



中国核能电力股份有限公司

China National Nuclear Power Co., Ltd.



2021

Corporate Social Responsibility Report

China National Nuclear Power Co., Ltd.

Message from the Chairman



Lu Tiezong Chairman and Party Secretary, CNNP

The year 2021 was of milestone significance. It witnessed the centenary of the Communist Party of China (CPC) and was the period in which the time frames of the two centenary goals converged. Adhering to the Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era and keeping in mind both the domestic and international situations, CNNP carried forward the spirit embodied by the "Two Bombs, One Satellite" project and the cause-oriented, responsibility-oriented, strictness/carefulness-integrated, and striving-based spirit of the nuclear industry. We grounded our work in this new stage of development, applied the new development philosophy, constructed the new development paradigm, and fully implemented relevant national policies. Under the premise of ensuring nuclear safety, we actively and orderly developed nuclear power, fulfilling our mission of "developing the nuclear industry to strengthen the country and serve the society," and ushering in the new journey toward high-quality development during the 14th Five-Year Plan period.

In 2021, we worked hard to safeguard workplace safety and develop high-quality projects. Always attaching top priority to quality and safety, the Company carried out the three-year action plan to enhance workplace safety with "comprehensive improvement of safety and operational reliability management" as the main task, and implemented the delicacy project management model of "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). Through these efforts, we ensured safe operations of nuclear power units and the high quality of ongoing construction projects and realized new highs in performance indicators regarding safe operations of nuclear power units. In 2021, the first nuclear power plant in the Chinese mainland, Qinshan Nuclear Power Plant, celebrated its 30th year of safe power generation and was approved for continued operation. By then, the plant had achieved 200 reactor years of safe operation in total and 19 of its power units got full marks in the WANO composite index, ranking first in the world.

In 2021, we persisted in green development and environmental protection. Respecting nature, we enhanced our environmental governance system, strengthened environmental risk identification and management, and monitored the surroundings of nuclear power plants to ensure ecological security. Besides, to facilitate the realization of the carbon peaking and carbon neutrality ("dual

carbon") goals, we made continuous efforts to improve the energy efficiency and resource utilization rate, strictly controlled the emission and discharge of waste, and accelerated the development of renewable energy. In 2021, CNNP generated 182.637 TWh of electricity in total, equivalent to saving 55.2477 million TCEs, and reducing CO₂, SO₂ and NO_x emissions by 144.749 million tons, 469,600 tons and 408,800 tons respectively, equivalent to planting 499,000 hectares of trees.

In 2021, we emphasized the role of innovation in driving high-quality development. The three-year action plan for reform was in full swing. We moved faster to advance R&D and commercialize core technological achievements, and benchmarked corporate management against the world-class level. With big data and information technologies, we empowered the safety management of nuclear power plants, enabled systematic and intelligent management of engineering construction, and strengthened our core competitiveness. In 2021, the Company was selected as a pilot enterprise for developing management benchmarks for key state-owned enterprises by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC). Our R&D investment accounted for 2.60% of revenue and we were thereby awarded the honorary title of Zhongguancun High-tech Enterprise.

In 2021, we deepened cooperation with partners and created shared value. We strengthened cooperation with partners and orderly advanced the development of three segments of nuclear energy and multi-use of nuclear energy, non-nuclear clean energy, and the agile new industry, further extending the value chain. We worked with suppliers to build long-term and stable strategic partnerships and a responsible supply chain. Through deepened exchanges and cooperation with domestic and foreign partners, we facilitated China's nuclear power products and services to go global and joined hands with all stakeholders to create value for all.

In 2021, we put the people first and boosted the well-being of employees. Aiming to "build a world-class talent team" and establish multi-level and cross-sequence career development pathways, we moved faster to select and train young cadres, high-caliber professionals and technical staff, as well as highly skilled personnel. Protecting employee rights was our top priority. We insisted on equal employment, improved the way of income distribution, and strengthened democratic communication. We cared about employees' physical and mental health and offered assistance and benefits, striving to create a positive, excellent, healthy and safe workplace and career development platform for

employees. In 2021, we organized 1,601,730 hours of employee training in total and launched the "Serving the People" campaign, through which we formulated and implemented 1,078 measures that benefited the staff.

In 2021, we engaged in community development and offered services that contributed to a better life for local residents. In the pursuit of development for all, we brought nuclear power closer to the public and showed them the beauty of nuclear power through innovative and diversified communication approaches. We held the "Appealing Light" Cup nuclear power knowledge contest for the ninth consecutive year, which was benchmarked against national science popularization contests for the first time and won wide recognition from the public. By giving play to our expertise and resources, we boosted local development in terms of industries, human capital, culture, ecology and organizations, consolidated and expanded the achievements made in poverty alleviation, and gave back to the local community with concrete actions. In 2021, CNNP invested 600 million yuan in targeted poverty alleviation and paid 7.913 billion yuan in taxes.

Only through hard work can we overcome difficulties and make our dreams come true. In 2022, we will continue to follow Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, and deepen our understanding of "seeking happiness for the Chinese people and rejuvenation for the Chinese nation as our original aspiration and mission." We will enhance our awareness of the need to maintain political integrity, think in big-picture terms, follow the leadership core, and keep in alignment, remain confident in the path, theory, system, and culture of socialism with Chinese characteristics, and firmly uphold General Secretary Xi Jinping's core position on the Party Central Committee and in the Party as a whole and the Party Central Committee's authority and its centralized, unified leadership. We will unswervingly carry forward the spirit embodied by the "Two Bombs, One Satellite" project and the cause-oriented, responsibility-oriented, strictness/carefulness-integrated, and striving-based spirit of the nuclear industry, and persist in the corporate mission in the new era of "developing the nuclear industry to strengthen the country and serve the society." We will always hold discipline in awe and respect, do not cross the red line, earnestly fulfill our responsibilities, build our capabilities in the five aspects, and make constant efforts to build a high-quality listed company. We will contribute to the construction of a beautiful China and improve the ecological environment with safe, efficient, clean and low-carbon energy, and take practical actions to set the stage for the upcoming 20th CPC National Congress.

About Us

Company Profile

China National Nuclear Power Co., Ltd. (SSE: 601985, "CNNP" for short) is jointly invested by its controlling shareholder China National Nuclear Corporation (CNNC), China Three Gorges Corporation (CTG), China Ocean Shipping (Group) Company (COSCO), and China Aerospace Investment Holdings Ltd. Its business scope covers development, investment, construction, operation and management of nuclear power projects and supporting facilities; investment and development of clean energy projects; investment and investment management of power transmission and distribution projects; R&D of technologies for safe nuclear power operation, related technical and consulting services; and electric power sales.

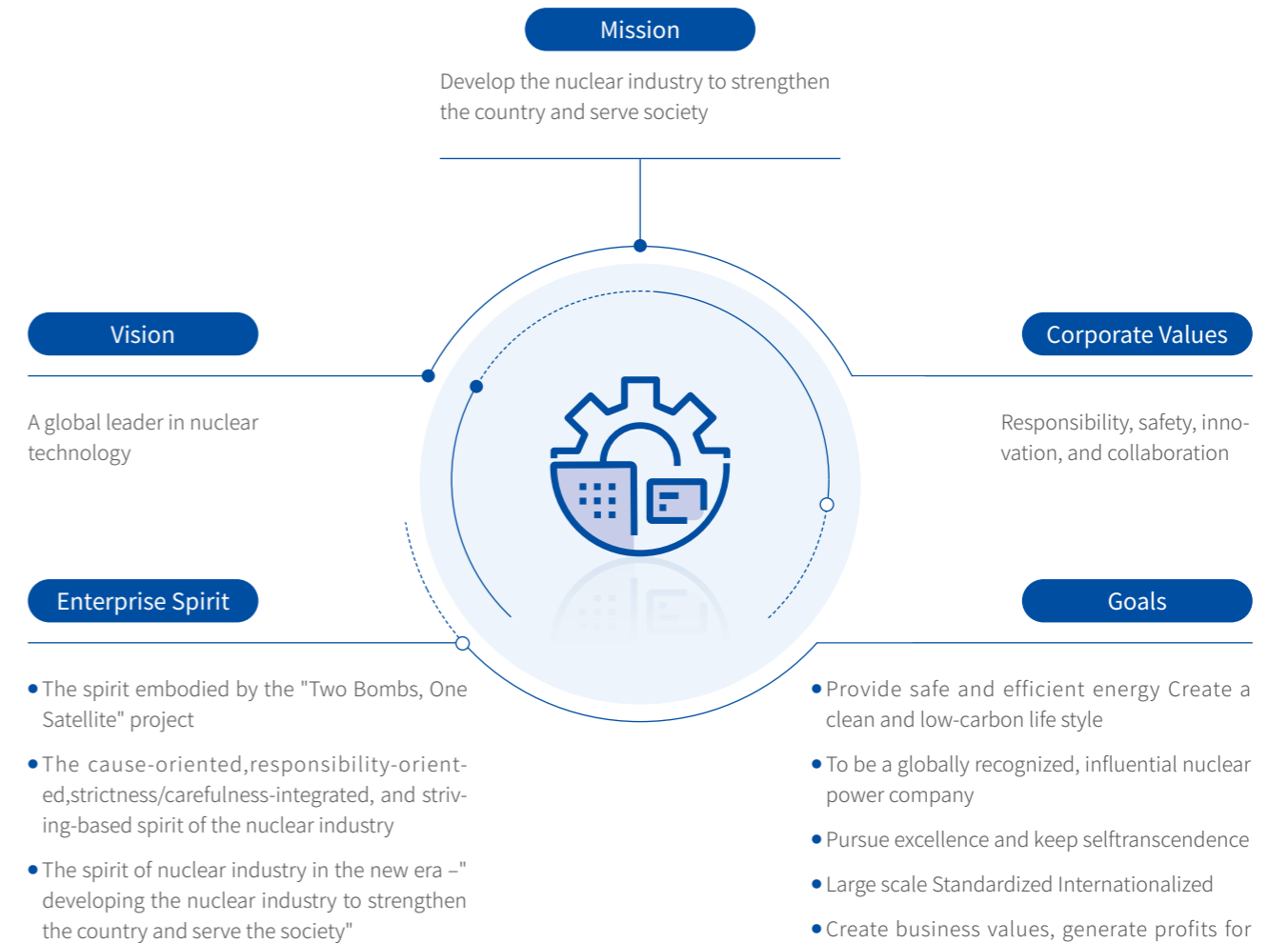
As of March 31, 2022, CNNP had controlled 26 companies, run one joint venture and had equity in 11 companies. Its total assets reached over 400 billion yuan. We had controlled 25 nuclear power units in operation, with an installed capacity of 23.71 GW, and 6 units under construction, with an installed capacity of 6.353 GW.

1	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"
2	Qinshan Nuclear Power Plant No. 2	Type of reactor: PWR CNP600 Rated power: 1X670MWe 1X650MWe 2X660MWe	First large commercial nuclear power plant independently designed, built, operated and managed by a Chinese company
3	Qinshan Nuclear Power Plant No. 3	Type of reactor: HWR CANDU700 Rated power: 2X728MWe	China's only commercial HWR nuclear power plant
4	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
5	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 (2011-2015)
6	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 development by a Chinese company), hailed as a project of "vital importance to the country"
7	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
8	Sanmen Nuclear Power Plant	Type of reactor: PWR AP1000 Rated power: 2X1250MWe	AP1000, the world's first third-generation reactor
9	Zhangzhou Nuclear Power Plant Unit 1 and Units 2	Type of reactor: HPR1000 Rated power: 2X1212MWe	The bulk production of the "national business card" Hualong One reactor goes well to create a "Clean Energy Park"
10	Tianwan Nuclear Power Plant Unit 7 and Units 8	Type of reactor: PWR VVER1200 Rated power: 2X1265 MWe	The heads of state of China and Russia witnessed the commencement of the project
11	Xudabao Nuclear Power Plant Unit 3, Liaoning	Type of reactor: PWR VVER1000 Rated power: 1X1274 MWe	The heads of state of China and Russia witnessed the commencement of the project
12	Small modular reactor, Hainan Nuclear Power Plant	Type of reactor: Small Reactor "Linglong One" Rated power: 1X125 MWe	Changjiang multipurpose small reactor modular technology demonstration project, modular

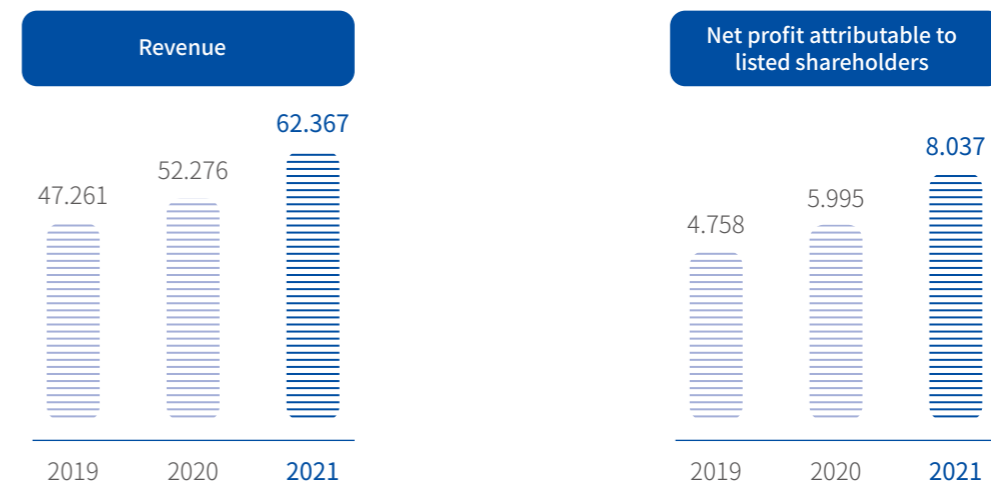
Statistics up to March, 2022

● Units in operation ● Units under construction

Company Culture



Revenue and Profit (Unit: billion yuan)



Strategy and Governance

Development Strategy

Upholding the mission of developing the nuclear industry, strengthening the country and bringing welfare to humanity, we have formulated clear strategic positioning and medium- and long-term goals toward becoming a world-class clean energy service provider with global competitiveness. In 2021, the Company officially issued the Comprehensive Development Plan for the 14th Five-Year Plan Period, in addition to 13 purpose-specific plans. We have aligned the development goals of our business segments for the 14th Five-Year Plan period to the overall high-quality development of China's nuclear energy sector, and made every effort to realize our long-term goals at an earlier date.

Strategic Positioning

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 production of clean and low-carbon energy, and is tasked with building a country with strong nuclear power and providing high-quality energy supply.



Strategic Goal

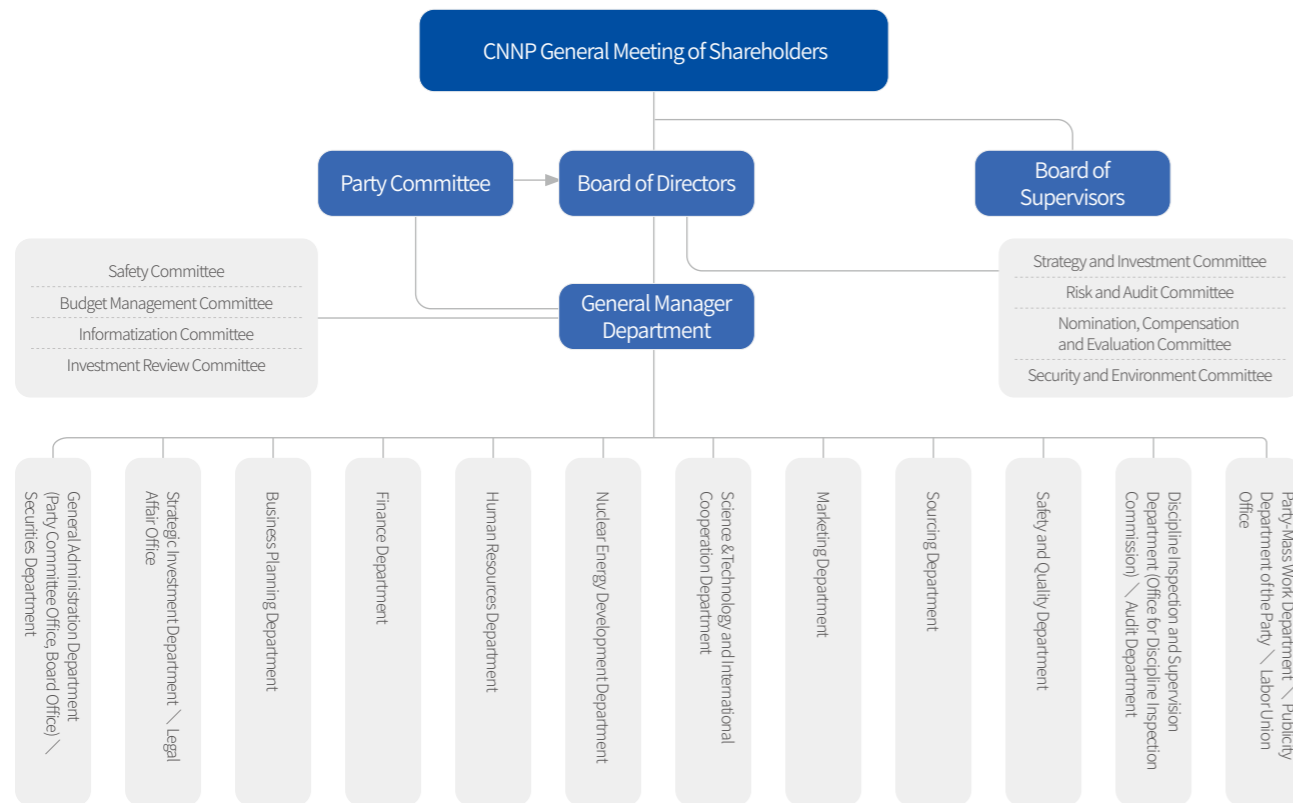
Strategic goal through the year 2050: To become a world-class competitive clean energy provider

Goals 2021-2025	Long-range goals through 2035
<ul style="list-style-type: none"> • 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 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. 	<ul style="list-style-type: none"> • 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 companies in the world. • 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 made 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 Guidelines

		
Scale-up	Standardization	Internationalization
<p>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.</p>	<p>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.</p>	<p>Expanding global presence, fostering global business operations, improving international management capability and gaining a greater say to build a world-class nuclear energy company.</p>

Governance Structure



26 holding subsidiaries	Qinshan Nuclear Power Co., Ltd.	72%	Hunan Taohuajiang Nuclear Power Co., Ltd.	51.16%	CNNP Liaoning Nuclear Power Co., Ltd.	54%
	Nuclear Power Qinshan Joint Venture Co., Ltd.	50%	CNNP Guodian Zhangzhou Energy Co., Ltd.	51%	CNNP Ocean Nuclear Power Development Co., Ltd.	51%
	Third Qinshan Nuclear Power Co., Ltd.	51%	CNNP Xiapu Nuclear Power Co., Ltd.	55%	CNNP Shandong Nuclear Power Co., Ltd.	51%
	CNNP Nuclear Power Operation Management Co., Ltd.	100%	CNNP Huadian Hebei Nuclear Power Co., Ltd.	51%	CNNP Suneng Nuclear Power Co., Ltd.	51%
	Jiangsu Nuclear Power Co., Ltd.	50%	Fujian Sanming Nuclear Power Co., Ltd.	51%	CNNP Hainan Nuclear Power Co., Ltd.	100%
	Sanmen Nuclear Power Co., Ltd.	56%	CNNP Henan Nuclear Power Co., Ltd.	51%	Nuclear Power Operations Research (Shanghai) Co., Ltd.	12.5%
	Fujian Fuqing Nuclear Power Co., Ltd.	51%	CNNP UK Ltd.	100%	CNNP Rich Energy Co., Ltd.	100%
	Hainan Nuclear Power Co., Ltd.	51%	CNNP Technology Investment Co., Ltd.	100%	CNNP Yanlong Technology Co., Ltd.	51%
	CNNP (Shanghai) Nuclear Power HWR Technology R&D Co., Ltd.	100%	CNNP Taihai Clean Energy (Shandong) Co., Ltd.	50%		
11 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.	5%	China National Uranium Co., Ltd.	4.2786%		
1 joint venture	CNNP Zheneng Energy Co., Ltd.	50%				

Governance Mechanism

CNNP continues to improve institutional arrangements and strives to build a modern corporate governance system to enhance corporate governance capabilities and promote the Company's sustainable development. In 2021, CNNP was included by the SASAC in the List of Model Enterprises in Improving Corporate Management among Key State-Owned Enterprises and the List of Demonstration State-Owned Enterprises in Corporate Governance, and its Board of Directors won the Golden Round Table Award for Special Contribution to Board Governance.

The Decision-making System Composed of "the Articles of Association, Three Regulations and Four Rules"

Benchmarked against world-class peers, we moved faster to build a modern corporate governance system with Chinese characteristics. We optimized the structure of the Board of Directors, and promoted the decision-making system composed of "the Articles of Association, Three Regulations and Four Rules" across the board. We implemented democratic centralism following the collective decision-making system for decisions on major matters, appointment and removal of key-post holders, major project arrangement and the use of large amount of funds. Fourteen company policies were revised and updated based on the responsibilities of decision makers such as the Party Committee and the Board of Directors, the Company's reform and development direction, the reality of corporate operations and management. We also improved the list of decision-making matters, and clarified the rights and responsibilities of each decision-making body, to lay a solid foundation for each decision-making body to perform their duties scientifically and improve corporate governance.

Integrated Supervision System

In 2021, the Company pressed ahead with the integrated supervision system across the board, and subjected corporate governance to the Party's leadership and supervision. We also gave full play to the role of supervision in ensuring execution and promoting improvement and development, thereby providing a strong political guarantee for the CNNP's high-quality development.

Integrated supervision system

- We sorted out policies on discipline inspection, supervision and auditing to form 28 regulatory documents while putting special focus on the revision of the Integrated Supervision Guidebook and the compilation of regulations on strengthening political supervision.
- We developed an annual plan for integrated supervision and assigned 52 supervision tasks in key areas, among which 47 had been completed.

Collaborated supervision

- We convened meetings of the inter-department working group for integrated supervision, prepared quarterly briefings on the progress, and created an information sharing and communication platform.
- We maintained the integrated-supervision talent pools on a regular basis. The level-1 talent pool of CNNP has 99 members and level-2 talent pools of subsidiaries have 487 members in total.

IT-empowered integrated supervision

- We initiated the construction of an integrated supervision platform based on audit informatization. It lays a solid foundation for full integration of businesses, auditing and discipline and the establishment of a first-class integrated-supervision information sharing center for central SOEs.

Enterprise Risk Management

Based on a well-developed risk management organizational structure, the Company shoulders primary responsibility, improves the system of enterprise risk management (ERM), and ensures that all major risks are controllable and contained. In 2021, we took the initiative to participate in the preparation or amendment of four national standards on risk management such as *Risk Management - Legal Risk Management Guidelines and Risk Management - Risk Assessment Techniques*, building up the Company's image as an industry benchmark.

Improving the risk management system

- In 2021, the headquarters formulated a series of risk management procedures such as *Enterprise Risk Management and Risk Assessment and Procedural Compliance Review of Major Projects (Matters)*. Upon completion, they were sent to member companies.
- In 2021, we identified major risks of the year, shouldered primary responsibility, and formulated countermeasures; on a monthly basis, we reported the control status and red/yellow/green (RYG) indicator of major risks.
- In 2021, we set early warning indicators for major risks, realizing the transformation of from qualitative to quantitative risk warning indicators.

Developing a quantitative risk assessment model

- We established a working group for quantitative assessment of major risks. In 2021, four quantitative assessment models for major risks were basically built, such as the risk management model for investment and process of engineering construction projects.

Conducting specific risk assessment

- In line with Risk Assessment and Procedural Compliance Review of Major Projects (Matters), we conducted specific risk assessment and timely made procedural review comments in 2021. For issues related to the "six types of major projects," we organized risk procedural compliance before decision making.

Raising risk compliance awareness

- Through industry benchmarking, we keep track of good practices of ERM, internal control, compliance management and other aspects inside and outside the industry.
- In 2021, we organized training to raise employees' awareness of risk management.

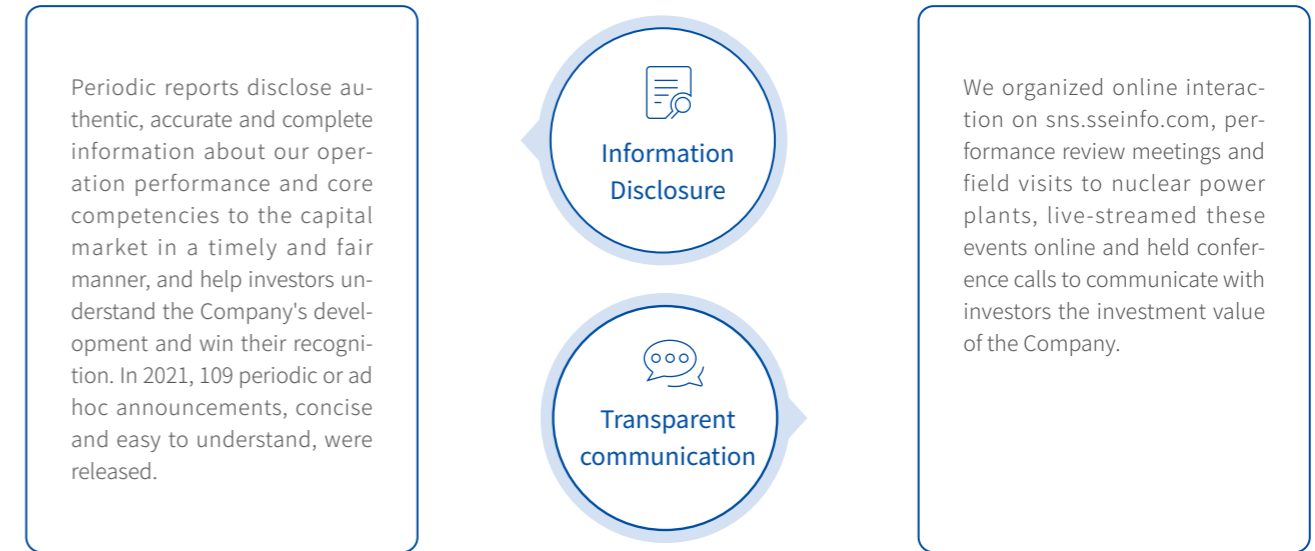
Compliance Operation

We adhere to law-based corporate governance, and strictly abide by laws and regulations such as *The Company Law*. We strengthen compliance management, raise employee's compliance awareness, and strive to foster a compliance culture that involves everyone, covers every aspect and is present all the time, and build a compliance management system featuring comprehensive coverage, clear division of rights and responsibilities, and well-coordinated and effective execution. Throughout the year, CNNP organized 28 internal audits in five areas.

In 2021, the *CNNP Compliance Manual* was released to regulate corporate compliance in 10 aspects, including safety, quality, environmental protection, occupational health, market transaction, labor and employment, and corporate governance. We have clarified compliance behaviors when dealing with stakeholders such as employees and partners, and signed the letter of compliance commitment with employees. We have improved the whistle-blowing channels for stakeholders on wrongdoings, and ensured that we could build the Company's core competitiveness and achieves high-quality development through compliance management involving all employees and all business segments.

Investor Relations

With various unblocked information communication channels, we enhance disclosure management, maintain close communication with our investors, effectively ensure accurate and standardized information disclosure, and continuously improve the transparency of corporate operation. In 2021, CNNP won China Securities Golden Bauhinia Award as one of the Listed Companies with Best Investment Value during the 14th Five-Year Plan period.



Case | The 2020 performance briefing held via multiple channels



In 2021, CNNP organized experts to provide training on value management of listed companies and worked on performance updates, information disclosure, investor relations and other aspects. In particular, the 2020 performance briefing was held offline, while live-streamed online and open to conference calls simultaneously, warmly received by investors. It was recognized by SSE Roadshow Center and promoted as a good practice.



CSR Management

Opportunities and Challenges

Considering environmental factors and the industry's development trends and our own operation situation, we identified the opportunities and challenges facing us and responded proactively to contribute to the sustainable development of global clean energy.

External Environment	Opportunities and Challenges	Our Response
COVID-19 prevention and control as a "new normal".	<ul style="list-style-type: none"> The surge of COVID-19 cases in some areas at home and abroad has put forward higher requirements for safe and stable operation of nuclear power units. Due to the COVID-19 pandemic, equipment supply delay and other factors, some engineering construction projects may lag behind the schedule. 	<ul style="list-style-type: none"> Strictly implement COVID-19 prevention and control measures and follow local COVID-19 control policies, keep a book of visitors and strengthen public environment management; timely keep track of the situation of personnel dispatched to overseas posts, organize training on protection from COVID-19 before their departure, and manage them after their return. Rationally allocate construction resources, control four aspects of project construction, strengthen risk identification and management, and ensure high-quality and efficient construction of new nuclear power units, striving to put relevant nuclear power units into commercial use as scheduled.
Deepening reforms in the electricity system.	<ul style="list-style-type: none"> The openness of the electricity terminal market provides opportunities for the Company to provide power distribution and supply services. The reform of the power system has been steadily advanced. The power market structure and market system with effective competition are being formed; the power transaction scale is gradually expanding; and the proportion of electricity traded in the market-oriented manner is increasing year by year. But there exist uncertainties in power sales. 	<ul style="list-style-type: none"> Closely follow policies on spot power transaction and direct power transaction, and seek to enlarge the proportion of government-authorized power contracts; market our electricity with a focus on "adequate supply and competitive price." Continue to build the industrial pattern of "nuclear energy plus non-nuclear clean energy plus agile new industry", and expand technical services for nuclear power operation.
China actively fosters a new development pattern with domestic circulation as the mainstay and domestic and international circulations reinforcing each other.	<ul style="list-style-type: none"> The fostering of the new development pattern indicates a new situation where "demand drives supply, and supply creates demand" for the nuclear energy industry, which puts forward higher requirements for innovation in nuclear energy products. The domestic circulation attracts global resource elements, which puts higher requirements for enhancing international cooperation and competitive advantages of the nuclear energy industry, coordinating international and domestic market resources, and integrating into domestic circulation and international circulation. 	<ul style="list-style-type: none"> Focus on addressing pain points and weaknesses, continuously improve the ability of scientific and technological innovation, and combine reform and innovation with talent training. Promote digital transformation by embracing the national trend of infrastructure construction, and strive to stimulate the vitality of reform and innovation. Advance overseas development by leveraging advanced project management and technological advantages.

External Environment	Opportunities and Challenges	Our Response
China sets the goal of "peaking CO ₂ emissions before 2030 and achieving carbon neutrality before 2060."	<ul style="list-style-type: none"> Clean and low carbon energy will increase a lot. The pattern of complementary development is forming between the stable base load energy represented by nuclear power and the intermittent, scattered renewable energy. Nuclear power will embrace new development opportunities. With the increase in the number of new energy market players and investment intensity of major energy groups, it is a challenge to compete for market share. 	<ul style="list-style-type: none"> Closely follow national development policies, seize the opportunities in the new energy market, and accelerate the implementation of the industrial development strategy of "nuclear power plus new energy". Integrate the green and low carbon development philosophy into the whole process of nuclear power projects, and advocate green office and low-carbon lifestyles among employees.
The public confidence in nuclear power development is recovering.	<ul style="list-style-type: none"> Since the middle and later parts of the 13th Five-Year Plan period, the public has shown a high degree of acceptance for nuclear power and nuclear heating projects, which lays a good foundation for the sustainable development of nuclear energy. 	<ul style="list-style-type: none"> Compiled the <i>Stakeholder Communication and Management Manual</i>, to win public understanding and support for nuclear power. Have held the "Appealing Nuclear Power" science popularization activity for nine consecutive years. By the end of 2021, the activity had attracted over three million participants.
China proposes to align efforts to consolidate and expand the achievements in poverty alleviation with efforts to promote rural revitalization.	<ul style="list-style-type: none"> The COVID-19 pandemic has restricted personnel movement and slowed economic growth, which increases the risk of our paired-up counties and villages of falling back to and posing challenges to our rural revitalization work. 	<ul style="list-style-type: none"> Promote the development of local industries, increase consumption of local products, and promote infrastructure construction, and cultural development as well as education in areas which have emerged from poverty, to effectively consolidate the achievements made in poverty alleviation.



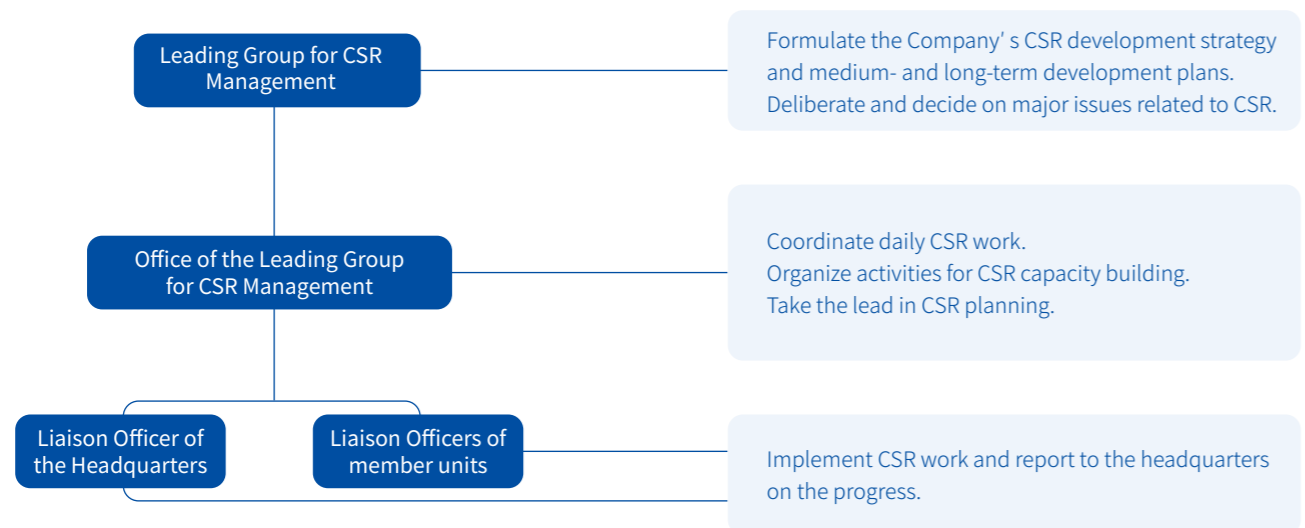
CSR Philosophy

Adhering to the core values of "responsibility, safety, innovation, and collaboration," CNNP integrates the CSR philosophy into daily operation and management, promotes economic development, environmental conservation and social progress in a coordinated manner, environment and society, and joins hands with stakeholders to create a more sustainable and better world.



CSR Management System

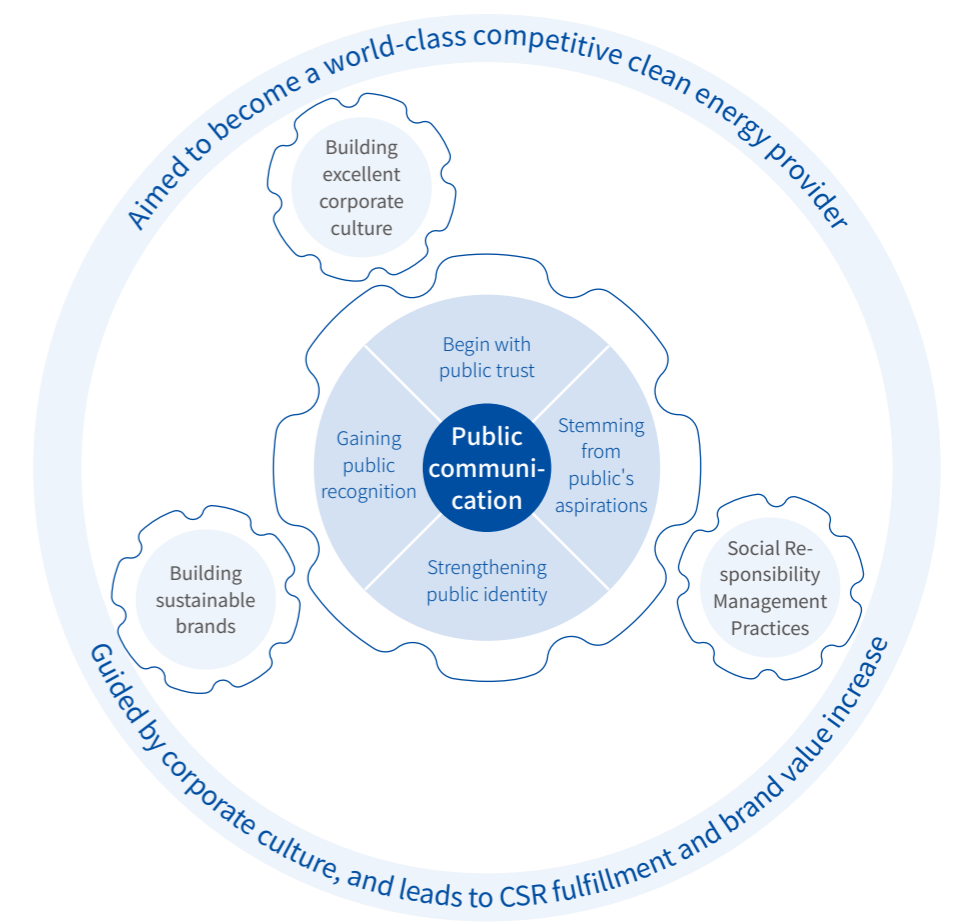
We continuously improve the organizational structure for CSR management, coordinate CSR management, and adopt a top-down approach to integrate the CSR philosophy into corporate operation and management, to create comprehensive value.



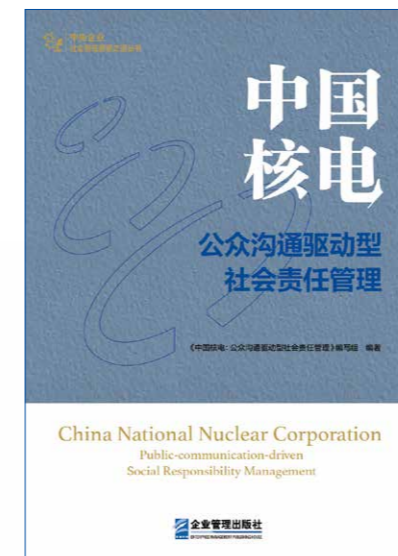
Organizational Structure for CSR Management

CSR Management Path

Aimed to become a world-class competitive clean energy provider, 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. The public's recognition of and identification with our sustainability branding is the ultimate measure of our CSR management effect. We have explored a CSR management path with CNNP's characteristics that is "guided by corporate culture, and leads to CSR fulfillment and brand value increase." In 2021, several of our CSR management practices were included in the list of outstanding CSR cases by China Electricity Council and our ESG practice in the list of outstanding cases by the Listed Companies Association of Beijing.



CNNP's CSR management path driven by public communications



China National Nuclear Corporation: Public Communication-Driven Social Responsibility Management is listed as a typical CSR case collection of central state-owned enterprises.



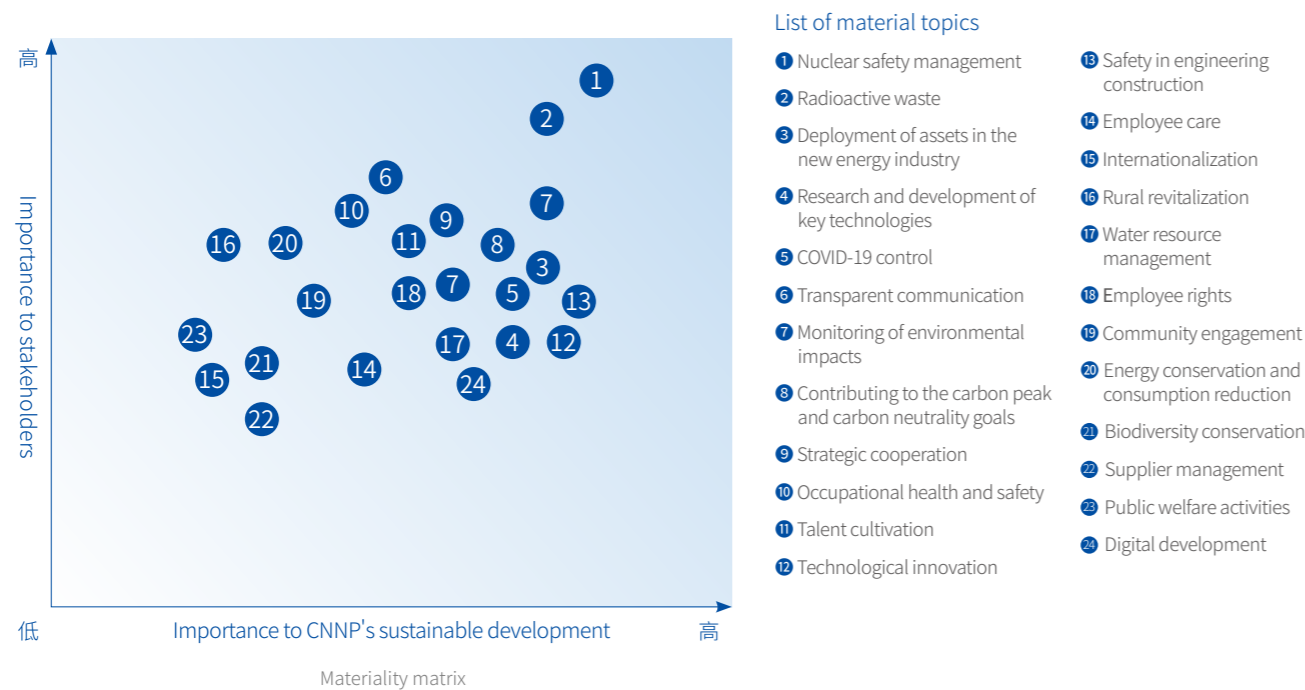
CSR Communication Management

Material topics

Based on the dynamics of sustainable development, strategic planning and the expectations and demands of stakeholders, we identify and prioritize topics from the dimensions of "Significance to CNNP's sustainable development" and "significance to stakeholders," to determine the focus of corporate management and information disclosure, and better respond to the demands of stakeholders.



Analysis process of material topics



Stakeholder Communication

The Company attaches importance to stakeholder communication, and improves the transparency of corporate operation. We have built diversified communication platforms to respond to the expectations and demands of stakeholders, strengthen mutual understanding and trust, and establish a close and harmonious relationship.

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

Responding to the UN SDGs

Actively responding to the United Nations Sustainable Development Goals (SDGs), we clarify key responsibilities and incorporate the key SDGs that are closely related to the Company's development into CSR management, contributing to the realization of SDGs as soon as possible.



Building a Safe and Reliable Brand of Excellence

- 19 operating units achieved full marks in WANO composite index, with the average mark of 99.51, ranking 1st in the world.
- Over 220 reactor-years of safe operation in total.
- Fuqing Nuclear Power Plant won China Quality Award.
- The Phase I Project of Sanmen Nuclear Power Plant won the Gold Medal of National Quality Engineering Award.

Low-carbon development facilitates ecological progress

- In 2021, the nuclear power units in commercial use generated 182.637 TWh of electricity, equivalent to reducing 55.2477 million tons of standard coal consumption, and cutting CO₂, SO₂ and NO_x emissions by 144.749 million tons, 469,600 tons and 408,800 tons respectively.

Bolstering Development Vitality through Innovation

- R&D expenditure accounted for 2.60% of the revenue.
- won 79 technological achievement awards.

Promoting Cooperation to Achieve Win-Win Results

- 8,873.3 MW installed capacity of non-nuclear clean energy in operation
- 278 Strategic suppliers

Being People-Oriented and Boosting the Well-Being of Employees

- 15,756 Employees
- 65.63 million yuan Training expenditure
- 1,601,730 Employee training hours
- 1,078 Measures formulated and completed during the campaign of "Serving the People"

Promoting Social Harmony and Inclusion and Empowering a Better Life

- Over 600 million yuan spent on poverty alleviation in paired-up counties and villages
- 7.913 billion yuan tax payment
- 59,995.4 volunteer service hours in total

Feature

01 Pride of the Nation: Three Decades of Safe Power Generation



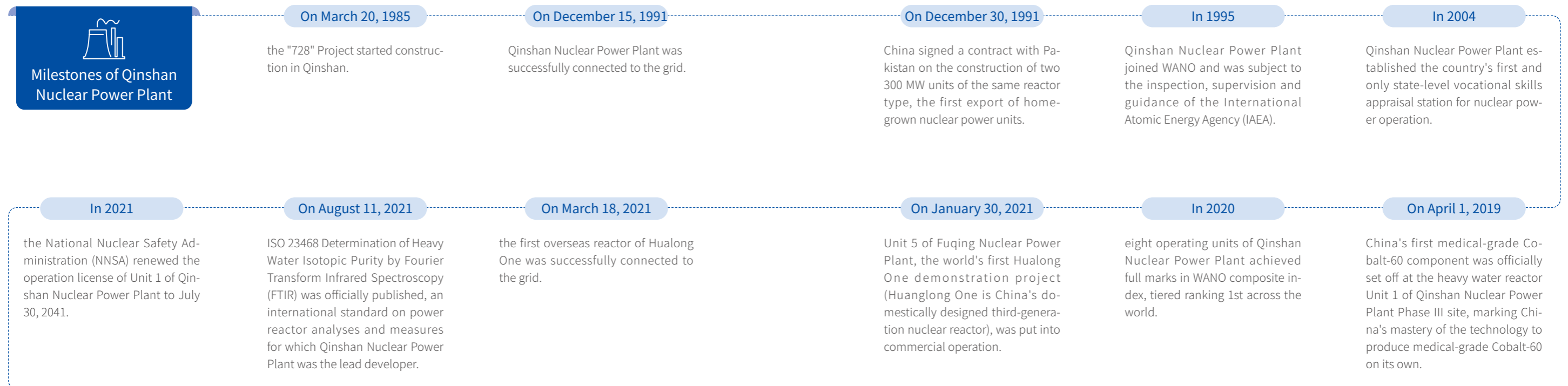
Over 30 years ago, Qinshan Nuclear Power Plant was built at Hangzhou Bay, the first independently designed and built nuclear power plant since 1949, which ushered the country into the era of nuclear power generation. Over the years, through relentless pioneering efforts, Qinshan Nuclear Power Plant has "explored a path toward developing home-grown nuclear power generation technology", "met international standards for nuclear power project management", and made historic breakthrough in increasing the home-grown nuclear power generation capacity from 300 MW to 1,000 MW. It has cultivated over a thousand nuclear power technical specialists, and built the country's largest nuclear power plant with the most units, reactor types, and the biggest installed capacity. Qinshan Nuclear Power Plant, the pride of the nation, has become a signature project in China's nuclear power industry.

Contributing to China's Nuclear Power Development Since the 1990s

Starting from scratch, Qinshan Nuclear Power Plant has become an industry leader that ranks 1st in the World Association of Nuclear Operators (WANO) composite index. As an epitome of China's nuclear power industry, Qinshan Nuclear Power Plant has created a host of miracles and supported the country to build strong strength in nuclear power.



A bird's view of Qinshan Nuclear Power Plant



Nuclear Power Generation Contributing to China's Carbon Peaking and Carbon Neutrality Goals with the Capacity of 640 TWh

Compared with coal-fired power, nuclear power is distinctly clean, and emits only 1% of carbon dioxide through the lifecycle that of coal-fired power, equivalent to that of hydropower and wind power, and significantly lower than that of solar power. On the road toward carbon peak and carbon neutrality, developing nuclear energy aligns better with the development trend of China's energy sector, and will contribute greatly to achieving the goals.

Since connection to the grid in 1991, Qinshan Nuclear Power Plant has maintained safe, stable, economical and environmentally friendly operation of its nine operating units. As of February 2022, it had generated 640 TWh of electricity in total, saving energy and reducing emissions equivalent to afforestation of an area 406 times that of the West Lake scenic area.

Q&A How clean is nuclear energy?

Nuclear energy is a clean, low-carbon, efficient and reliable energy source with unique advantages such as high energy density, small footprint, and low cost in long-term operation. Nuclear fission of 1 kg of Uranium 235 can generate as much energy as approximately 2,700 tons of standard coal, with zero carbon dioxide emission. The greenhouse gas (GHG) emission of the entire industrial chain of nuclear power is equivalent to that of hydropower and wind power, one-fifth of that of solar photovoltaic power, and two orders of magnitude lower than that of coal-fired power.

1 kg of Uranium 235	2700 tons of standard coal
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Case The first nuclear power plant in Chinese mainland approved to renew its operating license

On September 3, 2021, in accordance with Nuclear Safety Law of the People's Republic of China and Provisions on Supervision and Administration of Civilian Nuclear Safety Equipment, NNSA approved the renewal of the operating license for Unit 1, Qinshan Nuclear Power Plant till July 30, 2041. According to IAEA, apart from economic benefits, extending the operating life of units in service will significantly increase the availability and stability of low-carbon electricity. This is critical for the world to achieve climate goals and transition to clean energy by 2050.

Building a Talent Pool in Nuclear Power Industry with 6 Vocational Skill Level Certificates

Qinshan Nuclear Power Plant has not only achieved safe and efficient operation, but also promoted the development of China's nuclear power industry in an all-round way. Its efforts respond to the call of Premier Zhou Enlai to "master technology, accumulate experience, and cultivate talents to lay a foundation for nuclear power development in the future."

It has cultivated a great many of scientists and technological talents, such as Ouyang Yu, an academician of Chinese Academy of Sciences and Ye Qizhen, an academician of Chinese Academy of Engineering. Moreover, it has cultivated the first 35 nuclear power operators in the mainland and over 2,500 nuclear power technicians. There is also one state-level master's workshop and one academician's workstation, winning it the reputation of the cradle of China's nuclear power professionals.

At the same time, Qinshan Nuclear Power Plant is authorized to certify six vocational skill levels for nuclear reactor operation watchmen, nuclear reactor control & maintenance personnel, nuclear reactor mechanical equipment maintenance personnel, radiation protection specialists (health physicists), radioactive waste disposal personnel, and nuclear equipment non-destructive testing personnel. It has China's first and only state-level vocational skills appraisal station for nuclear power operation.



Operators of Qinshan Nuclear Power Plant

Supporting the Healthy China Initiative by Empowering Gamma Knife with Home-grown Nuclear Technology

Qinshan Nuclear Power Plant pays much attention to scientific & technological support and the innovation-driven development. After years of independent research and development, it has successfully developed the technology to produce Cobalt-60 for medical purpose, ending the monopoly of foreign exporters. This technology, applied to the Gamma Knife, has brought great benefits for cancer patients across the country.

The heavy-water reactor units of Qinshan Nuclear Power Plant are among the few nuclear power units in the world that can produce Cobalt-60. As the only Cobalt-60 production base in China, the plant can produce Cobalt-60 on its own and has actively employed nuclear technology to fight the COVID-19 pandemic. Since the outbreak of the pandemic, CNNC has used Cobalt-60 to sterilize bulks of disposable protective gowns, reducing the time for irradiation sterilization of over ten thousand disposable protective gowns and getting them ready for shipping to just six hours. Leveraging its proprietary technology to produce Cobalt for industrial purpose, Qinshan Nuclear Power Plant has made its contribution to building a Healthy China.

Q&A What is Gamma Knife?

Gamma Knife is mainly used in tumor treatment. It is non-invasive, and can be applied to precisely located areas, without the need of anesthesia or surgery. Its core components are Cobalt-60 radioactive sources with high radioactivity. China has long relied on import for such radioactive sources whose supply shortage has seriously hindered the development of the health-care sector.

On April 1, 2019, China's first medical-grade Cobalt-60 component was officially set off at the heavy water reactor Unit 1 of Qinshan Nuclear Power Plant Phase III site, marking China's mastery of the technology to produce medical-grade Cobalt-60 and the ability to apply it to the Gamma Knife, which lays a solid foundation for the sustainable development of China's Gamma Knife industry.

Feature

02 Contributing to Carbon Peak and Carbon Neutrality Goals and Empowering a Better Life with Clean Energy



As a clean, low-carbon, efficient and reliable energy source, nuclear energy has played an important role in supporting the country to achieve carbon peak and carbon neutrality goals and promote the energy transition. It is one of the most practical choices for the country to implement energy strategies and address climate change. During the 14th Five-Year Plan period (2021-2025), CNNP will proceed from the new development stage to promote the application of nuclear energy in more areas, move faster to develop non-nuclear clean energy, and actively engage in the carbon trading market while guaranteeing the security of national energy supply, to contribute to the carbon peak and carbon neutrality goals.

Shouldering the Responsibility and Promoting Green Development in a Coordinated Way

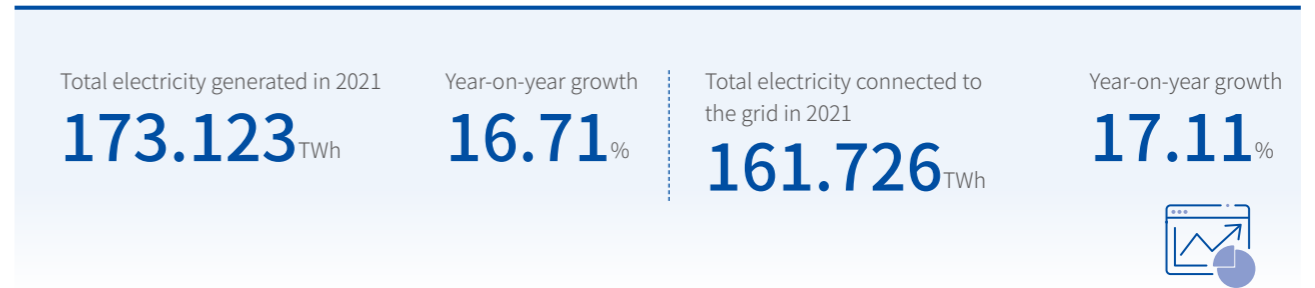
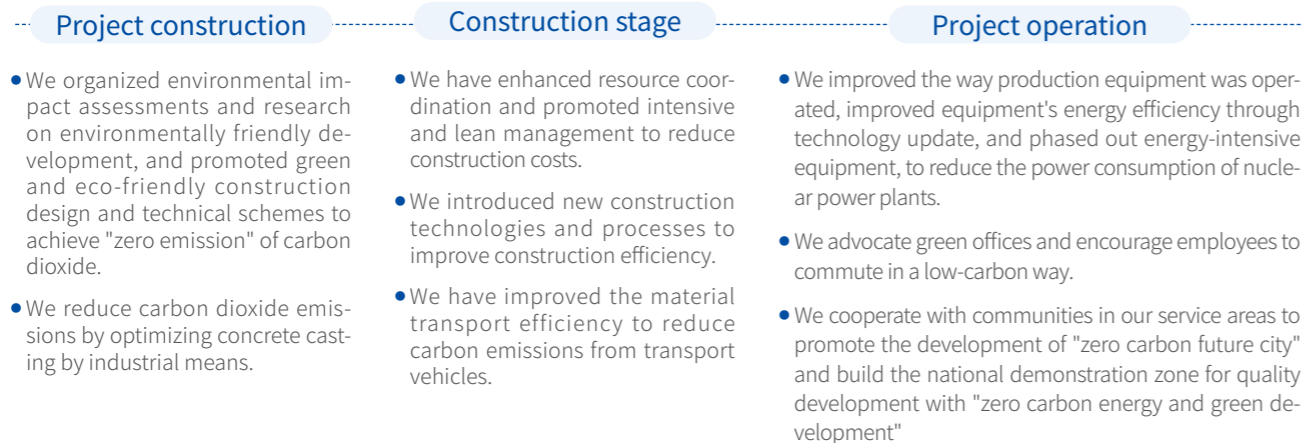
As China works to peak emissions by 2030 and achieve carbon neutrality by 2060, CNNP is given a new mission. Fully aware of the urgency and arduousness of the goals, we leverage our own business and resource advantages, systematically plan for green development and align all aspects of corporate operations and management with these goals.

Key tasks to help achieve carbon peak and carbon neutrality goals

- Ensuring nuclear safety, developing nuclear energy in a safe and orderly manner, and continuously expanding the nuclear power market;
- Diversifying the use of nuclear energy, such as heating, hydrogen production, nuclear steam supply, and integrated smart energy services for industrial parks;
- Leveraging the advantages of nuclear power as a baseload energy source and site selection for nuclear power plants to promote the development of non-nuclear clean energy industries;
- Striving to develop the agile clean technology industry and conducting R&D and industrial promotion of low-carbon, zero-carbon and carbon-negative technologies when appropriate.

Moving Faster to Develop Nuclear Power

In the new development stage, to actively develop nuclear power in a safe and orderly manner, CNNP works actively to put the home-grown third-generation nuclear power technology into operation and supports the development of the fourth-generation nuclear power technology - High-temperature gas-cooled reactors (HTGRs). By going green and low-carbon in the construction, operation and management of nuclear power projects, we support the country to build strong strength in nuclear power.



Year	Power generation of nuclear power units (TWh)	Equivalent to reduction in standard coal consumption (10,000 tons)	Equivalent to reduction in CO ₂ emissions (10,000 tons)
2018	117.847	3712.43	9726.6
2019	136.214	4181.77	10956.24
2020	148.336	4531.66	11872.96
2021	173.123	5236.97	13720.86

Major projects put into operation

The world's first Hualong One demonstration project: China's domestically designed third-generation nuclear reactor put into commercial operation

On January 30, 2021, Unit 5 of Fuqing Nuclear Power Plant, the world's first Hualong One demonstration project was put into commercial operation, marking the end of foreign monopoly and China's elevation into advanced countries in nuclear power technology. Every year, each Hualong One unit generates 10 TWh of electricity, sufficient to meet the power needs of one million people for production and domestic use of the year in a moderately-developed country, equivalent to reducing standard coal consumption by 3.12 million tons and carbon dioxide emissions by 8.16 million tons each year. This is of vital importance to optimize the energy mix, advance green and low-carbon development, and help build the dual-circulation development pattern.

Tianwan Nuclear Power Plant Phase III Project put into commercial operation 151 days ahead of schedule

On June 2, 2021, Unit 6 of Tianwan Nuclear Power Plant was put into commercial operation, marking that its Phase III project was complete 151 days ahead of schedule. After put into operation on schedule, Unit 5 and Unit 6 will, compared with coal-fired power generation, reduce over 5,171,200 tons of standard coal, 13,559,700 tons of carbon dioxide emissions, and 44,100 tons of sulfur dioxide emissions, equivalent to over 34,000 hectares of afforestation, per year.

Exploring Multi-purpose Utilization of Nuclear Energy

In the new-era spirit of "innovation and dedication to building the country's strength in nuclear power," CNNP continuously expands the scope of nuclear energy application. We have played an important role in heating with clean energy, seawater desalination, industrial steam supply and several other economic sectors, further reducing the country's total carbon emissions.

Case | World's first land-based commercial small modular reactor starts construction

On July 13, 2021, Linglong One, a multi-purpose small modular reactor (SMR) demonstration project, officially entered the construction phase at Changjiang Nuclear Power Plant in Hainan Province. With the SMR technology, each unit has a power generation capacity of 125,000 kW. It is the world's first onshore commercial SMR. After completion, it is expected to generate 1 TWh of electricity per year to meet the energy needs of 526,000 households.

Extended reading: About Linglong One SMR technology

Unlike traditional nuclear power technologies, Linglong One can be used for not only nuclear power generation, but also seawater desalination, regional heating and cooling and industrial heat supply, suitable for self-owned energy sources at industrial parks, on islands, at mining areas, and energy-intensive enterprises. At the same time, it is small in size, modular, integrated, and passive. With high safety performance, a relatively short construction cycle, and flexibility for deployment, Linglong One can be used as clean distributed energy.

Case | Zhejiang Haiyan Nuclear Heating Demonstration Project, the first nuclear heating project in southern China

Zhejiang Haiyan Nuclear Heating Demonstration Project (Phase 1), completed by Qinshan Nuclear Power Co., Ltd., was the first nuclear heating project in southern China, and was officially put into operation on December 3, 2021. With a heating area of 460,000 m² it has benefited nearly 4,000 households with nuclear heating. Once the project reaches its full capacity, each year it is expected to reduce the consumption of electricity and standard coal by 196 GWh and about 24,600 tons, and CO₂ emissions by about 59,000 tons, equivalent to afforestation of 230 football fields every year.



The ceremony for operation of Zhejiang Haiyan Nuclear Heating Demonstration Project

Case | Multi-purpose utilization of nuclear energy contributing to green and low-carbon regional development

In May 2021, Fujian Fuqing Nuclear Power Co., Ltd. reached a cooperation agreement with Jiangyin Industrial Cluster Zone and the Fujian-Taiwan (Fuzhou) Blue Economic Industrial Park to provide the latter with integrated energy solutions including "electricity, steam, cooling, heating, and water". It also signed the *Cooperation Agreement on Integrated Utilization of Nuclear Energy and Zero-Carbon Industrial Parks* with the People's Government of Fuqing City, to build a nuclear energy-driven, intelligent, and zero-carbon energy supply system for industrial parks and a model clean energy base, and effectively promote green and low-carbon energy development.



Fujian Fuqing Nuclear Power Co., Ltd. signing a project cooperation agreement with the People's Government of Fuqing City

Complementary Roles of Solar Photovoltaic and Wind Power

Leveraging the advantages of nuclear power as a baseload energy source and the geographical advantages of nuclear power plants, we develop non-nuclear clean energy industries, promote multi-energy complementarity, and have seen substantial increase in solar photovoltaic and wind power generation. Moreover, we have built integrated energy bases and extended upstream and downstream sectors, to better support socio-economic development. In 2021, CNNP's non-nuclear clean energy power generation reached 9.514 TWh of electricity, a year-on-year increase of 68.69%; among them, 9.313 TWh of electricity was connected to the grid, a year-on-year increase of 69.27%.

In 2021

Installed capacity of non-nuclear clean energy nuts in operation

8,873.3^{MW}

Installed capacity of units under construction

1,921.8^{MW}

Installed capacity of units pending construction

6,174.5^{MW}

By the end of the 14th Five-Year Plan period

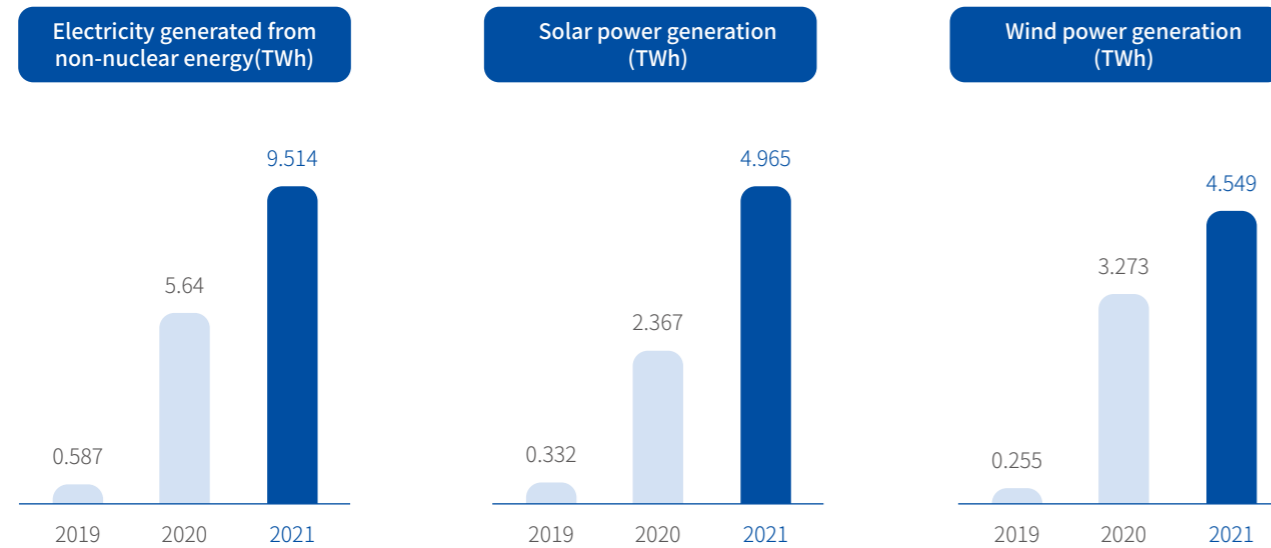
Expected installed capacity of non-nuclear clean energy nuts in operation

30^{GW}

Installed capacity of units under construction

3^{GW}





Actively Engaging in Emerging Markets

We actively engage in carbon trading markets and leverage the market mechanism to reduce GHG emissions. In 2021, CNNP participated in the trading of green electricity and carbon emission quota and issued green bonds, playing a demonstrative role, and exploring a new path and accumulating experience for high-quality nuclear power development.

May 2021

Fujian Fuqing Nuclear Power Co., Ltd. issued the first carbon-neutrality green corporate bond in the nuclear power industry.

This bond marked the debut of the world's first reactor of Hualong One in the stock exchange market. As the first tranche of green corporate bond in 2021, it has a face value of one billion yuan, with a three-year term and a coupon rate of 3.51%.

September 2021

CNNP Rich Energy Co., Ltd completed its first online deal of green electricity trading.

CNNP Rich Energy Co., Ltd is one of the first pilot new-energy power companies in Zhejiang for the implementation of the *Working Plan for Green Electricity Trading Pilot Program*. In its first online deal of green electricity trading, it sold 53.45 GWh of green electricity, ranking 2nd in the province.

December 2021

CNNP Rich Energy Co., Ltd signed emissions trading contracts for a single crediting period.

Six renewable energy power generation projects of CNNP Rich Energy Co., Ltd signed emissions trading contracts for a single crediting period on domestic and overseas markets, reducing carbon dioxide emissions by about 3.3355 million tons in total. Among them, the contract volume of the CCER (Chinese Certified Emission Reduction) forward transaction reached 360,500 tons of carbon dioxide, from which it reaped carbon trading benefits for the first time.



Q&A

What are green corporate bonds? How can they contribute to the carbon peak and carbon neutrality goals?

Building a green financial system is of national strategic importance. According to an announcement issued by Shanghai Stock Exchange on March 16, 2016, funds raised through green corporate bonds must be invested in green industries for the construction, acquisition, operation and refinancing of green projects. In the past six years since its launch in 2016, the Chinese green bond market has seen the total issuance on the rise. Issuers raise funds from the issuance of green bonds and spend the money in the areas important to carbon peak and carbon neutrality goals, covering clean energy, ecological conservation, and pollution control projects, etc.

Case | Tianwan 2GW Tidal Land Photovoltaic Demonstration Project supports high-quality regional development

Along with Jiangsu Nuclear Power Co., Ltd., CNNP Rich Energy Co., Ltd. plans to build a 2GW photovoltaic power generation project in the tidal land of Lianyung District. The project is committed to building Lianyung District into a demonstration base for multi-energy complementarity. While helping adjust local energy mix, it will create jobs for local residents and drive high-quality economic development.



The signing ceremony for the Tianwan 2GW Tidal Land Photovoltaic Demonstration Project



01

Building a Safe and Reliable Brand of Excellence

In 2021

- 19 operating units achieved full marks in WANO composite index, with the average mark of **99.51**, ranking 1st in the world
- Over **220** reactor-years of safe operation in total






Consolidating the Foundation of Safety

We always keep in mind that safety is the lifeline of the nuclear power industry. We adopt a rational, coordinated and multi-pronged approach to ensuring nuclear safety, foster a nuclear safety culture, and improve the safety management system, cementing the foundation of safety with concrete actions.


Improving the Safety Management Level

We always regard the nuclear safety regulations as the soul of CNNP and never stop pursuing excellent safety performance. We continuously improve nuclear safety regulations and organize nuclear safety trainings and evaluations. In practice over the years, we have fostered a culture enabling excellent nuclear safety performance, and the mindset of putting people and safety first among the employees, and improved the Company's nuclear safety management.

 <h4>Nuclear safety culture building</h4> <ul style="list-style-type: none"> • Revised the framework of CNNP's nuclear safety regulations • Upgraded CNNP's ten principles for excellent nuclear safety • Released <i>CNNP Nuclear Safety Indicators for Nuclear Power Plants</i> • Released the <i>Report on CNNP's Practices of Culture Building for Nuclear Safety in Response to the Call of President Xi Jinping</i> 	 <h4>Nuclear safety communication and training</h4> <ul style="list-style-type: none"> • Watched the TV program <i>Saving Lives Is of Paramount Importance: Learning General Secretary Xi Jinping's Important Statements on Workplace Safety</i> • Organized the online safety law compliance quiz, with nearly a thousand participants • Organized safety lectures given by the executives • Produced the <i>Safety Warning Video: Fukushima Nuclear Accident</i> 	 <h4>Nuclear safety evaluation</h4> <ul style="list-style-type: none"> • Organized a training workshop for nuclear safety evaluators in line with the standards of CNNP's nuclear safety regulations • Regularly organized nuclear safety evaluations and questionnaire surveys to monitor the Company's nuclear safety management level
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Improving Safety Management System

Putting safety first, we shouldered primary responsibility for workplace safety, tightened oversight and implemented the Three-Year Action Plan to improve workplace safety. In 2021, all our nuclear power plants were certified by the ISO quality management system; Qinshan Nuclear Power Plant, the first in the mainland, celebrated its 30th anniversary of safe power generation and had its operating license renewed.

<h1>19</h1> <p>operating units achieved full marks in WANO composite index</p>	<p>with the average mark of</p> <h1>99.51</h1>	<p>ranking</p> <h1>1st in the world</h1> 
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Improving the workplace safety accountability system

- CNNP released the list of responsibilities for safety management of specific areas and structures, specified responsible departments and persons, and saw to it that safety management responsibility was effectively implemented.
- The list of hazards under graded and classified management of all affiliates was released, with specified responsible persons, and was updated dynamically to eliminate safety hazards. In 2021, 99.96% of the safety hazards identified were rectified.

Enhancing workplace safety supervision

- Safety directors were appointed for independent safety supervision. At CNNP, we have established a weekly reporting mechanism for on-site safety directors. Every year, we organize inspections led by safety directors, and conduct safety evaluation at the yearend, to continuously supervise and improve the safety status of our affiliates.
- CNNP has stepped up efforts to identify and sort out key structures, systems and equipment that are safety- and environment-sensitive. The workplace safety center enables visualized safety management using advanced information technology for all operating units under construction.

Rectification of safety hazards

- Promote *The Implementation Plan for the Three-year Action Plan of CNNP to Intensify Workplace Safety*. In doing so, we focus on two topics in nine areas of workplace safety rectification.

Safety Benchmarking and Problem Rectifications

We conduct internal and external peer reviews and ensure that the feedback system is running efficiently so that we can learn from inside and outside the Company, prevent safety risks, summarize good practices, and improve safety management on a continuous basis.

Peer reviews

We have launched external reviews organized by World Association of Nuclear Operators (WANO) and China Nuclear Energy Association (CNEA) and internal reviews. We benchmarked against world-leading peers, enhanced exchanges with them and worked continuously to improve safety management. In 2021, we conducted 17 peer reviews, including eight external reviews and nine internal reviews.

Case | Qinshan Nuclear Power Plant becomes the world's first to have nine units reviewed by WANO simultaneously



In 2021, Qinshan Nuclear Power Plant became the world's first of its kind to have nine units subject to the WANO peer review at the same time. Compared with the single-plant review, this WANO peer review of nine units reduced the workload of both parties, produced more valuable results, and would help Qinshan improve multiple-reactor management and build a world-class nuclear power base. The review results show that Qinshan Nuclear Power Plant has made significant improvement in the performance of certain important areas, reaching the level of excellence rarely seen in the reviews by WANO Tokyo Center.

"Qinshan Nuclear Power Plant is a model in sharing best practices with international peers. It is a pioneer among the first pilot nuclear power plants in WANO's excellent performance initiative. It has ranked top in WANO reviews among international peers. Its peer review cycle is expected to extend to six years from four years."

—Naoki Chigusa, Director General WANO Tokyo Center

The feedback system

We have improved the feedback system and established the A/B incident-specific feedback system. For internal and external typical problems, investigations are organized and feedback provided quickly, and rectification effectively made to ensure that the feedback is well communicated and improvements are made to prevent similar problems from happening.

A Hierarchical Management

CNNP has established the A/B incident management mechanism and focused on addressing typical and reoccurring incidents.

B Information Sharing

CNNP has developed a sound feedback platform, to share information in a timely manner.

C Prevention

CNNP shares the lessons and good practices of units during their construction and operation period to the new project teams, engineering companies, manufacturers and other upstream partners, to guarantee construction quality before the construction starts.

D In-process Control

For key incidents, we hold feedback meetings to communicate key regulatory requirements, analyze causes, and formulate countermeasures. Moreover, we keep track of the rectification progress of power plants via the feedback platform.

E Problem-Specific Rectification

We have set up a taskforce to address common problems of multiple-plant management. We have prepared and released *Human Errors in the Use of Electrical Tools, Safety Management of Concrete Operations*, and collaborated with industry associations to make safety evaluations and improve project-specific safety management.



Enhancing Safety Emergency Management

We have formulated the implementation plan for key tasks of nuclear emergency response during the 14th Five-Year Plan period (2021-2025). By improving the organizational structure and plans for emergency response, we work continuously to build a modern nuclear emergency response capacity and system and enhance our emergency rescue capability. In 2021, CNNP Emergency Work Management Platform was awarded one of the outstanding achievements (5-star) of electricity safety and emergency management technology by the Electricity Safety Protection Committee of China Electricity Technology Market Platform.



Sanmen Nuclear Power Plant conducts anti-terrorism drills

In 2021

767

single-item emergency drills

6

comprehensive emergency drills

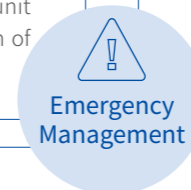


Emergency response organizational structure

- CNNP has set up a working team for nuclear emergency response which is on duty around the clock to ensure timely, rapid and proper response.
- The team of each operating unit has signed the agreement to provide proximity-based aid to emergency response. Moreover, we speed up building a well-coordinated, fast and effective multiple-unit emergency response system with clear division of labor.

Emergency response plans

- CNNP has revised and issued more than 400 workplace safety plans and procedures, such as *CNNP Emergency Response Plan for Nuclear Accidents*.
- We have promoted the standardization of the nuclear emergency response plans and accelerated the development of *CNNP's Emergency Response Plan Standards*.



Emergency response equipment and supplies

- CNNP has upgraded some equipment and assembly points of emergency command centers, developed and updated emergency command software systems, and regularly conducted the maintenance of emergency communication devices to make sure they are working normally all year round.
- We implement the project *CNNC Nuclear Safety and Nuclear Emergency Base Construction*, and accelerate the procurement of emergency response equipment and supplies such as shared facilities and critical basic supplies.

Emergency response training and drills

- In 2021, five nuclear power operating bases of CNNP conducted emergency response awareness activities to share good practices of nuclear emergency response.
- In 2021, CNNP participated in the 3rd National Emergency Management Law Popularization Knowledge Contest, with over 10,000 participants in total, and won the Outstanding Organization Award.
- We also organized personnel to join national nuclear emergency management trainings and organized internal trainings on nuclear emergency regulations and standards.
- Besides, we formulated the 2021 emergency drill and training plan for nuclear power operating bases and conducted comprehensive emergency drills.

Case | Qinshan Nuclear Power Plant participates in the 1st Yangtze River Delta International Emergency Disaster Reduction & Rescue Expo (Nuclear Emergency Response Expo)

Qinshan Nuclear Power Plant was invited to the 1st Yangtze River Delta International Emergency Disaster Reduction & Rescue Expo held at National Exhibition and Convention Center from May 7 to 9. At its exhibition booth, it introduced nuclear safety, nuclear emergency response, nuclear security, nuclear fire protection and other knowledge to the visitors. With easy-to-understand explanation, intriguing AR experiences and vivid interaction activities, it attracted wide attention and won praise from industry peers. In particular, the integrated digital maintenance screen that enables emergency rescue captured the attention of many business insiders.



Qinshan Nuclear Power Plant invited to attend the 1st Yangtze River Delta Nuclear Emergency Response Expo

Building Quality Projects

Believing that quality is essential for value creation and branding, we strictly control the quality of nuclear power unit projects, enhance quality management, and strive to build quality projects and our reputation for high-quality projects. In 2021, 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

We attach great importance to quality management of nuclear power projects. Centering on key areas and difficult points of quality management, we actively implement several measures to ensure safe, eco-friendly, high-quality and efficient engineering construction of nuclear power projects.

Improving the quality management system



- CNNP promoted the implementation of the lean management system featuring "six controls and seven noes", built the integrated project-specific progress management system, and formulated and released the *Guidelines on Controlling Top 10 Risks of Nuclear Power Projects*. Moreover, CNNP developed the performance assessment system for nuclear power projects under construction and the targeted incentive plan for project teams.
- CNNP improved the safety and quality integrity system, implemented the red/yellow line and blacklist mechanism, and prohibited the entry of personnel who crossed the safety & quality red line, thus raising the awareness of employees in all positions to ensure safety and quality.

Enhancing independent supervision of engineering construction quality



- CNNP stepped up efforts to conduct supervision and spot checks, and organized project owners to conduct independent spot checks, giving play to their role as independent supervisors.
- CNNP commissioned independent supervision companies to examine and evaluate the effectiveness of the contractor's safety system and quality assurance system, and exercise the veto power on safety and quality issues in an effort to help project owners make science-based and correct decisions.

Advancing digital transformation of nuclear power engineering construction



- In the drive to promote intelligent construction sites, we developed such functions as high-risk operation management, violation identification, and risk-based early warning, to reduce on-site safety risks and monitor personnel, machinery, materials and environment on construction sites in real time and more actively. In 2021, the intelligent construction sites of CNNP Guodian Zhangzhou Energy Co., Ltd. and Jiangsu Nuclear Power Co., Ltd. were put into use.

Raising company-wide quality awareness



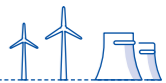
- The Quality Month activity was launched. We organized lectures on quality management, and organized employees to participate in quality management knowledge contests, among other quality management activities online or offline to improve the implementation of quality management rules & processes and quality improvement recording.

Key Projects

In 2021, we had five nuclear power units under construction. All nuclear power projects of CNNP achieved steady progress, with effective management of safety, quality, progress, investment, technology, environmental protection and other aspects.

1	2	3	4
Unit 5 of Fuqing Nuclear Power Plant, the world's first Hualong One demonstration project, was put into commercial operation ahead of schedule, completed in just 68.7 months.	The world's first land-based commercial small modular reactor (SMR), the Linglong One, officially entered the construction phase. This is China's first SMR demonstration project, marking that China ranks top in SMR technology.	Unit 5 of Tianwan Nuclear Power Plant was completed in just 56.3 months.	Unit 6 of Tianwan Nuclear Power Plant was put into commercial operation, setting a world record with the shortest time for a 10 MW nuclear power plant to be put into commercial operation from nuclear fuel loading.

Case | Unit 5 of Fuqing Nuclear Power Plant, the world's first Hualong One demonstration project, was put into commercial operation and Fuqing Nuclear Power Plant won China Quality Award

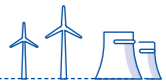


On January 30, 2021, Unit 5 of Fuqing Nuclear Power Plant, the world's first Hualong One demonstration project, was put into commercial operation. This marked the end of foreign monopoly and put China in the ranks of countries with home-grown third-generation nuclear power technology after the United States, France and Russia. This was a big milestone for the country to build its strength in nuclear power. In December 2021, Fuqing Nuclear Power Plant won China Quality Award, an influential quality award at home and abroad.

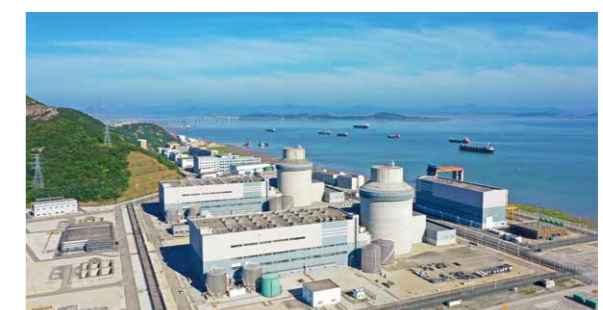


Panorama of Fuqing Nuclear Power Plant

Case | Phase I Project of Sanmen Nuclear Power Plant won National Quality Engineering Award Gold Medal



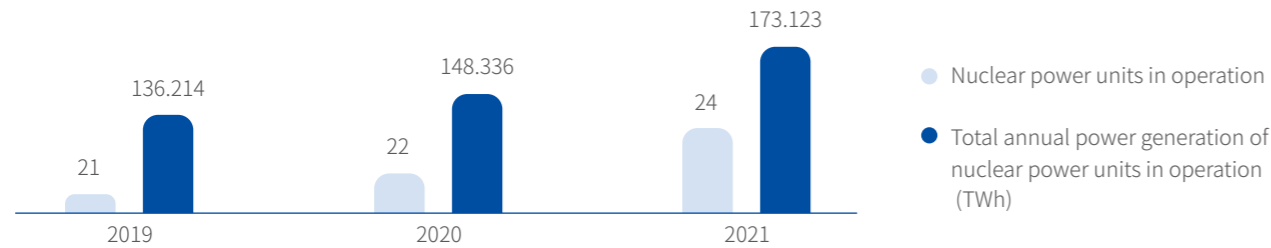
On December 6, 2021, the Phase I Project of Sanmen Nuclear Power Plant won Gold Medal of the National Quality Engineering Award, the oldest and highest-level national honor awarded for engineering construction quality. This project drove the upgrade from second-generation to third-generation nuclear power technology, contributing to the leapfrog development of China's nuclear power industry chain and ability to build third-generation nuclear power plants.



The site of Phase I Project of Sanmen Nuclear Power Plant

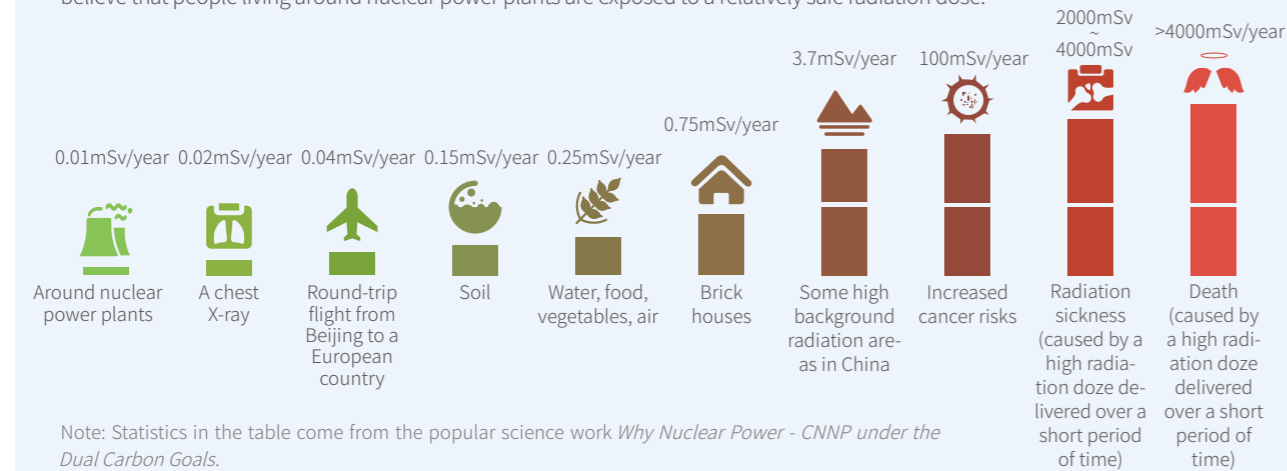
Ensuring Safe Operation

CNNP has continued to improve nuclear power operation, equipment reliability, and human error prevention, to ensure safe, stable and reliable operation of nuclear power plants.



Q&A Will living around nuclear power plants increase the risk of exposure to radiation?

Some believe that even though nuclear power technology is safe, nuclear power plants still have the risk of radiation exposure compared with conventional power plants. To address this concern, Wang Naiyan, a nuclear physicist and academician of Chinese Academy of Sciences, made a scientific explanation, "We are exposed to radiation all the time; the radiation may come from X-rays at hospitals, the use of home appliances, the intake of water and rice, and smoking, etc. According to statistics, the average annual amount of radiation employees from nuclear power units are exposed to is much less than the ambient background radiation, not to mention radiation nearby residents are exposed to, which is generally below 0.01 mSv per year, equivalent to an increase of 5-day ambient background radiation per year, compared to the international safety standard of 1 mSv per year. So, we have grounds to believe that people living around nuclear power plants are exposed to a relatively safe radiation dose."



Overhaul Management

In 2021, we completed 18 overhauls and created a few records in terms of overhaul safety, quality and overhaul period. Among them, the OT212 overhaul of Tianwan Nuclear Power Plant was safely completed within 21.09 days, breaking the world record for VVER-1000 units; the OT501 overhaul broke the national record for M310 reactor units with the shortest first overhaul. The 309 overhaul of Qinshan Nuclear Power No.2 Plant took 41.34 days, a national record for M310 units' once-in-a-decade overhaul.

In 2021 the actual overhaul period was ahead of the schedule

67.4

days

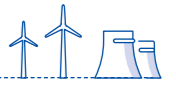
he overhaul period was shortened, with an equivalent increase of power generation by about

1.5

TWh

CNNP ranked **1st** in multiple-plant overhaul performance across the country

Case | Sanmen Nuclear Power Plant Unit 2 set a world record with the shortest time for the first overhaul of pressurized water reactors



On February 28, 2021, all overhaul and test items of the first refueling and overhaul for Unit 2 of Sanmen Nuclear Power Plant were successfully completed, setting a world record with only 28.14 days as the quickest first overhaul for nuclear power units. Through thorough preparation and meticulous work to prevent human error and ensure success at one go, it scored three stars and above in more than 97% of the indicators, and delivered on its commitment to safeguard power supply security and safety for celebrating the 100th anniversary of the founding of the CPC with outstanding performance and concrete actions.

Equipment Reliability Management

We step up efforts to improve equipment reliability and informatization and prevent equipment operation risks in an effort to continuously promote safety and operation reliability of nuclear power plants. Unit 5 of Tianwan Nuclear Power Plant realized zero unplanned shutdown in the full cycle from the first fuel loading to the first overhaul, the best performance among M310+ reactor units. In 2021, CNNP reported zero incident rated INES level 1 or above and maintained a good record of nuclear safety.

Optimizing the equipment management process

- We have issued the *Core Processes and Software Optimization Suggestions of Power Plant Work Orders*, aligning the regulations and processes of production plan management and emergency repair management with those of status reports and experience feedback.

Advancing lean management of work orders

- We have improved the preventive maintenance system for critical equipment and safety-, quality- and environment-sensitive equipment, established the cost management basis for repetitive work orders and minimum inventory management requirements, and reduced the inventory of domestically-made consumable spare parts. Moreover, we have issued the *List of Elements of a Standard Work Order for Nuclear Power Plant* and optimized the delicacy management system for production costs.

Promoting intelligent nuclear power plants

- We have organized experts to sort out and optimize the management process of safety production management platform phase I (ASP-1) to improve the applicability of ASP-1; we have also developed the industrial intelligent software for safety production management platform phase II (ASP-2).
- We have continued to promote the development of the equipment reliability management system (ERMs), online supervision and health assessment for major equipment, optimization of preventive maintenance and application of repair & maintenance rules, etc.

Prevention of Human Errors

In strict accordance with established procedures, we strive to prevent human error and violations or improper operations, and unplanned shutdown or outage thus caused, and ensure the safety of personnel and equipment.

Preventing human errors

- Developed human-error prevention tools and videos on red/yellow line management
- Comprehensively examined, analyzed, and summarized human error traps of CNNP, and released the CNNP Investigation and Analysis Report on Human Error Traps

Standardizing operational behavior

- Organized activities to collect good practices and released the *2021 CNNP Collection of Good Practices of Human Error Management*
- Developed the CNNP Observation Guidance Standard Card
- Issued the guidelines on personnel performance management maturity ratings
- Optimized CNNP's information sharing platform for human-error management

Improving operational skills

- Trained employees and contractor personnel with positions of main production departments on human-error prevention
- Organized contractors of affiliates to participate in the human-error prevention skills competition
- Held exchange meetings for human error management

02

Low-carbon Development Facilitates Ecological Progress

In 2021

• CNNP produced 182.637 TWh of electricity, equivalent to reducing 55.2477 million tons of standard coal consumption, and cutting CO₂, SO₂ and NO_x emissions by 144.749 million tons, 469,600 tons and 408,800 tons respectively. This is equivalent to planting 499,000 hectares of trees.

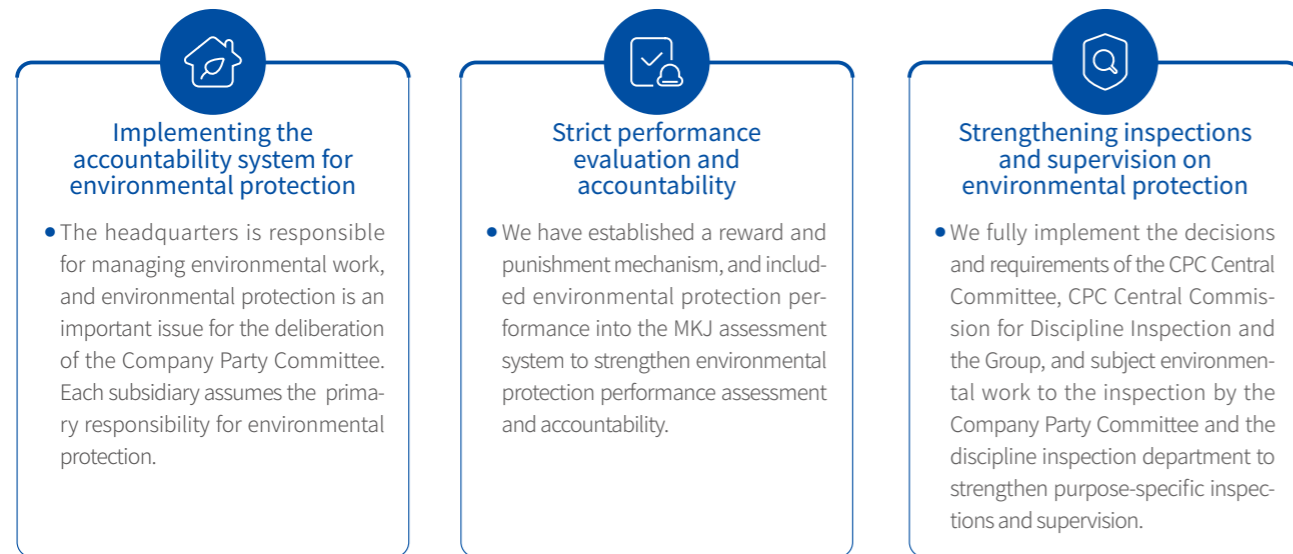


Standardizing Environmental Governance

Attaching great importance to the building of environmental management systems, CNNP clarifies the accountability system, and subjects environmental protection to the inspection by the Company Party Committee and the discipline inspection department. We continuously improve environmental management policies and supervise their implementation and strive to build an environmental governance system with clear division of responsibilities, specific targets, scientific decision-making, participation of diverse stakeholders, and strong execution.

Improving the Environmental Management System

By "highlighting environmental protection in production, business and operation management," the Company improved the accountability system for environmental protection at all levels. All our nuclear power plants have enhanced their automation, standardization and IT application to predict and issue early warnings against environmental quality problems. They have conducted internal reviews regularly, established stable and reliable quality assurance systems, and supported environmental monitoring laboratories to be certified by the CNAS (China National Accreditation Service for Conformity Assessment). By the end of 2021, all the nuclear power plants had passed the ISO 14001 environmental management system certification.



Case | Jiangsu Nuclear Power Co., Ltd. wins international recognition for its graded management of environmentally sensitive SSCs

In 2021, Jiangsu Nuclear Power Co., Ltd. continued to grade and manage environmentally sensitive SSCs in Units 5 and 6, complied the list of SSCs at each grade, and enforced corresponding SSCs management measures. In 2021, the WANO review recognized its graded management of environmentally sensitive SSCs as a good practice that deserve to be promoted to nuclear power plants around the world.

Strengthen Environmental Monitoring

The Company attaches great importance to comprehensive monitoring of the environment around nuclear power plants in operation, covering the atmosphere, fallout, soil, water quality, etc. The three shields of nuclear power plants have been intact. The performance of the radioactive gases, liquid and solid waste treatment system meets the designed requirements, and our radioactive effluent discharge is below the national regulatory limits. In 2021, CNNP organized two special environmental inspections on the radioactive waste management systems, safety management of radioactive waste, basic information about radioactive waste, consistency of the registration, general condition of waste safety management, waste package safety, etc.



Case | Zhangzhou Energy Co. Ltd. speeds up simultaneous design, construction and operation of environmental protection facilities and the main body of the project

The on-site radiation environment monitoring system is an essential environmental facility for nuclear power plants. Zhangzhou Energy Co. Ltd. strictly follows the rules that the radioactive pollution prevention and control facilities and the main body of the project should be designed, constructed, and put into use simultaneously, and that only when these facilities pass the acceptance inspection can they be put into production or use. In 2021, it took the initiative to communicate with the National Nuclear Safety Administration (NNSA), NNSA Eastern Office, Fujian Provincial Department of Ecology and Environment, and local governments, implemented the requirements of system construction, and completed the site selection for the monitoring system laboratory, which created favorable conditions for finishing the system construction on schedule.

Case | CNNP Liaoning Nuclear Power Co., Ltd. takes multiple measures for environmental monitoring

CNNP Liaoning Nuclear Power Co., Ltd. has compiled and released the "Environmental Monitoring" procedures, and monitors the dust and noise on the construction site, water quality of the domestic sewage treatment station, as well as flue gas from the boiler room, among other measures for environment control. It monitors and records the dust and noise levels on the construction site every week. Every quarter it commissions a qualified third-party agency to sample and test the rain outfall, boiler room and domestic sewage treatment station, and strengthens maintenance of the boiler's pollution control facilities and online monitoring devices in the plant to ensure compliant discharge of key pollutants. As of the end of 2021, the company performed well in environmental protection overall with zero environmental pollution incident.



A panorama of Xudabao nuclear power plant

Developing Renewable Energy

CNNP has moved faster to develop the renewable energy industry. Focusing on wind and photovoltaic power generation, we prioritize renewable energy development in Northeast China, Northwest China, and the northern region of North China, strive to improve regional energy mix and reduce air pollution, and promote local economic development.

March 31, 2021	December 7, 2021	December 15, 2021
<p>Hebei</p> <p>Phase I 40 MW Photovoltaic Power Generation Project in Wentang town, Pingshan county, was connected to the grid.</p> <p>Once the project is fully connected to the grid, it is expected to generate 54.7265 GWh of electricity per year throughout its life cycle of 25 years, equivalent to reducing the consumption of standard coal by about 16,746.31 tons, and the emissions of SO₂, NO_x, and CO₂ by about 1,267.53 tons, 633.77 tons, and 42,124.51 tons respectively.</p>	<p>Gansu</p> <p>Liugudun Salina 99.5 MW Photovoltaic Power Project in Minghua town, Sunan county</p> <p>This project is among the first new energy projects connected to the grid in Gansu province. After the grid connection is fully completed, it is expected to supply 178.427 GWh of electricity to the grid each year, which can reduce about 57,100 tons of standard coal consumption and smoke and dust emissions, SO₂ emissions and CO₂ emissions by about 626.34 tons, 1,501.35 tons and 15,400 tons per year.</p>	<p>Xinjiang</p> <p>Decentralized Wind Power Project in Yining county was connected to the grid.</p> <p>This is the first wind power project in the direct jurisdiction of Yili Prefecture. With a total installed capacity of 20 MW, the project has an annual power generation capacity of about 46.7 GWh. Once the project is put into operation, it is expected to reduce CO₂, SO₂ and NO_x emissions by about 35,841 tons, 17 tons, and 9 tons respectively, per year.</p>

Optimizing Resource Utilization

Insisting on economical and efficient utilization of natural resources, CNNP introduces innovative approaches and concentrates efforts to minimize resource consumption during the construction and operation of power stations. Meanwhile, a number of special actions are launched to greatly increase the comprehensive benefits of natural resources utilization.

Enhancing the Energy Efficiency of Equipment

The Company strengthens institutional management to improve resource efficiency. Four indicators, namely the "comprehensive energy consumption per 10,000 yuan of added industrial value, comprehensive energy consumption per 10,000 yuan of output value, CO₂ and SO₂ emissions per 10,000 yuan of industrial output value" are included in the *CNNP MKJ Management and Evaluation Measures*, to measure the annual performance of nuclear power, wind power, and photovoltaic power plants. The energy conservation and emissions reduction analysis report is submitted on a quarterly basis. In 2021, we increased investment, over 66 million yuan in total, in energy conservation and emissions reduction.

Case | Jiangsu Nuclear Power Co., Ltd. won the title of "green factory" at the provincial level

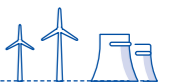


In 2021, Jiangsu Nuclear Power Co., Ltd. actively participated in Jiangsu's green-factory campaign, and made improvements based on the analysis of infrastructure, management system, energy conservation management, energy and resource input, emissions, etc. It clarified the green factory tasks from 2021 to 2025, set goals, tapped the potential for energy conservation and emissions reduction, and strengthened the conservation and comprehensive utilization of resources. After self-evaluation, third-party evaluation, on-site inspection, data review, and recommendation by the county, municipal and provincial governments, Jiangsu Nuclear Power Co., Ltd. was awarded the title of "Green Factory" at the provincial level in December 2021.



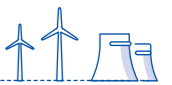
The "Green Factory" certificate for Jiangsu Nuclear Power Co., Ltd.

Case | Special actions launched for capacity increase and efficiency improvement of units to increase the power generation capacity



The capacity increase and efficiency improvement of units are achieved by scientific and rigorous technical demonstration and testing of the performance of turbo generator units based on the existing configuration, to fully tap the potential of the units and increase the power generation capacity. With low input and high output, this can notably improve quality and efficiency. In 2021, the nameplate rating of Unit 1 of Qinshan Nuclear Power Plant No. 2 was increased to 670 MW from 650 MW, with the approval of Zhejiang Provincial Development and Reform Commission. Qinshan Nuclear Power's successful capacity increase and efficiency improvement made it the first typical case of evaluation-based capacity increase in the domestic nuclear power industry. Fujian Fuqing Nuclear Power Co., Ltd., Jiangsu Nuclear Power Co., Ltd., and Hainan Nuclear Power Co., Ltd. are also working on quality and efficiency improvement.

Case | Qinshan Nuclear Power Co., Ltd. provided membrane deaerators for plants to save electricity



As the key equipment in nuclear power plants, deaerators remove oxygen from the feedwater. The deoxygenation efficiency affects the safety and energy consumption of the unit. Membrane deaerators are compact equipment, safe, energy-efficient and use less chemical reagents. Qinshan Nuclear Power Co., Ltd. has replaced the common thermal deaeration method with this high technology, greatly reducing energy consumption of the nuclear power plant. When calculated by five treatments of excessive oxygen content each year, the two water storage tanks of the REA system of Qinshan Nuclear Power Plant No. 2 will consume 54 MWh of electricity. The installation of membrane deaerators will save the trouble to change water through the thermal deaerator, and thus can save 54 MWh of electricity and reduce wastewater discharge by 3,000 tons every year.

Reducing Water Consumption

In its project operation, the Company continues to reduce water consumption by promoting technological transformation, optimizing the wastewater discharge process of power stations, planning for systematic water consumption, and continuously improving water efficiency. In 2021, the industrial water consumption of CNNP decreased by about 5% year-on-year.



Real-time online water metering and analysis system

We replaced and added the metering equipment to the freshwater system for water intake, supply and use, to help identify abnormal water intake and use in a timely manner.



Optimizing the discharge process of industrial wastewater.

The water discharged from sand backwash filters and carbon backwash filters is recovered to the water distribution well to be recycled in the clarifier. And the flushing slag water from the clarifier is discharged to the newly built sedimentation tank to recycle the supernatant.



Upgrading and reconstruction of domestic wastewater treatment station

We raised the standards for domestic wastewater discharge to the *Level A Criterion in the Pollutant Discharge Standards for Urban Sewage Treatment Plants*.



Q&A

Will the operation of nuclear power plants consume a lot of water?

The biggest source of water consumed by nuclear power plants is cooling circulating water, which is mainly used to cool the saturated steam after power generation. As the cooling is a cross-circulated process through the heat exchange system, the cooling water taken from the outside evaporates during heat absorption and liquefies after heat release in discharge, so that it can be recycled in the units. At the same time, nuclear power plants can adopt water cooling solutions that consume less water based on their conditions, such as secondary circulation cooling, air cooling and reuse of reclaimed water. They only need to make up for the evaporated cooling water on a daily basis. This can meet the water supply reliability standards for nuclear power plants and solve the conflicts with other water users.

Case | Applying the seawater circulating cooling technology to reduce freshwater intake



In coastal areas where nuclear power plants are located, freshwater is in short supply and the allowable exploitation quantity is decreasing year by year. In response, the plants further optimized their seawater intake plan and introduced the seawater circulating cooling technology: use seawater to cool heat exchange equipment and then recirculate it in the cooling tower for reuse. This has effectively eased the shortage of freshwater intake and use in coastal areas.

Improving the Fuel Utilization Efficiency

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

Strictly Controlling Effluent Discharge

CNNP has improved the system of radioactive and non-radioactive waste management, strictly implemented the laws and regulations on nuclear safety, and stepped up efforts in minimizing radioactive waste to reduce radioactive waste generated.

Radioactive Waste Management

The Company continues to minimize radioactive waste. In accordance with *The Law on the Prevention and Control of Radioactive Pollution and Regulations on the Safety Management of Radioactive Waste*, all operational plants have tightened the approval of applications for waste discharges and strengthened discharge monitoring.

The headquarters has set up a taskforce for radioactive waste minimization, and each plant a corresponding team, to comprehensively manage radiation protection and radioactive waste minimization. At the beginning of the year, the taskforce would formulate the annual plan for radioactive waste management and propose radioactive waste minimization projects for approval, and review the work at the yearend, to effectively control and minimize the discharge of radioactive waste. In 2021, the treatment systems for solid waste, wastewater, and waste gases ran well, and the discharge of radioactive liquid effluents of our operational units was under effective control, which was lower than the limits set by the Ministry of Ecology and Environment.

Non-radioactive Waste Management

The Company manages non-radioactive waste in strict compliance with laws and regulations, such as *The Law on the Prevention and Control of Environmental Pollution Caused by Solid Waste* and *The Chemical Discharge Management*. As required by the *National Working Plan for Standardized Environmental Management and Assessment of Hazardous Waste for the 14th Five-Year Period*, the nuclear power plants have updated the *Responsibility System for the Prevention and Control of Pollution Caused by Hazardous Waste*, improved the hazardous waste management system, the registration of general solid waste and hazardous waste and sought better solutions for reducing the discharge of non-radioactive waste.

Air pollutants

- Projects under construction are required to be equipped with and operate the facilities for air pollution prevention and control (i.e. desulfurization, denitrification and dust removal devices), and strengthen maintenance of online air pollutant monitoring equipment. We have tightened the control of fly ash and dust in open operation sites, raw material storage yards, waste slag yards, etc., and improved dust suppression measures to put fugitive emissions under strict control.

Wastewater

- We have strengthened the monitoring of the quality of discharged water to ensure discharge compliance. We set up sewage outfalls in strict accordance with relevant standards, and improved the maintenance of online sewage monitoring equipment to ensure the normal functioning of environmental protection equipment.

Solid waste

- We have implemented *The Law on the Prevention and Control of Environmental Pollution Caused by Solid Waste*, and advanced the minimization of radioactive waste to reduce its generation from the source.

Case

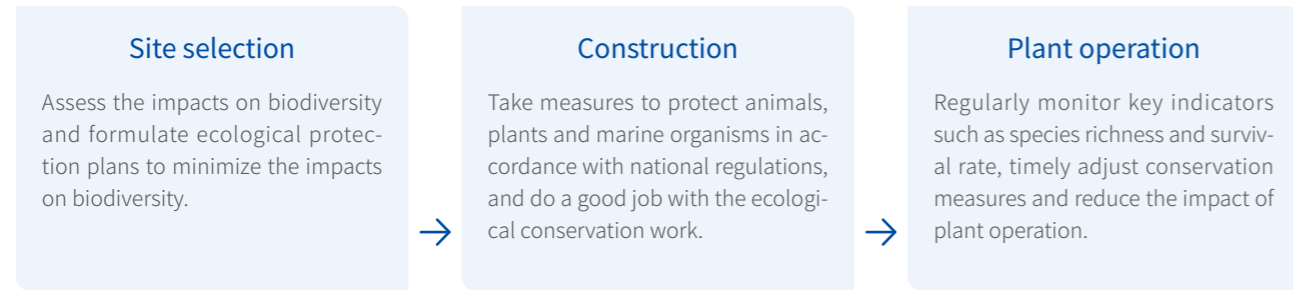
Jiangsu Nuclear Power Co., Ltd. takes cyclic sampling of wastewater to ensure compliant discharge



When treating non-radioactive liquid effluent from conventional islands, considering its risk of contamination, Jiangsu Nuclear Power Co., Ltd. applies the same method as that for treating radioactive effluent. The management of liquid effluents strictly complies with the requirements of the *Chemical Discharge Management*. Cyclic sampling of wastewater is carried out before discharge. If the sampling analysis results meet the discharge standards, the wastewater can be discharged when approved. Otherwise, the wastewater needs to be further treated.

Protecting Biodiversity

CNNP steps up efforts to conserve biodiversity during site selection, construction and operation of the power plants. We also continuously improve surrounding ecological environment and the habitats of species, to mitigate the pressure on biodiversity loss.



Case | Jiangsu Nuclear Power Co., Ltd. conducts research on the genetic diversity of marine organisms

In order to better protect marine biodiversity and ensure the sustainable utilization of marine resources, Jiangsu Nuclear Power Co., Ltd. commissioned Nantong Environmental Monitoring Station of the State Oceanic Administration to carry out research on the genetic diversity of marine organisms. The project team investigated the genetic diversity of marine organisms in the waters surrounding the power station, and selected three dominant species for analysis: the portunus trituberculatus, oratosquilla, and collichthys lucidus. The research has found that genetic diversity is at a high level and in a relatively ideal living environment, with little impacts from the environment and human beings.

Case | Hainan Nuclear Power Co., Ltd. cultivates the pearl oyster, Pinctada maxima, while ensuring safe operations

The pearl oyster living in the waters near Changjiang Nuclear Power Plant, Hainan, is a wild animal under Class II state-level protection and an endemic species in the South China Sea. The plant crew is actively experimenting the cultivation of pearl oysters. They farm and reproduce pearl oysters with the residual heat of the cooling water. Pearl oysters need no fish feed and thus can purify the marine environment, inhibit the growth of planktonic algae and the eutrophication of water and facilitate safe operation of the units. The project team has re-opened the oyster farming area and restored the oyster population in surrounding waters, contributing to biodiversity conservation and safe operation of the units at the same time.



Hainan Changjiang Nuclear Power Plant carries out experimental cultivation of pearl oysters

Advocating a Green Lifestyle

In 2021, to mark the World Environment Day on June 5 and other major occasions, CNNP encouraged low-carbon ways of production and lifestyles. We organized various educational and publicity activities on environmental protection at each power station as well as residential neighborhoods, to nudge residents to contribute to emissions reduction, energy conservation and environmental protection.

Fujian Fuqing Nuclear Power Co., Ltd.

Fujian Fuqing Nuclear Power Co., Ltd., together with the local emergency response office and universities, launched an awareness activity themed on "Safe and Orderly Development of Nuclear Power for Carbon Peaking and Carbon Neutrality" on the World Environment Day, to raise public understanding of the important role of nuclear energy in reaching the carbon peak and carbon neutrality goals.



Jiangsu Nuclear Power Co., Ltd.

Jiangsu Nuclear Power Co., Ltd. cooperated with Lianyungang Ecology and Environment Bureau and sub-district offices to organize a public biking activity on the Earth Day, which was welcomed and responded warmly by the public.



Zhangzhou Energy Co. Ltd.

Zhangzhou Energy Co. Ltd., together with the Eastern Office of the National Nuclear Safety Administration and the Ecology and Environment Bureau of Yunxiao County, jointly launched an awareness activity themed "Harmonious Coexistence with Nature," to call the public for resource conservation and environmental protection.



CNNP Liaoning Nuclear Power Co., Ltd.

The young employees of CNNP Liaoning Nuclear Power Co., Ltd. popularized knowledge about environmental protection and nuclear power to citizens in Longwan Park, Huludao city, and picked up waste in the park to protect the environment.



Case | Creating a friendly image to enhance public communication

While actively protecting biodiversity, CNNP is thinking about how to raise public understanding of the creatures around the nuclear power plants, and work with the public in biodiversity protection. In 2021, CNNP created a series of cartoon characters bearing unique features of nuclear power plants, and named them "Colorful CNNP", namely "Double C". Each cartoon character represents a nuclear power base and has a distinct personality. They appeared a lot in various publicity activities and helped to raise public awareness of biodiversity conservation.

03

Bolstering Development Vitality through Innovation

In 2021

- 2.60% of the revenue spent on R&D



Advancing Reform and Innovation

Attaching great importance to deepening reform in all respects, we continue to bolster the momentum and vitality of development, implement specific measures, and advance the three-year SOE reform action plan, shouldering our primary responsibility as an SOE.

Continuing the SOE reform

Through advancing the three-year SOE reform action plan, we continuously bolster the momentum and vitality of development. By the end of 2021, we had completed more than 90% of the 56 reform tasks and 306 measures.

Specifically we set tasks in six aspects, i.e., improving the modern enterprise system with Chinese characteristics, improving the layout and structure of the state-owned sector, proactively and steadily deepening the mixed-ownership reform, improving the market-oriented operation mechanism, implementing reform-related projects, and strengthening Party leadership and Party building. Among them, all tasks of 2021 were completed and most key tasks of 2022 were also completed ahead of schedule, accounting for 91.1% of the 56 reform tasks, a high level in the performance assessment organized by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC).

Case | CNPO recommended by the SASAC as a good practice for tech-SOE reform



In line with the decisions and plans of the Party Central Committee and the State Council, as well as the requirements of the SASAC and CNNC, China Nuclear Power Operation Technology Corporation (CNPO) advanced the demonstration action for tech-SOE reform and the reform of research institutes in a coordinated manner, and gradually formed an innovation-driven, market-oriented remuneration and incentive system, further releasing the vitality of innovation and entrepreneurship. CNPO was rated "excellent" in the 2021 purpose-specific performance assessment organized by the State Council's SOE Reform Office and was selected into the SASAC's collection of good practices in reform innovation.



CNPO was rated excellent in the appraisal of tech-SOE reform

Three-system reform

We attach great importance to deepening the reform of three systems concerning labor, personnel, and distribution. A flexible personnel management mechanism has been fostered and effectively operated, which enables the promotion and demotion of the management personnel, the recruitment and dismissal of staff, and the rise and fall in salaries. Furthermore, we step up efforts to implement the tenure system and contract-based management for the leadership, explore a performance-based appraisal and incentive mechanism, and accelerate building an intensive learning organization so as to fully stimulate the Company's endogenous momentum of development and enhance our competitiveness.

Promoting the tenure system and contract-based management

We actively promoted the tenure system and contract-based management of the headquarters and affiliates, with the completion rate of 100%.

Improving and promoting the system to remove underperformers and the incompetent

Efforts were stepped up to allow demotion for the management and remove underperformers and the incompetent to optimize the personnel structure. By the end of 2021, CNNP and its subsidiaries had 830 management personnel.

Market-oriented employee exit reform

We continue to recruit experienced personnel. In 2021, CNNP and its subsidiaries had 1,283 new hires, all through open recruitment; we revised the Labor Relations Management and developed the employee exit mechanism.

Employee salary reform

In accordance with the Remuneration Regulations, we increased the proportions of the income gap and unfixed salary, so that income can be increased or decreased based on performance.

Institutional innovation

To meet the needs of high-quality development in the new era, we continue to introduce institutional innovations, strengthen intensive management, and develop new business models, optimizing corporate systems and mechanisms with concrete actions.

Developing intensive management models

In line with the overarching requirement of deepening reform and promoting innovation-driven development, we focus on advancing intensive management models to improve our per-capita labor productivity. Moreover, we step up efforts to promote offline operation of sourcing, training, information, scientific research, repair & maintenance, etc. with brick-and-mortar centers and platforms to improve business concentration and tap the potentials of the enterprise.

Introducing new operation models

The "industry platform plus project company" model is introduced and dynamically optimized in light of the different characteristics and development stages of nuclear power operation, nuclear energy development, multi-purpose utilization of nuclear energy, non-nuclear clean energy and agile clean energy technology, etc.

Promoting equity diversification and mixed-ownership reform

In 2021, we introduced non-state-owned capital to 17 mixed-ownership subsidiaries. Moreover, we completed the integration of non-nuclear clean energy platforms, established a Swimming Pool Reactor (SPR) platform company, and fully implemented equity diversification to drive the industry's high-quality development through institutional innovation.

Expediting Independent Innovation

CNNP steadfastly adheres to the path of independent innovation with Chinese characteristics. To this end, we give full play to the primary role of enterprises in innovation, strengthen the implementation of strategic plans for scientific and technological development, and promote technological research and innovation and move faster to industrialize S&T achievements, to provide a strong guarantee for corporate sustainability.

An enabling mechanism for technological innovation

CNNP regards development as the first priority, talented people as the most important asset, and innovation as the biggest driving force. In 2021, we seized the opportunities brought about by the latest round of technological revolution and industrial revolution, put technological innovation at the core of corporate development, and released our scientific research plan for the 14th Five-Year Plan period, to provide strong S&T support for our high-quality development.



Top-level design

Our S&T development plan for the 14th Five-Year Plan period specifies three priority areas: investment, unit operation and maintenance, and units under construction, and calls for more research input in five fields: strategic investment, market-oriented application of nuclear energy reactors, multi-purpose utilization of nuclear energy, application of new energy technology, and agile high-tech technology.



Institutional arrangements

We have established the "1 plus 11" system to provide institutional support for the management of scientific research projects, talent development, incentives for researchers, and the commercialization of S&T achievements.



Innovation platforms

We have built a core collaboration mechanism, and the collaborative innovation platform supported by Nuclear Power Operations Research (Shanghai) Co., Ltd. and China Nuclear Power Operation Technology Corporation (CNPO), in addition to brick-and-mortar research institutes, and the Joint R&D Center of Digital Nuclear Power Technology with Tsinghua University.

Case | The headquarters, nuclear power plants in operation, affiliated institutes, and non-nuclear clean energy enterprises of CNNP all certified as high-tech enterprises

Attaching great importance to technological innovation, we conduct scientific research in investment, operation & maintenance, and units under construction, and promote the integrated allocation of projects, S&T achievements, and personnel in key areas. All our nuclear power plants in operation, affiliated institutes and non-nuclear clean energy enterprises are certified as National High-tech Enterprises; and the headquarters is awarded the High-tech Enterprise of Zhongguancun. These achievements lay a solid foundation for CNNP to become a high-tech high-quality nuclear power listed company with core competencies.

Technological R&D and achievement commercialization

CNNP coordinates project arrangements, increases investment in science and technology, and enhances independent innovation capability. In 2021, we considerably increased investment in technological innovation and made breakthroughs in domestic substitution of imported equipment and parts, equipment reliability improvement, and the building of intelligent nuclear power plants. We continued to improve the mechanism to commercialize technological advancements, and increased incentives and assessment efforts to promote the commercialization of high-quality core technologies with market competitiveness. In 2021, we won 79 awards for scientific and technological achievements, the most in the company history. Moreover, we appraised 87 technological advances and issued an international standard for heavy water reactors.

CNNP values the protection of intellectual property rights, promotes the application for and authorization of inventions and patents, and encourages company-wide innovation. In 2021, we were granted 611 intellectual property rights, including 26 invention patents, 420 utility model patents, and 165 software copyrights.

Case | Kicking off the research project for the world's first Carbon-14 radioactive isotopes with commercial reactor

To promote the application of nuclear technology in China, Qinshan Nuclear Power Plant and CNNC China North Nuclear Fuel Element Co., Ltd. (CNNFC), etc. jointly held a kick-off meeting for producing the world's first Carbon-14 radioactive isotopes in a commercial reactor, with the aim to promote the application of the first Carbon-14 radioactive isotopes into reactors in 2022 and launch it in the market in 2024.

The Carbon-14 radioactive isotopes can be used for the detection of Helicobacter pylori infection, development of new medicine, and PM2.5 detection, etc. As China's only Cobalt-60 production base, the heavy water reactor units of Qinshan Nuclear Power Plant plan to leverage the Cobalt-60 production technology to produce Cobalt sources for industrial and medical purposes and Carbon-14 radioactive isotopes, and to focus on the development of Carbon-14 production technology through radiation. With the production of Carbon-14 radioactive isotopes in the reactor, the plant can produce cobalt source for industrial and medical purposes and Carbon-14 nuclide while ensuring safe power generation, so as to provide a strong guarantee for the development of the country's nuclear technology industry.



The kick-off meeting for the production of the world's first Carbon-14 radioactive isotopes in a commercial reactor

In 2021
79
awards for scientific and technological achievements

700
awards at the provincial/ministerial level, from CNNC or industry associations

2
EPRI technology transfer awards



Promoting Delicacy Management

We continued to optimize the MKJ management system by formulating performance management indicators and MKJ indicator measurement models. At the same time, we promoted the transition from specialized, standardized management to delicacy management, laying a foundation for digitizing operation and management; benchmarking against world-class standards, we built the "3142" system with capability improvement at the core, and made improvements through three-dimensional indicator benchmarking.

Focusing on the investment positioning as a listed company, CNNP has built a full-life-cycle investment management system covering from investment planning to exit. Apart from that, we have built investment value models and continuously improved the delicacy management of our investment; we piloted digital transformation and leveraged big data and information technology to establish a digital operation platform covering and tracking all areas. In 2021, the digital operation monitoring platform based on risk response was recognized as a big data industry development demonstration project by the Ministry of Industry and Information Technology.



Honor

A Model Enterprise in Improving Corporate Management among Key State-owned Enterprises awarded by the SASAC

Empowering Development with Digital and Intelligent Technologies

Leveraging digital and intelligent technologies, CNNP has promoted the construction of 5G wireless networks in nuclear power plants and developed the ASP-1 technology and ASP-2 industrial software. At the same time, efforts have been made to build intelligent construction sites, improve operation safety, and contribute to systematic and intelligent management of engineering construction. With these efforts, we are striving to meet the highest level in China and even in the world in terms of project management.

Case | i-WeiXiu of Qinshan Nuclear Power Plant: A demonstration solution for digital transformation

Focusing on digital transformation at the production level of nuclear power plants, Qinshan Nuclear Power Plant has developed i-WeiXiu, a digital management system for daily repair and maintenance. The i-WeiXiu system has considerably improved the efficiency of repair and maintenance and broken away from traditional maintenance scenarios and modes. It is a digital transformation demonstration solution for delicacy management of nuclear power-related repair and maintenance, and explores a new way for digitizing frontline management. It has won the first prize of CNNC for management innovation and WANO evaluation recognition.

Case | Building a digital platform for smart energy assets management

To effectively promote the integration of safety management standardization and informatization, China Rich Energy Corporation Limited has actively built a digital platform for smart energy assets management, with which, it will start a new development path based on large-scale management and digital management of new energy business. In 2021, this digital platform won the Informatization Management Innovation Award for Energy Enterprises.



The digital platform of China Rich Energy Corporation Limited for smart energy assets management



04

Promoting Cooperation to Achieve Win-Win Results

In 2021

- 278 strategic suppliers



Deepening Strategic Cooperation

CNNP has established partnerships with the government, customers and various kinds of institutions, to integrate resources and complement with each other, striving to achieve mutual benefits and common development.



Case | Cooperation with the Postal Savings Bank of China



CNNP attaches great importance to and strengthened cooperation and exchanges with the Postal Savings Bank of China and other financial institutions through offline seminars and strategic partnerships. By so doing, we hope to establish a long-term and stable strategic partnership with the bank and carry out various forms of exchanges and cooperation in nuclear power, new energy and other fields, so as to achieve mutual benefits and common development.

Optimizing the Business Portfolio

CNNP responds to the state's call for grounding our work in this new stage of development, apply the new development philosophy, construct the new development paradigm, and promote high-quality development. Following the "dual carbon" goals, the Company confirmed the plan for optimizing the business portfolio during the 14th Five-Year Plan period, with focus on developing nuclear energy, non-nuclear clean energy, and new agile industries. While centering around the development of these three industries, we will work to upgrade related industries, foster new growth points, and keep extending the industrial value chain.



Nuclear energy

To seize the opportunities brought by the drive toward the "dual carbon" goals, set up the Nuclear Energy Development Department, insist on integration and opening up, promote industry integration, and drive scientific, orderly and efficient development of nuclear energy.



Non-nuclear clean energy

Make full use of internal and external resources, build integrated energy base projects based on the geographical advantages of nuclear power plants and the needs of local economic and social development, and boost the development of non-nuclear clean energy.



New agile industry

Conduct top-level planning for industrial development and come up with solutions for integrated operations of the agile investment platform; reach out to over 70 scientific research institutes, universities, tech companies and investment institutions, conduct comprehensive and in-depth analyses of potential investment directions, identify the first key industries to invest in and carry out due diligence and scientific research of related projects.

Case | The Intelligent Operation and Maintenance Research Center for Nuclear Power Equipment



On March 24, 2021, the Nuclear Power Operation Research Institute and Shanghai Jiaotong University signed a cooperation agreement on jointly developing the Intelligent Operation and Maintenance Research Center for Nuclear Power Equipment which was unveiled on the same day. The center focuses on key nuclear power equipment and explores ways for the Company and the University to cooperate. It will help both sides give full play to their resources and strengths, seek common development, cultivate researchers, and achieve more scientific research results.



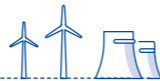
The signing and unveiling ceremony of the Intelligent Operation and Maintenance Research Center for Nuclear Power Equipment

Deepening Global Development

Guided by the strategy of internationalization, CNNP persists in opening up and win-win cooperation. We have cooperated with many countries in clean energy and promoted made-in-China products and technologies to overseas markets.

Faced with multiple difficulties, such as the grim pandemic situation and tense and volatile international relations, CNNP has continued to promote the development of nuclear power-related technical services. We worked harder to tap our potential of technical services on one hand and develop the technical service market on the other. We also improved our technical services and products, extended the value chain of the industry, expanded technical services to more areas, and moved faster to bring China's nuclear power products and services overseas.

Case | The heads of state of China and Russia jointly witnessing the launch of the largest Sino-Russian nuclear energy project



On May 19, 2021, Units 7 and 8 of Tianwan Nuclear Power Plant and Units 3 and 4 of Xudabao Nuclear Power Plant officially started construction. Chinese President Xi Jinping and his Russian counterpart Vladimir Putin jointly witnessed the ground-breaking ceremony via video link and each delivered a speech. President Xi pointed out that in the new international situation, the two countries should share development opportunities and make the pie of cooperation even bigger. China and Russia enjoy a solid foundation for and share many common interests in energy cooperation. While consolidating existing partnership projects in the traditional energy sector, the two sides should seek cooperation in the new energy sector, promote a package of partnerships in nuclear energy, and explore new areas of cooperation, such as renewable energy. Nuclear energy cooperation between China and Russia has created a new model for building a community with a shared future for mankind. The two will strive to make the project a global model project in nuclear safety.

This is so far the largest nuclear energy project between China and Russia, representing the highest level of pragmatic bilateral cooperation. Once completed and put into operation, the project will generate 37.6 TWh of electricity each year, equivalent to reducing CO₂ emissions by 30.68 million tons per year.



Construction begins for the Tianwan Nuclear Power Plant and Xudabao Nuclear Power Plant

Building a Responsible Supply Chain

Upholding equality, mutual trust, honesty, opening up, and win-win cooperation, CNNP seeks sustainable development together with suppliers and strives to establish long-term and stable strategic partnerships. In 2021, the Company's key performance in sourcing and supply chain management reached the advanced level of benchmark set by SASAC.

Formulating sourcing principles

We have formulated the *Sourcing Management Regulations* to make sure that the Company's sourcing practices comply with the principles of openness, equality, impartiality, fair competition, honesty, standardization, high efficiency, and security of supply. Always honoring contracts and our words and upholding rule of law and business credit, we work with suppliers on an equal and mutually beneficial basis and effectively protect the lawful rights of suppliers and their employees.

Improving sourcing management

Focusing on 16 key tasks in five areas, including improving the organizational structure and institutional arrangements, improving the supplier management system, promoting centralized sourcing, and team building, we enrich our improvement actions based on the status quo of sourcing and bidding & tendering management. We have formulated an implementation plan for the CNNP Two-Year Action and carried out 21 governance improvement actions in eight key areas to contribute to the establishment of an advanced sourcing management system. In 2021, the Company realized 99% e-sourcing and 99% centralized sourcing, with the disclosure rate of 99%.

Strengthening supplier management

We improved the supplier management system by following the master plan and promoting institutional development and the use of IT and supplier assessments.

Formulating supplier management principles

The *14th Five-Year Plan for Supplier Management* was developed as part of top-level design, laying down the principles, pathways and goals for supplier management as well as measures that can be taken to realize related goals for the following five years.

Improving the supplier management system

We improved the supplier management system, regulations and standards, and released the updated version of the *Supplier Management Regulations*.

Strengthening the integration of supply chain management data

We improved the functions of the supplier management information system and strengthened the integration of supply chain management data.

Strengthening supplier training

We trained non-core suppliers on supplier-related procedures and systems and communicated to them supplier management requirements through meetings, interviews and in other forms. We also publicized and implemented the *Ten Noes for Integrity and Self-Discipline of Suppliers* to enhance their awareness of integrity.

Assessing suppliers

We assessed suppliers' management capabilities and produced corresponding verification and rectification reports. We stepped up to monitor abnormal behavior of suppliers, i.e. using CNNC's e-sourcing platform to issue early warnings against abnormal behaviors of suppliers and thus to detect and prevent them in a timely manner.

Case | Project management capability training for suppliers



To improve suppliers' self-management capabilities, CNNP has carried out capacity building programs targeting their weaknesses in project management. Courses such as Organization Activation and Self-Transcendence: Pursuing Excellence are developed for mid- and high-level management personnel of suppliers. Since 2021, we have trained nearly 200 members from more than 30 suppliers.



Project management capability training for suppliers

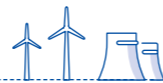
Boosting Common Development of the Industry

Fully leveraging our influence in the nuclear power industry, we actively participate in industry-wide communication and the formulation of standards at home and abroad and help the industry achieve higher-quality and more sustainable development through concerted efforts with stakeholders.

Formulating Industry Standards

The Company attaches great importance to leading the formulation of technical standards in the industry. These standards support the development of nuclear power technology and facilitate the internationalization of China's nuclear power industry. In 2021, CNNP's = Determination of heavy water isotopic purity by Fourier transform infrared spectroscopy was approved as an international standard.

Case | ISO 23468: Determination of heavy water isotopic purity by Fourier transform infrared spectroscopy released



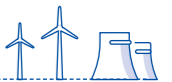
The international standard ISO 23468: Determination of heavy water isotopic purity by Fourier transform infrared spectroscopy compiled under the lead of Qinshan Nuclear Power Plant was officially released. The standard provides the latest advanced technical specifications for determining heavy water concentration in the international nuclear energy field. It marked a milestone in Qinshan Nuclear Power Plant's drive to spur technological innovation, and a breakthrough in the standardization and internationalization of China's nuclear power technology.



Strengthening Exchanges and Collaboration

The Company keeps deepening exchanges and cooperation with domestic and international partners to learn advanced concepts in the industry and share good practices. We aim to strengthen communication through mutual learning, and cooperation through communication. To this end, a number of international cooperation and exchange platforms are built to display the Company's technical strengths and scientific research results. We have maintained regular communication with overseas companies, including Électricité de France S.A, Westinghouse, Technatom, and Framatome.

Case | CNNP attending the Tsinghua PBCSF Economic Forum on Carbon Neutrality to promote collaborative development in the industry

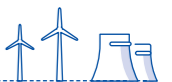


CNNP was invited to attend the Tsinghua PBCSF Economic Forum on Carbon Neutrality as a representative of the nuclear energy industry and delivered the keynote speech entitled Nuclear Energy Contributes to the "Dual Carbon" Goals, Clean Energy Empowers a Bright Future in the Carbon Neutrality and Energy Transformation session, to explore with industry peers development models for emissions reduction.



CNNP representative delivering a keynote speech at the Tsinghua PBCSF Economic Forum on Carbon Neutrality

Case | Ambassador of Argentina Sabino Vaca Narvaja on a field visit to the Hualong One demonstration project site



The National Energy Administration (NEA) and CNNP had a video meeting with Norman Martinez, Secretary of Energy of the Ministry of Economy and Ambassador of Argentina Sabino Vaca Narvaja at Fuqing Nuclear Power Plant. They showed Mr. Norman Martinez virtually around Fuqing Units 5 & 6 while Mr. Narvaja and his delegation were physically present at the Hualong One project site. Both sides had in-depth discussions on how to accelerate nuclear power cooperation and reached a significant consensus.

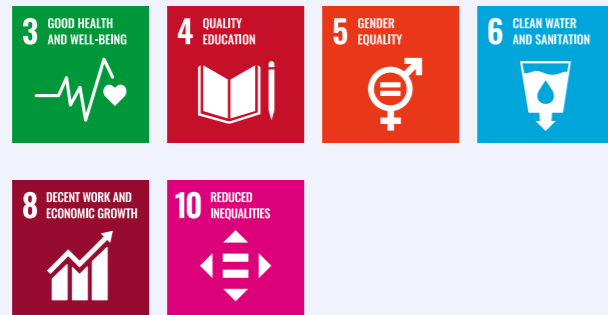


Ambassador Sabino Vaca Narvaja leads a delegation to Hualong One demonstration project site

Being People-Oriented and Boosting the Well-Being of Employees

In 2021

- 65.63 million yuan was spent on training, with 1,601,730 hours of training in total
- 1,078 measures completed in the "Serving the People" campaign

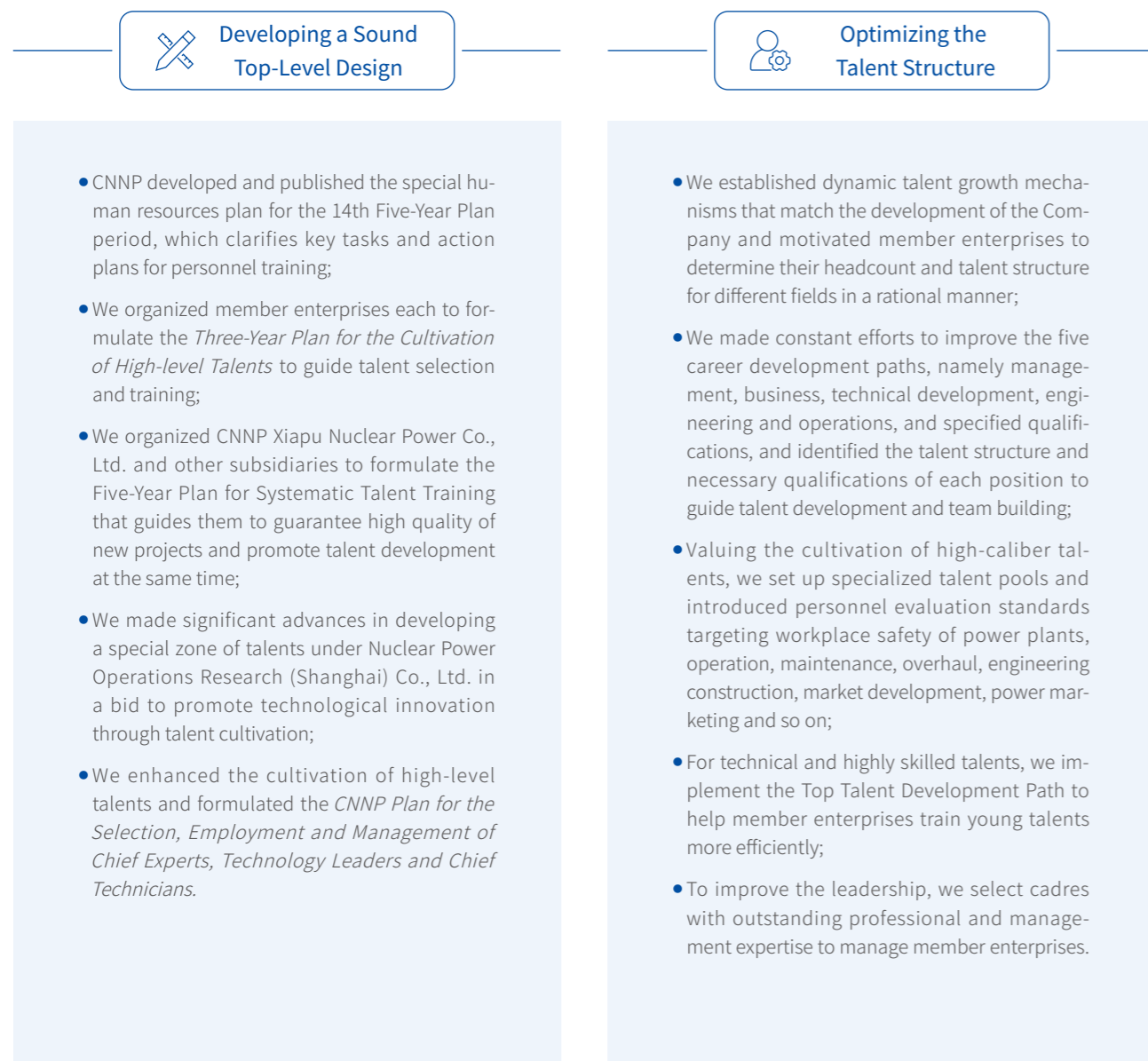


Building a Competent Talent Team

Following the guideline of "prioritizing talent, selecting and employing personnel in a market-oriented way and deepening human resources reform" and aiming to "build a world-class talent team", we moved faster to select and train young cadres, high-caliber professionals and technical staff, as well as highly skilled personnel, and establish multi-level and cross-sequence career development pathways, striving to form a well-structured pyramid of talented personnel and build a new highland for attracting and retaining nuclear power professionals.

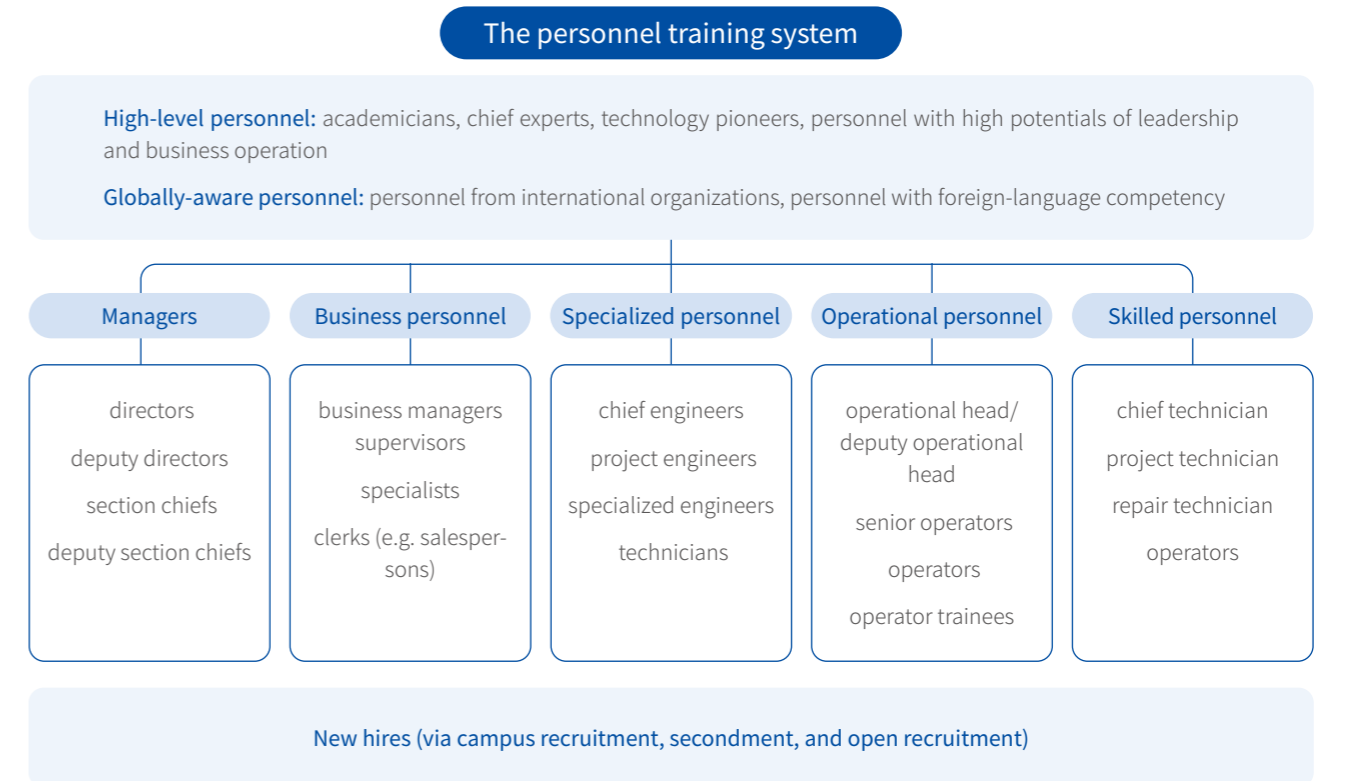
Building Smooth Career Development Paths

The Company has improved the top-level design, formulated training plans for different levels of talents, built five career development paths, and established specialized talent pools. While making great endeavors to cultivate technical and highly-skilled personnel, we select cadres with good merit and strong abilities to replenish our team of professional leaders, and take multiple measures to optimize our talent structure and unblock career development paths.



Improving the Personnel Training System

The Company attaches great importance to constructing a scientific and systematic talent training system, which can help build a competent and well-structured talent team. To further release the potential of young talents, CNNP has implemented the Elite Program to facilitate the growth of new recruits. We also enhanced the cultivation of "four types of specialized talents (academicians, chief experts, technology pioneers, personnel with high potentials of leadership and business operation)" and paved the path for them to realize further development. In 2021, the Company hired 32 high-caliber talents and promoted 21 young cadres through open selection.



Case | The 2021 Media Literacy Training for Spokespersons and Listed Companies

To strengthen employees' identification with CNNC and CNNP and encourage them to assume responsibilities as ambassadors of CNNP, the 2021 Media Literacy Workshop for Spokespersons and Listed Companies was organized. The program required all levels of Party members to lead by example, communicate the Party's policies via media outlets, and contribute to building a "reliable, amiable, low-carbon, and empowering" corporate image for CNNP.

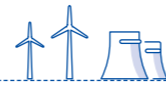


A mock one-to-two interview



A mock press conference

Case | A lecture given by the president of China Association for Public Companies (CAPCO) as guest speaker



To further enhance leading cadres' expertise and corporate governance ability, on December 1, 2021, CNNP invited Song Zhiping, President of CAPCO and China Enterprise Reform and Development Society (CERDS) to give a lecture entitled *Toward a New Era of Corporate Governance*, to an audience of over 250 who attended in person or online to share insights into the high-quality development of China's nuclear power industry.

Case | Attracting more talents through the Elite Program



The Elite Program is launched to attract more competent fresh graduates. Through order-based talent cultivation programs and summer camp (open days) activities among college students, we have built up an outstanding employer brand and enhanced the Company's appeal to talented personnel.

Building Platforms for Employees to Show Their Abilities

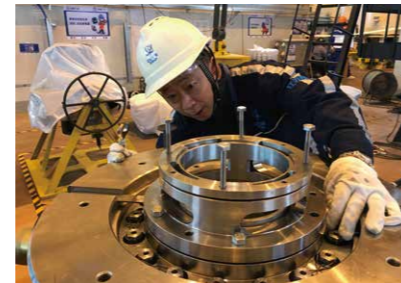
The Company has organized various activities to improve the efficiency of employee training, including technological R&D projects, open-competition projects, mentoring programs, and skill competitions. We have also organized and participated in the National Vocational Skills Competition, the CNNC Skills Competition, the Vocational Skills Competition of the Nuclear Energy Industry, etc., to build platforms for skilled staff to show their abilities. In 2021, the Company hosted the National Class II Vocational Skills Competition - For Nuclear Reactor Operation Watchmen, and participated in three events of the Competition. Six employees were awarded the honorary title of National Technical Experts and one the National Outstanding Contribution Award for Skilled Personnel Cultivation.



The 2021 National Class II Vocational Skills Competition - For Nuclear Reactor Operation Watchmen hosted by CNNP

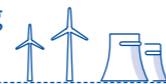


Ma Yiming, a "National Technical Expert" from Qinshan Nuclear Power Co., Ltd.



Zan Yinghui, a "National Technical Expert" from Jiangsu Nuclear Power Co., Ltd.

Case | Encouraging employees to make technological breakthroughs and building platforms for technical staff to show their abilities



CNNP highly values the cultivation of S&T personnel. Regarding key technological problems and difficulties involving multiple fields, we select the best candidates through open competition to provide a platform for S&T personnel to show their abilities. First, we encouraged member enterprises to apply for key research projects, and received 133 such applications in 2021, among which 36 were reviewed and approved by the expert panel organized by CNNP's S&T department. Second, we invited open competition for 17 projects on homemade equipment among member enterprises, and received 56 team applications. Third, we tracked the progress on the open-competition projects, conducted corresponding acceptance inspections, and used the inspection results to formulated plans for selecting tech leaders. In this way, we managed to advance major projects, personnel training and R&D projects simultaneously.

Protecting Employee Rights

CNNP strictly abides by laws and regulations and always puts the rights of employees first. Adhering to the principles of equality, openness and transparency, we guarantee equal employment, rational income distribution, and democratic communication, and care for employees' physical and mental health, and strive to create an upbeat, harmonious and people-oriented workplace good for employees' wellbeing and occupational health and safety.

Equality and Diversity

CNNP strictly follows The *Company Law* and The *Labor Law* and other applicable laws and regulations in China as well as applicable international labor standards. In terms of recruitment and employment, the Company abides by the nondiscrimination principle and treats all employees equally regardless of their gender, age, education, or nationality. Additionally, CNNP prohibits and opposes any form of child labor and forced labor to create an equitable, diverse, and inclusive workplace. As of 2021, the Company employed 15,756 people, including 2,313 female employees and 1,049 of ethnic minorities, with the contract signing rate of 100%.

By type of personnel	Managers	14.50%
	Business personnel	15.91%
	Specialized personnel	37.08%
	Operational personnel	19.28%
	Skilled personnel	11.06%
	Others	2.17%
By educational background	Master's degree or higher	9.18%
	Bachelor's degree	81.55%
	Junior college	7.48%
	Others	1.79%
By age group	Below 35 years of age	63.00%
	36-40 years of age	15.79%
	41-50 years of age	14.62%
	51 years of age and above	6.59%
By gender	Male	85.32%
	Female	14.68%

Compensation and Incentives

The Company has established an all-encompassing performance appraisal mechanism covering all employees. The appraisal results bear heavily on employees' job transfer, promotion and training, and reflect their responsibilities and contributions, to reward or punish accordingly. We constantly develop market-oriented incentives and have introduced equity incentives, Strategy-Item-Point (SIP) incentives, and targeted incentives to ensure competitive compensation and benefits for employees, thus stimulating employees' enthusiasm and vitality.

Equity incentives	SIP incentives	Targeted incentives
Equity incentives are introduced to allow backbone employees to grow together with the Company. The first options granted to employees were unlocked in June 2021. By the end of 2021, 457 of the 490 recipients had exercised their stock options, and the effect of the incentive was remarkable.	By integrating tasks into projects, converting projects into points, and points into monetary rewards, we have introduced SIP incentives for the performance appraisals of R&D departments. SIP performance bonuses are paid on a monthly and settled on a quarterly basis. This helps enhance the effect of incentives that link performance appraisal results with total points and total income with performance.	The revised measures for MKJ appraisal-based incentives cover safe operation, engineering construction, market development, innovation and efficiency improvement, etc. Incentives targeting key and difficult tasks are offered to further improve management efficiency.

Democratic Management

The Company listens to the voices of employees carefully and establishes channels for democratic communication to enhance employees' sense of ownership and protect their rights to know, participate, express and supervise. To solve employees' most pressing difficulties and problems that are of great concern to them, we made a to-do list and tracked the progress to ensure that employees' concerns and suggestions were replied to and addressed properly.

In 2021, CNNP conducted questionnaire surveys on corporate culture and employee opinions based on such indicators as the sense of happiness, the sense of gain, and the sense of belonging. Meanwhile, we solicited employees' views and suggestions and collected a total of 4,414 valid suggestions.



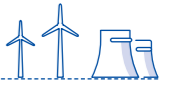
In 2021

Proportion of employees that are members of the labor union:
100%

Number of employees surveyed on corporate culture and their opinions:
13,670

Accounting for **84.7%** of the total

Case | Fujian Fuqing Nuclear Power Co., Ltd. listens to employees and improves their wellbeing



During the "Serving the People" campaign, Fujian Fuqing Nuclear PowerCo.,Ltd. set up a "Happy Nuclear" information disclosure column to respond to employee concerns promptly and build a "bridge" for information communication. In 2021, it received more than 300 opinions and suggestions from employees, and actively responded to and addressed them. By the yearend, 128 of the suggestions were implemented, significantly improving employees' sense of satisfaction and happiness. This case was promoted on People.com, Xuexi Qiangguo, CNNC's official website and account, and was rated by CNNC as an Excellent Case for Party History Education.

Occupational Health

While strictly complying with applicable laws and regulations, such as The *Workplace Safety Law* and The *Law on the Prevention and Treatment of Occupational Diseases*, CNNP takes measures to safeguard employee health and safety, cares for their health conditions, and strives to build a healthy workplace. As of the year 2021, the coverage of employee health examinations reached 100%.

<p>Occupational health monitoring</p>	Identified and evaluated workplace hazards and risks and managed them by level; hired external specialized agencies to conduct occupational health examinations of employees in specific positions; kept employees' health files, analyzed their health status and assessed their work adaptability to ensure that employees' health conditions were fit for their working environment.
<p>Physical and mental health services</p>	Raised employees' occupational health awareness; organized training and lectures on regular prevention of occupational diseases; conducted medical emergency drills to improve employees' health management capabilities; implemented the EAP (Employee Assistance Program) and offered psychological counseling service.
<p>Personal protective equipment</p>	We put up warning signs and on-site test results at relevant workplaces to raise awareness of risks, and prepare protective equipment for places with occupational disease hazards. Furthermore, we limit the on-site working time according to the assessment of the occupational disease hazards to minimize risks.
<p>Pandemic prevention and control</p>	Fully implementing policies on the isolation, nucleic acid testing and vaccination of high-risk groups, kept a register of visitors and disinfected the sites to stop the spread of the coronavirus and safeguard the health of employees.

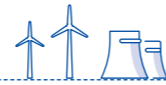


First-aid training organized by Jiangsu Nuclear Power Co., Ltd.



A nucleic acid testing site at Fujian Fuqing Nuclear Power Co., Ltd.

Case | CNNP opens its first EAP counselor training workshop, enhancing its care for employees' mental wellbeing



To improve mental health services and comprehensive employee care, CNNP has been actively training EAP counselors to build a professional EAP team, and gradually build sound mental health and psychological counseling systems. Moreover, we care about employees' physical and mental health, and work to enhance their psychological capital and motivate them at work. In September 2021, CNNP's first EAP counselor training workshop started in Beijing, and at the end of it, 72 trainees received the certificate of junior EAP counselor.



CNNP's first EAP counselor training workshop

Creating a Happy Life Together

Being people-oriented, CNNP organizes various cultural, sports and entertainment activities to enrich employees' cultural life. We organize Party building activities to promote team building, enhance the vitality of the organization and strengthen employees' sense of belonging. By showing special care for female, retired and young employees and employees' children, we aim to make CNNP an ideal harbor for employees.

Colorful life

The Company organizes various sport competitions, reading club's activities, impromptu speech contests, artistic performances, team building and networking activities and so on to create an energetic atmosphere that encourages employees to work hard, have fun, and achieve work-life balance, thus enhancing employees' sense of identification with CNNPs' corporate culture.

Sport activities



We have renovated the gymnasium and built a fitness center for employees to do exercises. Besides, a series of sport activities, including long-distance running competitions, ball games, fun games, and brisk walk activities, are organized to improve employees' physical health and advocate a healthy and happy life.



The second gas volleyball competition of Jiangsu Nuclear Power Co., Ltd.

Cultural activities



Reading club's activities, recitations, speech contests and movie watching activities are organized regularly to allow employees to relax and promote mutual understanding among employees. We also organize large cultural events and singing competitions to enable young employees to show their talents and pursue the dream of developing the nuclear industry to strengthen the country.



The cultural event for celebrating the centenary of the CPC

Team building activities



We organize team-building activities during holidays and weekends to enrich employees' spare time while enhancing team collaboration and cohesion and capacity building. By deepening exchanges with local and external organizations, we broaden employees' horizons, add fun to their life, and enhance their wellbeing.



A joint Party building plus team building event between CNNP Liaoning Nuclear Power Co., Ltd. and an external unit

Employee Care

As a people-oriented company, we care for the wellbeing of and offer special services and benefits for special groups, including female employees, retirees, employees in need, single employees, and employees' children.

Benefits for female employees

Popularize women's health knowledge, organize activities to mark the International Women's Day, establish a special leave system and provide special services for female employees during menstruation and lactation; offer lectures on parenting, alleviate their parenting anxiety, and promote family harmony.

Benefits for retirees

Provide a customized comprehensive physical examination plan, organize visits, and send gifts to them during the Spring Festival and the Double Ninth Festival; organize symposiums to enable retirees to make contributions and offer wellness services to help them better enjoy their retirement.

Assistance to employees in need

Record information about employees in need, and build a special management platform to help them get through the difficult time; organize employees to participate in the medical mutual assistance plan, another guarantee for employee health.

Benefits for single employees

Based on the actual needs of single employees, networking activities are organized jointly with external units to allow employees to show their talent and make friends and strengthen their sense of happiness.

Benefits for employees' children

Find out the education needs of employees' children, communicate with the local government and education bureau to help employees' children get admitted to the right school or kindergarten; provide employees' children with fitness facilities and sites for cultural and recreational activities during holidays, to show our sincere care for their healthy growth.

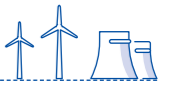


The nursing room at Sanmen Nuclear Power Co., Ltd.



A networking activity for single employees at CNNP Liaoning Nuclear Power Co., Ltd.

Case | Jiangsu Nuclear Power Co., Ltd. launches Family Open Day to build a bridge between employees' families and the Company



To allow employees' families a better understanding of the company and motivate employees' passion for work, from March to July 2021, Jiangsu Nuclear Power Co., Ltd. organized the Family Open Day activities. Family members of employees were invited to Tianwan Nuclear Power Plant where they learned some basic nuclear knowledge at the education and exhibition center and had a look at the outside of the nuclear power unit. The activities brought family members of employees closer to nuclear power facilities and deepened their ties with the Company.



Family members of employees invited to Tianwan Nuclear Power Plant to see the nuclear power facility with their own eyes



06

Promoting Social Harmony and Inclusion and Empowering a Better Life

In 2021

- 600 million yuan spent on paired-up assistance for poverty alleviation;
- 7.913 billion yuan paid in taxes.



Public Communication

Adhering to the "3C" (Confidence, Connection, and Coordination) communication philosophy, CNNP has always taken transparent communication as a vital part of CSR, to explain to the public nuclear power's positioning as a "Credible, Nice, Zero-carbon and Empowering" source of energy, and kept exploring innovative public communication models that allow the public to feel the charm of clean energy better and make nuclear power more accessible to the public.

Diversified Communication Channels

CNNP continues to diversify information disclosure channels, and discloses information about its key projects, major policies, and outstanding achievements through the Shanghai Stock Exchange, on the Company's official website and WeChat account, and via press conferences, winning public recognition with honest and transparent disclosure. In 2021, CNNP released more than 1,000 pieces of news on its intranet and extranet, and more than 400 posts on new media platforms, and attracted more than 90,000 followers on WeChat. Besides, the Company started to run its WeChat video channel, with the most-watched video attracting more than 70,000 clicks.

Multiple Forms of Exchanges

CNNP continued to organize nuclear science popularization activities such as the CNNP Summer Camp and the "Appealing Nuclear Power" Cup National Nuclear Power Knowledge Contest. We brought people closer to nuclear power via such platforms as the nuclear power science and technology museum and popular science exhibition halls, enhanced public trust in the Company, and created a positive public opinion for the development of nuclear power, and gathered positive energy for the development of the industry.

Lectures and Q&As



Invited industry experts, Weibo influencers, and college teachers to give lectures on knowledge about nuclear power, and targeted audiences on platforms such as Douyin, WeChat, and Weibo to popularize nuclear science, field their questions and enhance people's understanding of nuclear power.

Field visits



Organized Open Day activities where people from all walks of life were invited to our nuclear power plants to better understand nuclear power; organized study tours for teenagers to the nuclear power science and technology museum and the popular science exhibition halls, to inspire them to pursue the dream of developing the nuclear industry to strengthen the country and strengthening their sense of patriotism.

Science popularization



Organized science popularization activities in schools, residential neighborhoods and office buildings using the public-speech system, display boards, blackboard newspapers, on-site explanation, etc. to advocate the spirit of science and our green, clean and efficient brand image; popularized nuclear science and gave back to society through volunteer services.

Brand activities



Continued to launch events such as the CNNP Summer Camp, "Appealing Nuclear Power" and Nuclear Power Awareness Week to increase public trust in us through knowledge sharing, information dissemination, and skills display online and offline.



Q&A Are nuclear power plants safe or not?

Are nuclear power plants safe? This question may be difficult to answer, for there is only relative safety, no absolute safety. Nothing is absolutely safe, including taking a plane, a train or a car, or even walking. But we won't stop doing these things just because of the risk, because the safety probability is greater than the risk probability. In a sense, safety is a risk at an acceptable level.

From site selection, design, construction, commissioning, to operation and decommissioning, the nuclear power plant follows a strict quality assurance program (QAP), with special quality assurance procedures every step along the way. Therefore, relatively speaking, it is safe to build and operate nuclear power plants. China has maintained an excellent nuclear safety record for a long time, and ranks among the top in the world in operational safety performance indicators for nuclear power plants. Thanks to the ever-safer utilization of nuclear technology and effective nuclear materials control, public health and environmental safety can be fully guaranteed.



A nuclear safety popularization event organized by Fujian Fuqing Nuclear Power Co., Ltd.



Students from Xingcheng Nanyi Primary School invited to the publicity and exhibition center of CNNP Liaoning Nuclear Power Co., Ltd.

Case | Attracting more talents through the Elite Program



CNNP is committed to public communication. The popular science activities organized over these years have won us the trust of the public. Through cooperation with the media and Internet influencers, we bring nuclear science close to the general public. Aiming for the long run, we sow the seed of nuclear science in the heart of students and have built a few popular nuclear science brands such as the "Appealing Nuclear Power." In 2021, the "Appealing Nuclear Power" science popularization activity was upgraded and became part of the debut of the musical Glory of the Nation to mark the 30th anniversary of grid-connected power generation of Qinshan Nuclear Power Co., Ltd. We invited influencers on Weibo to watch the activity, held the Open Day for journalists, and published China Nuclear Power, the country's first picture book on popular nuclear power science targeting adolescents. A diversity of activities were launched online or offline and recommended on Weibo, Kuaishou, WeChat Channel, etc., accumulating experience in building nuclear power science popularization brands and exploring new paths in this respect. By the end of 2021, the "Appealing Nuclear Power" science popularization activity had attracted over three million participants from 34 provincial regions.



Closing ceremony of the 9th "Appealing Nuclear Power" Cup National Nuclear Power Knowledge Contest

Promoting Local Development

CNNP has leveraged its expertise and resources to promote local employment, build a livable environment, improve public services, and promote common development of the Company and local community. In 2021, CNNP paid 7.913 billion yuan in taxes.

Promoting local employment

We signed general affairs and labor dispatching contracts with locals and coordinated contractors to give preference to locals nearby in recruitment, to create employment opportunities and also help locals start their own business.

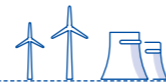
Building a livable environment

We improved the living conditions and environment in local community by widening local roads, implementing greening projects, upgrading sewage pipe networks, etc.

Improving public services

We improved local public services by building libraries, football pitches, activity centers, and so on.

Case | Jiangsu Nuclear Power Co., Ltd. engages in community development to jointly create a better life



Under the theme of "Shaping a Bright Future with Jiangsu Nuclear Power", Jiangsu Nuclear Power Co., Ltd. participates in local environmental governance. It worked with local community on road widening and sewage pipeline network upgrading. Determined to enhance the quality of public services, it has jointly built an employee service center and an activity center for people with disabilities with the Gaogongdao Subdistrict, a public pick-your-own garden and a football pitch with the Sucheng Subdistrict, and a computer lab with the Laogongtang Neighborhood, and introduced projects with Haitang, Binhai and Yunshan neighborhoods to build them into model neighborhoods. The company promoted its integration with local communities through multiple channels and paint with them a bright, prosperous future.



Ceremony held for Jiangsu Nuclear Power Co., Ltd.'s donation of computers

Contributing to Rural Revitalization

While offering paired-up assistance to poverty-stricken villages, CNNP conducts thorough surveys, and strives to help local people address practical problems. Following higher standards, the Company has stepped up efforts to consolidate and expand the achievements in poverty alleviation and contribute to rural revitalization with more concrete actions.



The development of local industries

Tasks

- We factor into the reality of targeted villages, fully tap into our strength as a nuclear power company, and vigorously develop characteristic industries. We also adopt intensive and efficient agricultural production methods, and push forward an on-line-offline marketing model to improve the quality of farm produce and efficiency of agricultural production, and steadily increase farmers' income.

Best practices

- Hainan Nuclear Power Co., Ltd. put in 800,000 yuan to support Yidong Village to develop its planting and breeding industries, and improve its living environment, and social etiquette and civility. As a result, an additional 500-plus mu of mango was planted, with an estimated annual output worth three million yuan.
- CNNP Liaoning Nuclear Power Co., Ltd. donated 295,000 yuan to Zhujia Village to build a collective-owned economic oil pressing factory.



Education & training

Tasks

- We step up support for education by donating school supplies, providing scholarships and grants, and offering volunteer education services. Apart from that, we improve the scientific and cultural literacy of local students, and foster future talents for rural revitalization.

Best practices

- CNNP Guodian Zhangzhou Energy Co. Ltd. formed a team of volunteer teachers composed of selected members of the Communist Youth League;
- Jiangsu Nuclear Power Co., Ltd. awarded the Spring Bud Scholarship to 123 outstanding students, and awarded the Spring Bud Grants to 54 disadvantaged students to help cover their school expenses.



Culture

Tasks

- We enrich villagers' cultural life and invest in facilities for cultural and recreational activities. To promote local culture, we fully support rural tourism development, and promote the integration between culture and tourism.

Best practices

- Jiangsu Nuclear Power Co., Ltd. helped Wuzhao Village build a reading room, a chess and card room, and a public square to meet the growing need of villagers for a better cultural life.
- Sanmen Nuclear Power Co., Ltd. offered 350,000 yuan to build a sightseeing platform in Shizitou Village to promote its cultural development.

Environmental conservation

Tasks

- Devoted to improving the rural environment, we strive to make villages look more appealing, contribute to ecological progress, and build beautiful villages.

Best practices

- Sanmen Nuclear Power Co., Ltd. donated 200,000 yuan to Shizitou Village to improve its ecological and living environment.
- Jiangsu Nuclear Power Co., Ltd. and Gaogongdao Subdistrict repaired the embankment of Huangwo Village, designed and launched special bus services, installed street lights, and built a small public park. The Company also aided the Banqiao Subdistrict renovate the Huangniwan Road in Lianyungang, Jiangsu Province.

Organizations

Tasks

- We select Party members and cadres to serve in primary-level Party organizations to inject fresh blood into the organizations, stimulate their innovation and vitality, and enhance their performance.

Best practices

- Thirteen officials were sent to work in villages in Zhejiang, Chongqing, Jiangsu, Fujian, Hainan, and Liaoning, etc. to carry out a new round of rural revitalization.



The collective-owned oil pressing factory in Zhujia Village sponsored by CNNP Liaoning Nuclear Power Co., Ltd.



A volunteer teacher from CNNP Guodian Zhangzhou Energy Co. Ltd. is giving a lecture to the class



A young volunteer from Sanmen Nuclear Power Co., Ltd. doing a health examination for a senior in Shizitou Village



Village-based cadres selected from Fujian Fuqing Nuclear Power Co., Ltd. are working in Zhuling Village

Engaging in Charitable Activities

CNNP is actively engaged in charitable activities such as environmental protection, blood donation, and caring for the elderly and children, striving to give back to society with concrete actions. In 2021, our volunteer activities attracted 5,864 participants who offered a total of 59,995.4 service hours.

Environmental volunteering

- Volunteers organized awareness activities on waste sorting in residential neighborhoods, helped residents sort and clear garbage, brought home to local residents the benefits and necessity of garbage sorting, and protected the local environment.

Caring for left-behind children

- We tracked and recorded how the left-behind children did in schools and at home and built a long-term assistance mechanism. We popularized nuclear science, donated school supplies, organized cultural and sports activities, and provided psychological counseling to enrich their after-school life and help them grow up healthily.

Caring for people with special needs

- We visited elderly people of no family, recipients of the subsistence allowance, elderly people with disabilities, veterans, and retired cadres, cared about their physical and mental health, helped solve their difficulties in life. We offered them with regular physical examinations, essential groceries, artistic performances, companionship, to bring warmth and joy to them.

Blood donation

- We regularly organize blood donations to fulfill our CSR and build up our responsible corporate image. Taking Qinshan Nuclear Power Co., Ltd. as an example, 83 of its employees donated 28,650 ml of blood in 2021.



Volunteers from CNNP Guodian Zhangzhou Energy Co. Ltd. and left-behind children



Leaders from Jiangsu Nuclear Power Co., Ltd. visiting an elderly veteran

Outlook for 2022

CSR Area	Highlights in 2021	Commitment for 2022
Intrinsic Safety	<ul style="list-style-type: none"> The annual power generation reached 182.637 TWh, an increase of 18.61% year on year 19 power units got full marks in the WANO composite index and the average mark of all power units reached 99.51, both ranking first worldwide Over 200 reactor years of safe operation 	<ul style="list-style-type: none"> Annual power generation target: 196 TWh Complete the three-year action for safety improvement and continue to promote the safe operation of nuclear power plants Deepen the implementation of the delicacy project management model of "six controls and seven noes"
Green and Low-Carbon Development	<ul style="list-style-type: none"> Promoted the application of new nuclear energy technologies and the development of renewable energy and contributed to the goals of peaking CO₂ emissions and achieving carbon neutrality Promoted the fulfillment of environmental responsibilities at all levels, improved the environmental management system, and comprehensively enhanced the Company's basic environmental protection capabilities Strengthened the implementation of biodiversity conservation measures in project site selection, plant construction and operation, and other processes, and continued to improve the environment in the surroundings of power plants 	<ul style="list-style-type: none"> Further increase the installed capacity of existing new energy projects and promote the development of the new energy sector Strengthen the comprehensive utilization of nuclear energy, and facilitate site survey, general selection, protection and development of multi-purpose nuclear energy projects Contribute to the "dual carbon" goals by promoting low-carbon operations
Innovation-Driven Development	<ul style="list-style-type: none"> Recruited and trained high-level S&T personnel and innovators Promoted the commercialization and application of research results through scientific research and new technology incubation Promoted the integration of technology and innovation and the application of digital technology, networking technology and artificial intelligence in the nuclear power industry Solidly advanced the three-year action plan for the SOE reform to guarantee a completion rate of tasks over 90% 	<ul style="list-style-type: none"> Further modernize the corporate governance system and enhance governance capabilities Explore a pathway toward delicacy management by applying digital technology Deepen the reform of the technological innovation system and promote the commercialization of scientific and technological achievements Deepen reforms and complete all tasks in the three-year action plan for the SOE reform
Cooperation	<ul style="list-style-type: none"> Built harmonious partnerships and further deepened strategic cooperation Moved faster to develop nuclear power, non-nuclear clean energy, and emerging agile industries Actively expanded overseas markets, deepened cooperation with foreign nuclear power and new energy companies, and integrated superior resources 	<ul style="list-style-type: none"> Coordinate the development of nuclear energy, non-nuclear clean energy, and emerging agile industries Adhere to integrated development, respond to customer needs, expand the market, and innovate in the development model to promote high-quality development of the three major industries
People-Centric Workplace	<ul style="list-style-type: none"> Improved the market-oriented incentives to stimulate employees' passion for work Implemented the principle of prioritizing the training of competent personnel and enhanced the building of three teams (technical talents, skilled workers, and management personnel), and improved the development path for top talents Selected and trained top talent, and built a talent pool for China's nuclear power industry 	<ul style="list-style-type: none"> Enhance the operation of the training center to improve the utilization of training resources and make employee training more efficient Select high-level technical talents and further improve the talent structure of China's nuclear power industry
Social Harmony and Inclusion	<ul style="list-style-type: none"> Held the "Appealing Nuclear Power" Cup National Nuclear Power Knowledge Contest for the ninth consecutive year Invested over 60 million yuan in paired-up assistance for poverty alleviation Paid 7.913 billion yuan in taxes 	<ul style="list-style-type: none"> Hold the 10th "Appealing Nuclear Power" Cup National Nuclear Power Knowledge Contest Strive for common prosperity with the local community and promote rural revitalization by driving employment, improving infrastructure, etc. Help the elderly, children and other groups in need and continue to protect the environment

CSR Honors and Awards

Recipient	Honor/Award	Issued by
CNNP	Model Enterprise in Improving Corporate Management among Key State-Owned Enterprises	State-Owned Assets Supervision and Administration Commission of the State Council
	Demonstration State-Owned Enterprise in Corporate Governance	State-Owned Assets Supervision and Administration Commission of the State Council
	GoldenBee Excellent CSR Report 2020 – Ever-Green Award	<i>China Sustainability Tribune</i> under the Ministry of Commerce
	Special Prize of the National Enterprise Culture Outstanding Achievement Award	China Enterprise Confederation/China Enterprise Directors Association
Qinshan Nuclear Power Plant	Zhongguancun High-tech Enterprise	Zhongguancun Science and Technology Park Management Committee
	Listed Company with the Most Investment Value During the 14th Five-Year Plan Period of the China Securities Golden Bauhinia Award	Hong Kong Ta Kung Wen Wei Media Group
	First Prize of Scientific and Technological Progress Award	Chinese Society of Measurement
Sanmen Nuclear Power Plant	Technology Transfer Award of EPRI	Electric Power Research Institute (EPRI), U.S.
	International Quality Management Gold Award	International Convention on Quality Control Circles
	National High-Quality Project Gold Award	China Association of Construction Enterprise Management
	National May Day Labor Award	All-China Federation of Trade Unions
Fuqing Nuclear Power Plant	China Quality Award (Nomination Award)	State Administration of Market Regulation
	PMI Project Management Award	Project Management Institute
CNNP Guodian Zhangzhou Energy Co., Ltd.	National Excellent Quality Management Team Award	China Association for Quality
Hainan Nuclear Power Plant	The 19th National Quality Management Award	China Association for Quality
China Nuclear Power Operation Technology Corporation Ltd., Wuhan	National May 1st Labor Award	All-China Federation of Trade Unions
	First Prize of Hainan Provincial Science and Technology Progress Award 2020	Hainan Science and Technology Award Conference
	A demonstration high-tech company in deepening market-oriented reform	State-owned Assets Supervision and Administration Commission of the State Council

Appendices

Terminology

Nuclear energy	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.	Equivalent dose	A product of multiplying radiation weighting factor by the average dose absorbed by tissues or organs, with the unit of sievert (Sv).
Nuclear power	Nuclear power is a way of electricity generation by using the thermal energy released by nuclear fission in nuclear reactors.	Millisievert	An international unit used to measure the effective dose of radiation and reflecting the degree of personal injury due to exposure to ionizing radiation.
Pressurized water reactor	A nuclear reactor in which water is not boiling, with pressurized light water (ordinary water) as coolant and moderator without boiling.	Absorbed dose	Volume of radiation energy absorbed by unit mass of tissue or organ.
Heavy water reactor	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 pressure pipe type.	Gy	International unit of absorbed dose, $1\text{Gy}=1\text{J/Kg}$, meaning the energy generated by radiation to tissues or organs of a kilogram is one joule.
Reactor year	One reactor year equals to one year of operation for one reactor in nuclear power plant.	Effective dose	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.
WANO	The World Association of Nuclear Operators, which was founded in 1989 in Moscow.	Environmental background	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.
WANO performance indicators	Indicators WANO develops and uses to evaluate member power nuclear power plants. The ranking results can be used to compare surveyed power plants.	Bq	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.
Capacity factor	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.	Peaking carbon dioxide emissions	The annual carbon dioxide emissions of a certain region or industry will steadily drop after reaching the highest-ever level
IAEA	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.	Carbon neutrality	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.
INPO	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.	The "dual carbon" goals	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 ₂ emissions peak before 2030 and achieve carbon neutrality before 2060.
		Carbon sink	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.

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Expert Opinion

The CNNP Corporate Social Responsibility Report 2021 provides the highlights and achievements of CNNP in pursuing coordinated economic, social and environmental progress under the guidance of the philosophy of ecological civilization, as well as its positive role in promoting safe and innovation-driven development of the nuclear power industry and contributing to the "dual carbon" goals.

CNNP fully leveraged the advantage of clean energy in providing baseload power. Faced with opportunities for nuclear power development brought by China's drive toward the "dual carbon" goals, CNNP has formulated key tasks for contributing to these goals while ensuring national energy security. In 2021, CNNP generated 182.637 TWh of electricity, equivalent to reducing 144.749 million tons of carbon dioxide emissions.

CNNP focused on R&D of cutting-edge nuclear technologies. CNNP puts technological innovation at the core of corporate development and constantly improves the mechanism for promoting the R&D and application of scientific and technological advances. This has not only provided scientific and technological support for the Company's development but also effectively enhanced the independent innovation capability of China's nuclear power industry. In 2021, CNNP won 79 awards for its scientific and technological achievements, and released China's first international standard in nuclear electrochemistry.

In response to public concerns, CNNP has continued to enhance transparent communication. The Company has selected hot topics of public concern such as nuclear power plants' safety and radiation risks and addressed public concerns in the "Q&A" section in this report, so that the report can play a bigger role in effective communication with stakeholders, and enhance public understanding of and support for nuclear power companies.

In the future, I hope that CNNP will continue to consolidate its political stance, strengthen forward-looking thinking around national strategies, and promote innovation to catch up with the world class, thereby making more contributions to building China into a powerhouse in the global nuclear industry.

Chen Hua
Vice Chairman of China Nuclear Energy Association (CNEA)
Executive Vice President of the Nuclear Power Operation Branch of CNEA

The *CNNP Corporate Social Responsibility Report 2021* is the tenth CSR report released by the Company and is as good as its predecessors. It responds to topics of public concern, satisfies the needs of stakeholders for information disclosure, demonstrates CNNP's commitment to honest, transparent communication, and is informative, comprehensive and people-centered.

It is an informative report. The CSR Features review the history of CNNP, and demonstrate the Company's current achievements. Focusing on the 30th anniversary of Qinshan Nuclear Power's safe power generation, the report systematically introduces its leap-forward development from the "pride of the nation" to a "signature project of the nation." The report also elaborates on CNNP's efforts to contribute to the "dual carbon" goals while ensuring national energy security.

It is a comprehensive report. In each CSR section, the report comprehensively presents the latest progress and performance of CNNP in fulfilling CSRs in safety, environmental protection, and employee development with detailed data and plenty of cases.

It is a people-centered report. With a large number of pictures and stories about work-life balance, volunteer services, and CNNP's involvement in rural revitalization, the report shows our harmonious relations with local community and brings us closer to the readers.

I hope that CNNP will continue to fulfill its responsibility as a state-owned enterprise in the future, convey its CSR spirit, and become an excellent model in CSR fulfillment and public communication for other Chinese companies.

Qian Xiaojun
Associate Dean and Professor at Schwarzman College, Tsinghua University
Director at Research Center for Green Economy and Sustainable Development, Tsinghua University

Related Reports and Publications



CNNP System of Culture Excellence



CNNP Employee Code of Conduct



CNNP Training Material on Culture Excellence



Redefining Safety



CNNP's 10 Principles of Excellent



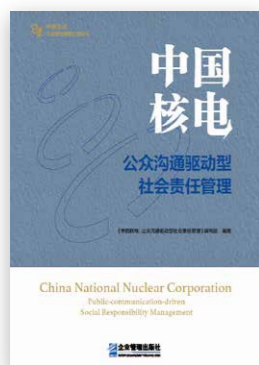
Why Nuclear Power



Stories of Nuclear Power



CNNP Visual Identification Standard Handbook



Public Communication



Ideals and Culture



Tianwan Nuclear Power Plant



Youth of Hainan Nuclear Power Co., Ltd.

List of Contributors to the Report

Head of the report preparation team: Lu Tiezhong

Deputy head of the report compilation team: Ma Mingze, Du Yunbin, Luo Xiaowei

Report preparation team members:

Zhang Yong, Chen Jinxing, Chen Fubin, Wei Zhigang, Zhang Zhenhua, Chen Zhigang, Li Fang,

Qu fanyu Wanglan, Li Zhongtao, Zhao Jianhua, Yu Kaizhi, Wu Xiangdong, Zeng Xun

Xu Xiaofeng, Wang Guohua, Li Zhaoxu, Xu Jia

Director of the editorial department: Xu Jia

Members of the editorial department: Luo Luhong, Shen Randi, Chen Fuqiang, Tian Hongda

Contributors:

Wang Yidi, Jiang Chenxing, Dong ronghua, mu Siqi Kang Zonglv, Hu Yiwen, Guan Tingliang, Liu Tongtong

Fang Lusheng, Wang Zhengyan (Qinshan Nuclear Power Co., Ltd.)

Zhou Guoye, Zhang Tao (Fujian Fuqing Nuclear Power Co., Ltd.)

Li Chao, Tao Chunyang (Sanmen Nuclear Power Co., Ltd.)

Zuo Peiyu (China Nuclear Power Operation Technology Corporation Ltd., Wuhan)

Guo Jinmin (CNNP Xiapu Nuclear Power Co., Ltd.)

Zhao Wuchao (CNNP Liaoning Nuclear Power Co., Ltd.)

Zhou Xiang, Sun Jianye (Jiangsu Nuclear Power Co., Ltd.)

Liu Xia, Xu Dan (Hainan Nuclear Power Co., Ltd.)

Zhao Wei (CNNP Rich Energy Corporation Limited)

Chen Sining (Operation Research Institute)

Yao Ningyi (CNNP Guodian Zhangzhou Energy Co., Ltd.)

Liu Wenzhe (CNNP Ocean Nuclear Power Development Co., Ltd.)

Feedback from Readers

Dear readers,

Thank you for reading our report!

This is the eighth issue of our social responsibility report. We look forward to your opinions and recommendations to help us improve in the future.

Please answer the following questions and fax the form to 010-81920369 or mail it to us.

Please tick ✓ the appropriate the answer.

Do you think the report highlights our economic, social and environmental work and our significant impacts?

Yes Partially No

Do you think the information and indicators provided in the report is clear, accurate and complete?

Yes Partially No

Do you think the arrangement of the content and style of the report is clear and helpful with your reading and understanding of the report?

Yes Partially No

Open questions:

Which part of the report are you most interested in?

What information needs to be provided about CNNP that is not provided herein?

What suggestions do you have for our future issues?

Please provide your contact information if that's ok with you:

Name: _____ Company: _____

Tel: _____ E-mail: _____

Address: _____



Address: No. 10 Building, Kunyufu East District, Yard 9,
Linglong Road, Haidian District, Beijing
Postal Code: 100097
Tel: 010-81920188
Fax: 010-81920369
Email: cnnp@cnnp.com.cn



Scan to follow CNNP
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Please scan the above QR codes to follow CNNP on WeChat and Weibo to find more about the Company.