

# 2022

## Corporate Social Responsibility Report

China National Nuclear Power Co., Ltd.

### Nuclear Power to Light Up Homes



# About This Report

## Reporting period

The report covers our business activities from January 1, 2022 to December 31, 2022, and also includes additional information beyond the stated reporting period.

## Reporting cycle

Since the first report of China National Nuclear Power Co., Ltd released in 2012, we have continuously disclosed social responsibility information to the public. This is the eleventh CSR report from our company.

## References to China National Nuclear Power Co., Ltd.

In the report, "China National Nuclear Power Co., Ltd." is also referred to as "CNNP", "the Company" or "we".

## Reporting scope

The report covers all relevant information of CNNP and its holding subsidiaries, joint ventures, and companies with direct investment from CNNP.

## Data source

All data in the report are from official documents and statistics reports of CNNP.

## Compilation conformance

This Report is prepared in accordance with the *Guidelines to the State-owned Enterprises Directly under the Central Government on Fulfilling Corporate Social Responsibilities* issued by State-owned Assets Supervision and Administration Commission of the State Council (SASAC), *Guidelines on Corporate Social Responsibility Reporting for Chinese Enterprises (CASS-CSR 4.0)* issued by the Chinese Academy of Social Sciences, the *GRI Sustainability Reporting Standards (GRI Standards)*, and the *Guideline on Environmental Information Disclosure by Listed Companies of Shanghai Stock Exchange (SSE)*.

## Reliability assurance

The Company assures that no fictitious record, misleading statement, or material omission are included in this report, and will joint and several liability for the report's authenticity, accuracy, and completeness.

## Report Access

This Report is available in both Chinese and English, including paper and electronic versions. You can download the electronic version of the Report from CNNP official website (<http://www.cnnp.com.cn>).

For a hard copy of the Report, please contact us at [cnnp@cnnp.com.cn](mailto:cnnp@cnnp.com.cn) or 010-8192 0188.

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## Message from the Chairman



In 2022, the Communist Party of China (CPC) held the 20th National Congress and depicted a grand blueprint for building China into a modern socialist country in all respects. The policy of "developing nuclear power in an active, safe and orderly manner" has charted a clear direction for our high-quality nuclear power development in the new journey. We carried out our operation and development while adhering to the concept of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, the spirit of Xi Jinping's important instructions and the spirit of the 20th CPC National Congress. We also applied the new development philosophy and constructed the new development paradigm in a complete, accurate and comprehensive way. We sought for better business operation, effective implementation and stricter management, striving for a new journey towards sustainable development to create a better future for all. CNNP was selected the Demonstration State-Owned Enterprise in Corporate Governance by SASAC and won the first prize of National Enterprise Management Modernization Innovation Achievement and the Listed Company with the Most Investment Value of the China Securities Golden Bauhinia Award.

**We maintained dedicated to safeguarding work safety.** Focusing on the safe and orderly development of nuclear power, we further consolidated the achievements of the three-year action for safety improvement, improved the work safety management, and implemented the "six controls and seven noes" (i.e. progress control, investment control, quality control, safety control, environmental protection control, and confidentiality control; no exceeding the schedule, no excessive investments, no quality problems, no accidents, no pollution incidents, no breaches of confidentiality, and no violations against integrity). delicacy management. By doing so, we aim to ensure the sound management of the six controls of the units under construction and the safe and stable operation of the units in operation. In 2022, as 18 operating units achieved full marks in WANO composite index with the average mark of 98.58, CNNP becomes world leading in safety performance.

**We carried out the nuclear operation in a sustainable way.** Upholding the concept of green development, we carried out stringent management of environmental conservation and strict supervision of discharge emissions. Besides, we conducted special actions on environmental conservation enhancement and pollution prevention and control to orderly develop nuclear energy, wind power, photovoltaic and other clean energy sources to reinforce our efforts in energy conservation and emission reduction. We released the *CNNP Biodiversity Conservation Practice* and launched the first "Beauty of Nuclear Harmony" Biodiversity Conservation Practice Photography Contest to highlight the beauty of nuclear power. In 2022, CNNP produced 199.29 TWh of nuclear power and non-nuclear clean energy generation, equivalent to reducing 60.52 million tons of standard coal consumption, and cutting CO<sub>2</sub>, SO<sub>2</sub> and NO<sub>x</sub> emissions by 158.57million tons, 514,400 tons and 447,900 tons respectively.

**We drove our high-quality development through innovation.** By adopting centralized management, we have completed the three-year action plan for the SOE reform ahead of schedule. Furthermore, we fostered the concept of delicacy management in all employees and injected new vitality for enterprise development with reform and innovation. We have not only made great breakthrough in core technology research by optimizing the science and technology innovation system, but also integrated information technology into the whole life cycle of nuclear power by accelerating the digital transformation of nuclear power. These achievements facilitated CNNP's goal of becoming a world-class enterprise. In 2022, the case of Board of Directors development was selected as one of the outstanding cases in the three-year action plan for SOEs by SASAC. CNNP was included in the list of Grassroots Demonstration SOEs in Corporate Governance by SASAC. Moreover, CNNP's one sci-tech achievement was awarded the China Patent Excellence Award.

**We promoted cooperation to create value together.** Focusing on three core industries, as in nuclear energy, non-nuclear clean energy, and new agile industries, we deepened the industry-university-research cooperation and implemented the "internationalization" strategy to strengthen international exchanges and cooperation and to familiarize the international patents and international standards. We aim to build a responsible industrial chain and create maximum value together with upstream and downstream supply chain partners and international partners. In 2022, CNNP obtained 7 authorized international patents and won the Nuclear Excellence Award by WANO for two consecutive years.

**We boosted the well-being of employees.** We adopted the strategy of prioritizing talent and improved talent quality and the ability to allocate human resources. For employee care, we created a fair, positive, healthy and resourceful career development platform through which employees are granted with the opportunity to present themselves. The action seeks to boost their sense of belonging so that they can live a happy life. In 2022, we achieved 98.90% coverage for staff training. Moreover, we have 25 talents receiving national awards and 38 high-level talents.

**We engaged in community development.** We continued to innovate diversified communication and has held the "Appealing Nuclear Power" science popularization activity for ten consecutive years. Drawing on our professional and resource advantages, we have devoted ourselves to public welfare charity to promote local industries, talents, culture, ecology and organizational vitalization and integrate enterprise and local development. In 2022, we invested 1,121.89 million yuan in rural vitalization projects and 18.42 million yuan in donations and public welfare projects.

In the future, the international strategic pattern and national economic development will undergo profound changes. As for global energy crisis and the clean energy development, the nuclear energy will play a more crucial role in transforming the energy structure and ensuring economic and social development. In response, we will seize the new opportunity of clean energy development in the context of achieving China's 30•60 Decarbonization Goal, striving to become a world-class clean energy provider and contributing to China's vision of building a strong nuclear country. Such efforts aim to help our country build a modern socialist country in all respects and advance the great rejuvenation of the Chinese nation on all fronts.

# About Us

## Company Profile

China National Nuclear Power Co., Ltd. (Stock Code: 601985.SH, "CNNP" for short) is jointly invested by its controlling shareholder China National Nuclear Corporation (CNNC), China Three Gorges Corporation (CTG), China COSCO SHIPPING Corporation Limited, and China Aerospace Investment Holdings Ltd. The licensed business items within the Company's business scope are: power generation business, transmission business, power supply (distribution) business. Its general items include general equipment repair, intelligent transmission and distribution and control equipment sales, manufacturing of transmission, distribution and control equipment, technical service, technology development, technology consultation, technology exchange, technology transfer, technology promotion, power transmission and distribution project investment, and investment management.

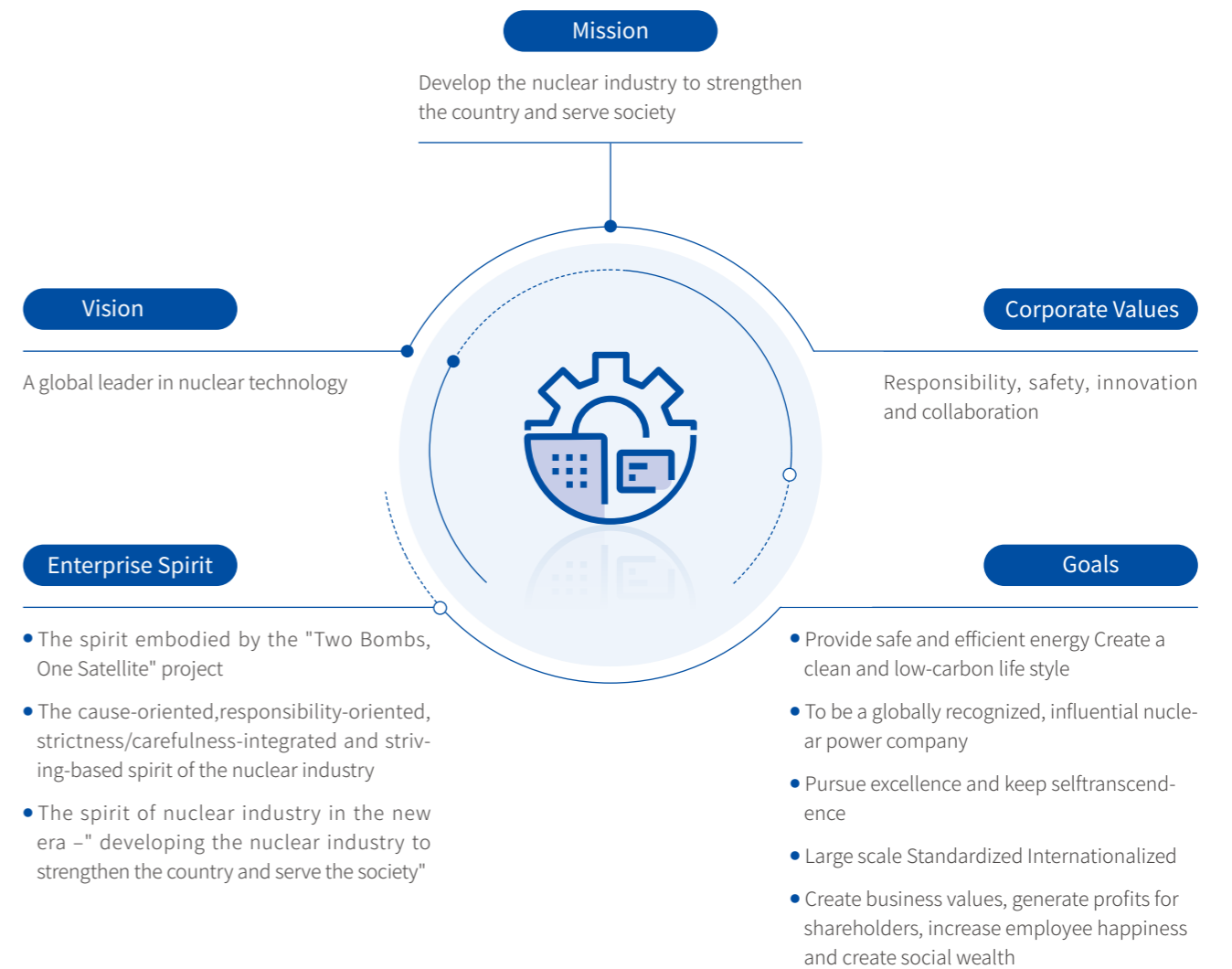
As of March 31, 2023, CNNP had controlled 25 nuclear power units in operation, with an installed capacity of 23.75 GW, 9 units under construction, with an installed capacity of 10.13 GW, and two units to be built after approval, with an installed capacity of 2.42 GW. The Company's non-nuclear clean energy have an installed capacity of 13.06 GW, including 4.26 GW of wind power and 8.80 GW of photovoltaic power. The Company also holds the stake of independent energy storage power plants with an installed capacity of 211 MW. The Company controlled an installed capacity of 7.64 GW under construction, including 1.56 GW of wind power and 6.08 GW of photovoltaic power.

Qinshan Nuclear Power Plant No.1	Type of reactor: PWR CNP 300 Rated power: 1X350MWe	First nuclear power plant ever built in the Chinese mainland, hailed as the "Pride of the nation"
Qinshan Nuclear Power Plant No.2	Type of reactor: PWR CNP 600 Rated power: 4X670MWe	First large commercial nuclear power plant independently designed, built, operated and managed by a Chinese company
Qinshan Nuclear Power Plant No.3	Type of reactor: HWR CANDU700 Rated power: 2X728MWe	China's first commercial HWR nuclear power plant
Fangjiashan Nuclear Power Plant	Type of reactor: PWR CNP1000 Rated power: 2X1089MWe	One of the first 1 GW reactors independently designed, manufactured, constructed, and operated by a Chinese company
Jiangsu Nuclear Power Plant	Type of reactor: PWR VVER1000 Rated power: 2X1060MWe 2X1126MWe Type of reactor: Improved PWR M310 Rated power: 2X1118MWe	A model project of China -Russia nuclear energy cooperation Final nuclear power project that started construction during the 12th Five-Year Plan Period (2011-2015)
Fuqing Nuclear Power Plant	Type of reactor: PWR CNP1000 Rated power: 4X1089MWe Type of reactor: HPR 1000 Rated power: 2X1161MWe	One of the first 1 GW reactors independently designed, manufactured, constructed and operated by a Chinese company The world's first Hualong One nuclear reactor (Huanglong One is a third-generation reactor model independently developed by a Chinese company), hailed as a project of "advanced equipment for the country"
Hainan Nuclear Power Plant	Type of reactor: PWR CNP 600 Rated power: 2X650MWe	The southernmost and the first nuclear power plant to be built in the minority-inhabited areas in China
Sanmen Nuclear Power Plant	Type of reactor: PWR AP1000 Rated power: 2X1250MWe	The world's first AP1000 (the world's first proven Generation III+ pressurized water reactor) nuclear power plant
Sanmen Nuclear Power Plant Unit 3 and Unit 4	Type of reactor: PWR CAP1000 Rated power: 2X1251MWe	Domestic advanced third-generation PWR nuclear power
Zhangzhou Nuclear Power Plant Unit 1 and Unit 2	Type of reactor: HPR1000 Rated power: 2X1212MWe	One of the first projects after the bulk production of the "national business card" Hualong One reactor
Tianwan Nuclear Power Plant Unit 7 and Unit 8	Type of reactor: PWR VVER1200 Rated power: 2X1265MWe	The heads of state of China and Russia witnessed the commencement of the project
Xudabao Nuclear Power Plant Unit 3, Liaoning	Type of reactor: PWR VVER1000 Rated power: 2X1274MWe	The heads of state of China and Russia witnessed the commencement of the project
Small modular reactor, Hainan Nuclear Power Plant	Type of reactor: Small Reactor "Linglong One" Rated power: 1X125 MWe	Global first multipurpose modular small reactor technology demonstration project

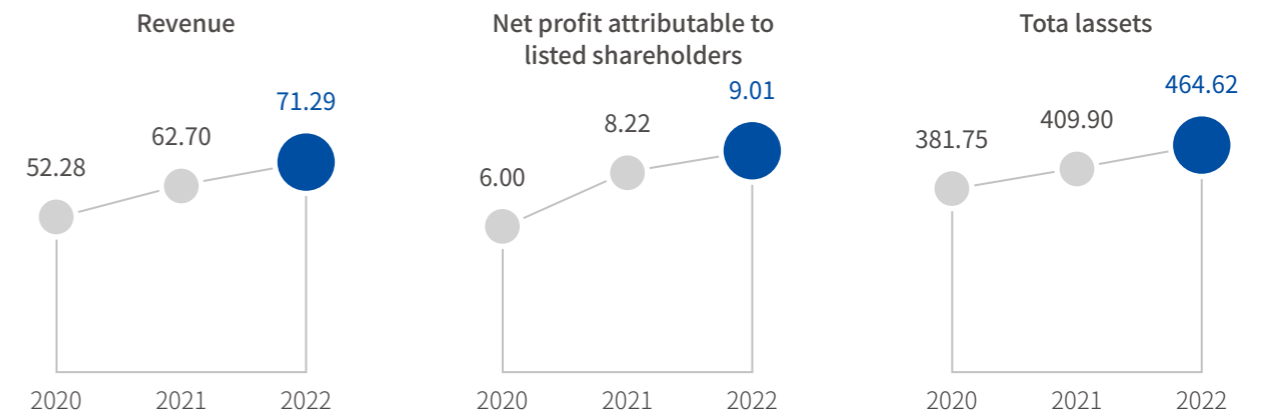
Statistics up to March 31, 2023

● Units in operation ● Units under construction

## Company Culture



## Key Financial Indicators (Unit: billion yuan)



Statistics up to March 31, 2023

# Strategy and Governance

## Development Strategy

As China enters the new development phase, the country plans to implement new development philosophy, build new development paradigm, and promote high-quality development. In response, CNNC has clarified its strategic positioning, strategic goals, and strategic guidelines. We set up a high-quality development index system for three core industries, as in nuclear energy, non-nuclear clean energy, and new agile industries, and proposed six projects and eight capacity building programs. We also integrate human, financial and material resources into our high-quality development. These actions aim to achieve our long-range goal of becoming a world-class competitive clean energy provider.

## Strategic Positioning

CNNP is the main arm of CNNC to develop its nuclear power business and the main channel to transform the advanced scientific and technological achievements. With the focus on investment, construction and operation of nuclear power projects, CNNP strives to promote the efficient utilization of cutting-edge nuclear technologies and the high-quality supply of clean and low-carbon energy, and is tasked with building a country with strong nuclear power and developing modern energy system.

## Strategic Goals

### Progress

• **Zero serious injuries and zero work-related fatalities** in 2022.

• Safe nuclear power operation for over **240** reactor years with zero accidents.

• **23.75** GW of total installed capacity of nuclear power units

• **12.53** GW of installed capacity of non-nuclear clean energy in operation.

• **32.628** GW of installed capacity of nuclear power units in operation and under construction.

• **18.2567** GW of installed capacity of non-nuclear clean energy in operation and under construction.

• **2.57%** of year-on-year revenue growth of technology service business.

• 18 operating units achieving **full marks** in WANO composite index, with the average mark of **98.58**, leading the world in safety performance.

### Goals in 2021-2025

Ensuring 100% nuclear safety.

The installed capacity to reach **56** GW by 2025 (26 GW from nuclear power projects and 30 GW from non-nuclear clean energy projects).

The total installed capacity of projects in operation and under construction will be the greatest nationwide; the nuclear energy can be utilized for multiple purposes and the output value of nuclear power technology services will be doubled; the value of the non-nuclear clean energy industry will reach 10 billion yuan, and new breakthroughs will be made in the agile clean technology industry.

To become a global leader in nuclear power operation performance.

### Long-range goals through 2035

• Basically achieve the goal of becoming a world-class clean energy service provider.

• Increase the installed capacity of electric power to over **100** GW and become one of the Top **500**.

• The operation indicators of nuclear power will remain top-class in the world, and the operation performance of non-nuclear clean energy will also lead the industry.

• Nuclear energy will be commercialized and industrialized in fields like power, heating, seawater desalination, hydrogen production etc.

• The nuclear power industry standards mainly compiled by CNNP will be widely adopted and CNNP will be able to provide a package of solutions to the world.

• The new agile industry will be effectively expanded, with its business income accounting for more than **10%**

### Strategic goal through 2050

**To become a world-class competitive clean energy provider.**



### Scale-up

Coordinating efforts on business development, asset management, marketing, talent development and value creation, and enhancing the capacity of energy supply to build a bigger, better, stronger company.



### Standardization

Advancing standardization of technical and managerial positions and processes in all business and functional areas, and building an efficient, flexible and standardized management system to increase profitability.

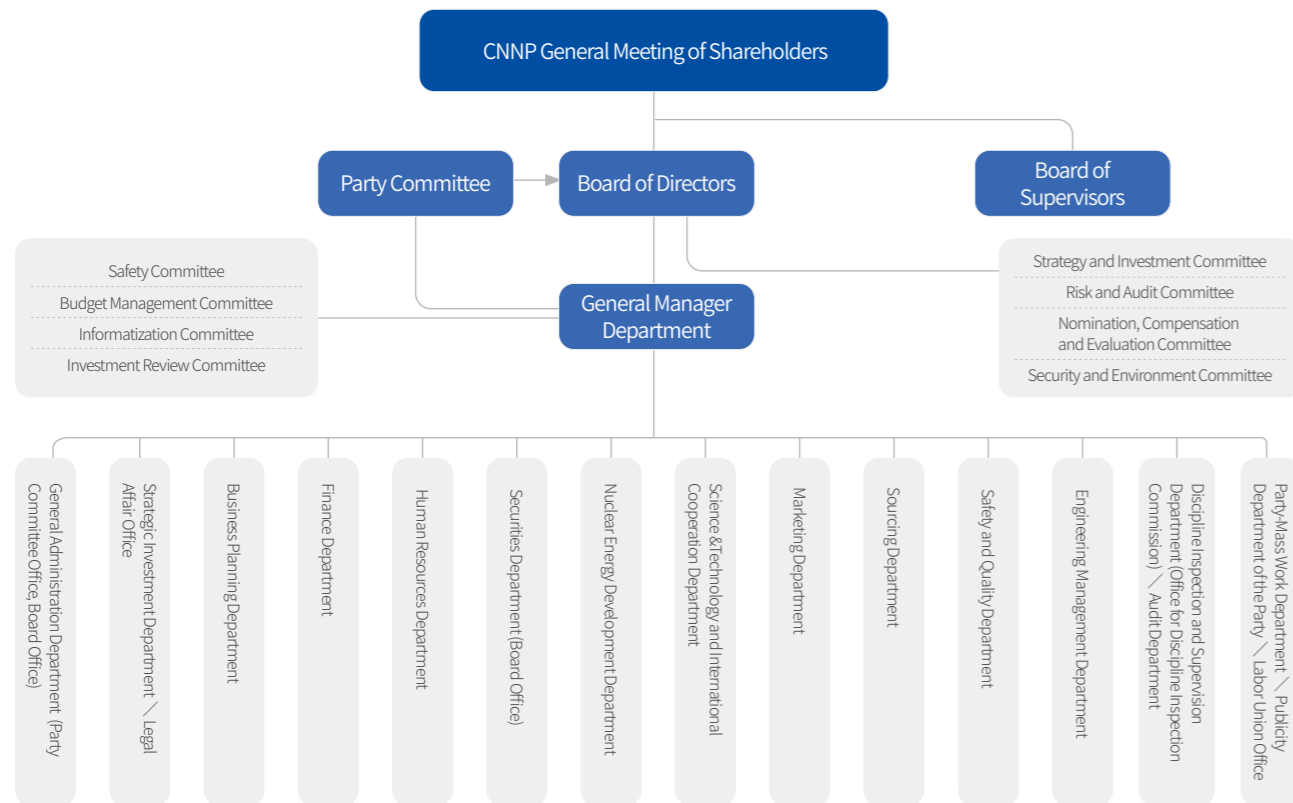


### Internationalization

Expanding global presence, fostering global business operations, improving international management capability and gaining a greater say to build a world-class nuclear energy company.



## Governance Structure



28 holding subsidiaries	Qinshan Nuclear Power Co., Ltd.	72%	CNNP (Shandong) Technical Service Co., Ltd.	100%	CNNP Liaoning Nuclear Power Co., Ltd.	54%
	Nuclear Power Qinshan Joint Venture Co., Ltd.	50%	Hunan Taohuajiang Nuclear Power Co., Ltd.	51.16%	CNNP Ocean Nuclear Power Development Co., Ltd.	51%
	Third Qinshan Nuclear Power Co., Ltd.	51%	CNNP Guodian Zhangzhou Energy Co., Ltd.	51%	CNNP Shandong Nuclear Power Co., Ltd.	51%
	CNNP Nuclear Power Operation Management Co., Ltd.	100%	CNNP Xiapu Nuclear Power Co., Ltd.	55%	CNNP Suneng Nuclear Power Co., Ltd.	51%
	Jiangsu Nuclear Power Co., Ltd.	50%	CNNP Huadian Hebei Nuclear Power Co., Ltd.	51%	CNNP Hainan Nuclear Power Co., Ltd.	100%
	Sanmen Nuclear Power Co., Ltd.	56%	Fujian Sanming Nuclear Power Co., Ltd.	51%	Nuclear Power Operations Research (Shanghai) Co., Ltd.	100%
	Fujian Fuqing Nuclear Power Co., Ltd.	51%	CNNP Henan Nuclear Power Co., Ltd.	51%	CNNP Rich Energy Co., Ltd.	70%
	Hainan Nuclear Power Co., Ltd.	51%	CNNP UK Ltd.	100%	CNNP Yanlong Technology Co., Ltd.	51%
	CNNP (Shanghai) Nuclear Power HWR Technology R&D Co., Ltd.	100%	CNNP Technology Investment Co., Ltd.	100%	CNNP Donghua Maoming Green Energy Co., Ltd.	51%
	CNNP Taihai Clean Energy (Shandong) Co., Ltd.	50%				
12 companies with direct investment	Shandong Nuclear Power Company Ltd.	5%	Huaneng Xiapu Nuclear Power Co., Ltd.	10%	CNNP Financial Leasing Co., Ltd.	6.46%
	CNNP (Shanghai) Enterprise Development Co., Ltd.	28%	Huaneng Hainan Changjiang Nuclear Power Co., Ltd.	49%	CNNP Ningxia Tongxin Protective Technology Co., Ltd.	10%
	Xiongan Xingrong Nuclear Power Innovation Center Co., Ltd.	20%	CZEC Operation and Maintenance Engineering Co., Ltd.	19%	Blue Sky Taihai Clean Nuclear Engineering Management (Shandong) Co., Ltd.	19%
	Beijing Electric Power Trading Center Co., Ltd.	3%	China National Uranium Co., Ltd.	4.2786%	CNNP Carbon Asset Management Co., Ltd.	15%
1 joint venture	CNNP Zheneng Energy Co., Ltd.	50%				

## Governance Mechanism

We strive to build a modern corporate governance system and enhance our corporate competitiveness, control, influence and risk resistance to make rapid progress in the goals during the 14th-Year Plan period and in the medium and long-term goals. In 2022, CNNP was awarded the 17th Golden Round Table Award for Special Contribution to Board Governance. Lu Tiezhong, Chairman of CNNP, won the 2022 China Securities Golden Bauhinia Award for Outstanding Entrepreneur, and Ma Mingze, General Manager of CNNP, won the China Securities Golden Bauhinia Award for Best CEO.

## Enterprise Risk Management

We have improved the risk management system in accordance with the Guidelines on the Operation of Board of Directors Audit Committees of Companies Listed on Shanghai Stock Exchange, Articles of Association, the Implementation Rules for the Risk and Audit Committee of Board of Directors as well as other relevant requirements. By deeply incorporating comprehensive risk management into our development strategy, such management run through all fields and the whole process of the Company's development, and promote full coverage of risk management to effectively controls major risks.

- **Risk warning and monitoring:** We continuously optimize the quantitative warning indicator system and the mechanism of monitoring and warning for major risks, and conduct analysis and prediction of risk development trends.
- **Risk identification and assessment:** We carry out risk identification and assessment, and improve our capability of risk management in key areas and major projects. We also improve the reporting mechanism for major risk events and regularly prepare comprehensive risk management reports.
- **Risk investigation and special rectification:** With the release of special plans for compliance risk prevention and governance in areas such as procurement and bidding engineering construction and rural vitalization, we conduct comprehensive self-inspection self-correction and hierarchical supervision to promptly rectify any problems found.
- **Risk management improvement:** Through internal and external training, communication with advanced enterprises, and other means, we strive to enhance the understanding of risk management internal control and compliance among risk internal control system administrators, and improve their professional skill.

## Compliance operation

The Company has strengthened compliance management and formulated 53 improvement measures in seven major areas, including organizational foundation institutional development and mechanism operation, to effectively support and ensure the Company's compliance operation and reform and development. In 2022, we participated in compiling training materials for power enterprise compliance practitioners organized by the China Electricity Council (CEC) and published the Legal Compliance Guidelines for Nuclear Power Operation and Management.

### Strengthening organizational leadership

The Party Secretary fulfills the primary responsibility of promoting the rule of law. The Board of Directors of the Company is the top decision-making body for compliance management, and the Risk and Audit Management Committee is responsible for promoting compliance-related management

### Improving the institutional system

We have organized the development and release of one compliance manual one compliance management system and 11 compliance management guidelines, and completed the sorting of compliance risk database, compliance case database, and compliance obligation list in key areas. A hierarchical and classified compliance management system has been taken shape

### Improving the working mechanism

We have sorted out compliance obligations, control nodes, and key performance points, and guided business departments to consolidate the main responsibility in compliance management. We also implement compliance management reporting, rectification, and accountability mechanisms for violations

### Cultivating a compliance culture

We have launched various forms of compliance training in key areas such as the performance of directors and supervisors, and equity mergers and acquisitions. The compliance brand, CNNP "601985" and the cartoon image "He xiaohe", are released, thus continuously promoting the regular and diverse legal compliance training

# CSR Management

## CSR Philosophy

Adhering to the core values of "responsibility, safety, innovation and collaboration," CNNP integrates the sustainability philosophy into production, operation and decision-making. We fulfill our responsibility to our stakeholders such as government, regulators, customers, employees, partners and environment and jointly create a better future.

### Safety

Safety is the lifeline of the nuclear power industry. We aim to set a model for safe nuclear energy, ensure safe and stable operation and promote efficient development of nuclear energy.

### Innovation

Innovation provides an inexhaustible momentum for CNNP's pursuit of excellence. We continuously promote innovation on all fronts by focusing on technological innovation, and relentlessly pursue excellence and self-transcendence.

### Talent cultivation

Talented personnel are the most important asset of a company, and the source of momentum for building up core competencies and creating value.



### Green development

We respect the environment and pursue green development, aiming to provide safe and efficient energy and create a clean and low-carbon life.

### Win-win cooperation

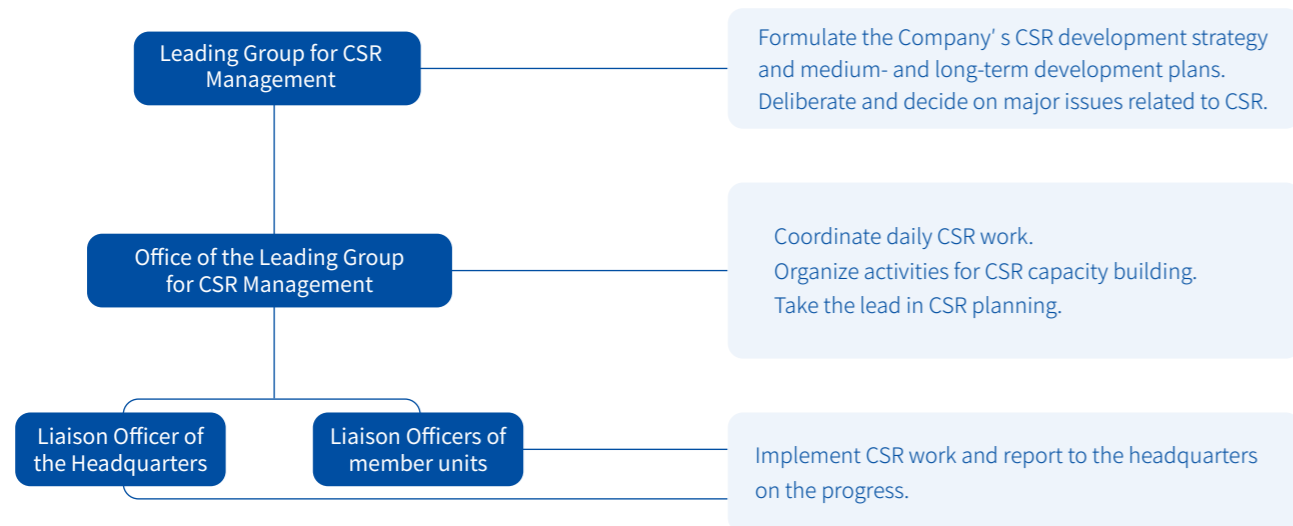
Cooperation is crucial for the development of nuclear power industry. We deepen exchange and cooperation based on openness and mutual benefits to drive the development of the industry.

### Community service

We uphold openness and inclusive development, give back to society, and help build a harmonious wonderful atmosphere.

## CSR Management System

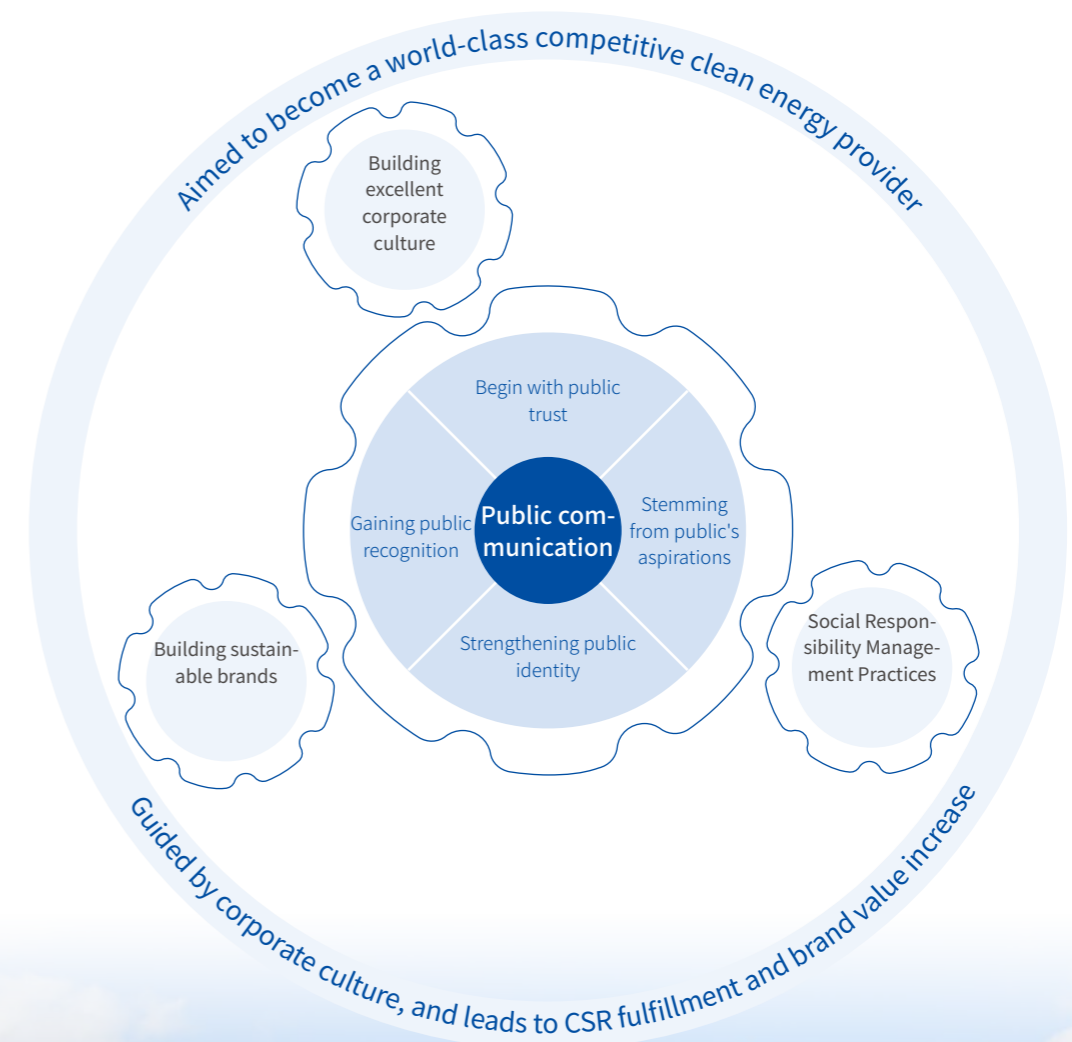
CNNP attaches great importance to CSR management. To enhance our capabilities in sustainability, we build a sound organizational system to ensure the implementation of CSR management planning and to integrate employees' job responsibilities and social responsibilities.



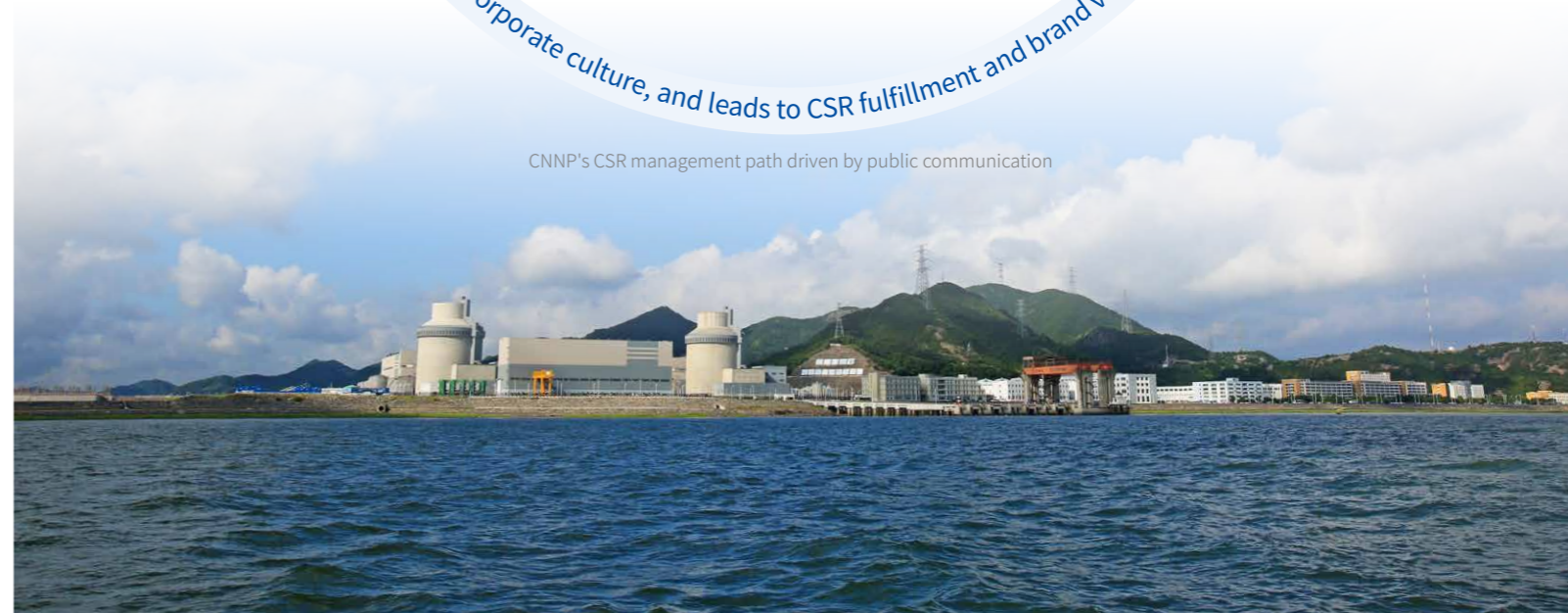
Organizational structure for CSR management

## CSR Management Path

CNNP drives CSR management through public communications, wins public trust with its excellent corporate culture, and determines the priorities of CSR management based on the public's aspirations and concerns. Diverse communication and engagement activities are organized to increase enhance public understanding and support. We actively build the management system model with CSR concept as the core, corporate culture development as the path, and corporate brand as the symbol. Besides, we propose a path to promote the integration of corporate culture, corporate brand and CSR concept, thus promoting the cultural development and enhancing corporate cohesion. By shaping our brand, we can improve our brand reputation and achieve our strategic goal of becoming a world-class competitive clean energy provider.



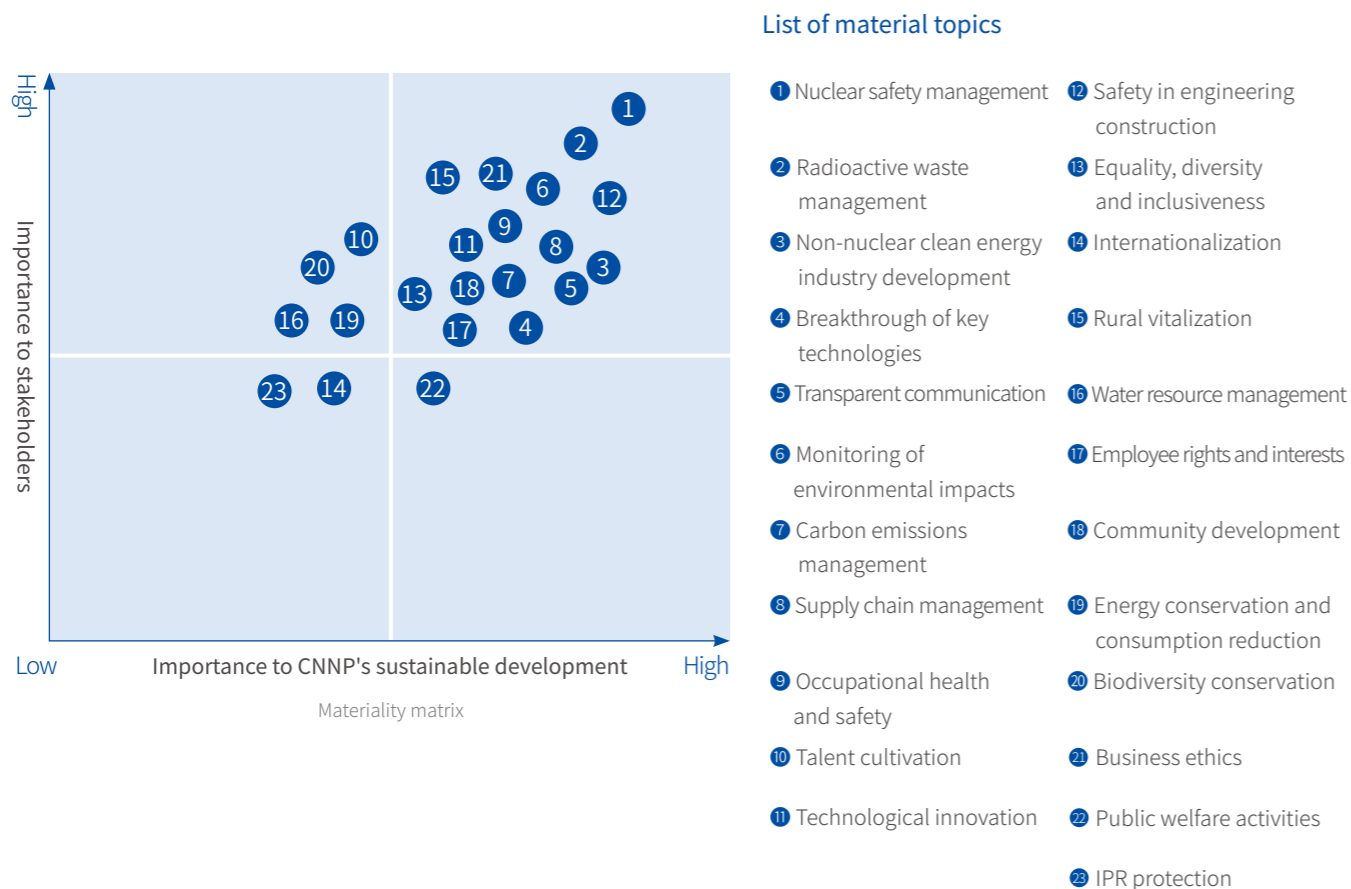
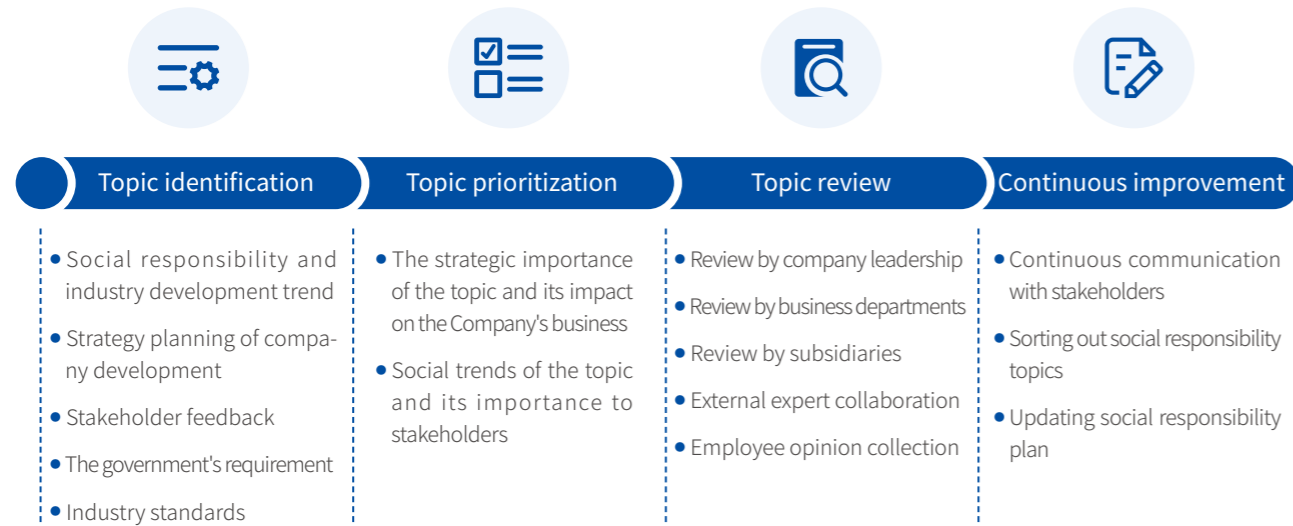
CNNP's CSR management path driven by public communication



# CSR Communication Management

## Material Topics

Highly valuing material topics management, CNNP continues to conduct internal and external investigations to familiarize the material topics that stakeholders' concerned topics for business operation. While prioritizing the relevant issues, we collect suggestions and expectations from all parties on sustainability as important references for our sustainable development management.



## Stakeholder Communication

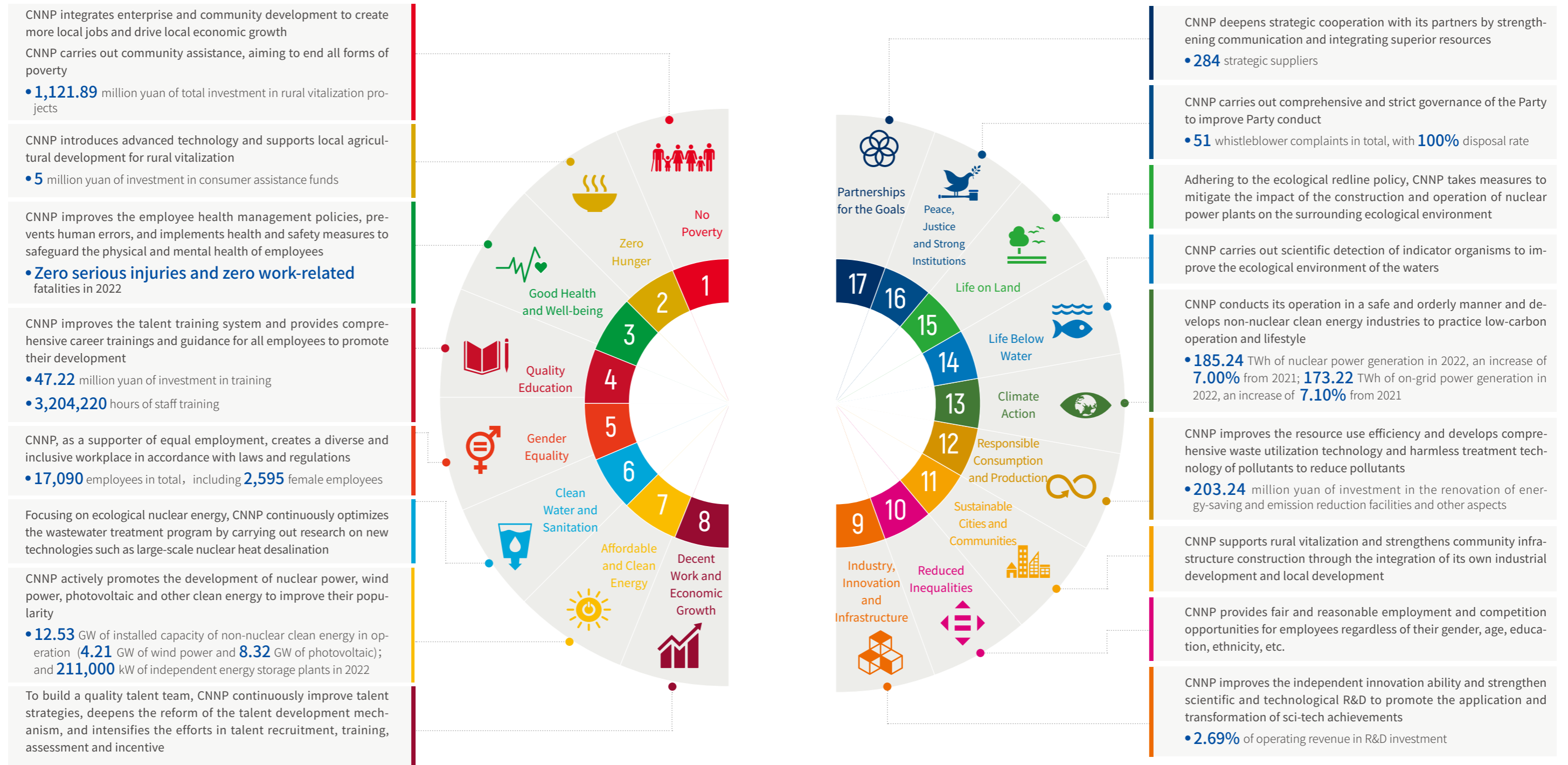
We are fully aware that the cooperation with stakeholders is the driving force for our high-quality and long-term development. To familiarize the needs of stakeholders, we listen to their expectations and demands, create multiple communication channels, and establish a real-time, effective and long-term communication mechanism. Consequently, we would respond to their demands with practical and targeted actions.

Major stakeholders	Expectations and demands	Communication channels and response
Shareholders and investors	Returns Rights protection Compliance management	General Meetings of Shareholders Annual reports Stable operation Information disclosure Cash dividend
Government	Compliance Tax payment in accordance with law Driving local development	Compliance management Actively pay taxes Driving local economy Providing employment opportunities Accepting guidance and supervision
Customers	Safe and steady electricity supply High-quality services	Improving service Coordinating with power grid dispatching Strengthening communication
Partners	Contract fulfillment Responsible sourcing Win-win cooperation Promoting industry development	Disclosing sourcing information Building a responsible supply chain Carrying out exchanges and cooperation
Employees	Compensation and benefits Occupational health and safety Career development People-oriented services	A healthy and safe workplace Systematic training Employee care
Environment	Energy conservation and emissions reduction Ecological protection Addressing climate change	Development of clean energy Energy conservation and emissions reduction Biodiversity conservation
Society	Promoting community development Supporting public welfare Providing volunteer service	Community engagement Rural revitalization Public benefit activities



## Contribution to UN SDGs

We have developed a more sustainable and inclusive business model to become an active contributor to the United Nations Sustainable Development Goals (UN SDGs), which set out the global vision and priorities for sustainable development by 2030.





# Feature

## Boosting Common Prosperity for All Chinese People and Contributing CNNP's Efforts to Rural Vitalization

### Working Together for New Achievements in Rural Vitalization

CNNP follows the overall principle of "led by Party building, providing industrial assistance, attracting investment and adopting targeted strategies", we investigate the resource advantages of the targeted areas, combine assistance programs with Party building, industrial project implementation and overall planning, and incorporate the performance of assistance programs into our annual assessment program to ensure the outcomes.



### Achievements in featured Paired Assistance

Thanks to the efforts of Qinshan Nuclear Power Co., Ltd, Baihe Village in Shizhu County has gradually transformed from "being supported" to "supporting itself", promoting rural development and common prosperity.



Before and after construction of Baihe B&B

Jiangsu Nuclear Power Co., Ltd. has been providing consumption-driven assistance for five consecutive years, actively expanding the market for agricultural products such as watermelons growing in greenhouse and rice growing in farmland with fish in Houyao Village and Wuzhao Village.



Rice & Watermelon (Featured products in assistance programs)

2022 was the crucial year to promote rural vitalization. Focusing on the market, technology, model and team building, we and our subsidiaries coordinate resources, revitalize local economy and promote education, thus achieving the transformation from dependence on others to self-reliance. Besides, we also integrate rural vitalization with industrial development as well as the campaign called "Serving the People with Concrete Actions " and take concrete measures to solve problems for people in need. All these efforts have consolidated the existing achievements in practice and written a new chapter of rural vitalization.



### Taking Multiple Measures to Stimulate New Vitality in Rural Vitalization

CNNP people work together and make every effort to empower rural vitalization through industrial development, talent training, cultural advancement, ecological conservation and organization guarantee, injecting inexhaustible power into this cause.



### Industrial development

CNNP firmly upholds the concept of "rural vitalization hinges on industrial development", utilizes industrial assistance to create a distinctive model and drives employment through industrial development, thus promoting orderly and effective development of rural vitalization.

Qinshan Nuclear Power Co., Ltd. has developed and constructed a nearly 180-mu "Hejin" tea garden project in Jinshi Village, Shunxi Town, Pingyang County. This project has changed the long-standing situation of Jinshi Village without self-reliance ability and increased capabilities and income of low-income farmers in the village. After the cultivation and operation of the "Hejin" tea garden, it is expected to bring nearly 300,000 yuan in annual profits to the whole village.



Hejin Tea Garden



### Talent cultivation

Talents are essential elements to develop the countryside. CNNP stays committed to helping impoverished people access education and build aspirations and increases the investment of resources in talent cultivation. We also attach great importance to basic education, expand the distribution of high-quality educational resources to the community level and take comprehensive measures to achieve better education in rural areas, promoting the ideological transformation of the new generation in the countryside.

Xiapu Nuclear Power Co., Ltd. provided one-to-one assistance for 21 students in difficulty in Xiapu No.1 Middle School. The company raised more than 150,000 yuan and 11 students were admitted into colleges such as Hunan University and Fuzhou University etc.



The handover ceremony of student grants between Xiapu Nuclear Power Co., Ltd. and Xiapu No.1 Middle School

## Cultural advancement

Defining a complete public cultural service system as the pillar, CNNP strengthens the construction of public cultural infrastructure, enhances local public cultural services, and actively explores new paths for cultural vitalization in rural areas.

Hainan Nuclear Power Co., Ltd. invested in repairing the Party-Masses Service Center and the Village Square as well as constructing the "Village Plaque Stone" and the New Era Civilization Practice Center in Yidong Village. Overall upgrading of places for cultural activities is a great manifestation of our CNNP's efforts in assisting in Li Township.



"Village Plaque Stone" of Yidong Village

## Ecological conservation

Driven by green development, CNNP gives full play to the clean energy, speeds up the improvement of rural living environment and promotes green agriculture. To build a beautiful countryside that is pleasant to live and work in, we also promote the application of new energy-saving and environmental protection technologies and define a favorable ecological environment as the pillar to support rural vitalization.

Liaoning Nuclear Power Co., Ltd. conducted the project of comprehensive treatment of Shangjiagou small watershed and improvement of living environment in Zhujia Village, Jianchang Manchu Township, Xingcheng City, Huludao City. Livelihoods projects, such as hardening roads, setting up centralized garbage bins, building cultural square, have been implemented to enable the village to look brand new.



After the sanitation renovation of the surrounding environment of Sunbaitun Village

## Organization guarantee

In response to the call of "Organization guarantee is the primary project of rural vitalization", CNNC has actively stationed cadres to improve the quality of rural grass-roots organization construction and promoted rural vitalization in the whole system of CNNC to a new level.

The Party branches of Sanmen Nuclear Power Co., Ltd. Sanhe Village and the other village have jointly built the Party building platform, signed the Agreement on Joint Construction of Branch Party Building and integrated the Party branch construction into rural vitalization and paired assistance. To further strengthen the leading and guarantee role of Party building, continue to carry out party branch organization life, a series of Party building exchange activities, such as regular activities of Party branch, Themed Party Day, Party cadres training, supporting Party members in difficulty, are conducted.



Sanmen Nuclear Power Co., Ltd. conducts on-site research on the progress of rural vitalization and paired assistance in Sanhe Village

## Case Joining forces to explore a new model of "non-nuclear clean energy + industrial development"

CNNP Rich Energy Co., Ltd. fulfills its responsibility to provide paired assistance for Tongxin County, Ningxia. The total investment of 2.1 billion yuan in constructing wind power, solar power and energy storage projects gives a strong impetus to the local industry to extend and strengthen the chain and injects ever-lasting source of "nuclear power" for the high-quality economic and social development of Tongxin County.

- Based on project construction, the company expanded extensive cooperation with the government of Tongxin County in Party building, cadre exchange, school donation, economic progress of the whole village, ecological protection, and consumption-driven assistance, etc. On December 7, 2022, Tongxin Quanyan 100MW/200MWh energy storage power station was successfully connected to the grid, which served as a grid-side "power bank" and enhanced the flexible regulation ability of the power grid. This project enables the power grid to effectively cut peaks and fill valleys, relieves the pressure of peak power supply, and promotes the consumption of non-nuclear clean energy.



- The company actively introduced partners such as Sineng Electric Co., Ltd. (SINENG) and Yingli Group Company Limited (YINGLI) into Tongxin (Rich Energy Co., Ltd.) Clean Energy Industrial Park, with an investment of nearly 500 million yuan and annual output value of about 2 billion yuan. Around 300 new jobs were added and the "Tongxin Model" featured by industry leading and strategic cooperation were forged to promote rural vitalization.

- In Hantianling Village, Tongxin County, "Ten projects", including in water distribution connection, clean heating and village history museum construction, were being implemented to build this village into a model village for high-quality development of rural vitalization and into "zero carbon" model village. The pilot project of "geothermal + PVT thermoelectric cooling and clean triple supply" were launched and the construction of PV panels and geothermal wells were completed to heat about 7,000 m<sup>2</sup> of housing for 100 households in the village.



“ In winter evenings, when the children lived in a house, I had to check a few times a night to avoid accidents. With such heating device, I was finally able to sleep soundly and no longer afraid of gas poisoning. Its cost was more than 10,000 yuan cheaper than burning charcoal. ”

—A local villager from Hantianling Village



# 01

## Building a Safe and Reliable Brand of Excellence



In 2022

- 18 operating units achieved **full marks** in WANO composite index, with an average mark of **98.58** for all units involved in WANO composite index evaluation
- Over **240** reactor-years of safe operation in total

# CSR Story

## national demonstration project Hualong One is completed for operation

On March 25, 2022, Unit 6 of Fuqing Nuclear Power Plant, the country's second nuclear power unit using Hualong One, a domestically designed third-generation nuclear reactor, was geared up for commercial operation. It marked the full completion and operation of the Hualong One demonstration project and the improvement of China's nuclear power technology and comprehensive strength into the world's top level, strongly supporting the country's efforts to build up its strengths in nuclear power.

As a landmark nuclear power project presented by China to the world, Hualong One, the most preferred third-generation nuclear reactor in the market, complies with the highest international safety standards. Building on proven and fully-fledged engineering technology, it creatively adopts a 177-reactor core design and a combination of "active and passive" safety systems with 88% of its first reactor parts manufactured domestically. Meanwhile, advanced designs such as single unit arrangement and double-shell containments can prevent and mitigate serious accidents, enhance protection from external events, and improve emergency response. Sufficient analysis and engineering studies ensure that power plants are safe, economical, and cutting-edge.

### A national landmark project

Hualong One possesses complete independent intellectual property rights. Its design and R&D team has won the 4th China Quality Award and the operation of Unit 5 and 6 demonstration projects of Fuqing Nuclear Power Plant has been recognized as a milestone in the 100-year history of the Communist Party of China, a major event since the 19th National Congress of the CPC, one of the top 10 national technologies in 2022, and the top 100 buildings in the new era of China in 2022.

### Excellent performance

Each unit of Hualong One generates nearly 10 TWh of electricity annually, which can meet the demand of 1 million people, reduce standard coal consumption by 3.8 million tons, and lower carbon dioxide emissions by 9.47 million tons, equivalent to planting 70 million trees.



## Cementing the Foundation of Safety

Safety is the lifeline of the nuclear power industry. Adhering to the principle of "safety and quality first", we strengthen the nuclear safety culture, improve safety management and emergency response, and maintain work safety cautiously. These efforts help us solidify the foundation of safety and set an example of nuclear safety for global players.

### Safety Culture

CNNP follows high standards in building a nuclear safety culture. In charge of building an integrated nuclear safety culture, the Nuclear Safety Culture Promotion Committee establishes uniform standards and evaluates nuclear safety culture through systematic training, questionnaires and on-site inspections to ensure that nuclear safety is practiced and institutionalized. In 2022, CNNP's nuclear safety culture building was recognized as one of the top 10 corporate safety culture best practices by the Ministry of Emergency Management.



#### Integrated nuclear safety culture development

- Establishing standards such as guidelines for building the nuclear safety culture and ten principles of excellent nuclear safety culture
- Formulating a plan to promote an integrated nuclear safety culture of CNNP and its subsidiaries



#### Nuclear safety culture evaluation system

- Adopting digital means in developing the nuclear safety culture on-site evaluation system, questionnaire system, and evaluation and management module to collect, process, and analyze relevant data collected from surveys and on-site inspections



#### Nuclear safety culture training and publicity

- Developing uniform nuclear safety culture training materials and building an online training platform for authorized courses in basic nuclear power plant safety
- Producing educational videos on the ten principles of excellent nuclear safety culture and carrying out a publicity competition on the theme of "863 basic actions" for nuclear safety culture improvement



CNNP's 10 Principles of Excellent Nuclear Safety Culture (2022 Edition)



**CNNP releases China's first book, systematically summarizing the achievements of excellent nuclear safety culture building**

In 2022, CNNP released the *Nuclear Safety Culture Journey of CNNP* at the 4th Excellence Culture Festival and Excellent Nuclear Safety Culture Publicity Campaign. The book brings together the practices and achievements of CNNP in building a nuclear safety culture in the last three decades. It reflects CNNP's rational, coordinated and multi-pronged approach to nuclear safety and serves as the first book in China that offers insights into how to build an excellent nuclear safety culture for the whole nuclear power industry.



**Safety Management System**

Putting life and safety first, we strengthen risk control and safety supervision, implement the Three-Year Action Plan to improve work safety, carry out education activities, and optimize the management system to consolidate the safety foundation. In 2022, a total of 99.89% of hidden dangers were rectified.

**Risk control and supervision**

- Implementing the responsibility chain and risk prevention and control system to eliminate hidden dangers, regional safety responsibility networks, standardized classification of nuclear power plant hazard sources as well as safety-wise and environmentally sensitive SSCs, forming a top 10 list of safety and environmental risks, and strengthening the control and rectification of key risks
- Carrying out inspections by safety directors who coordinate nuclear safety and on-site inspections and urging those in charge to rectify problems and improve the situation

**Three-year action for safety improvement**

- Delivering the *Implementation Plan for the Three-year Action Plan of CNNP*, rectifying key and thorny issues, and summarizing typical approaches to addressing common and systematic problems

**Better safety awareness**

- Organizing a wide range of April 6 Work Safety Day and Work Safety Month activities, carrying out safety education and training such as accident warning education, online safety commitments, safety courses by executives, safety inspections, and high-risk operation control and improvement, fostering a sound safety atmosphere, and urging all employees to fulfill safety responsibilities



**CNNP carries out contractor safety management improvements**

In 2022, CNNP carried out a series of contractor safety management improvements. For example, we held contractor safety management workshops and lectures given by experts of the Safer Academy of Inherent Safety, providing platforms for contractors to exchange good practices of safety management and understand the essential requirements of safe development. By upgrading the *Guidelines for Contractor Safety Supervision and Management*, we summarized best practices and standardized and digitalized management processes.



CNNP Contractor Safety Management Meeting

**Safety Improvements**

The Company has established a feedback system, whose effectiveness is evaluated by CNNP and its peers, followed international standards, and strengthened exchanges. With better resilience against safety risks, we summarize and promote best practices to continuously improve safety management.

**Peer reviews**

We have participated in external reviews organized by the World Association of Nuclear Operators (WANO) and China Nuclear Energy Association (CNEA) and carried out internal reviews to evaluate the Company's safety management systems and improve the safety and quality responsibility chain. In 2022, we conducted ten peer reviews, including two external reviews and eight internal reviews.



CNEA conducts a peer review of the nuclear safety culture of the Fuqing Nuclear Power Plant.



## Feedback system

By diversifying the channels to take in external practices and breaking information barriers, we have established a holistic feedback system. We also optimize the A/B incident management mechanism and rapidly investigate typical issues among multiple plants to prevent the recurrence of similar problems and improve the effectiveness of feedback.

### Improving the holistic feedback system

- Launching the Company's first cross-group feedback cooperation project, so that CNNP's practices can be applied in all 53 commercial nuclear power units in China.
- Establishing a hotline mechanism for exchanges among front-line professionals.
- Facilitating feedback in the design, manufacturing, installation, and commissioning stages with a regular communication mechanism.



### Optimizing the A/B incident management mechanism

- Setting 19 A incidents and 89 B incidents, raising 169 management requirements, and having 1,166 action items developed by subsidiaries.
- Holding regular and non-regular meetings and improving the effectiveness of actions. In 2022, a total of 11 A incident meetings and 11 monthly feedback meetings were held.



### Institutionalizing important practices

- Accumulating important practices. In 2022, a total of four feedback reports, two standardized evaluation guides, 34 safety learning materials and 119 translated industry documents were published.



## Emergency Management

The Company continues to improve the emergency organization and management system, optimize emergency plans and facilities, strengthen emergency drills and training, and digitalize emergency management to improve our nuclear emergency response.

### Improving the emergency response system

- Improving the emergency plan system, the emergency response process, and the practicality of emergency documents. In 2022, 335 emergency documents were upgraded.
- All subsidiaries of CNNP optimize their emergency systems that are compatible with their development scale and status. In 2022, the verified on-duty emergency response rate exceeded 99%.

### Equipping emergency devices and supplies

- Upgrading and regularly maintaining equipment of emergency command centers to ensure their effective operation.
- Forming a list of CNNP's nuclear emergency preparedness and material reserves and building a multi-function comprehensive base.



### Strengthening emergency inspections and drills

- Inspecting emergency response capacities, rectifying hazards and organizing drills in nuclear power plants under construction and operation and wind and solar power plants, stress-testing emergency plans, and improving emergency management.

### Preventing natural disasters

- Preventing natural disasters in advance, clarifying the responsibility of the person in charge to identify and analyze risks and take targeted response, and carrying out emergency drills to prevent various natural disasters such as typhoons and floods. In 2022, we effectively responded to super typhoons Hinnamnor and Muifa.



### CNNP builds an intelligent emergency management platform

In 2022, with more efforts invested to build an emergency information platform, CNNP sought ways to improve emergency management based on smart technology and deeply integrated modern information technology into emergency management with digital means and upgraded application systems. These efforts aimed to make the emergency management of CNNP science-based, precise, and intelligent.

In 2022



2,023 single-item drills

7 comprehensive emergency drills

## Building Quality Projects

Following the quality concept of "quality creates values and a brand", CNNP improves the quality management system, strictly controls the safety and quality of projects, and builds exemplary projects to build up China's strengths in the nuclear industry. In 2022, all our special operations personnel worked with certificates and we had zero major equipment accident, man-caused major quality accident, theft or loss of hazardous materials, and fire accident.

### Quality Management

The Company implements delicacy management covering the whole process of project construction and strengthens overall quality management by improving the system and quality awareness of employees to cement the foundation of nuclear safety. In 2022, the Phase I Project of Sanmen Nuclear Power Plant won National Quality Engineering Award Gold Medal and seven units, including Qinshan Nuclear Power Co., Ltd. and Jiangsu Nuclear Power Co., Ltd., received the International Quality Management Gold Award from the International Convention on Quality Control Circles, which marked an all-time high in the number of awards received.



#### Optimizing the quality management system

- Formulating documents such as the *Action Plan for Improving Nuclear Power Safety and Quality (2022-2025)* and the *Action Plan for Strengthening Project Quality Management* to standardize quality management and refine quality control.
- Implementing the lean management system featuring "six controls and seven noes", namely control of progress, investment, quality, safety, environmental protection, and confidentiality; zero delay, overbudget, quality incident, safety accident, environmental protection violation, information leak, and integrity problem.
- Establishing mechanisms such as rapid project coordination meetings and regular feedback meetings to quickly address major problems in construction.
- Establishing a safety and quality director mechanism and applying advanced quality management methods such as the excellent performance model.



#### Enhancing quality supervision

- Conducting joint quality inspections of four units, including CNPO and CNNFC to ensure the effective operation of the quality system.
- Entrusting an independent supervisor to inspect and evaluate the effectiveness of the contractor's safety system and quality system, ensuring veto power over safety and quality issues, and helping owners make science-based and well-informed decisions.



#### Improving the quality awareness of all employees

- Issuing the CNNP Quality Warnings to standardize quality education and training.
- Establishing the system of safety, quality, and integrity, implementing the mechanisms of "red and yellow lines of safety and quality" and blacklists, and restricting the access of personnel who violate red lines.



#### The practice of Jiangsu Nuclear Power Co., Ltd. selected as the national quality benchmark in 2022

In 2022, the quality management model "chain reaction based on the SREE (security, reliability, efficiency, and environmental protection) quality principle" developed by Jiangsu Nuclear Power Co., Ltd. was selected as the 2022 national quality benchmark. The model, based on the self-proposed SREE quality principle, adopts advanced management concepts and methods such as excellent performance, lean management, integration of digital technology into industrial development, systematic thinking and Internet logic to level up the quality awareness of all employees and standardize their behavior. Through standardized delicacy management, the difficulties in multi-process management are effectively solved with effective tools.

### Key Projects

In 2022, the eight controlled nuclear power projects of CNNP under construction achieved steady progress with breakthroughs.

March 25, 2022

Unit 6 of Fuqing Nuclear Power Plant, the country's second nuclear power unit using Hualong One, was geared up for commercial operation, marking the full completion and operation of China's independent third-generation Hualong One demonstration project.

1

August 23, 2022

The inner dome of the Zhangzhou Nuclear Power Plant Unit 2 was hoisted, setting a record for the shortest schedule using open-top construction technology.

2

November 30, 2022

The world's first commercial on-shore small modular reactor, Hainan Nuclear Power Plant Linglong One, installed its nuclear island.

3



#### What is Hualong One

Hualong One is a fusion of the ACP1000 technology of China National Nuclear Corporation (CNNC) and the ACPR1000+ technology of China General Nuclear Power Group (CGN). ACPR1000+ is CGN's third-generation nuclear power technology with complete intellectual property rights, evolved from the CPR1000+ and ACPR1000 models after continuous R&D efforts. ACP1000 is a third-generation nuclear power technology with complete intellectual property rights owned by CNNC based on its three decades of design and construction, the introduced third-generation technology, and more than ten years of R&D.

## Ensuring Safe Operation

Focusing on the safety and stability of nuclear power plants, CNNP runs the mechanism of equipment reliability management, overhaul management, and prevention of human errors efficiently and continuously improves safe operation performance, playing the role as a ballast in ensuring energy supply. In 2022, the Company's 25 nuclear power units maintained sound safety.

In 2022



- 18 operating units achieved full marks in WANO composite index, with an average mark of **98.58** for all units involved in WANO composite index evaluation, leading the world in safety performance.
- Over **240** reactor-years of safe operation in total.
- **0** serious injuries and work-related deaths.



**Case** The Qinshan Nuclear Power Plant Phase II Project reached two decades of safe operation

In 2002, the first unit of the Qinshan Nuclear Power Phase II Project, China's first domestic large commercial nuclear power plant, was put into commercial operation, realizing self-dependent design, construction, management, and operation. Through the project, China developed know-how in building domestic nuclear power plants from research, design, construction, installation, equipment manufacturing, commissioning, operation, and management, and created a 600,000-kilowatt-level nuclear power brand. By the end of 2022, the Qinshan Nuclear Power Plant Phase II Project had been safely run for 20 years, generating more than 304.5 TWh of electricity in total.

*"The Qinshan Nuclear Power Plant Phase II Project has been running safely for 20 years. This year (2022) marks the 20th anniversary of its commercial operation. The nuclear power unit is designed to last for 40 years, so it is safe for it to serve in the next two decades. We are even considering extending its operation period to 60 years."*

*Chinese Academy of Engineering and chief designer of the Qinshan Nuclear Power Plant Phase II Project*



Qinshan Nuclear Power Plant Phase II Project Units 1 and 2

### Overhaul Management

The Company's overhaul optimization team holds special meetings and implements planned research projects to improve overhaul management, operation, maintenance, and performance, achieving excellent safety and quality indicators and a shorter overhaul schedule than that of competitors. The 601 overhaul of Tianwan Nuclear Power Plant is the first overhaul of M310 units, and the 409 overhaul of Qinshan Nuclear Power No.2 Plant sets the best record for M310 units' overhaul in a decade while the 215 overhaul of that also has the best class-B overhaul record. The first overhaul of Sanmen Nuclear Power Plant Unit 2 completes the first repair of pressurized water reactors within the shortest time frame in the world.

In 2022

**16** overhauls of units

**65.47** days ahead of the planned construction schedule

### Equipment Reliability Management

The equipment reliability management committee is responsible for the delicacy management of equipment and digitalization to improve equipment reliability. In 2022, the unplanned shutdown of the 25 operating units of CNNP remained low, and CNNP reported zero incident rated INES level 1 or above with a sound nuclear safety record.

#### Equipment delicacy management

- Establishing equipment classification standards, identifying single point vulnerabilities (SPV) in power plants, and optimizing the preventive maintenance outline to ensure that equipment is well-maintained and runs properly.

#### Equipment management mechanism

- Releasing the 2022 equipment reliability work plan to coordinate the effective operation of the equipment reliability management committee, and improving equipment management through seminars, evaluations and joint construction of equipment reliability management platforms.

#### Equipment digitalization management

- Developing and applying the equipment reliability management system (ERMs), piloting the safety production management platform phase II (ASP-2), and realizing digitalized delicacy management of equipment.

### Prevention of Human Errors

To better prevent human errors, the Company identifies the weakness in human error management, standardizes operations, improves skills, and avoids violations of standards to prevent unplanned automatic shutdowns and outages and ensure the safety of people and equipment.



#### Identifying weakness in human error management and carrying out targeted improvements

- Improving the definition and identification of human errors in CNNP for standardized operations, making use of existing platforms such as status reports and observation guidance, bettering the collection mechanism of human caused failures, identifying weaknesses in human error management, and carrying out targeted improvements.



#### Promoting tools to prevent human errors and standardizing operations

- Filming short videos of human error prevention tools, compiling and promoting excellent cases of personnel code of conduct, enhancing employees' awareness of adopting tools to improve behavioral norms.



#### Strengthening operational skill training to prevent human errors

- Human error prevention training carried out for the formal staff of major production offices and contractor personnel.
- Organizing the contractor personnel to participate in the skill competition about preventing human errors.
- Carrying out exchanges on human error management.

# 02

## Safeguarding a Green Environment with Nuclear Power



In 2022

- CNNP generated **199.29** TWh of nuclear and new energy power. Compared with coal-fired power generation, it was equivalent to reducing the burning of standard coal by 60,523,500 tons, reducing CO<sub>2</sub> emissions by 158,571,500 tons, reducing SO<sub>2</sub> emissions by 514,400 tons, and reducing nitrogen oxide emissions by 447,900 tons



# CSR Story

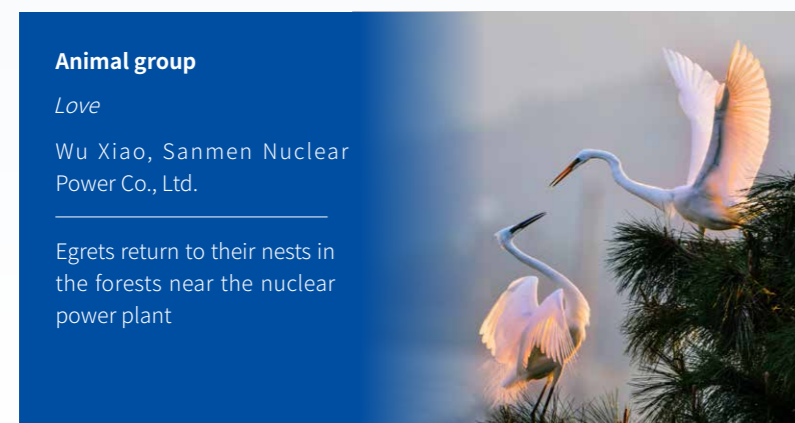
## Enjoying the Beauty of Nuclear Power Achieving Harmonious Co-existence with Nature

With practical efforts in biodiversity conservation for a long time, CNNP seeks to thrive together with nature. In 2022, CNNP built a new brand and held the first "Beauty of Nuclear Power" biodiversity conservation photography contest, conveying the charm of nuclear power technology and nature, and the peaceful coexistence between them. The photography contest attracted staff, locals, and non-profit photographers with a total of 600 high-quality photos submitted.

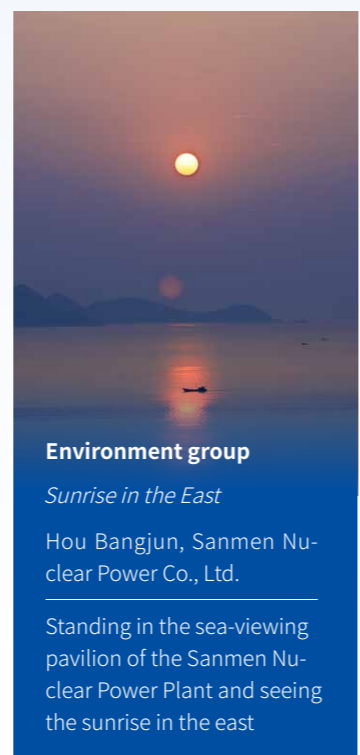
Biodiversity conservation	Ecological compensation	Natural capital accounting
<ul style="list-style-type: none"> <li>Relocating coral to protect its habitats</li> <li>Using the waste heat from nuclear power plants to help the reproduction of <i>Pinctada maxima</i></li> <li>Conducting research on the genetic diversity of marine organisms</li> </ul>	<ul style="list-style-type: none"> <li>Implementing greening projects to create garden-style power plants and maintaining the original ecology through forest transformation and ecological restoration</li> </ul>	<ul style="list-style-type: none"> <li>Integrating natural capital into corporate decision-making and management, assessing natural capital, promoting the practice within the Company, and building a benefit-oriented mechanism for ecological conservation and green development</li> </ul>



**Plant group**  
*Mango Moonlight*  
Liu Xuan, Hainan Nuclear Power Co., Ltd.  
A fruitful mango tree at the Changjiang Nuclear Power Plant in Hainan



**Animal group**  
*Love*  
Wu Xiao, Sanmen Nuclear Power Co., Ltd.  
Egrets return to their nests in the forests near the nuclear power plant



**Environment group**  
*Sunrise in the East*  
Hou Bangjun, Sanmen Nuclear Power Co., Ltd.  
Standing in the sea-viewing pavilion of the Sanmen Nuclear Power Plant and seeing the sunrise in the east

## Implementing Environmental Management

Adhering to the concept of green development, CNNP coordinates and implements special environmental protection improvement and pollution control actions, incorporates environmental protection into the inspection of the Company's Party Committee and discipline inspection department, and clarifies the responsibility for environmental protection.

### Management system

The Company strictly abides by Chinese *Environmental Protection Law*, the *Law on Prevention and Control of Radioactive Pollution*, *Nuclear Safety Law*, and other laws, regulations, standards, and government policies. We improve the established rules and regulations of CNNP on environmental protection and coordinate environmental protection matters in the selection of new plant sites and the preliminary development of non-nuclear clean energy. Each subsidiary clarifies the responsibilities of environmental protection for its departments, hires qualified eco-personnel, and ensures the investment and effective use of eco-funds to meet relevant targets.



All the nuclear power plants have passed the ISO 14001 Environmental Management System certification

### Improving the management system

- Publishing the *CNNP Measures for Environmental Protection* to clarify the responsibilities, guidelines, principles, and objectives of environmental protection
- Publishing the *CNNP Guidelines for Energy Conservation, Consumption Reduction, and Emission Reduction*, and establishing an index system composed of binding, incentive, and evaluative indicators

### Implementing the responsibility system for environmental protection

- The CNNP headquarters formulates rules and regulations for environmental protection and supervises the implementation of relevant regulations, standards, and systems for environmental protection by subsidiaries
- Each subsidiary assumes the primary responsibility for environmental protection, implements the requirements of independent supervision, and regularly conducts evaluation and analysis of environmental protection practices



### Tightening assessment and accountability

- Holding those failing to perform properly accountable according to the *CNNP Administrative Measures for Safety, Quality, and Environmental Protection Accountability* with each subsidiary establishing an accountability filing mechanism for environmental incidents
- Implementing assessments in accordance with the *CNNP MKJ Management and Scoring Measures* and incorporating the assessment indicators into the performance evaluation index system of each subsidiary and the annual business performance evaluation responsibility letter

## Environmental impact monitoring

CNNP improves the established radioactive effluent and environmental monitoring management system and the quality guarantee system. In 2022, the Company formulated the *Requirements for Aerial Monitoring of Radiation Around Nuclear Facilities* to strengthen the radiation monitoring of the surrounding environment.

All subsidiaries strictly abide by national standards such as the *Regulations for Environmental Radiation Protection of Nuclear Power Plant* and the *Regulations for Environmental Radiation Monitoring of Nuclear Power Plant*, and issue suitable management procedures and directives such as *Environmental Monitoring Management*, *Environmental Monitoring Program*, and *Environmental Monitoring Quality Guarantee* to guide the implementation. In 2022, each subsidiary effectively monitored the surrounding environment of operating nuclear power plants, and the frequency and results met the requirements of national and industry standards.

### Case CNNP Xiapu Nuclear Power Co., Ltd. standardizes environmental monitoring procedures

According to *Environmental Monitoring Management*, CNNP Xiapu Nuclear Power Co., Ltd. monitors air, noise, marine environment, and water and soil conservation during construction to evaluate the impact of construction on the surroundings. It also completes the baseline survey of the radiation environment in the first two years of unit operation as scheduled, builds and commissions the environmental monitoring system and the supervisory monitoring system, and formulates 24 technical regulations such as the *Environmental Monitoring Outline*, laying a solid foundation for subsequent radiation monitoring.



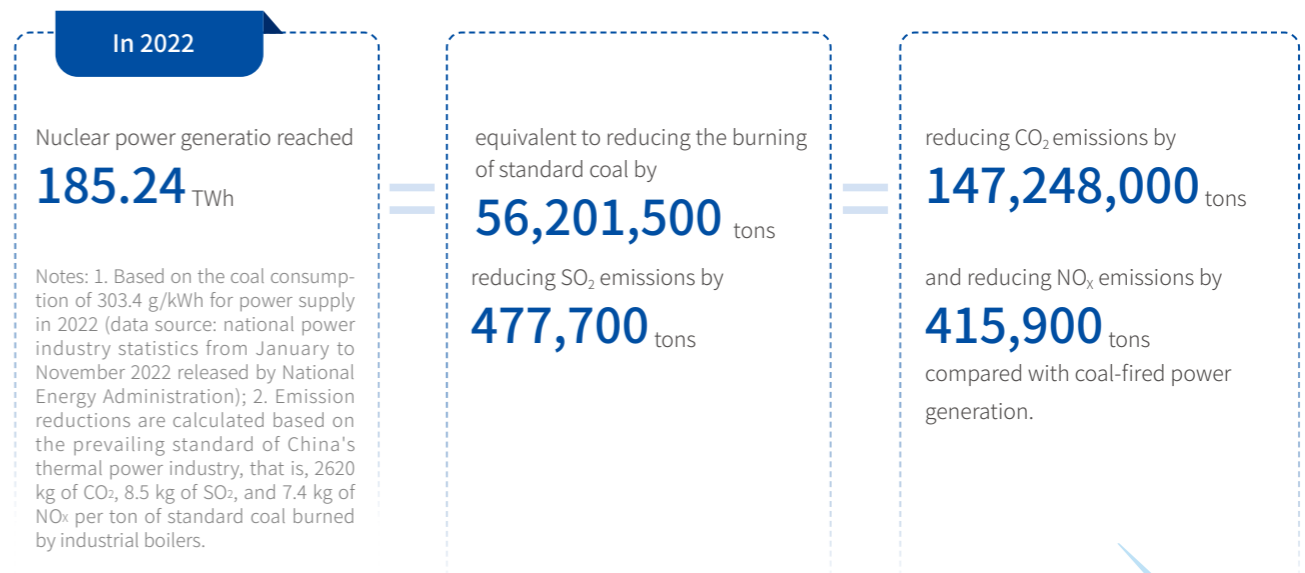
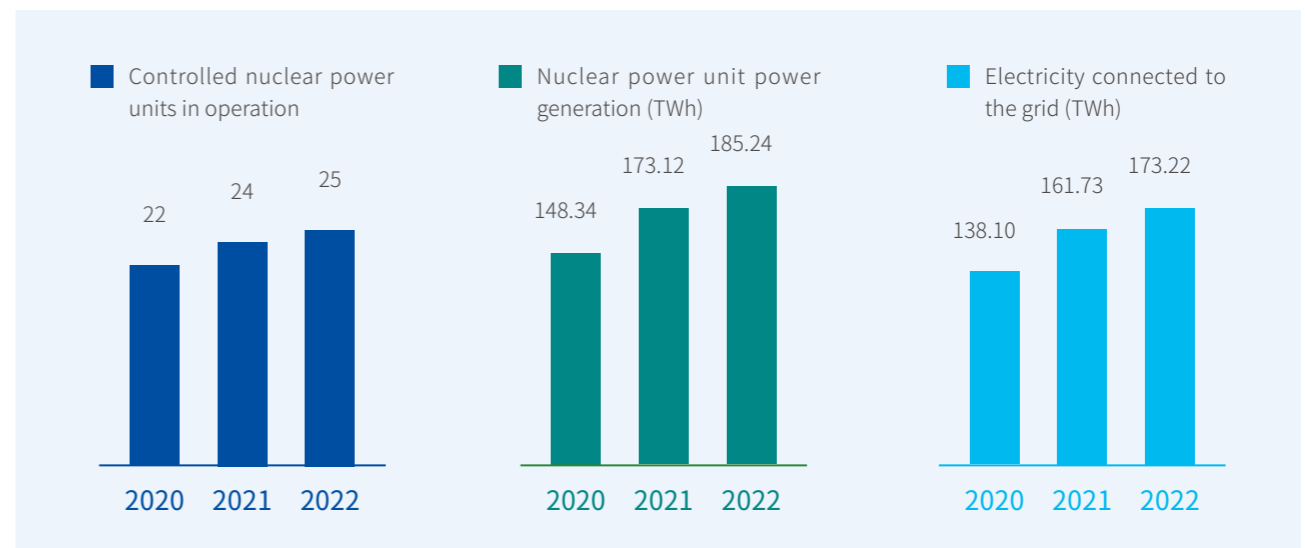
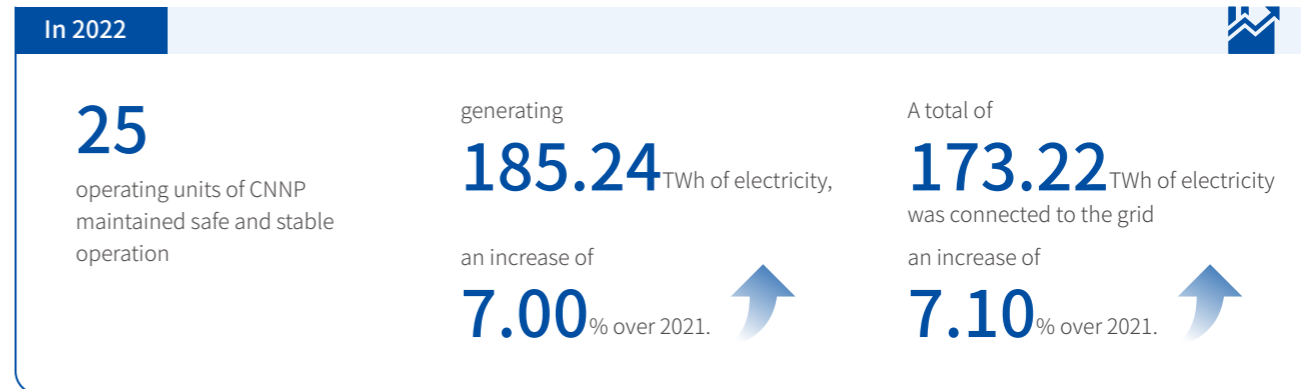
Monitoring the general environment and the marine environment during construction

## Seeking Low-carbon Development

CNNP continues to advance innovation in nuclear power technology, develop nuclear power in a safe and orderly manner, and champion energy reform and energy security, contributing to a new energy system and China's 30•60 Decarbonization Goal.

### Safe and orderly development of nuclear power

Safe and efficient, nuclear power is one of the most reliable baseload electricity types in the power system, making it indispensable in building a clean, low-carbon, safe, and efficient energy mix in China's new era. CNNP develops nuclear power of scale by steadily promoting self-dependent third-generation large-scale pressurized water reactors represented by Hualong One, ensures that nuclear power contributes to the 30•60 Goal, and owns an installed capacity that matches the goal of building a strong nuclear power country.



Projects approved

**On April 20**  
Units 3 and 4 of the Sanmen Nuclear Power Plant were approved by the state

**On September 14**  
Units 3 and 4 of the Zhangzhou Nuclear Power Plant were approved by the state

Projects being constructed


**On February 25**  
Unit 8 of the Tianwan Nuclear Power Plant started construction



**On May 19**  
Unit 4 of the Xudabao Nuclear Power Plant started construction



**On June 28**  
Unit 3 of the Sanmen Nuclear Power Plant started construction



## Comprehensive utilization of nuclear energy

Nuclear energy plays an important role in building a new energy mix in China, ensuring energy security, and realizing the 30•60 Goal. According to customer need, CNNP provides a variety of region-specific services such as nuclear heating, nuclear hydrogen production, and nuclear steam supply, which are coupled with petrochemical, the metallurgy of iron and steel, and other industrial processes to support their high-quality development under the new development paradigm.

The Company's first industrial nuclear heating project is completed and put into operation

On December 15, 2022, the Company's first industrial nuclear heating project was completed and put into use in Haiyan County, Zhejiang Province, offering green energy heating to nine local corporate users. Adopting central heating, the heat source is located within the Qinshan Nuclear Power Plant, sending heat to industrial users through insulated heating pipes.



The heating project, offering 24/7 services, supplies about 288,000 GJ of heat each year, equivalent to saving about 10,000 tons of standard coal and reducing CO<sub>2</sub> emissions by about 24,000 tons.

The Company's first industrial nuclear steam supply project officially begins

Nuclear steam supply, a new way of harnessing the heat of nuclear power plants, can meet the steam demand of the petrochemical industry and reduce comprehensive energy consumption. On May 27, 2022, the energy station of the Jiangsu Nuclear Power steam project poured the first tank of concrete, unveiling the construction of the Company's first industrial nuclear steam supply project at the Tianwan Nuclear Power Plant.





The Tianwan Nuclear Power steam supply project can provide 4.8 million tons of industrial steam for the Lianyungang petrochemical base every year, equivalent to reducing the burning of standard coal by 400,000 tons and decreasing CO<sub>2</sub> by 1.07 million tons each year.

**Read more** How can nuclear energy generate steam

Steam, an indispensable source of heat and power in the production of petrochemical enterprises, converts thermal energy during refining and prevents heat loss in pipelines. Now, the industrial steam used by Chinese companies mainly comes from coal-fired power plants or self-owned coal-fired boilers.

Nuclear power plants release energy through nuclear fission, heating water into steam which drives steam turbines to generate electricity. In addition to power generation, the substantial thermal energy of steam can match the requirements of heat parameters in high-temperature industrial processes.

Nuclear steam supply avoids the use of coal in a safer and more efficient manner with steam from nuclear power units as the heat source. Nuclear power plants separate the primary circuit from the secondary circuit and the secondary circuit from the industrial steam circuit. Through multi-layer heat exchange and based on the industrial steam pipeline, steam is sent to the Lianyungang petrochemical base for industrial production. The nuclear steam supply technology is safe, reliable, clean and efficient.

## Developing non-nuclear clean energy


CNNP accelerates the development of non-nuclear clean energy such as wind power and photovoltaics, making energy and power industries go green. In 2022, CNNP's non-nuclear clean energy projects were rolled out in 30 provinces, municipalities, and autonomous regions across China, with more than 12 GW of installed non-nuclear clean energy capacity in operation, nearly 6 GW of projects under construction, and 14.05 TWh electricity generated, an increase of 47.66% over 2021.

**In 2022**

The installed capacity of CNNP's controlled non-nuclear clean energy reached **12.53 GW**, including **4.21 GW** of wind power, **8.32 GW** of photovoltaics, and **211,000 kW** of independent energy storage power stations.

CNNP's controlled non-nuclear clean energy projects under construction reached **5.73 GW**, including **1.56 GW** of wind power and **4.17 GW** of photovoltaics.

Scenery at a glance



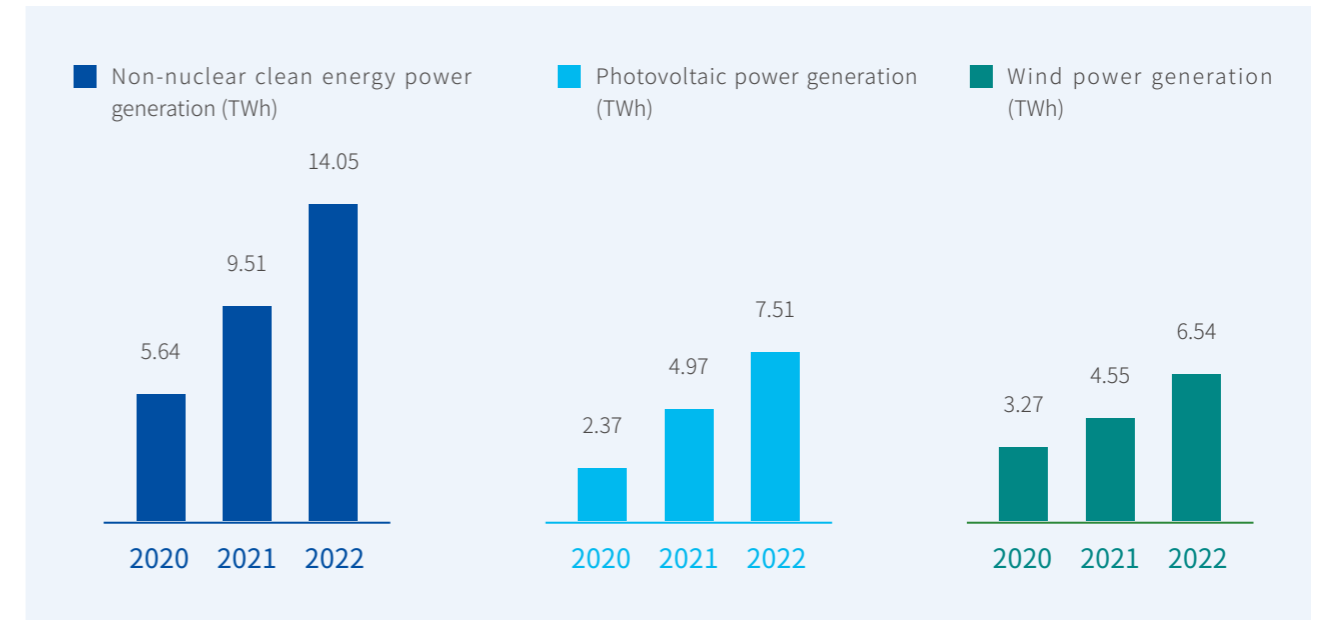
**PV power**

CNNP Rich Energy's 80MW Agri-PV project in Xinlongchuanbu Town was connected to the grid and started working on November 28, 2022, with an average annual electricity amount of nearly 88 GWh to the grid, equivalent to reducing the burning of standard coal by about 28,000 tons and CO<sub>2</sub> emissions by about 76,000 tons each year.




**Wind power**

The Tieling Cainiu and Aji 50MW wind power project undertaken by Zhongjing Power Investment Group under CNNP Rich Energy was connected to the grid and started working on December 20, 2022, with an average annual electricity amount of 180 GWh, equivalent to reducing the burning of standard coal by about 57,000 tons and CO<sub>2</sub> emissions by about 140,000 tons each year.



### Case The world's first "nuclear-thermal-photovoltaic-storage" demonstration project

Jiangsu Nuclear Power Co., Ltd. makes use of the thermal water of nuclear power plants to jointly develop the Tianwan 2GW tidal land photovoltaic demonstration project with CNNP Rich Energy Co., Ltd. The project started onshore on September 22, 2022, and it is expected that the 2GW photovoltaic power will be fully connected to the grid by the end of 2025. The project will become the world's largest offshore photovoltaic project and the largest nuclear-thermal-photovoltaic-storage demonstration project tapping into the thermal water of nuclear power plants, making the project a milestone for promoting multi-energy complementarity.



After the project is put into operation, it will generate 2.234 TWh of electricity to the grid, equivalent to reducing standard coal by 681,200 tons, greenhouse gas emissions by 1.7711 million tons, SO<sub>2</sub> emissions by 15,000 tons, and nitride emissions by 6,800 tons each year.

## Harnessing Resources Efficiently

Pushing forward green and low-carbon development, CNNP strikes a balance among energy conservation, emission reduction, and nuclear development, optimizes the power generation structure, and promotes multi-energy complementarity, conservation and efficiency. We improve the operation of units to lower their electricity consumption, strengthen wastewater recycling, and go all out in advocating energy conservation and emission reduction.

### Better energy conservation and efficiency

The Company standardizes energy conservation and emission reduction management and reduces carbon emissions throughout project construction and operation. In 2022, the Company released the *Management Measures for Energy Conservation, Consumption Reduction, and Emission Reduction*, which put in place a corresponding index system consisting of 42 indicators in 12 categories, including power plant electricity consumption, energy consumption and intensity, major production material consumption, water resource consumption and intensity, solid waste, and emission monitoring equipment. In 2022, the Company's CO<sub>2</sub> emissions stood at 89,897 tons, down by 2.67% from 2021.

**In 2022**

A total of **203,238,800** yuan was invested in the renovation of energy conservation and emission reduction facilities.

**In 2022**

<p>The actual energy consumption was about</p> <p><b>0.30</b> tons of standard coal per 10,000 yuan of industrial added value</p> <p>down by</p> <p><b>9.31</b> % year-on-year</p>	<p>The actual comprehensive energy consumption was</p> <p><b>0.21</b> tons of standard coal per 10,000 yuan of industrial output</p> <p>down by</p> <p><b>5.19</b> % year-on-year</p>	<p>The actual CO<sub>2</sub> emission was</p> <p><b>0.013</b> tons per 10,000 yuan of output,</p> <p>down by</p> <p><b>13.35</b> % year-on-year</p>
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Note: Nuclear power plants do not emit pollutants such as SO<sub>2</sub> and NO<sub>x</sub>, and CO<sub>2</sub> emissions are mainly converted from the amount of purchased energy. CO<sub>2</sub> emissions are calculated according to the purchased electricity calculation coefficient specified in the *Notice on Subsidiaries Strictly Submitting Statistical Annual Reports and Regular Reporting of Relevant Energy Conservation and Emission Reduction Data*.

#### Case Sanmen Nuclear Power Plant implements several energy conservation and emission reduction projects

Following the requirements of energy conservation and emission reduction, Sanmen Nuclear Power Plant, based on its internal and external environments, has issued 36 management procedures on energy conservation and emission reduction, such as Energy Conservation and Emission Reduction Technical Supervision and Waste Management, and implemented 11 key projects such as energy-saving hot standby of auxiliary boilers and CMS vacuum pump energy-saving operation. For the energy-saving operation of circulating pumps, the angle of their blades is flexibly adjusted according to the seawater temperature. For example, the angle drops from 84% to 81% as seawater cools. In 2022, blades operated on 81% for about 6.5 months, reducing electricity consumption by about 15 GWh.

### Fewer water consumption

To reduce water consumption, the Company upgrades technology, plans rational use of water, and improves water efficiency. We set constraints for water consumption per unit of power generated and incentives for comprehensive plant electricity consumption and implement differentiated management for different bases. In 2022, the water consumption of China's nuclear power industry decreased by 1.96% from 2021.

Water conservation	Efficient water use
<ul style="list-style-type: none"> <li>• Saving water through smart supply pipelines</li> <li>• Renovating the sewage discharge system of concrete batching plants</li> <li>• Checking leaks and saving water in raw water pipelines and on-site pipe networks</li> </ul>	<ul style="list-style-type: none"> <li>• Recycling construction sewage after three-step precipitation</li> <li>• Using reclaimed water for dust control and greening in plants</li> </ul>

#### Case Jiangsu Nuclear Power Co., Ltd. receives the title of "Jiangsu Province Water-saving Enterprise"

Prioritizing water conservation, Jiangsu Nuclear Power Co., Ltd. makes overall assessments of the company's policies, water management planning, water-saving statistics, water quota, and recycling according to the *Jiangsu Province Water-saving Enterprise Standards*. The company carries out special actions to improve energy and water conservation, compiles independent water-saving enterprise evaluation reports, and conducts thorough evaluations of its efforts to build a water-saving company. Through careful planning in the early stage, the company has passed the review by the Lianyungang Water Conservation Center and Jiangsu Provincial Water Conservancy Department, earning the title of "Jiangsu Province Water-saving Enterprise", another breakthrough after the award of "Green Factory".

#### Case Qinshan Nuclear Power Plant No. 1 follows high standards in wastewater treatment

Qinshan Nuclear Power Plant No. 1 has improved its treatment of wastewater as per high standards, and the indicators of wastewater discharged meet the *Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant*, the strictest discharge standard for domestic sewage treatment at present. When collecting wastewater, the Plant separates rain and sewage from wastewater, which is then classified, collected, transferred, and recycled as reclaimed water, effectively reducing wastewater treatment by 80%. Treated wastewater can be used for irrigation, which is of great significance to environmental protection and marine pollution control.

### Greater nuclear fuel efficiency

The Company has improved the *Guidelines for Nuclear Fuel Management* and other policies to standardize nuclear fuel management and adopted advanced management solutions to enhance nuclear fuel efficiency. According to the technical specifications for nuclear power plant operations, we have formulated effective measures to monitor the operation of the reactor core and nuclear fuel to ensure on-site operations consistent with the refueling design of nuclear power plants. We have also increased the monitoring level and the frequency of sampling and analysis, and indexed fuel integrity against the fuel reliability indicators of WANO with indicator performance tracked.

## Strictly Controlling Effluent Discharge

Guided by the *Circular of the CPC Central Committee and the State Council on Further Promoting the National Battle to Prevent and Control Pollution*, CNNP has formulated a corresponding work plan and strictly implemented the system of simultaneous design, construction, and operation of environmental protection projects. We improved the radioactive and non-radioactive waste management system to take further actions to minimize radioactive waste from the source.

### Radioactive waste management

The Company and each nuclear power plant continue to minimize radioactive waste and strictly control the annual amount of radioactive solid waste. In 2022, the Company formed a list of radioactive waste in nuclear power plants based on surveys and analyzed plans for radioactive waste storage capacity and transfer. We have released the "CNNP Radioactive Waste Medium and Long-term Treatment and Disposal Plan" and technical waste management guidelines to promote the research and application of waste minimization technology.

In 2022, the CNNP treatment system of three types of waste operated without disruptions with effective control of radioactive effluent. There was no incident of excessive discharge of radioactive materials throughout the year or radioactive solid waste exceeding the target amount.



#### Improving radiation protection management standards and systems

- Publishing *Guidelines for the Management of Radioactive Waste*, *Technical Guidelines for a Pollution Monitoring*, and other standard documents, 21 management guidelines and 50 technical guidelines in the field of radiation protection, covering all elements of radiation safety management of nuclear power plants



#### Submitting reports regularly

- Publishing the CNNP monthly performance report and annual report on radiation protection and regularly evaluating the radiation safety management of each unit to summarize good practices and identify weaknesses in a timely manner

### Non-radioactive waste management

The Company strictly controls non-radioactive waste in accordance with the *Law of the People's Republic of China on Prevention and Control of Environmental Pollution by Solid Waste* and the *Law of the People's Republic of China on the Prevention and Control of Soil Pollution*, uses chemicals that produce minimized hazardous waste, and regulates hazardous-waste-prone procurement, use, and removal processes to minimize hazardous waste (including mixed waste) from the source.

Each nuclear power plant has improved its non-radioactive waste management system, improved the registration of general solid waste and hazardous waste, upgraded several technologies, and sought improvement solutions to reduce the discharge of non-radioactive waste.



#### Sanmen Nuclear Power Plant reduces hazardous waste discharge

According to the *Sanmen Nuclear Power Plant Hazardous Waste Reduction Work Plan*, Sanmen Nuclear Power Plant has adopted measures such as clean production, source reduction, and recycling, and formulated annual reduction targets for more than 10 types of hazardous waste such as waste batteries, lubricant, packaging buckets, and expired chemicals from 2022 to 2025. As of November 2022, the hazardous waste of the Plant had decreased by 17 tons from 2021, which showed that it had effectively controlled the generation of hazardous waste.

## Conserving Biodiversity

Valuing biodiversity conservation, the Company improves the environmental quality around nuclear power plants, monitors indicator organisms, measures residual heat of the cooling water through remote sensing, and promptly adjusts measures to protect the surrounding marine environment.



#### Avoiding protected areas: sticking to the ecological bottom line and optimizing construction plans to avoid nature reserves

- To ensure that the temperature rise of 1° C in summer will not affect the Zhangjiangkou Mangrove National Nature Reserve and Dongshan Coral Reef Marine Nature Reserve, Zhangzhou Energy Co. Ltd. compared different thermal water outlets and finally agreed on a location six meters underwater in the southeastern part of the plant. The maximum envelope area of 4° C temperature rise and residual chlorine is only 0.48 km<sup>2</sup>. During construction, shield machines were adopted to limit the scope of suspended sediment and protect the surrounding environment.



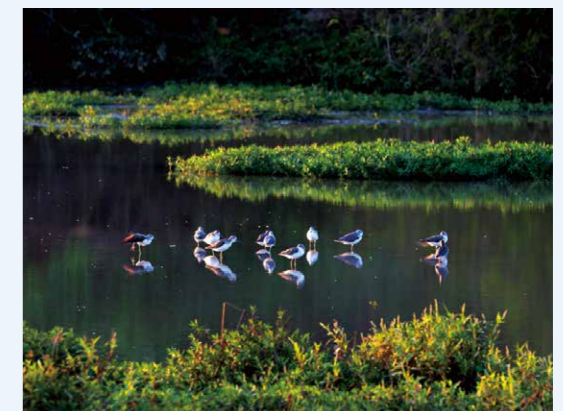
#### Conducting fish stocking: effectively improving the water environment and conserving aquatic biodiversity

- CNNP Liaoning Nuclear Power Co., Ltd. invested special funds for three special fish stocking actions of "jointly building a sustainable blue homeland" in 2022, releasing a total of 14,157,100 swimming crabs and 598,800 barracudas.
- Guided by experts of the Yunxiao County Marine Fisheries Bureau, Zhangzhou Energy Co. Ltd. released more than 1.25 million red seabreams, more than 2.5 million black seabreams, more than 830,000 yellowfin seabreams, more than 1.25 million crescent sweetlips, and more than 150 million red tail shrimps in the fishing-prohibited waters of Dongshan Bay.

#### Sandpipers living around Jiangsu Nuclear Power Co., Ltd.



#### The beautiful "bird island" near the drainage canal of Hainan Nuclear Power Co., Ltd.





# 03

## Enhancing Self-reliance through Innovations



In 2022

• R&D investment reached **2.69%** of the business revenue





# CSR Story

## Producing the world's first Carbon-14 isotopes in a commercial reactor

Carbon-14 breath test has been used for detecting *Helicobacter pylori* infection for a long time, and the annual demand for such test in China exceeds 30 million. But in the past, China's Carbon-14 supply entirely relied on imports. Giving full play to its advantages in scientific research innovation, talent team, achievement commercialization and industry development, CNNP has joined hands with stakeholders to actively implement the Healthy China Initiative and make a more balanced layout for the medical isotope industry base on the current situation.

In 2022, a major breakthrough was made in the manufacturing of medical isotopes with the world's first batch of commercial reactor Carbon-14 irradiation production targets installed in the reactor core at Qinshan No. 3 Nuclear Power Plant. It was anticipated that the plant will start to provide carbon-14 radioactive isotopes to the market in 2024 and its production capacity can fully meet domestic demand. This will mark the start of independent production of Carbon-14 in China to shake off the long-term dependence on imports. It will also promote the building of a demonstration base for the commercial application of nuclear technology, the establishment of a stable supply system of medical isotopes, the development of the industrial chains of isotope application, and make new and greater contributions to public health.

### How is Carbon-14 mass produced?

The nitrogen-containing targets specially developed by researchers would be installed into the reactor core of a nuclear power unit. The nitrogen undergoes a nuclear reaction in the reactor to form Carbon-14 nuclide with 6 protons and 8 neutrons. The long-term and high-power operation of the nuclear power unit provides a stable neutron source for constant production of Carbon-14.

### What can Carbon-14 be used for?

Carbon-14 is widely used in agriculture, chemistry, medicine, biology and other fields, and is the key to many disciplines. The Carbon-14 breath test has long been used in the detection of *Helicobacter pylori* infection.

### Will Carbon-14 be harmful to the human body?

Although Carbon-14 is radioactive, it will not cause harm to the human body. China has very strict standards for the use of Carbon-14. The radiation dose caused by a Carbon-14 breath test is approximately equal to that caused by taking a 30-minute flight or eating 12 to 14 bananas.



Operation staffs of Qinshan Nuclear Power Plant slowly inserted the target into the reactor core.

## Deepening Reform and Innovations

CNNP is fully committed to promoting the transformation of the management and control model with the goal of intensification, and building a demonstration model for intensive operation. We build long-term system with important reform initiatives and sound experiences and incorporate them into the operation system through intensifying various measure in the three-year SOE reform action plan, so as to further advance the demonstration action for tech-SOE reform. We deeply improve and implement the lean management in all aspects of our work. In 2022, the demonstration action for tech-SOE reform of a subsidiary was selected into the SASAC's collection of good practices in reform innovation.

### Strengthening intensive management reform

CNNP has implemented intensive management reforms, steadily promoted the physical operation of shared service centers, and made efforts to become more refined and stronger in the professional field through resource integration and ongoing optimization. Through coordination and the implementation of planning system, we strive to eradicate management obstacles to the development of CNNP on a large scale and forge an exemplary model of intensive management.

#### Strengthening leadership and overall planning

- Leading group, office and preparation group for intensive management were set to take charge of top-level design, overall layout, comprehensive planning and coordination, guidance and supervision.
- Organized research on the current status of intensive business management, carried out intensive management training and publicity, and prepared the design plan for CNNP intensive management center with the aim of setting up six operational bodies including the procurement center, digital innovation center and others, conducted top-level design and overall planning for intensive management in the next three years.

#### Systematic advancing with categorized implementation

- Conducted difficulty assessment of reforms in each center, and provided categorized guidance by focusing on key and difficult tasks and following the principle of "phased implementation in accordance with ground realities of each center". In 2022, six brick-and-mortar intensive management centers were established.
- Recruited team staff for each center, refined operation plan, analyzed business process, prepared for operation procedures, formulated business standards, etc., laying the foundation for the timely completion of the six centers and the implementation of intensive management.

### Intensifying the three-year SOE reform action plan

In 2022, CNNP had completed all the 56 reform tasks and 306 measures of the three-year SOE reform action plan ahead of the schedule with remarkable results. CNNP was listed as a Demonstration State-Owned Enterprise in Corporate Governance by SASAC and awarded as a High-quality Listed Company with the Most Investment Value of the China Securities Golden Bauhinia Award.

 Case CNPO awarded an excellent enterprise of tech-SOE reform by SASAC for the second time

In 2022, CNPO was once again recognized as excellent Science Reform Demonstration Enterprise, after being rated excellent in Double-Hundred Action and Science Reform Demonstration Action in 2020. After being listed under the demonstration action for tech-SOE reform, CNPO takes the lead in implementing market-oriented and innovation-driven initiatives to deepen reforms in areas including corporate governance, talent selection and appointment, incentive and restraint system, technological innovation, market development. We effectively tackle problems in core technological research that hinder the country's development and unleash the driving forces for business growth.



### CNNP completed key reform tasks of the three-year SOE reform action plan

#### Improving the modern enterprise system with Chinese characteristics

- Improve the articles of association, formulate the list of major business issues to determine the specific content and pre-procedures for Party committee to participate in major decisions, with an aim to ensure the advance study on development strategy, major problems and important issues of CNNP.
- Optimize the decision-making system on major matters, major appointments/dismissals, major project arrangements and the use of large amounts of money, and clearly define the boundary of the power and responsibility between governance bodies. Set up four special committees under the board of directors to establish a corporate governance system with transparency, coordination and balances.

#### Improving the market-oriented operation mechanism

- Promote the market-oriented talent selection and appointment mechanism, and fully implement the tenure system and contract-based management among managers.
- Promote subsidiaries such as CNNP Rich Energy and CNPO to establish the record-filing system for total payroll and formulate remuneration distribution policy in line with the market practice and better reflecting the actual conditions of each subsidiary.

#### Promoting structural adjustment of industry layout

- Focus on the three core businesses of nuclear energy, non-nuclear clean energy, and agile new industries; clarify five business sectors including nuclear power generation, multi-purpose utilization of nuclear energy, nuclear power technology services, non-nuclear clean energy and agile cleaning technology.
- Carry out over 150 special actions on quality and efficiency enhancement, with comprehensive improvement on the safety, reliability and economical operation of power generation units.

#### Deepening the reform of mixed ownership

- CNNP has introduced non-public capital to set up 48 mixed-ownership enterprises. Non-public capital was also introduced to projects such as wind farm, PV and pool type reactor low-temperature heating supply in a timely manner to realize mixed ownership.

#### Advancing technological innovation and digital transformation

- Build a diversified S&T innovation platform, improve the scientific research system, implement the operation of the research institute through "small core, extensive collaboration", and establish a digital nuclear power joint R&D center with Tsinghua University, so as to secure a series of innovative achievements.
- Build "new infrastructure" such as the autonomy of the nuclear power work safety management platform, the R&D of the intelligent management system for key/sensitive equipment in nuclear power plants, and a digital operation platform covering all areas of tracking and monitoring to promote the in-depth integration of digital technology and business operation.

#### Promoting excellent Party leadership and cultural brand

- Adhere to Party leadership and coordinate the promotion of the three major projects of "corporate culture implementation, social responsibility fulfillment, and brand value enhancement" and build the brand of "excellent Party building and first-class management" for four consecutive years.

## Stepping up efforts to enhance lean management

CNNP practices a new development philosophy and serves a new development paradigm in the new development stage for high-quality development, and implements the concept of lean management in an all-round way. We carry out key task planning by focusing on intensive operation, improving quality and efficiency, targeted implementation and digital innovation, and empower the high-quality development with lean management by addressing details and processes.

#### Work Mechanism

- Establish a monthly case sharing and special work progress reporting mechanism for lean management, create a visual platform to monitor the task progress, and realize real-time dynamic tracking of special work of lean management.

#### Precise Assessment

- Incorporate lean management special work into MKJ assessment and establish a regular feedback mechanism, implement precise assessment and incentives for special lean management achievements of each unit.



#### Digital Empowerment

- Compile excellent cases of lean management such as Work Safety Platform (ASP), Operation Monitoring Platform, Management System Digital Intelligence Platform and Supervision (V2) System of CNNP.
- Complete the CNNC code cleaning, coordinate the advancement of internal and external strategic joint storage to realize the transfer of spare parts across power plant nuclear warehouses, with an annual benefit of over RMB 100 million.

#### All-around Publicity

- Carry out comprehensive publicity on special plans, outstanding figures and excellent cases of "Lean management Year" through featured reports, briefing and integrated media platforms.
- Cultivate a lean management improvement cultural atmosphere through the case promotion and implementation, and compile and publish *Continuously Improving, Pursuing Excellence*.



Compiling and publishing the *Continuously Improving, Pursuing Excellence*



Case

#### CNNP won the first prize of National Enterprise Management Modernization Innovation Achievement

In 2022, CNNP's *Aiming for World-class Excellent Operation Management of Nuclear Power Enterprises* achievement stood out from 644 participating projects and won the first prize of the National Enterprise Management Modernization Innovation Achievement Award. The achievement was refined from CNNP's excellent operation management model, equipment reliability management and safety supervision defense system, power plant production system with work orders as the core, and improvement of production decision-making and risk control system, effectively promoting a series of experience and achievements in intensive reform and production management standardization enhancement of CNNP.

## Advancing Technological Innovation

Giving full play to its role as the main force of sci-tech innovations, CNNP continues to promote the integrated allocation of projects, achievements and talents in key areas and independent R&D of key technologies in China, and gradually build an industrial structure of "nuclear energy + non-nuclear clean energy + new agile industries" to unleash vital forces for sci-tech innovations.

In 2022, power plants, affiliated institutes, and non-nuclear clean energy enterprises under CNNP were certified as "National High-tech Enterprises", and CNNP Headquarters were also certified as "Zhongguancun High-tech Enterprises", laying solid foundations to build CNNP into a high-quality and high-tech nuclear power listed company with core competitiveness.

### Optimizing Sci-tech Innovation Mechanism

Upholding the philosophy of "development is the top priority, talents are the primary resource, and innovation is the essential driving force", CNNP optimizes sci-tech innovation mechanism and platform, and enhances the role of sci-tech innovation as the driving force.

#### Optimizing sci-tech innovation mechanism



- Introduce top-notch strategic scientists to refine and improve the "trinity" process system of sci-tech research projects, talents and achievements, and formulate three-year action plans for sci-tech innovation during the 14th Five-Year Plan Period.
- Focus on resource input in key areas such as original technology and economical improvement, CNNP's centralized R&D mechanism of "Project Guide Mode" operates effectively.

#### Improving sci-tech innovation platform



- Intensify the efforts in "small core, extensive collaboration" by focusing on three sci-tech research institutions to give full play to the roles of five group-level sci-tech research platforms, carry out in-depth cooperation with Tsinghua University in the fields of smart nuclear power, nuclear energy multi-purpose, and agile industries to realize the breakthrough in nuclear power key equipment intelligent management industrial software.

#### Selecting sci-tech innovation talents



- Facilitate sci-tech talents to gain experiences in major projects and key sci-tech research projects by open competition mechanisms, with an aim to select a team of chief experts and sci-tech leaders for CNNP.
- Strengthen positive incentives and establish multi-mode and multi-dimensional sci-tech innovation awards.

## Strengthening science and technology R&D

CNNP ramps up efforts to promote breakthroughs in key sci-tech research projects and critical technologies, grasp forward-looking advanced productivity, and enhance core competitiveness for the future. In 2022, CNNP successfully completed the annual target of the major model R&D projects of integrated fast reactor, Hualong's follow-up models, and 1,000 MW supercritical high-temperature reactor; deployed the core needs of CNNP's industry development and technology innovation, and planned a number of major sci-tech research projects on. The investment of high-quality R&D during the year reached about 1.91 billion yuan.

- Expedite the industrialization process of the perovskite solar cell project in the agile industry and prepare for the establishment of the relevant company and pilot sci-tech research, and advance hydrogen energy and energy storage projects in an orderly manner.
- Qinshan Nuclear Power Plant has started the development of Yttrium-90 glass microsphere target and its supporting R&D, and it was the first attempt in the world to use commercial reactors to produce Yttrium-90 glass microspheres.

CSR honors

- The "Nuclear Power Project Work Safety Standardization Research and Application—Global Benchmarking Good Practices" of Jiangsu Nuclear Power Co., Ltd. **won the first prize of the 3rd Safety Science and Technology Progress Award.**
- The *Improvement of Vibration Reliability of Half-speed Steam Turbine for 1,000 MW Nuclear Power Plant* project of Fuqing Nuclear Power Co., Ltd. **won the first-class project of national power industry equipment management innovation achievements.**



## Strengthening Sci-tech achievement commercialization and IPR management

The sci-tech achievements commercialization and intellectual property management of CNNP have been improving. In 2022, the sci-tech achievement commercialization center was established, and over 60 projects had been completed, with the commercialization amount exceeding 100 million yuan. In strict compliance with the Law of People's Republic of China on Intellectual Property Protection, we comprehensively deploy intellectual property management and protection with a three-year action plan and a sound management system for the high-quality development of intellectual property, and implement the whole process management of intellectual property for major sci-tech research projects. In 2022, CNNP released China's first advanced pressurized water reactor user requirements document with complete independent intellectual property rights; Jiangsu Nuclear Power Co., Ltd. won the "Jiangsu Provincial Intellectual Property Standard Implementation Certification". By the end of 2022, CNNP was granted a cumulative of over 4,000 patents and nearly 1,000 software copyright registrations.

In 2022

Nearly **1,500** patent applications submitted

with **917** patent authorizations granted

Nearly **100** new invention patents

about **77** sci-tech achievement awards of various categories received

with about **500** awards in accumulation

CSR honors

- The *Underwater Installation Method of Positioning & Supporting Structure of Irradiation Supervision Tube* won the **China Patent Excellence Award**, achieving **a breakthrough from scratch.**
- The "Fully Digital Rod Position Measuring Device and Its Method" invention patent of Qinshan Nuclear Power Plant was authorized **the US patent authority**, realizing the ground breaking of CNNP's patent authorization in the US.



## Promoting Digital Transformation

CNNP takes steady steps to advance digital transformation, improves operation and management (O&M) efficiency through information and digital office, facilitates the transformation and upgrading of industry digitalization and intelligence with digital nuclear power construction, and safeguards cybersecurity with a sound information security management system.

### Intelligent energy management

Relying on digital technology, CNNP has introduced AI digital employees and smart warehouse management systems to promote ASP-1 project research, ASP-2 industrial software development, smart construction of nuclear power plant and smart management of work safety of non-nuclear clean energy. By doing so, we continuously advance the project management of CNNP to that of a world-class enterprise.

Making full use of cloud computing, big data, IoT, mobile Internet 5G, AI and other technologies, CNNP has built smart sites covering multiple scenarios such as 5G high-definition video backhaul, personnel and vehicle management, AI analysis, etc. to realize all-round, real-time and dynamic monitoring and supervision of personnel, machinery, materials and environment at the nuclear power construction site, creating a new model of "digital technology + CNNP standards".

#### Improving operation and management efficiency

- Sanmen Nuclear Power Co., Ltd. launched the first AI digital persona employee "Zhou Meiyi" in China's nuclear power field. She can prepare financial account statements and execute instruction accurately and quickly, which is one of the achievements of CNNP's digital transformation.
- Fujian Fuqing Nuclear Power Co., Ltd. and other companies have built digital warehouses, and the corporate warehouse management has been transformed from labor-intensive to technology-intensive.

#### Enabling digital nuclear power construction

- The work safety management platform R&D project (ASP-1) passed the technical acceptance, marking a major leap forward in the digitalization and autonomy of CNNP's work safety platform, and the in-depth integration of nuclear power digital technology and core business areas entering a new stage.
- The intelligent management system (ASP-2) of key sensitive equipment in nuclear power plants passed the technical acceptance, marking a ground-breaking breakthrough in CNNP's key equipment management industry software.



The launch of Hualong Intelligent Digital Warehouse at Fujian Fuqing Nuclear Power Co., Ltd.

#### Case CNNP's first post-repair test digital management module uses in Qinshan Nuclear Power Plant

In 2022, the first post-repair test digital management module of CNNP was launched at Qinshan Nuclear Power Plant. This module was CNNP's first standardized and digital post-repair test management module developed by Qinshan Nuclear Power Plant with years of experience in overhaul post-repair management to address the pain points of each department during the post-repair test, with functions such as online application for post-repair test, intelligent ticket clearance, auxiliary scheduling, instant push notification, test control, visualized real-time indicators and others. The application of this module is conducive to the refinement of overhaul, digital management and the realization of digital drive.

#### Case CNNP Rich Energy Co., Ltd promotes digital transformation of non-nuclear clean energy work safety

In 2022, the non-nuclear clean energy work safety of CNNP Rich Energy Co., Ltd ushered in a new stage of digital transformation, intensive management, and intelligent operation, completed the centralized control construction of provincial companies in Gansu, Xinjiang and Ningxia, promoted the "unmanned or less manned" operation and maintenance and successfully piloted in three unattended stations. Through the construction of the centralized control center and the regional operation and maintenance, the centralized management and control of daily monitoring, statistical analysis of data, reporting, dispatching calls and other functions of the power generation station had been realized, which effectively reduced the labor cost of operation and maintenance. In this way, its lean management and information construction reached a new level.



### Cybersecurity

CNNP follows the requirements of Chinese laws and regulations on cybersecurity and the *CNNP Network Security Operation Specification*, improves the information security management system, coordinates the unified operation of network security, network security technology research, and the construction of network security talent teams. We participated in the cybersecurity emergency response drills organized by the Ministry of Public Security, safeguarded cybersecurity during the Beijing Winter Olympic Games (Beijing 2022) and the National Two Sessions (the National People's Congress & the Chinese People's Political Consultative Conference), strictly protected the security of various information including customer information, and built a solid network security protection system.

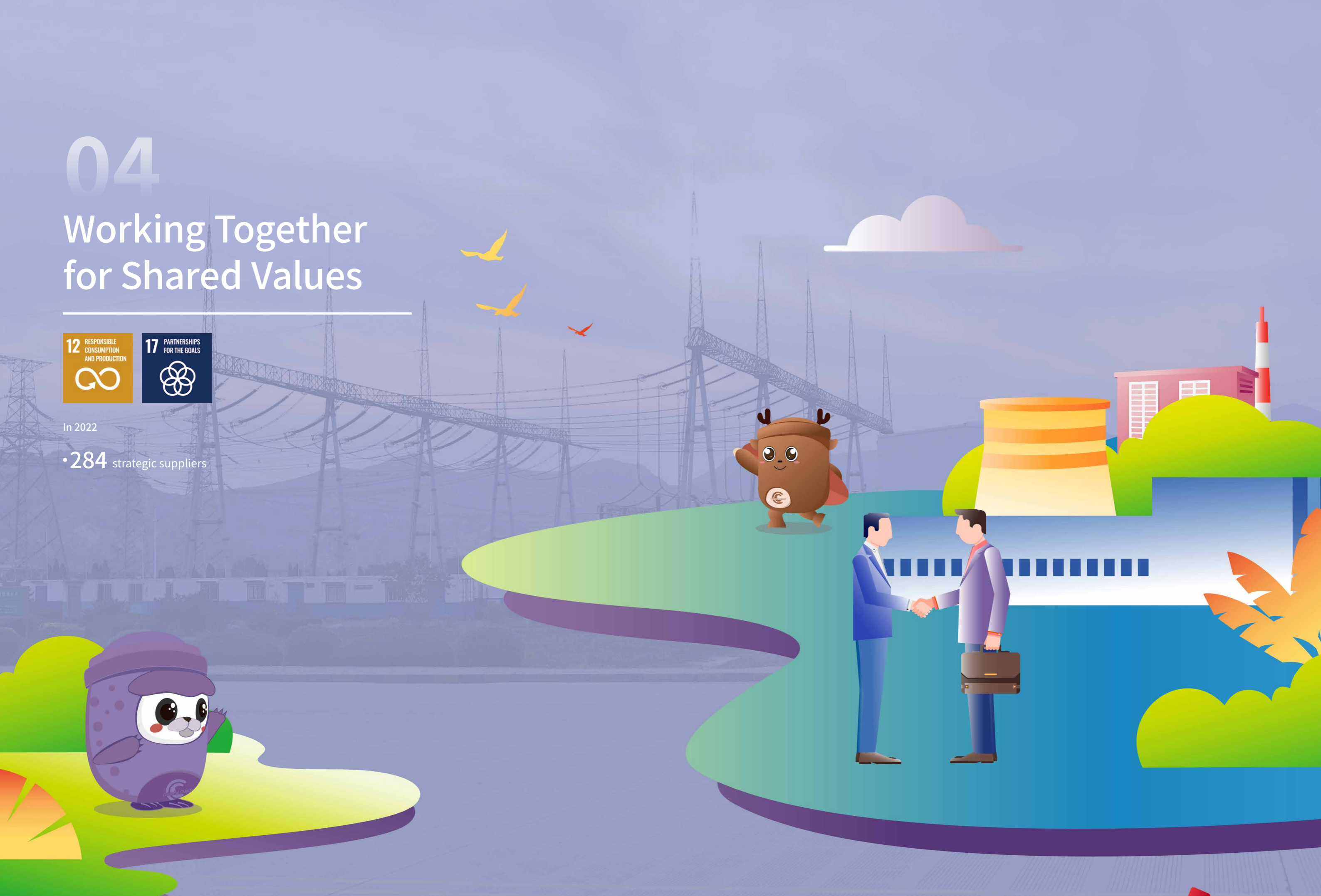
# 04

## Working Together for Shared Values



In 2022

•284 strategic suppliers



# CSR Story

## The two overseas demonstration units of Hualong One are completed and put into operation

On April 18, 2022, Unit 3 of the Karachi Nuclear Power Plant in Pakistan, the fourth unit globally and the second unit overseas using China's independently designed third-generation nuclear reactor, Hualong One, passed the provisional acceptance. Qinshan Nuclear Power Plant is responsible for the joint commissioning and trial operation of the Karachi Unit 2 and Unit 3 (or the K2/K3 project) and is in partnership with Pakistan's Chashma Nuclear Power Generating Station. The completion and operation of two overseas units of the Hualong One have demonstrated to BRI countries the cutting edge of Hualong One technology.

### Triumphing over odds

In December 2018, the first group of Qinshan Nuclear Power Plant personnel involved in the K2/K3 project arrived in Pakistan. A total of 189 people in 31 groups were sent to Pakistan by the Plant for 41 months. They overcame adverse effects to complete 570 commissioning tests and the trial operation management of K2/K3 project units, contributing a lot to their smooth handover.

### Working together

Leveraging the business advantages of CNNP, Qinshan Nuclear Power Plant establishes an enduring and diversified cooperation model featuring sustainable development through regular high-level negotiations, personnel visits, operation feedback, and management sharing, and provides one-stop full-life-cycle solutions for the K2/K3 project to improve its performance.



- On May 21, 2021, the first overseas reactor of Hualong One, Karachi Unit-2 (K-2) in Pakistan, was put into commercial operation, filling one-third of the power gap in Pakistan.
- After the completion of each unit, it is expected to generate about **9** TWh of electricity each year, which can meet the annual electricity demand of more than **4** million households in Pakistan.

## Building Responsible Supply Chains

CNNP aims to build a supply chain ecosystem of "efficient collaboration, mutual benefits, and agility and resilience", improves the Company's supply chain and procurement management, and strengthens the awareness of upstream and downstream players for a responsible supply chain of integrity, risk sharing, and win-win cooperation.

### Standardized procurement management

The Company sets the annual procurement management objective of "vigorous and intensive efforts for innovation, continuous improvements to be first-class", reforms the procurement system and mechanism, and improves procurement management.

In 2022

the Company's e-procurement rate stood at

**98.90%**

the centralized procurement rate at

**93.90%**

the disclosure rate at

**99.30%**

### Reforming the procurement system and mechanism

- Advancing the operation of the procurement center by improving the establishment plan, procurement management system, procurement information system, procurement center personnel preparation, center business undertaking, and center operation support



### Improving the procurement management system

- Publishing the revised *Headquarters Procurement Management Measures*, *Strategic Spare Parts Management*, *Supplier Management Regulations* and other policies
- Improving procurement standard documents and coordinating the preparation of contract standard texts



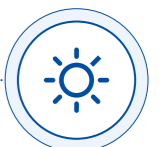
### Digitalizing procurement

- Improving the quality of major material data, efficiently cleaning material codes, and building a data management and control platform for procurement and supply chains



### Ensuring transparent procurement

- Releasing the *Measures for Procurement Supervision and Administration* to strengthen the institutional support of procurement supervision, and building a supervision mechanism to assess, monitor and inspect the whole process of procurement
- Integrating procurement and bidding integrity into employee education and training to strengthen the integrity and compliance awareness of employees
- Releasing the *Ten Noes for Integrity and Self-Discipline of Suppliers* to heighten suppliers' integrity awareness



### Improving the procurement staff abilities

- Engaging more than 800 people in the online training on improving CNNP's business procurement to enhance the knowledge and skills of procurement personnel
- Establishing an expert database and building the procurement and supply chain management expert system



## Enhanced supplier management

Guided by overall planning, the Company continues to optimize the supplier management system, a process that is supported by system building, digitalization and ability assessment. CNNP strengthens the building of management systems and the management of supplier access and supplier relationship to improve overall supplier management.

Improving the supplier management system	Preventing and controlling supply chain risks	Improving supplier capabilities
<ul style="list-style-type: none"> <li>Improving CNNP's whole-process supplier management system, covering aspects such as supplier entry and exit, qualification evaluation, supplier selection, performance evaluation, and bad behavior management</li> <li>Upgrading the <i>Supplier Management Regulations</i> and improving supplier classification and bad behavior management</li> </ul>	<ul style="list-style-type: none"> <li>Enhancing procurement and supply chain risk prevention and control and support capacity, and conducting overall assessments of CNNP's annual supply chain risks</li> </ul>	<ul style="list-style-type: none"> <li>Convening the CNNP supplier conference, establishing the Hualong One supply alliance, and striving to shape an independent and controllable supply chain and core competitiveness in nuclear energy</li> </ul>



Supplier management measures

## Promoting Development of the Industry

CNNP strengthens cooperation with multiple partners in more aspects. Our partnerships with upstream and downstream players and research institutes promote industry-university-research cooperation to boost innovation and win-win development.

### Deeper cooperation and exchanges

Seeking opportunities to cooperate with external players, we establish extensive partnerships with governments, corporate financial institutions, and research institutes to achieve complementarity and mutual benefits and lead the development of the nuclear power industry.

**Cases**

<b>Government-enterprise cooperation</b> Leveraging local resources and contributing to local development	<ul style="list-style-type: none"> <li>All subsidiaries of CNNP have maintained sound partnerships with local governments. For example, our subsidiaries partner with local governments to build "Zero Carbon Future City" and "Zero Carbon Demonstration Village" in Haiyan County of Jiaxing City and Sanmen County of Taizhou City in Zhejiang Province.</li> </ul>
<b>Cooperation between companies</b> Deepening information sharing to improve corporate competitiveness	<ul style="list-style-type: none"> <li>We join hands with companies such as China Nuclear Energy Industry Corp. and China Nuclear Uranium Co., Ltd. to improve safety management, focus on the "two lists" of hidden dangers and institutional measures for nuclear and radiation safety, carry out special work safety actions, and promote information sharing.</li> </ul>
<b>Bank-enterprise cooperation</b> Expanding financing channels and improving financial support	<ul style="list-style-type: none"> <li>We strengthen exchanges and cooperation with financial institutions such as policy banks, China Nuclear Finance Company Limited, and commercial banks to expand financing channels and establish a multi-channel capital support system.</li> </ul>
<b>University-enterprise cooperation</b> Carrying out technological research and training technological talent	<ul style="list-style-type: none"> <li>Giving full play to the advantages of industry-university-research cooperation, CNNP and Tsinghua University deepen collaboration in the self-dependent development of nuclear power software and accelerate the innovative application of ASP-2 in equipment monitoring and intelligent diagnosis.</li> </ul>



## Stronger supply chains with integration

The Company strengthens supply chains by improving the foundation, supplementing with technology, and advancing integration and optimization to be a modern supply chain leader. By making supply chains more resilient and competitive, we play a leading role in building a modern industrial system.

As a leading project in the nuclear power industry, Hualong One brings together 58 SOEs such as Dongfang Electric Corporation and Harbin Electric Corporation, 140 private companies, and over 5,000 upstream and downstream enterprises to achieve domestic manufacturing of 411 pieces core equipment and realize the leap from "Made in China" to "Created in China".



### Sanmen Nuclear Power Co.,Ltd. carries out research on zinc acetate conversion by alcoholysis to break the international monopoly

Sanmen Nuclear Power Plant and the Research Institute of Physical and Chemical Engineering of nuclear industry (IPCE) carry out the first research on the centrifugal separation technology of natural zinc isotopes in China and the first research on zinc acetate conversion by alcoholysis in the world. They achieve the self-dependent preparation of nuclear-grade depleted zinc acetate based on test results obtained in the primary-circuit high-temperature and high-pressure simulation and in the reactor of Sanmen Nuclear Power Unit 2. It helps break the monopoly of other countries and reduce costs by about 50%, making China the fourth country in the world to master the technology recognized as "internationally advanced level".

## Industry standard drafting

The Company plays an active role in drafting industry standards to promote a win-win achievement and standardized development of the nuclear power industry.

In 2022

CNNP released  
**83** standards

**54**

standards as the editor-in-chief

**29**

standards as the co-editor



### Jiangsu Nuclear Power Co., Ltd. releases *Work Standards for Operational Heads of Nuclear Power Plants*

In nuclear power plants, operational staff assumes the responsibility of ensuring the safe and stable operation, and the operational head is the manager directly responsible for nuclear safety. Jiangsu Nuclear Power Co., Ltd. has issued the *Work Standards for Operational Heads of Nuclear Power Plants*, which clarifies the training scope and content under the excellence standard system and the five basic abilities and skills of the operational head. The document guides the daily work of operational heads to improve their skills and leadership to ensure the safe operation of nuclear power plants.



The main control room of Jiangsu Nuclear Power Unit 2



### Qinshan Nuclear Power Co., Ltd. releases the third national standard, *Specification of Draw-up Commissioning Program for Pressurized Water Reactor Nuclear Power Plants*

According to the notice from the State Administration for Market Regulation (Standardization Administration), the national standard GB/T 41585-2022 Specification of Draw-up Commissioning Program for Pressurized Water Reactor Nuclear Power Plants with Qinshan Nuclear Power Co., Ltd. as the chief editor was approved and published, made it the third national standard issued by the company. As of 2022, Qinshan Nuclear Power Co., Ltd. had issued 80 standards of various kinds, including two international standards, three national standards, 37 industry standards, 36 group/enterprise standards, and two association standards.

## Expanding International Cooperation

To expand overseas markets, the Company hosts international forums, strengthens international exchanges and cooperation, and elevates the brand's influence to make our nuclear power business go global.



### Deepening global business

Two projects, "Application of EPRI's Single Point Vulnerability Guide to Make Unit Operation Safer and Lower Unplanned Shutdown" and "Application of EPRI's Continuous Online Monitoring Guidebook to Improve Maintenance Strategy" submitted by the Nuclear Power Operation Research Institute, won the 2022 EPRI Technology Transfer Awards.



### Developing the global market

In 2022, Jiangsu Nuclear Power Co., Ltd. signed four foreign technical service projects and carried out more than 100 exchanges and negotiations with overseas customers such as Russian Atomic Energy Supply Chain Company and Russian Atomic Energy Service Company.



### Hosting international forums

On September 17, 2022, CNNP hosted the session "Build a Green Home Together – Nuclear Technology Applications in Energy Science and Technology" of the First China-ASEAN Forum on the Peaceful Uses of Nuclear Technology. The sessions focused on peaceful uses of nuclear technology under the RCEP mechanism, enabled ASEAN countries to better understand China's nuclear technology industry capabilities, and paved the way for future cooperation.



### Fujian Fuqing Nuclear Power Co., Ltd. deepens cooperation and exchanges with the Karachi Nuclear Power Plant

On April 18, 2022, Fujian Fuqing Nuclear Power Co., Ltd. and the Karachi Nuclear Power Plant signed a partnership agreement. Tapping into the brand and technical expertise of Hualong One's first reactor, Fujian Fuqing Nuclear Power Co., Ltd. selected experts to support the overhaul of Karachi Hualong One's first overseas reactor K201 and provided high-quality technical services, which was spoken highly of by Pakistan.



Fujian Fuqing Nuclear Power Co., Ltd. holds a ceremony to send the Hualong One overhaul expert team

# 05

## Working Together to Share a Better Future



In 2022

- **47** million yuan was spent on training, with **33,204,220** hours of training and **16,903** participants in total



# CSR Story

## Starlight Does Not Ask Passersby, and Time Pays Off

Carbon-14, an isotope of the element carbon, is an important tool for diagnosing major diseases. As it is in short supply in the domestic market, China relies heavily on imports. Thus, to independently conduct R&D and production of isotopes, Qinshan Nuclear Power Co., Ltd has started the R&D and production of carbon-14 decisively. It has built an isotope production base dedicated to the R&D of isotope irradiation production technology, formed an R&D team led by the company leaders and consisted of R&D and production personnel.

### Being a pioneer to open up new ways of isotope production though radiation

Our technology of Carbon-14 isotope production through radiation is the first of its kind in China, which means that it is developed and produced from none without any reference experience. The isotope R&D team has been working day and night to overcome technical difficulties and persistently exploring new ways of isotope production through radiation.



Isotope R&D team

### Pursuing perfectness and incorporating craftsmanship into field operation



Isotope underwater operation team

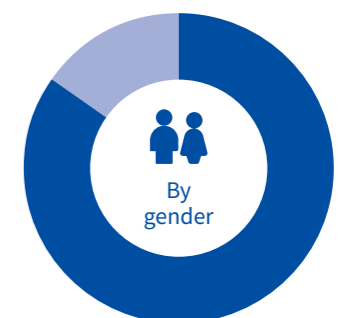
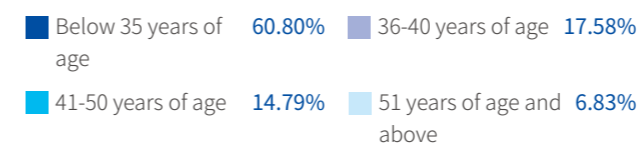
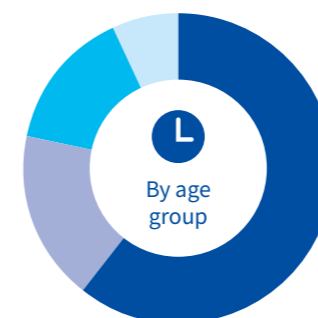
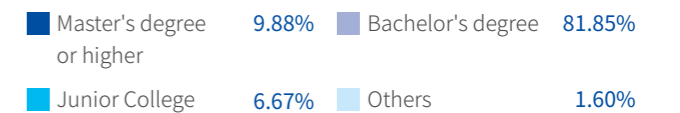
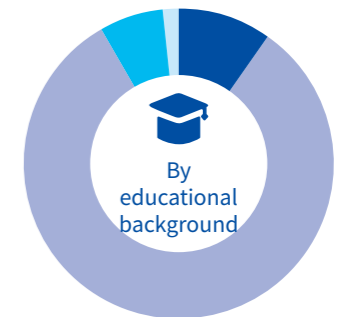
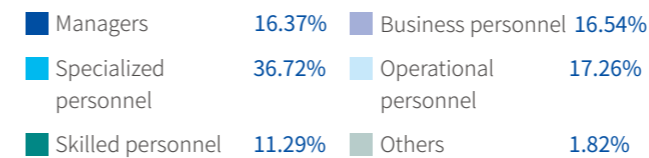
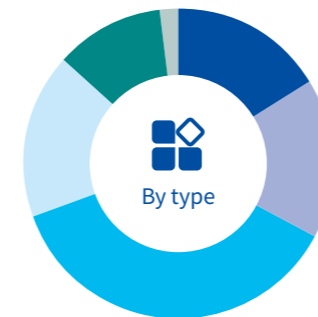
On-site operations, including isotope underwater disintegration, loading and shipping, are carried out by the isotope underwater operation team. The team has proactively innovated isotope production equipment on the technology side and optimized and upgraded the original production equipment, so as to improve equipment operability. It has also independently developed cobalt isotopes center rod underwater cutting machine and supporting facilities within a short period of time, which makes up for a domestic shortage in the technology of underwater cutting of high-level radioactive small objects. Consequently, the team has won 16 provincial and ministerial-level honors, including the Science and Technology Progress Award of CNNC and Outstanding Contribution to Science and Technology Progress Award of China Nuclear Energy Association (CNEA), and has been granted 49 invention patents.

## Protecting Employee Rights

CNNP strictly abides by laws and regulations and sticks to equal employment. We improve our remuneration and benefits systems, build unimpeded communication channels for employees, and consistently improve occupational health and safety care, in an effort to create a favorable working environment for employees.

### Equality and Diversity

CNNP strictly follows the laws and regulations in China, such as the *Company Law* and the *Labor Law*, as well as applicable international labor standards. We uphold equal employment, oppose any form of forced labor, child labor and harassment, and also provide fair and reasonable jobs and competitive opportunities for our employees.



## Compensation and Benefits

Implementing the *Employee Performance Regulations* and *Remuneration Regulations*, the Company has improved our all-encompassing performance appraisal mechanism covering all employees to fully mobilize employees' proactiveness and enthusiasm. We strictly implement national social security policies as we enlist employees for pension, medical, unemployment, work injury and maternity insurances, legitimately as well as pay social insurance premiums in full and on time. In addition, we have improved the welfare security mechanism for employees and established the enterprise annuity and supplementary medical insurance system, which have enhanced their life quality and strengthen their welfare security.



### Business incentives

Based on the *Annual Salary Management Measures for Responsible Person*, we have established a strong link between their operational performance and compensation, evaluating their performance in controlling four aspects of project construction, unit operation and safety production, and non-nuclear clean energy market development.



### Specialized incentives

The revised measures for MKJ appraisal-based incentives cover safe operation, engineering construction, market development, innovation and efficiency improvement, etc. Specialized incentive measures such as the *Regulations on Commendation for Pre-Development of Nuclear Energy Projects* and *Regulations on Incentives for Scientific Research of CNNP* are formulated to offer targeted incentives.




### Equity incentives

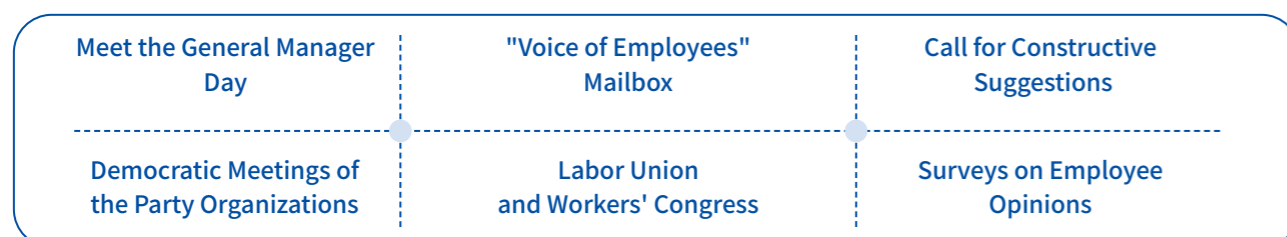
The Company further promotes the equity incentive measures and innovates the medium and long-term incentive exercise mode, becoming the first operational case in Shanghai Stock Exchange. The second option (three in all) granted to the employees in the first phase of equity incentive has been exercised in November 2022, with 466 employees exercising their stock options. We have also completed framework design for the second phase of equity incentive scheme.

## Democratic Management

We unblock the communication channels between the Company and the employees and establish the Labor Union. Through Workers' Congress, democratic meetings, public disclosure of facility affairs, and staff exchange meetings etc, we respond to employees' expectations and demands, encourage them to give full play to their role in democratic management, democratic participation and democratic supervision, and safeguard their rights to information, participation, management, election and supervision in accordance with the law.

In 2022





- CNNP conducted questionnaire surveys on corporate culture and employee opinions for **6** consecutive years, based on such indicators as the sense of happiness, the sense of gain, and the sense of belonging, to solicit employees' views and suggestions.
- In 2022, the proportion of employees that are members of the labor union reached **100%**, **12,309** of employees participated in the survey on corporate culture and employee opinions, with a participation rate of **81.60%**, and **40** effective suggestions for commonality being collected.




Diversified democratic communication channels


## Occupational Health

Valuing the occupational health of employees, we improve our safety management system, intensify the prevention of occupational diseases and devote ourselves to creating a comfortable, healthy and happy working environment for our employees.

Safeguarding occupational health 	Enhancing physical and mental health 	Preventing occupational diseases 
<ul style="list-style-type: none"> <li>• Organizing training for occupational health personnel and managers</li> <li>• Inviting third parties to monitor occupational health hazards</li> <li>• Regularly conducting inspection for operating units and units under construction on occupational disease protection</li> <li>• Organizing daily supervision on occupational health for production contractors</li> </ul>	<ul style="list-style-type: none"> <li>• Providing ongoing Employee Assistance Program (EAP) counseling, on-site counseling and mental health LIVE classes to relieve employees' psychological stress</li> <li>• Organizing occupational health check-ups</li> </ul>	<ul style="list-style-type: none"> <li>• Launching Occupational Disease Prevention and Control Awareness Week activities</li> <li>• Displaying warning signs and on-site test results in the workplace to raise the safety awareness of employees</li> <li>• Providing protective gear to fully protect employees' occupational safety</li> </ul>


Case
Launching Psychological Care Month activities

CNNP launched a series of "525 Love Myself" Psychological Care Month activities from May to June, 2022, including psychological knowledge quizzes, classic psychological games, on-site counseling by psychologists, EAP counseling and lectures by experts. Through rich content and various forms of activities, we have promoted mental health knowledge to our employees, increased their awareness of caring physical and mental health, and enhanced their psychological adjustment ability.

In 2022


The coverage of employee health examinations

# 100%

## Empowering Employee Development

Aiming at "Talent Thriving Enterprise" and upholding systematic thinking, CNNP attaches great importance to talent cultivation. We constantly innovate the environment and institutional mechanism for talent growth and improve the talent cultivation system. By providing comprehensive vocational training and guidance for employees in different positions and at different levels, we support employees to realize their self-worth.

## Unblocking Career Development Path

We adhere to the strategy of giving priority to talents by strengthening the team building of technical and skilled talents at all levels and facilitating their career development path. We also improve the science and innovation platform and strengthen the development of our cadre to promote high-quality corporate development.

In 2022


Newly hired high-caliber talents

# 26

people

Openly selected young cadres

# 96

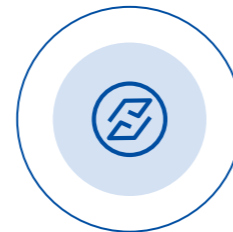
persons



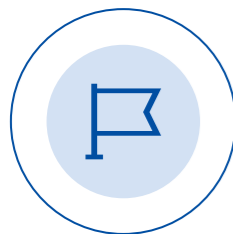
- Selecting the first group of chief experts, sci-tech leaders and chief technicians, as well as the person in charge of "open-competition projects" to provide manpower for the construction in key areas, key projects and major projects
- Building a CNNP six-tier sci-tech talent pool with 266 new members in 2022, selecting academicians, chief experts, technology pioneers, personnel with high potentials of leadership and business operation, and nuclear talents, and improving sci-tech talents list

**Strengthening the sci-tech talent building**

- Organizing all member units to improve the "Top Talent Development Path" and carrying out the "Spark Program" to accelerate the development of outstanding young talents and lay a solid talent foundation for corporate development



**Reinforcing the young talent cultivation**

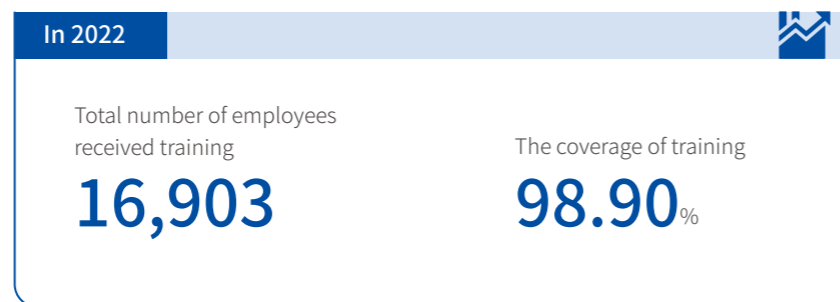


- Optimizing the selection of cadres through internal selection and external exchange, and increasing the exchange of cadres of headquarters to other listed companies
- Establishing and improving the talent pool of directors and supervisors, and implementing dynamic management for it, which gives priority to professionals with political excellence, rich experience in corporate governance and familiarity with accounting, law, finance and other related fields

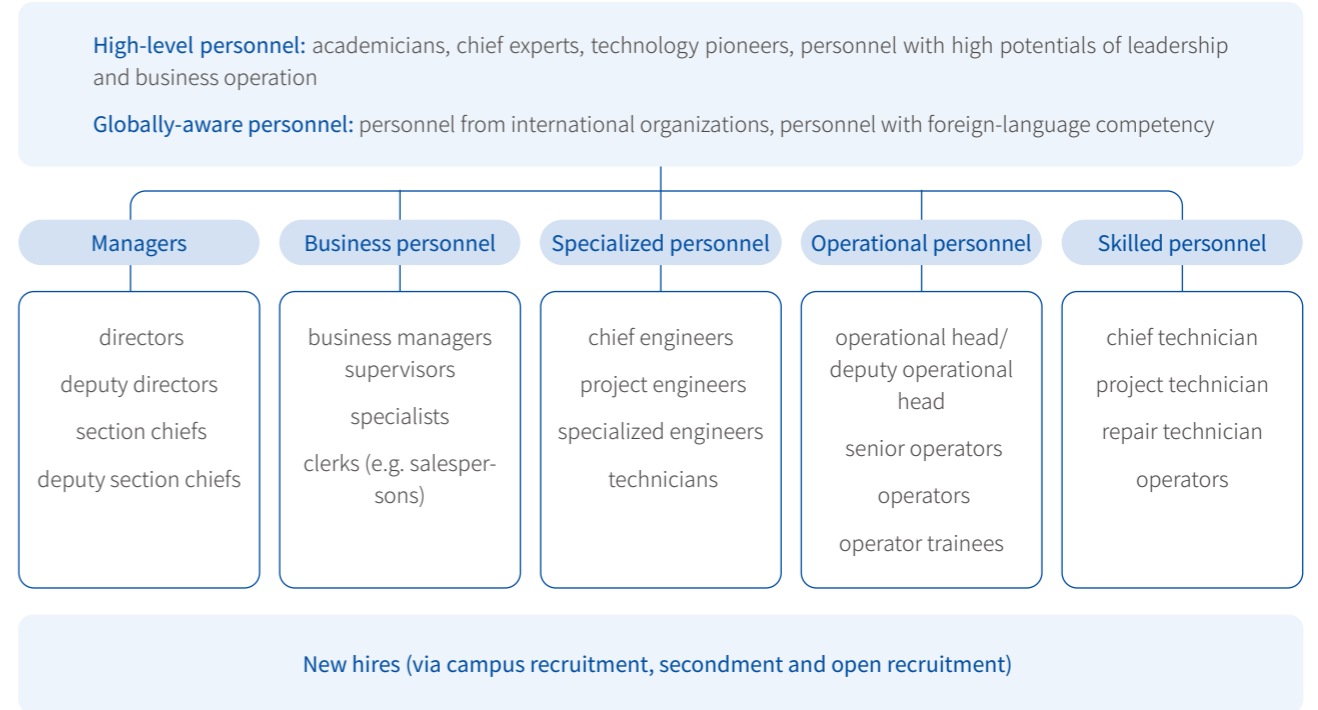
**Optimizing cadre building**

**Improving Training System**

We keep pushing forward the synergistic development of "three teams" (technical talents, skilled workers and management personnel) while building up a team of professional skilled personnel. We organize competitions and training to improve the quality and skills of our employees and build up a developing tiered team of talents. In 2022, one employee of CNNP was awarded China Skills Award and another National Technical Expert, making CNNP talents who have won national awards reach 25.



**The personnel training system**



**Case Sanmen Nuclear Power Co., Ltd. conducts operator retraining**

Sanmen Nuclear Power Co., Ltd. attaches importance to operator training. For personnel who have obtained operator licenses, at least 108 hours of retraining on basic safety, theory and simulator is organized annually to maintain and improve their vocational capabilities. It reinforces the operators' basic theoretical and operational knowledge, updates them on recent or upcoming changes in nuclear power plant design and procedures. Meanwhile, it strengthens the basic skills of operators, improves their performance, and enhances the personal and group capabilities to handle complex operating conditions, thus effectively safeguarding the safe and stable operation of the units.



Sanmen Nuclear Power Co., Ltd. licensed operators receives retraining on simulators

## Strengthening Employee Care

Upholding "people-oriented" concepts, CNNP strives to create a comfortable working and living environment for employees by carrying out regular cultural and sports activities, assisting employees in practical matters and enriching their spiritual and cultural life.

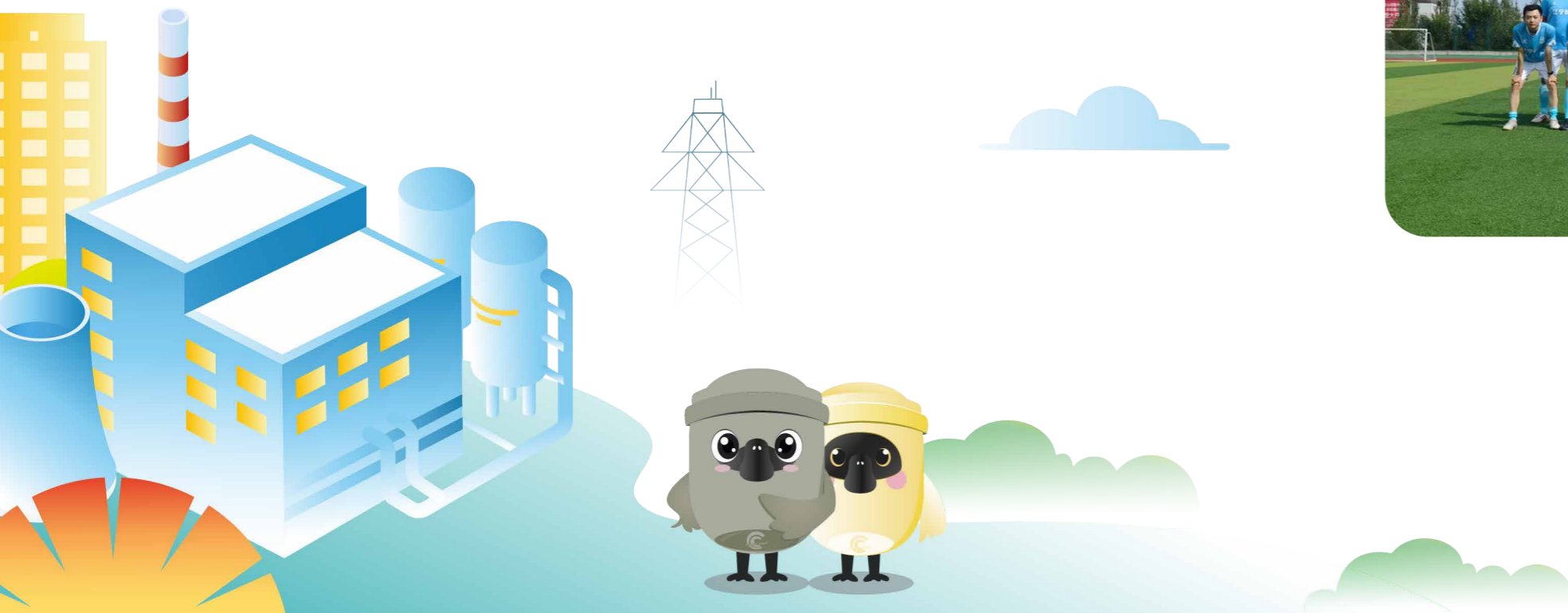
### Caring for Employees

We concern all employees' needs, deliver humanistic care to them, create a warm, stable and harmonious working atmosphere, so as to enhance their sense of belonging to the Company.



## Enriching the Recreational Life of Employees

As we lay emphasis on the work-life balance of our employees, we set up cultural and sports associations, provide venues for activities and carry out various holiday events to create a sincere, united, open and progress-oriented atmosphere as well as to meet the diversified recreational needs of our employees.



# 06

## Growing Together to Enhance People's Well-being



In 2022

- About **11.00** billion yuan paid taxes
- **1,121.89** million yuan spent on rural vitalization poverty alleviation programs
- **18.42** million yuan spent on external donations and public welfare projects

# CSR Story

## With Decade-long Companionship, "Appealing Nuclear Power" Illuminates Your Dreams

With public-driven social responsibility management as its focus, CNNP continuously introduces new communication modes to display the charm of nuclear power to the public. Meeting the needs of nuclear power development and the public, CNNP has joined hands with stakeholders to organize the "Appealing Nuclear Power" activities. Through online live broadcast of experts, nuclear knowledge quiz, nuclear knowledge presentation contest, thematic summer camp and other activities, we have effectively compensated for the vacancy of exposure for middle school students in the field of nuclear science and nuclear power science.

Wu Qianxiang, a Dong girl from the Guizhou mountainous region, has witnessed the development of "Appealing Nuclear Power" while growing from a junior high school girl who didn't know about nuclear until the 2nd session of "Appealing Nuclear Power" to a lecturer standing in the stage for its 10th session. After being admitted to her preferred university, she bravely left her home, the mountainous area she is familiar with, for the unknown, and chose electric power as her major without hesitation. Now, she is an employee of CNNP Xiapu Nuclear Power Co., Ltd. "Appealing Nuclear Power brought me the opportunity to see the world outside mountains, witnessed my growth from a girl of ignorance to passion, and helped me realize my dream," said she, "It is Appealing Nuclear Power that brought nuclear power into my life, inspiring me to work hard and to strive!"

- In 2022, the 10th Appealing Nuclear Power Cup science popularization activity was promoted online with topic #AppealingNuclearPowerBeautifulChina# on the Twitter-like Weibo being read more than **15.191** million times and the number of participants in the summer camp and presentation contest exceeding **1,000**, resulting in its online exposure to exceed **100** million.
- Over the past ten years, the Appealing Nuclear Power activities have covered 34 provinces (municipalities directly under the Central Government, autonomous regions and special administrative regions), and the number of participants in the knowledge quiz has grown from more than **6,000** in the first session to more than **500,000** in the 10th session, with more than **3.6** million participants over the past ten years.



## Transparent Public Communication

Our public communication work is based on the principles of "coordination through headquarters, integration of resources, guidance by projects, emphasis on key points, cooperation between government and enterprises, synergy and interaction". We strictly follow the relevant laws and regulations and policy documents when announcing information related to construction and operation of projects to the public in a timely manner to safeguard their right to information, participation and supervision.

### Providing unimpeded communication channels

To meet the new demands and expectations of the public, CNNP has widened its stakeholders from the government, partners and the public side, and upgraded "3C" (Confidence, Connection, and Coordination) public communication philosophy to the new one of "Co-governance, Co-existence, and Co-prosperity". Through more collaborative governance and more detailed protection, we aim to achieve the harmonious co-existence of human and nature, co-prosperity of economy and environment, and enterprise and society.



<p><b>Science popularization</b></p> <p>Inviting experts to lecture on nuclear science, distributing scientific materials and promoting through the media to enhance the public's knowledge of nuclear power</p>	<p><b>Public participation</b></p> <p>Enabling public participation through questionnaires, public communication seminars, etc., throughout the main stages of site selection, design, construction, commissioning, to operation and decommissioning of nuclear power plants</p>	<p><b>Information disclosure</b></p> <p>Disclosing information on nuclear and radiation safety through social responsibility reports, the Company's official website and other tools to ensure transparent operation of nuclear power plants, information publicity and continuous public monitoring</p>	<p><b>Opinion Management</b></p> <p>Establishing an efficient reporting network and forming a sound early warning mechanism, to properly and timely respond to public opinion on nuclear-related events</p>
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Main points of public communication



**Case** Sanmen Nuclear Power Co., Ltd. Organizes Media Open Day

During the 8th CNNC Nuclear Open Science Week, 18 journalists from Zhejiang Satellite TV, Zhejiang Daily, Zhejiang Education News and other media came to Sanmen Nuclear Power Co., Ltd. to take a close look at clean energy. During the activity, the journalists exchanged ideas with employees there on hot topics such as nuclear power generation, clean energy, integration of enterprises and local communities, and delicacy management.



Media Open Day held by Sanmen Nuclear Power Co., Ltd.

**Exploring interesting ways to popularize nuclear science**

To promote nuclear power science, CNNP builds sci-tech museums, exhibition halls, public halls and other halls, where more open, interesting and interactive science popularization activities are held. This is to make the public understand the development of nuclear power through diverse and interesting forms and enhance their awareness and recognition of nuclear technology. In September 2022, on the occasion of the 10th anniversary of Appealing Nuclear Power, CNNP and the Chinese Nuclear Society jointly launched the *Nuclear Science Popularization Initiative for 2030*. With eight science popularization priorities, it encourages nuclear scientists and practitioners to join us to promote the concept of green nuclear energy development, popularize nuclear science knowledge and nuclear safety culture.

**Joint Initiative on Nuclear Science Popularization 2022 Beijing**

- Targeting audiences of science popularization and highlighting important points and integrating nuclear science into daily education
- Reinforcing bottom-line thinking and enhancing knowledge on nuclear-related emergency and strengthening mechanisms building
- Creating exemplary model for nuclear science popularization and enhancing its brand concept and reputation
- Keeping up with the times and innovating the content and form of nuclear science popularization
- Highlighting integrated communication and encouraging public to create high-quality nuclear science works and exhibitions
- Embracing global vision and promoting international exchange and cooperation in nuclear science field
- Improving incentives and establishing a linked mechanism and a united front for science popularization
- Giving priority to talents and strengthening the team building of leading talents and cadres



Qinshan Nuclear Power Co., Ltd arranged a group of people consisting of media reporters, online influencers transmitting positive energy, representatives of relevant local governments, teachers and students of universities to visit Qinshan Nuclear Power Plant.



Sanmen Nuclear Power Co., Ltd launched a science tour to popularize the nuclear power principles, the history of the nuclear industry and its corporate culture.



CNNP Xiapu Nuclear Power Co., Ltd. invited local government leaders, school teachers and students, villager representatives and other members of the society to visit the Promotion and Display Center of Xiapu Nuclear Power Plant.



Fujian Fuqing Nuclear Power Co., Ltd. held "Meeting Scientists to Have Conversation on Green Future" Nuclear Power Science Forum with Fujian Science and Technology Museum.

**Case** Creating series of derivative science popularization products of Double C cartoon character

On May 31, 2022, celebrating Children's Day on June 1 and World Environment Day on June 5, CNNP released its first animated short film featuring the Double C (Colorful CNNP: cartoon characters bearing unique features of nuclear power plants) cartoon characters - "Nuclear Power the Magic Power". Originally produced by CNNP, it is the first domestic double carbon themed cartoon film. Instead of the conventional textual form, the animated video promotes the nuclear power knowledge in an entertaining and humorous way. At the same time, CNNP has rolled out derivatives of "Double C" cartoon characters such as memes, plush toys and creative products. On Nov 11 (Double Eleven – one of China's biggest online shopping events), the first online store for nuclear power creations in China was launched, bringing the nuclear power images into people's daily life.



Scan code to watch



## Integrated Development of the Company and Local Communities

Giving full play to its technical and resource advantages, CNNP stimulates employment of local communities, creates a pleasant living environment for them, and promotes public services, so as to foster the coordination and co-prosperity of the Company and local communities.



### Stimulating employment of local communities

Promoting the development of the surrounding industries, providing employment opportunities for residents and improving the local employment situation



### Creating a pleasant living environment

Installing solar-powered street lights, enabling level road conditions, setting up garbage containers, renovating public toilets, and improving public infrastructure



### Promoting public services

Building cultural squares, libraries, activity centers, etc., to enhance local public services

### Case Hainan Nuclear Power Co., Ltd. promotes construction of clean energy industrial park

Upholding the strategy of "nuclear-based diversified and synergistic development", Hainan Nuclear Power Co., Ltd. drives the local high-quality development by continuously promoting the construction of Hainan (Changjiang) Clean Energy High-tech Industrial Park. In 2022, 8 projects were signed in the park, more than 30 high-quality projects were reserved, with the output worth of the signed projects being expected to reach 20 billion yuan. Stream supply project of Hainan (Changjiang) Clean Energy High-tech Industrial Park kicked off construction. The lithium carbonate production project with the Company's equity contribution has been proceeded to the implementation. And the first stage of scientific breeding trials of Pearloyster achieved initial results. All of these efforts make a good demonstration for industrial use of the sea resources nationwide.

### Case Qinshan Nuclear Power Co., Ltd and Zhejiang Haiyan jointly build Zero-carbon Future City

In 2022, the *Guidelines for Building a Zero-carbon Future City*, jointly planned by Qinshan Nuclear Power Co., Ltd and Zhejiang Haiyan, was formally approved by the Zhejiang Provincial Development and Reform Commission. It becomes the first official plan in China to build a zero-carbon high-quality development model zone based on the comprehensive utilization of nuclear energy. Considering the energy demand of residents, public buildings and industrial parks in Zero-carbon Future City, the city will supply various types of energy and mediums such as cold energy, heat energy, electricity, hydrogen energy, demineralized water, compressed air and others to build a zero-carbon integrated energy supply system based on nuclear energy that is green and low-carbon, safe and resilient, open and shared, intelligent and efficient, thereby providing a solution for comprehensive energy supply from China for global zero-carbon governance.



Masterplan of Zero-carbon Future City



### Case Sanmen Nuclear Power Co., Ltd. and local communities of Sanhe village jointly construct "zero-carbon model village".

Located near Sanmen Nuclear Power Plant's entrance tunnel, Sanhe village is designated to receive Sanmen Nuclear Power Co., Ltd.'s paired assistance. In 2022, relying on the resource endowment of Sanhe village, the company has turned its unused land into a bustling "Nuclear Power Shared Farm" and established channels to sell agricultural products such as forest chickens and lotus ducks. This has created jobs and generated stable incomes for local residents. As Sanhe village was selected into the second batch of pilot low- (zero-) carbon village in Zhejiang Province, the company seizes the opportunity to build a "zero-carbon model village" with Sanmen County People's Government in 2023 to meet the people's aspiration for a better life.

## Dedicating to Public Welfare

In an effort to give back to the community, CNNP has been proactively involved in public welfare, carrying out projects such as environmental protection, voluntary blood donation and helping the disadvantaged. In 2022, 5,674 people participated in volunteer service activities, with 3,000 hours and 32 volunteer projects completed.



Qinshan Nuclear Power Co., Ltd. conducts volunteer activities such as tree planting.



Caring for people with special needs

CNNP Liaoning Nuclear Power Co., Ltd. visits autistic children in Stars' Dream Family Service Center of Xingcheng City.

Environmental volunteer activities

### Case Qinshan Nuclear Power Co., Ltd and Zhejiang Haiyan jointly build Zero-carbon Future City

In 2022, the *Guidelines for Building a Zero-carbon Future City*, jointly planned by Qinshan Nuclear Power Co., Ltd and Zhejiang Haiyan, was formally approved by the Zhejiang Provincial Development and Reform Commission. It becomes the first official plan in China to build a zero-carbon high-quality development model zone based on the comprehensive utilization of nuclear energy. Considering the energy demand of residents, public buildings and industrial parks in Zero-carbon Future City, the city will supply various types of energy and mediums such as cold energy, heat energy, electricity, hydrogen energy, demineralized water, compressed air and others to build a zero-carbon integrated energy supply system based on nuclear energy that is green and low-carbon, safe and resilient, open and shared, intelligent and efficient, thereby providing a solution for comprehensive energy supply from China for global zero-carbon governance.



Masterplan of Zero-carbon Future City



CNNP Xiapu Nuclear Power Co., Ltd. organizes blood donation activities.

Blood Donation

Sponsorship for students



CNNP Rich Energy Co., Ltd. creates "Rich Energy's Windmill of Love" Party building brand and carries out charity activities to help students.

# Outlook for 2023

CSR Area	CSR Highlights in 2022	CSR Commitment for 2023
<b>Safety and Reliability</b>	<ul style="list-style-type: none"> <li>18 operating units got full marks in WANO composite index, with an average mark of 98.58 for all units involved in WANO composite index evaluation, leading the world in safety performance</li> <li>Over 240 reactor years of safe operation of nuclear power units</li> <li>Released <i>CNNP Ten Principles of Excellence Nuclear Safety Culture (2022 Edition)</i>, summarized and published <i>Nuclear Safety Culture Journey of CNNP</i></li> </ul>	<ul style="list-style-type: none"> <li>Continuously promote work safety and ensure nuclear safety</li> <li>Annual power generation capacity reaches 205 TWh</li> <li>Average of the WANO composite index score is above 98</li> </ul>
<b>Green Environment</b>	<ul style="list-style-type: none"> <li>Vigorously developed nuclear power, wind, PV and other clean energy, built a management system for energy saving and emission reduction, and promoted special projects in "energy saving for green power plants" and "power rise of nuclear power units"</li> <li>Continuously enhanced the power generation capacity of nuclear power plants to better ensure clean energy supply</li> <li>Built the Company's first nuclear heating project</li> </ul>	<ul style="list-style-type: none"> <li>Continue to promote projects such as multi-purpose nuclear energy and non-nuclear clean energy to support the China's 30·60 Decarbonization Goal</li> <li>Strictly control effluent discharge to enhance the Company's ability to protect the ecological environment</li> <li>Insist on low-carbon development and make CNNP's efforts in building a resource-saving and environment-friendly society</li> </ul>
<b>Innovation-driven Development</b>	<ul style="list-style-type: none"> <li>Successfully completed the three-year action plan for the reform of SOEs</li> <li>Steadily promoted centralized reform and created a model of centralized management</li> <li>Kept following the principle of "Four aggregations", clarified the core needs of science and technology innovation for the development of China's nuclear power industry, and completed R&amp;D investment of about 1.914 billion yuan throughout the year</li> </ul>	<ul style="list-style-type: none"> <li>Continuously deepen management innovation and systematically advance intensive reform</li> <li>Constantly optimize the mechanism of talent for scientific and technological innovation to build a high-quality innovative talent pool</li> <li>Promote CNNP's digital transformation and improve the Company's core competitiveness</li> </ul>
<b>Collaboration</b>	<ul style="list-style-type: none"> <li>Standardized procurement management and built a supply chain ecosystem</li> <li>Promoted the coordinated linkage of upstream and downstream industries to enhance the resilience and competitiveness of the industrial chain and supply chain</li> <li>Expanded international cooperation and integrated advantageous resources</li> </ul>	<ul style="list-style-type: none"> <li>Continue to deepen strategic cooperation and strengthen responsible supply chain</li> <li>Strengthen supply chains by improving the foundation, supplementing with technology, and advancing integration and optimization to be a modern supply chain leader</li> <li>Actively explore overseas markets, adhere to cooperation with overseas counterparts, and enhance the competitiveness of enterprises</li> </ul>
<b>Unity and Cooperation</b>	<ul style="list-style-type: none"> <li>Carefully selected the first chief experts, sci-tech leaders and chief technicians of CNNP and announced that one employee won the China Skills Award and another won the National Technical Expert</li> <li>Demonstrated outstanding synergy in supporting staff deployment of key positions in major project. Explored new medium and long-term incentive exercise mode, taken as the first operational case of Shanghai Stock Exchange</li> </ul>	<ul style="list-style-type: none"> <li>Advance the physical operation of the training centers to improve the utilization rate of training resources and the output rate of talent training</li> <li>Select high-level technical talents for CNNP and continuously promote the construction of technical talent pool of China nuclear power</li> </ul>
<b>Common Growth</b>	<ul style="list-style-type: none"> <li>Held the "Appealing Nuclear Power" science popularization activity for ten consecutive years</li> <li>Gave full play to its industrial advantages and vigorously promoted the integration of enterprise and local development</li> <li>Appointed 13 temporary cadres to make CNNP's contribution to rural vitalization and fulfill the social responsibility as a central SOE</li> <li>Built the brand featuring biodiversity and harmony with CNNP's characteristics</li> </ul>	<ul style="list-style-type: none"> <li>Continue to hold the "Appealing Nuclear Power" science popularization activity and the "Beauty of Nuclear Harmony" cultural activity</li> <li>Pursue common prosperity of CNNP and all subsidiaries and contribute to rural vitalization with industrial development, talent training, cultural advancement, ecological conservation, organization guarantee and so on</li> <li>Help the elderly, children and other groups in need and make our commitment to public welfare activities</li> </ul>

# CSR Honors and Awards

Awardees	Honor/Award	Awarded by
CNNP	A-level in Evaluation of Information Disclosure by Shanghai Stock Exchange (the highest level)	Shanghai Stock Exchange
	GoldenBee Excellent CSR Report – Evergreen Award	China Sustainability Tribune under the Ministry of Commerce
	Special Contribution Award to Corporate Governance	Directors & Boards
	The Most Leading CEO	Directors & Boards
	Wind's 2021 Top 5 in the Public Utilities Industry in China's Listed Companies Market Value Ranking	Wind Information Co., Ltd.
	2022 Top Graduate Employers	yingjiesheng.com
Qinshan Nuclear Power Co., Ltd.	The first prize of the Central SOEs QC Group Achievement Publication Competition	China Association for Quality
	Annual Case Award of "The 17th People's CSR Award"	People's Daily people.cn
Sanmen Nuclear Power Co., Ltd.	China Standards Innovation and Contribution Award	State Administration for Market Regulation
	People's Craft Award-Technology	people.cn
Fujian Fuqing Nuclear Power Co., Ltd.	Model Enterprise for Harmonious Labor Relations in China	Ministry of Human Resources and Social Security of the People's Republic of China, All-China Federation of Trade Unions, China Enterprise Confederation/China Enterprise Directors Association, All-China Federation of Industry and Commerce
	National Popular Science Education Base	China Association for Science and Technology
Jiangsu Nuclear Power Co., Ltd.	China Grand Awards for Industry (Nomination Award)	China Federation of Industrial Economics
	2022 National Quality Benchmarking Enterprise	China Association for Quality
CNNP Liaoning Nuclear Power Co., Ltd.	The first batch of "Jiangsu Green Development Leading Enterprises"	Department of Ecology and Environment of Jiangsu Province, Jiangsu Federation of Industry and Commerce
	National Excellent Quality Management Team Award	China Association for Quality, All-China Federation of Trade Unions, All-China Women's Federation, China Association for Science and Technology
	2022 National Quality Benchmarking Enterprise	China Association for Quality
CNNP Xiapu Nuclear Power Co., Ltd.	China Quality Installation Engineering (China Installation Star)	China Installation Association
	Advanced Unit of "Urban-rural Integration Development" for Rural Vitalization	Xiapu Government
China Nuclear Power Operation Technology Corporation Ltd., Wuhan	May 1st Labor Award	Fujian Provincial Trade Union
	Excellent Science Reform Demonstration Enterprise	State-Owned Assets Supervision and Administration Commission of the State Council
	2021 Hubei Top 100 High-tech Enterprises	Department of Science and Technology of Hubei Province & Hubei Academy of Scientific and Technical Information

# Appendices

## Terminology

<b>Nuclear energy</b>	Nuclear energy (or atomic energy) is the energy released from the atomic nucleus through mass conversion, in line with Albert Einstein's equation $E=mc^2$ , wherein, e = energy, m = mass, and c = constant of light velocity.
<b>Nuclear power</b>	Nuclear power is a way of electricity generation by using the thermal energy released by nuclear fission in nuclear reactors.
<b>Pressurized water reactor</b>	A nuclear reactor in which water is not boiling, with pressurized light water (ordinary water) as coolant and moderator without boiling.
<b>Heavy water reactor</b>	A nuclear reactor that uses tritium as moderator and can be directly fueled by natural uranium. It may use water or tritium water as the coolant, and includes two types: the pressure vessel type and the pressurepipe type.
<b>Reactor year</b>	One reactor year equals to one year of operation for one reactor in nuclear power plant.
<b>WANO</b>	The World Association of Nuclear Operators, which was founded in 1989 in Moscow.
<b>WANO performance indicators</b>	Indicators WANO develops and uses to evaluate member power nuclear power plants. The ranking results can be used to compare surveyed power plants.
<b>Capacity factor</b>	It is the ratio between the power capacity actually generated by a unit within a certain period and the power capacity calculated by nameplate capacity, and it reflects the safety operation and management level of a unit.
<b>IAEA</b>	The International Atomic Energy Agency. It was founded in 1957 and is headquartered in Vienna, Austria. IAEA keeps a close relationship with the United Nations, and serves as a platform for research and technological cooperation of all countries in the field of atomic energy.
<b>INPO</b>	The Institute of Nuclear Power Operations which was founded in 1979 after the Three Mile Island accident to promote the information exchange and experience sharing between nuclear power plants, periodically assess nuclear power plants, establish performance goals and help train personnel for nuclear power plants.

<b>Equivalent dose</b>	A product of multiplying radiation weighting factor by the average dose absorbed by tissues or organs, with the unit of sievert (Sv).
<b>Millisievert</b>	An international unit used to measure the effective dose of radiation and reflecting the degree of personal injury due to exposure to ionizing radiation.
<b>Absorbed dose</b>	Volume of radiation energy absorbed by unit mass of tissue or organ.
<b>Gy</b>	International unit of absorbed dose, 1Gy=1J/Kg, meaning the energy generated by radiation to tissues or organs of a kilogram is one joule.
<b>Effective dose</b>	Effective dose equivalent is the sum of product of the appropriate tissue weight factor and the average dose equivalent acceptable to all organs and tissues of the human body under the condition of stochastic effect as the radiation effect of human tissue or organ, and of inhomogeneous exposure of the whole body.
<b>Environmental background</b>	Environmental factors in unpolluted natural environment, which includes original basic chemical composition and energy distribution of environmental factors such as atmosphere, water, soil and biology during their natural formation and development before the disturbance from human activities.
<b>Bq</b>	Standing for "Becquerel" in French. It is an SI derived unit of radioactivity, used to measure radioactive materials or radioactive sources. GBq is equivalent to $10^9$ Bq; TBq is equivalent to $10^{12}$ Bq.
<b>Peaking carbon dioxide emissions</b>	The annual carbon dioxide emissions of a certain region or industry will steadily drop after reaching the highest-ever level.
<b>Carbon neutrality</b>	Net-zero carbon emissions, which refers to the realization of zero emission of carbon dioxide by offsetting carbon dioxide emissions by means of afforestation, energy conservation and emission reduction.
<b>The "dual carbon" goals</b>	On September 22, 2020, at the General Debate of the 75th Session of the United Nations General Assembly, Chinese President Xi Jinping announced that China will scale up its Intended Nationally Determined Contributions by adopting more vigorous policies and measures, and aim to have CO <sub>2</sub> emissions peak before 2030 and achieve carbon neutrality before 2060.
<b>Carbon sink</b>	The process, activity or mechanism of using photosynthesis to absorb carbon dioxide in the atmosphere and fix it in vegetation and soil through measures such as afforestation, forest management, and vegetation restoration, thereby reducing the concentration of greenhouse gases in the atmosphere.

## GRI Index

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## Expert Opinion

I have read through the 2022 CNNP Corporate Social Responsibility Report very carefully. Its 11th CSR report shows that CNNP, as a nuclear power generation enterprise, has made great achievement in ensuring safety and reliability, contributing to green environment, promoting innovation-driven development, championing unity and cooperation, pursuing common growth. The Company has seriously fulfilled the commitments and adapted concepts in social responsibility, yielding good results through management measures and practices, and demonstrating the responsibility of "building a world-class clean energy provider". Compared with the reports of previous years, the 2022 Report reflects several distinctive features.

Firstly, the Report proactively integrates into the new development paradigm. Against many risks and challenges such as the repeated outbreaks of the pandemic and the complex and severe domestic and international situation, CNNP has taken the initiative to integrate into the new development pattern in 2022, with common prosperity as the value goal of corporate social responsibility. It also has made efforts in stabilizing growth, increasing employment, contributing tax revenue, entrepreneurship and innovation, rural vitalization, ecological conservation, public welfare, etc., playing an increasingly significant role in the sustainable development of China's economy and society.

Secondly, the Report develops new ideas and new thinking. In the feature "Boosting Common Prosperity for All Chinese People and Contributing CNNP's Efforts to Rural Vitalization", the Company responds to China's call for rural vitalization, and shows its resolution and action to build a modern socialist country in an all-round way.

Thirdly, the Report explains CNNP's CSR actions in detail. The Report discloses detailed data on the CSR indicators and shows the CSR performance and commitment of the Company in a comprehensive manner. The Report has been prepared in accordance with the GRI Standards issued by the Global Sustainability Standards Board (GSSB), the Guidelines on Environmental Information Disclosure by Listed Companies issued by the Shanghai Stock Exchange and other guidelines. With the efforts to promote the UN SDGs, CNNP has shown readers its CSR practice and highlights. The Report not only reflects CNNP's international perspective and global awareness, but also allows readers to read and understand easily and accurately.

Fourth, the Report enhances corporate abilities on social responsibility fulfillment. CNNP has integrated sustainable development into all actions in 2022 and striven to further improve its standardization, organization structure, professionalism and branding, making increasingly significant contributions to the society. The Company boasts advantages in healthy development, employee responsibility, ecological environment and fair operation. As the enterprise develops and grows, the CSR targets have gradually expanded to more related parties such as consumers, employees, government, suppliers and communities. With the original goal of maximizing the company's own profits, CNNP has now expanded to pay more attention to the public interest and welfare of society.

Fifth, the Reports highlights the safety with focuses. Nuclear safety is the lifeline of nuclear energy development. CNNP has been putting safety and quality first, promoting the construction of nuclear safety culture. In 2022, the Company improved safety management and emergency preparedness to ensure workplace safety and effectively reduce nuclear energy risks. CNNP's practice on nuclear safety culture development has been selected as the best practice of corporate safety culture by the Ministry of Emergency Management.

In conclusion, the 2022 CNNP Corporate Social Responsibility Report is a high-quality CSR report since the Report systematically and comprehensively presents the Company's CSR philosophy, highlights and achievement.

-- Zhu Hongren  
Party Secretary, Vice Chairman and Secretary-General of China Enterprise Confederation  
and China Enterprise Directors Association

## Related Reports and Publications



CNNP System Of Culture Excellence



CNNP Employee Code of Conduct



CNNP Training Material on Culture Excellence



Redefining Safety



CNNP's Biodiversity Conservation Practice



Why Nuclear Power



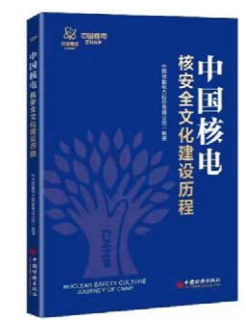
Stories of Nuclear Power



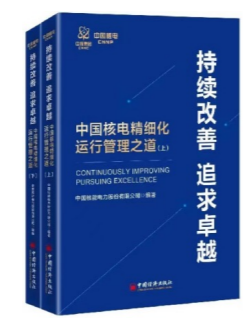
CNNP Visual Identification Standard Handbook



CNNP White Paper on Public Communication



Nuclear Safety Culture Journey of CNNP



Continuously Improving, Pursuing Excellence



CNNP Ten Principles of Excellence Nuclear Safety Culture (2022 Edition)



Nuclear Power Boom: Safety



Nuclear Power Boom: Coordination



Nuclear Power Boom: Responsibility



Nuclear Power Boom: Innovation

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## Feedback from Readers

Dear readers,

Thank you for reading our report!

This is our 11th CSR report. We look forward to your opinions and suggestions to help us improve our CSR reporting in the future.

Please scan the QR code on the right and fill out the questionnaire online to provide feedback on our report. Thank you!



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