Nuclear Power Plant (mSv)	11.22	7.325	8.267
	Units 1 & 2 of Fangchenggang Nuclear Power Plant (mSv)	6.36	3.608	3.686
	Unit 1 & 2 of Taishan Nuclear Power Plant (mSv)	7.10	8.501	3.881
Nuclear Safety	Number of in-service nuclear power units	24	25	26
	Ratio of units achieving the world's advanced level (the world's top quartile) in WANO indicators (%)	72.6	83.0	79.2
	Unplanned shutdowns (times)	5	1	2
	Number of level-2 or above incidents defined in the International Nuclear and Radiological Event Scale (times)	0	0	0
Personal safety of employees	Human error in license operating events	6	8	3
	Work-related fatalities	1	2	0
	Industrial safety accident rate per 200,000 man hours	0.013	0.009	0.005
Occupational disease incidence rate	0	0	0	

Note: Since 2021, data of Daya Bay Nuclear Power Plant, Ling Ao Nuclear Power Plant and Lingdong Nuclear Power Plant located in Daya Bay Nuclear Power Base have been included into the consolidated statistics of Daya Bay Nuclear Power Base.

Scientific research

Performance Indicators	2020	2021	2022	
Investment in scientific research activities (RMB billion)	3.79	4.15	5.16	
Total participants of scientific research activities	8,582	8,909	10,124	
Educational background of scientific research personnel	Doctor's degree (headcount)	175	203	234
	Master's degree (headcount)	2,836	2,786	3,192
	Bachelor's degree (headcount)	4,891	4,924	5,343
National talents	Academician (headcount)	1	2	2
	New Century Hundred-Thousand-Ten Thousand Talent Project	6	4	3
Patent applications	Number of recipients of special allowance of the State Council (headcount)	39	34	44
	Invention	874	2,031	1,168
	Utility mode	604	538	685
Authorized patents	Appearance design	21	15	11
	Invention	395	470	434
	Utility mode	591	767	772
Appearance design	26	24	15	

Operation

Performance Indicators	2020	2021	2022
Total assets (RMB billion)	788.5	848	912.7
Total overseas assets (RMB billion)	113.8	134.9	139.7
Operating income (RMB billion)	110.7	121.4	137
Overseas operating income (RMB billion)	20.3	22.5	34.2
Ratio of overseas operating income (%)	18	19	25
Total tax payment (RMB billion)	12	12.6	15.1
Gross in-service installed capacity of clean energy (GW)	63.16	68.5096	77+
Gross in-service installed capacity of nuclear power (GW)	27.14	28.26	29.38
Gross in-service installed capacity of nonnuclear power (GW)	37.95	40.1541	48.3998

Environment

Performance Indicators	2020	2021	2022
CO ₂ emissions equivalent reduced from clean energy (million tons)	200	210	220
Comprehensive energy consumption (10,000 tons of standard coal ²)	180.01	179.5	183.92
Comprehensive energy consumption per RMB 10,000 of output value (tons of standard coal equivalent ³)	0.1643	0.1486	0.1424

Note: **2.** This indicator refers to the sum of the standard coal equivalent of actual energy consumption in industrial production of an enterprise, and deducts the sum of the enterprise's standard coal equivalent of energy conversion output.

3. This indicator refers to the ratio of comprehensive energy consumption of enterprises to their total industrial output value. The formula is comprehensive energy consumption (tons of standard coal equivalent) divided by industrial gross output value (RMB 10,000).

Staff development

Performance Indicators	2020	2021	2022	
Number of employees	42,464	42,972	44,576	
By gender (%)	Male	83.32%	83.52%	83.24%
	Female	16.68%	16.48%	16.76%
By age (%)	30 years old and under	27.31%	25.14%	24.96%
	31-50 years old	65.08%	67.61%	67.70%
	51 years old and above	7.61%	7.25%	7.34%
By region (%)	Employees from China	91.41%	91.64%	92.63%
	Employees overseas	8.59%	8.36%	7.37%
Total training hours for employees (million hours)	387	259	280.8	
Annual training hours per employee (hour)	93	60	141	
Employee turnover rate (%)	6.55%	6.65%	5.82%	
New employees (headcount)	3,560	3,758	4,515	

Community contribution

Performance Indicators	2020	2021	2022
Global charitable donations (RMB million)	172	77.6754	46.5974
Poverty alleviation investment (RMB million)	101.06	59.476	55.5112
Number of CGN employee volunteers	16,432	26,718	11,659 ⁴

Note: **4.** Due to the COVID-19 impact, the number of volunteers decreased in 2022.

GRI Standards Content Index

Contents	GRI Standards	
About This Report	2-2、 2-3	
Message from the Chairman	2-22、 2-23	
CSR Feature: Upholding Party Leadership and Making New Strides	2-24、 2-26	
CSR Feature: Writing a New Chapter of High-quality Development and Striving Forward in the New Journey Toward Chinese Modernization	2-16、 2-22、 2-24	
About CGN	2-1、 2-2、 2-6、 201-1、 404-1	
Corporate Governance	2-9、 2-10、 2-11、 2-12、 2-17、 2-18、 2-27	
Sustainability Management	2-13、 2-14、 2-15、 2-16、 2-22、 2-26、 2-29、 3-1、 3-2、 3-3	
Safe Operations	Safety Management	403-1
	Quality Projects	416-1
	Operational Safety	416-1
	Occupational Health	403-1、 403-2、 403-4、 403-5
Innovation-driven Development	Reform and Innovation	2-12、 2-13、 2-17、 2-18、 2-19
	Independent Innovation	2-24
	Digital Transformation	2-24
	IPR Protection	2-27
Green and Low-Carbon Development	Contribution to the Industry	203-1
	Environmental Management	2-27
	Tackling Climate Change	201-2 302-1、 302-2、 302-3、 302-4、 302-5
	Protection of Clear Water and Sky	2-27、 306-1、 306-2、 306-3、 306-4、 306-5
	Resources Conservation	103-2、 301-2、 303-1、 303-2、 303-3
Employee Development	Environmental Services	203-1
	Biodiversity Conservation	304-3、 304-4
	Employee Rights	2-19、 103-2、 201-3、 401-2、 401-3、 405-1、 406-1、 407-1、 408-1、 409-1
Harmonious Community	Employee Growth	2-7、 404-1、 404-2、 404-3
	Employee Care	403-3、 403-4、 403-6、 405-1
	Rural Vitalization	203-1、 415-1
	Community Development	103-2、 203-1、 203-2、 204-1、 413-1
Outlook	Energy Science Popularization	2-29
	Corporate Philanthropy	203-1、 413-1
	Win-win Cooperation	203-2、 414-1、 414-2
Performance Data	2-22	
GRI Standards Content Index	102-8、 102-9、 201-1、 302-3、 305-5、 306-2、 306-3、 401-1、 404-1、 405-1	
	102-55	

The report is printed on eco-friendly paper. 

China General Nuclear Power Corporation

Postcode: 518026

Fax: 86-755-83699900

Website: www.cgnpc.com.cn

Address: CGN Building, No. 2002, Shennan
Boulevard, Shenzhen, China

 **Twitter:** CGN France/CGN Group Official

 **Facebook:** CGN.FR/CGN clean energy

 **Instagram:** cgnfrance/CGN Clean Energy

 **Youtube:** CGN Newmedia

 **TikTok:** CGN_FR



The official account
of CGN on Wechat



The official account
of CGN on Weibo



CGN Douyin
account



The official account
of CGN on Bilibili



The official account
of CGN Channels



The official account
of CGN on Xuexi
Qiangguo APP



The official account
of CGN on Kuaishou



The official account
of CGN on Toutiao