中广核 CGN

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2020 | CGN

Corporate Social Responsibility Report 2020

About This Report

This report is the 10th annual corporate social responsibility report issued by China General Nuclear Power Corporation (“CGN” , “the Group” , or “we” for short) in China. It discloses CGN’s performance in the fields of economy, environment and society in 2020. We hope you can know more about us through this Report!

Reporting Scope

This Report covers the period from January 1, 2020 to December 31, 2020, with some content dating back to previous years or referring to later years. The Report covers China General Nuclear Power Corporation and its subsidiaries and branches. All the data and information disclosed in the Report come from the official documents of the Group and the documents and reports officially issued by external organizations. Statistics in relation to China do not include that of Taiwan Province. The Group guarantees that there is no false record, misleading statement or major omission in the Report.

Compilation Conformance

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

Report Access and Feedback

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

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Message from the Chairman

The year 2020 was an extraordinary and challenging year. In response to the sudden onslaught of COVID-19, complicated and severe external situation, and other major tests, CGN followed the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, resolutely implemented the decisions and plans of the CPC Central Committee and the State Council, and carried out major tasks such as corporate operation and development, COVID-19 response, and the fight against poverty in a more coordinated way. While ensuring stability, we pursued progress and continuously improved quality, efficiency and overall strength. By the end of 2020, our total assets reached RMB 788.5 billion and our businesses covered 22 countries and regions across the world. We achieved double-digit growth in major business indicators for the 8th consecutive year, and we were one of the profitable and profit-increasing among the key enterprises directly under the SASAC, maintaining our leading position among the central state-owned enterprises (SOEs). We thus contributed to the sustained economic growth and social stability.

Regarding nuclear safety as the lifeblood to cement the foundation of development

CGN always regards safety as the lifeblood of its development. We thoroughly implement General Secretary Xi Jinping's important instructions on nuclear safety, and focus on strengthening weaknesses to improve safety management. In 2020, the 24 in-service nuclear power units maintained safe and stable operation. The ratio of units achieving the world's advanced level of WANO (World Association of Nuclear Operators) indicators reached 72.6% and the average unit capability factor (UCF) maintained above 92% for the third consecutive year. Unit 2 of Ningde Nuclear Power Plant achieved the world's excellent level for all of the 12 WANO indicators. As of December 31, 2020, Unit 1 of Ling Ao Nuclear Power Plant had secured a safe and stable operation for 5,291 days in a row, setting a world record for generating units of similar types.

Remaining true to our original aspiration of developing clean energy and building a beautiful China

Responding to global climate change, China has announced the ambitious goal to peak carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060. Transitioning to a clean and low-carbon energy mix is the key to achieving this goal. As a clean energy enterprise, CGN stays true to the original aspiration, leverages the advantages of principal business, and promotes the development of nuclear power, wind power, solar power and other clean energy according to high standards and ambitious targets, as well as the research, development and application of advanced clean energy technologies. Thus we have contributed to China's climate goal and response to climate change. In 2020, CGN achieved an on-grid power generation of 263.112 TWh by using clean energy, equivalent to reducing carbon dioxide emissions by over 200 million tons and afforestation of approximately 600,000 hectares. In this respect, we also facilitated the transition to a clean and low-carbon energy mix.

Continuing to conduct innovations independently and seizing opportunities for future development

Innovation is the cornerstone of CGN's development. We unswervingly pursue independent innovation and strive to seize opportunities for future development. In 2020, we made important breakthroughs in a batch of major projects, in key areas, and in the development of 55 technologies. The collaborative innovation system took shape and produced a host of outcomes: the proprietary third-generation nuclear power technology Hualong One (HPR1000) entered the 4th stage of the Generic Design Assessment (GDA) and obtained the European User Requirement (EUR) certification; the nuclear-class distributed control system (nuclear class DCS) Firmsys was applied to multiple technologies and reactors; a total of 115 R&D achievements related to smart nuclear power were granted; and pollutant control by electron beam was applied in demonstration projects for the treatment of multiple pollutants. All these have provided long-lasting impetus to the sustainable development of the Group.

Adopting a people-oriented approach and building harmonious communities

The development of an enterprise is closely related to communities, so promoting common development with communities is the key to advancing the development of nuclear power sector. CGN constantly seeks innovation in the way of communicating with stakeholders and of bringing home to the public the beauty of clean energy. On August 7, 2020, we hosted the 8th annual CGN Open Day under the theme of "cultivating corals under the sea, visiting nuclear power plants on the 'cloud'." The event was live streamed on the Internet, covering six nuclear power bases simultaneously for the first time, to demonstrate the charm of nuclear power from sea, land and air. Upholding the philosophy of "driving local economy and benefiting local people with high-quality projects," we continued to improve local environment, promote the development of local industries, and carried out charity activities for building harmonious relations with local communities.

Making concerted efforts to overcome difficulties and secure a victory in the COVID-19 fight

In 2020, confronted with the sudden outbreak of COVID-19, CGN firmly implemented General Secretary Xi Jinping's important instructions and the decisions and plans of the CPC Central Committee and the State Council on COVID-19 response, and spared no effort to protect our premises and employees from the coronavirus and help contain the spread of the virus in other parts of the country. To support the resumption of work and production, we did our best to secure safe and stable power supply at home, and did a good job in COVID-19 control at our overseas project sites. We worked with stakeholders to overcome difficulties and get through hard times, and shouldered our responsibility as a central state-owned enterprise with concrete actions.

Striving to win the battle against poverty and helping build a moderately prosperous society in all respects

The year 2020 saw the completion of building a moderately prosperous society in all respects in China and China's decisive victory in the fight against poverty. CGN proactively carried out poverty alleviation tasks in Guangxi, Guangdong, Sichuan, Inner Mongolia Autonomous Region, Xinjiang Uygur Autonomous Region, Hubei and Fujian. We have spent RMB 420 million and sent 68 employees to poverty-stricken areas as anti-poverty officials. Moreover, we initiated the clean energy development fund platform worth over RMB 30 billion to implement 16 clean energy projects in 13 impoverished counties of the above seven provincial regions. With continuous efforts, CGN substantially outperformed its original commitments made to Lingyun and Leye counties in Guangxi and some other impoverished areas, and lifted the two counties out of poverty. Among many others, two poverty alleviation models of CGN were listed as outstanding cases of central SOEs' practices of poverty alleviation. The Egret Class and the Rainbow Plan have become CGN's signature projects of poverty alleviation through educational support. With these efforts, CGN made its due contribution to the fight against poverty.

The year 2021 marks the 100th anniversary of the founding of the Communist Party of China (CPC), the first year of the 14th Five-Year Plan, and the year for China to achieve the first centenary goal of building a moderately prosperous society in all respects and embark on a new journey toward the second centenary goal of building a modern socialist country in all respects. During the period in which the timeframes of the two centenary goals converge, CGN will adhere to the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, be keenly aware of the need to maintain political integrity, think in terms of the big picture, follow the leadership core, and keep in alignment with the central Party leadership. We will have full confidence in the path, theory, system, and culture of socialism with Chinese characteristics, and uphold General Secretary Xi Jinping's core position on the CPC Central Committee and in the Party as a whole, and the Central Committee's authority and its centralized, unified leadership. We will keep on working with great determination to promote the high-quality development, accelerate the building of a world-class clean energy enterprise, and support the country's efforts in achieving carbon peak and neutrality goals. In doing so, we hope to deliver more to celebrate the 100th anniversary of the founding of the CPC and contribute more to realizing the Chinese Dream of national rejuvenation!

Yang Changli
Chairman of CGN

杨长利

CSR Feature I

Reflecting on CGN's 40 Years of Efforts in the Development of Shenzhen SEZ

We need to forge ahead and pursue development by learning from the past and embracing the trends of the times. Since its inception four decades ago, CGN has overcome difficulties and challenges, seized the opportunities brought about by reform and opening up, and inherited the spirits of pioneer, innovation and hard work, gradually growing into China's largest and the world's third largest nuclear power operator at the same time with the development of Shenzhen Special Economic Zone (Shenzhen SEZ).

Growing together with Shenzhen SEZ

Shenzhen has made historic leaps forward since the establishment of the special economic zone 40 years ago, and the journey ahead is inspiring. The huge change of Shenzhen SEZ is the result of hard work of generations of workers. Standing at a new starting point, we should firmly implement the decisions and plans of the CPC Central Committee, carry forward the spirits of pioneer, innovation and hard work, and strive to advance reform and opening up and create greater miracles that astonish the world!

--- Excerpt from General Secretary Xi Jinping's speech at the celebration of the 40th birthday of Shenzhen SEZ

Yang Changli, Chairman of CGN, receives the interview with CCTV Xinwen Lianbo on learning General Secretary Xi Jinping's important speeches and sharing the outlook of CGN.

In the new development stage, we will follow the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, firmly implement the guidelines of important speeches delivered by General Secretary Xi Jinping, and pursue safe, innovative and high-quality development, striving to be a spearhead of enterprise reform and development.

Excerpt from Chairman of CGN Yang Changli's interview with CCTV's Xinwen Lianbo on learning General Secretary Xi Jinping's important speeches and sharing the outlook of CGN

Starting from scratch and daring to blaze a trail

After the policy of reform and opening up was adopted, Shenzhen SEZ was officially founded in August 1980. In the same year, Guangdong Power Company and CLP Group completed the compilation of the Feasibility Study Report on Joint Development of A Nuclear Power Station in Guangdong Province. Seven years later, after overcoming financial and technological difficulties, Daya Bay Nuclear Power Plant was put into operation on May 6, 1994, becoming the first large-scale commercial nuclear power plant in the Chinese mainland.

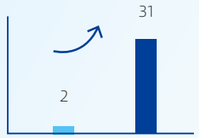
From "bringing in" to "going global"

As Shenzhen grows from a small fishing village to an internationalized metropolis, CGN, starting from Daya Bay, carries the innovation gene of Shenzhen SEZ with it and constantly pursues independent innovation. Upholding the development model of "introduction, digestion, assimilation, and innovation", CGN has successfully developed the third-generation Hualong One (HPR1000) nuclear power technology with proprietary intellectual property rights, and exported it to the world.

The drive to build a world-class enterprise

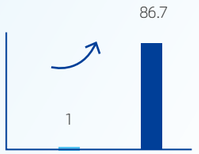
CGN always pursues reform and innovation. While focusing on the main business of nuclear power, CGN has actively promoted the development of non-nuclear clean energy, making a major leap forward from a purely nuclear power enterprise to an integrated clean energy group. Moreover, CGN has taken the initiative to support national strategies and the Belt and Road Initiative (BRI), and made substantial breakthroughs in exporting China's nuclear power. We have expanded new energy business to key overseas markets, and are heading toward a world-class clean energy enterprise.

Nuclear power unit



units in service and under construction

Localization rate of equipment for nuclear power units (%)



Daya Bay Nuclear Power Plant | Phase II of Fangchenggang Nuclear Power Plant

Business coverage: **22** countries and regions worldwide

Zhou Chuangbin

"Worker Academician" of CGN, was awarded Prominent Individuals in Innovation and Entrepreneurship and Outstanding Role Models at the 40th Anniversary of Shenzhen Special Economic Zone.

***Note:** Zhou Chuangbin is a senior expert in special tests of CGN and Shenzhen's first recipient of China Skills Award. He is also known as "Worker Academician" by the media.*

Daya Bay Nuclear Power Base in Guangdong

For details of 40 highlights of CGN's 40 years with Shenzhen SEZ, please scan the QR code.

Making new accomplishments in the new development stage

Entering the new development stage of the 14th Five-Year Plan period (2021-2025), CGN will follow the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, and keep in mind the big picture that China has entered the new stage of development. CGN will apply the new development philosophy, create a new pattern of development, and endeavor to contribute more to achieving the second centenary goal of building a modern socialist country in all respects.

Acting as a vanguard in three aspects

- A vanguard in applying the new development philosophy
- A vanguard in promoting the innovation-driven development
- A vanguard in implementing national strategies

Nurturing new opportunities for a good start

- Concentrating on the principal business and optimizing the investment priority ranking
- Grounding efforts in the current stage and advancing reform to meet domestic demand
- Maintaining dynamic equilibrium and keeping up with domestic and overseas development trends

Continuing to empower CGN

- Pursuing green development and driving the common development of the domestic nuclear power industry chain
- Expediting the development of core technologies and improving the capability of independent innovation
- Implementing the organizational path for a new era and improving primary-level governance

Continuing to pursue the "nuclear" dream

The voice of workers born in the 1950s

Overcoming difficulties and challenges of the times

This is our most difficult times. But if we hang on, we will be able to finish the training in France. I hope I can make the most of this training before going back to China.

—Excerpt from a letter written by a "Golden Person" to his wife on September 22, 1989

The voice of workers born in the 1960s

People have to be a little stressed to get things done.

—Zheng Weiping, a "Golden Person" of CGN

The voice of workers born in the 1970s

Sparing no effort to seek excellence

To safeguard nuclear safety, everyone is a safety barrier.

—Cui Li, Outage Center of China Nuclear Power Operations Co., Ltd.

The voice of workers born in the 1980s

I will continue to work hard to build up China's strength in nuclear power and show the extraordinary power of our generation.

—Zhang Meiling, China Nuclear Power Technology Research Institute Co., Ltd.

The voice of workers born in the 1980s

Following our dream and living it to the full

I'm one of the ordinary clean energy workers, and our mission is to do our best to provide stable and safe electricity.

—Lei Chaoyuan, CGN New Energy's Wuyueshan Wind Farm in Hubei

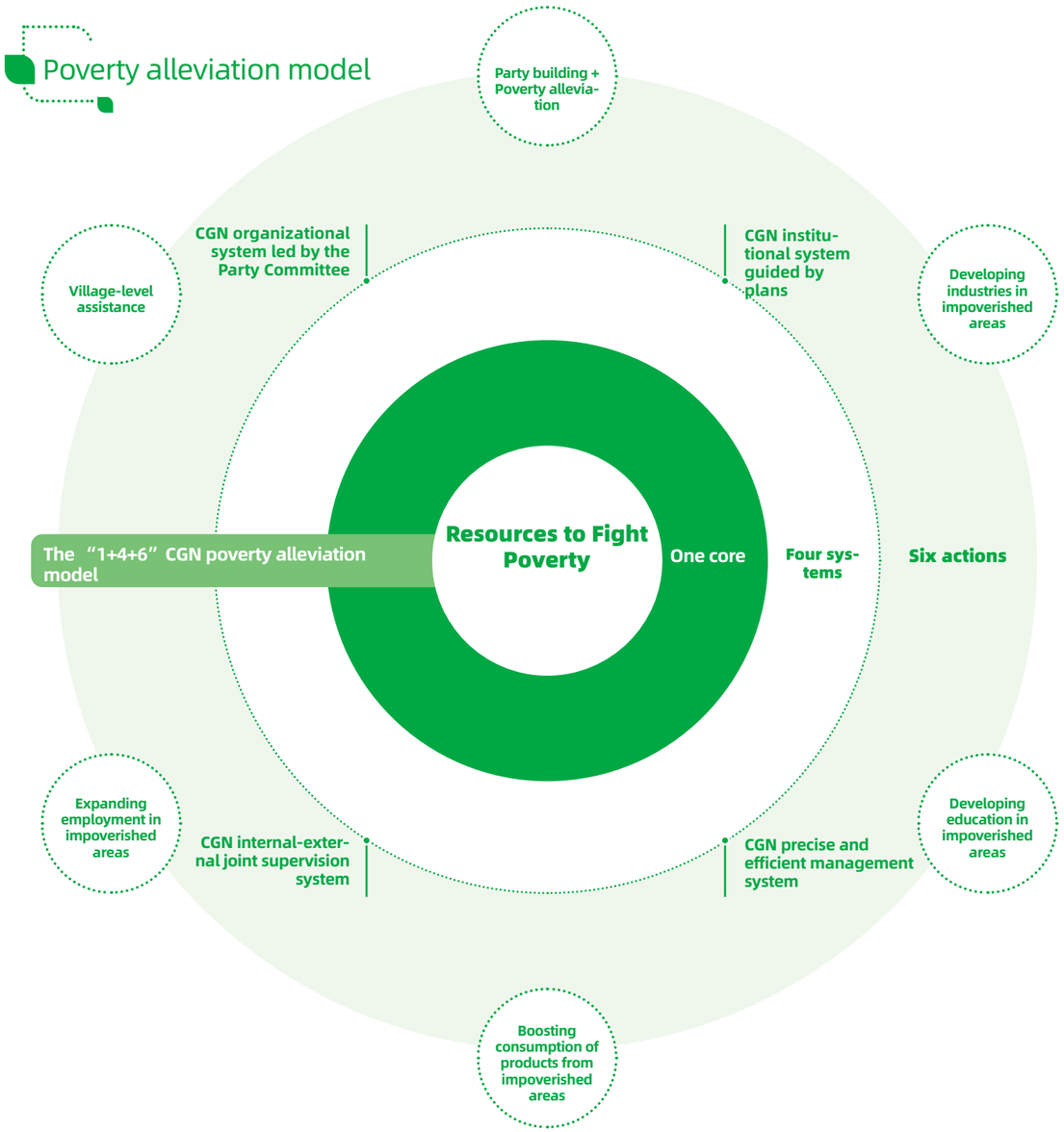
***Note:** "Golden Persons" refer to the nuclear power operators dispatched by CGN abroad for operator training in three batches during the period from April 1989 to the beginning of 1990. If the training expense was converted into gold, the weight would be closely equivalent to that of a person. This is where the nickname "Golden Persons" comes from.*

CSR Feature II

Making Good Use of Resources to Fight Poverty

The year 2020 witnessed China's completion of building a moderately prosperous society in all respects and decisive victory in the fight against poverty. As a central SOE, CGN resolutely implemented the plans of the CPC Central Committee and the State Council on securing a victory in the fight against poverty. CGN made full use of its technological and industrial advantages, and explored the "1+4+6" targeted poverty alleviation model with own characteristics. Under this model, poverty alleviation is planned, deployed, assessed and implemented simultaneously with corporate operations and management. We can also introduce diverse stakeholders from outside to help the poor emerge from poverty, thus contributing to securing a decisive victory in the fight against poverty and achieving the first centenary goal.

Poverty alleviation model



Earnestly implementing General Secretary Xi Jinping's important instructions, CGN takes into consideration local resources and development needs, leverages its advantages in science and technology, industry, human resources, and platforms, and mobilizes employees, specialized institutions and charity organizations and other external stakeholders, etc. to help poor areas shake off poverty in a sustainable and stable way.

CGN organizational system led by the Party Committee

- The leadership system is led by Party Secretary, supported by the Standing Committee of the Party Committee (in charge of major projects), and coordinated by the leading group of poverty alleviation
- The Standing Committee of the Party Committee convenes meeting to discuss poverty alleviation work; Party Secretary and members of the Party Committee conduct field research on poverty alleviation.
- Targeted poverty alleviation is included in the Group's strategic focus and Party building performance assessment.

CGN institutional system guided by plans

- The *Three-Year Work Plan for Targeted Poverty Alleviation* and the *Annual Work Plan for Poverty Alleviation* are compiled as general guidelines.
- The *Standards for the Administration of Poverty Alleviation Work, Administrative Rules for Poverty Alleviation Officials Dispatched* by the CGN and other supporting policies are issued.
- A working mechanism consisting of "one agreement, two reports, and three meetings" is built to ensure work efficiency.

CGN precise and efficient management system

- We select and assign outstanding employees to work as poverty alleviation officials in impoverished areas, who shall be overseen by the Party Committee.
- We make sure that every penny is well spent and that different mechanisms for promoting poverty alleviation and every project is formulated according to local conditions.
- We continue to advance targeted poverty alleviation projects supported by well-prepared preliminary work,fair use of funds, the real-time follow-up and real benefits for the public, in order to deliver the effect as planned.

CGN internal-external joint supervision system

- We strengthen conduct improvement throughout our poverty alleviation work.
- We carry out inspections by the Discipline Inspection Committee and special audits for poverty alleviation work, to make sure all the responsibilities are fulfilled properly and the poverty alleviation work produces the desired effect.
- We regularly conduct exchanges with the impoverished areas and have formed a collaborative supervision mechanism.

Party building + Poverty alleviation

Giving full play to the role of Party building and establishing the fortress for poverty alleviation

- The Party Committee takes overall charge and the members of the Party Committee are in charge of major projects.
- We strive to build high-quality Party branches by improving the Party Committee and joint building with the Party Committee.
- We ramp up efforts to forge a team of outstanding Party members through training and osmosis.

Developing industries in impoverished areas

Leveraging industrial and technological advantages to build a green engine for poverty alleviation

- We have built an industry chain featuring "food irradiation + bio-organic fertilizer + kiwifruit planting", and employed technologies to develop local industries.
- We develop local characteristic and advantageous industries in line with local plans and conditions.
- We develop clean energy as a green engine for poverty alleviation.

Developing education in impoverished areas

Integrating internal and external human resources to help stop the intergenerational transmission of poverty

- Focusing on the long-term development, we help people increase confidence in their own ability to lift themselves out of poverty and see that they could access the education and skills they need to do so.
- We promote the model of Egret Class to help block the inter-generational transmission of poverty.

Boosting consumption of products from impoverished areas

Leveraging online and offline channels to market products from impoverished areas, improve quality, and increase sales

- We leverage the "internet+" channels such as live-streaming platforms to unleash consumption potentials.
- We organize fairs, ensure steady centralized procurement and advocate "purchase instead of donation" to expand sales.

Expanding employment in impoverished areas

Integrating upstream and downstream labor demand and providing jobs for poor households

- We have established a joint employment service center, expanding employment channels and improving skills for people from poor households.
- We take targeted measures to match "job seekers from poor households" with "employment channels", in order to ensure the poverty alleviation effect.

Village-level assistance

Applying our corporate governance experience to help poor villages shake off poverty and build a beautiful countryside

- We take different measures to help different poor households in different villages combat poverty and thus promote the development of impoverished areas.
- We have introduced new asset management solutions to promote the sustainable development of the village-level collective economy.
- We strive to improve the people's living standards, especially their housing conditions.

Our poverty alleviation performance

RMB **420** million invested in assistance to poor people in total

Targeted Poverty Alleviation in Lingyun County in Baise, Guangxi and the Rainbow Plan were selected as Outstanding Cases of Central SOEs' Practices of Targeted Poverty Alleviation by the SASAC.

Dispatched **68** poverty alleviation officials to **10** villages of **7** provincial regions

CGN's Efforts to Build a Long-term and Effective Poverty Alleviation Mechanism in Leye County was selected as one of the Top 50 Comprehensive Cases of Chinese Enterprises' Practices of Targeted Poverty Alleviation by the State Council's Leading Group on Poverty Alleviation and Development.

Initiated the clean energy development fund platform worth over RMB **30** billion

CGN in Continuing Market-oriented Development and Building a Long-term, Effective and Stable Mechanism for Poverty Alleviation was selected as one of the Top 50 Purpose-Specific Cases of Chinese Enterprises' Practices of Targeted Poverty Alleviation by the State Council's Leading Group on Poverty Alleviation and Development.

Implemented 16 clean energy projects in **13** impoverished counties of seven provincial regions

CGN in Targeted Poverty Alleviation: A New Chapter in Enterprises' Poverty Alleviation was selected as one of the Top 50 Comprehensive Cases of Chinese Enterprises' Practices of Targeted Poverty Alleviation by the State Council's Leading Group on Poverty Alleviation and Development.

Promoted the Egret Class to **9** schools in **5** provincial regions

CGN in Supporting the Education of Left-behind Children for Poverty Alleviation: The Rainbow Plan was selected as one of the Top 50 Purpose-Specific Cases of Chinese Enterprises' Practices of Targeted Poverty Alleviation by the State Council's Leading Group on Poverty Alleviation and Development.

Lifted over **11,000** people out of poverty in Lingyun and Leye counties in Guangxi

Please scan the QR code to watch *CGN: Let Hope Rise.*

An effective poverty alleviation measure: Party building + Poverty alleviation

Case: Solving the "last-mile" problem of poverty alleviation through Party building

In 2016, the fight against extreme poverty was officially launched. The poverty alleviation team of Yangjiang Nuclear Power Base went to Kongtong Village, Yangchun, Yangjiang City for targeted poverty alleviation. From the very beginning, the team formulated the work plan for poverty alleviation through Party building and proactively conducted Party building activities with the purpose of poverty alleviation. Party members of the 33 Party branches of Yangjiang Nuclear Power Base went to the village one after one for poverty alleviation. Through door-to-door visits, telephone consultation, online communication and other ways, they provided one-to-one assistance for poor households in the village. In the past five years, they, wearing bright red vests, knocked on doors to inform them of the Party's favorable policies and conducted field research to promote the development of industries. With the collective efforts of all Party members of Yangjiang Nuclear Power Base, a series of poverty alleviation projects such as PV power generation, agricultural cooperatives and educational support have been conducted in Kongtong Village, helping lifting all the 392 people from 130 poor households out of poverty.

Stakeholders' comment

If you didn't live the way they did, you would not know how hard it was. If you never met students there, you wouldn't know how much they yearned for learning. If your heart was never touched the way I was when I was there, you wouldn't be able to appreciate the greatness of life.

—Wu Lei, Commissary in charge of Publicity of the Party Branch of Planning Department, Yangjiang Nuclear Power Base

From 2016 to 2020,

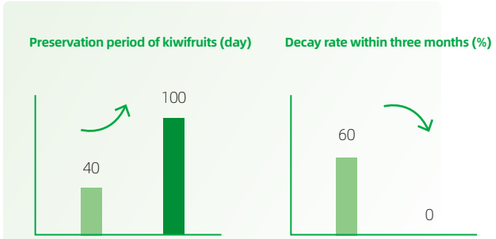
- **1,990** primary-level officials and
- **3,820** technicians were trained

Employing technologies to improve the effect of poverty alleviation work

Case: The food irradiation technology facilitates the transformation and upgrade of deep processing of agricultural products

The conventional low-temperature preservation technology will keep kiwifruits fresh for about 40 days. As the kiwi planting area continues to expand, there is a risk of slow-moving inventory. CGN's low-temperature electron beam food irradiation technology can extend the preservation period of kiwifruits to 100 days without compromising contents of sugar, vitamin C, solubles, and taste, etc., and can thus effectively reduce fruit rotting and increase the sale income. At the same time, through the development of food irradiation in places of origin of agricultural products, we could offer jobs and training opportunities to the villagers, so that poor households don't need to migrate to find work. In October 2020, CGN invested RMB 18 million to build China's first place of origin food irradiation demonstration center for agricultural products. After put into operation, the demonstration center provides electron beam food preservation service for farmers within 200 kilometers of Baise, including Leye County. These efforts promote the transformation and upgrade of modern agricultural product processing industry in Baise City.

Renderings of the Electron Beam Food Irritation Demonstration Center in Baise City



Effect of CGN electron beam food irritation technology

Developing local industries to cement the foundation of poverty alleviation

Case: Supporting the planting of red kiwifruits to promote poverty alleviation

Leye is one of China's demonstration counties for organic agriculture, with favorable climate for growing kiwifruits. The local specialty, red kiwifruit, is a national geographical indication (GI) product, enjoying broad market prospects. But dispersed planting, the operations of self-employed individuals, and the short preservation period have restricted kiwifruit growing from becoming a pillar industry in the county.

Responding to the above problems with its own advantages, CGN cumulatively invested RMB 23.45 million in building a 156.33 hectares kiwifruit park. Moreover, we launched an innovative operational model to engage poor households in kiwifruit planting via a sound mechanism of delivering assistance to every household and individual in need. Since the operation of the project, the collective economies of ten villages have been boosted; 4,440 people from 1,025 households have been lifted out of poverty, with an increase of RMB 4,000 in average annual income per capita. As a result, the capability of poor people to increase income and shake off poverty is comprehensively improved. Meanwhile, to meet high demand for organic fertilizers and high requirements for food preservation technology, we funded the construction of bio-organic fertilizer plants and place of origin food irradiation demonstration centers, and employed advanced technologies to promote the scalable development of local organic farming industry.

Stakeholders' comment

Since the establishment of the industrial park, more and more villagers have returned to the village. Everyone is willing to work within the village. Now my wife and I are both working here, with a fixed annual income of RMB 40,000 to RMB 50,000. The fruit harvest next year will bring us additional dividends, bringing our household income to RMB 60,000.

—Huang Jingwei, a villager who has emerged from poverty in Banhong Village, Gantian Town, Leye County

Developing education in impoverished areas

Case: The Egret Class gives students wings to access good education

- A total of **17** Egret Classes were launched for **1,624** poor students.
- From 2018 to 2020, **100**% of the Egret Class graduates scored higher than the junior-college admission line in the national college entrance exam, **68.3**% higher than the college admission line, and **7.7**% higher than the first-round college admission line.

Enabling children in poor areas to access good education is an important way to block the intergenerational transmission of poverty. CGN has adopted a variety of measures to promote the development of poor areas, including theoretical learning, skills training, field practice, and summer camps, etc. In this way, CGN helps students from poor households increase confidence in their own ability to shake off poverty and access the education and skills they need to do so.

Liangshan Yi Autonomous Prefecture in Sichuan Province is one of the 14 contiguous impoverished areas in China. More than 95% of local children have never travelled outside and know little about the outside world. Facing the educational difficulties in Liangshan, the teachers of the Egret Class not only teach students the required subjects, but also organize summer camps and study tours to take the children to the outside world. To attend a charity auction in Shanghai of artworks by students from impoverished areas, Yan Fan, a teacher of the Egret Class, worked out and repeatedly revised the funding plan and follow-up implementation plan, sought support from the superior department, and finally took care of the money and travel issues. He took two students with him, and the artworks painted by the Egret Class, to Shanghai. At the charity auction, two drawings of the students were auctioned on the spot for RMB 1,000 each.

From 2018 when the Egret Class was opened to the end of 2019, 11 assistance actions were initiated for the Egret Class in Liangshan, providing over 2,200 participation opportunities to teachers and students. Diverse group activities and study tours enabled the students of the Egret Class to achieve growth and pursue their dreams.

Boosting consumption of products from impoverished areas to increase farmers' income

Case: The live-streaming platforms inject impetus into poverty alleviation

The excess inventory of agricultural and sideline products poses a great obstacle to the fight against poverty. It requires the joint efforts of enterprises and poverty alleviation officials to explore the right way of expanding consumption and sales channels of agricultural and sideline products. Following the trend of the internet celebrity economy, and coordinated by poverty alleviation officials and the CGN's branch of Communist Youth League, CGN turned to live-streaming and invited "Guozi Xiaoxin" (the WeChat official account of News Center of the SASAC) and other internet influencers to do live-streaming sessions, in an effort to boost the online sales of agricultural and sideline products.

On January 7, 2020, Cao Wenfei, an official of CGN assigned as member of the standing committee of the country-level Party Committee and deputy county chief of Leye, Guangxi, hosted a live-streaming session. "This is the tangerine from Baini Village, Leye in Baise. Every tangerine is fresh picked with dew. The freshest tangerine is for you." At that night, Cao Wenfei's live-streaming session attracted a live audience of 153,000. The debut made a record of selling 8,000 kg tangerines within two hours, earning Cao the reputation of "Celebrity County Chief".

As of the end of November 2020, he had more than 410,000 followers and helped sell agricultural products worth nearly RMB 6 million. Taking advantage of the internet celebrity economy, Cao Wenfei guides all first secretaries in his county to do live streaming to promote local products. In order to consolidate the results of poverty alleviation, he will proactively perfect the logistics and after-sales services across the e-commerce industry chain, and deliver more industrial projects on the ground.

- China General Nuclear Power Services Corporation (CGNS) dedicated a column for products in impoverished areas on the e-commerce platform hhyungu.com (*Haihe Yungu*), with a total sales volume of over RMB 6.5 million.

Promoting employment in impoverished areas to break the cycle of poverty

Case: Taking a mix of measures to promote employment for poverty alleviation- "A job for one person helps his/her family shake off poverty"

To effectively combat poverty, we must make sure the jobs offered go to the impoverished. On the basis of all-round on-site surveys, CGN has organized job fairs for registered poor people with labor capability who want to seek a job. We took the initiative to work with the local government, urged Leye County and Lingyun County to release recruitment information on their WeChat official accounts, and organized telephone interviews, virtual interviews and in-person interviews, etc., to ensure the job opportunities were directed to all impoverished households.

In order to help poor workers improve skills and find jobs in their home county, CGN worked with Leye County to initiate the CGN-Leye Joint Employment Service Center. The center provides internship opportunities, employment consultation and mentoring, and other services for junior college students, undergraduates and graduates. With job openings provided by local industrial development projects, CGN helps local poor find jobs by means of local employment, employment outside of the county, and employment skills training to increase their household income.

- The kiwi park provides **50** jobs per 66.67 hectares.
- The food irradiation project provides more than **100** jobs in the upstream and downstream industry.
- Xing'an League Wind Power Industry Base and the Xing'an League Biological Natural Gas Base can directly or indirectly provide more than **1,500** jobs in the upstream and downstream industry.
- More than **3,000** employment skills training opportunities were offered to poor households.

CSR Feature III

CGN's Efforts in Combating COVID-19

In 2020, the sudden outbreak of COVID-19 took a severe toll on the world order and economy. CGN resolutely implemented the important instructions of General Secretary Xi Jinping and proactively followed the decisions and plans of the CPC Central Committee and the State Council. We rushed to the aid of Hubei, then the epicenter of the outbreak, and did our best to guarantee normal power generation of wind farms and stable energy supply in the province. While ensuring staff safety, CGN spared no effort to promote the resumption of work and production. Meanwhile, we did a good job in protecting our overseas projects and project teams from COVID-19, proactively supported the global fight against the pandemic. We worked with stakeholders to overcome the difficulties of the times.

Supporting the domestic COVID-19 fight

Combating COVID-19

RMB 30 million

On January 27, CGN donated RMB 30 million to support Hubei's fight against COVID-19.

42 million items

From January 29, all electron beam sterilization centers of CGN resumed work and disinfected and sterilized 42 million items of medical protective equipment for free in total.

5,000 protective suits

On February 7, Yangjiang Nuclear Power Company and Taishan Nuclear Power Joint Venture Co., Ltd. donated 5,000 sets of protective suits for Wuhan, which were delivered by CGNS Yangjiang Branch after traveling 1,200 km for 22 hours.

150,000 items

On February 13, CGN Energy International Holdings Co., Ltd.(CGNEI) and CGNPC Uranium Resources Co., Ltd. purchased 72,000 N95 masks, 50,000 FFP3 medical masks, 30,000 pairs of medical gloves, and 100 protective suits from France, Australia and other countries and regions, and delivered them to relevant hospitals in Wuhan.

263.112 TWh

CGN tried its best to ensure nuclear safety and stable power generation, providing strong guarantee for winning the battle against COVID-19. Throughout the year, a total of 263.112 TWh of clean energy generated by CGN was connected to the grid.

50,000 masks

On March 9, CGN donated 50,000 N95 masks (packed in 250 cartons) to Shenzhen.

1 set

On March 19, after traveling for nearly 40 hours, workers of CGN Nuclear Technology Development Co., Ltd. (CGN Technology) delivered one set of core equipment for the accelerator to Hubei to help with the treatment of medical wastewater.

Resumption of work and production

1 set

On February 20, the first blade of No. 4 wind turbine of CGN's Daishan No.4 Offshore Wind Power Project was docked with the wheel hub, completing the first milestone after the resumption of the project.

350 people

On March 26, the chartered G4318 train departed from Jingzhou, Hubei, transporting CGN's 350 employees and their family members stranded by COVID-19 back to Guangdong.

+500 recruits

On April 19, CGN organized nearly 20 key member enterprises to recruit over 500 people for over 150 positions, contributing to employment stability amid the fight against COVID-19.

100%

On April 26, the booster station of CGN's Lenghu Phase III 50 MW Wind Power Project was built on the Qinghai-Tibet Plateau. CGN New Energy Holding Co., Ltd. had resumed all its projects under construction.

CGN acts as a vanguard in COVID-19 fight

Ye Xiaojun

Model Worker of Central SOEs in the Fight Against COVID-19

At the height of the COVID-19 outbreak, Ye Xiaojun rallied the Party branches of his company, and 61 Party members and backbone workers to provide free services of irradiation sterilization for months, supporting the country's fight against COVID-19. They accumulatively sterilized 42 million items of protective equipment with the irritation technology free of charge, and shortened the time needed for supplying the urgently needed materials, such as masks and protective suits, from 7-14 days to 1 day.

The Party Committee of Taishan Nuclear Power Joint Venture Co., Ltd. (TNPJVC)

Model Unit of Central SOEs in the Fight Against COVID-19

During the COVID-19 outbreak, the Party Committee of TNPJVC effectively contained the spread of the coronavirus and ensured work safety at the same time. It coordinated the management of over 4,000 employees from 97 partners, and donated 5,000 protective suits and 3,000 medical masks to Guangdong's aid-Wuhan team and local hospitals in Wuhan. Donations were also given to Taishan No. 2 People's Hospital and other institutions. Moreover, mental care was provided for the employees and their family members stranded in Wuhan due to COVID-19. Through domestic and overseas COVID-19 control, Taishan Nuclear Power Plant managed to ensure the safe and stable operation of nuclear units.

Zhao Yunfeng

Model Worker of Central SOEs in the Fight Against COVID-19

During the Spring Festival holiday and the first outbreak of COVID-19 in 2020, Zhao Yunfeng was the only on-duty Party member of Hubei Branch of CGN New Energy Holding Co., Ltd. at Xuanhua Wind Farm. He bravely shouldered the responsibility and made it his top priority to fight COVID-19 and ensure work safety and power supply. From January 23 to April 8, he was on duty for 71 consecutive days, during which a total of 31.66 GWh of clean energy was generated by Xuanhua Wind Farm and connected to the grid of Hubei.

Fang Jianjun

Model Worker in Guangdong's Fight Against COVID-19

In the big test of the COVID-19 pandemic, Fang Jianjun played the exemplary role of Party members to overcome the difficulties and protect the safety of Daya Bay Nuclear Power Base in Guangdong. Fang led a team to compile the Emergency Response Plan for the COVID-19 Pandemic, proposing graded management of high-risk and low-risk groups at and off working hours. The plan was widely used as a reference by foreign peer companies when the pandemic was raging abroad.

CGN's efforts to support the overseas fight against COVID-19

CGN's overseas projects and units strictly implemented the requirements of the SASAC on COVID-19 response of overseas projects. While ensuring staff safety from COVID-19, they leveraged cutting-edge technologies to promote production and shouldered social responsibilities to support local fight against COVID-19. By so doing, they managed to keep the workers and projects safe, and build up the CGN image overseas.

Protecting staff safety

Based on the actual situation of project operation, CGN's overseas units established their respective COVID-19 response team, and formulated detailed response plans. They followed the epidemic situation in surrounding countries, learned from the experience of the domestic fight against COVID-19, and adopted a series of measures to protect the safety of overseas employees.

Supporting partners to combat COVID-19

CGN proactively supported its overseas partners' fight against COVID-19. Specifically, we donated 200,000 medical masks to the British Branch of EDF (Electricité de France), 20,000 medical masks to Framatome, 20,000 medical masks and 3,000 goggles to Orano, and 30,000 medical masks to French Alternative Energies and Atomic Energy Commission (CEA).

CGN donates 50,000 medical masks to EDF.

Stakeholders' comment

Our Center needs 6,000 masks every day, not only for frontline medical workers, but also for the critically ill. I want to express gratitude to CGN for the medical supplies they sent. This helped meet our urgent needs for medical masks.

—Pierre Carly, head of Paris Emergency Center

During the lockdown, we stayed at home all the time. My husband lost his job, my children couldn't go to school, and I couldn't do business. The materials sent by CGN could get us through the next two to three months.

—SelvaraniSuramaniam

Supporting communities to combat COVID-19

CGN Europe Energy (CGNEE) donated 15,000 FFP2 masks to Greater Paris University Hospitals (AP-HP), and EUR 10,000 to purchase rice, sugar and other life necessities for hundreds of needy families. Edra Power Holdings Sdn Bhd of CGNEI provided daily necessities for 520 needy families nearby, and provided assistance funds for 180 self-employed individuals who had difficulties in business operations, to tide local disadvantaged groups and families over difficult times.

CGNEE donates medical materials to Greater Paris University Hospitals (AP-HP).

Sharing CGN's anti-COVID-19 experience

Daya Bay Nuclear Power Base compiled the Guide on COVID-19 Response, which is widely promoted among industry peers across the world, contributing to the global fight against COVID-19. The guide provides a model for the Hinkley Point C Project in the UK, laying a solid foundation for the continuous implementation of the primary critical path. The effectiveness of CGN's COVID-19 response has been highly recognized by the UK's Office for Nuclear Regulation (ONR).

About CGN

Company Profile

China General Nuclear Power Group (CGN) is headquartered in Shenzhen, Guangdong Province and controlled by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC). Committed to "developing clean energy to benefit mankind" and with a 4+X business layout, CGN develop businesses in the fields of nuclear power, nuclear fuel, new energy, financial services, nuclear technology, etc. The Group has three Hong Kong listed companies and two mainland listed companies. The installed capacity of clean power in operation controlled by the Group exceeds 63 GW, including 27.14 GW of nuclear power and 36 GW of new energy.

Status in the industry

- The largest nuclear power enterprise in China
- The third largest nuclear power enterprise in the world
- Ranks 196th among the top 500 enterprises of China
- Ranks 19th among the top 100 multinational companies of China

Listed companies

- CGN Power Co., Ltd. 01816.HK 003816.SZ
- CGN Mining Co., Ltd. 01164.HK
- CGN New Energy Holding Co., Ltd. 01811.HK
- CGN Nuclear Technology Development Co.,Ltd. 000881.SZ

CGN's business scope

Nuclear energy

In 2020, we maintained safe and stable operations of our nuclear power plants and steadily advanced the construction of nuclear power projects.

- **24** in-service units with an installed capacity of **27.14** GW, accounting for **54.4**% of China's total
- Approved **7** nuclear power units under construction with a total installed capacity of **8.229** GW
- Nuclear on-grid power generation amounted to **168.464** TWh in 2020

New energy

Through market-oriented innovative operation and enhanced equipment governance and resource coordination, the new-energy projects in service maintained stable operation, and those newly put into operation made record highs.

- **473** new-energy projects in China with a total installed in-service capacity of **24.5396** GW
- Invested in **48** new-energy projects overseas with a total installed in-service capacity of **11.475** GW
- **76.63** TWh of on-grid power generated by new energy in 2020

Nuclear fuel

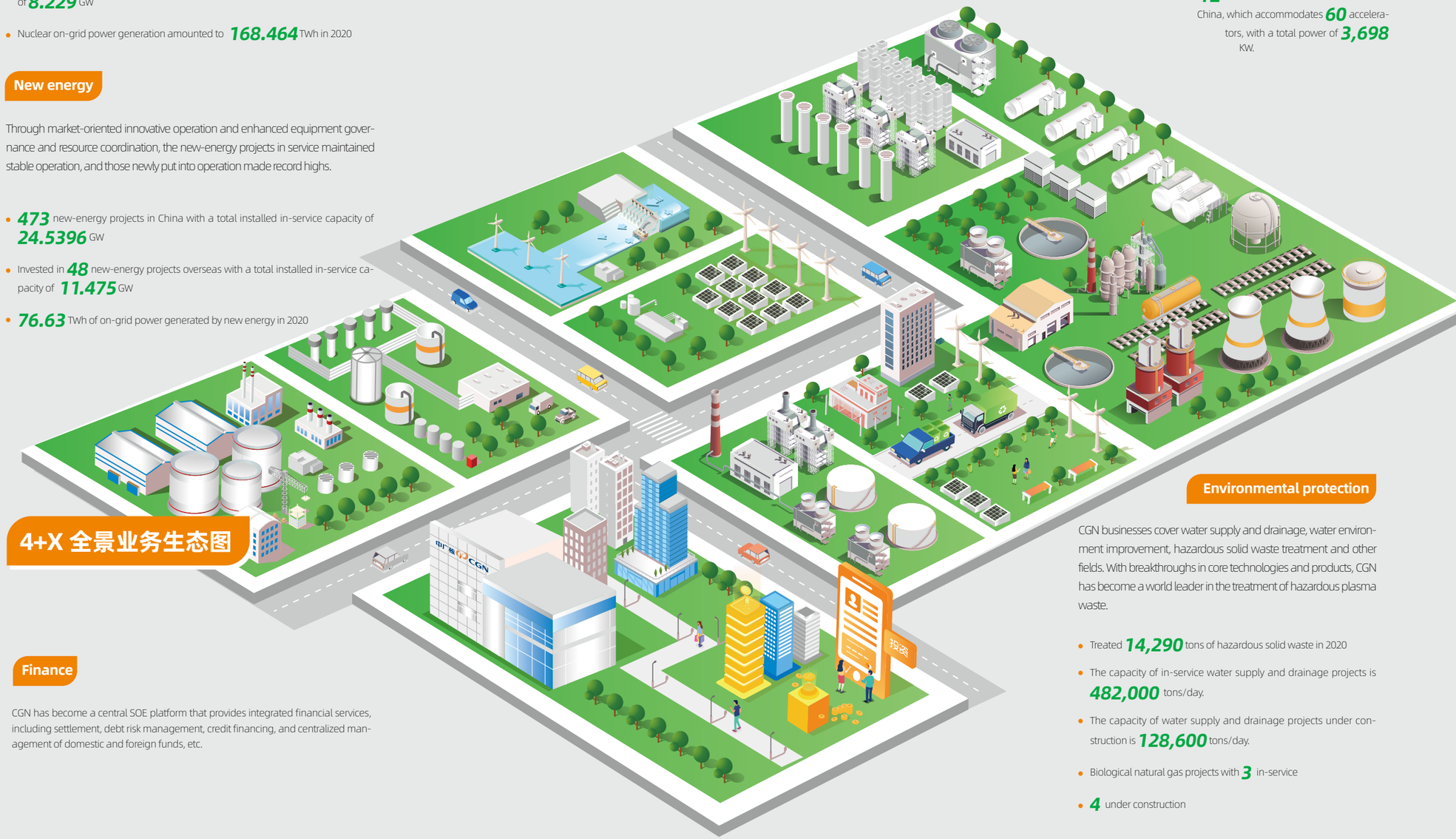
We conducted high-quality operation of Husab Uranium Mine in Namibia, optimized the development structure of uranium resources to ensure safe supply of nuclear fuel, and modernized nuclear fuel supply and industry chains.

- **7** uranium mine projects (including those at the prospecting stage)

Non-powered nuclear technology

CGN ranks first in China in terms of electron accelerator R&D and electron beam irradiation processing services, and among the top three in China in terms of R&D of modified polymers and instrumentation.

- Produced **420** electron accelerators cumulatively.
- Has **12** electron beam irradiation centers in China, which accommodates **60** accelerators, with a total power of **3,698** KW.



Finance

CGN has become a central SOE platform that provides integrated financial services, including settlement, debt risk management, credit financing, and centralized management of domestic and foreign funds, etc.

Environmental protection

CGN businesses cover water supply and drainage, water environment improvement, hazardous solid waste treatment and other fields. With breakthroughs in core technologies and products, CGN has become a world leader in the treatment of hazardous plasma waste.

- Treated **14,290** tons of hazardous solid waste in 2020
- The capacity of in-service water supply and drainage projects is **482,000** tons/day.
- The capacity of water supply and drainage projects under construction is **128,600** tons/day.
- Biological natural gas projects with **3** in-service
- **4** under construction

Overview of global business layout

***Note:** Those listed above are all in-service projects, unless otherwise specified.*

2020 CGN in 2020

Investment

Assets

- Total assets: RMB **788.5** billion
- Ratio of overseas assets: **17**%

Knowledge assets

Building a sound scientific research and innovation system to promote the application and transformation of innovative achievements

- Investment in sci-tech R & D: RMB **3.79** billion
- Number of personnel of sci-tech research activities: **8,582**

Human resources

Protecting the rights and interests of employees and establishing diversified and sound training and promotion mechanism

- Number of employees: **42,464**
- Total employees by localized recruitment of international projects: **3,329**

Social relations

Continuing transparent communication, voluntary services and public services, and implementing targeted poverty alleviation

- Total donation in targeted poverty alleviation: RMB **101.06** million
- Total domestic and overseas donation: RMB **172** million

***Note:** the overseas donation includes RMB 101.06 million for targeted poverty alleviation.

Working style

Strict Compliance

Always work with strictness

Prudent attitude

Strict implementation

Stringent discipline

Prudent decision-making

Prudent decision-making

Cautious operations

Detail-oriented

Considerate

Careful

Fact-based Approach

Down-to-earth

Fact-based approach

Do some deeds

Seek actual effects

Output

While creating business value, we care about the harmonious development of ecological environment and society.

	Value creation	Stakeholders
Business performance	◦ Operating income: RMB **110.7** billion	Shareholders and employees
	◦ Ratio of overseas operating income:18%	
Safety performance	◦ Ratio of units achieving the world's excellent level (the world's top decile) in WANO indicators: 69.8%	All
	◦ Ratio of units achieving the world's advanced level (the world's top quartile) in WANO indicators: 72.6%	
	◦ As of December 31, 2020, Unit 1 of Ling Ao Nuclear Power Plant had been operating for 5,291 days without unplanned shutdowns, ranking number one among all units of the same type.	
	◦ Number of level-2 or above incidents defined in the International Nuclear Event Scale: 0	
Environmental performance	◦ Gross in-service installed capacity of clean energy: 63.1546 GW	All
	◦ On-grid power generated from clean energy 263.112 TWh	
	◦ On-grid power generated from clean energy equivalent to reduction of 80.3807 million tons of standard coal consumption	
	◦ Total CO2 emissions reduced converted from on-grid power generated from clean energy: 209.9954 million tons	
Employee development	◦ Cumulative training hours in 2020: 3.87 million hours	Employees
	◦ Average training time per employee: 93 hours	
Community development	◦ Help 10 poor villages out of poverty	Government, communities
	◦ 16,432 participants in volunteer activities	Communities
	◦ 850,000 visitors to nuclear power bases	

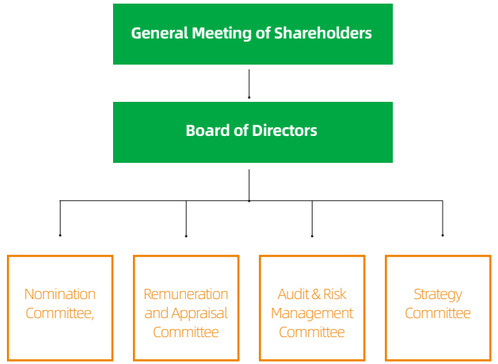
Corporate Governance

Board of Directors

Board operation

The Board of Directors of CGN has established scientific rules of procedure in strict accordance with laws and regulations such as the *Company Law of the People's Republic of China*. Under the Board, there are four specialized committees: Nomination Committee, Remuneration and Appraisal Committee, Audit & Risk Management Committee, and Strategy Committee, to help the Board make science-based, informed decisions.

In line with the decisions and arrangements of the CPC Central Committee, the State Council and the SASAC, the Board puts into practice the guiding principles from General Secretary Xi Jinping that we must adhere to the Party's leadership over state-owned enterprises (SOEs), develop a modern enterprise system and treat it as the direction of SOE reform, and strive to build a modern SOE system with Chinese characteristics. To this end, the Board earnestly fulfills its roles assigned by the shareholders' general meeting, especially in "strategy making, decision making, and risk prevention". The decisions of the Board are collectively made and executed pursuant to the Articles of Association and authorized corporate governance powers.



Deepening the reform of modern enterprise system

We implement the five Board power pilot programs, deepen the reform of modern enterprise system, and improve the governance mechanism of subsidiaries with the core being "chairman, Party Secretary and legal representative undertaken by one person".

Enhancing risk control

The Board closely watches the latest changes to political and economic landscapes at home and abroad, urges the management to enhance risk control of major projects, and guarantees the work safety and technological R&D, especially major R&D projects.

1	4	10	3	34
General Meeting of Shareholders	Board meetings (including 1 interim board meetings)	Specialized committee meetings	Director special briefings	Proposals reviewed and approved by the Board

Board composition

According to the *Articles of Association*, the Board of Directors consists of nine directors, of whom there are seven directors recommended by the SASAC, including four outside directors; one director is recommended by Guangdong Hengjian Investment Holding Co, Ltd.; one is an employee director elected at the workers' congress. In 2020, the Board of Directors had seven active directors, and four outside directors were replaced.

Yang Changli
Chairman

Li Dingcheng
Outside director

Ma Li
Outside director

Zhang Xiaolu
Outside director

Xu Haihe
Outside director

Wen Wenxing
Director

Chen Sui
Employee director

Management Team

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

Yang Changli

Chairman of CGN

Gao Ligang

President and Director of CGN
President of CGN Power

Li Li

Director of CGN

Shi Bing

Senior Vice President of CGN

Pang Songtao

Senior Vice President of CGN

He Haibin

Chief Accountant of CGN

Guo Limin

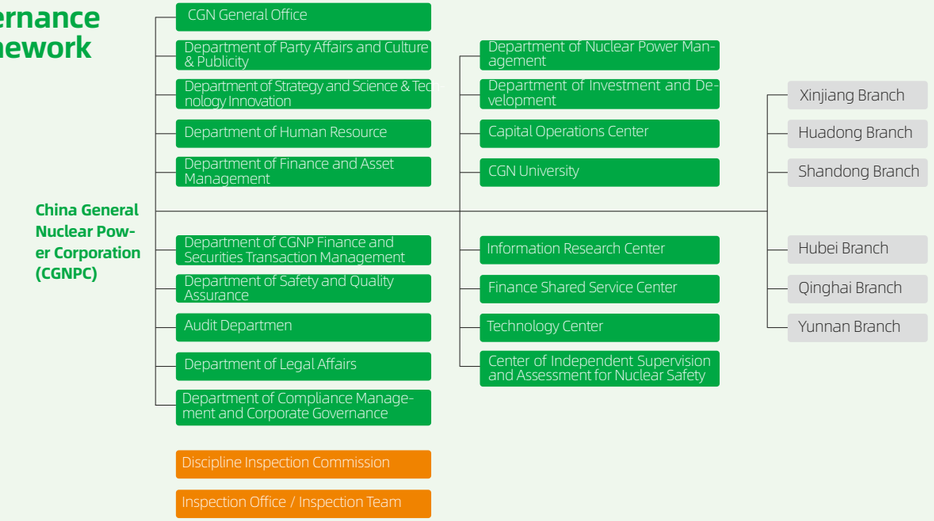
Senior Vice President of CGN

Li Yilun

Senior Vice President of CGN

***Note:** All of the positions above were effective as of July 2021.

Governance Framework



Compliance Management

The year 2020 witnessed CGN's efforts to formulate rules and policies on compliance management. Strictly following the government documents such as *Guidelines on Compliance Management for Central State-owned Enterprises (Trial)* and the *Guidelines for the Compliance Management of Enterprises' Overseas Operation*, all our subsidiaries gradually built sound organizational and institutional systems for compliance management to ensure "across-the-board compliance".

Anti-corruption and integrity

We strictly abide by relevant regulations such as the Interim Provisions of the State Administration for Industry and Commerce on Banning Commercial Bribery and the CGN Rules on Handling Employees' Violations of Rules and Discipline. Moreover, we enhance discipline management and improve institutional development so that all employees of CGN don't dare to, are not able to and have no desire to commit acts of corruption.

Anti-trust actions

We uphold the principles of the market economy and strictly abide by relevant business laws and regulations of China and host countries and regions. We hire outside legal counsels to ensure compliance in asset transactions and bidding processes, and ensure accountability for overseas operation violations.

Operating sites which had completed corruption risk assessment: ***100***%

Employees who had received anti-corruption training: ***100***%

Business partners which had received information about CGN's anti-corruption policies and procedures: ***100***%

An unimpeded whistle-blowing channel has been set up to enable employees and third parties (such as suppliers) who have business dealings with the Group to report any business-related malpractice and violation with their information protected as secrets.

CGN has developed the course *Study of Discipline Violation Cases* and carried out the multi-tiered anti-corruption training, covering all management personnel overseen by the Party Committee of the Group.

CGN remains vigilant in cracking down on corruption, strictly implements the procedures for violation investigation and handling, and severely punishes acts of corruption according to law and disciplines.

CGN improves the policies and procedures in key areas of business transactions, and works to institutionalized and regularize anti-corruption work during overseas businesses.

Risk Management

In 2020, we worked actively to contribute to stability on six key fronts and security in six key areas as required by the central government. Based on thorough research and analysis, we identified major risks that might hinder us from achieving the business goals of the year, formulated and implemented measures to improve quality and performance, and ensured the robust operation of the Group.

Risks	Countermeasures
1 The multi-base and multi-unit operation and management brought challenges to resource coordination and control.	• We improved technological capability, management and the mechanism for major equipment management & operation to ensure the safe operation of nuclear power bases.
2 The power sales of nuclear power bases were affected by economic development, power demand, market reforms, policy orientation and other factors.	• We strengthened regional coordination to meet power demand of different areas when appropriate, avoided shutdowns and load shedding, and actively followed the trends of electricity market reform.
3 The government tightened regulation over nuclear safety and environmental protection, posing a greater challenge to compliance for projects under construction.	• We formulated measures for optimizing projects under construction to ensure project progress, quality and compliance.
4 Fluctuations in RMB exchange rate and credit situation posed financial risks such as cash flow impacts, debt financing and cost control.	• We adopted a series of measures to reduce financial risks, including closing exposures in foreign currency debt exchange rate in batches, capped incremental foreign currency debts, and increasing the scale of direct financing, etc.

Lowering Costs and Improving Business Performance

We continue to practice the management philosophy level by level, and take multiple measures to optimize operational models, management and digital operations, realizing continuous improvement in assets operation efficiency.

Business transfer

We optimize the model of shared financial management. With the original headquarters-subsidiary operation model intact, we launched a pilot program to transfer the business of 10 headquarters-run subsidiaries to the Wuhan Sub-center. More business will be transferred to the Wuhan Sub-center in the coming years, which is expected to save costs of RMB 10 million or so every year.

Lean management

We have changed the auditing fee calculation method to fixed quotation. Hence, despite the increasing labor costs, we could get the same audit quotation for "2+N" years, and saved RMB 11.15 million in audit expenses in the Group's final account as per the same statistical scope.

Centralized sourcing

We have optimized the scope, methods and strategies of centralized procurement, and reduced the procurement cost by RMB 1.753 billion in 2020 as per the same statistical scope. The launch of CGN Mall has substantially improved procurement efficiency, reducing the sourcing period from 100 days at most to less than 10 days.

Green bookkeeping

The CGN Electronic Accounting File System is launched, making it possible to realize the lifecycle management of accounting files. As a result, the filing process is simplified, as the file security is improved and the average work efficiency is also improved by 60%.

Party Building

Upholding Party leadership and enhancing Party building is the foundation and core of SOEs. We earnestly implement the Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, and abide by the working regulations of primary-level units of SOE, while integrating grassroots Party building efforts and improving grassroots Party organizations in the following five aspects. We hope to lead high-quality corporate development with high-quality Party building, providing strong guarantee for creating a new development pattern at an earlier date.

01 *Integrating with ideological education to improve the political awareness.*

We improve the "first topic" system, apply learning to work, and actively benchmark against best practices and standards. We continue to apply what we have learnt from Party building to guide our work and see that our leaders shoulder their political responsibilities.

02 *Integrating with institutional development to improve governance efficiency.*

We continue to advance the incorporation of Party building into the articles of association of domestic subsidiaries, optimize the Party pre-review procedure, and further clarify the relationship and division of rights and responsibilities between CGN's governance entities.

Yang Changli, Chairman of CGN, gives a lecture on Party building to the trainees of the Red Egret - Hovering Program.

03 *Integrating with the organizational system to create more value.*

We further sort out the relationship between the three levels of Party organizations of the Group; at each level, we set up Party member responsibility areas, Party member demonstration posts, Party member work teams, and Party member service teams, initiating a wave of benign competition at CGN.

04 *Integrating with operational management to improve the effect of regulation.*

We draw on the theories and tools of management science, and good practices in nuclear power work safety, construction engineering, etc. Based on these references, we have formed a Party building management brand with CGN's characteristics.

05 *Integrating with the performance assessment system to better motivate the fulfillment of Party building responsibilities.*

We improve the Group's assessment method for the Party building accountability system, with the results in this regard accounting for 20% of overall performance. We also increase efforts in assessment, debriefing, evaluation, and application of assessment results to make sure the Party building responsibilities are earnestly fulfilled.

123
"first topics" discussed by the CGN Party Committee

798
rectification actions taken under the initiative to raise awareness of the need to stay true to the Party's founding mission

97.4%
of the above rectification actions completed

Sustainability Management

We integrate the philosophy of sustainable development with our corporate strategies. Specifically, we practice sustainability management across functions and business links to enhance the Group's capability and competitiveness n sustainability, improve the quality of corporate development and contribute to economic and social sustainability.

Sustainability Strategy

Our sustainability-embedded CSR philosophy

Our mission

Develop clean energy to benefit mankind

Our vision

Become a world-class clean energy group

Opportunities and challenges of sustainable development

- China has entered a new normal of economic growth, shifting from high-speed growth to medium- and high-speed growth.
- China is and will remain in an important period of strategic opportunity for development for a long time.
- Global energy demand continues to grow and the supply structure undergoes fundamental changes; the proportion of fossil fuels continues to decrease while the sector of renewable energy is growing rapidly.
- During the 14th Five-Year Plan period (2021-2025), China will expedite the development and utilization of clean energy, and significantly increase the proportion of clean energy consumption.
- China has announced the goals to peak carbon dioxide emissions by 2030 and achieve carbon neutrality by 2060.
- The world economy is facing uncertain growth prospects and the risk of economic recession is amplified.

Our response

We will implement the guidelines of General Secretary Xi Jinping's important speeches and the decisions and arrangements of the CPC Central Committee, seize the opportunities of economic development and energy transition, and persist in independent innovation and core capability building. We will systematically plan and advance reform and high-quality development, to better serve economic and social sustainability. As a clean energy group specializing in nuclear power, we will always put safety, quality and efficiency first in the development of nuclear power. Meanwhile, we will promote the development of non-nuclear clean energy, to enable access of clean energy to more people and contribute to the global transition to green and low-carbon energy.

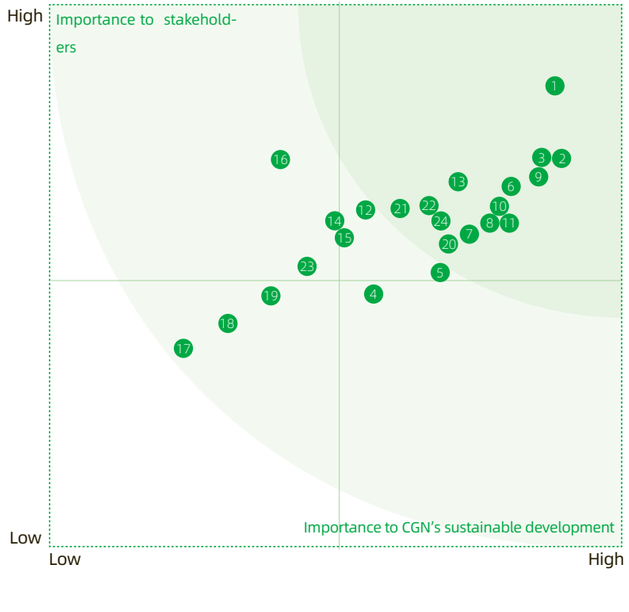
Contribution to UN SDGs

The United Nations 2030 Sustainable Development Goals (SDGs) outline a bright future of a sustainable world. Achieving this grand vision requires the joint efforts of all sectors of society. CGN's sustainability strategy coincides with the UN's sustainability vision. In the course of pursuing our own sustainable development, we can contribute to the realization of 13 of these SDGs.

Materiality Management

In order to better understand the expectations and demands of stakeholders, we conducted a questionnaire survey on stakeholders following the material topic analysis process, and collected 8,603 valid copies of the questionnaire in 2020. We screened out key material topics over "importance to stakeholders" and "importance to CGN's sustainable development", and provided key disclosure of these topics in the report..

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



We conducted a questionnaire survey on stakeholders following the material topic analysis process, and collected

8603 valid copies of the questionnaire in 2020.

1. Safety management
2. Engineering quality and safety
3. Safe operation
4. Technological innovation
5. Win-win cooperation
6. Environmental management
7. Tackling climate change
8. Resource saving
9. Environmental risk management
10. Ecological protection
11. Environmental services
12. Protecting basic rights and interests of employees
13. Occupational health and safety
14. Career development
15. Employee care
16. Targeted poverty alleviation
17. Joint development of infrastructure overseas
18. Community engagement
19. Transparent communication
20. Party Building
21. Compliance management
22. Risk management
23. Reducing costs and increasing efficiency
24. Sustainability management

Stakeholder Engagement

Stakeholders	Expectations and Demands	Communication and Response
The Government	○ Compliance operation ○ Ensuring nuclear safety ○ Optimizing energy mix ○ Maintaining and increasing the value of state-owned assets ○ Paying taxes according to law	○ Implementing national energy policies ○ Improving corporate governance ○ Subject to regulatory review ○ Reporting regularly
Shareholders	○ Continuous and stable returns ○ Transparent and open information	○ Sound business ○ Information disclosure
Customers	○ Fair and transparent operational environment ○ Stable supply of clean energy	○ Improving operation management ○ Actively coordinating grid dispatch ○ Strengthening communication
Partners	○ Fair partnership ○ Creating a responsible supply chain	○ Open cooperation and win-win development ○ Transparent procurement
Employees	○ Guaranteeing compensation and benefits ○ Health and safety ○ Career development ○ Employee care	○ Ensuring the basic rights and interests of employees ○ Protecting employees' occupational health and safety ○ Providing abundant staff training and scientific development mechanism ○ Employee care and cultural activities
The Environment	○ Tackling climate change ○ Waste management ○ Protecting biodiversity	○ Promoting clean energy development ○ Continuously optimizing environmental management ○ Development of environmental protection services ○ Protecting biodiversity
Communities	○ Engaging in community development ○ Transparent communication ○ Charity	○ Driving economic development and creating jobs ○ Active and transparent communication ○ Continuously carrying out charitable activities and helping the poor and people in need
Media	○ Transparent and open information	○ Transparent information disclosure ○ Regular communication

Safe and Stable Operation

Our Commitment

Nuclear safety is the core of CGN. We will always safeguard the lifeline of nuclear power safety and ensure stable operation of commercial nuclear power units, striving to lead the world in the WANO composite index.

Our Actions

- Continuously improving safety management
- Advancing technological innovation
- Ensuring safe construction, operation and maintenance of nuclear power sites
- Enhancing cooperation across the industry chain

Our Achievements

72.6 %
of units achieved the world's advanced level (the world's top quartile) in WANO indicators

Unit 2 of Ningde Nuclear Power Plant achieved the world's excellent level in all the **12** WANO indicators.

6 units of Daya Bay Nuclear Power Base made history by scoring full mark in the WANO composite index for all six units for the first time.

Nuclear Power Base in Yangjiang, Guangdong

Safety Management

We always put safety, especially nuclear safety, first and foremost. We earnestly implement the *Nuclear Safety Law* and other governing laws, regulations, guidelines and standards, continue to optimize the safety management system, and build the safety-conscious culture, so as to safeguard our safety lifeline.

Improving safety management

The defense-in-depth nuclear safety management system

We have established effective defense-in-depth (DiD) systems at all stages of design, construction and operation of nuclear power stations. In the stage of design, we set up physical DiD barrier to ensure the inherent safety of nuclear power stations; in the stages of construction and operation, we set up DiD defenses for preventing, monitoring and rectifying the possible failures of equipment, personnel, and organizations. In this way, we protect the integrity of the three physical barriers and minimize the probability and damage of radioactive release in the environment. In designing and improving nuclear safety policies and procedures, we always take into consideration the establishment and effectiveness of DiD systems.

The highly transparent and effective experience feedback system

Our experience feedback system is based on detecting incidents. With a transparent reporting system, we analyze the fundamental cause of the incident, formulate corresponding corrective actions, and form a dynamic and transparent feedback system to prevent the recurrence of incidents. While drawing lessons, we regularly summarize and solidify good practices, conduct exchanges with industry peers, and draw on external experience to improve safety management.

The completely independent safety supervision system

We have established the internal-external joint supervision system. Internally, we have built a three-tiered supervision and assessment system covering the working areas of nuclear power stations, nuclear power bases and plants. We are subject to the irregular, targeted inspections from national regulatory authorities on the safety of nuclear power plants, and regularly invite international peers to make safety evaluation. Through effective internal and external supervision, we hope to constantly improve safety management.

The nuclear emergency response system

We have established an all-encompassing emergency plan system with nuclear emergency response at the core, and an emergency defense mechanism with multiple defenses. We have specialized emergency response equipment and sufficient qualified response personnel. All our nuclear power plants have established a sound emergency response and preparedness system. They can organize emergency drills of different scales timely to ensure rapid response to any kind of emergency. In 2020, in accordance with relevant laws and regulations on emergency management in China, we compiled the CGN Administrative Measures for Emergency Response and updated the *CGN Comprehensive Emergency Response Plan*, to better regulate the Group's emergency response management.

5192

Emergency drills held in 2020

Building a safety-conscious culture

Everyone is a safety barrier. We have built an all-encompassing safety-conscious culture that involves every employee, led by senior management and advocated by model employees personally. Moreover, activities such as "The Management Onsite", "I Want Safety", and "Respecting Nuclear Safety Starts from Observing Procedures" are organized on an ongoing basis to raise employees' awareness of safety and urge all employees to put "Safety First and Quality Foremost" in their daily work.

Special inspection and supervision of safety management

From May to June 2020, for the first time in the CGN history, special inspection teams were formed and led by senior management members to assess the safety management practices at each nuclear power base. Through this top-down approach, we hoped to foster an environment where everyone is conscious of safety, participates in and supervises safety management. By doing so, we see that safety management is enhanced and the relevant responsibilities are fulfilled at all levels.

Changwan Leadership Forum

On April 26 and 27, 2020, we held the Changwan Leadership Forum under the theme of "Being Responsible and Ensuring Stable and Sustainable Operations - Protecting Nuclear Safety and Pursuing Innovation-driven Development". We studied General Secretary Xi Jinping's key instructions on the development of the nuclear power industry and CGN, and did case studies of typical internal safety and quality incidents to build up our leadership in safety management.

Gao Ligang, President and Director of CGN and President of CGN Power, led a delegation to carry out safety management inspection at Ningde Nuclear Power Co,. Ltd.

From July 29 to July 30, Gao Ligang, President and Director of CGN and President of CGN Power, conducted "follow-up visits" on the safety inspection at Ningde Nuclear Power Plant.

Shi Bing, Senior Vice president of CGN, led a delegation to carry out safety management inspection at Hongyanhe Nuclear Power Co,. Ltd.

From May 18 to May 22, Shi Bing, Senior Vice President of CGN, led a delegation to carry out safety management inspection at Hongyanhe Nuclear Power Co., Ltd. The panel of experts conducted special inspection on four aspects such as coolant sources and emergency diesel generators.

Pang Songtao, Senior Vice President of CGN, led a delegation to conduct safety inspection at Yangjiang Nuclear Power Co,. Ltd.

From May 18 to May 22, Pang Songtao, Senior Vice President of CGN, led a delegation to conduct safety inspection at Yangjiang Nuclear Power Co,. Ltd., which focused on four aspects such as coolant sources and emergency diesel generators.

Construction Engineering Quality

The engineering quality of nuclear power units under construction is crucial to the safe and efficient operation of the units after they are put into production. We always put safety and quality first and never stop pursuing excellence, and have set the goal of "zero violations and zero quality defects". We focus on key and difficult points of quality management, and proactively implement quality management measures to improve the safety and quality of construction engineering projects.

Construction scale

	At home	Abroad
Nuclear power units under construction	7	2
Other projects under construction (wind power and solar power)	41	4

Quality management

Fulfillment of quality responsibilities

We have improved responsibility systems, especially the concentric-circle quality responsibility system for the design team. Moreover, we have sorted out the responsibility chain of intensive construction management operations, and fully promoted the application of quality evaluation system for major schedule adjustments.

International benchmark building

We have urged projects under construction to formulate and implement quality improvement plans, made quality improvement a routine, and continued to consolidate the results of management standardization and on-site standardization. In 2020, we conducted six evaluations on Hongyanhe Project, Fangchenggang Project, and Huizhou Project.

Promoting advanced construction technologies

We have benchmarked against industry leaders, studied how to apply advanced construction technologies to nuclear power projects, and applied them to Hualong Project in an orderly manner. While optimizing the construction process, we have improved the physical outcomes of construction engineering.

ISO 9001

- All CGN's construction projects were certificated by ***ISO 9001*** quality management system.
- On December 1, 2020, Unit 3 and Unit 4 of Yangjiang Nuclear Power Plant won CGN its first National Quality Project Gold Award, which is the first and the highest state-level award recognizing high-quality construction engineering projects across sectors and disciplines. On December 11, 2020, the project also won the ***Excellent Project Award of the 19th China Quality Award (2020-2021).***
- Anhui Baima Lake Wind Farm was awarded ***National Advanced Unit for Quality Management.***
- Inner Mongolia Dalat Photovoltaic Base 100 MW No. 3 Project won the ***2020 China Power Quality Engineering - Operation/Construction Award.***

Key projects

Taipingling Nuclear Power Plant Phase I Project in Guangdong

Located in Huangbu Town, Huidong County, Huizhou City, Guangdong Province, the Taipingling Nuclear Power Plant Phase I Project in Guangdong is planned to deploy 6 Hualong One nuclear power units. The idea of ecological conservation runs throughout the project lifecycle from site selection, design, construction, to operation and maintenance. The project team takes the initiative to reduce environmental impact and resource consumption, align with the plans of surrounding areas and integrate into local development. On October 15, 2020, the first tank of concrete was poured on the nuclear island of Unit 2, symbolizing that the project entered a new stage of construction.

San'ao Nuclear Power Project in Zhejiang

The San'ao Nuclear Power Project in Zhejiang is jointly funded, constructed and operated by CGN and Zhejiang Zheneng Electric Power Co., Ltd.. The project plans to build six Hualong One nuclear power units in phases under one single plan. After completion, it will significantly increase the percentage of clean energy in energy consumption in Zhejiang, which is of vital importance to safeguarding national energy security and achieving the goals of carbon peak and neutrality. On December 31, 2020, the main project of Unit 1 officially started.

Nanpeng Island Offshore Wind Power Project in Yangjiang, Guangdong

With 73 wind turbines, Nanpeng Island Offshore Wind Power Project has an installed capacity of 400 MW, the first, large-capacity, in-service single offshore wind power project in China, and the first offshore wind power project with over 10 km of distance from the coastline and over 10m of water depth in Guangdong Province. On December 16, 2020, with the last unit connected to the grid, it was put into operation with full capacity, feeding 1.015 TWh of electricity per year to the grid.

LDB Wind Power Expansion Project in Brazil

The LDB Wind Power Expansion Project is located in Lagoa do Barro in Brazil's northeastern state of Piaui. On October 18, 2019, CGN won the bid in the A-6 energy auction held by Brazil's Ministry of Mines and Energy. The project started construction in November 2020, local time, and is scheduled for commercial operation by the end of December 2021, with an installed capacity of 82.8 MW and an estimated annual power generation of 366 GWh.

The world's largest project of using electron beam for industrial wastewater treatment in Jiangmen, Guangdong

On June 5, 2020, the world's largest project of using electron beam technology in the treatment of printing and dyeing wastewater was officially put into operation in Xinhui Victory City Company Limited. With seven electron accelerators working at the same time, it can treat up to 30,000 tons of wastewater a day, and recycle 70% of the wastewater, equivalent to saving 4.5 million tons of water per year and at least RMB 10 million of costs for businesses. The project marks that China's independently developed electron beam technology has reached the world-advanced level, and provides an effective solution and benchmark subject for the integrated treatment of industrial wastewater.

Wastewater before and after treatment

Safe Operation

We continue to optimize the operation of nuclear power and new-energy projects to ensure their safety, stability and reliability.

Operation of nuclear power projects

With a world-level, "three-tiered, three-line" organizational system for work safety management, we follow the principles of standardizing, specializing and centralizing safety management, take the conservative approach to decision making and apply bottom-line thinking, thus maintaining the good performance of 24 in-service nuclear power units.

Indicators	2020
Number of in-service nuclear power units	24
Ratio of units achieving the world's excellent level (the world's top decile) in WANO	92.03%
Ratio of units achieving the world's excellent level (the world's top decile) in WANO	69.8%
Ratio of units achieving the world's advanced level (the world's top quartile) in WANO	72.6%

As of December 31, 2020, Unit 1 of Ling Ao Nuclear Power Plant set a world record for maintaining zero unplanned shutdown for 15 consecutive years and safe and stable operation for 5,291 days in a row, the longest among generating units of similar types in the world. Its safety performance was covered by CCTV Focus.

0 level-2 or above incidents defined in the International Nuclear Event Scale

12 nuclear power units scored **full mark** in the WANO composite index.

The average unit capability factor (UCF) maintained **the world's advanced level in WANO indicators for the third consecutive year.**

Fleet Management

Standardized

- We built the OPST model (the operation standard management system) in the core areas of operations, and achieved the unified organizational management system, the unified technical standards and procedures system, the unified post qualifications and the authorized training system, as well as the unified operation management tools.
- Through SRT (the IT-enabled operation screening team), we strengthened the application of IT in a more coordinated way, formulated the smart operation plan for nuclear power, and promoted the implementation of smart operations.

Specialized

- We specified the directions of capability development of power plants and specialized companies respectively, and continuously promoted specialized services in areas including refueling outage, engineering modification, equipment management, spare parts management, as well as the design and construction of nuclear power plants.
- For major projects and equipment, we set up technical teams composed of specialists to advance these projects in a more professional way.

Centralized

- We continued to maximize the overall value through centralized management like resource allocation, joint contribution, sharing benefits and business coordination.
- We carried out the centralized reporting of spare parts for outage among multiple bases to ensure the supply of spare parts for outage. We also built the virtual storage of spare parts to optimize the inventory structure and led the industry with the single-plant inventory of the multiple bases.

Outage Management

CGN completed 17 refueling outages in 2020, with excellent performance in terms of safety, quality and duration. Several records were made. Among them, the initial outrage of Unit 6 of Yangjiang Nuclear Power Base took only 49.7 days, the shortest for units of the similar kind in the world. Moreover, the world's first EPR unit outrage was completed, overcoming different technical speculations, uncertainties and unexpected defects, among other challenges.

Equipment Management

We continue to improve the "8+1" operation mechanism for major equipment, embed the "8+1" chief expert mechanism into the power plant process, and ensure the fulfillment of major equipment management responsibilities. Moreover, we have set up a coolant source-leading group and an instrument control expert panel, and mobilized multiple bases to coordinate technical support, reliability and obsolescence management, and scientific & technological advancement. By doing so, we extend the "8+1" equipment management practices to engineering areas, promote the application of engineering experience in the production stage, and improve the management of equipment throughout its life cycle.

Operation of new-energy projects

We have strengthened the management of safety, quality and environment (SQE) and worked hard on safety supervision, team building, and standards review to improve our operation and management of wind power, solar power and other new-energy projects.

Strengthening safety process supervision

We continuously improve the SQE assessment system, lean toward the grassroots contribution, and include in-process monitoring indicators into the monthly SQE assessment. We improve the mechanism of supervising and evaluating the safety performance of the management, keep personal SQE performance records for senior management, and include their safety performance into in-process performance assessment, so as to urge them to effectively implement the work safety responsibilities.

Building a stronger safety supervision team

We set up the position of safety director in 32 new-energy subsidiaries, and all the safety directors are in place. Moreover, we explored new ways for safety directors to do their job, and received 137 SQE proposals from safety directors in 2020.

Carrying out internal safety assessment

We have improved the standards for SQE standardization review and established a 163-member SQE specialist team. For the first time, we organized internal experts to conduct independent standardization review on the in-service sites and plants, and rated 54 first-level, 84 second-level, and 75 third-level sites/plants in 2020.

4561.2 **MW**

Newly installed capacity in 2020

Average utilization hours of wind power and PV power exceed the industry average by

4.5 **%**

In the first half of February 2020, a worker of CGN Tuokexun Wind Farm in Xinjiang walked two hours a day to inspect wind turbines and tackle malfunctions.

Story of Striving

Pursuing excellence on the way to dreams

I feel honored to live and work in this great era. I will always push myself to do my best at work and act as a role model.

Zhou Chuangbin, Deputy Chief Engineer, Commissioning Center of China Nuclear Power Engineering Co., Ltd.

Zhou Chuangbin awarded the National Role Model Worker

What can be done in 30 years? Since he joined Daya Bay Nuclear Power Plant in 1991, Zhou Chuangbin has been working on nuclear power unit commissioning, and transformation himself from a secondary school student in rural eastern Guangdong to a "Worker Academician" in Shenzhen SEZ.

For the past three decades, dedicated to nuclear power unit commissioning, he solved numerous technological headaches, contributing to the development of China's nuclear power industry. In 2011, before the cold functional test of Unit 1 of Hongyanhe Nuclear Power Plant and Unit 1 of Ningde Nuclear Power Plant, the 500 kV main power supply was not ready for use. Zhou did a careful load calculation and safety analysis, and proposed to use auxiliary power supply for the cold functional test when the main power source was not available. Moreover, he prepared a detailed emergency response plan for power failure to fix the weakness of power supply and ensured the successful implementation of the cold functional test, avoiding major delays of the two nuclear power projects.

The pursuit of excellence has no end. Zhou is a contributor and witness to the rapid development of CGN's nuclear power business and has participated in developing China's proprietary third-generation nuclear power technology – HPR1000. He has never stopped his efforts to pursue excellence. In the future, he will continue to carry forward the spirit of craftsmanship and contribute to the development of nuclear power.

Zhou Chuangbin (right) at a commissioning site

Technological Innovation

CGN has earnestly implemented the innovation-driven development strategy, and continues to seek technological innovation that is in the world's forefront, serves economic development and the country's major needs, and meets people's need for a better life and health. With the efforts to enhance the mutual reinforcement of independent innovation and collaborative innovation and seek technological innovation and institutional innovation at the same time, we strive to build an industry-leading base for technological and industrial innovation, improve the Group's core competitiveness, and support the Group's high-quality development.

Innovation system

CGN regards technological innovation as an important driving force for its high-quality development and building a world-class model enterprise. We have formed a "three-in-one" overall layout for technological innovation, deployed and implemented key tasks in three categories: strategic projects, special projects of independent innovation, and Peak Plan projects. Moreover, we have formulated supporting measures regarding systems and mechanisms, technological talents, R&D input and commercialization, etc.

RMB 3.79 billion

Investment in technological activities in 2020

Innovation platforms

At present, CGN has one Key State Laboratory, one National Engineering Technology Research Center, seven National Energy R&D Centers, as well as several provincial/ministerial-level and Group-level R&D centers.

CGN's 9 state-level R&D platforms

- National Nuclear Power Plant Safety and Reliability Engineering Technology Research Center
- National Energy Ocean Nuclear Power Platform Technology R&D Center
- Key State Laboratory of Nuclear Power Safety Monitoring Technology and Equipment
- Distributed Control System R&D Center of National Energy Nuclear Power Station
- National Energy Solar Thermal Power Generation Technology R&D Center
- National Energy Nuclear Power Engineering Construction Technology R&D Center
- Nuclear-class Equipment R&D Center of National Energy Nuclear Power Station
- National Energy Nuclear Power Operation and Life Management Technology R&D Center
- National Energy Advanced Nuclear Fuel Element R&D Center

Technological team

We have actively improved the evaluation, selection, training and employment mechanism of technological talents, and endeavored to build a high-level talent team and especially a high-end technological talent development system covering chief experts, senior experts, young and middle-aged experts. Besides, we have appointed 40 chief experts, formulated the term of reference (TOR) for their five-year tenure, and provided incentives for them to undertake major innovation projects and tasks. At present, CGN has over 8,000 technological personnel and over 5,500 R&D personnel, including one academician, six national talents of international candidates of New Century Talents Project, and 39 recipients of special government allowances from the State Council.

Collaborative innovation

We continue to improve the collaborative technological innovation mechanism, build a technological innovation ecosystem, and secure advantageous research resources at home and abroad in the form of joint research institutes, joint ventures, joint innovation consortia or innovation alliances, etc.

- We have established the Enterprise Innovation and Development Fund with National Natural Science Foundation of China, and employed the national research platform to solve our own basic research problems.
- We have established a low-temperature heating reactor technology cooperation platform with Tsinghua University to promote the application of nuclear energy in the fields of central heating and comprehensive utilization.
- We have established the Advanced Nuclear Energy and New Energy Research Institute with Harbin Institute of Technology to further our cooperation in the fields of nuclear energy and new energy.
- We have reached an agreement with French Alternative Energies and Atomic Energy Commission (CEA) on investing in the material test reactor project initiated by CEA.
- Under the guidance of State Administration of Science, Technology and Industry for National Defense, CGN, together with dozens of institutions including China National Nuclear Corporation (CNNC), Chinese Academy of Sciences (CAS) and China Academy Of Engineering Physics (CAEP), etc., has initiated the joint working group of Sino-Russia Lead-bismuth Fast Reactor and Russian MBIR (a research facility with a multi-purpose sodium-cooled fast-neutron reactor) Consortium, to further bilateral cooperation in the construction and experimental research of lead-bismuth fast reactors and fast-neutron reactors.

Case

Alliance for Independent Innovation in Nuclear Power Operation & Maintenance Technology and Spare Parts

On November 26, 2020, the Alliance for Independent Innovation in Nuclear Power Operation & Maintenance Technology and Spare Parts, initiated by China Nuclear Power Operations Co., Ltd. (CNOC), a subsidiary of CGN, was inaugurated in Shenzhen. The inaugural ceremony attracted the presence of over 80 big names in China's nuclear power industry. The alliance consists of 24 member units such as Wuhan University and the Institute of Optics and Electronics, Chinese Academy of Sciences, and aims to unite universities, research institutes and upstream, midstream and downstream enterprises to establish a collaboration platform for tackling difficulties and common problems in nuclear power operation & maintenance, sharing risks and benefits. CNOC has signed special cooperation agreements with ten of the member units.

Nuclear Power Base in Ningde, Fujian

Innovation outcomes

1499

Patents applications filed

1012

Patents granted

HPR1000

- A Chinese proprietary third-generation nuclear power technology
- Single-plant design; electric power of units: 1,150 MW; safe and highly efficient
- CGN's pilot projects: Unit 3 and Unit 4 of Fangchenggang Nuclear Power Plant in Guangxi, Unit 1 and Unit 2 of Taipingling Nuclear Power Plant in Guangdong, and Unit 1 of San'ao Nuclear Power Project in Zhejiang.
- The HPR1000 nuclear reactor entered the final stage of the Generic Design Assessment (GDA) in February 2020, and obtained the European User Requirement (EUR) certification in October 2020, paving the way for its entry to the European power market.

Rendering of HPR1000

Firmsys

- China's first nuclear-class distributed control system (nuclear class DCS) with proprietary intellectual property rights.
- Firmsys has been applied to 15 nuclear power units under construction in China, saving the cost of RMB 5 billion. CGN is one of a few suppliers in the world that have mastered the nuclear-class DCS technology.
- Firmsys has officially been applied to gigawatt-level pressurized water reactor nuclear power plants, indicating we are able to develop "the central nervous system" of nuclear power plants all by ourselves.

Distributed Control System R&D Center of National Energy Nuclear Power Station

Smart Nuclear Power

- We have integrated the businesses, data and resources covering different stages of design, construction, commissioning, operation and maintenance of nuclear power projects.
- The digital HPR1000 2.0 enables the intelligent interface between three-dimensional models and two-dimensional drawings, the integration of multi-dimensional data, as well as the coordinated construction of both physical and digital power plants. It also makes nuclear power safer, more reliable and more economically viable.
- We continue to lead the industry with 115 R&D achievements, 59 granted patents and 44 granted software copyrights. Three of our projects were approved and rated as state-level projects by the Ministry of Industry and Information Technology and the Ministry of Science and Technology.

Using Electron Beam for Industrial Wastewater Treatment

- In cooperation with Tsinghua University, we have developed an electron accelerator and radiation reactor for sewage treatment. By combining the ionizing radiation technology with the conventional wastewater treatment technology, they can efficiently treat pollutants that are difficult to degrade by conventional means.
- The technology boasts wide adaptability, fast reaction, strong degradation, high efficiency, low cost, and high quality of recycled water. It can be applied in the treatment of industrial wastewater, domestic sewage, and micro-polluted drinking water, etc.
- The world's largest project of using electron beam for industrial wastewater treatment was completed and put into operation in Jiangmen, Guangdong.

Spotlight | Nuclear power robots guard the safe operations of nuclear power facilities

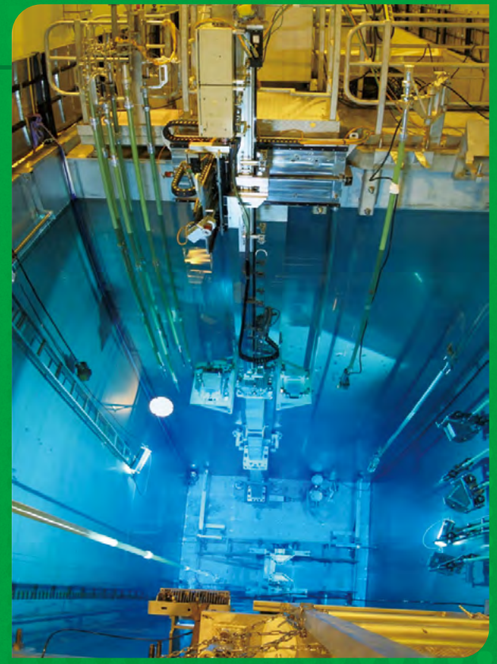
In the Industry 4.0 era, intelligent equipment represented by intelligent robots has revolutionized the ways of production. We actively promote the R&D of nuclear power robots to save employees from complex and repetitive tasks, thus substantially improving operational efficiency and quality.

The robot for polishing the flange and top-cover sealing groove of reactor pressure vessels

The robot is capable of grinding, polishing, dust collection and surface inspection, and the first of its kind in China to inspect and polish the sealing surface of key equipment in nuclear power plants. Before the robot, it would take 12 operators to work for 2.5 hours to polish the sealing surface, in addition to a separate sealing surface inspection. With the robot, by means of remote automatic control, it takes only two operators to work for half an hour to complete the tasks of grinding, polishing and inspection at one go, with much improved work efficiency and quality. If applied to 6 units a year, the robot could save RMB 6.1 million per year.

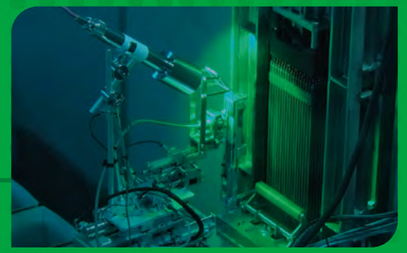
The robot for repairing fuel assembly skeletons

In China, CGN is the first to develop the underwater intelligent repair technology and robot for fixing typical defects of nuclear fuel assembly skeletons, having overcome technological barriers challenges such as remote disassembly, underwater overturning, precise docking and automatic rod extraction of high-level nuclear fuels, and making it possible to reconstruct nuclear fuel assemblies in a safe and reliable manner. The robot has been applied in Ling Ao Nuclear Power Plant, and has successfully repaired 3 sets of nuclear fuel skeletons which have return to normal operation. It resolves the problem of long-term storage of damaged assemblies and produces significant social and economic benefits.



The nuclear fuel assembly inspection robot

The robot is used for long-term tracking and improving assemblies in service. It is used to monitor assembly consumption, analyze the root cause of abnormal conditions, and test the reactor fuel performance. The robot has been applied in Daya Bay Nuclear Power Plant and Ling Ao Nuclear Power Plant.



The robot for cleaning marine organisms living in tunnels

The robot is equipped with the motion copying technology that allows it to approach an irregular section on a base with uncertain amplitude. It can clean up the marine organisms living in cool water intake tunnels within a relatively short period of time. The robot saves workers from the labor and avoids safety risks and project delays while cleaning up the tunnel in a highly efficient, safe and comprehensive manner. It has successfully been applied in Taishan Nuclear Power Plant.

The robot for collecting marine organisms in tunnels

The robot is used together with the marine organism removal equipment to remove the marine organisms living from the bottom of the tunnel and collect the marine organism silt. The whole collection and transport process is unmanned and intelligent. The robot has successfully been applied at Taishan Nuclear Power Plant.

The robot for detecting and cleaning foreign materials in pipelines

The robot is used to detect foreign materials and cracks in pipelines of nuclear power plant and collect the foreign materials detected, in addition to polishing and dust cleaning. It is applicable to pipelines of a wide range of calibers and complex pipeline systems and can be equipped with multiple tools for complex operations. The robot has successfully been applied in Ling Ao Nuclear Power Plant.

Win-win Cooperation

The sustainable development of the nuclear power industry depends on our concerted efforts. We always uphold the concept of win-win cooperation. To achieve this goal, we enhance cooperation with partners of the supply chain and the industry chain.

Rate of supplier performance evaluation

100 **%**

Supply chain management

We have formulated the *Supplier Management Measures* and other policies, and accordingly manage the whole process of supplier access, management and evaluation, etc.

Open and transparent procurement

We have disclosed the supplier bidding results on the Internet, established an AI-assisted Q&A (including consultation and complaint filing) platform for suppliers, and moved all supplier services online, to guarantee the transparency and convenience of bidding.

Supplier performance evaluation

Suppliers are evaluated regularly in areas such as technology, quality, cost, delivery, service response and environmental protection. Suppliers which have seriously violated environmental protection requirements, business ethics and contract provisions will be restricted from bidding or blacklisted according to the Group's *Supplier Misconduct Management Process*.

Supplier incentives

We have developed plans for optimizing cooperation with strategic and star-rated suppliers. With a host of preferential policies for payment optimization, business rating and payment discounts, we encourage suppliers to improve services and try to establish mutual trust with them for win-win results.

Case

Joining hands with new-energy suppliers to achieve a win-win situation

On June 11, 2020, CGN held the 2020 Supplier Conference in Beijing for its domestic new-energy suppliers. With the theme of "seeking innovation and building mutual trust for a win-win future", the conference focused on how supply chain partners could join hands to achieve high-quality development in the era of subsidy-free bidding. On the conference, CGN commended star-rated suppliers and signed strategic cooperation agreements with 10 strategic suppliers.

Industry chain collaboration

We strengthen cooperation with industry chain partners in areas such as safety, quality and R&D, to jointly improve management across the industry chain.

Improving safety management

We expand the occupational health management to cover contractors and any other personnel who are allowed to enter the nuclear power plant.

Improving quality management

We certify construction quality managers, and retrain, assess and test professional skills of the construction unit's frontline management personnel; we continue to improve the standard qualification curriculum for full-time personnel, and promote the construction unit to improve project quality management.

Case

The 2020 China (Yantai) Nuclear Energy Safety and Nuclear Power Industry Chain Summit

On October 15, 2020, the 2020 China (Yantai) Nuclear Energy Safety and Nuclear Power Industry Chain Summit, hosted by the People's Government of Yantai and organized by Yantai Development and Reform Commission, was opened at Yantai International Expo Center. The theme was "Bringing safety and development to a new level". Shi Bing, Senior Vice President of CGN, attended the opening ceremony. He unveiled the platform for advanced nuclear energy simulation tests, and witnessed the signing of the Egret Fund cooperation agreement. The 2020 China International Nuclear Power Industry and Equipment Exhibition was held simultaneously at the center too, where CGN unveiled a lot of independent innovation achievements.

Nuclear Power Base in Hongyanhe, Liangning

Green and Low-carbon Development

Our Commitment

We are committed to providing safe, reliable, clean and economical energy for the society so as to contribute to environmental protection and the building of a beautiful China.

Our Actions

- Promoting the development of clean energy
- Improving environmental management
- Protecting biodiversity
- Providing environmental protection services

Our Achievements

On-grid power generation from clean energy equivalent to reducing the consumption of

80.3807 **million tons of standard coal**

On-grid power generation from clean energy equivalent to reduction of

209.9954 **million tons of carbon dioxide**

0

Environmental pollution incident

The project of soil and water conservation in Dawu, Hubei

Response to Climate Change

The transition to a low-carbon development model is the inevitable way for human beings to mitigate climate change. Keeping in mind its mission, CGN continues to promote the development of clean energy such as nuclear power and keeps intensifying its efforts of energy conservation and emission reduction, so as to bring sustainable, low-carbon and clean energy to more people and contribute to the transition to a low-carbon society.

The CGN's Daishan No.4 Offshore Wind Power Project in Zhejiang

Focusing

on development opportunities and social responsibility

Opportunities

- In the 14th Five-Year Plan, China proposes to develop offshore wind power in an orderly manner while promoting the development of coastal nuclear power safely and steadily; and to build a number of clean energy bases with various complementary energy resources and increase the proportion of non-fossil energy in total energy consumption to about 20%.
- China has set the goal of peaking carbon dioxide emissions by 2030 and achieving carbon neutrality by 2060. To this end, the transformation of the energy mix will be accelerated, and clean power such as wind, photovoltaic and nuclear power may be further developed.
- The accelerating global energy transition has established the development trend of clean energy and electrification, and put forward new requirements for power enterprises.

Actions

we are committed to the production and supply of clean energy with zero carbon emissions by focusing on reducing energy consumption in operation as well as working to tackle climate change and build a clean and beautiful world with stakeholders.

Providing

high quality and sustainable clean energy products

The extensive use of fossil energy has placed a heavy burden on the environment, and the development of clean energy has become a common choice in the global response to climate change. Compared with traditional fossil energy, clean energy can effectively reduce greenhouse gas emissions generated in its production and use, which is of great significance to the global transition to low-carbon energy.

As a clean energy company specializing in nuclear power, CGN is committed to promoting the high quality development of nuclear power while developing non-nuclear clean energy businesses. We actively participate in clean energy projects under the Belt and Road Initiative, and work with stakeholders to contribute to the effective response to global climate change.

186.487 TWh
On-grid power generation from nuclear energy

39.788TWh
On-grid power generation from wind energy

8.339 TWh
On-grid power generation from photovoltaic energy

28.498TWh
On-grid power generation from other clean energy

263.112 TWh
Clean power has been generated by CGN

Equivalent to

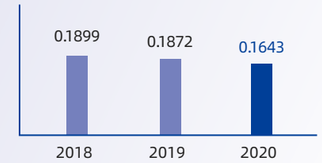
- reducing the consumption of 80.3807 million tons of standard coal
- reducing the emission of over 209.9954 million tons of carbon dioxide
- afforestation of more than 592,000 hectares

Reducing

energy consumption in our operations

We work hard to improve energy efficiency and reduce energy consumption in the operation process by improving the energy management system, replacing energy-intensive equipment, optimizing the equipment operation, making energy-saving transformations and promoting green office.

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



- The Daya Bay Nuclear Power Plant has saved 15 GWh of electricity in the past three years by optimizing the operation of key power-consuming equipment during outages and hot shutdowns, as well as the operation of fans in the ventilation system of the turbine plant, replacing the energy-intensive equipment, and controlling the operation time.
- The Hongyanhe Nuclear Power Plant uses the nuclear steam heat exchange technology to supply heating, which can save about 20,000 tons of standard coal and reduce about 73,340 tons of carbon dioxide emissions every year. It has also upgraded water heaters and fluorescent lamps in living quarters, which can save 24.9 MWh of electricity every year.
- The Taishan Nuclear Power Plant has optimized its office resources by replacing the out-dated and energy-consuming equipment, which saves about 14 MWh of electricity throughout the year.
- The Yangjiang Nuclear Power Plant uses new energy vehicles for employee commuting in the base to reduce fuel consumption.
- The Ningde Nuclear Power Plant has formulated the energy-saving management plan to replace street lamps in office and living quarters with energy-saving lamps. Electric vehicle charging piles are also installed in office and living quarters, to reduce energy consumption in an all-round way.

Environmental Management

In line with the low-carbon development strategy, we constantly improve the environmental protection management system, regulate production management, and do our best to minimize our environmental impact.

0

Major environmental pollution and ecological damage incident reported by CGN

The environmental management system of all CGN power plants has been certified by the

ISO 14001 environmental management system.

Environmental management system

We strictly abide by the ISO 14001 environmental management system, as the *Law of Prevention and Control of Radioactive Contamination* and *Law on the Prevention and Control of Atmospheric Pollution*. We have made continuous efforts to improve the environmental management system, formulated our own environmental management policies and integrated the environmental management and production management system to meet safety, economic and environmental goals at the same time.

Environmental management philosophy

Symbiosis	CGN, as a "benevolent player", is dedicated to blending with indigenous ecosystems in the neighborhood, while maintaining the ecological originality and balance.
Mutualism	CGN, as a "participant", drives the development of surrounding villages and towns with projects and interacts with the environment to achieve mutual benefits and a better ecological equilibrium.
Regeneration	CGN, as a "contributor", provides high-quality ecological products such as clean energy, and contributes to a green, harmonious and prosperous nuclear power ecosystem.

Environmental protection goals

Short-term Goals	To improve CGN's environmental management organization, comprehensively identify the problems related to energy conservation and ecological environmental protection of both CGN and its member companies, comprehensively control environmental risks and make sure that all issues are completely rectified with no violations in 2020.
Medium-term Goals (2021-2022)	To further improve CGN's energy conservation and ecological and environmental protection management system, establish the concept of integrated environmental protection, improve the management of environmental protection from the organizational and operational aspect, promote standardized and IT-based environmental management of CGN and its member companies, and explore the establishment of an effective long-term mechanism.
Long-term Goals	To elevate the overall energy efficiency and emissions levels of principal pollutants of CGN's nuclear power operations to a world-leading level, and those of its non-nuclear power operations to the country-leading level; to possess domestically or internationally leading technologies in ecological pollution prevention and control in main business fields; to greatly raise employee awareness of energy conservation and environmental protection, and become a model in the industry.

Basic principles

Combining prevention and control with prevention prioritized	Advance on all fronts while pursuing key breakthroughs	Guidance & management by category	Technology first in driving efficient development

Resource Conservation

We constantly optimize production management, introduce advanced technologies at home and abroad, improve resource efficiency and promote water conservation and protection, contributing to building a resource-saving society.

Saving and protecting water resources

Water-saving transformation

The Fangchenggang Nuclear Power Plant optimizes operation and adopts an advanced process to reduce fresh water consumption. Ningde Nuclear Power Plant has carried out water-saving transformation on relevant production systems to reduce water consumption, saving 35,000 tons of water year on year.

Water recycling

The Yangjiang Nuclear Power Plant and the Fangchenggang Nuclear Power Plant adopt the closed circulating cooling system to reduce the amount of circulating volatilization and improve the recycling rate of fresh water. The recycling rate of industrial water of Yangjiang Nuclear Power Plant reached 99.8%.

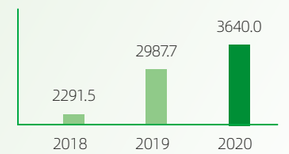
Desalination

The Hongyanhe Nuclear Power Plant has installed the desalination system which can save the seawater consumption by reusing the concentrated water of secondary reverse osmosis, recycling over 200,000 tons of concentrated water a year.

Water source protection

All nuclear power plants carry out regular and irregular inspections on water sources all year round, and monitor the water quality in strict accordance with the requirements of national and local standards. Strictly implementing the river chief system, Daya Bay Nuclear Power Plant has set the river management and protection goals and is subject to public supervision, providing institutional guarantee for water source protection.

Total water consumption (10,000 tons)



Dakeng Reservoir in Daya Bay, Guangdong

Pingdi Reservoir in Yangjiang, Guangdong

Improving the nuclear fuel utilization rate

Better fuel management

By replacing the single-enrichment assembly plan with the double-enrichment assembly plan, and improving the flexibility of the cycle length of the nuclear power plant, we can cut the loss of waste materials for early shutdown, and reduce the number of spent fuel assemblies. The nuclear fuel utilization rate thus was improved by about 10%.

R&D efforts

We have carried out the highly flexible fuel management research and engineering demonstration. In 2020, we completed the key technology R&D and most of the demonstrations, which is expected to be applied on the ground in 2022 to further improve the utilization rate of nuclear fuel.

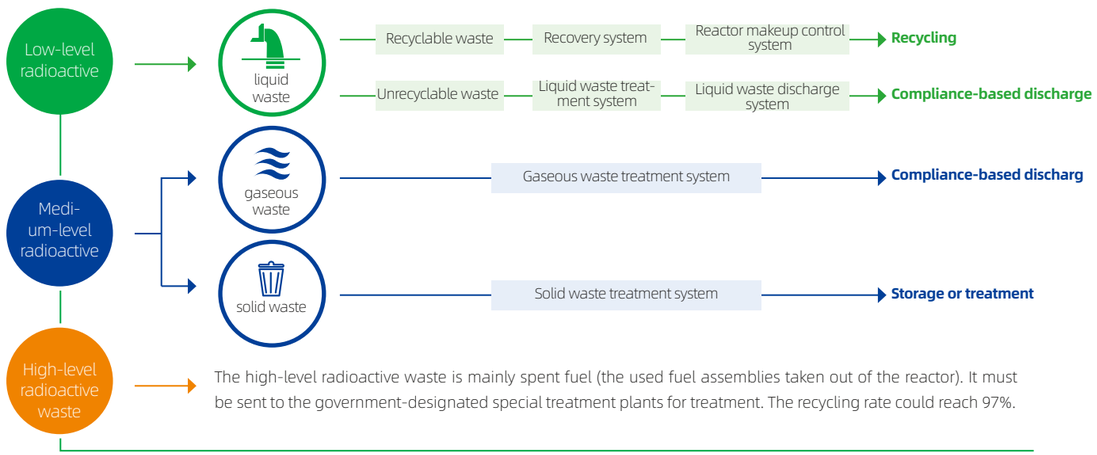
Risk Control

We strictly abide by laws and regulations, and properly manage and dispose of the radioactive waste produced in the operation process. We have a complete set of radioactive waste treatment mechanism in place, and integrate the radioactive pollution control into the whole operation process. We have also put in place a strict environmental monitoring system to make sure our plant operations have minimal impact on the surrounding environment.

Radioactive waste management

We strictly abide by the *Law of Prevention and Control of Radioactive Contamination, Regulations for Safe Radioactive Waste Management, and Regulations on the Safe Transportation of Radioactive Materials*. To minimize waste and optimize protection against radiation, we have formed a set of systematic radioactive waste control and treatment mechanism to reduce the impact of radioactive waste.

Radioactive waste control and treatment mechanism



The high-level radioactive waste is mainly spent fuel (the used fuel assemblies taken out of the reactor). It must be sent to the government-designated special treatment plants for treatment. The recycling rate could reach 97%.

***Note:** The storage, transportation and treatment of radioactive waste are in strict accordance with the relevant laws and regulations.

Will nuclear power plants affect the marine environment?

Scan the QR code to learn more about the environmental monitoring of nuclear power plants

Emissions of wastewater, exhaust gases and solid waste

We follow the most stringent emission standards and apply international advanced technologies to improve our capability on waste treatment to keep emissions much lower than the national standard in China.

	Daya Bay Nuclear Power Base		Yangjiang NPP		Fangchenggang NPP		Ningde NPP		Taishan NPP		Hongyanhe NPP	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
Discharge of radioactive liquid waste (non-tritium radionuclides) presented in national standard proportion	0.27%	0.24%	0.55%	0.41%	0.29%	0.30%	0.24%	0.37%	3.02%	4.85%	0.19%	0.151%
Emission of radioactive gas waste (inert gas) presented in national standard proportion	0.43%	0.42%	0.30%	0.21%	0.29%	0.30%	0.28%	0.30%	1.59%	2.19%	0.20%	0.142%
Solid radioactive waste (m^3)	244.8	230.3	60.8	102.44	67.6	74.04	124.8	110.4	0	80.99	118.4	120
Environmental monitoring result	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal

***Note:** At present, the nuclear power plants operated by CGN are all located in China, so they must comply with the GB 6249-2011 : Regulations for Environmental Radiation Protection of Nuclear Power Plant for the discharge/emission of solid, gas and liquid waste. Since the nuclear power bases vary in terms of the number of operating units, their service years and operating condition, the annual quota of waste discharge and emission from each base that applies to the Chinese regulatory authorities once every five years is also different. To increase the comparability of the data, we disclose the ratio of discharge/emissions to state annual limit. In recent years, the discharge/emissions data of each nuclear power base of CGN has been relatively stable, fluctuating within the range of 1%.

***Note:** Daya Bay Nuclear Power Base includes Daya Bay Nuclear Power Plant, Ling Ao Nuclear Power Plant and Lingdong Nuclear Power Plant.

Environmental monitoring

We have established a sound environmental monitoring system and cooperate with the national regulatory agencies and the third-party monitoring system to reduce the impact of nuclear power plants on the natural and social environment.

Ministry of Ecology and Environment (MEE)

The MEE (the National Nuclear Safety Administration) strictly oversees the radioactive discharge of nuclear power plants, and adopts the "double-track" monitoring on the gaseous and liquid effluents as well as the peripheral environment of nuclear power plants, which is respectively implemented by the operation departments of nuclear power plants and the radiation environmental monitoring institutions of the host province. The monitoring data in 2020 shows that the air absorbed dose rate measured around China's in-service nuclear power bases is within the range of local natural background with no impact on the environment or public health.

In-house Monitoring System

CGN has established a strict environmental monitoring system and an environmental inspection record system for its in-service nuclear power bases to monitor and analyze the environmental media of air, terrestrial and marine organisms within 10 km of nuclear power plants, and assess the environment in and around these plants. The long-term tracking and monitoring data of CGN's in-service nuclear power plants indicates that the radioactivity in the surrounding area remains the same as the background data before the nuclear power plant was put into operation with no negative impact on the environment.

Hong Kong Observatory

Hong Kong Observatory has 12 radiation monitoring stations across Hong Kong. It monitors the environmental gamma radiation level 24 hours a day, and releases annual reports to inform the Hong Kong public of the environmental radiation level. The multi-year monitoring results show no increase in artificial radionuclides caused by the Daya Bay Nuclear Power Plant.

Ecological Protection

We are always committed to developing eco-friendly nuclear power, and attach great importance to the impact of nuclear power plants on the surrounding ecological environment. We continue to advance re-greening projects and protect biodiversity at and around nuclear power plants.

Re-greening

We practice ecological conservation in the process of project development, construction, operation and maintenance, and promote re-greening to contribute to the building of a beautiful China.

Garden-esque nuclear power plants

Yangjiang Nuclear Power Plant in Guangdong has set up a task-force to tackle soil erosion and improve the environment. Through a series of measures such as site leveling, earthwork backfilling, and increasing vegetation coverage, they have greened the production preparation area and the island in Pingdi reservoir, striving to build a garden-esque nuclear power plant and contribute to ecological conservation in the surrounding areas.

The Chinese white dolphin spotted near Yangjiang Nuclear Power Plant

The dolphin-shaped green island in the middle of Pingdi reservoir

The tea garden at Ningde Nuclear Power Plant

The tea garden in Ningde Nuclear Power Plant

When the plant construction kicked off, a 200-mu tea garden was preserved in the plant area to protect the pillar industry of local people. The tea garden has since then been run by a company founded by tea farmers, the only tea garden operating in a nuclear power plant. The tea garden is not only conducive to regional ecological conservation, but also a stable source of income for local farmers. It is a real-life example of the development philosophy that "lucid waters and lush mountains are invaluable assets".

A sea of windmills and flowers - a new hot destination of ecotourism

With the goal of building garden-esque wind farms, CGN has carried out the "sea of windmills and flowers" project at many wind farms, blending the wind power projects into the natural environment according to local conditions to drive the development of local tourism. The project has become a huge success at Jiangjiashan Wind Farm in Hubei. There, the windmills exist in harmony with the lake view, flowers and grass, forming a beautiful natural scenery and attracting numerous tourists on holidays.

The sea of windmills and flowers at the Jiangjiashan Wind Farm, Hubei

The mountain path used to be full of rocks and mud.
No one wanted to go up the mountain at all.

Mr. Liu, a villager

- ★ **The Ningde Nuclear Power Plant Phase I Project won the title of National Model Project for Soil and Water Conservation, the first CGN plant to receive the honor.**
- ★ **CGN New Energy won the title of National Model Project for Soil and Water Conservation for three consecutive years.**

Biodiversity conservation

CGN has incorporated biodiversity conservation into its development strategy and practiced the four-step (avoidance, reduction, mitigation, and compensation) biodiversity management idea throughout the project lifecycle. We have also integrated our operation with biodiversity conservation, striving to achieve harmonious coexistence with the surrounding natural environment and contribute to sustainable development.

Avoidance

Priority should be given to the design and construction scheme that avoids negative disturbance, so as to avoid the impact on the key areas of biodiversity conservation.

Reduction

When disturbance cannot be avoided, the impact of projects on biodiversity should be minimized by formulating and implementing the strict environmental management system, monitoring the surrounding environment and protecting species.

Mitigation

To tackle the global ecological, environmental and climate change crisis, mitigation measures should be taken to provide cleaner energy and to help mitigate regional/global environmental change as much as we can.

Compensation

Ecological restoration and biodiversity compensation measures should be taken when appropriate for better biodiversity conservation.

Case

Rich ecosystems around the Daya Bay Nuclear Power Base

The Daya Bay Nuclear Power Base has been devoted to biodiversity conservation, and formed rich ecosystems in the land and surrounding sea areas of the base. Local public welfare organizations provide technical support by sending experts in animal, plant and marine biological conservation to carry out independent biodiversity surveys. They found six species of animals and plants under second-class state protection: crested goshawks, common buzzards, collared scops owls, Chinese bullfrogs, pythons, Mucuna birdwoodiana, as well as the animals in the national list under protection that are useful and valuable for economy and scientific research, including egrets, cattle egrets and oriental garden lizards, etc.

Cattle egrets in the Daya Bay Nuclear Power Base

Case

Construction route changed to protect welwitschia mirabilis

CGN's Husab Uranium Mine in Namibia attaches great importance to ecological conservation. According to the original construction plan of the mine's permanent water supply pipeline project, 100 welwitschia mirabilis of more than 1,000 years old on average need to be transplanted. In order to minimize the impact on the rare plant, CGN Swakop Uranium Co., Ltd. optimized the route for many times and transplanted only 3 welwitschia mirabilis trees in the end.

***Note:** Welwitschia mirabilis is a rare tropical plant that can survive for thousands of years. It is only found in the desert along the southwest coast of Africa and is the national flower of Namibia.

Spotlight | Electron beam, the silver bullet for pollution control

With breakthroughs in electron beam irradiation technology in recent years, we have applied the technology to the treatment of industrial and medical wastewater, harmless treatment of antibiotic residue, irradiation sterilization and disinfection on a large scale. The technology is also being used to landfill leachate and pharmaceutical wastewater treatment.

Wastewater treatment

Compared with the traditional wastewater treatment technology, the electron beam has stronger penetration, quicker reaction, higher efficiency and better biological safety, which can remove the refractory organic pollutants in the wastewater and achieve complete disinfection and sterilization.

Harmless treatment of solid waste

It can realize harmless treatment of solid waste, achieve complete sterilization and disinfection of medical waste, remove antibiotic residues, and realize 100% treatment of landfill leachate, etc., providing a new solution for safe, economical and efficient treatment of solid waste.

Irradiation sterilization

Being able to sterilize at room temperature efficiently without any chemicals added, it has been used in sterilization and preservation of medical products, agricultural products, and food, etc.

The world's largest Project of using electron beam for industrial wastewater treatment in Jiangmen, Guangdong

China's first project of using electron beam for medical wastewater treatment in Shiyan, Hubei

Medical materials sterilized and disinfected by electron beam

Story of Striving

Racing against time to overcome all difficulties

> *We hope to expand and strengthen the accelerator business, expand its application scenarios and contribute to China's development and application of nuclear technology.*
>
> ***Yu Jiang, chief engineer of electronic accelerators, CGN***

In 2020, the quiet life was disrupted by the sudden outbreak of COVID-19. On February 5, Yu Jiang was assigned an emergency task to develop a special electronic accelerator for medical wastewater treatment within one month for Xiyuan Hospital, Shiyan, Hubei Province. "The design and development of accelerators have very strict irradiation safety requirements and very high process standards. It was very difficult and the schedule was too tight." Normally, it would take about half a year to produce an electronic accelerator, from design to manufacturing and assembly. To accomplish this seemingly impossible task, Yu Jiang eagerly sought for scientific research support, and meanwhile rallied the Group's backbone workers to set up a taskforce composed of Party members overnight. They divided responsibilities and got themselves ready.

"No one grumbled or flinched" , Yu said. Every one strived forward whatever hardship ahead.

On March 15, the electron beam treatment equipment went off the assembly line on time, reaching the design requirements in all indicators.

At noon on March 19, after nearly 40 hours of drive, the core parts of the equipment were delivered by 7 trucks to Xiyuan Hospital, a designated COVID-19 hospital, and ready for installation and troubleshooting.

As the epidemic was a test for the Chinese people, the development of this accelerator was a special test for CGN Nuclear Technology Development Co., Ltd. Through concerted efforts, the team completed the R&D of the equipment – which would normally take three to six months – in just one month.

Stimulating Employee Vitality

Our Commitment

We are committed to discovering, guiding and developing the potentials of our employees, so as to help them live a better life, realize greater value and grow together with the Group.

Our Actions

- Protecting basic rights and interests
- Safeguarding occupational health and safety
- Helping employees with self-realization
- Enhancing workplace happiness

Our Achievements

42464
Employees

0%
Occupational disease incidence rate

3.87 **million**
Total training hours

The "Flashmob Event" during the National Day at Yangjiang Nuclear Power Plant

Employee Rights Protection

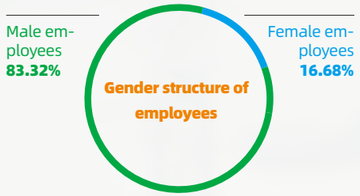
We strictly abide by relevant laws and regulations, and have formulated suitable management policies and systems to safeguard the rights and interests of our employees.

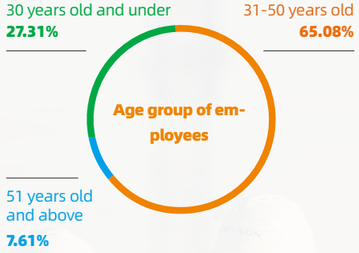
Diversity and equality

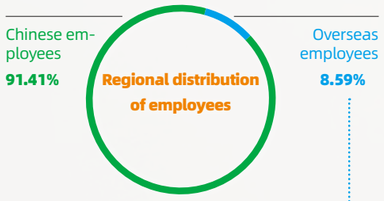
We strictly abide by the *Labor Law of the People's Republic of China*, *the Labor Contract Law of the People's Republic of China*, *the Labor Employment Promotion Law of the People's Republic of China*, and other governing laws and regulations. We have formulated our own *Labor Employment Administrative Rules and Administrative Rules on Recruitment and Allocation*. We adhere to the non-discriminatory employment policy, and treat employees equally regardless of their nationality, race, gender, age, religious belief or cultural background. Also, we strictly prohibit child labor or forced labor in any form.

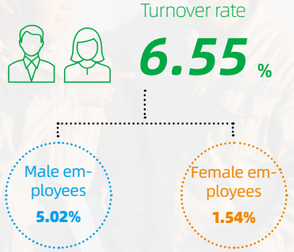
42464
employees

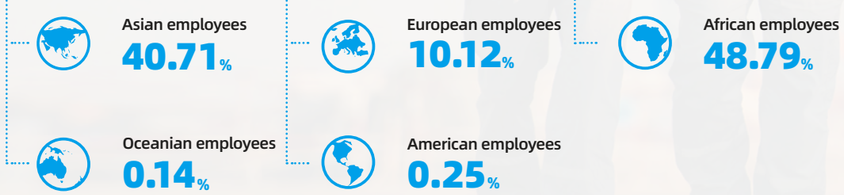
8.47%
Female executives











Compensation and benefits

We have purchased social insurances, including the medical insurance, pension, unemployment insurance, work-related injury insurance and maternity insurance, as well as supplementary medical insurances for employees. We offer annual paid leaves, and encourage employees to take necessary leaves and balance work and life. Female employees are entitled to maternity leave with their positions kept, which is in line with the *Special Rules on the Labor Protection of Female Employees*.

100 %
Labor contract signing rate

100 %
Social insurance coverage

Democratic management

We have formulated the *CGN Working Manual for Democratic Management Standardization* to institutionalize, standardize the process of democratic management and make it more operable. We continue to improve the workers' congress system, and constantly promote the disclosure of the Group's affairs. CGN's second-tier member companies each holds at least one workers' congress every year as required. All major matters concerning the key interests of the employees are deliberated by the workers' congress.

100 %
Labor union coverage

3
Weeks at least, the period for notifying employees of operational changes

Occupational Health and Safety

In strict accordance with regulations governing occupational safety and health, we have established a complete occupational safety and health protection system and work constantly to improve the health and safety management of employees.

All nuclear power plants have been certified by the

ISO 45001

0%

Incidence rate of occupational disease

Safety management

Nuclear power

- **Identification and management of hazardous factors**

  Through the identification and assessment of hazardous factors in various types of work, we can control the occupational health risks, grade and manage the factors and risks accordingly. We take technological and management measures and strengthen individual physical protection to reduce occupational health risks.

- **Publicity, training and warning**

  We actively carry out publicity and training activities themed on occupational hazards, to inform employees of possible occupational hazards and teach them the correct way to protect themselves. We put up warning signs and on-site test results in relevant workplaces to raise employees' awareness and ability of self-protection and cultivate the habit of following safety protocols.

- **Across-the-board engagement and active prevention**

  We carry out independent occupational hazard monitoring and assessment in daily work, and take timely measures to eliminate, isolate or reduce the risks and strengthen individual protection. We also provide protective equipment including ear protectors, protective overalls and shoes in the places with hazardous factors, and limit the on-site working time according to the hazard assessment result.

- **Inspection by external specialized agencies**

  For employees whose job might expose them to radioactivity, noise, high temperature, chemical poison (ammonia) and high pressure, we hire external specialized agencies each year to do occupational health examinations, before, during and after their term of service. We also keep their personal health records and use the examination results to analyze the health status and work adaptability of individuals and teams, and identify occupational contraindications and health damage, to ensure that employees are fit for the job. Targeted interventions will be made in light of the examination results.

Uranium mine

CGNPC Uranium Resources CO., Ltd. has set up a safety department to take charge of mine safety. The department staff visits the mine each week to check employees' health conditions and on-site safety conditions, and if any safety problem is found, corrections will be made in a timely manner and the effect supervised and tracked so as to reduce future safety accidents.

New energy

CGN New Energy conducts annual SQE standardization review to check the implementation of physical examination as well as the identification and notification of hazardous factors. It also has a body dedicated to staff services, and has released policies including the *Health Care Management Measures and the Employee Psychological Crisis Intervention Measures* to comprehensively safeguard the occupational health and safety of employees.

Health management

A better health management system

Organization	Each member company has established the Health Management Committee.
Talent training	A team of health management coordinators (part-time) is set up. Professional training was organized for the coordinators and the quarterly reporting mechanism is in place to improve the team building.
Institutional support	Each member company has formulated a management mechanism of coordinated planning, multilevel management and clear division of responsibilities to ensure the effect of health management.

Sound health management services

Physical examination	We offer regular physical examinations for employees to monitor their health status. In 2020, we offered 271 medical aids to the seriously ill employees, 557 physical examinations for retired employees, and our "health managers" met 384 service requests.
Healthcare publicity and education	We carried out more than 100 health care activities, published 602 scientific health articles, and distributed more than 500 health brochures for retired employees in 2020.
Psychological consultation	We also provide psychological consultation service for employees. In 2020, we surveyed the mental health of 21,869 respondents. We have a 24/7 health consultation hotline for overseas employees, and have launched psychological training for project managers in the UK, so as to help employees manage their own health conditions.

CGN was selected in October 2020 as one of the first batch of pilot enterprises to build a Healthy China.

Case

The 5.25 EAP Psychological Care Action

The 3rd CGN 5.25 EAP Psychological Care Action officially ended on June 5, 2020. The one-month event launched a series of themed activities to provide psychological care for employees, including a radio program and a virtual salon. A number of senior psychological counselors were invited to give lectures on physical and mental health, parent-child communication and intimate relationship for employees to meet their different psychological needs. In particular, famous psychological consultation experts were invited to the online health lecture to teach the audience how to deal with stress, manage emotions and sleep better. Their lectures help solve employees' different psychological problems and enhance their wellbeing.

Employee Growth

We keep strengthening employee training and unblocking promotion channels, so as to motivate them to achieve self-realization while contributing to corporate development.

100%
Employee training coverage

3.87
million training hours in 2020

93
Training hours per employee

19%
a year-on-year increase of

1
national model worker

6
provincial and municipal model workers

2
model individuals in the central SOEs' fight against COVID-19

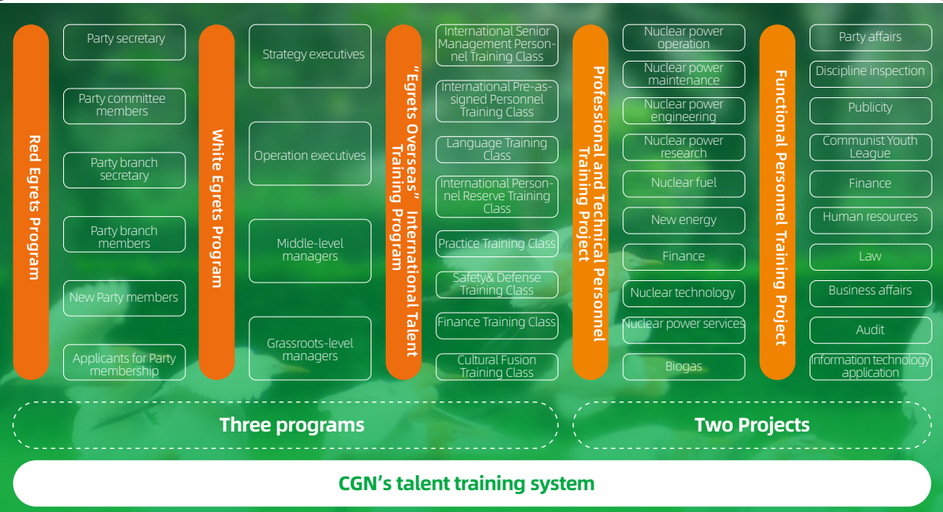
1
model unit in the central SOEs' fight against COVID-19

1
model individual in Guandong Province's fight against COVID-19

Training

Talent training system

Talent Development Precedes Corporate Development
——Across-the-Board, All-round, Whole-Process Talent Training



CGN's talent training system

- **11** sessions of the Red Egret - Running Program were held with **362** participants.
- **6** sessions of the Egret - Wings-Spreading Program were held with **159** participants.
- **64** sessions of the Red Egret Program was held with **2,045** participants, covering applicants for Party membership, new Party members, Party branch members, Party branch secretaries and Party committee members.
- The overseas session of the "Egrets Overseas" International Talent Training Program with **31** trainees and the ACCA session with **51** trainees both advanced smoothly.
- **18** training sessions were held by the headquarter's **6** functions with **1,179** participants

Improving the training system

The WANO Nuclear Leadership Project

We vigorously customize the courses of the WANO Nuclear Leadership Project according to CGN's conditions, and have trained and accredited 12 seed lecturers. We have released the Chinese rendering of WANO Nuclear Leadership Effectiveness Attributes, and explored new ways of developing nuclear power leadership based on the attributes of the nuclear power industry.

Business-university cooperation

We have cooperated with Harbin Institute of technology, Northeast Electric Power University and North China Electric Power University to cultivate 75 university students, and provided the field study opportunities to 149 participants from Sun Yat-sen University's nuclear engineer education program in three batches. We have also applied to the National Development and Reform Commission to become one of the first national pilot enterprises for business-university integration to further promote business-university cooperation in talent cultivation.

Online training and education

China Nuclear Power Engineering Co., Ltd. has launched live-streaming platforms such as the manager's room, craftsman's room and chief engineer's lecture room on Dingtalk, attracting more than 10,000 viewers. Yangjiang Nuclear Power Co,. Ltd. shot microfilms and documentaries to reproduce the real-life safety incidents on the production site, to raise employees' safety awareness. In 2020, 6,700 online tests were organized by our subsidiaries at all levels, a year-on-year increase of 161%, and they were taken by 489,000 people, a year-on-year increase of 543%.

Career development

Unblocked staff development channels

CGN has several career development channels for managerial, professional and skilled personnel, and has established a talent flow mechanism between them. Employees can choose either of the channels to achieve self-realization according to their abilities, potentials and personality. We also offer coaching and other support to help employees plan their career development.

Internal selection and training

We have selected a group of competitive, professional young employees who are politically reliable to work in the front line in the fields of production and operation, construction engineering, R&D, Party building and discipline inspection, financial management as well as comprehensive management, so as to cultivate their management skills.

He Haibin, Chief Accountant of CGN, at the annual summary and commendation conference of the ACCA training class of "Egrets Overseas" International Talent Training Program

The recruitment of professional managers

Seven member companies have issued administrative measures for professional managers. Multiple managers have selected and hired several professional managers, including its president through the market-oriented approach, to meet the talent demand for the development of CGN's new businesses.

Better development model of international talents

The *CGN Administrative Measures for Workers Dispatched Overseas* clarifies the process of overseas dispatch and management, and we have improved the support for workers dispatched to work overseas, to ensure the smooth progress in international talent selection. Excellent employees are selected to participate in CGN's international projects and external exchanges. We also select employees to work at international organizations on secondment, with an aim to give them a global vision and improve their ability to work in an international environment.

Story of Striving

From a rookie to a star operator

> *Keep in mind your original aspiration and forge ahead, and you'll find a better version of yourself along the way.*
>
> ***Li Kai, unit operator of the Daya Bay Nuclear Power Plant***

In July 2020, Li Kai from the Daya Bay Nuclear Power Plant won the honorary title of "National Young Expert" at the 20th National Young Expert competition. Li is a nuclear power unit operator, working on the first line to watch out for nuclear safety. What makes him extraordinary in a seemingly s ordinary post?

The first three years: being the youngest manager

In 2009, the 20-year-old Li Kai graduated from university and started to work in the Second Operation Department of the Daya Bay Nuclear Power Plant. Although he had studied some related knowledge of thermal energy and power in university, he was still a "rookie" surrounded by many "masters". Young and fearless, he was hungry for knowledge and applied what he learnt to actual work. In just three years, he had transformed from a green hand to a skilled worker, the youngest of all skilled workers at the plant.

5,000+ days and nights: working to ensure the safe operations of two star units

Li Kai is responsible for the safe operations of two star units of the Ling'ao Nuclear Power Plant Phase I. He had participated in various maintenance outages, minor repairs and major power supply tasks, and kept the star units run safely for more than 5,000 days. All the data he recorded, inspections he made, operations he handled and challenges he overcame over these days and nights have witnessed him growing from a nobody to an excellent senior operator.

Employee Care

We care for our employees. We offer various kinds of support to make their life better, and organize sports & cultural activities, to enrich their spare time and enhance their sense of happiness and belonging.

325
Children of employees provided with school/kindergarten admission services

318
Issues solved for employees

723
Visits paid to employees in need

48,312
Participants of cultural and sports activities

Employee care

We take special care of the actual needs of employees in difficulty, employees fighting in the COVID-19 front-line, employees on long-term business trip and for female employees, to enhance their sense of belonging at CGN.

- CGN Service Group Co., Ltd. visited a seriously ill employee and brought him RMB 116,800 donated by coworkers
- During the midsummer, China Nuclear Power Operations Co., Ltd. brought sympathy gifts to outage sites.
- China Nuclear Power Technology Research Institute Co., Ltd. helped employees apply for public rental housing, and rental subsidies for fresh graduates. Also, it followed closely the government's housing security and preferential policies for talent recruitment, and helped eligible employees apply for rental subsidies for newly-recruited talents and talents in key industries, alleviating the housing pressure of employees.

Sports activities


Basketball match held by CGN Capital Holdings Co., Ltd.


Badminton match held by Ningde Branch, CGN Service Group Co., Ltd.

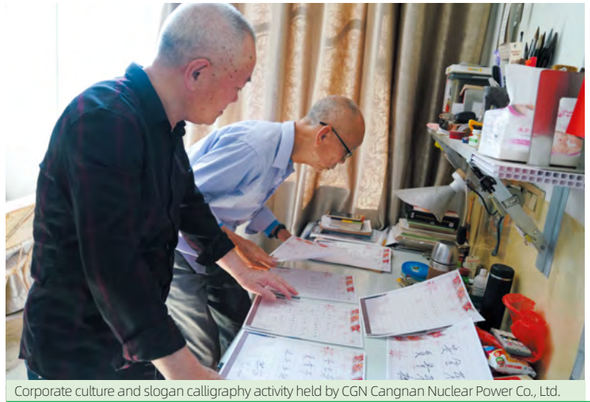
Festival celebrations


China Nuclear Power Operations Co., Ltd. marked the International Women's Day


Zongzi making activity held by Suzhou Nuclear Power Research Institute

Cultural and sports activities

Aiming to improve working skills, enrich spare time life and enhance team cohesion, we organize rich cultural and sports activities such as skill competitions, reading clubs, basketball games, badminton games, and parent-child games, so as to create a harmonious and caring workplace.


Corporate culture and slogan calligraphy activity held by CGN Cangnan Nuclear Power Co., Ltd.

Corporate culture live-streaming activity held by CGN Service Group Co., Ltd.


Lantern Festival activity held by Fangchenggang Nuclear Power Co., Ltd.


Mid-Autumn Festival activity held by Edra Power Holdings

Co-building a Harmonious Community

Our Commitment

We are committed to promoting local economic development through the development of clean energy, contributing to the prosperity and sustainable development of the local community, benefiting the local people, and reassuring the government and the people.

Our Actions

- Promoting community development
- Communicating with transparency
- Providing assistance to neighbors

Our Achievements

RMB 172 million

Total domestic and overseas donations

RMB 8.65 million

Overseas donations

16,432

Volunteer participants

The Open Day of CGN

Community Development

We actively participate in community development, and are committed to developing high-quality projects to drive the local economy and benefit the people. By some concrete support such as improving the community environment and eliminating community poverty, we strive to build a harmonious community and comprehensively promote community development.

3,329

Local employees recruited by international projects

CGN's ways to drive community development

Economic development

- Promoting local employment
- Driving the development of local enterprises and other enterprises in the industry chain
- Improving local infrastructure
- Paying taxes

Environmental development

- Providing clean energy to help with energy conservation and emissions reduction
- Improving the community environment

Social development

- Improving public health
- Supporting cultural conservation and development
- Helping communities get rid of poverty
- Solving community problems

Case

Co-building a clean community to protect the beautiful home

In 2020, in order to help the nearby Dongping neighborhood in Dongping town to build a National Civilized City, Yangjiang Nuclear Power Plant invested RMB 8 million improving the comprehensive neighborhood environment, especially the road traffic conditions around the Plant site, which has greatly improved the living environment of local residents.

Case

Creating a circular poverty alleviation model through new-energy projects

On October 7, 2020, the 3,000 MW Wind Farm Phase I Project in the old revolutionary base areas of Xing'an League, Inner Mongolia completed the foundation pouring for 229 wind turbines. With an investment of RMB 6.5 billion, the Phase I project hired 3,000 workers at the construction peak, 30% of which were locals. After completion, the project would generate 12,382 TWh of electricity a year in theory, equivalent to the reduction of carbon dioxide emissions by 2.4913 million tons if generated by thermal power. The construction and later production and operation can create more than 1,500 direct jobs in Xing'an League, and the project is expected to pay RMB 5.2 billion for local taxes during its 20-year operation. It is a typical example of how a new energy project can drive regional economy, stimulate industry and improve people's livelihood.

Case

Contributing to educational development under the Belt and Road Initiative

CGNEI has been assisting the development of education in countries like Malaysia for a long time. CGNEI's Edra Power Holdings Sdn Bhd has effectively promoted local economic and social development by providing scholarships and jobs and funding primary schools nearby. It has built enduring trust with the local government, the public, non-governmental organizations and other stakeholders, which has laid a solid foundation for it to defuse strategic risks and achieve the set goals and sustainable development.

Scholarships for college students in difficulty

Since 2019, Edra Power Holdings Sdn Bhd has established scholarships at the Energy University of Malaysia and several other public universities for outstanding students from low-income families, with about 26,000 Ringgit (equivalent to RMB 36,000) each per academic year. It also gives priority to these recipients in recruitment.

Funding primary schools near the power plant

In Malaysia, many kids dropped out of school at their fifth grade due to financial reasons. To help alleviate the financial burden of families and encourage students to stay in school, Edra Power Holdings Sdn Bhd has launched a student assistance program to provide 180,000 Ringgit (equivalent to RMB 294,000) to 34 schools, and donated to 2,251 students school supplies worthy 374,000 Ringgit (equivalent to RMB 613,000).

Case

The PV power generation plus desertification control Project in Kubuqi, Inner Mongolia

CGN's Kubuqi photovoltaic (PV) project is located in Duguitala, Hangjin Banner, Ordos City, Inner Mongolia Autonomous Region, at the hinterland of Kubuqi Desert. The project has completed five PV power plants with an annual capacity of about 1,200 GWh, equivalent to saving 440,000 tons of standard coal and reducing 1.1 million tons of carbon dioxide emissions per year. At the same time, the project adopts a three-dimensional circular scheme featuring "power generation above the panels, grass planting under, and breeding in between", to control desertification by combining PV power generation, ecological restoration, poverty alleviation and ecotourism. It has been effectively applied to about 27,000 mu of desert, contributing to local desertification control and greening the northern border area.

Spotlight | Meeting community needs and building a model of integrated plant-community development

Proceeding from the needs of community development, we make full use of our own professional, technical and financial advantages and the comprehensive effect of nuclear power project, so as to promote the economic and social development of surrounding communities.

Daya Bay Nuclear Power Plant

The Daya Bay Nuclear Power Plant has attached great importance to the relationship with surrounding communities since its construction began. Committed to harmonious coexistence with surrounding communities, it has always maintained a good relationship with surrounding communities. It spends nearly RMB 5 million on community development a year, such as supporting surrounding relocated neighborhoods (villages), building roads, cultural and sports facilities, building and renovating community health centers. Since put into commercial operation, the Plant has provided more than 6,000 jobs for community residents, so that local farmers could get jobs near home. And 15,000 people are working directly for the Daya Bay nuclear Power Base.

Taishan Nuclear Power Plant

The Taishan Nuclear Power Plant keeps employing local people and purchasing from local suppliers. It recruited 380 local employees and purchased over RMB 2.2 million products from local suppliers in 2020, and helped to sell local agricultural and sideline products. During the outbreak of the COVID-19, it shared information with surrounding communities and partners, helped set up epidemic-control duty booths, provided hand-held infrared thermometers, disinfectants and other protective equipment for the community, and conducted joint anti-epidemic inspections, to support local epidemic control.

Yangjiang Nuclear Power Plant

The Yangjiang Nuclear Power Plant has helped Kongtong village in Yangchun city to develop the Haolong pigeon breeding base which is estimated to add RMB 300,000 to the income of the collective economy every year. It also supports Kongtong to grow sweet corns by providing technical guidance, procuring the sweet corns and marketing them on live-streaming platforms. The first 30 sweet-corn growers have each increased their income by RMB 3,000 on average.

The sweet corns growing in Kongtong village

San'ao Nuclear Power Plant

For the success of the project, the project team of San'ao Nuclear Power Plant put forward the integrated development model based on the thorough study of China's existing nuclear power projects in promotion, construction and operation. While pursuing integrated development "coordinated by the government, led by the nuclear plant, participated in by diverse forces, and guided by plans", the project team has actively promoted equity investment in the nuclear power project, the development of green energy towns (including industries), co-construction of transport infrastructure, and localized employment. By aligning the project development with the local development needs of Cangnan, they are working to comprehensively upgrade local industries and economy.

Transparent Communication

We always take transparent communication as an important social responsibility, and constantly explore new communication forms to show the public the beauty of clean energy, and popularize the nuclear science in a more relatable, interesting way.

Diversified communication channels

Information disclosure

- Official website (The platform for the disclosure of nuclear and radiation information)
- Official account on WeChat, Weibo and other new media platforms
- Press conferences
- CSR reports/Special reports
- Regular information disclosure in communities
- Media reports

Public communication

- Industrial tours
- Open Day activities
- Popularization of nuclear science in schools and communities
- Knowledge competitions on nuclear science
- Exhibitions, conventions and exchanges
- Nuclear science exhibition halls

15

Press conferences and media briefings organized

12

Exhibitions attended, including China International Import Expo and China Hi-tech Fair

The Daya Bay Nuclear Power Base and the Modoushan Science Popularization Base in Yunnan won the honorary title of

Excellent Energy Science Popularization Base

in 2020 issued by China Energy Research Society.

Spotlight | Live-streamed coral science popularization – The 8.7 Open Day

On August 7, 2020, to mark the 15th anniversary of the idea that lucid waters and lush mountains are invaluable assets proposed by General Secretary Xi Jinping, CGN made another innovative attempt in public communication. We launched the eighth Open Day to show the public around the nuclear power plants online. The science-popularization event was live streamed, showing the beauty of the nuclear plants from sea, land and air.

A virtual tour to six nuclear power bases at one go

At the live-streaming site of the Daya Bay Nuclear Power Plant, Wang Yuheng from The Brain, a famous talent show, served as the chief coral conservation officer, together with Zhang Cheng from IUCN, took the online audience to the only 1:1 nuclear power plant refueling pool in China, the main control room and other production areas, and the real-time work scenes of nuclear engineers. With the help of the UAV and underwater camera robot, they knew the plant truly lived up to its reputation as "China's most beautiful power plant". At the same time, the Yangjiang Nuclear Power Base, the Taishan Nuclear Power Base and two other nuclear power bases also joined the live-streaming and interacted with the audience.

China's first coral conservation area established at the nuclear power base

On the same day, the Coral Conservation Area was inaugurated at Daya Bay Nuclear Power Base, becoming China's first coral conservation area in the sea area of a nuclear power base. Before the inauguration ceremony, we selected 40 coral conservation officers from the public to claim and name the first batch of coral branches that had been cultivated in the nursery. During the activity, coral conservation volunteers dived into the water to collect and clean up the broken branches of corals, and put them into the nursery for cultivation. Netizens witnessed the whole process of coral restoration through the live camera, and realized the importance of marine ecological protection. CGN also connected video signals to the seabed so that netizens can observe the growth of corals online.

3.7 million+

Viewers attracted to the live-streaming event

90 million +

Overall exposures

70+

First reports by mainstream media

Special communications

The "CGN and Shenzhen SEZ in the past four decades" thematic interview

On August 13, 2020, the "CGN and Shenzhen SEZ in the past four decades" media delegation organized by the Publicity Department of Shenzhen Municipal Party Committee visited Daya Bay Nuclear Power Base, CGN Design Institute and CGN Research Institute to learn how CGN started from the Daya Bay Nuclear Power Plant and drove high-quality development of clean energy with a global vision.

"Thumbs up for Nuclear Power" University Student Speech

From August to October 2020, the Daya Bay Nuclear Power Plant launched the "Thumbs up for Nuclear Power" University Student Speech Contest to celebrate the 40th anniversary of the founding of Shenzhen SEZ. University students shared their thoughts about nuclear power and spread nuclear knowledge to the public. More than 300 thoughts from 11 universities including Sun Yat-sen University and the Chinese University of Hong Kong (Shenzhen) participated in the contest. Their speeches got 350,000 thumbs up and 13,000 people watched and participated in the live-streamed finals. *Toutiao*, *Netease* News and other 19 mass media reported on the contest.

The first Ningde Science Carnival

On August 28, 2020, the first Ningde Science Carnival opened in a shopping mall in the city. Jointly organized by the Ningde Nuclear Power Plant, East Office of the National Nuclear Safety Administration etc., the event aimed to spread knowledge of nuclear power development, ecological protection, nuclear safety regulations, and marine protection to the public, so as to attract the public into the world of nuclear power through interesting and engaging activities.

The Virtual Open Day of Charmon-Wotlek Wind Farm in France

On December 31, 2020, CGN EuroEnergy held the Virtual Open Day of Charmon-Wotlek Wind Farm in France, with the theme of "Waltz in the Wind". It aired footages to fully show the beauty of Charmon-Wotlek Wind Farm, and tell the story of CGN's wind farms in Europe, and how they contributed to energy conservation and emissions reduction, local ecological protection, and CSR fulfillment. The footages of the event were released in Chinese, French and English on media and social platforms all over the world.

The event was reported or reposted by more than

70 overseas media,

covering an overseas audience of more than

12 billion.

The Virtual Open Day was report by the SASAC's overseas social media account with over

one million views.

I hope I can work in some Chinese company in the future. I have learned some Chinese. My knowledge about China was mainly about Chinese culture and food. I didn't know that China cares so much about sustainable development, renewable energy and environmental protection.

Aude TELOT, a freshman from the Department of European and International Culture, University of Versailles

The Open Day of Taishan Nuclear Power Plant

Taishan Nuclear Power Plant launched the Sound Map H5 of Taishan Nuclear Power Plant to show the production and living scenes of the Plant through illustrations. At the same time, the animation effect of one take is adopted to create immersive viewing experience and enhance the public knowledge of the plant in a unique way.

Scan the QR code to watch the Sound Map H5 of Taishan Nuclear Power Plant

The Open Day of Hongyanhe Nuclear Power Plant

Hongyanhe Nuclear Power Plant launched a live-streaming session on TikTok. Guo Xinghai, the host, took the audience to two landmarks: Huaxi and Wenlan Pavilion, answered various questions from them and showed them the working and living environment at the plant.

Charity

Always conscious of social needs, we mobilize employees and advantageous resources to carry out volunteer services and charity activities such as visiting those in need, education support and poverty alleviation, giving back to the society with concrete actions.

Caring for the poor and the elderly

- Taishan Nuclear Power Joint Venture Co., Ltd. paid 571 visits to senior citizens and people in difficulty in 2020.

- The Youth League Committee of Suzhou Nuclear Power Research Institute sent moon cakes to the elderly before the Mid-Autumn Festival.

Supporting child education

- CGN New Energy donated RMB 100 million to build "Egret School" in Xing'an League of Inner Mongolia, with 36 primary school classes and 12 junior middle school classes to promote the development of education in Xing'an League.

- The CGN's "Egret Class" was initiated on October 12, 2017, open to children from poor ethnic minority families in Lingyun County and Leye County of Baise, Guangxi Province, Puge County of Liangshan, Sichuan Province, Mouding County of Chuxiong, Yunnan Province and Kongtong village of Yangchun City of Yangjiang. By the end of 2020, it had admitted a total of 1,750 students.

- Together with Green Pine Care Foundation, CGN established the Egret Rainbow Children's Choir of Yi Ethnic Group in Liangshan and invited the famous Yi musician Mo Xizishi to give a music lecture to 59 Yi children.

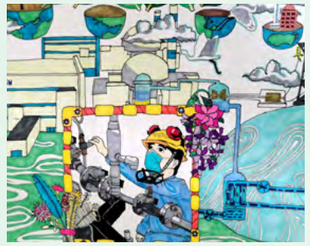
Improving living conditions

- By the end of 2020, the "Water Cellar, Love of the Earth" charity program of the Daya Bay Nuclear Power Plant had donated RMB 228,600, bringing clean water to more than 2,200 people in 500 families.

- CGN Swakop Uranium Co., Ltd. funded the installation of embedded reflective road lamps on a stretch of more than 40 kilometers of roads to improve road safety.

Popularizing energy knowledge

- The Taishan Nuclear Power Plant, Taishan Science and Technology Association and Education Bureau co-host the 3th Taishan Youth Science and Technology Innovation Competition, presenting a feast of popular science to teenagers.



- More than 160 teachers and students of Shanwei Xiaofengfan Art School visit the Lufeng Nuclear Power Plant to learn about the knowledge and beauty of nuclear power.

- A team of CGN Environment Protection's Wuxi branch visited Wuxi Institute of Technology to launch a science popularization activity with the theme of "clean energy and the green future".

The volunteer team of CGN Design Institute won the 7th Gold Award of Guangdong Volunteer Services.

About *16,432*

Participants attracted by our volunteer services and charitable activities

49,384

Service hours in total

Supporting COVID-19 response

- Yangjiang Base of Suzhou Nuclear Power Research Institute organized employees to Dongping Middle School to help clean the campus before school reopening.

- CGN Service Group Co., Ltd. visits Pengcheng Kindergarten to help clean the air conditioners and disinfect the campus before the return of teachers and children.

- CGN Swakop Uranium Co., Ltd. donates edible oil, sugar, flour and other essential provisions to 42 families in the shanty area of Swakopmund.

Outlook

Integrating into the new development pattern and planning for further development in this new stage of development

The year 2021 will see China embark on the journey toward the Second Centenary Goal, and is the first year covered by the 14th Five-Year Plan. At this historic starting point, we will follow the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, shoulder the mission entrusted by the times to CGN, deeply understand the characteristics of the new development stage, and actively integrate into the "dual circulation" development pattern. We will resolutely implement the new development concept, and strive to opening up new opportunities for high-quality corporate development, and make a good start for the next five years.

Ensuring safety and quality to build a solid foundation for development

We will firmly shoulder the political responsibility of safeguarding nuclear safety, comprehensively complete all tasks of the three-year work safety improvement action, and keep the bottom line of no major risks.

Focusing on key projects to opening up new horizons

We will devote ourselves to serving national economic development, strengthen the management of nuclear power projects, promote the development of new energy with high quality and high standards, accelerate the transformation and upgrading of new business, and promote the continuous improvement of CGN's business.

Continuing to pursue independent innovation to master core technologies at an earlier date

We will enhance the dominant position of innovation and unswervingly follow the path of independent innovation to develop key core technologies, enhance the ability of technological innovation, and strive to take our future in our own hands.

Continuing the reform to improve comprehensive performance

Continuing the reform is our major political task. We will actively plan and advance reform, focus on key tasks, stimulate vitality, highlight grassroots innovation, and implement the three-year SOE reform plan with high quality.

Improving quality and efficiency to strengthen business management

Facing the complex business environment, we will take various measures to overcome the difficulties, continuously improve the quality and efficiency of development, and strive to achieve the goal of stable growth.

Upholding the Party leadership to support reform and development

We will implement the Party building tasks assigned to central SOEs, improve the quality of Party building, promote the full and strict governance over the Party, deal properly with ideological, confidentiality and publicity work under the new situation, and deliver on our actions to celebrate the 100th anniversary of the founding of the Party.

Nuclear Power Base in Yangjiang, Guangdong

Performance Data

Safety

Nuclear Power Plant /Unit		2018	2019	2020
Maximum personal radiation dose at each nuclear power plant in operation	Daya Bay Nuclear Power Plant (mSv)	5.11	9.14	5.023
	Ling Ao Nuclear Power Plant (mSv)	10.32	6.94	6.767
	Lingdong Nuclear Power Plant (mSv)	5.25	5.81	4.695
	Units 1-6 of Yangjiang Nuclear Power Plant (mSv)	8.11	11.82	12.047
	Units 1-4 of Hongyanhe Nuclear Power Plant (mSv)	7.60	8.79	6.434
	Units 1-4 of Ningde Nuclear Power Plant (mSv)	8.00	8.72	11.219
	Units 1 & 2 of Fangchenggang Nuclear Power Plant (mSv)	3.59	4.10	6.361
	Unit 1 & 2 of Taishan Nuclear Power Plant (mSv)	0.29	1.01	7.095
Nuclear Safety	Number of in-service nuclear power units	22	24	24
	Ratio of units achieving the world's advanced level (the world's top quartile) in WANO indicators (%) *	78.79	76.39	72.6
	Unplanned shutdowns (times)	2	3	5
	Number of level-2 or above incidents defined in the International Nuclear Event Scale (times)	0	0	0

Scientific research

Performance Indicators		2018	2019	2020
Investment in scientific research activities (RMB billion)		3.41	3.79	3.79
Total participants of scientific research activities		7,143	7,164	8,582
Educational background of scientific research personnel	Doctor's degree (headcount)	162	170	175
	Master's degree (headcount)	2,105	2,208	2,836
	Bachelor's degree (headcount)	4,791	4,708	4,891
National talents	Academician (headcount)	2	2	1
	International candidates of New Century Talents Project (headcount)	4	5	6
	Number of recipients of special allowance of the State Council (headcount)	33	37	39

Performance Indicators		2018	2019	2020
Patent applications	Invention	722	785	874
	Utility mode	516	544	604
	Appearance design	7	23	21
Authorized patents	Invention	268	348	395
	Utility mode	492	513	591
	Appearance design	9	14	26

Operation

Performance Indicators	2018	2019	2020
Total assets (RMB billion)	670.09	749.48	788.5
Total overseas assets (RMB billion)	111.03	139.9	133.8
Operating income (RMB billion)	97.85	109.9	110.7
Overseas operating income (RMB billion)	20.9	22.72	20.3
Ratio of overseas operating income (%)	21.4	20.7	18
Total tax payment (RMB billion)	9.54	11.86	12.0
Gross in-service installed capacity of clean energy (GW)	51.24	58.18	63.16
Gross in-service installed capacity of nuclear power (GW)	24.30	27.14	27.14
Gross in-service installed capacity of nonnuclear power (GW)	26.94	31.04	37.95

Environment

Performance Indicators	2018	2019	2020
Equivalent to CO_2 emissions reduction from clean energy (million tons)	Over 170	Over 210	Over 200
Comprehensive energy consumption (10,000 tons of standard coal)*	175.88	199.96	180.01
Comprehensive energy consumption per RMB 10,000 output (tons of standard coal equivalent /RMB 10,000) *	0.1899	0.1872	0.1643

***Note:** This indicator refers to the sum of the standard coal equivalent of actual energy consumption in industrial production of an enterprise, and deducts the sum of the enterprise's standard coal equivalent of energy conversion output.
This indicator refers to the ratio of comprehensive energy consumption of enterprises to their total industrial output value. The formula is comprehensive energy consumption (tons of standard coal equivalent) divided by industrial gross output value (RMB 10,000).

Discharge of the Three Wastes	Daya Bay Nuclear Power Plant			Yangjiang Nuclear Power Plant			Fangchenggang Nuclear Power Plant		
Performance Indicators	2018	2019	2020	2018	2019	2020	2018	2019	2020
Ratio of liquid effluent (nuclides but tritium) to state annual limit	0.35%	0.27%	0.24%	0.29%	0.55%	0.41%	0.41%	0.29%	0.30%
Ratio of gaseous effluent (inert gases) to state annual limit	0.56%	0.43%	0.42%	0.24%	0.30%	0.21%	0.35%	0.29%	0.30%
Generation of radioactive solid waste (m3)	248.6	244.8	230.3	44.8	60.8	102.44	64.6	67.6	74.04
Environmental Monitoring Results	normal	normal	normal	normal	normal	normal	normal	normal	normal

Discharge of the Three Wastes	Ningde Nuclear Power Plant			Taishan Nuclear Power Plant			Hongyanhe Nuclear Power Plant		
Performance Indicators	2018	2019	2020	2018	2019	2020	2018	2019	2020
Ratio of liquid effluent (nuclides but tritium) to state annual limit	0.30%	0.24%	0.37%	0.54%	3.02%	4.85%	0.21%	0.19%	0.151%
Ratio of gaseous effluent (inert gases) to state annual limit	0.30%	0.28%	0.30%	0.71%	1.59%	2.19%	0.21%	0.20%	0.142%
Generation of radioactive solid waste (m3)	136.8	124.8	110.4	0	0	80.99	159.6	118.4	120
Environmental Monitoring Results	normal	normal	normal	normal	normal	normal	normal	normal	normal

Staff development

Performance Indicators		2018	2019	2020
Number of employees		42,085	41,622	42,464
By gender(%)	Male employees	83.10%	83.29%	83.32%
	Female employees	16.90%	16.71%	16.68%
By age (%)	30 years old and under	34.73%	30.59%	27.31%
	31-50 years old	59.87%	63.13%	65.08%
	51 years old and above	5.4%	6.28%	7.61%
By region (%)	Employees from China	91.94%	91.32%	91.41%
	Employees overseas	8.06%	8.68%	8.59%
Total training hours for employees (10,000 hours)		461	477	387
Annual training hours per employee (hour)		108	108	93
Employee turnover rate (%)		7.18%	7.01%	6.55%
New employees(headcount)		4,056	3,404	3,560

Community contribution

Performance Indicators	2018	2019	2020
Total domestic and overseas donations (RMB million)	33.83	102.85	172.00
Poverty alleviation investment (RMB million)	About 26	90.31	101.06
Number of CGN employee volunteers	About 27	About 91	164.32

***Note:** The total domestic and overseas donations include 101.06 million RMB for targeted poverty alleviation.

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