



China Power International Development Limited
中國電力國際發展有限公司

(incorporated in Hong Kong with limited liability)

(Stock Code : 2380)



Sustainability Report 2021



About This Report



Basis of Preparation

This report is prepared in accordance with the relevant requirements of the Guiding Opinions on Fulfilling Social Responsibilities of Central Enterprises issued by the State-owned Assets Supervision and Administration Commission of the State Council of the PRC (“SASAC”), and the prevailing Environmental, Social and Governance Reporting Guide issued by The Stock Exchange of Hong Kong Limited (“Hong Kong Stock Exchange”), and with reference to the Sustainability Reporting Standards of the Global Reporting Initiative (“GRI Standards”).



Reporting Period

This report covers the period from 1 January 2021 to 31 December 2021, part of the content, as appropriate, has been traced back to the previous years. This report is dated on the same day as the Annual Report 2021 of China Power (i.e. 17 March 2022).



Reporting Scope

The Group as a whole.



Publication Cycle

This report is published annually.



Reporting Principles

Materiality, quantitative, balance and consistency.



Data Sources

The financial data cited in this report is derived from the audited Annual Report 2021 of China Power, and the other data is derived from internal official documents of China Power and relevant statistics.



Reference

For the convenience of presentation, “China Power” or the “Company” refer to China Power International Development Limited, and the “Group” or “we” or “us” or “our” refer to China Power together with its subsidiaries in this report.



Currency

The currency used in this report is Renminbi (“RMB”), unless otherwise specified in related data.



Access to this Report

This report is available in Chinese and English electronic versions. You may access this report by the following ways:

Website: <http://www.chinapower.hk>

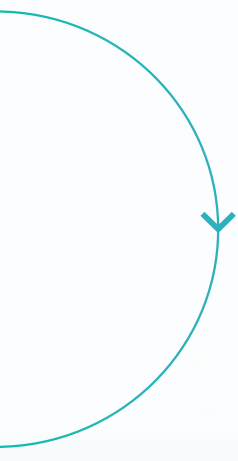
Email: ir@chinapower.hk

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Message from the Chairman



HE XI
Chairman of the Board, Executive Director

Green-empowerment Intelligent Innovation Mutual Achievement

The year 2021 marked the beginning of China's "14th Five-Year Plan" and set off on a new journey of strategic transformation of China Power. It was a challenging, extraordinary and difficult year to China Power. Actively implementing the national requirements under the "Dual Carbon" strategy, we have adjusted our strategic direction and reshaped the strategy to establish our new goal of becoming a world-class green and low-carbon energy provider. We repositioned ourselves strategically on the one hand, and captured new opportunities of development and expanded the principal clean energy segment at full steam to integrate with the development trend of synergistic innovation of the energy industry on the other hand, all the while staying committed to enhancing the investment value of the Company and maximizing the interests of the shareholders.

Following the formation of the new senior management of the Company last year, we planned for formulating the new strategy of the Company at a new stage of development, determined the new market position as "transform from a traditional power generation company to a green and low-carbon energy provider", and designated the new mission of "Lower Carbon Empower Better Life" and the core philosophy of "Green-empowerment, Intelligent Innovation and Mutual Achievement". By proposing the strategic goals and paths for the three phases up to 2025, 2030 and 2035 respectively, we strived to become not only a leading energy enterprise in China but also all around the world.

In October 2021, we organized a high-level press conference for the new strategy, announced it to the government, enterprises and mass media and mutually signed the Green and Low-carbon Initiative, which enhanced the brand recognition and market influence of "China Power" significantly.

Facing the new wave of green and low-carbon development, we are eager to embrace it with our sense of urgency and mission of "no waiting, sparing no efforts but running fast forward" to build a new system of "comprehensive development for all employees", and to motivate the passion of all employees to achieve leapfrog development of our clean energy business.

Clean Energy Development at Full Steam

In 2021, large-scale energy base photovoltaic power projects such as Shanxi Xinrong 100MW Photovoltaic Grid Parity Project, Phase II of Datong Hunyuan 100MW Photovoltaic Grid Parity Project and Shandong Haiyang 300MW Offshore Wind Power Project were connected to the power grid at full capacity, which accomplished the Group's expansion into the new horizon of marine energy development. As at the end of 2021, the consolidated installed capacity of the Group was 28,931.9MW in aggregate, of which the consolidated installed capacity of clean energy amounted to 15,091.9MW, accounting for 52.16% of the total consolidated installed capacity, which marked the fundamental change of the Group's asset structure that was principally based on coal-fired power, hence making it the first traditional energy enterprise in the capital market of Hong Kong with clean energy accounting for more than half of its total installed capacity.

During 2021, the share price of the Company increased by over 210%, while the market capitalization grew by approximately 250% as compared to the beginning of the year and exceeded HK\$60 billion at its highest, which is beyond the expectation of the capital market.

Diversifying the Layout in the New Green Energy Industries

Our blueprint layout of the new green energy industries has been gradually fulfilled at phases. In 2021, we established various project companies, including:

- Energy storage company — Xinyuan Smart Storage (新源智儲), which provides the “integrated” solution of modularized combinations, movable deployment and container-mode energy storage with annual capacity growth arising from the energy storage system development and construction amounting to 668MWh;
- Green power transportation company — Qiyuanxin Power (啟源芯動力), which develops the business of battery swapping for heavy trucks to seize the market opportunities as a pioneer, with a market share exceeding 50% currently;
- Developers in the county areas — CPNL (中電農創) and CP Changxing (中電長興), which comprehensively expand business exposure in the development of beautiful low-carbon and zero-carbon rural areas;
- Geothermal energy development company — Xinyuan Yunneng (新源蘊能), which promotes the development of geothermal energy projects in an orderly manner; and
- Entrusted management project of Yanqing Garden Hydrogen Refueling Station, which was an ancillary facility for the 2022 Beijing Winter Olympics, through which the Company has established an integrated platform of “production, storage, distribution and refueling” to contribute and support the “Green Winter Olympics”.

In addition, a number of integrated energy demonstration projects including the Xiaogang Village Project in Anhui Province were successfully put into operation, and the Liaoning Chaoyang 500MW Photovoltaic Grid Parity Demonstration Project completed the first parity green certificate transaction in China. Driven by the synergies with the new electricity sales market, the Company completed green power transactions of approximately 23,488MWh during the year.

Joining Hands with Partners to Achieve Win-win Cooperations

We are deeply aware that strategic transformation and groundbreaking development could not have been accomplished by the Company alone. As such, we worked actively on bringing down walls and embracing the future in our pursuit of green and low-carbon energy solutions, with a view to building an ecosystem and partnership network with joint contribution, shared benefits and common prosperity.

In order to deepen our strategic cooperation with major customers, we entered into over 300 cooperation agreements with local governments at all levels as well as upstream and downstream leading enterprises along the industrial chain last year. Leveraging our competitive edges as a “Double-Hundred Enterprise (雙百企業)” and the opportunities arising from the “Three-Year Action (三年行動)” for the reform of State-owned enterprises, we improved the employee incentive and constraint mechanism, strengthened the efforts in training of young talents, and encouraged employees from enterprises with rich human resources to shift their focuses to new industries, new business forms and new business models (the “Three New Businesses (三新業務)”) in a bid to stimulate vitality and momentum of the Company. While maintaining standardized operation, we continued to enhance our quality and efficiency as a listed company, effectively protect the legal rights of the investors and share with them the results of the Company’s high-quality development.

Remaining Committed to Sustainable Development

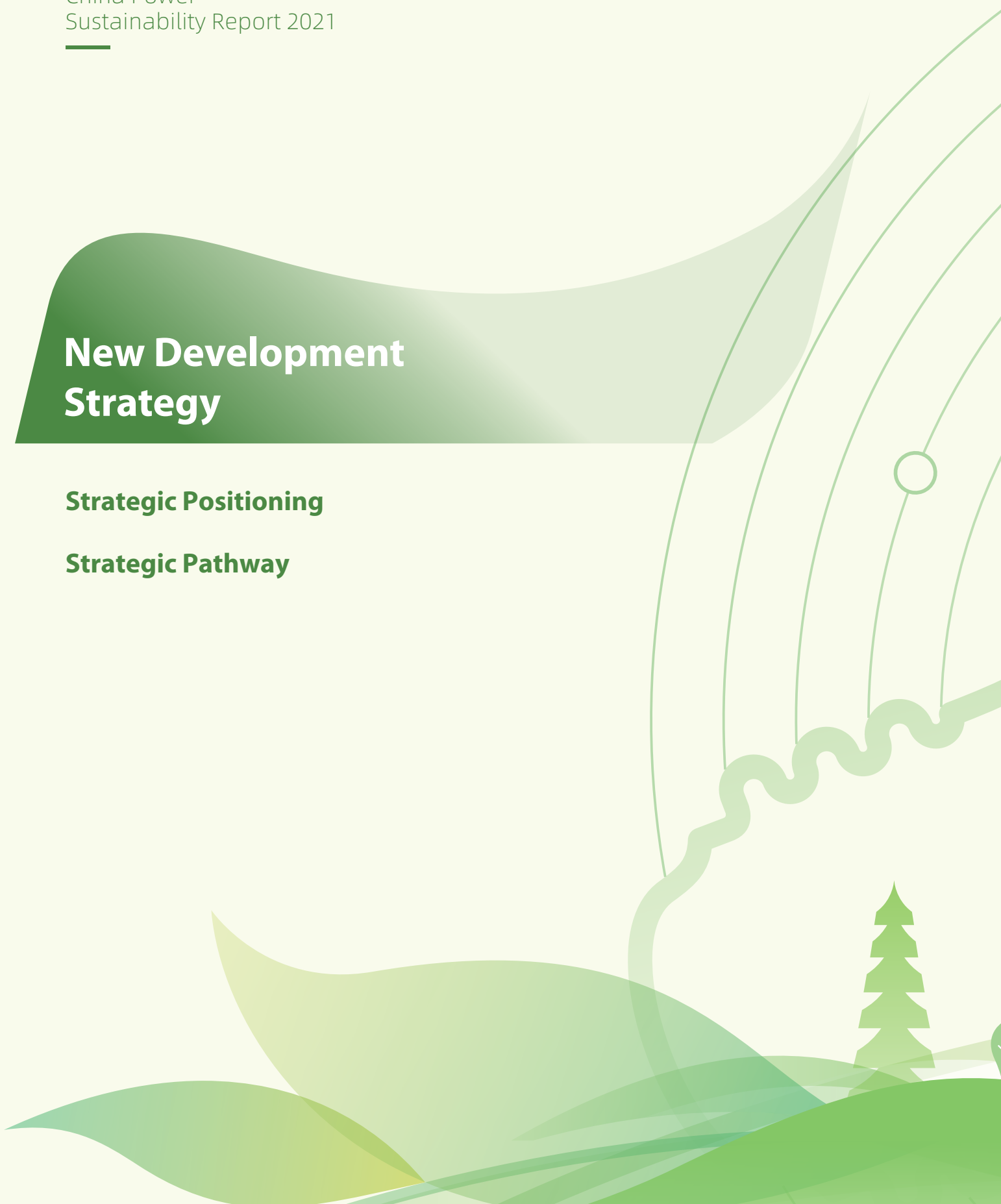
We actively fulfilled our corporate responsibilities and obligations in promoting sustainable social and economic development. In this regard, we strengthened the governance in relation to energy conservation and emission reduction and realized ultra-low emission of all coal-fired power generating units in China. In addition to providing reliable power supply to safeguard local development, we made all efforts to cope with extreme weather conditions such as snowstorms and rainstorms, and fulfilled our corporate responsibilities in aspects such as pandemic prevention and control, financial-aids for students and flooding prevention. We organized voluntary services with 4,929 volunteers involved and made charitable donations up to a total amount of RMB3,020,061 during the year. Our efforts and contributions have been well-recognized by the public. The Company received the Prize of “Special Mention Corporate Governance (企業管治 — 評判嘉許獎)” under the H-share Companies and Other Mainland Enterprises Category in the Judges’ Report of “Best Corporate Governance and ESG Awards 2021” released by the Hong Kong Institute of Certified Public Accountants (HKICPA), and was named “Excellent ESG Enterprise of 2020-2021 (2020-2021年度傑出ESG企業)” under the “Excellent ESG Recognition Scheme (傑出環境、社會及企業管治表現嘉許計劃)” by Hong Kong Economic Times.

There will be both opportunities and challenges in 2022. Standing at the new starting point of becoming a world-class green and low-carbon energy provider with its best endeavors, China Power will conduct in-depth analysis on the new development trends and work hard with perseverance under the guidance of the new strategy so as to create a brighter future with the concerted efforts of all stakeholders.

New Development Strategy

Strategic Positioning

Strategic Pathway

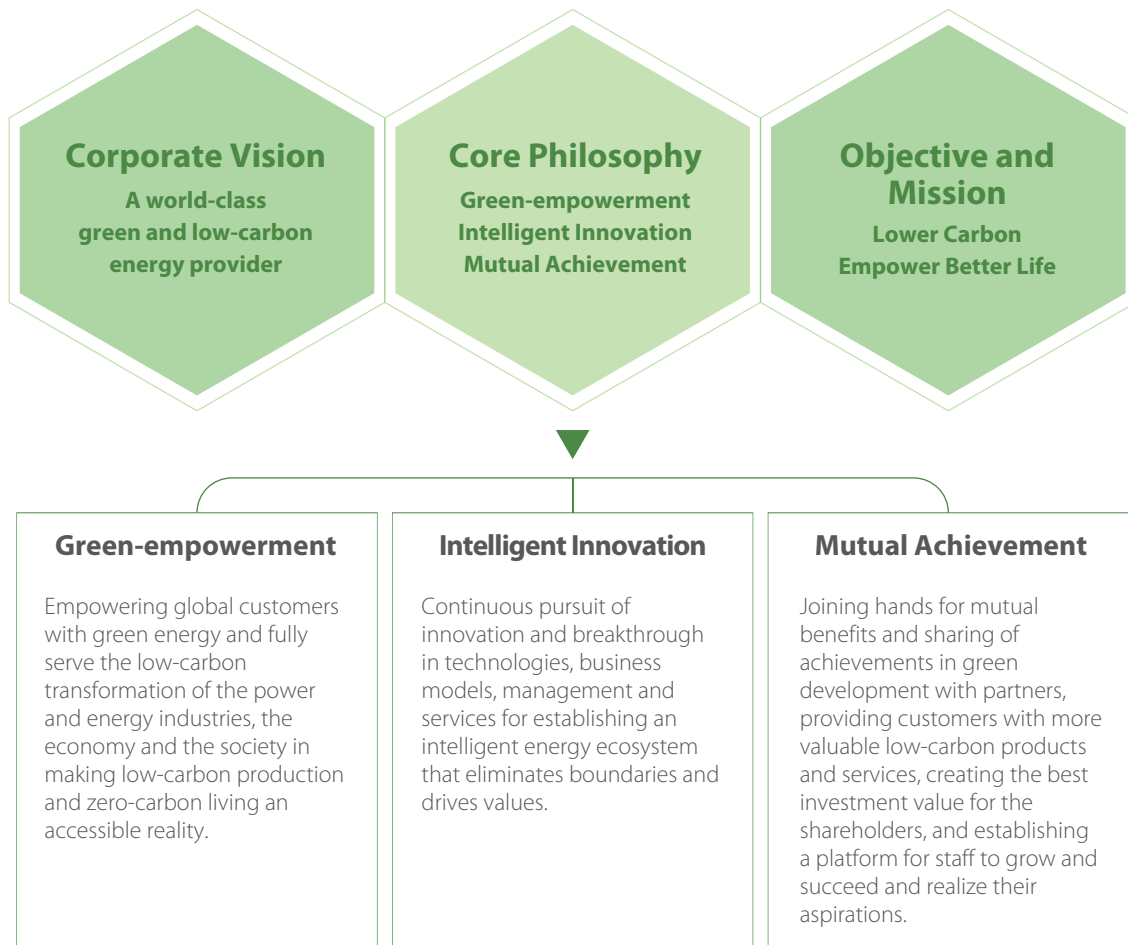






In 2021, China Power released the Outline of the New Development Strategy. With the objective and mission of “Lower Carbon Empower Better Life”, we have adhered to the core philosophy of “Green-empowerment, Intelligent Innovation, and Mutual Achievement”, and anchored in the position of “transforming from a traditional power generation enterprise to a green and low-carbon energy provider” with a focus on promoting the development of

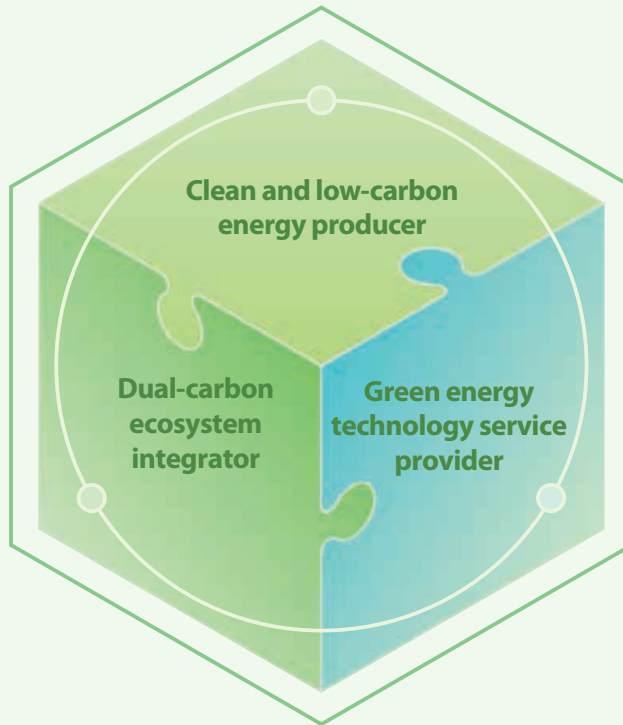
clean and low-carbon energy such as photovoltaic power, wind power, hydropower, geothermal energy and biomass energy. Proactive efforts will be made to nurture emerging industries of green energy, including energy storage, hydrogen energy, green power transportation and integrated intelligent energy, so as to realize the “dual wheel drive” of clean and low-carbon energy and emerging industries of green energy. We have strived to grow and become a “Double-leading Enterprise” from a leading enterprise in China towards a leading enterprise in the world and dedicated to progress towards a “world-class green and low-carbon energy provider”.



Strategic Positioning

Transform from a traditional power generation enterprise into a green and low-carbon energy provider

“Three-in-one” Business Positioning



“Double-leading Enterprise” Growth Positioning



Strategic Pathway

By 2025

Becoming a leading green and low-carbon energy provider in China



By the end of 2023

Proportion of clean energy in terms of installed capacity will exceed **70%**

Proportion of clean energy in terms of revenue will exceed **50%**

Proportion of revenue from integrated intelligent energy will exceed **15%**

Number of confirmed strategic sizable customers and confirmed cities, counties and districts for strategic cooperation will exceed **100**

By the end of 2025

Proportion of clean energy in terms of onshore installed capacity will exceed **90%**

Proportion of clean energy in terms of revenue will exceed **70%**

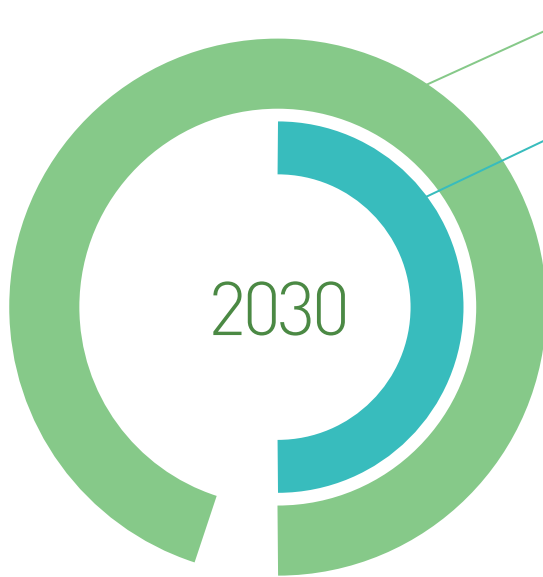
Proportion of revenue from integrated intelligent energy will exceed **25%**

Number of confirmed strategic sizable customers and confirmed cities, counties and districts for strategic cooperation will exceed **200**

Becoming a leading enterprise for green power transportation and energy storage and power station, a pioneer for low-carbon and zero-carbon beautiful rural areas and a builder for new hydrogen power ecology in China which have completed a number of pilot demonstration projects for green power transportation, energy storage and hydrogen power offshore

○ By 2030

Progressing towards a world-class green and low-carbon energy provider



- Onshore installed capacity of clean energy will account for over **95%** of the total onshore installed capacity
- Proportion of revenue from integrated intelligent energy will exceed **50%**
- Number of confirmed strategic sizable customers and confirmed cities, counties and districts for strategic cooperation will exceed **1,000**
- **100%** of the offshore energy and power installed capacity will be clean and low-carbon energy assets which, including green power transportation, energy storage and hydrogen power, will be applied under multi-scenario in various regions offshore
- The “three-in-one” brand positioning of China Power that integrates the role of clean and low-carbon energy producer, green energy technology service provider and dual-carbon ecosystem integrator will be recognized by the international market

○ By 2035

Becoming a world-class green and low-carbon energy provider

Securing a forefront position in the industry in terms of its investment intensity in technological research and development and its proportion of technology-related revenue, and possessing a series of globally competitive low-carbon and zero-carbon core technologies and solutions. The Company will have clean and low-carbon energy assets covering over 30 countries and regions, with its green power transportation, energy storage and hydrogen power being widely applied offshore. China Power will become a well-known brand of green and low-carbon energy provider with international competitiveness and influence.



Case

China Power released its new strategy officially

On 23 October 2021, China Power hosted the “Building World-class Low-carbon Enterprise Development Forum cum New Strategy Press Conference”, which was held on-site and online in Beijing and Hong Kong simultaneously. Centering on the goals of “Carbon Emission Peak and Carbon Neutrality”, the participant enterprises probed in depth the new requirements for “building a world-class low-carbon enterprise”, the roles they played in achieving the “dual carbon” goals and discussed the low-carbon and zero-carbon technological innovation and industrial ecological construction and other issues. China Power released its new development strategy to the government, enterprises and media during the forum, and jointly signed a green and low-carbon initiative, which greatly improved the brand reputation and market influence of China Power.



China Power announced its new development strategy at the press conference held on-site and online in Beijing and Hong Kong on 23 October 2021

About China Power

Business Distribution

Group Structure

Corporate Governance

Highlights of the Year

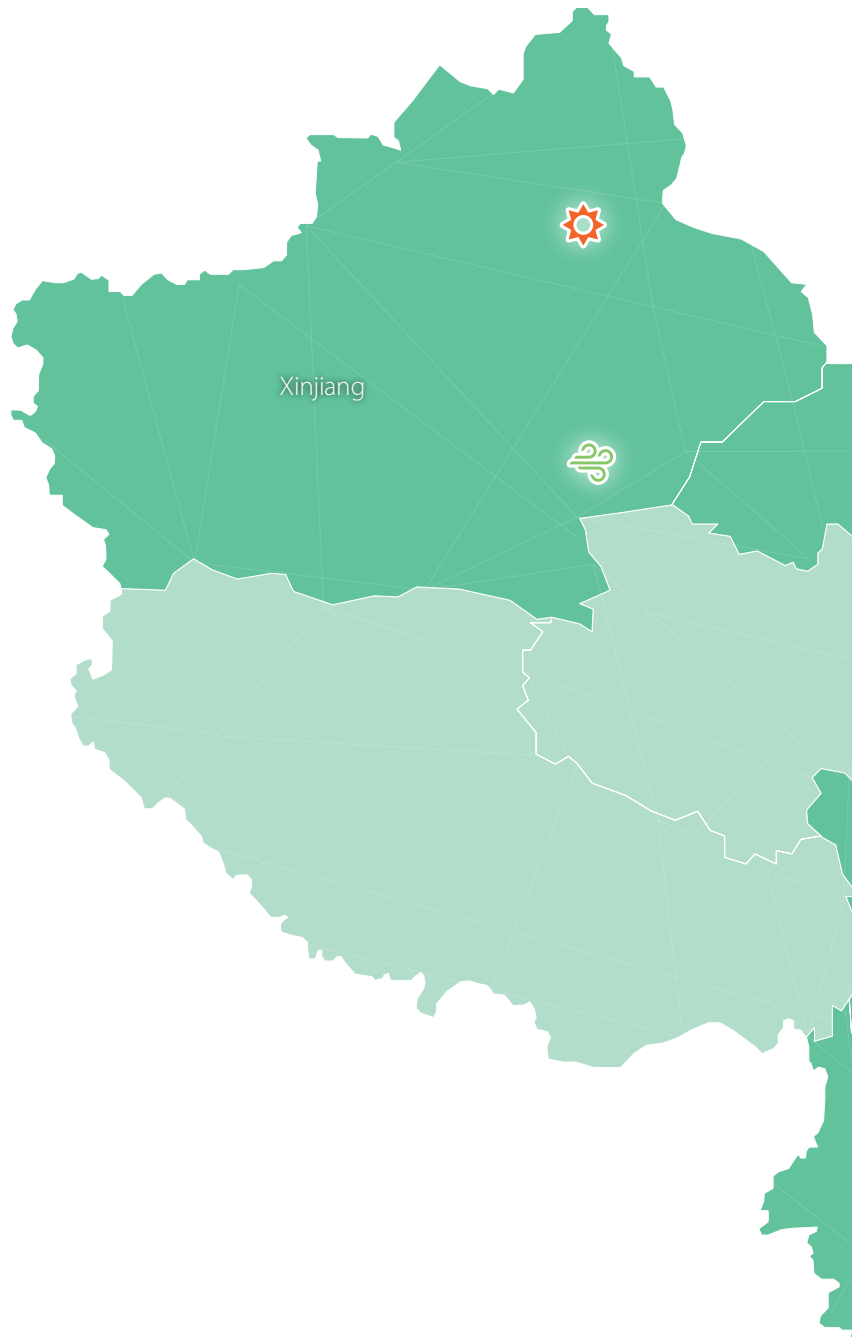


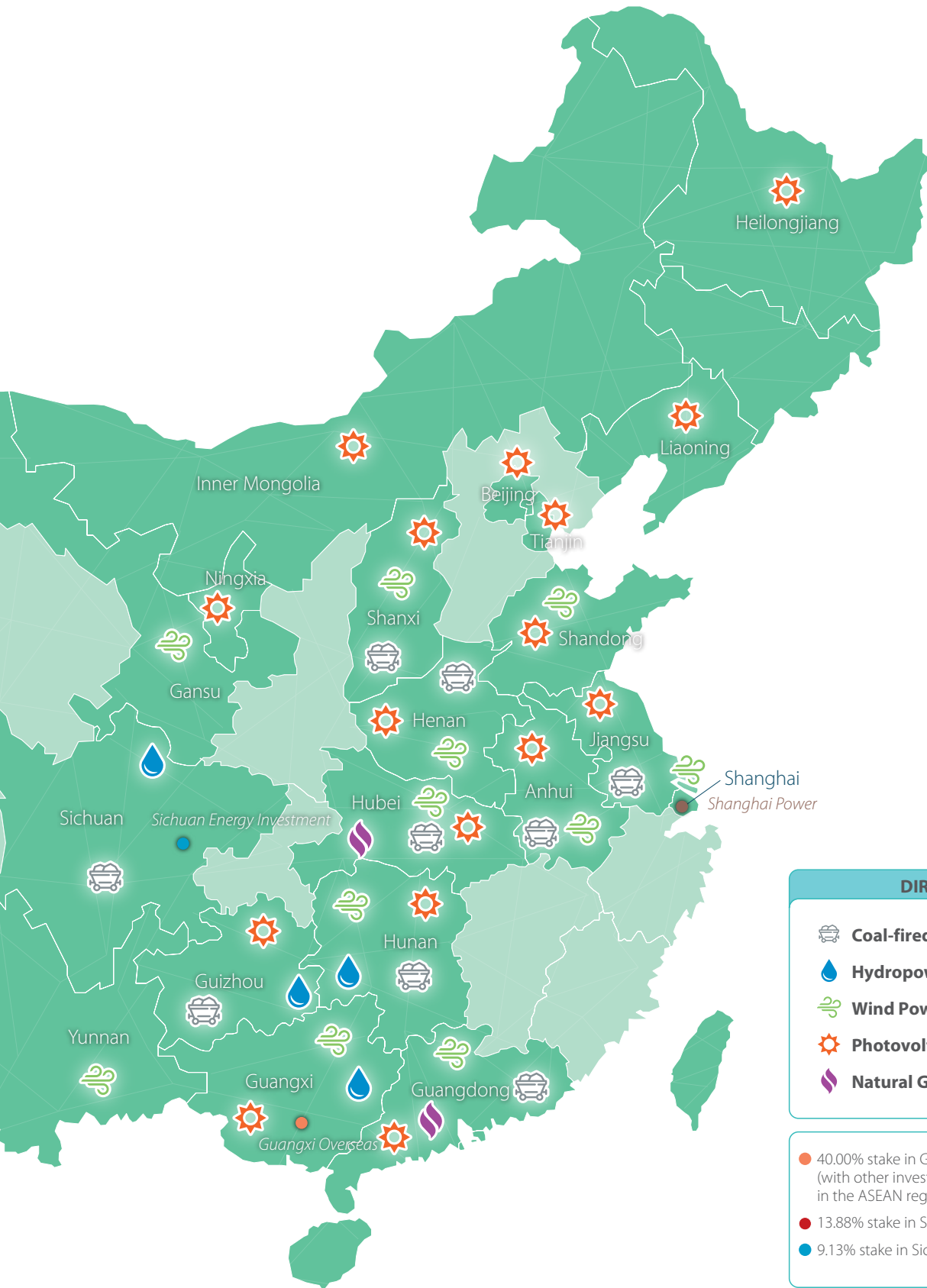


Business Distribution

China Power was incorporated in Hong Kong with limited liability under the Companies Ordinance (Chapter 622 of the Laws of Hong Kong) (“Hong Kong Companies Ordinance”) in March 2004 and is a core subsidiary of State Power Investment Corporation Limited (“SPIC”), an integrated energy group which simultaneously owns coal-fired power, hydropower, nuclear power and renewable energy resources in the People’s Republic of China (the “PRC”).

The shares of the Company were listed on the Main Board of the Hong Kong Stock Exchange in October 2004 with the stock code 2380. From the beginning of solely engaging in generation and electricity sales of coal-fired power, the Company has expanded its business into the areas of, among others, hydropower, wind power, photovoltaic power, natural gas power, energy storage, green power transportation and integrated energy services through continuous development. Various business segments have been kept growing along with the constant expansion of the Group.



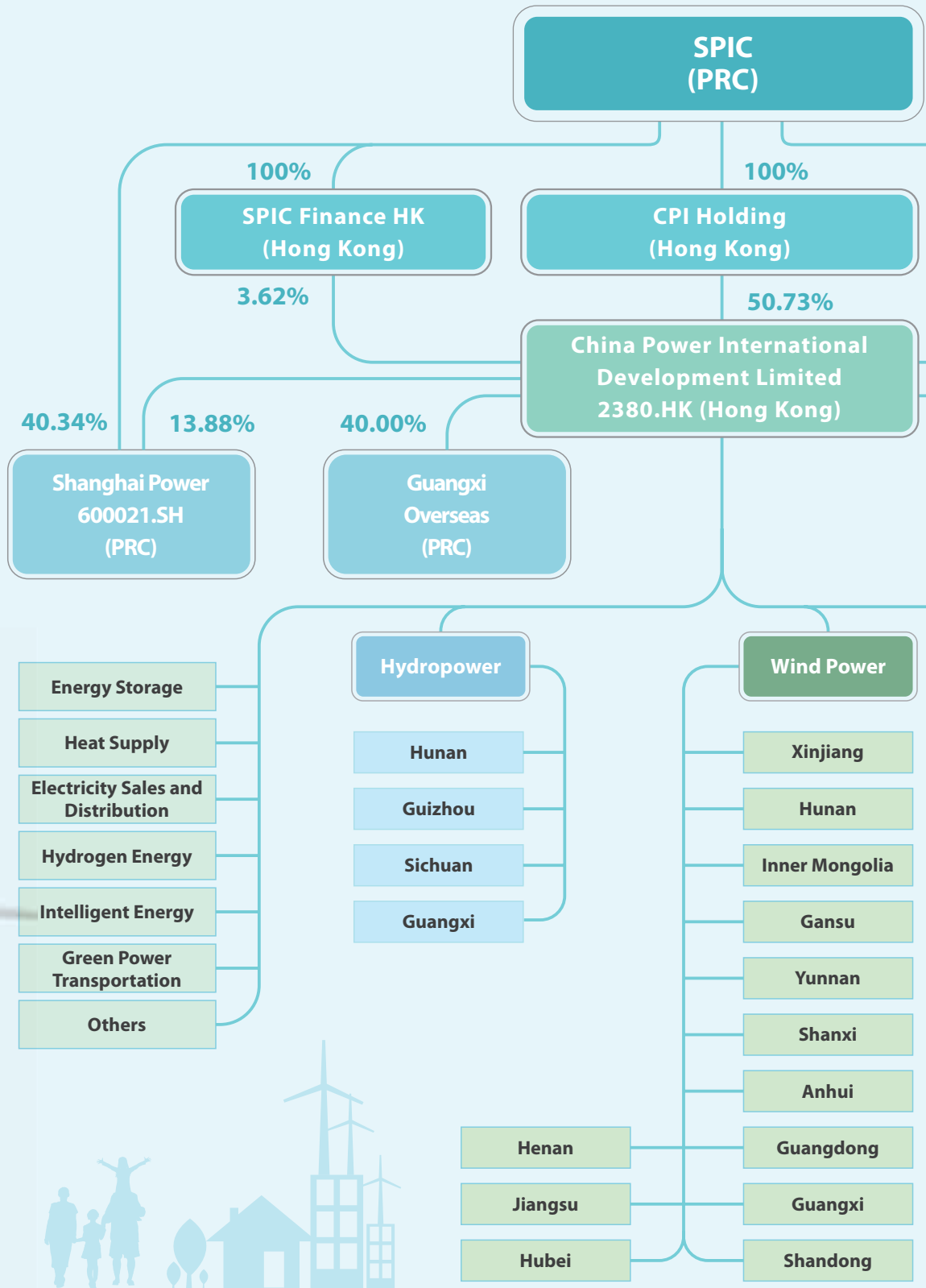


DIRECTIVE

- Coal-fired Power
- Hydropower
- Wind Power
- Photovoltaic Power
- Natural Gas Power

- 40.00% stake in Guangxi Overseas (with other investments located in the ASEAN region)
- 13.88% stake in Shanghai Power
- 9.13% stake in Sichuan Energy Investment

Group Structure





Public

45.65%

Other assets

9.13%

**Sichuan Energy Investment
1713.HK (PRC)**

Photovoltaic Power

- Henan
- Anhui
- Shanxi
- Liaoning
- Hubei
- Guangdong
- Guizhou
- Shandong
- Heilongjiang
- Beijing

Natural Gas Power

- Hubei
- Guangdong
- Tianjin
- Xinjiang
- Jiangxi
- Inner Mongolia
- Hunan
- Ningxia
- Guangxi
- Jiangsu

Coal-fired Power

- Anhui
- Henan
- Hubei
- Sichuan
- Guizhou
- Jiangsu
- Shanxi
- Guangdong
- Hunan

Corporate Governance

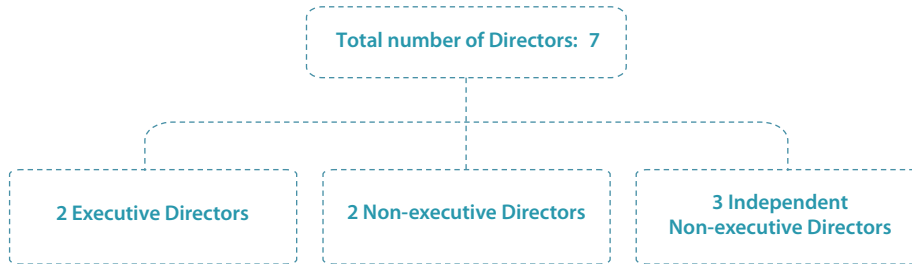
The Company strictly abides by relevant laws, regulations and the rules of regulatory authorities, and constantly improves its corporate governance system. Its staffing structure is in line with laws, regulations and the mandatory requirements for listed companies. Its Directors are diversified in terms of capabilities, skills and experience. At the same time, the Company has formed a corporate governance structure with effective control and balances which the shareholders, the board of Directors of the Company (“Board”), four committees under the Board, and the management operate independently and in coordination.

In December 2021, the Hong Kong Stock Exchange published its consultation conclusions on the review of CG Code and the associated Listing Rules. Most of the amendments are applicable for the financial year commencing on or after 1 January 2022. The Company has been substantially adopted the new requirements under the amended CG Code as our corporate governance practices over the years.

Board Diversity

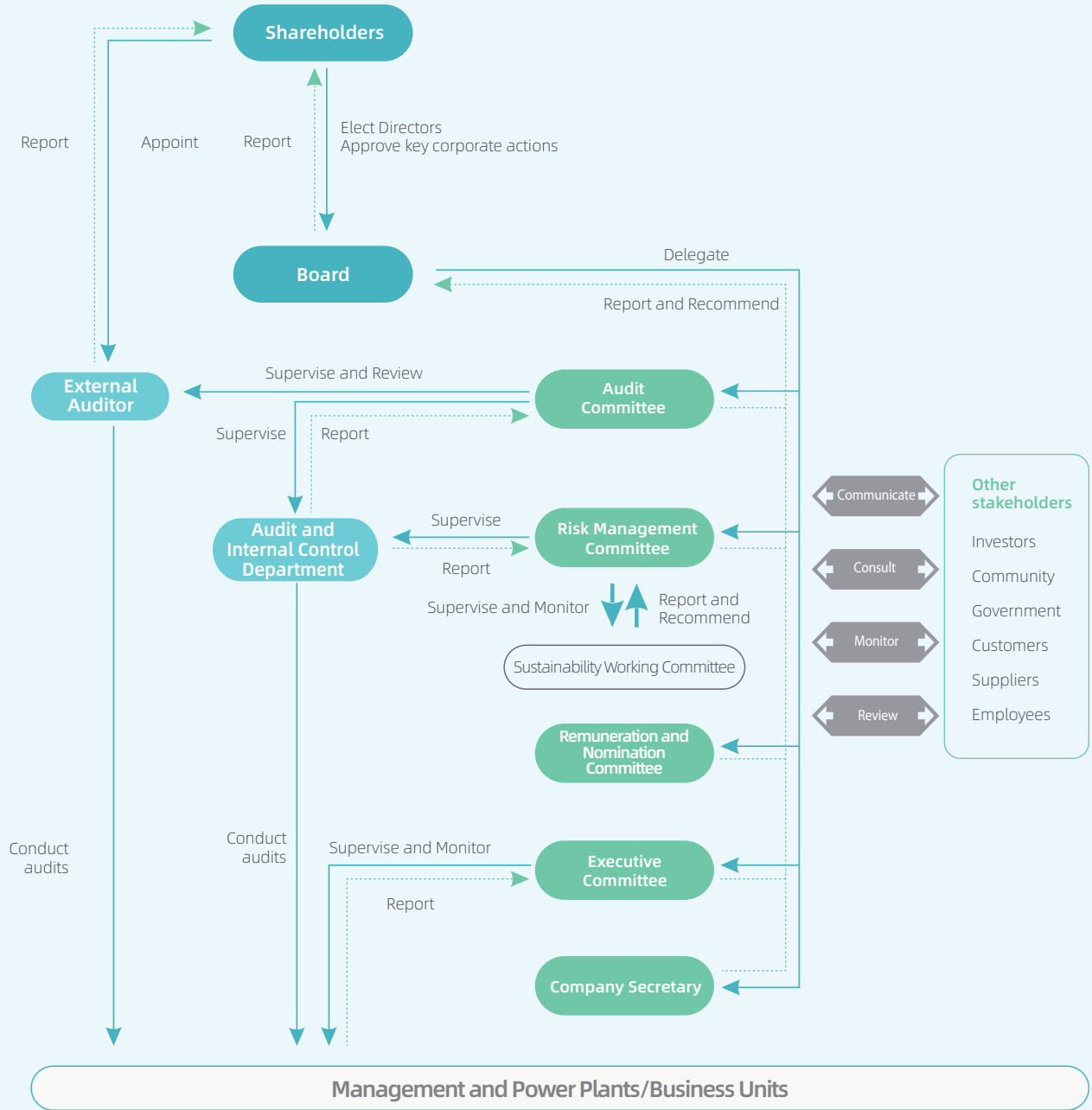
- The Board adopted a “Board Diversity Policy” in August 2013 and reviewed the implementation and effectiveness of the policy annually. To identify suitably qualified candidates to become Board members, it should be based on a number of diverse aspects, including Board members with different background, skills, regional and industry experience, gender and other qualities, that are in balanced and complementary with each other, creating synergy, and enabling the Board to function effectively as a whole.
- All members currently in the Board are male. The Company will appoint at least one female director no later than 31 December 2024 with reference to the “Board Diversity Policy”. The Human Resources Department of the Company is working on the numerical targets, timeline and necessary measures to achieve the gender diversity on the Board as well as our workforce.

As of 31 December 2021



Type of meeting	Number of meetings held in 2021
Annual General Meeting	1
General Meeting	1
Board Meeting	8
Executive Committee Meeting	24
Audit Committee Meeting	2
Risk Management Committee Meeting	2
Remuneration and Nomination Committee Meeting	3

Governance Framework



Legal compliance

We further promote corporate legal governance with a focus on our responsibility of rule of law development, the optimization of compliance and governance system for modern enterprises and the improvement of operational compliance management. We put emphasis on following the right direction in incorporating constitution study into the duties of the primary responsible person performed by the principal responsible person to promote rule of law, so that rule of law awareness becomes the major driving force of corporate development.

Optimizing the top-level design

- Optimized the top-level design for rule of law development and promulgated the “Implementation Plan for Rule of Law Development in the ‘14th Five-Year Plan’ Period” to make arrangements for rule of law development during the “14th Five-Year Plan” period;
- Standardized system and process management by revising more than 153 sets of systems in 2021 for better timeliness and applicability of corporate systems;
- Launched the legal information system generally.

Strengthening governance of legal entities

- Improved the merger and acquisition management of domestic new energy projects and the decision-making process for joint development projects;
- Streamlined the governance workflow for overseas legal entities to ensure compliant and efficient operations.

Adhering to operational compliance

- Incorporated requirements of compliance management into specific compliance systems and business processes of respective business areas;
- Refined the compliance management for statutory information disclosure of listed companies and made statutory information disclosures in a timely and accurate manner according to laws;
- Pushed forward specific compliance evaluation for respective units to urge rectification of their weaknesses.

Building a compliance culture

- Formulated and issued the “Plan for Rule of Law Promotion and Education for the 8th Five-Year Plan Period (2021-2025)” as a foundation for improving the execution of rule of law by cadres on all fronts;
- Published the “Notice on Organizing and Launching the 2021 Constitution Promotion Week” to promote the roll-out of the campaign to raise legal literacy;
- Adopted new forms of propaganda, such as short films, legal seminars, knowledge contests and diversified campaigns on rule of law, to promote the spirit of the constitution.

Case

Wuhu Power Plant promoted the spirit and awareness of the constitution

To prepare for the 8th National Constitution Day and the 4th National Constitution Publicity Week, Wuhu Power Plant set up display boards under the theme of “Constitution Publicity Week” to share knowledge on the constitution with a rich variety of pictures and text on the campaign website and WeChat groups in 2021. Meanwhile, with a focus on constitution promotion, it highlighted provisions about throwing objects from height and acts of heroism in the Civil Code. Through these, it practically incorporated knowledge of the constitution and rule of law into employees’ daily work and lives, thereby creating a strong cultural ambience that “promotes the spirit of the constitution and upholds the authority of the constitution”.



Risk Management and Control

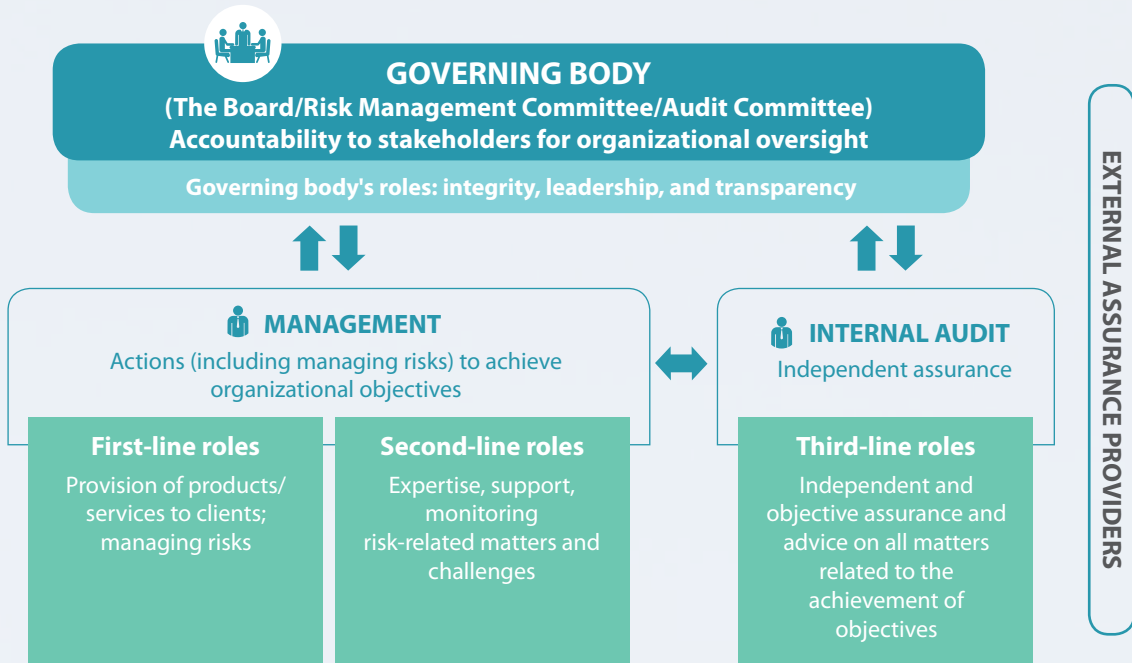
The Board plays a leading role in building a “Prudent, Progressive and Responsible” risk management culture with a view to ensuring the high-quality and sustainable development of the Group.

The Risk Management Committee is delegated by the Board with responsibilities to oversee the Group’s overall risk management framework and to advise the Board on the Group’s risk-related issues. The Risk Management Committee is also responsible for approving the Group’s risk management policies and assessing the effectiveness of the Group’s risk controls. The details of its terms of reference have been posted on the websites of the Company and the Hong Kong Stock Exchange.

The Risk Management Committee has identified a comprehensive risk indicator system related to the Group’s operations by conducting regular research. Based on the standards regarding the risk management framework of the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”, including its standards being updated on an ongoing basis) and the latest ISO31000 Risk Management Guidelines for internal control and risk management, the Group has established a risk management system framework closely following the “Three Lines Model” published and updated by the Institute of Internal Auditors (the “IIA”) in July 2020.

An important feature of the updated new “Three Lines Model” is the shift of the emphasis from value protection and risk reduction to value creation and contribution to the achievement of strategic objectives. This perspective indicates a more proactive role for risk management in identifying opportunities in emerging risks to be seized and exploited for potential future growth and for business decision-making of the Group. The Board believes the updated risk management system will better facilitate the Group’s strategic development goals.





- KEY**
- ↑ Accountability, reporting
 - ↓ Appointment, direction, resources, oversight
 - ↔ Alignment, communication, coordination, collaboration

Source: The IIA's Three Lines Model — An update of the Three Lines of Defense (July 2020)

The Three Lines Model is more principle-based with greater focus on the importance and role of governance and clarity of responsibilities with its functions being well-supported by three components

Risk Management and Control

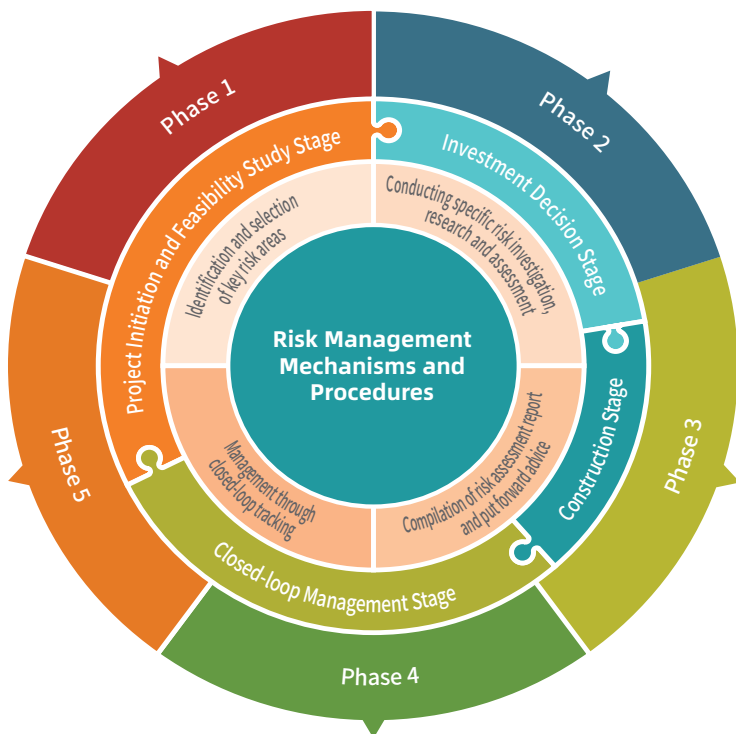
We have established and improved a risk management leadership system under the direct leadership of the Board (as the key responsible body). The Chairman of the Board is directly in charge of the risk management department (audit and internal control), and thereby comprehensively enhances the influence of the risk management system and improves the timely reporting mechanism.

The management assumes full command and is responsible for overseeing major risk checkpoints and core actions. Relevant departments then co-organized and followed up on specific risks and commenced their efforts in major risks prevention and elimination, which are updated on a monthly basis by reviewing various risk management ledgers. The major risks prevention and elimination targets are included in the letters of responsibilities for the annual goals of each department, with an aim to ensure the Company's risks are controllable and under control in general.

Our risk management mechanisms and procedures



Diagram of Risk Management Mechanisms and Procedures



Phase 1	Formulating risk management policies, strategies and risk assessment standards
Phase 2	Comprehensively collecting first-hand information for risk management and risk identification
Phase 3	Conducting risk assessment and establishing comprehensive risk management ledgers
Phase 4	Following up the risk controls as well as tracking and updating the risk management ledgers on a quarterly basis
Phase 5	Risk reporting and monitoring

Major risks identification

Changes in environmental policies	<p>The government successively promulgated a series of policies in relation to carbon targets and carbon emissions, resulting in higher requirements on coal-fired power generation companies in terms of efficient and clean operation as well as the treatment of exhaust gas and wastewater, which may in turn increase the cost of the Company regarding project investment</p>
Extreme weather disasters	<p>In 2021, we faced natural disasters such as wind hails, typhoons, floods and earthquakes, which brought challenges to ensuring personnel safety, stable operation of power generating units and reliable power supply</p>
Fluctuation in fuel costs	<p>Coal prices skyrocketed and hit record highs repeatedly during the second half of last year. Profitability of individual coal-fired power enterprises is limited under the impact of high coal price and regional power tariffs</p>
Regular pandemic containment	<p>The global pandemic control situation remains critical, while prevention of imported cases and regular pandemic containment continue to be the focus of our related control efforts. Apart from the risk of infection of COVID-19, the efforts to be put in implementation of the containing measures would also affect the production and operation</p>
Major responsive measures	<ul style="list-style-type: none"> ● Promote energy development and transition of the Group and strictly select projects with higher profitability ● Strengthen the communication with the relevant government authorities, keep abreast of the development trend of policies and study their details intensively ● Learn from previous experience and track meteorological data closely to plan in advance for and implement risk response measures against extreme weather proactively ● Carry out special practical drill exercises to strengthen employees' risk aversion ability ● Ensure stable coal supply and enhance bargaining power ● Develop resources for integrated energy projects and accelerate the formation of large-scale new energy bases ● Put stepped-up marketing efforts in electricity sales to absorb quality users ● Strengthen implementation of regular pandemic containment measures in all units and organize vaccination of employees in a timely manner ● Leverage the technology monitoring platform to provide remote technological support, thereby facilitating steady operation and production of projects

Shareholder engagement

We strictly implement the requirements under the Hong Kong Companies Ordinance and the Listing Rules of the Hong Kong Stock Exchange. We also maintain regular contact with investors through general meetings and roadshows. In 2021, we kept communication with investors frequently and the efforts devoted to investor relations were 3 to 4 times of that in the previous years.

2021

Offline roadshows in regions such as Beijing, Shenzhen and Guangzhou, and online roadshows through videoconferencing and teleconferencing

130 sessions

Number of investment institutions met

Over **550**

Investment banks, brokers-researchers and fund managers met

approximately **600**

Organizing investor roadshows

- Arranged roadshows for interim results announcements, annual results announcements and other matters, and met with various local and overseas investment institutions to fully promote the investment value of the Company with an aim to gain the full support from the capital market.

Expanding media channels

- Increased news submission to Hong Kong and overseas media outlets, with more than 50 pieces of corporate news shared by various media for nearly 700 times and covered by key financial media such as Bloomberg, ET Net and Hong Kong Economic Times;
- Published over 150 advertorials through the official accounts on domestic and overseas financial platforms, namely 10jqka.com.cn and Futu Securities. These articles had approximately 5 million views in total and served as an enhanced promotion tool that better suited the user scenario of investors.



More effective investor communication

- Received investor research teams and engaged with domestic and overseas investors at meetings;
- Answered and replied to investors' calls and emails and placed emphasis on maintaining the relationship with all shareholders;
- Convened the annual general meeting in the form of videoconferencing, which allowed shareholders to attend in person in Hong Kong or join by watching the live webcast;
- Arranged press conferences for results announcements regularly to enable direct communication between the management and investors;
- Held regular results roadshows and special roadshows to gain confidence and support from the capital market.



Meeting with investors

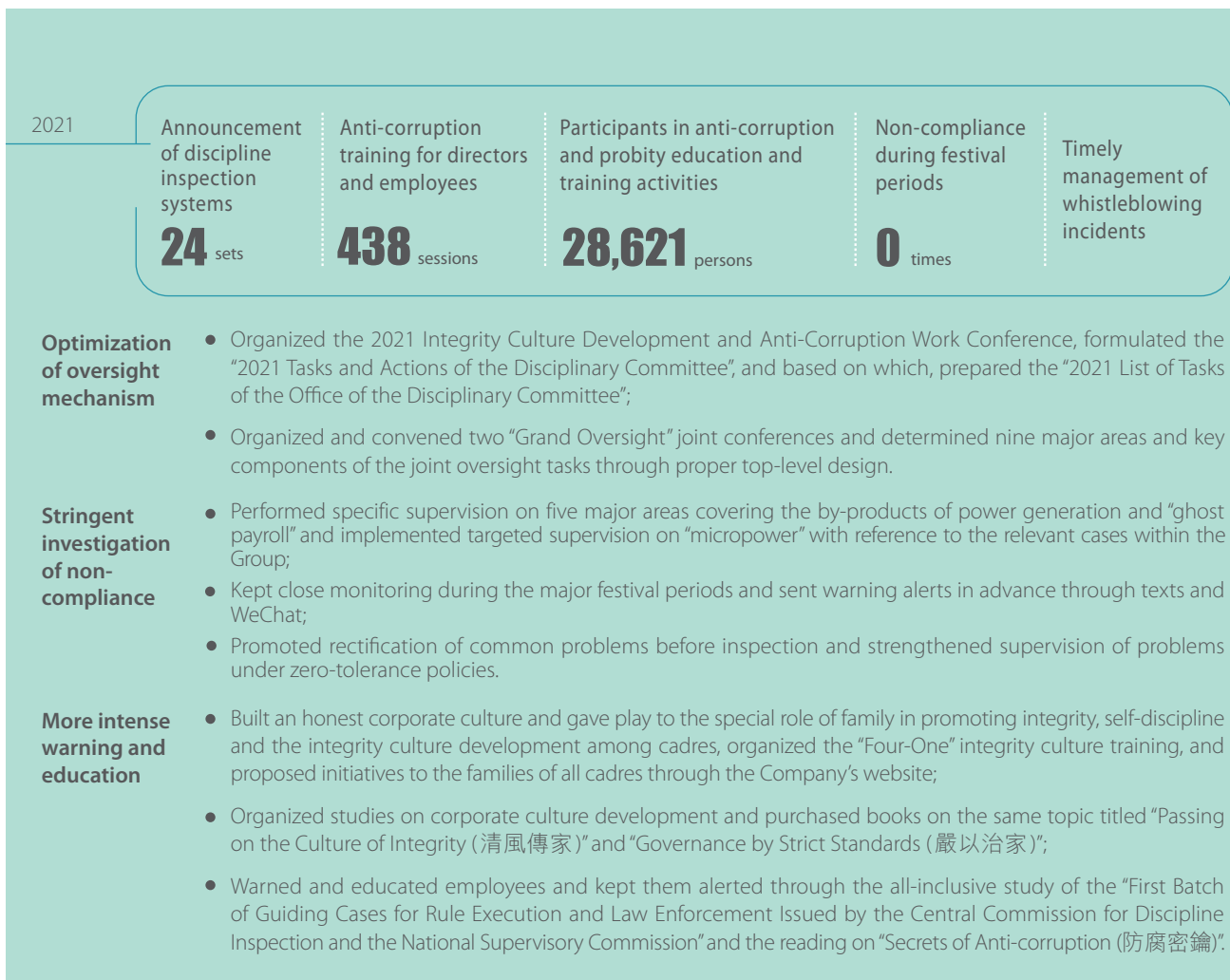


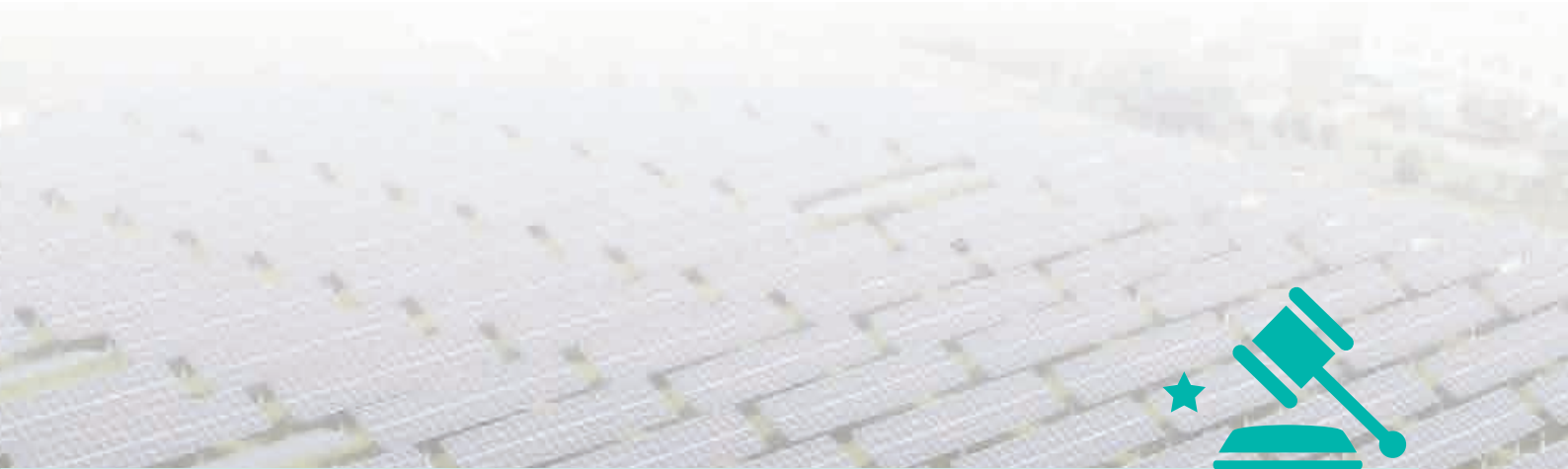
Whistleblowing Policy and Anti-corruption

We are in strict compliance with laws and regulations regarding corruption and bribery prevention, including the Company Law of the PRC, the Anti-Money Laundering Law of the PRC and the Anti-Unfair Competition Law of the PRC. Adopting a holistic approach for building the “Three No’s” mechanism, we have developed the accountability mechanism where no one dares to corrupt, the prevention mechanism where no one can corrupt, and the protection mechanism where no one wants to corrupt, thereby striving for exhibiting the culture of integrity in the workplace.

The Board has also approved the implementation of the “Whistleblowing Policy” in April 2012, which is applicable to employees and those who deal with the Group (e.g. customers and suppliers) for raising concerns about any misconducts in relation to the Group in a secure and confidential manner to the Internal Audit Department, which will then directly report the same to the Audit Committee.

The Company has formulated a series of anti-corruption policies since 2005 which are in compliance with the prevailing anti-corruption laws and regulations where our business operations and units are located. Anti-corruption seminars are organized on a regular basis each year to educate our management and staff at all levels of the relevant laws and regulations and the measures the Company adopted to fight against corruption so as to foster our corporate culture of honesty and integrity.





Case “Immersive” warning and education before festivals

In September 2021, Dabieshan Power Plant organized the first court observation for party cadres and representatives from key positions in the corruption trial against Mr. Wan, a cadre member of the Macheng Public Security Bureau. This “immersive” learning experience served as a warning lesson on anti-corruption before festivals. During the trial, employees of Dabieshan Power Plant were stunned and shocked by sets of dreadful data and series of transactions that allowed Wan to abuse his power for personal gains. Apart from the court observation, Dabieshan Power Plant also educated its employees before festivals by preparing and distributing warning and education materials before festivals, as well as arranging studies and alerts for party cadres and staff at key positions.

“Take the case as a warning, keep the law in mind, focus on spiritual pursuit, resolve the fundamental issues around outlook on the world, life and values, fulfil responsibilities of the position with diligence, and become the benchmark of honesty and accountability.”

——An employee of Dabieshan Power Plant

Case Pre-festival anti-corruption reminder

Anti-corruption reminders in form of announcements and text messages were distributed to cadres and employees by the Office of the Disciplinary Committee of China Power during festivals and holidays to remind them to uphold anti-corruption practices during holidays, so as to build up a deeply-rooted honest corporate culture among the employees.



Highlights of the Year

Accolades for performance of social responsibilities during the year



National Civilization Unit

Maintained the title of "National Civilization Unit" after being reviewed by the Central Guidance Commission on Building Spiritual Civilization



Excellent ESG Enterprise of the Year

Honored as "Excellent ESG Enterprise of 2020-2021" by Hong Kong Economic Times, a major financial newspaper in Hong Kong



Special Mention Corporate Governance Award

Won the prize of "Special Mention Corporate Governance" by HKICPA under the H-share Companies and Other Mainland Enterprises Category at the "Best Corporate Governance and ESG Awards 2021"



Social Charity Award

Presented with the "Social Charity Award" at the 3rd "Belt and Road" Hundred-Country Journey Short Video Competition



Enterprise with Outstanding Low-Carbon and Sustainability Practices

Received the "Enterprise with Outstanding Low-Carbon and Sustainability Practices Award" at the 9th Global Enterprise Sustainable Competitiveness Summit Forum



Outstanding Enterprise in Responsible Information Disclosure

Won the 2021 China Power Industry Corporation "Outstanding Enterprise in Responsible Information Disclosure" Award



5A Power Enterprise with Good Standardization Practices

Changshu Power Plant was accredited the honorary title of “5A Power Enterprise with Good Standardization Practices” by China Electricity Council



CGMA Best Practice of Management Accounting Award

Suzhou Shared Service Company received the award of “CGMA Best Practice of Management Accounting 2021” at the CGMA Annual Awards and CFO Summit Forum 2021 organized by The Chartered Institute of Management Accountants



2021 China Electric Power Quality Project Award

Jingmen Power Station’s “Jingmen High-tech Zone Natural Gas Co-generation Energy Supply Project” won the “2021 China Electric Power Quality Project Award” from China Electric Power Construction Association



Management and Technology Innovation Achievement Award

CP Guorui was awarded the First Prize of “2021 Power Industry’s Plant Management and Technology Innovation Achievement Award” by China Association of Plant Engineering for its “Operation Management System for Sales of Power Generation By-products”



Chemical Technical Innovation Achievement Award

CP Hua Chuang won the “First Prize for Technical Innovation” at the 11th Power Industry Chemical Engineering Technical Exchange Forum held in Ningbo, Zhejiang Province, the PRC



National Energy Digitalization Demonstration Project Award

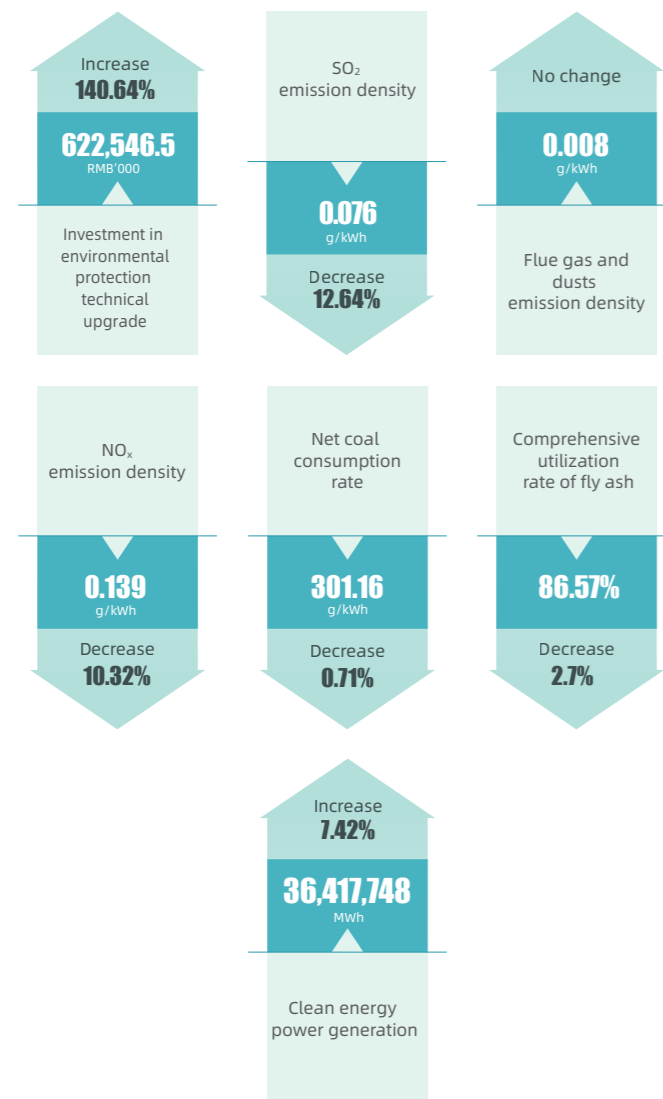
CP Zhihui’s “USTB Industrial Park Integrated Intelligent Energy Project” won the “National Energy Digitalization Demonstration Project Award” at the “2021 National Energy Internet Conference”

Key Performance in 2021

Environmental Performance

In 2021, in order to realize the sustainable development of clean energy and support the transformation and upgrade of the energy structure, we put in an all-out effort in developing the principal business of clean energy and continued to increase the investment in environmental protection technical upgrade.

Year-on-year Changes

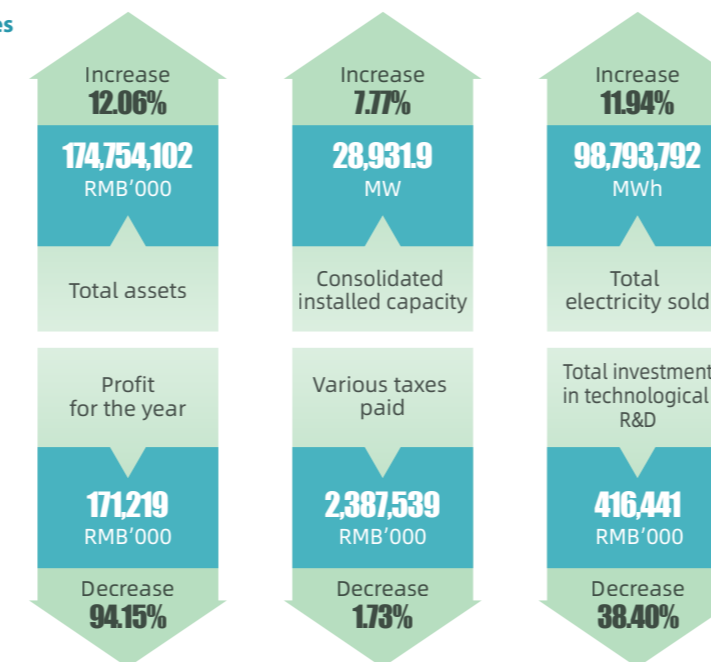


Equivalent to reduction of CO₂ emission of 29,006,736 tonnes

Economic Performance

In 2021, against the backdrop of attaining the goal of "Carbon Emission Peak and Carbon Neutrality", we seized the opportunity to build a new power system which mainly composed of clean energy and realized positive growth in total assets, consolidated installed capacity and total electricity sold.

Year-on-year Changes



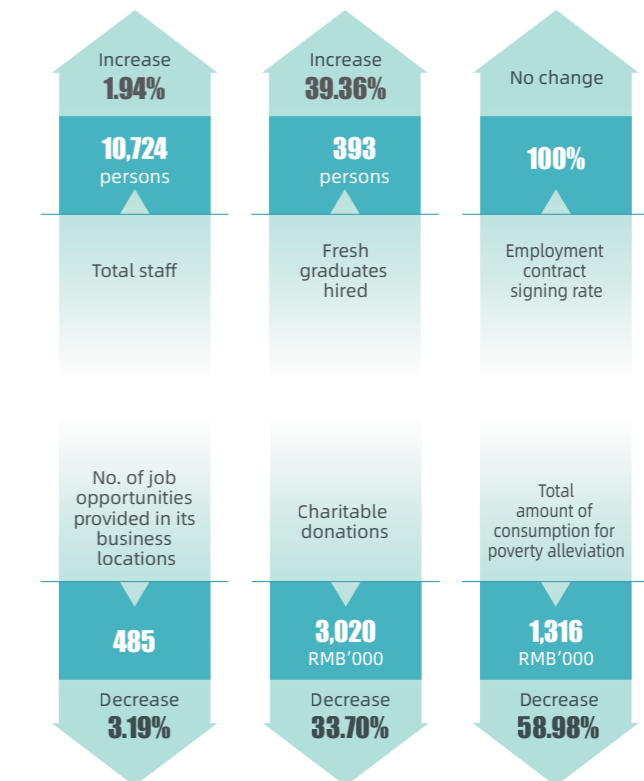
Indicators	2017	2018	2019	2020	2021
Revenue (RMB'000)	19,966,811	23,175,626	27,763,287	28,427,721	34,734,288
Income tax paid (RMB'000)	466,947	528,533	629,883	551,315	1,212,800
Profit for the year (RMB'000)	1,280,707	1,637,185	2,201,150	2,925,551	171,219
Profit/(Loss) attributable to equity holders (RMB'000)	795,272	1,098,355	1,284,381	1,708,305	(515,693)
• Total electricity sold (MWh)	64,053,714	70,964,796	83,558,993	88,255,525	98,793,792

• Total electricity sold covered the wholly-owned or controlled power plants of the Group

Social Performance

In 2021, we actively explored innovative cooperative development models around the goals of rural revitalization, modernization of governance capabilities and shared prosperity in this era, thereby bringing value to the country and the nation of this generation.

Year-on-year Changes



Major Events in 2021



01 6 January

Changshu Power Plant was accredited the honorary title of “5A Power Enterprise with Good Standardization Practices”

Changshu Power Plant was accredited the honorary title of “5A Power Enterprise with Good Standardization Practices” by China Electricity Council. The award was promoted by the National Energy Administration of China in recognition of power enterprises for their comprehensive management capability in improving work efficiency, saving production costs, and supporting realization of corporate strategic goals through effective operations and standardized systems. The assessment covered the fields of power generation, power supply, power construction, power research and development, etc.

02 8 March

Tsing Yi 140kW Rooftop Photovoltaic Power Project in Hong Kong was officially put into commercial operation

Tsing Yi 140kW Rooftop Photovoltaic Power Project of China Power in Hong Kong was officially put into commercial operation. The project is the first energy project developed by China Power in Hong Kong, marking the successful launch of the first clean energy development project of China Power in Hong Kong.

03 9 April

Wu Ling Power’s “Integrated Intelligent Energy Demonstration Project for Office Park” was put into operation

Wu Ling Power’s “Integrated Intelligent Energy Demonstration Project for Office Park” located in Changsha City was officially put into operation, which is the first full-chain zero-carbon integrated intelligent energy demonstration project in Hunan Province, the PRC, covering power source, grid, load, storage and utilization. The Project deeply explores the potential of shallow geothermal energy, and innovatively builds prefabricated energy modules to realize zero-carbon energy supply and enhance the level of resources utilization.

04 5 June

China Power issued the inaugural “2020 China Power Environmental Protection White Paper”

China Power issued the inaugural “2020 China Power Environmental Protection White Paper”, which summarized its environmental management practices during the “13th Five-Year” period in all aspects, particularly those in 2020, and highlighted the establishment of its comprehensive environmental management system. To practice the State’s Chairman Mr. Xi Jinping’s Ecological and Environmental Protection Concepts in the New Era, China Power continued to take actions to prevent and control atmospheric pollution, making outstanding contributions to the Blue Sky, Green Water and Clean Soil Protection Campaign.

06 29 July

The integrated intelligent energy project in Xiaogang Village was awarded the “Excellent Demonstration Project of Integrated Intelligent Energy”

Xiaogang Village Project was awarded the “Excellent Demonstration Project of Integrated Intelligent Energy” at the 2021 Integrated Intelligent Energy Conference held in Xiong’an, Hebei Province, the PRC. The project was recognized as a typical demonstration project in promoting integrated intelligent energy and driving energy revolution and digital development in rural areas through the provision of clean energy, smart infrastructures and green industries, and hence building an eco-friendly, convenient and healthy village.

08 30 September

Formation of the professional geothermal power development company

To promote the leapfrog clean and low-carbon development of the Company, China Power seized the strategic opportunities arising from the development of geothermal energy to embark on the formation of the professional geothermal power development company (“Xinyuan Yunneng”), which is a company that focuses on high-quality development and utilization of geothermal energy and facilitates the improvement of the technologies and systems for exploitation and utilization of geothermal energy, thereby promoting geothermal energy to become another key and renewable energy among China’s energy consumption.

05 28–29 June

China Power completed the first parity green certificate transaction in China

Liaoning Chaoyang 500MW Photovoltaic Grid Parity Demonstration Project of China Power provided 60 parity green certificates during the “International Dialog on Energy Reform 2021” and completed the first parity green certificate transaction in China. While satisfying the user demands for green energy, parity green certificate trading further induces green consumption across the country and encourages the consumption and use of clean energy.

07 7 August

China Power expanded its presence in “Green Power Transportation” business successfully

China Power acquired 36% of the equity interest in Qiyuanxin Power, marking the success of China Power in expanding its presence in “Green Power Transportation” business, which is of great significance to the promotion of the Group’s transition towards integrated intelligent energy and sustainable green development.

09 23 October

China Power officially announced its new strategy

China Power organized the “Building World-class Low-carbon Enterprise Development Forum cum New Strategy Press Conference of China Power” in Beijing and Hong Kong, and officially announced its new development strategy.

10 8 November

Dabieshan Power Plant’s online monitoring system for carbon emissions was officially put into operation

Dabieshan Power Plant’s online monitoring system for carbon emissions was officially put into operation. It is the first power generating unit equipped with online monitoring function for carbon emissions in Hubei Province. With the addition of carbon-emission monitoring modules to the existing intelligent operation system of No. 4 power generating unit, it is expected to enhance the preciseness on carbon emission testing and measurement. Guiding the formulation of targeted carbon reduction measures based on real-time monitoring of carbon emission data, the system fundamentally safeguards the Group’s advantages in the carbon emission trading market.

12 26 November

China Power issued the first coal-fired power asset-backed securities in form of similar REITs products in China successfully

SPIC-China Power Energy Infrastructure Investment and Anhui’s Asset-backed Special Program (similar to REITs) (國家電投—中國電力能源基礎設施投資和皖資產支持專項計劃) (類REITs) was successfully issued and established on the Shanghai Stock Exchange. The product is the first domestic infrastructure REITs with coal-fired power assets as the underlying assets.

14 16 December

China Power achieved breakthrough in the development of marine energy

SPIC Shandong Peninsula South No. 3 Offshore Wind Power Project was connected to the power grid at full capacity for power generation. The project is the first offshore wind power project invested by China Power, marking a groundbreaking progress in the development of marine energy by the Company.

11 16 November

China Power was named one of the “Excellent ESG Enterprises of 2020–2021”

China Power was awarded the honor of “Excellent ESG Enterprises of 2020–2021” by Hong Kong Economic Times (香港經濟日報) in recognition of its achievements in respect of environmental, social and corporate governance (“ESG”) at the “ESG and Green Financial Forum cum Accreditation Ceremony 2021”. Among a total of 16 prize-winning enterprises, China Power was the only power generation enterprise.

13 6 December

The corporate governance of China Power was recognized by the HKICPA

At the “Best Corporate Governance and ESG Awards 2021” organized by the HKICPA, China Power won the Prize of “Special Mention Corporate Governance” under the H-share Companies and Other Mainland Enterprises Category. It affirmed the public recognition in Hong Kong for its performance in sustainability, transparency as well as corporate governance and operation.

15 27 December

The first energy storage and power station project of Xinyuan Smart Storage was connected to the power grid successfully

Haiyang Power Storage’s energy storage and power station of 101MW/202MWh, built by Xinyuan Smart Storage as one of the main contracted builders, was successfully connected to the power grid. It is the Group’s first successful on-grid large-scale shared energy storage and power station with a capacity exceeding 100MW.

Sustainability Governance

Governance Structure

Board's Statement

Conceptual Model

Communication on Responsibilities

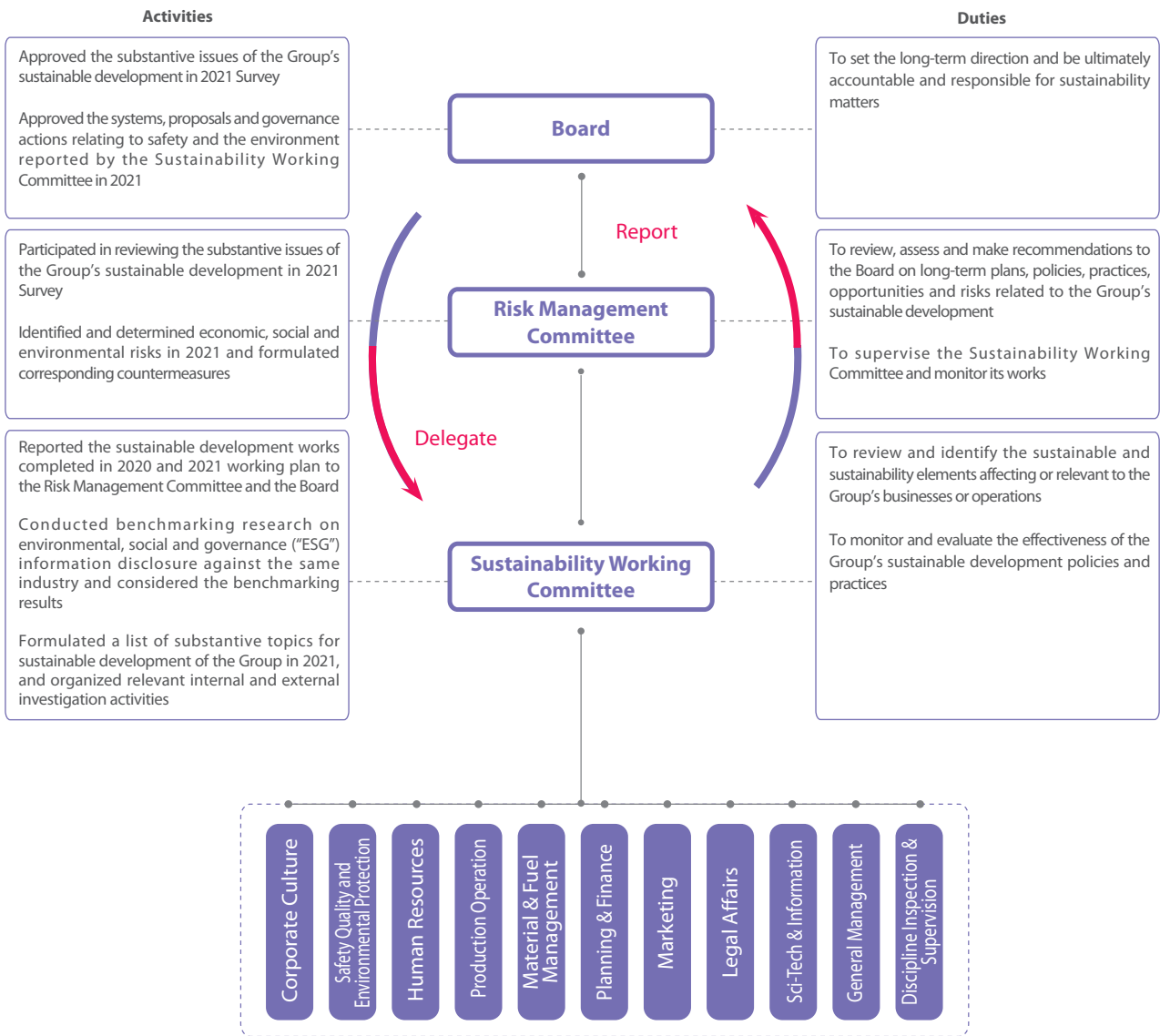
Topics Analysis





Governance Structure

We have established a comprehensive organizational structure for sustainable development, in which we counted on the Sustainability Working Committee to carry out sustainable development matters of the Group, and to report to the Risk Management Committee and the Board in a timely manner, thereby further promoting the Group's practices for sustainable development.



Composition

- Members of the Sustainability Working Committee are appointed by the Board, including but not limited to general managers or head of all businesses and functional departments of the Company
- The Chairman of the Sustainability Working Committee is a vice president of the Company, appointed by the Board

Working Mechanism

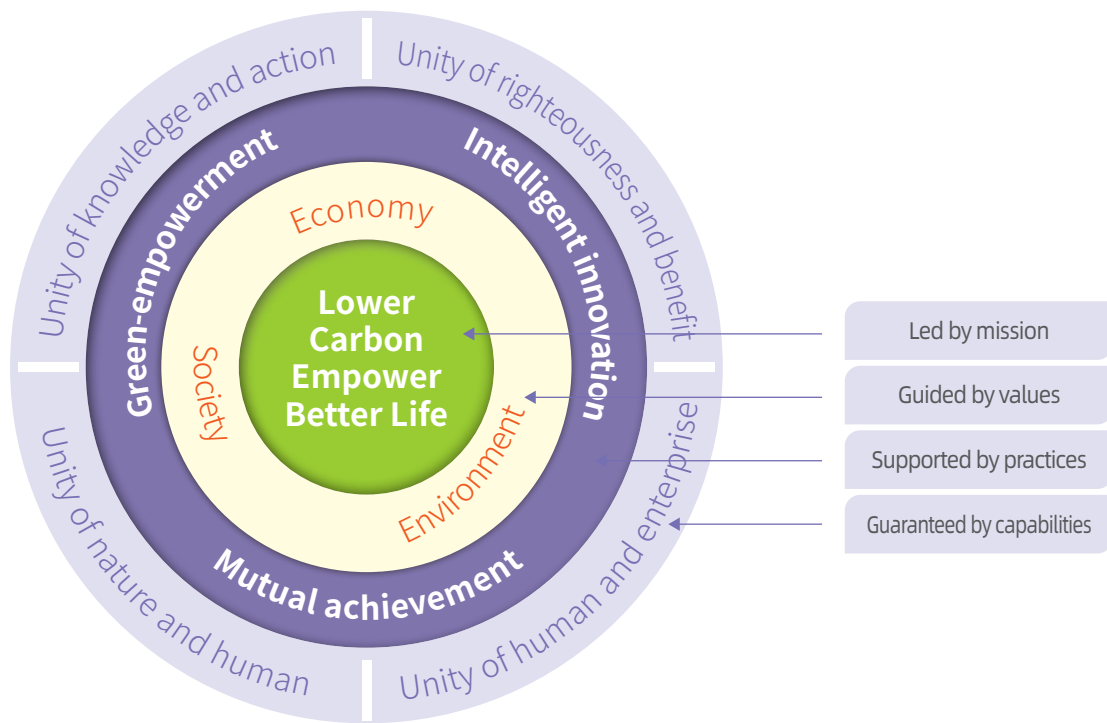
- The Sustainability Working Committee reports at least once to the Risk Management Committee each year. The number of times of reports and meetings are determined by its Chairman

Board's Statement

<p>Material ESG issues of the Group have been reviewed</p>	<p>A "top-down" approach is adopted for the ongoing identification, evaluation, management and supervision of ESG issues</p>	<p>ESG issues are incorporated into the Group's formulation of strategy</p>
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Conceptual Model

We are committed to the mission of "Lower Carbon Empower Better Life", insisting on the orientation of creating comprehensive values for the economy, society and environment. We adhered to the principles of "Green-empowerment, Intelligent Innovation and Mutual Achievement" to promote implementation of the Group's business, striving to achieve the development concept of "Unity of nature and human, Unity of righteousness and benefit, Unity of human and enterprise, Unity of knowledge and action", so as to become a world-class green and low-carbon energy provider.



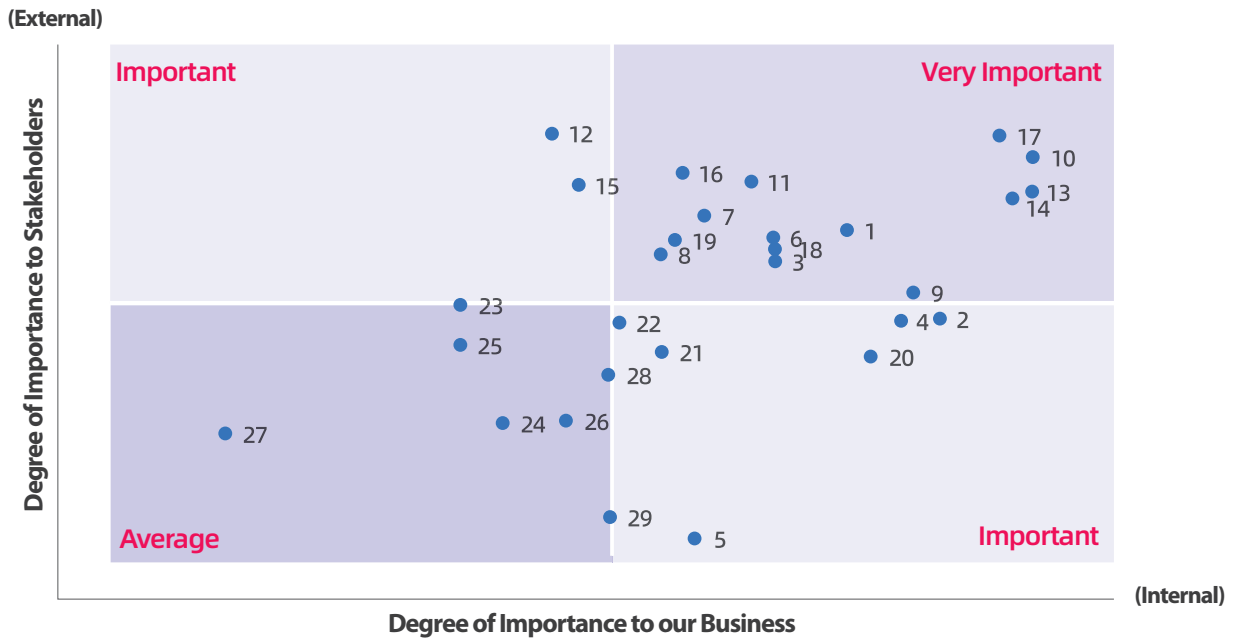
Communication on Responsibilities

Stakeholders Management

Stakeholders	Expectations and Requirements	Modes of Communication and Participation	Our Responses
 Regulatory authorities	<ul style="list-style-type: none"> Legal compliance Compliance in operations Paying taxes according to laws Energy conservation and emissions reduction Promoting employment 	<ul style="list-style-type: none"> Participating in relevant meetings Reporting on work done Information submission 	<ul style="list-style-type: none"> Accelerating the transformation of economic development Complying with laws and regulations Maintaining active communication and engagement with relevant regulatory authorities
 Investors	<ul style="list-style-type: none"> Increasing profitability Stable dividend distribution policy Increasing market value Reducing operating risks of the Company 	<ul style="list-style-type: none"> Press conference for results announcement Roadshow Reverse roadshow Investors conference General meeting Daily communication 	<ul style="list-style-type: none"> Communicating closely with investors and improving the timeliness of information disclosure Striving to enhance profitability of the Group Adopting market recommendations and improving management of the Group
 Employees	<ul style="list-style-type: none"> Protecting legitimate rights and interests of employees Ensuring occupational safety and health Providing reasonable remuneration and benefits Fostering fair career development opportunities Showing care for retired employees 	<ul style="list-style-type: none"> Staff congress meeting Staff forum Reasonable suggestion Openness of factory affairs Daily communication 	<ul style="list-style-type: none"> Signing and performing labor contracts according to laws and implementing democratic management Establishing occupational safety management system and strengthening prevention of occupational diseases of staff Establishing sound remuneration and benefits policy Providing systematic career planning and employee development training Paying visits to and providing services for retired employees
 Customers	<ul style="list-style-type: none"> Contract performance Quality assurance Service guarantee Mutual benefit and win-win result 	<ul style="list-style-type: none"> Sales and order-placing meetings Customer satisfaction survey 	<ul style="list-style-type: none"> Providing quality, efficient, safe and green energy products and services Keeping trade secret
 Suppliers	<ul style="list-style-type: none"> Long-term cooperation Meeting commitments Open, fair and just procurement Joint development Mutual benefit and win-win result 	<ul style="list-style-type: none"> Supplier meeting Transparency of bidding information Strategic cooperation Cooperation agreement 	<ul style="list-style-type: none"> Implementing open and transparent business principles and processes Standardizing management and performing contracts and agreements Implementing responsible procurement policy
 Creditors	<ul style="list-style-type: none"> Strong debt-paying ability Repaying principal and interest on time Mutual trust and cooperation 	<ul style="list-style-type: none"> Cooperation agreement Regular site visits 	<ul style="list-style-type: none"> Repaying loans as scheduled Strengthening communication and engagement
 Partners	<ul style="list-style-type: none"> Building harmonious, interactive and amicable relationship Achieving win-win result and mutual growth 	<ul style="list-style-type: none"> Exchange visits among senior management Strategic cooperation 	<ul style="list-style-type: none"> Broadening channels of communication and cooperation Strengthening communication and cooperation with stakeholders
 Peers	<ul style="list-style-type: none"> Strict compliance with policies and industry regulations Creating a healthy environment for competition Promoting the development of power industry 	<ul style="list-style-type: none"> Industry associations Seminars 	<ul style="list-style-type: none"> Ensuring strict compliance with industry policies and regulations Deepening power system reform and improving core competitiveness of the Company Strengthening industry communication and promoting industry development
 Community	<ul style="list-style-type: none"> Supporting local economic development Protecting the living environment of the community Building harmonious relationship with the community 	<ul style="list-style-type: none"> Collaboration and joint contribution Charitable activities Publicity activities 	<ul style="list-style-type: none"> Supporting economic development of the areas where we operate Organizing environmental protection and charitable activities Organizing community volunteer service activities

Topics Analysis

For this report, in the context of new trends and new strategies in 2021, we revised and adjusted the material topics of the Group, and conducted an online questionnaire thereof. In this survey, a total of 1,647 questionnaires were collected, mainly involving management and employees of the Company (internal aspects), and the government, partners, suppliers, regulators, investment institutions, CSR/ESG industry experts, shareholders and the general public (external aspects). According to the statistical results of the survey, the weight calculation method was ultimately adopted to determine the two-dimensional material ESG Topic Matrix.



No.	Topic	No.	Topic	No.	Topic
1	Serving for implementation of national strategies	11	Reduction of various types of emission	21	Supply chain risk management
2	Reform of State-owned enterprises	12	Conservation of energy and resources	22	Disaster relief
3	Strategic transformation	13	Development and utilization of clean energy	23	Protection of employees' rights and interests
4	Safeguarding shareholders' rights and interests	14	Technological renovation and innovation in relation to environmental protection	24	Career development of employees
5	International operation	15	Climate risk management	25	Occupational health and safety of employees
6	Corporate governance by law	16	Conservation of ecological environment	26	Caring for employees
7	Risk management	17	Green power transportation	27	Volunteer and charitable activities
8	Anti-corruption	18	Serving rural revitalization	28	Win-win cooperation
9	Intelligent innovation	19	Production safety	29	Building corporate culture
10	Low-carbon transformation	20	Responsible procurement		

Combating Climate Change

**Identifying and Managing
Climate-related Risks**

**Implementing the "Dual Carbon"
Targets Comprehensively**

**Best Endeavours to Ensure Safe
Energy Supply**





Identifying and Managing Climate-related Risks

The issue of climate change is a globally common challenge. Controlling and reducing carbon emissions has become the inevitable responsibility of enterprises. Since 2020, with reference to the recommendations made by the Task Force on Climate-Related Financial Disclosures (“TCFD”), we have responded to the impacts of climate change which are increasingly concerned about by investors. In 2021, in compliance with the Guidance on Climate Disclosures published by the Hong Kong Stock Exchange, we have further enriched and adjusted the standards on climate-related information disclosure as a response to the regulatory requirements.

2020

- Making disclosure on the physical risks and transition risks of the Group and its response strategies

2021

- Making disclosure on the governance procedures carried out by the Group for climate change
- Identifying the climate scenarios of the Group
- Making disclosure on the climate action plan checklist and report on the implementation progress of the plan
- Making disclosure on the procedures of identification and management of climate risks, the financial impacts and response strategies of the Group

Governance Procedures

Governance structure for climate change

We adopt the sustainable development governance structure as the overall structure for climate change. The governance structure is responsible for devising the goal, path and other aspects for climate change, promoting the identification, assessment and analysis of risks in relation to climate change by the Group, and guiding the specific practices made by the Group in response to climate change as a whole.

Governance procedures for climate change

Climate-related issues are directly managed by the Sustainability Working Committee, reviewed and assessed by the Risk Management Committee and finally reported to the Board for review and making decisions. The governance procedures mainly include, among others, identification of climate-related issues, identification and analysis of the areas involving climate risks and recommended action plans in response to the climate-related issues.

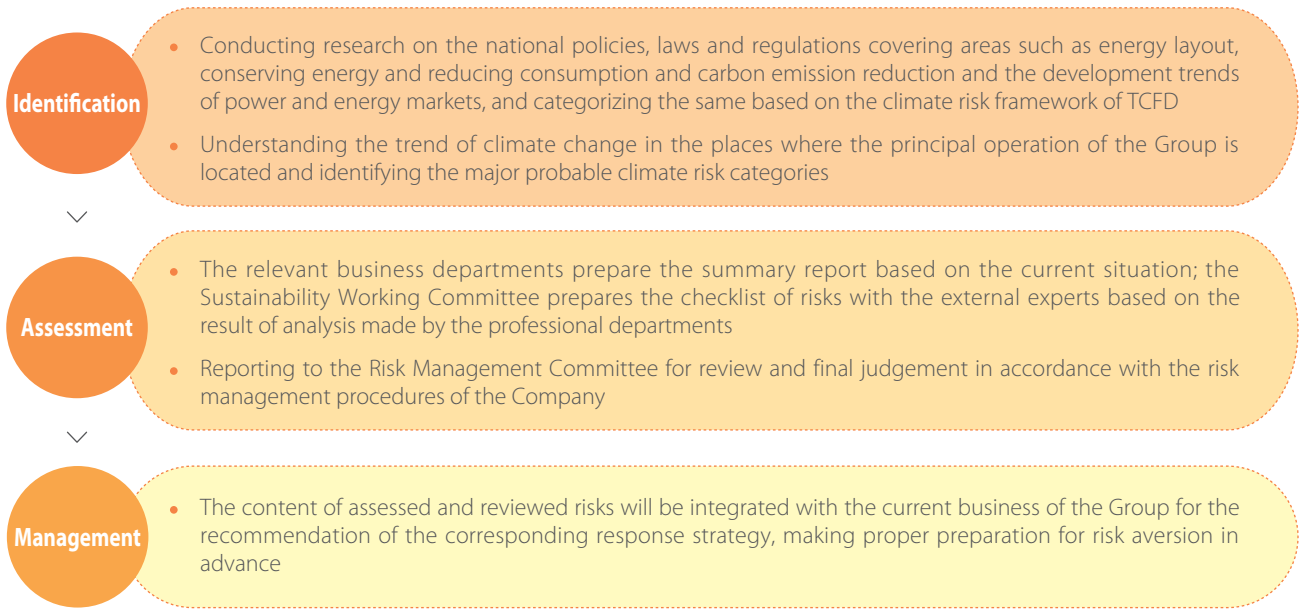
Specific practices: formulating and reviewing the goals of the Group in response to climate change by the Board

In 2021, China Power formulated and announced the Group’s new strategy outline. The Board and the Sustainability Working Committee participated in the review and confirmed the strategic goals and paths of the Group in its new development phase, specified the phased objectives regarding the future response to climate change and the implementation of the “dual carbon” goals for the three phases up to 2025, 2030 and 2035, as well as other working goals for key areas, thereby setting the goal and direction for the green practices of the Group in the future.

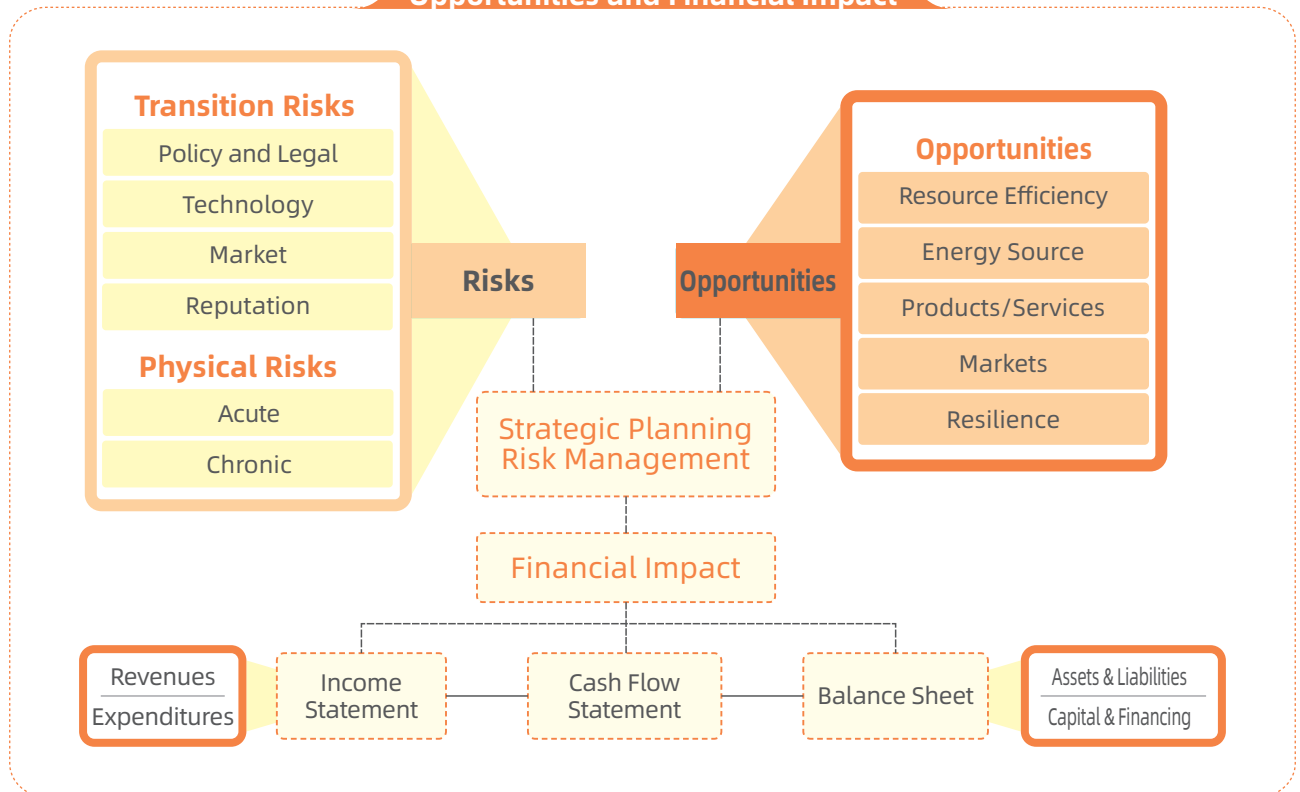
Understanding climate risks and their impacts

Procedures of Climate Risk Management

We have complied with the disclosure procedures set out in the “Guidance on Climate Disclosures” issued by the Hong Kong Stock Exchange to determine the procedures of climate risk management of the Group. In addition, we have identified and analyzed the climate risks in line with the framework of “Climate-related Risks, Opportunities and Financial Impact” put forward by the TCFD, based on which we built the knowledge on the overall impacts of climate risks on the operation of the Group.



Climate-related Risks, Opportunities and Financial Impact



Analysis on climate scenarios

Considering the future changes in energy development and climate under different scenarios, we analyze the risks and impacts of such changes on the development of China's power industry, and thereby provide the basis for devising the strategy of sustainability and path of green transformation of the Group. We take reference of the modes of climate change under the following two scenarios in general.

First scenario: If the green transformation and the control on carbon emission of mankind are under control effectively, under which the world can manage to control its average temperature and "keep the rise in mean global temperature to well below 2 °C above pre-industrial levels, and preferably strive to limit the increase to 1.5 °C" as proposed by the Paris Climate Accords, in such case, we take reference of the Representative Concentration Pathways (RCP) 4.5 required by the Intergovernmental Panel on Climate Change (IPCC) and the net-zero emissions by 2050 scenario (NZE) proposed by the International Energy Agency (IEA), and conduct research on the future trend of the change in temperature and energy demand based on this scenario. Second scenario: Despite the rapid development of the economy and society currently, the efforts put in by human to control climate change is insufficient, which leads to the increasing mean global temperature above the critical value of 1.5 °C in the event of extreme conditions, in such case, we make analysis on the future trends of climate change and changes in energy, power and fuels according to the RCP8.5 required by the IPCC and the Stated Policies Scenario (STEPS) proposed by the IEA.



Scenario

Mean global temperature will increase by 3°C to 4°C before 2100

According to the RCP8.5 required by the IPCC and the Stated Policies Scenario (STEPS) proposed by the IEA

Trend Analysis

- Increase in mean global surface temperature will exceed 1.5°C in around 2030¹
- The sea level will rise at an annual rate of 8 to 16 mm/year between 2081 to 2100²
- In 2030, the power demand by India will be higher than that of other regions. Apart from that, the demand growth of South East Asia and Africa will be the most significant. The absolute growth in power demand of China will be the highest, accounting for more than 40% of the global growth in 2030
- Global power demand growth will be higher than that of all other fuels. In 2030, power consumption will account for 21% of the overall global energy consumption³

Mean global temperature will increase by 1.5 °C to 2 °C before 2100

According to the RCP4.5 required by the IPCC and the net-zero emissions by 2050 scenario (NZE) proposed by the IEA

- The increase in global temperature will be restricted to 1.5°C to avoid over-ceiling increase of temperature
- The global carbon dioxide emission relating to energy and arising from industrial processes will decrease by nearly 40% between 2020 and 2030
- In 2050, coal demand will decrease to 0.6 billion tonnes of coal equivalent, representing a decrease of 90%
- By 2030, solar and photovoltaic power and wind power will become the principal power source of the world, which together will provide nearly 70% of global total power generation in 2050⁴

¹ World Energy Outlook 2021 of the IEA

² The Fifth Assessment Report of the IPCC

³ World Energy Outlook 2020 of the IEA

⁴ Net-Zero Emissions by 2050 of the IEA

Climate risks, financial impact and our response

By formulating the above scenarios and analyzing the impact of each scenario, we identified a series of climate-related risks and opportunities associated with the assets and services in the major markets arising from the changes in these scenarios. At the same time, taking reference of the framework relating to the climate risks of the TCFD, we analyzed and illustrated the impacts of these risks and opportunities on the Group specifically and proposed the corresponding response measures.

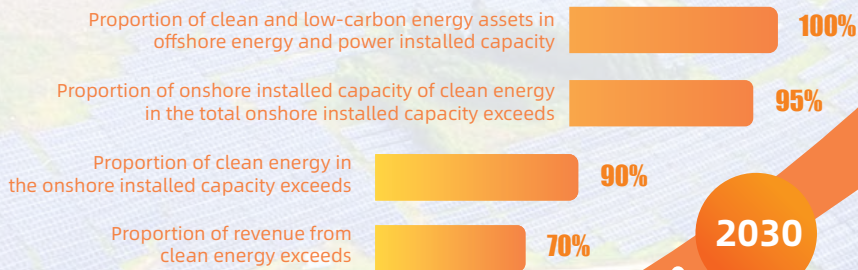
Type of climate risks	Descriptions of risks/opportunities	Classification of financial impact	Impacts	Responses
Transition Risks	Policy and Legal	<ul style="list-style-type: none"> Revenues Expenditures Assets 	<ul style="list-style-type: none"> Impacts on business layout: Under the requirement of these policies and action plans, the overall development path of the Group needs to be optimized, while various subordinated units shall change the development mode in compliance with the requirements of the local policies Increase in operating costs: There are stricter policy requirements for climate regulation, resulting in higher prices for gas emissions, which will gradually increase the compliance costs in terms of the relevant resource inputs of enterprises Increase in management costs: Under the transition of the mode of production and development, the Group shall increase management inputs on its equipment and other areas 	<ul style="list-style-type: none"> Formulating the Outline of the Group's New Development Strategy in the new phase, specifying the development goals and paths and directing the implementation of the goals comprehensively Suspending the addition of any coal-fired power assets and promoting the transition towards clean development and upgrade for existing coal-fired power assets Strengthening the cooperation with local governments to develop new energy bases Expanding business presence in emerging green energy industries, promoting the development of integrated energy, hydrogen energy, energy storage and green power transportation and exploring "new business segments"
	Technology	<ul style="list-style-type: none"> Revenues Expenditures Assets 	<ul style="list-style-type: none"> Promote asset appreciation: The R&D of innovative technology and the addition of relevant patents will enrich the intangible assets of enterprises, while technological breakthroughs will help prolong the useful lives of the Group's fixed assets Increase in cost of technology R&D: Increase in the R&D costs of technologies in the emerging segments such as technological upgrade and breakthroughs in environmental protection, new energy consumption technology and energy storage technology Increase in the costs of nurturing professional talents: Talents in technological reform constitute the foundation of enterprises; therefore, the Group needs to establish and develop professional technological talent teams to strive their best for the development of the new business areas 	<ul style="list-style-type: none"> Strengthening the industry-academia-research cooperation in R&D and establishing a cooperative research model of resource sharing and technology sharing with enterprises; developing topic research and joint talent training relationship with colleges; giving play to the advantages of other industry resources and planning layout of technology input on a reasonable basis Establishing platforms for special areas and technology exploration, entering into cooperation with the leading enterprises in the related areas by way of joint capital contribution and hence establishing professional enterprises to facilitate in-depth development of the special areas by exploring the relevant technologies and markets
	Market	<ul style="list-style-type: none"> Expenditures Assets 	<ul style="list-style-type: none"> Increase in research inputs: Increase in costs of research and studies in relation to policies, rules and procedures for trading in the spot market and carbon market Increase in transaction costs: Increase in the cost of fulfilling contracts for market transactions of the production business 	<ul style="list-style-type: none"> Increasing training on the contents covering the latest trading rules and environmental protection issues such as carbon market to enhance employees' professional management capabilities and awareness Establishing standardized carbon trading contract performance procedures and strengthening process control

Type of climate risks	Descriptions of risks/opportunities	Classification of financial impact	Impacts	Responses
Transition Risks (Cont'd)	Reputation	<ul style="list-style-type: none"> Capital Financing 	<ul style="list-style-type: none"> Impacts on reputation in the capital market: If negative public opinions arise when the environmental protection measures of enterprises is under market regulation, their performance in the capital market will be affected; otherwise, if enterprises can manage to deliver positive image under regulation, their performance perceived by the investors will be enhanced Impacts of public opinions on corporate image: No matter the performance of enterprises is good or poor, public opinions will affect their image built in terms of corporate responsibilities as well as social credibility at the same time, which will reduce or increase the costs incurred in respect of public opinion management accordingly 	<ul style="list-style-type: none"> Strengthening investor communication and management of investor relationship, protecting investors' right to know about the status-quo of enterprises and enhancing the timeliness of information disclosures Strengthening communication with the community and promoting the understanding of the public on enterprises by running campaigns of open-days in various forms
	Acute	<ul style="list-style-type: none"> Assets Liabilities Expenditures 	<ul style="list-style-type: none"> Asset impairment: Extreme weather can cause damage to power facilities, shorten useful lives of assets and may even result in serious loss of assets directly Increase in costs of operation and maintenance: Extreme weather events can cause damage to power generation facilities and increase the costs of maintenance and infrastructure construction Higher costs of supply chain management: Extreme weather can affect upstream fuel suppliers, resulting in increasing risks of supply chain Increase in staff subsidies: Under bitter cold or high temperature weather, the input of subsidies and condolences for on-site working staff may increase 	<ul style="list-style-type: none"> Strengthening climate risks identification and management, and based on which, relocating in advance those equipment, facilities and staff that could be affected by the extreme weather Strengthening emergency plans and emergency management to improve emergency response capabilities of the staff in the face of climate change emergencies Increasing input for staff care, adhering to giving top priority to safeguard employees' lives, health and safety and rendering our best care in routine or special occasions Strengthening the management and training of suppliers and putting emergency plans in place for special conditions
Physical Risks	Chronic	<ul style="list-style-type: none"> Assets Liabilities Expenditures 	<ul style="list-style-type: none"> Higher costs of infrastructure: Chronic risk such as high temperature and sea level spike might damage some power facilities of enterprises, resulting in additional inputs for infrastructure Increase in operating costs: Damage to water resources might cause shortage of cooling water supply of hydropower stations and other power generation facilities, hence increasing the supply chain costs of enterprises 	<ul style="list-style-type: none"> Optimizing development mode of the Group and promoting development and transition of energy Consolidating the foundation of internal management and improving the "anti-fragile" ability of the Group

Formulating the climate action plan

The following is our climate action plan and annual progress report formulated in line with the Group's strategic goals and paths:

Goals



Actions

Promotion of clean energy development
Digital transformation

Clean energy upgrade of traditional coal-fired power

Development and construction of new energy bases

Participation in green power market transactions

Development of the "Three New Businesses"

Integrated intelligent energy, energy storage, green power transportation and hydrogen energy

Expand the scope of collaboration and content with local governments at all levels, major customers, and upstream and downstream enterprises in the industry

Annual Progress

- Proportion of installed capacity of clean energy successfully transformed the Group towards clean energy as its core business **52.16%**
- Commencement of operation of clean energy projects **approx. 3,310 MWh**
- Achieving ultra-low emissions of all onshore coal-fired power generating units **100%**
- Number of developments of integrated intelligent energy projects exceeds **100**
- The capacity growth arising from energy storage system development and construction **668 MWh**
- The market share of battery-swapping heavy trucks in the field of green power transportation **exceeds 50%**
- A batch of large new energy base projects achieved **full capacity grid connection**, including Xinrong 100MW Photovoltaic Grid Parity Project, Phase II of Datong Hunyuan 100MW Photovoltaic Grid Parity Project, 550MW project in Zhongning County, Ningxia
- Data access rate of coal-fired power production **100%**
- Data access rate of new energy production **95%**
- Achieving green power trading **approx. 23,488 MWh**
- Chaoyang Power Station obtained **China's first parity green certificate** and completed the first transaction
- Number of cooperation agreements signed with local governments at all levels, major customers, and leading upstream and downstream enterprises in the industry chain **Over 300**

Implementing the “Dual Carbon” Targets Comprehensively

We stay committed to green, innovative and high quality development with a focus on promoting sustainable and rapid development of clean and low-carbon energy such as photovoltaic power, wind power, hydropower, geothermal energy and biomass energy. Proactive efforts have been made to nurture the emerging industries of green energy, including energy storage, hydrogen energy, green power transportation and integrated intelligent energy, optimize and adjust existing coal-fired power assets comprehensively, increase the proportion of clean energy at a faster pace so as to realize the “dual wheel drive” of clean and low-carbon energy and the emerging industries of green energy, thereby building a new ecosystem of low-carbon energy to fully serve the green and low-carbon transformation of the economy and the society.

Formulating targets

National targets

2030 “Carbon Emission Peak”

Striving to achieve carbon emission peak by 2030 (in terms of carbon dioxide emission)

2060 “Carbon Neutrality”

Striving to achieve carbon neutrality by 2060 (in terms of carbon dioxide emission)

The Group's targets

By the end of 2023

Proportion of installed capacity of clean energy exceeds **70%**

Proportion of revenue from clean energy exceeds **50%**

By the end of 2025

Proportion of onshore installed capacity of clean energy exceeds **90%**

Proportion of revenue from clean energy exceeds **70%**

By 2030

Proportion of onshore installed capacity of clean energy in the total onshore installed capacity exceeds **95%**

Proportion of revenue from integrated intelligent energy exceeds **50%**

Implementation Path

Overall strategy	Methods of promotion	Specific measures
Business expansion	Clean energy upgrade of traditional coal-fired power generation	<ul style="list-style-type: none"> No further expansion of coal-fired power generating units to lower the proportion of coal-fired power and reduce the Group's reliance on such energy form Performing clean energy upgrade of existing coal-fired power generating units to improve their performance, save energy and reduce emission
	Expansion of new energy bases	<ul style="list-style-type: none"> Focusing on the development of clean and low-carbon energy, such as photovoltaic power, wind power, hydropower, geothermal energy, biomass energy, etc. Tapping into resources for new energy development and building new energy bases across the country to facilitate large-scale development of new energy
	Plan for the development of the "Three New Businesses"	<ul style="list-style-type: none"> Actively cultivating emerging green energy industries including energy storage, hydrogen power, green power transportation and integrated intelligent energy
Regional synergy	Urban intelligent energy	<ul style="list-style-type: none"> Assisting in the construction of smart cities and advancing the applications of intelligent energy to boost green and circular economic development
	Development of county resources	<ul style="list-style-type: none"> Establishing the county development system and intensively exploring county resources to develop integrated intelligent energy in counties with greater efforts
	Building of low-carbon villages	<ul style="list-style-type: none"> Promoting the building of urban infrastructure in rural villages, the development of new green energy system and the agricultural modernization in rural villages under the "green energy + modern efficient agriculture" model, so as to achieve rural revitalization, the dual carbon targets and common prosperity
Industry integration	Transportation	<ul style="list-style-type: none"> Supporting the development and application of intelligent clean energy in the transportation sector and establishing the green transportation system to change the way of energy consumption for commute by combining "green energy + transportation"
	Construction	<ul style="list-style-type: none"> Building smart buildings and promoting green architecture by combining "green energy + construction"
	Agriculture	<ul style="list-style-type: none"> Establishing the development model that integrates new energy and agriculture for intense agriculture and energy development by combining "green energy + agriculture"



Achievements of the year

Establishment of unicorn companies

Intelligent energy storage

- Commenced strategic cooperation with Beijing Hyper Strong Technology Co., Ltd., a leading company in the energy storage industry, to jointly establish Xinyuan Smart Storage (新源智儲), which provided container-mode energy storage solutions with modularized combinations and movable deployment

Green power transportation

- Acquired 36% of equity interest in Qiyuanxin Power (啟源芯動力) and became its largest shareholder to focus on battery swapping services for heavy trucks. Through the new model of green power substitution, Qiyuanxin Power aimed at becoming the integrated intelligent energy provider that covered the three main functions of “green power transportation”, namely the research, development and promotion of battery swapping products, the investment and operation of battery charging and swapping facilities, and the management of motive battery assets

Geothermal energy

- Set up Xinyuan Yunneng (新源蘊能), a company specializing in geothermal energy, for conducting preliminary analysis on geothermal energy resources across China, liaising with working partners and performing early-stage project research

Urban and rural development

- Established CPNL (中電農創) with New Life Town Group, a leading company in rural revitalization, and positioned the joint venture as the No.1 asset-light platform company in achieving “rural revitalization, carbon emission peak and carbon neutrality”
- Established CP Changxing (中電長興), a wholly-owned subsidiary of China Power



Expansion of partnership network

<p>Integrated energy</p>	<ul style="list-style-type: none"> Commenced construction of the integrated fuel, hydrogen and electric power station demonstration project that was jointly developed with China National Petroleum Corporation
<p>Green power transportation</p>	<ul style="list-style-type: none"> Facilitated the cooperation between China National Petroleum Corporation and Qiyuanxin Power for on-site applications of green power transportation
<p>Regional cooperation</p>	<ul style="list-style-type: none"> Entered into regional cooperation and development agreements with a dozen of provinces, cities, counties and districts, including Shanxi, Liaoning, Anhui, Hebei, Henan and Shandong



Baozhigu Integrated Intelligent Energy Demonstration Project



Zhongguancun Yanqing Hydrogen Refueling Station



Rendering of twin towers of energy storage tanks



Battery-swapping heavy trucks



Best Endeavours to Ensure Safe Energy Supply

In 2021, the pursuit of carbon emission peak and carbon neutrality led to tighter control over total regional coal consumption, which posed immense challenges to coal-fired power enterprises. Against the increasingly high price of thermal coal and the shortage of power supply, we continued to offer high-quality and reliable power service. While we explored business potential, lowered costs and improved efficiency, we strived to ensure power supply and provide safe and stable electricity service.

Securing thermal coal supply

The demand and supply gap in the coal market drove coal prices to a historical high in 2021. In view of the new features of “fast-growing, highly fluctuating and rapidly evolving” of the market, we increased procurement of thermal coal to maintain a minimum coal inventory level, so as to meet the demand of coal for power generation.

Long-term contracts to ensure stable supply

Proportion of thermal coal in annual procurement

80%

Reaching the target of annual contract volume, optimizing the pricing mechanism and achieving a breakthrough in the procurement mix

Year-on-year increase in annual thermal coal procurement

5%

Long-term contract fulfilment rate

91%

Fulfilment rate of long-term contracts exceeded the NDRC requirement by

1%

Procurement costs were reduced by

RMB 275 million

More efficient procurement from the market

Strengthening the cooperation with professional institutions for better market analysis ability and scientific guidance for procurement

Through establishing coal reserves at staggered peaks and securing supply with forward contracts, procurement costs were reduced by

RMB 146 million

Taking advantage of policy subsidies, received government subsidies for coal combustion management of

RMB 52.21 million

Better coal blending and mixed burning quality

In 2021, revenue from coal blending and mixed burning recorded a year-on-year growth of

RMB 467 million

Cost saving per tonne of coal increased to

50.6 RMB/tonne

RMB30.0/tonne for the corresponding period, representing a significant improvement

New channel for coal import

By bargaining quotas, Wuhu Power Plant was allocated with

130,000 tonnes
Ground-breaking improvement

By bargaining quotas, Changshu Power Plant was allocated with

370,000 tonnes

Year-on-year increase of

140,000 tonnes

Establishing new coal import channels for onshore power plants and importing an aggregate of

1.1727 million tonnes

Costs saving amounted to

RMB 146 million

Strive to lower logistics costs

Given the improving transportation capacity of Haoji Railway, the procurement channels of Yaomeng Power Plant and Shangqiu Power Plant were optimized and hence reduced the logistics costs

Case Responding to hiking fuel cost

Seizing opportunities for coal procurement at staggered peaks

From January to June 2021, Dabieshan Power Plant capitalised on the price fall due to the pandemic and timely expanded the purchase of coal at discounted prices to build coal reserves during the low season. Given the higher coal price between July and December, it increased the proportion of mid-to-high grade sulphur coal and meager lean coal procured at low prices and improved the cost-efficiency of coal blending and mixed burning, so as to minimize fuel cost and maintain the regional leading position during the year.

In 2021, mid-to-high grade sulphur coal and low-cost meager lean coal accounted for 29.2% and 30.24% of the coal blending and mixed burning operation in Dabieshan Power Plant, respectively, which allowed it to reduce costs substantially.

Cost control and reduction by resources exploration

In 2021, CP Guorui explored resources in Northern Shaanxi and established the 1,000 km route for Shangqiu Power Plant to transport coal from Shaanxi to Henan. The transportation of coal from Yulin, Shaanxi to Shangqiu Power Plant by trucking effectively lowered coal prices within the region. Besides, CP Guorui expanded the resources in Southern Shanxi and cooperated with high-quality suppliers in the province to transport coal from Northern China to Sichuan so as to relieve the burden of Fuxi Power Plant in maintaining the power supply.

In-depth research on quality of coal mines to reduce error

In 2021, Pingwei Power Plant conducted in-depth joint sampling and comparison in mines to gain insights into the mining, processing and sampling procedures, inspection equipment and operating standards of major mines. Through the three-way comparison between mines, the marketing department and processing plants, it formulated a set of common standards for mining, processing and inspection operation at processing plants. By reducing the errors in heating value testing for incoming coal at acceptance inspection and the deviations in heating value testing for processing plants and furnaces, Pingwei Power Plant developed a new mechanism for managing the fuels at source.

Active diversification of coal sources

In November 2021, the representatives of Shangqiu Power Plant visited Pingmei Group Transportation and Distribution Company, during which they negotiated and reached a consensus to collaborate on securing coal supply for the coming winter and spring and cooperating under long-term coal contracts in 2022. As a result, a new source of supply was established for Shangqiu Power Plant under long-term coal contracts, which expanded its channel for fuel procurement.

Securing coal resources through forward contracts

In light of the tight resources and financing difficulties faced by coal mine operators within the region, Pu'an Power Plant created the new model of "securing coal resources through forward contracts with advance payment" in 2021, where it secured 1.4 million tonnes of coal by making a payment of RMB270 million in advance. Amongst it, 450,000 tonnes were delivered and a profit of RMB68.77 million was generated.

Forming special team to monitor imported coal

Changshu Power Plant continued to enhance the response and handling abilities in prevention and control of the portal threats arising from COVID-19 pandemic. Since forming its Special Unloading Team for imported coal, imported coal of 226,280 tonnes in total have been unloaded, during the period of which "Zero-infection" of employees was maintained



Dabieshan Power Plant diversified the sources of coal supply and increased coal inventory through multiple measures



Briefing with special port team officers of Changshu Power Plant before unloading imported coal at shift meeting



Centralised control room and power generating units at Shangqiu Power Plant maintained safe and stable operation

Providing Reliable Electricity

During 2021, extreme weather events happened frequently throughout China, the impact coverage and damage of which were larger and stronger than prior years. We timely kept abreast of the information on extreme weather by closely tracking the meteorological developments. Apart from maintaining proper reserve of emergency materials, we formulated all-round emergency plans and on-site handling plans to ensure reliable power supply during extreme weather.

Case Responding to extreme weather

Flood

- Shangqiu Power Plant formulated the emergency plan of single generator operation during the period of floods. It prepared rescue materials such as water pumps and raincoats in advance, and allocated fire-fighting sand bags in various regions to prevent backflow of rainwater. In addition, it conducted inspection and dredging generally in the districts where rainwater drainage was impacted. At the same time, the number of staff on duty was increased to enhance monitoring and inspection during flood periods
- Wu Ling Power exercised effective dispatch management over water resources across the basins through the 8 reservoirs along upstream and downstream of Yuanjiang River, which guaranteed a win-win situation of both flood prevention and power generation

Cold Wave

- CP Shentou streamlined the cold and chill prevention tasks generally to assign specific responsibilities on division of labor, specify the content and scope of inspection in details, conduct inspection of hidden hazards in every detail on the basis of due diligence within each designated scope. It assigned specific responsibilities for specific staff-in-charge to monitor the task performance, ensuring that the inspection of cold and chill prevention had its focus, division of labor, proper launch and full coverage in place

Typhoon

- Wuhu Power Plant made close contacts with the local meteorological authorities, timely kept abreast of the information of forecast and early warning for weather disasters such as rainstorms and floods. With announcements posted in time on the website of the company, it has put its forecast, early warning and emergency linked-response mechanisms in place



Case

Responding to rainstorms in concerted efforts

Since 16 July 2021, Henan Province was hit by unprecedented and extremely strong rainstorms in various areas. In particular, heavy rainfalls turned to floods in Zhengzhou and other counties and cities, the catastrophe of which broke the hearts of billion people throughout the country. In the face of the exceptional challenges, the business units of China Power in Henan Province took their best active actions to fully ensure stable and safe production and thus, combat the flood calamity with its reliable power supply.

Yaomeng Power Plant

- Closely monitoring the real-time weather, grasping information of flood and rainstorm developments, making timely adjustments on flood control and allocating flood prevention materials in various key venues
- Strengthening inspection on outdoor major equipment and low-lying areas, conducting inspection of hidden hazards, well preparing the rain-proof coverage and sewage draining, and conducting trial run of water pumping equipment

Shangqiu Power Plant

- Timely publishing the information of early weather warning through mobile network communication
- Improving various flood prevention materials by increasing sufficient number of counter-flood sand bags, iron shovels, raincoats and rain boots, so as to fulfil the on-site demands for containing floods

CP Guorui

- In the evening of 20 July, working staff were organized to ensure resumption of coal supply once the flood situation was under control
- Arranging the cleaning of the drainage holes of wagon balances, drainage ditches of ash reservoirs and sedimentation tanks, and purchasing flood-fighting and rescue materials such as sand bags and submersible pumps in advance



China Power
Sustainability Report 2021

Practice of Sustainability Strategy

Green-empowerment

Intelligent Innovation

Mutual Achievement





Green-empowerment

Creation of zero-carbon living through low-carbon production

When pursuing the strategy of “Carbon Emission Peak and Carbon Neutrality”, energy acts as the major battle field and electricity as the main force. As such, putting the “comprehensive development for all employees” in place, China Power is committed to empowering the production and industrial development with green energy, while promoting clean energy to the development of the counties and other rural areas, industrial parks, transportation and travel intensively. In addition, China Power strengthens the research on energy saving and emission reduction technologies during power production, with an aim to fully serve the low-carbon transformation of the power and energy industries, the economy and the society in making low-carbon production and zero-carbon living an accessible reality.

Sustainable Development Goals of the United Nations



Ensure availability and sustainable management of water and sanitation for all



Ensure sustainable consumption and production patterns



Take urgent action to combat climate change and its impacts



Conserve and sustainably use the oceans, seas and marine resources for sustainable development



Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss



Key Topics

- Serving for implementation of national strategies
- Strategic transformation
- Low-carbon transformation
- Reduction of various types of emission
- Conservation of energy and resources
- Development and utilization of clean energy
- Technological renovation and innovation in relation to environmental protection
- Climate risk management
- Conservation of ecological environment
- Green power transportation

Management Systems

- Management Measures for Solid Waste
- Management Measures for Air Pollutants
- Management Measures for Environmental Protection Equipment
- Management Measures for Water Pollutants
- Management Measures for Carbon Emission
- Management Measures for Energy Conservation
- Management Measures for Waste and Obsolete Materials
- Management Measures for Comprehensive Utilization of Resources
- Management Measures for the Environmental Protection Assessment (Trial)
- Management Regulations on Supervision of Environmental Protection
- Implementation Measures for the Ecological and Environmental Protection Census
- Management Measures for Green Engineering Construction
- Management Measures for Clean Engineering Construction

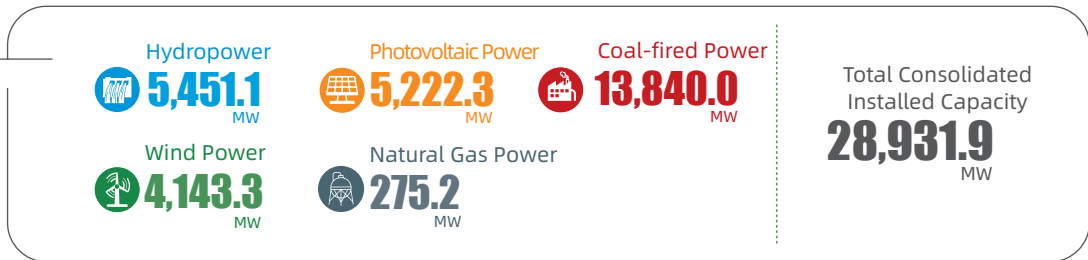
Promoting Green Transformation of Energy

Development of innovative power system is the essential initiative to promote and fulfil the reform of “Carbon Emission Peak and Carbon Neutrality”. We strive to develop clean and low-carbon energy systems such as wind power, photovoltaic power and hydropower, plan for the layout of the emerging green energy sectors such as integrated intelligent energy, energy storage, hydrogen energy and green power transportation, and develop green energy systems, so as to promote energy development and empower green transformation.

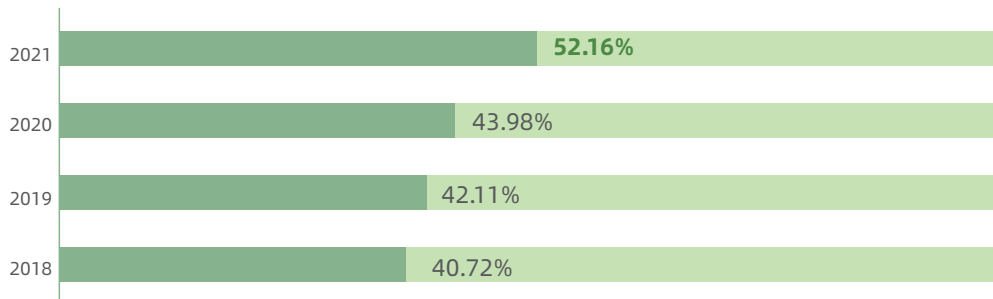
Developing New Energy Bases

We continued to push forward the flexibility upgrade of power generating units to enhance their effectiveness of power generation. At the same time, pursuing the new energy development and construction, we strengthened the cooperation with the government and enterprises to build the ecosystem of new energy development, and stepped up our efforts in building a number of new energy bases, promoting the large-scale development of new energy. In 2021, the Group’s clean energy power generation amounted to 36,417,748MWh, representing a year-on-year increase of 7.42%, equivalent to a reduction in carbon dioxide emission of 29,006,736 tonnes.

As at
31 December
2021



Proportion of clean energy in consolidated installed capacity



Increasing the proportion of new energy connection

- As of the end of 2021, the installed capacity of China Power’s power stations that were connected to the regional production and operation centers amounted to 1,804.6MW
- Pushing forward the flexibility upgrade of power generating units to enhance their peak shaving ability in power grid, hence promoting the fulfilment of indicators in relation to new energy development
- The new energy intelligent operation and maintenance platform was launched and achieved connection with all the 22 photovoltaic power stations and one wind farm, and the platform operated steadily in general

Creating the cooperation ecosystem of new energy

- Strengthening cooperation with the local governments, developing strategic partnership in clean energy development and giving play to the energy and resources advantages of various regions; embarking on the construction of new energy bases in regions possessing abundant natural resources such as wind, sunlight and water to expand room for clean energy development

Case**The first batch of offshore wind power demonstration project in Shandong was connected to the power grid for power generation at full capacity**

On 16 December 2021, Fan No. A29 of SPIC Shandong Peninsula South No. 3 offshore wind power project was connected to the power grid for power generation, marking the first batch of offshore wind power demonstration project in Shandong, as well as the Group's first offshore wind power project in Shandong fulfilling connection to the power grid for power generation at full capacity.

Distributed photovoltaic power stations were built on the rooftop of the project's onshore centralized control center. Coupled with the construction of ancillary devices such as 30MW/60MWh energy storage devices and highly efficient geothermal heat pump system, the warming and cooling demands of all districts of the onshore centralized control center were satisfied. It aimed to develop a power generation-supply integrated intelligent energy system with wind-photovoltaic-storage synergy.

Case**Guyuan "Photovoltaic +" Project was connected to the power grid for power generation**

On 31 December 2021, Phase 1 of 180MW among the 400MW "Photovoltaic +" Demonstration Project of China Power in Guyuan County, Hebei was connected to the power grid at full capacity successfully. The project is located in Guyuan County, Zhangjiakou City, Hebei Province at the junction of Hebei and Inner Mongolia. Upon commencement of production of Phase 1 of the project, the power supply of approximately 323,028MWh will be available for transmission to Northern Hebei in the first year. 935,000 tonnes of standard coal will be saved with emission reduction of carbon dioxide of approximately 281,300 tonnes, carbon monoxide of approximately 25.27 tonnes, nitrogen dioxide of approximately 1,080.92 tonnes and flue gas and dusts of 1,265.12 tonnes every year, contributing to the accomplishment of power supply with 100% clean energy for the 2022 Beijing Winter Olympics.

Case**Xinrong 100MW Grid Parity Photovoltaic Project was connected to the power grid at full capacity**

On 9 April 2021, Datong Photovoltaic Xinrong 100MW Grid Parity Photovoltaic Project was connected to the power grid and was put into operation at full capacity. The project is located in Shangshenjian Village, Xinrong District, Datong City, Shanxi Province. The project adopts forestry-and-photovoltaic integrated mode and gives play to the effect of "serving two purposes in one place and eco-restoration". It makes use of the idle land site in the low-lying mining area in Datong City for photovoltaic power construction, thereby driving the green transformation of the local economy with green and clean energy.

Case**Datong Hunyuan Phase 2 of 100MW Photovoltaic Grid Parity Project was connected to the power grid at full capacity**

On 31 October 2021, Datong Photovoltaic Hunyuan Phase 2 of 100 MW Mountain Photovoltaic Grid Parity Project, which was jointly developed and constructed by China Power and Xi'an Longji Clean Energy, was connected to the power grid at full capacity. Upon commencement of operation, it is expected to supply power of more than 160,000MWh for the power grid, saving standard coal of approximately 51,000 tonnes, and reducing emissions of sulphur dioxide of approximately 33 tonnes, carbon dioxide of approximately 140,000 tonnes and nitrogen oxides of approximately 31.4 tonnes every year.



Shandong Peninsula South No. 3 Offshore Wind Power Project



Vegetation greening efforts of Datong Photovoltaic

Developing Emerging Green Energy Industries

While striving for the development of the principal clean and low-carbon energy segment, we took initiative to expand into the new green energy segments such as energy storage, green power transportation and hydrogen energy. We expanded the energy development landscape and changed the modes of energy development continuously with an aim to accomplish the transition from a single power generation enterprise and traditional energy enterprise to a green and low-carbon energy provider.

2021

Layout of integrated intelligent energy

Capacity of
approximately
4,700 MW

More than **100** projects

Capacity growth under development
and construction of energy storage
system amounted to

668 MWh

Case

The Yanqing Garden Hydrogen Refueling Station Project in Zhongguancun completed construction of the first 70 MPa Hydrogen Refueling Station in Beijing successfully

On 30 June 2021, China Power completed the construction of the first 70 MPa Hydrogen Refueling Station, namely the Zhongguancun Yanqing Garden Hydrogen Refueling Station, in Beijing successfully. It has become the first hydrogen refueling station that has completed construction under the title of the national key R&D project of “Scientific Winter Olympics — Key Technological R&D and Application Demonstration for Hydrogen-powered Transport”. It is also the first hydrogen refueling station possessing 35 MPa and 70 MPa hydrogen refueling capacity at the same time in Beijing. Meanwhile, as the only hydrogen refueling station granted with hydrogen operation authorization in Beijing currently, it is able to safeguard hydrogen refueling services for 60-80 automobiles equipped with hydrogen-powered batteries during the 2022 Beijing Winter Olympics and its qualification games.



Zhongguancun Yanqing hydrogen refueling station

During the demonstration operation, the project added hydrogen of more than 3,300 kg in aggregate for automobile equipped with hydrogen-powered batteries in 2021, equivalent to saving approximately 16 tonnes of fossil fuel (diesel) for Yanqing game area, reducing emissions of carbon of approximately 50 tonnes and nitrogen oxides of approximately 0.85 tonnes, totally safeguarding hydrogen refueling services of more than 20 unit-times for the qualification games in Yanqing game area of Winter Olympics during the year.

Case

Pioneering the development of new energy transportation segment by the innovation of “battery-swapping heavy trucks”

Focusing on the five scenarios of mines, steel factories, ports, power plants and urban, Qiyuanxin Power actively pushed ahead “electric energy substitution” in the transportation sub-segments of “heavy weight, high frequency, high pollution” and carried out R&D with other eco-partners to promote various products of battery-swapping heavy trucks and engineering machineries. Leveraging its high environmental protection, high cost-effectiveness and excellent functions, it attained a leading market position and took the lead in the new development trend of integrated intelligent energy and new energy transportation by innovation.



Battery swapping station for electric heavy trucks

As at the end of 2021, China Power’s market share in the green power transportation market ranked among the top of the industry. It invested and built nearly 70 ancillary battery charging and swapping stations in various cities and provinces throughout China, delivered a total of more than 5,700 battery-swapping heavy trucks, of which the mileage exceeded 50 million km in aggregate. Assuming the daily mileage of each truck is 300km, it is estimated that 5,700 battery-swapping heavy trucks can reduce carbon emissions of 149,625 tonnes annually, equivalent to 8,307,700 trees planted, demonstrating outstanding advantage in environmental protection.

Case

Xinyuan Smart Storage's first energy storage and power station project was connected to the power grid successfully

On 27 December 2021, Haiyang Power Storage's Haiyang 101MW/202MWh energy storage and power station, of which Xinyuan Smart Storage was one of the main contracted builders, was connected to the power grid successfully. The project is the Group's first successful on-grid large-scale shared energy storage and power station with a capacity exceeding 100MW. It is also one of the first batch of five peak-shaving energy storage and power station demonstration projects in Shandong. As one of the main contracted builders, Xinyuan Smart Storage undertook the system integration of the project, achieved the proprietary integrated delivery of core energy storage equipment and provided the R&D, design and integrated goods supply services of the energy storage system. Upon commencement of operation, it provides services such as power assistance, peak shaving of power grid and leasing of energy storage capacity for Shandong Province. Each recharge of 200MWh can satisfy one month's power use by 1,000 households, representing an annual new energy power consumption of 100,000MWh.



Mobile intelligent energy storage

Case

Application of the first full-chain zero-carbon integrated intelligent energy demonstration project in Hunan Province

The Integrated Intelligent Energy Demonstration Project in the Office Park of headquarters of Wu Ling Power is the first full-chain zero-carbon integrated intelligent energy demonstration project in Hunan Province, covering power source, grid, load, storage and utilization. The project deeply explores the potential of shallow geothermal energy, and innovatively builds prefabricated energy modules to realize zero-carbon energy supply and enhance the level of resource utilization. Upon commencement of operation, the energy saving rate of the project can reach 50%. Taking into account of the Office Park of Wu Ling Power only, carbon dioxide emission can be reduced by approximately 1,236 tonnes/year.



The Integrated Intelligent Energy Demonstration Project in the Office Park of Wu Ling Power's headquarters

Developing Clean Coal-fired Power

We have strengthened the governance of existing coal-fired power generating units and promoted their energy-saving upgrade. In addition, we strengthened the monitoring and control of energy consumption in the production process of power generating units, implemented the accountability for environmental protection supervision in production process to ensure that each production site meets the specifications, thereby improving the efficiency of coal-fired power production comprehensively.

2021

The Group conducted overhauls on power generating units of

Class A	Class B
2 times	8 times
Class C	Class D
9 times	1 time

The operational ratio of desulphurization and denitration facilities maintains at **100%**

The per-hour average emissions of pollutants were above the limit for **0** time

Accumulated incentive electricity in respect of environmental protection of

473,000 MWh
Investment in upgrade of environmental technologies of the Group
RMB **622,546,500**

China Power has completed the ultra-low emission upgrade of all its domestic coal-fired power generating units

Implementing energy conserving management on power generating units

- We continued to formulate the Three-Year Action Plan for Energy Conservation and Efficiency Improvement of Coal-fired Power Generating Units, conduct research to inspect the coal-fired power generating units and make in-depth analysis on various issues existing in the power generating units through their functional testing ledgers over the years. We enhanced the areas ranging from refined management, operation optimization, technological upgrade, application of new technologies and intelligent development. In addition, we formulated the action plans and protection measures of various units.
- We carried out analysis on energy consumption of coal-fired power generating units to reduce the indicators of energy consumption effectively and enhance the power generation efficiency of power generating units continuously.
- Upgrade of air pre-heater of No.3 boiler of Pingwei Power Plant and air pre-heater of No.1 boiler of Fuxi Power Plant was completed to promote the efficiency improvement of coal-fired power generating units.

Promoting upgrade of coal-fired power generating units

- We conducted analysis on the five areas of related power generating units such as unplanned suspension control, energy consumption management, integrated energy supply, biomass coupling and blended-combustion of urban sludge and elimination and suspension of under-performing capacity, and implemented each of them. Based on heat-supply upgrade for energy conservation, flexibility upgrade of power generating units and digital (intelligent and intellectual) construction, we continued to optimize and adjust the asset structure and further solve the prominent problems such as higher energy consumption of certain older power generating units and increasing pressure on in-depth peak-shaving of power generating units.
- In 2021, flexibility upgrade of four coal-fired power generating units was completed, which enhanced the peak-shaving operation capability of power generating units and increased the new energy consumption capacity of the power grid.

Strengthening monitoring of environmental protection in production

- We have strengthened the supervision and management of environmental protection to ensure a sound and stable operation of the environmental protection facilities. Specifically, we have tracked and inspected online monitoring environmental protection data as well as data uploaded to the ecology and environment authorities. For each quarter, we have carried out technical supervision analysis and convened meetings on analyzing the operation of environmental protection facilities, and formulated corresponding measures to tackle the problems identified during operation maintenance.
- We have conducted on-site inspections of major technical transformation, including enclosed inspection of coal mines, and carried out environmental supervision of eight coal-fired power enterprises.

Case

Compiling Three-Year Action Plan for Energy Conservation and Efficiency Improvement of China Power's Coal-fired Power Generating Units

In 2021, China Power compiled the "Analysis on Energy Consumption of Coal-fired Power Generating Units and Three-Year Action Plan for Energy Conservation and Efficiency Improvement" through CP Hua Chuang with actively adapting to the adjustment of energy structure and the development needs of the electricity market as the overall requirement, and reducing coal consumption for power supply as the main goal. Based on the practical production status of China Power's coal-fired power generating units, we launched a systematic analysis of the energy consumption of the power generating units. We specified the direction of actions from the perspective of production management, operation optimization, energy-saving technical upgrade, new technology application and digitalization. As such, it provided a feasible path to ensure accomplishment of China Power's goal of energy conservation tasks relating to coal-fired power under the "14th Five Year" Plan, playing the key guiding role for the tasks of energy conservation and emission reduction of China Power's coal-fired power generating units.

Case

Organizing training seminars on ecological and environmental protection management

During 25 to 29 October 2021, China Power organized training seminars on ecological and environmental protection management at the training center of Changshu Power Plant, in which a total of 35 management staff and employees of various units of the Group attended.

The principal targets of these training seminars were personnel of environmental supervision and management and environmental equipment management from various units. The lectures mainly cover topics such as environmental laws and regulations, management of environmental equipment, hazardous solid waste management, supervision of environmental technologies, progress and trend analysis of the policies relating to carbon emission peak and carbon neutrality and management of carbon emission rights trading of the power generation industry. The lectures were given by experts with rich experience, aiming to effectively improve the trainees' business capabilities and skills regarding supervision of environmental technologies, environmental equipment management, management on carbon emissions and environmental laws and regulations, thereby ensuring the compliant implementation of our tasks relating to environmental protection and management.



China Power organized training seminar on ecological and environmental protection management in 2021



Participating in Market-oriented Trading

Against the backdrop of the changing power policies and market, we intensively participated in green power market transactions. Under the increasingly stringent policy requirements on management and control over carbon emissions and related transactions, we complied with the requirements of a series of policies such as Administrative Measures for Carbon Emission Rights Trading (Trial) (《碳排放權交易管理辦法(試行)》) (Order No. 19 of The Ministry of Ecology and Environment). We have properly studied, researched, analyzed and planned the business layout of carbon market trading to enhance the ability to respond to the power market, thereby incorporating ourselves into the green power trading landscape actively. In 2021, China Power's hydropower generating units participating in the market power trading obtained a total power production quota of approximately 5,953,000MWh with an average price of RMB291.8/MWh. In addition, the Group participated in the green certificate trading and applied for a total of 1,067,471 green certificates in respect of wind power and photovoltaic power projects, sold 387,697 green certificates, and achieved sales revenues of RMB12,551,800; while participated and completed green power transaction amounted to 23,488MWh.

Green power trading

- In September 2021, in the first nationwide green power trading, the green power transactions of Chaoyang Power Station of 2,783,000MWh for 2021 to 2025 in total were executed (of which 23,488MWh was completed in 2021), with traded tariff exceeding the basis price by RMB20/MWh, which locked the 5-year revenue from green power trading, representing an increase of approximately RMB56,000,000 in revenue

Green certificate trading

- Strengthening the analysis on policies for green certificates and clean energy consumption, we guided Shenyang Energy Investment (瀋陽能投) to acquire the parity green certificates of Chaoyang Project at once. It received approval of the green certificate transaction and completed the first batch of trades within two months

Carbon trading

- With in-depth research on carbon emissions and carbon trading policy, we actively responded to the challenges and opportunities arising from the carbon trading market. We established the carbon assets and carbon trading special study group to formulate the goal and plan for carbon emission reduction and implementation proposal of the Company based on actual situation as well as study the carbon trading strategy
- Keeping abreast of the latest carbon trading policy and market changes, we guided Shangqiu Power Plant to give priority to purchase Chinese Certified Emission Reduction ("CCER") at a low price to complement the quota shortfall, ensuring the relevant enterprises to successfully settle the payment and fulfilled the contracts for quota in the national carbon trading market. Through such CCER transactions, the contractual performance costs for carbon emissions have been reduced by RMB1,098,800

Case

Dabieshan Power Plant was honored with the Contractual Performance Exemplary Award relating to the carbon market of Hubei Province

On 2 March 2021, Dabieshan Power Plant received the honorable certificate of “Contractual Performance Exemplary Award” relating to the carbon market of Hubei Province in 2019 granted by Hubei Province Carbon Emission Trading Center. It has received this recognition for two consecutive years.

Since the release of the “Allocation Plan of Quotas for Carbon Emission Rights of Hubei Province 2019” by the Office of Ecology and Environment of Hubei Province in August 2020, through diligent research and analysis on the carbon quotas and carbon-offset market in Hubei province, it swiftly completed the approval procedure of the transaction. Meanwhile, through adopting various trading modes proactively, it reduced contractual performance costs effectively, gaining the recognition of Hubei Province Carbon Emission Trading Center.



The Contractual Performance Exemplary Award received by Dabieshan Power Plant

Case

China Power completed the first deal of parity green certificates in China

During 28 to 29 June 2021, the “International Dialogue on Energy Transitions 2021” jointly organized by the National Energy Administration, Jiangsu Provincial government and International Renewable Energy Agency was held in Suzhou. Liaoning Chaoyang 500MW Photovoltaic Grid Parity Demonstration Project of China Power provided parity green certificates for the campaign, fulfilling the first transaction of parity green certificate in China.

In this campaign, China Power’s Chaoyang Project sold 60 green certificates to the organizing committee through China Green Certificate Subscription Platform, representing green power supply of 60MWh and reduction in emissions of carbon dioxide of 52,314kg, sulphur dioxide of 28.2 kg and nitrogen oxides of 25.8 kg.



Green power trading of Shenyang Energy Investment

Case

Changshu Electricity Sales Company participated in the first green power trade

On 7 September 2021, the first green power trade was officially commenced. As one of the main market operators, Changshu Electricity Sales Company took part in this transaction actively with traded power amounting to 2,500MWh in total.

During this green power trade, Changshu Electricity Sales Company timely understood the power users’ demand for clean energy, and timely aligned it with the relevant clean energy resources of SPIC in the province. The accumulated trading experience has laid the foundation for the successive commencements of market trading in the future. Green power trading satisfied the demand for green transition of enterprises, expanding the channels of emission reduction of end users.

Case

China Power successfully issued the first tranche of green medium-term notes (carbon neutrality bonds) of 2021

On 22 October 2021, China Power successfully issued the first tranche of green medium-term notes (carbon neutrality bonds) of 2021 as the first issuer of “carbon neutrality bonds” under debt financing instruments (“DFI”) in the interbank bond market. The size of this tranche of bond issue was RMB1 billion at an issue cost of 3.39% and a maturity period of three years. The proceeds from the issue will be fully applied towards the clean energy projects such as photovoltaic power and wind power of the Company.

“Carbon neutrality bond” is a sub-category under green debt financing instruments. As compared to common debt financing instruments, the use of proceeds from the issue of “carbon neutrality bond” is more focused when they are particularly applied in those clean energy projects with effectiveness in carbon emission reduction, and cost advantage will be prominent. It is the category of bond specially launched by the National Association of Financial Market Institutional Investors (中國銀行間市場交易商協會) with a view to attaining the National “30·60” carbon neutrality goal.

Advocating Energy Saving and Emission Reduction in Production

Based on our “14th Five-Year Plan” and the medium- and long-term plan for ecological and environmental protection, we strive to fulfill our responsibilities of power generation enterprises to promote energy saving and emission reduction in production, strengthening the treatment of various emissions during the process of power production and developing ourselves as a green production-oriented enterprise.

Carbon Emission Management

Following the “Interim Measures for the Administration of Voluntary Greenhouse Gas Emission Reduction Trading” (《溫室氣體自願減排交易管理暫行辦法》) (Fa Gai Climate [2012] No. 1668), we actively responded to the emission reduction requirements of the government. Moreover, we established the “Carbon Emission Management Measures” at the Group’s level, which clarified the management responsibilities of carbon emission management at all levels as well as the approaches, objectives, principles and basic requirements of carbon emissions to promote our standardized operation of management on carbon emissions. In 2021, we streamlined the volume of carbon emissions of the coal-fired power generating units under management, made research for the “carbon emission peak and carbon neutrality” action routes and planning of China Power and conducted research on the existing technical routes of carbon capture and storage to make plans in advance for the layout route blueprint of the Company in terms of carbon capture and storage.

Emission Types	Scope ⁽¹⁾	Unit	2020 ⁽²⁾
Total CO ₂ emission	Scope 1	'000 tonnes	46,957
	Scope 2	'000 tonnes	/
CO ₂ emission density	Scope 1	g/kWh	838
	Scope 2	g/kWh	/

Notes:

- (1) We have not been involved in scope 2 currently.
- (2) On 5 January 2021, the Ministry of Ecology and Environment (MEE) announced the official commencement of the first contractual performance cycle of the Chinese carbon market. As the disclosure of the key emission data of carbon trading before completing carbon clearance will affect the trading strategy and implementation of emission control enterprises, the Company will not publish the overall emission data involving carbon trading in 2021 temporarily before the completion of carbon clearance. Such data will be disclosed in details in the next annual report after the contractual performance of carbon emission is completed.

Case

The world’s first combined cycle and heating and power co-generation demonstration project for hydrogen-mixed combustion in natural gas power generating units was successfully put into commercial operation

On 23 December 2021, Jingmen Lvdong Power Plant’s operating gas turbines realized 15% hydrogen-mixed combustion transformation and operation, while the power generating units possessed the compatibility of two operation modes, namely pure natural gas and hydrogen-mixed natural gas. It marked China’s first adoption of hydrogen-mixed combustion renovation test on heavy combustion engines of power generating units under commercial operation in an attempt to make breakthrough in scientific research. Besides, it is the world’s first combined cycle and heating and power co-generation demonstration project for hydrogen-mixed combustion in natural gas power generating units under commercial operation. By adding source of hydrogen fuel into the existing natural gas power generating units, the consumption demand of natural gas can be mitigated effectively, thereby ensuring the safe and stable heat supply in winters. With only one set of 54MW 30% hydrogen-mixed combustion engine in Jingmen, carbon dioxide emissions of 18,000 tonnes can be reduced per annum.

Case

Dabieshan Power Plant’s online monitoring system for carbon emission was officially put into operation

On 8 November 2021, the online monitoring system for carbon emission of Dabieshan Power Plant’s No. 4 power generating units was officially put into operation. It is the first power generating units possessing online monitoring function for carbon emission in Hubei Province. With the addition of carbon emission monitoring modules to the original intelligent operation system of No. 4 power generating units, it is expected to enhance the preciseness on carbon emission testing and measurement and guide the formulation of targeted carbon reduction measures based on real-time monitoring of carbon emission data. To safeguard the successful and highly efficient operation and use of the system, Dabieshan Power Plant has established the “Innovation Team of Intelligent Operation Platform of Carbon Emissions” to conduct research on the all-process measurement of carbon emission, auditing system and policies on emission control, which confirmed the composition of the modules of the monitoring system and achieved high intensity of real-time perception on carbon emission accordingly.

Exhaust gas monitoring

We have strictly abided by laws and regulations such as the Atmospheric Pollution Prevention and Control Law of the PRC, the Emission Standards for Air Pollutants from Coal-fired Power Plants (GB13223-2011), Ambient Air Quality Standards (GB3095-2012) and formulated the Management Measures for Air Pollutants. The Company has enhanced the maintenance of the online monitoring system for flue gas emissions, carried out researches on ultra-low emission, strengthened the monitoring and adjustment of the desulfurization and denitrification system to ensure that the emissions of nitrogen oxides, flue gas, dusts and sulfur dioxide meet the standards.



Emission Types and Categories	Unit	2020	2021	(Decrease)/ Increase	Changes
Total NO _x emission	'000 tonnes	8.978	9.230	0.252	+2.81%
NO _x emission density	g/kWh	0.155	0.139	(0.016)	-10.32%
Total SO ₂ emission	'000 tonnes	5.063	5.065	0.002	+0.04%
SO ₂ emission density	g/kWh	0.087	0.076	(0.011)	-12.64%
Total flue gas and dust emission	'000 tonnes	0.491	0.535	0.044	+8.96%
Flue gas and dust emission density	g/kWh	0.008	0.008	0	0

Case

Completion of the ultra-low emission upgrade of Pu'an Power Plant

Pu'an Power Plant Ultra-low Emission Upgrade Project had given priority to the innovative use of integrated denitration technology routes with the application of multiple technologies. The innovation plan adopting air pre-heaters has effectively curtailed the problem of blocking of air pre-heaters arising from the denitration process of ultra-low emission. Meanwhile, it is the first domestic exclusive use of the technical route of single tower double-cycle desulphurization. Upon the innovative combination of various technical upgrade routes, it has easily met the national ultra-low emission standard on each indicator. Accomplishing the operation performance of power generating units with the highest desulphurization level after ultra-low emission upgrade in the coal-fired power generation industry successfully, the project has opened up a replicable path of desulphurization and ultra-low emission technology for the large-scale coal-fired power generating units of high sulphur and coal input in China.

Upon completion of such upgrade, based on an annual power generation of 6,400,000MWh and in comparison with the pollutant emission standard for W combustion boilers of Guizhou region, the project has realized reduction of emission of 75%, 82.5% and 66.67% of nitrogen oxides, sulphur dioxide and flue gas and dusts, respectively, representing a reduction in emissions of 1,607.61 tonnes, 1,030.08 tonnes and 106.28 tonnes of nitrogen oxides, sulphur dioxide and flue gas and dusts, respectively, per year, which has improved the air quality of the region significantly.



Wastewater treatment

We have strictly abided by the standards such as the Integrated Wastewater Discharge Standard (GB8978-1996), Wastewater Quality Control Index for Limestone — Wet Gypsum Desulphurization of Coal-fired Power Plants (DL/T997-2020) and actively implemented the Action Plan for Prevention and Control of Water Pollution launched by the State Council. We have formulated the Management Measures for Water Pollutants to standardize the management of water pollutants (wastewater) discharged during the production process, and reduced the amount of pollutants in wastewater through means such as technical upgrades to accelerate the process of attaining "zero discharge" of wastewater in all aspects.

Type and Category of discharge	Unit	2020	2021	(Decrease)/ Increase	Changes
Total discharge of industrial wastewater	'000 tonnes	0	0	0	0

Regulations and procedures of treatment

Determining the procedures

We have formulated the water pollution management system, management procedures and water pollutant (wastewater) management procedures to standardize the formulation and announcement of the management system relating to water pollution as well as the treatment and recycling procedures of wastewater of the Group, with a view to strengthening the management, control and monitoring over all processes.

Specifying the responsibilities

We have specified the principal responsible parties for the treatment of water pollution and their responsibilities in management and supervision respectively.

Specifying the procedures

Based on the three disciplines of "Basic Requirements, Comprehensive Utilization of Wastewater and Up-to-standard Discharge", we have standardized and provided guidance on the wastewater treatment efforts of all units in their daily production.

Annual practice and case studies

Shangqiu Power Plant

Shangqiu Power Plant successfully implemented the technological project of "Research on the Application of Zero Wastewater Discharge Technologies Adopted by Coal-fired Power Plants Based on Source of Reclaimed Water". Being China's first zero-discharge device adopting flue gas and residue heat as the heating source, the project also adopted the three-substance atomization and high temperature side-drying device and the technological process system of pre-dust remover for the first time. With the leading position in terms of system design and technical route in China, the project has helped achieve zero discharge of wastewater throughout the power plant.

Pingwei Power Plant

Pingwei Power Plant carried out the transformation of the whole plant's domestic sewage treatment system, and the water quality after treatment reached the standard of "open loop cooling water system replenishment water" in "Water Quality of Urban Sewage Recycling and Utilization for Industrial Use" (GB/T19923), which were reused to replenish the water of the cooling tower, thereby ultimately achieving the goal of comprehensive utilization and reduction of discharge of wastewater of the whole plant.

CP Hua Chuang

CP Hua Chuang has invented its pioneering "Desalination Method in Substitution of Aeration (with Oxygen) Treatment Technology" to adopt salination instead of oxygen aeration, resolving the existing demerits of the traditional treatment of aeration with oxygen. Meanwhile, through effective R&D, it has successfully produced the integrated intelligent control system of aeration with oxygen to boilers, achieving the steady control in the treatment of aeration with oxygen to boilers. While reducing the deposition of corrosive materials in the boiler significantly, it has effectively increased the heating efficiency of the boilers, delivering sound results of energy-saving and emission reduction.

Solid waste disposal

In strict compliance with the Law of the People’s Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste and Standards for the Storage and Landfill Pollution Control of General Industrial Solid Waste (GB18599-2020), we have revised and improved the Solid Waste Management System at the group level, thereby promoting the systematic development of solid waste treatment tasks to ensure closed-loop management and control of hazardous waste and compliant disposal and utilization of non-hazardous waste.



Emission Types and Categories	Unit	2020	2021	(Decrease)/ Increase	Changes
Discharge density of hazardous solid wastes	g/kWh	0	0	0	0
Total discharge of hazardous solid wastes	’000 tonnes	0	0	0	0
Discharge density of non-hazardous solid wastes	g/kWh	29.30	35.17	5.87	+20.03%
Total discharge of non-hazardous solid wastes	’000 tonnes	1,701	2,344	643	+37.80%

Case

Launch of “Cloud-based Platform for Solid Waste Recycling and Utilization”

To address the problem of inefficient and disorderly management of solid wastes more effectively, CP Guorui has made use of Cloud technology to develop the Cloud-based platform, and provided customized integrated management services for upstream and downstream enterprises along the industrial chain in respect of integrated utilization of solid wastes from coal-fired power based on the SaaS business model. The platform aims to develop the trading platform for recycling of solid wastes, render clear, transparent and traceable processes of production, collection, transfer, utilization and disposal of solid wastes, achieve precise matching of and online trading between producers and handlers of solid wastes as well as trading among the upstream and downstream enterprises along the industrial chain on the Internet, and thus expand the market capacity. It will benefit the formation of a centralized and huge market throughout China and increase the turnover rate and utilization efficiency of solid wastes, unleashing immense economic and social benefits.

Case

Commencement of construction of Pu’an Power Plant’s Integrated Utilization of Power Generation By-products Project officially

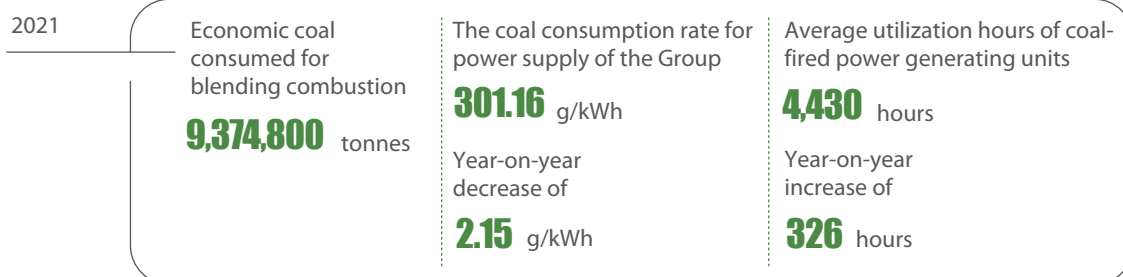
On 24 February 2021, the construction of Pu’an Power Plant’s Integrated Utilization of Power Generation By-products Project, of which the capital was jointly contributed by Guizhou Yitai Environmental and Guizhou Zetong Materials Company, was officially commenced. The launch of the project can effectively resolve the problems faced by power plants such as the difficulty in storage and disposal of desulphurized gypsum and high costs of transportation of power generation by-products, at the same time connecting the upstream and downstream industrial chain of power generation by-products, thereby integrating the ancillary industry of power generation by-products and project of integrated utilization of solid wastes. The project intended to build three production lines of gypsum powder with an annual production capacity of 150,000 tonnes, one production line of mortar with an annual production capacity of 150,000 tonnes, one production line of self-leveling materials with an annual production capacity of 100,000 tonnes, a production line of selected fly ash with an annual production capacity of 200,000 tonnes and 2 warehouses with storage capacity of 50,000 tonnes of fly ash each, with a view to solving the problems of disposal of power generation by-products of Pu’an Power Plant and promoting environmental protection generally.









Protecting the Natural Ecological Environment

Pursuing the implementation of the concept of ecological civilization, we continued to carry out environmental control and rectification and strive our best efforts to enhance ecological and environmental protection management. Focusing our concern about the launch of the relevant national policies and the specific requirements, we have compiled the "China Power '14th Five-Year' Proposal for the Implementation of Special Ecological and Environmental Development" to drive the implementation of enhanced action plan for ecological and environmental protection, establish a sound accountability system of ecological and environmental protection and perform the primary corporate responsibilities in terms of protecting biodiversity and contributing to the harmonious development of mankind and the nature.

Conservation of energy and resources

Strengthening the management over energy saving and consumption reduction in the production process, we have increased the operational efficiency of power generating units through technical upgrades, enhanced the utilization efficiency of energy and resources and reduced waste of resources in production. During operation, we have imposed strict management and control on the resources at construction sites, improved the results of recycling of resources, strengthened monitoring of energy consumption at offices or related venues, encouraged and advocated the practice of low-carbon concept by the employees in every aspect.



Indicator	Unit	2020	2021	(Decrease)/ Increase	Changes
 Coal consumption rate for power supply	g/kWh	303.31	301.16	(2.15)	-0.71%
 Total water consumption	Million tonnes	91.09	102.58	11.49	+12.61%
 Water consumption per unit	g/kWh	1,571	1,540	(31)	-1.97%
 Total office paper used	Tonnes	37.31	37.26	(0.05)	-0.13%
 Total power consumption of office buildings	MWh	11,956.17	12,750.10	793.93	+6.64%
 Total fuel consumption of corporate vehicles	Liters	653,400.48	674,790.45	21,389.97	+3.27%
 Total water consumption of office buildings	Tonnes	156,808.1	201,153.19	44,345.09	+28.28%
 Video conference	Times	2,269	3,966	1,697	+74.79%

Energy conservation and consumption reduction in production

- Vigorously promoting the model of “One Plant, One Strategy”, we have carried out monthly in-depth analysis and summary through management and control over production indicators such as coal consumption for power supply, fuel consumption, water replenishment rate, eco-friendly consumables and environmental emission indicators.
- Actively conducting refined management on energy saving operation, we have controlled cost and increased efficiency in full swing, promoted the year-on-year decline in both of the consumables for production and operation required by each unit of power generation and pollutant emissions. In 2021, the power generating unit No. 6 of Pingwei Power Plant ranked No. 1 among the same type of power generating units of SPIC in terms of coal consumption for power supply; while power generating unit No. 2 of Fuxi Power Plant and power generating unit No. 2 of CP Shentou ranked No. 1 in terms of coal consumption for power supply against regional benchmark.

Resource conservation in operation

- During project construction, in compliance with the “Management Measures for Green Engineering Construction” of the Group, we have enhanced the recycling of various materials used at the construction sites, established the ledgers and checklists relating to the maintenance of machineries and equipment, restricted collection of materials and reuse of construction garbage so as to strengthen the standardized management on construction resources.
- During daily office operation, we placed emphasis on advocating conservation of water, electricity, fuel and paper so as to encourage employees to lead a low-carbon lifestyle with green concept of recycling. In addition, we have strengthened the monitoring and management of energy consumption in offices or related venues by using energy-saving office equipment, thereby fostering our green offices.

Case Promoting regional ecological balance and development through sludge blending combustion

On 21 October 2021, Phase 1 of Urban Sludge Blending Combustion Project of Wuhu Power Plant was officially put into operation. Upon commencement of operation, daily and annual amount of sludge for blending combustion of the project was not less than 100 tonnes and nearly 40,000 tonnes, respectively, which will directly contribute an economic benefit of more than RMB8 million. Implementation of the project has effectively mitigated the problem concerning the disposal of sludge in Wuhu City, promoted utilization of the local sludge and biomass resources in full. Thus, urban solid wastes can be treated harmlessly, reduced and reused, hence benefiting the regional ecological balance and development.

Case Carrying out Energy Saving and Consumption Reduction Action

In August 2021, Dabieshan Power Plant issued the “Initiatives Relating to the Energy Saving and Consumption Reduction Action (《關於開展節能降耗行動的倡議書》)”, which required all employees to implement various measures under the Energy Saving and Consumption Reduction Action. Meanwhile, it has improved the “Implementation Rules of Energy Saving and Consumption Reduction (《節能降耗實施細則》)” to specify the requirements on 10 areas of conservation in use of various resources such as conserving paper, effective use of labor costs and enhancing the economic benefits of power generating units, aiming to increase the utilization efficiency of various resources generally and driving the development into a green and low-carbon enterprise.

Case Striving to become the Low-carbon Leader

In September 2021, the Group organized the first session of the campaign themed “Striving to Become the Low-carbon Leader” in a systematic manner. Scoring and rating were based on the monthly scores recorded on the “Low-carbon e points” platform of SPIC. Employees shall enter the occasions of “clearing the plate” and the time of stop driving in the above platform every day. According to the ranking based on the recorded platform scores, the accreditations of “Low-carbon Leader”, “Low-carbon Master” and “Low-carbon Talent” will be elected respectively, so as to encourage the practices of low-carbon concept in every aspect and nurture the daily low-carbon lifestyle and habits of employees.



Practicing the concept of environmental protection

We advocated enterprises and the society to implement the concept of environmental protection by organizing environmental protection activities, so as to enhance the understanding of the importance of protecting the ecological environment, and contribute every effort to the construction of our beautiful home planet.

2021

No ecological and environmental protection violations and emergencies

No general and serious incidents in relation to environmental pollution and exceedance in average hourly environmental protection indicators

Shangqiu Power Plant won the 2021 Benchmarking Honor Award for Energy-saving and Low-carbon Coal-fired Power in Henan Province

Case

Hosting fish hatchery activity to enhance fishery resources

Changzhou, Guangxi, a water conservancy hub, is located at the branch of 12km upstream from River Xun in Wuzhou, Guangxi. The region between upstream and downstream is suitable for inhabiting, breeding and feeding various types of fish to survive the winter. Since 2009, we hosted the releasing fishery resources campaign regularly for 12 consecutive years. On 31 July 2021, jointly participated by the Wuzhou Municipal Bureau of Agriculture and Rural Affairs, Fishery Law Enforcement Team and the relevant business units in Changzhou region, the project underwent on-site inspection, verification and random testing and subsequently organized the fish hatchery activity by employees, volunteers and the local public in an orderly manner. Nine fry species with a total of over 6.3 million fishes such as black carp, grass carp, silver carp and big-head carp were released for enhanced breeding.



Releasing fishery resources campaign in Changzhou, Guangxi, a water conservancy hub, in 2021

Case

Conducting the promotion campaign of "World Environment Day"

On 5 June 2021, embracing the 50th World Environment Day, China Power organized the promotional campaign themed "Symbiotic Harmony of Human and Nature" for environmental protection by various units under the Group, propagating and performing the concept of green development. Through various means such as setting up of enquiry counters, hanging banners and distributing pamphlets, Yaomeng Power Plant and Shangqiu Power Plant conducted activities to promote the law and knowledge of environmental protection and introduce environmental power generation technologies. Changshu Power Plant organized "Ecological Walk" hiking activity to promote "Carbon Emission Peak and Carbon Neutrality" on the Tiehuangsha Ecological Island, Changshu City. Through a range of events such as "Carbon Neutrality" tree planting, the "Most Beautiful Coastline" hiking and competitive Q&A on environmental protection knowledge, low-carbon culture and ecological ethics were advocated. Dabieshan Power Plant held a low-carbon hiking activity in Cultural Park, Xiaogan Village, Macheng City, competitive Q&A on environmental protection knowledge and environmental signatures, to ensure performing of the environmental protection concepts by employees.



Intelligent Innovation

Innovation of energy ecosystem by technical development

Serving as the primary momentum for development, innovation is the strategic support for the modern economic systems. During the development of intelligent energy, innovation is the essential means of promoting energy revolution. China Power has been enhancing the synergy of key technologies, continuing to breed and promote the evolution of new technologies, new business models and forms of intelligent energy. Meanwhile, by further pushing ahead the corporate digital transformation, China Power will deepen its management reform and consolidate the safety development, laying the solid foundation for the development of intelligent energy. In addition, it continues to seek innovation and breakthroughs in technologies, models, management and services as well as fosters constant innovation of the energy ecosystem.

Sustainable Development Goals of the United Nations



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation



Key Topics

Serving for implementation of national strategies

Reform of State-owned enterprises

Strategic transformation

Intelligent innovation

Production safety

Management Systems

Incentive Measures for Technological Achievements

Management Regulations for Scientific and Technological Work

Management Measures for Scientific and Technological Project

Management Regulations for Intellectual Property

Implementation Rules for Managing Innovation Work Management (Trial)

Management Regulations for Information-based Works

Management Measures for Electricity Market Transactions

Management Measures for Integration of Planning-Budget-Assessment-Incentive (JYKJ)

Management Manual for Quality, Safety, Health and Environment

Management Regulations for Production Safety Responsibility System

Management Measures for Safety, Quality and Environmental Protection Objectives

Management Measures for Safety, Quality and Environmental Protection Incidents

Management Measures for Safety, Health and Environmental Risks

Management Regulations for Production Safety Rewards and Punishments

Measures for Production Safety Supervision and Administration

Regulations on Emergency Work Management

Management Rules for Production and Operation Information Monitoring and Scheduling

Management Measures for Equipment Reliability

Management Measures for Safety Education and Training

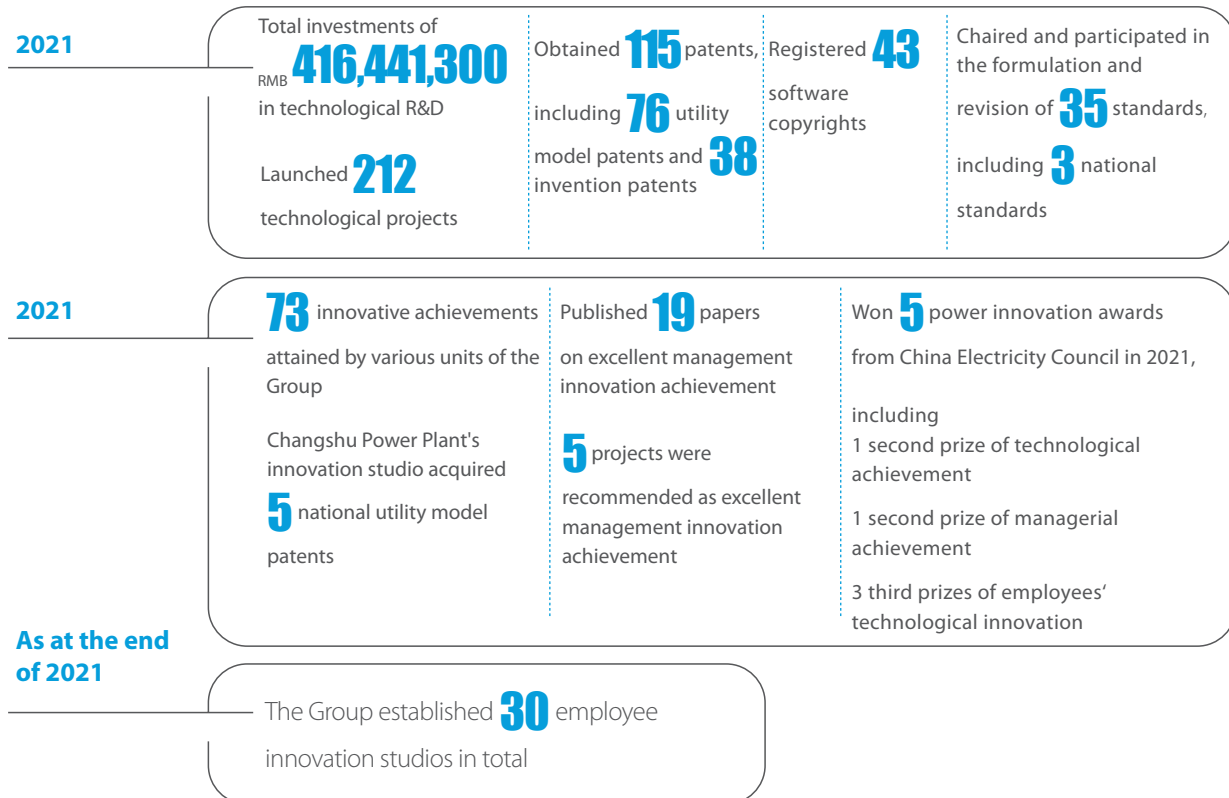
Management Measures for Occupational Health Work

Management Measures for Occupational Diseases and Work-related Injuries

Management Measures for the Safety of Employment of Outsourced Projects and Labor Services

Optimizing the Layout of Innovative Management

The Group has been intensifying technological innovation in serving the Group's development strategy. With the continuous enhancement in technological innovation capability, we strengthened the synergy of the collaboration between internal and external scientific research resources, promoting in-depth integration of research application among industries and academia. We have nurtured technical innovation talents, and explored the establishment of a win-win development model through the university-enterprise cooperation, aiming to provide impetus for the Group's transformation and development.



Innovation achievements

- The Project of Development and Application of Shutdown Protection System for Thermal Equipment in Coal-fired Power Plant jointly published by CP Hua Chuang and Fuxi Power Plant won the Second Prize of 2021 Golden Apple Award for power technological achievements;
- The Desalination Method in Substitution of Aeration (with Oxygen) Treatment Technology Project of CP Hua Chuang won the Second Prize of 2021 Power Industry's Plant Management and Technology Innovation Achievement Award and the Third Prize of 2021 Technology Innovation Achievements of China Power. The research achievements of the project have reached the international advanced level, while its technical upgrade has attained satisfactory results as planned;
- "Operation Management System for Sale of Power Generation By-products" developed by CP Guorui won the First Prize of 2021 Power Industry's Plant Management and Technology Innovation Achievement Award.

Deepening innovation management

- Based on the industrial layout of the Group, we have continued to promote the development of innovation capacity and cultivate the development capacity of cutting-edge technologies;
- We have strengthened the all-process control of technological projects, promoted the summary and refinement of excellent innovation achievements, and enhanced the publication of innovation achievements;
- We have enhanced the management of model worker innovation studio, given full play to the carrier role of the innovation studio, and conducted a wide range of activities, such as tackling problems in open recruitment procedure (揭榜), QC activities and approaches for tapping into five small (五小) innovation aspects;
- We have organized the "Technological Innovation Quarterly Bulletin of China Power" to collect the contents of technology policies, technology trends, system trends and introduction to technological achievements and circulated it to the associated units in time to realize the sharing of technological information and resources and hence promote the application of advanced technologies in practical production.

Improving soft power of innovation

- Surrounding the key tasks of the Group, we have conducted research on soft topics such as “Carbon Emission Peak and Carbon Neutrality”, energy storage industry, formulation of energy storage standards and rural revitalization;
- We held the technological exchange conference of China Power to share and exchange the current research hotspots in the field of energy and difficulties and challenges relating to the production of the associated units of China Power;
- In 2021, we totally organized the publications for 19 papers on innovation achievements under excellent management, of which 5 were recommended as innovation achievements under excellent management, and won one Second Prize of Technological Achievements, one Second Prize of Management Achievements and three Third Prizes of Employees’ Technological innovation at Power Innovation Award 2021 of China Electricity Council.

Deepening innovation cooperation

- We have established a joint venture with Shenzhen Yutuo Intelligence Co., Ltd. to jointly develop the robot intelligent application technology;
- We have strengthened cooperation, by way of in-depth exchange, with domestic renowned colleges and universities such as North China Electric Power University, Changsha University of Science & Technology and Northeast Electric Power University in 2021;
- We have entered into the cooperation agreement with North China Electric Power University to promote the construction of the graduate workstation. In 2021, we have officially commenced the operation of CP Hua Chuang-North China Electric Power University graduate workstation and accelerated promotion of the establishment of CP Hua Chuang-Northeast Electric Power University graduate workstation.

Protecting intellectual property rights

- We have applied for invention patent and utility model patent of a dry ash sealing and shrinkage bulk loader during the implementation of the technological project of comprehensive utilization of power generation by-products.

Case CP Zhihui won the “National Energy Digitalization Demonstration Project Award”

On 12 October 2021, “USTB Industrial Park Integrated Intelligent Energy Project” invested and constructed by CP Zhihui won the “National Energy Digitalization Demonstration Project Award”. The project is a multi-energy synergy system that combines power supply system, heating and cooling with multiple modes of energy such as wind power, photovoltaic power and natural gas. It achieved the intelligent control and optimal modulation in IEMS with photovoltaic power charging and micro-grids for wind and photovoltaic power and energy storage technology with a view to realizing the in-depth integration of energy flow and information flow and creating an energy internet with coordination of “Power Source, Grid, Load, Storage and Control”.

Case CP Hua Chuang was granted the first national invention patent authorization

In 2021, “An Evaluation Method for the Duration of Epoxy Mica Insulation of Generator Stator Bars” developed by CP Hua Chuang was officially authorized by China National Intellectual Property Administration. The research results are of great popularization and application value for generator manufacturers to improve their skill level of insulation in production, and for coal-fired plants and nuclear power plants to assess the aging conditions and life-cycle management of steam turbine generators. It is not only conducive to intellectual property protection, but also provides strong support for improving the core competitiveness.

Case Strenuous efforts in creating a new business model of “Carbon Finance + Integrated Intelligent Energy” for rural revitalization

CP Changxing has created a “Carbon Finance + Integrated Intelligent Energy” business model. It utilizes integrated intelligent energy to serve the development of all industries in the rural village, create more economic benefits and realize the cost reduction and profit increase. This scheme solves the financing-related problems through carbon neutrality debt + carbon pledge financing, solves the income-related problems through carbon trading, and accumulates quality carbon assets to improve market value management of enterprises, and rural energy project profitability and sustainable development capability of enterprises, ultimately realizing the innovation from the traditional business model to mixed business model.



Integrated Intelligent Energy Project of CP Changxing in Jiangxiang Village

Promoting Digital Transformation

We have promoted the in-depth digital development and transformation, promoted the sharing of internal data resources, developed and upgraded informatization systems, focused on improving the quality of operation and maintenance services and improved the efficiency of internal management with informatization management. In 2021, the Group has deepened the application of its financial sharing and production safety, health and environmental protection system, and the content of comprehensive data display has been enriched constantly so as to further improve its professional management level and scientific decision-making ability.

2021

**Suzhou Shared Service Company
won the Best Sharing Platform Prize at
2021 China Treasury Award**



Strengthening information management

- We have modified and compiled the informatization development plan and management system. We have completed the modification and compilation of informatization development plan for the "14th Five-Year" period of the Company and have comprehensively streamlined the informatization management system
- We have established the technology and information management system to realize the all-process management of technological projects and informatization projects
- We have promoted the launch of 14 RPA robots, such as automatic fund payment approval and intelligent order approval to improve the working efficiency of the finance procedures
- We have promoted the construction of infrastructure ERP to realize the efficient capital transfer and completion settlement of infrastructure companies



Promoting digital sharing

- We have completed the construction of the "intelligent new energy operation and maintenance platform" project. We have fully utilized the online real-time data application, fault early warning and diagnosis, and the promotion and application of production management system platform with a view to realizing remote data interconnection, early warning and diagnosis, intelligent operation and maintenance so as to effectively improve the intensive management level of new energy
- We have promoted and optimized the finance sharing system and tax sharing system, assisted in the construction of the regional sharing center, and created a cross-data center task pool mode for the first time to handle the businesses of companies in three provinces, thereby realizing the setup of finance sharing and business access among the companies in Fujian, Hainan and Shanxi as well as the comprehensive construction of the sharing center in Suzhou
- We have developed a financial data analysis platform, realizing the visual display of 207 key financial indicators on PC and mobile terminals

Case

China Power's technology and information management system was officially launched and put into operation

On 16 August 2021, a new China Power's technology and information management system was officially launched and put into operation to further promote the improvement of its technology and information management, achieve standardized, visual, traceable, searchable and analyzable technology and informatization projects, ensure the specific responsibilities, closed-loop management of problems and information sharing and implement the all-process control of projects in a centralized and efficient way. In addition, it has provided the support for making decision in relation to investment, supervision and optimization of technology and informatization by the Group with a view to improving the overall level of technology and information management.

Case

CP Huizhi promoted the digitalization transformation of financial management

CP Huizhi has actively developed the intelligent application innovation project, conducted its independent innovative R&D on RPA robot and finance sharing robot projects in the area of digitalization transformation, launched human resources sharing RPA robot project in China Power's headquarters, nine coal-fired power generation companies, and companies in Beijing and launched the finance sharing robot project in the sharing center. On the basis of process-based management of traditional robot, this project uses OCR and NLP AI technologies for automatic processing of settlement business in material-related contracts, improving the accuracy, timeliness and standardization of data.

Case

Digitalization achievements of Wu Ling Power won a special prize at Hunan BIM Application Competition

On 3 November 2021, achievements of Wu Ling Power on BIM and digitalization application in the whole design and construction process of large complex engineering project won a special prize at the third Hunan BIM Application Competition held by the Department of Housing and Urban-Rural Development of Hunan Province. For this project, Wu Ling Power has fully utilized the BIM technical advantages, developed the multi-dimensional BIM application and BIM-based engineering digitalization control platform so as to create a carrier of engineering big data, integrate the full life-cycle data of engineering, realize multi-party information sharing and integrated synergistic control and develop digital gene of engineering with a view to jointly creating intelligent engineering projects.



Deepening Corporate Reform and Development

Pursuant to the requirements of the Three-year Action Plan of the Reform of State-owned Enterprises promulgated by SASAC and SPIC, we, as a Double-Hundred Enterprise, further push forward the Three-year Action of the Reform. Focusing on optimizing and improving control and governance system of China Power, we have improved the modern enterprise system with Chinese characteristics; focusing on the Three-System reform and medium and long-term incentives, we have improved the market-oriented operation mechanism; driven by innovation and centered on transformation, we have also optimized our industrial layout and asset structure. In 2021, various reform tasks of the Group have been carried out in an orderly manner according to the requirements of the implementation plan and task ledgers, so as to continuously release our vitality and stimulate staff motivation to realize strategic transformation of the Group.



Pushing forward the reform of State-owned enterprise

According to the deployment requirements of the Three-year Action Plan for the Reform and benchmark improvement action, we have tracked and supervised the progress of the above said actions, held two themed promotion conferences to publicize the assessment indicators of key reform tasks of SASAC and SPIC and formulated two supervision lists;

Within the scope of tasks, the board of directors has been adequately established with external directors as the majority. The subsidiaries at all levels have comprehensively pushed forward the fixed-term system of managers and contractual management and basically completed the “Two non-core and no advantage businesses” divestment tasks assigned by SASAC and the disposal of low-efficiency and non-performing assets deployed by the Group;

We have carried out various special tasks in relation to the benefit maximization and “double-loss” governance. With the SDSJ management tool, we have weekly tracked the change results and reasons of “two-price and one-quantity” of each coal-fired power plant, continuously tapped into the business potential and successfully completed the supervision and loss reduction tasks under the Three-year Action Plan for the Reform of State-owned Enterprises.



Further participating in power market trading

We have carried out the trial operation of long-term settlement of spot goods in Shanxi. CP Shentou has continued to optimize the functions of the auxiliary decision-making system to develop a relatively mature spot goods trading process and system, led the establishment of trading offices for two provinces, shared the market trading information with other companies of the Group in Shanxi and released the recommendations on trading plans;

We have released the “Implementation Plan for Standardization Construction of Electricity Sales Companies of China Power” and taken 4 electricity sales companies, namely, CP Hefei, CP Changshu, CP Hulian and Shanxi Shentou, as the pilots to further promote the standardization construction of electricity sales companies.



Improving internal management mechanism

We have established JYKJ “1+N” system management regime in line with our own characteristics. We have comprehensively upgraded various JYKJ management systems, implemented the management responsibilities of JYKJ organization, regularly held themed JYKJ meetings, and timely studied the special works to improve the decision-making efficiency of the Group and improve the work quality of JYKJ;

We have further pushed forward the substantive entrusted management of large conglomerate enterprises by platform companies, formulated plans for injection of large conglomerate assets under the scope of reform into platform companies, revised and upgraded the checklist of respective rights and responsibilities of platform companies and entrusted large conglomerate enterprises to push forward the asset transfer in an orderly manner.



Case**China Power successfully issued the first coal-fired power asset (similar to REITs) product in China**

On 26 November 2021, SPIC-China Power Energy Infrastructure Investment and Anhui's Asset-backed Special Program (similar to REITs) was successfully issued and established on the Shanghai Stock Exchange. The product is both the first infrastructure (similar to REITs) product with coal-fired power assets as underlying assets in China and the first batch of equity financing infrastructure (similar to REITs) product on the stock exchange. The successful issuance of the product realizes equity financing of RMB2.576 billion for China Power. This innovative product provides a new concept to China Power and SPIC for coal-fired power asset revitalization and energy transformation, marking great significance on innovation.

Case**Wuhu Power Plant held an innovative market exchange and sharing meeting**

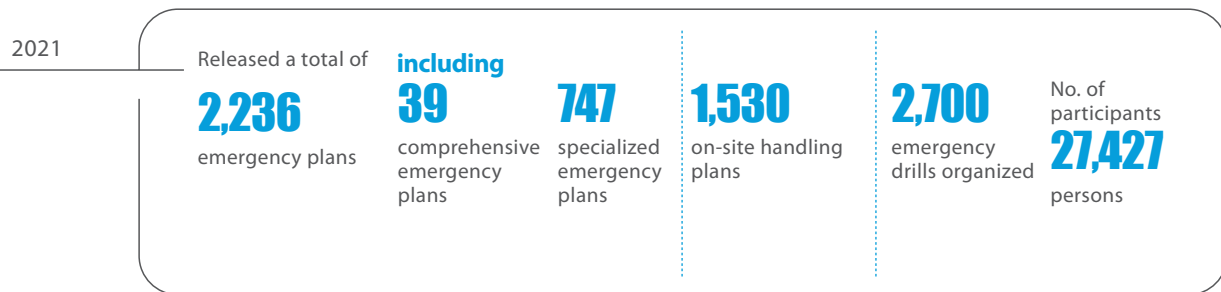
In the afternoon of 27 August 2021, Wuhu Power Plant held an innovative market sharing and exchange meeting. At the meeting, participants focused on learning the relevant knowledge of power spot market and carbon trading market, and discussed hot issues such as spot trading modes, settlement examples, carbon trading CCER emission reduction audit intensively. The meeting was the latest measure taken by Wuhu Power Plant to actively adapt to the power market reform and improve its adaptability to the power market, laying the solid foundation for it to participate in market competition in the future.

Creating a Safe and Stable Environment

We have strictly complied with the Production Safety Law of the PRC and the Law of the PRC on the Prevention and Control of Occupational Diseases and other safety and health-related laws and regulations, emphasizing the improvement in safety management and enhancement in safety capability with the focus on attaining the goal of “zero fatality” and “zero incident”. We have continued to improve the level of production safety management, with an aim to create a sound and safe development environment.

Improving safe production management

We have strengthened the building of the mechanism and system, laying the solid foundation of the safety management. We secured safety production by carrying out the assessment on the establishment of the safety, health and environmental protection system comprehensively, preventing the risks of safety production strictly, analyzing the loopholes in safety production in depth, and formulating counter-measures in a timely manner. In 2021, Pingwei Power Plant became the first “Four-Diamond and Two-Star” unit of the Group, and it was established as the “Four-Diamond” benchmarking unit for the safety, health and environmental protection system. In 2021, zero work day was lost due to work-related injuries.



No general and serious casualties and equipment accidents	No accidents related to dam leakage/collapse of dam in reservoirs and ash reservoirs and flooding of power plants	No general and serious fire accidents	No general and serious power safety accidents	No general and serious traffic accidents
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Number of work-related fatalities occurred in each of the past three years	2019	2020	2021
Number of people	0	0	0
Proportion	0	0	0

- Prepared and issued the “14th Five-Year Plan” for QHSE of China Power International Development Limited to promote the development and improvement of the HSE management system;
- Strengthened the development of our institutional systems and plan systems, prepared and issued the Checklist for Production Safety Accountabilities of China Power Headquarters (2021), and revised 23 systems, such as Regulations for Production Safety, Measures for the Implementation of Due Diligence and Monitoring on Production Safety and Regulations for Emergency Management;
- Guided 6 companies (such as Pingwei Power Plant and Fuxi Power Plant) to pass the evaluation of HSE system (AAA) and promoted the significant improvement of HSE management level of grass root.

Improving safety system

- Formulated and issued the Key Points of Supervision on Safety, Quality and Environmental Protection of China Power in 2021, held 3 times of general survey of dynamic safety supervision, conducted overall analysis on staffing, personnel structure, experience and qualification of system safety supervisors and established a reliable safety supervision team;
- Strengthened the safety supervision on the construction site, regularly inspected safety on site, and strengthened the safety supervision and management of contractors;
- Strengthened the control of maintenance process, quality and procedures, inspected the maintenance on site and urged the rectification of issues to ensure “completion of all required maintenance” with a view to ensuring the safety and quality of maintenance.

Strengthening safety supervision

Strictly preventing safety risks

- Strengthened the comprehensive management of production safety, enhanced the elimination and inspection of hidden hazards, improved the foundation of production safety, formulated and implemented measures to ensure power supply and production safety in key periods, carried out special inspection actions for production safety throughout the whole system, organized all companies to monthly sort out and report the Top 3 issues in relation to operation risk and elimination and inspection of hidden hazards, and formulated prevention and control measures;
- Organized the preparation of the work plan for the construction of the dual prevention mechanism of hierarchical control of safety risks and elimination, inspection and treatment of hidden hazards, and improved and refined the “two checklists” of this dual prevention mechanism;
- Optimized and improved the operation, equipment, occupational health and environmental risk database, strengthened the effectiveness of hazard identification and safety technical disclosure, and effectively improved the hazard identification, risk assessment and prevention ability of all employees.

Improving emergency response capability

- Assessed the emergency response capability of production plants to comprehensively improve the emergency response capability of companies of basic level;
- Prepared reserve of emergency supplies, established all-round emergency plans and on-site disposal plans, carried out special practical drills for floods, and offered emergency knowledge training for all employees to strengthen employees’ ability of self-rescue, avoid risks and prevent the occurrence of derivative accidents and events.

Case

Fuxi Power Plant used UAV in inspection on high-risk operation site for the first time

On 12 November 2021, Fuxi Power Plant innovatively used unmanned aerial vehicle (UAV) in inspection of on-site safety in respect of the quality inspection works of No.1 power generating unit after reinforcement of cooling tower. Fuxi Power Plant comprehensively inspected the arrangement of safety measures on the tower top, supervisors reporting on site and the operation procedures of working staff, and carefully reviewed the HD operation scene sent by UAV, so as to effectively improve the quality of safety supervision on site and ensure the safety of inspection.



Case

Pu’an Power Plant conducted an on-site emergency drill in mine

On 16 November 2021, Pu’an Power Plant organized an emergency response drill for personnel injury accidents, and invited the personnel of Pu’an County Emergency Management Bureau to provide professional guidance to the drill with a view to strengthening the emergency response ability of the mining team of Pu’an Power Plant in Daisu Mine, thereby improving the emergency response measures and creating a sound and safe development environment.



Improving safety production ability

We have formulated and improved various safety construction systems, put great efforts to provide employees with a safe and reliable working environment, offered diversified safety education and training, strengthened the safety supervision and management of contractors, continuously improved employees' awareness on production safety, standardized their safety production behaviors, and continuously strengthened the safety production capacity of enterprises.

2021

1,250
safety education
and training
programs in total

Safety education and
training programs were
provided to
81,987 persons



Laying the solid foundation for safety

- In accordance with Guiding Opinions on Safety Construction of SPIC Teams, we have formulated the Five-year Plan for Construction of Demonstration Teams, Scheme for Implementation of Safety Construction of Teams, Scheme for Assessment and Review on Safety Construction of China Power Teams and Manual on Safety Code of China Power Employees to fully promote the safety construction of teams;
- Printed and distributed 2020 Compilation of Safety Warnings, and distributed 40 safety and environmental protection warning cards to strengthen the risk prevention awareness of employees.



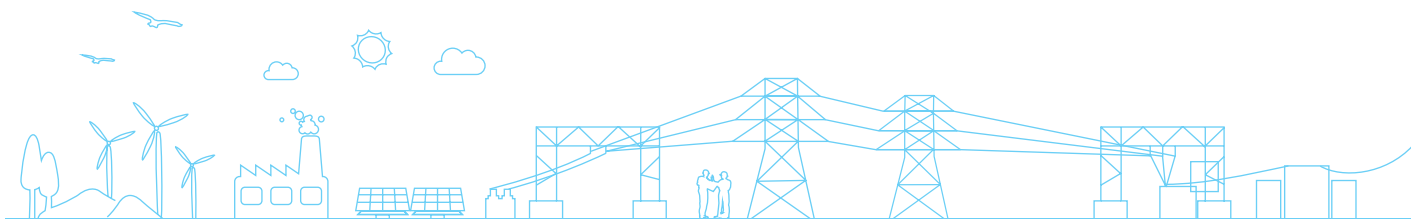
Emphasizing safety publicity

- With combination of "Safety Production Month", "Safety Lecture", "Publicity Day" and other relevant activities, we have publicized the safety culture system and connotation of the Group in an all round way in form of copywriting and video through secured WeChat Official Account, Diantouyi (電投壹) app and websites;
- Strengthened the concept of safety culture, thoroughly implemented the important idea of the State's Chairman Mr. Xi Jinping on production safety, and organized to watch various publicity videos on production safety.



Enhancing safety education

- Organized safety training and education for leaders, safety production managers and front-line operators in different fields, at different levels and with different themes, set up the "Safety Management Training Course for Leaders of Companies of Basic Level" and "2021 Production Safety Lecture";
- Conducted safety training through cloud training system. As at the end of 2021, we have totally offered 2,222 training programs, held 12 sessions of safety examination, and examined a total of 3,016 persons, at random, from leadership team, safety supervision, production management, operation and maintenance personnel to contractors, in a bid to comprehensively improve risk prevention awareness of employees;
- Devised the China Power HSE System Development and Improvement Plan, and held training classes for China Power HSE management system reviewers to vigorously improve abilities of HSE system developers of companies of basic level.



Case Dabieshan Power Plant conducted noise control treatment for the entire plant

On 9 September 2021, Dabieshan Power Plant obtained the first work permit of noise control treatment EPC Project for the entire plant, marking the official commencement of the project. The noise control treatment project for the entire plant is a livelihood project of the Company. Based on the on-site noise monitoring results, Dabieshan Power Plant installed silencing hood and barrier on equipment with higher noise level, such as cooling water tower, air compressor and three major fans, realizing the noise reduction and protecting the health of the employees of the power plant and the residents in the surrounding area. To ensure the smooth implementation of the project and achieve the expected goals, Dabieshan Power Plant invited experts from Central Southern China Electric Power Design Institute, China International Engineering Consulting Corporation and other domestic top-notch acoustic experts to review and assess the special report and preliminary design plan, laying a solid foundation for the smooth implementation of the project.

Case Yaomeng Power Plant offered training on fire safety knowledge

To further improve the fire safety awareness of all employees, popularize fire safety knowledge and improve the adaptability and self-protection ability of employees, on 26 November 2021, Yaomeng Power Plant organized training on fire safety knowledge and invited instructors from Henan Fire Protection Association to demonstrate a number of fire accident cases through videos and pictures, analyze the causes of the accidents and give a lecture of proper self-rescue and mutual-rescue measures.



Mutual Achievement

Bringing value recognition through win-win integration

Adhering to the integrated development approach, China Power firmly upholds the concept of “Talent is the topmost resource”, develops a comprehensive training and development system and pursues the mutual growth of enterprises and employees. It actively builds an ecosystem and partnership network with joint contribution, shared benefits and common prosperity in order to create a paradigm of industrial cooperation. It promotes energy development in rural areas and drives the building of beautiful villages with new momentum. By implementing procurement with transparency, it develops a responsible supply chain and makes every effort to promote value recognition in diversified aspects.

Sustainable Development Goals of the United Nations

	End poverty in all its forms everywhere
	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
	Ensure healthy lives and promote well-being for all at all ages
	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
	Achieve gender equality and empower all women and girls
	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
	Reduce inequality within and among countries
	Make cities and human settlements inclusive, safe, resilient and sustainable
	Strengthen the means of implementation and revitalize the global partnership for sustainable development

Key Topics

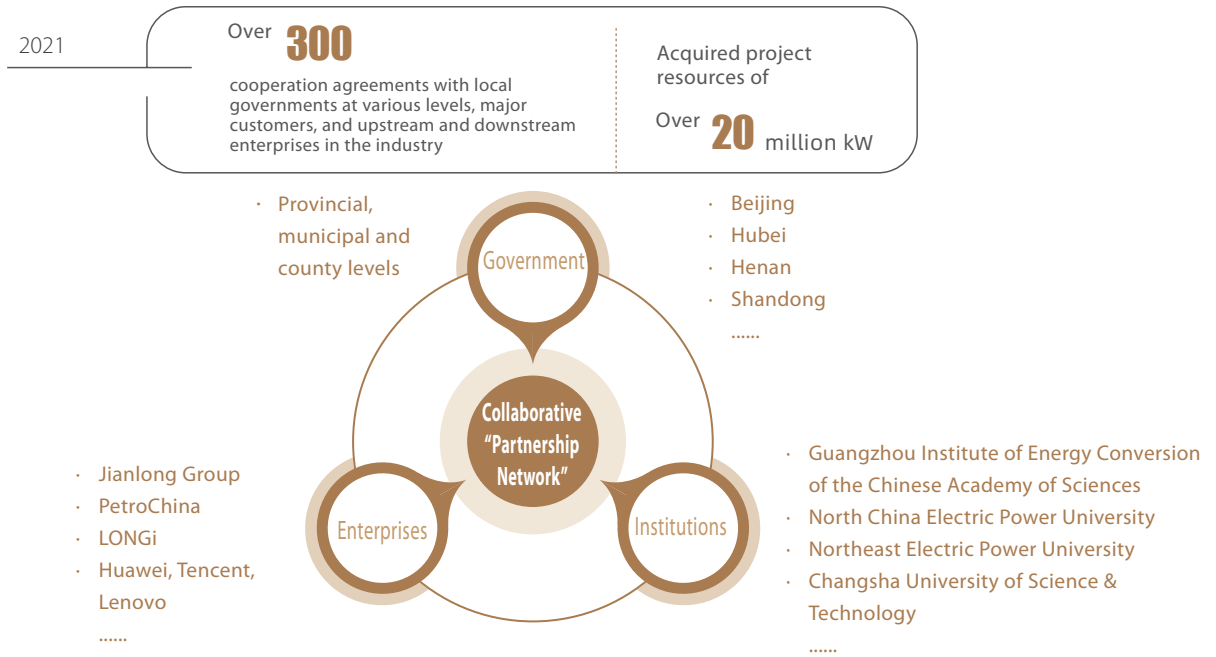
- Strategic transformation
- Serving rural revitalization
- Responsible procurement
- Supply chain risk management
- Protection of employees' rights and interests
- Career development of employees
- Occupational health and safety of employees
- Caring for employees
- Volunteer and charitable activities
- Win-win cooperation
- Building corporate culture

Management Systems

- Management Measures for Recruitment
- Management Measures for Labor Contracts
- Management Measures for Employees' Career Development
- Management Measures for Employees' Welfare Expenses
- Management Measures for Employees' Rewards and Punishments
- Management Measures for Therapy and Recuperation of Employees
- Management Measures for Assistance to Employees Suffering from Serious Disease
- Management Measures for Employee Caring Activities
- Management Measures for External Donations
- Management Measures for "Yingshanhong" Youth Volunteer Service Activities
- Management Measures for Material Procurement
- Management Measures for Material Suppliers
- Management Measures for Misconduct Records of Suppliers
- Management Measures for Inspection and Rectification of the Objections and Questions of Suppliers
- Management Measures for Information Disclosure

Creating Diverse Cooperation Values

We have been exploring the building of an ecosystem for the cooperation and mutual benefit of the Company and the local governments, while establishing a sound working relationship with local authorities. At the same time, we have signed strategic cooperation agreements with industry leaders to explore green and low-carbon energy solutions. The collaboration with strong business partners allows our strengths to complement each other and facilitates resources integration, so that we can work together to achieve progress in key cooperation fields such as agricultural modernization, green and low-carbon intelligent communities, large-scale new energy bases and county development, fostering a positive cooperation relationship.



Cooperation between government and the Company

- Actively planned and facilitated visits and exchange of views with local governments. In 2021, the Group met with the governments of over 30 provinces and municipalities, including the governments of Beijing, Tianjin and Liaoning Province. The Group's leadership team also intensively visited key members of 19 provincial governments in Hubei, Henan, Shandong, Shanxi and Gansu. Following the systematic reporting, promotion and introduction of our new corporate strategy, our development needs and the difficulties faced by us, the local governments showed us their understanding and offered guidance and support to the greatest extent
- Applied for membership and became the vice-chairman unit of the Committee on Energy under the Hong Kong Chinese Enterprises Association, where we actively made recommendations to the Committee on Energy on the relevant works and facilitated and participated in the exchange of views between the committee and the Environmental Protection Department of Hong Kong

Cooperation between the Company and other enterprises

- Expanded the partnership with major customers and understood their needs to identify the right starting point of cooperation for both parties, so as to gradually establish an efficient collaboration mechanism and build a solid working relationship
- Formed substantial partnerships with Jianlong Group, PetroChina, LONGi, Mingyang Group and Sungrow
- Built a low-carbon and zero-carbon big data centre with Huawei, Tencent and Lenovo

Cooperation between institutions and the Company

- Participated in three exchange meetings on new technologies organized by the Guangzhou Institute of Energy Conversion of the Chinese Academy of Sciences, North China Electric Power University and Changsha University of Science & Technology
- Conducted in-depth exchange with renowned electricity institutions successively, which included North China Electric Power University, Changsha University of Science & Technology and Northeast Electric Power University

Cooperation projects of various business units

Hong Kong Affairs Department

Applied for membership and became the vice-chairman unit of the Committee on Energy under the Hong Kong Chinese Enterprises Association, where it actively made recommendations to the Committee on Energy on the relevant works and facilitated and participated in the exchange of views between the committee and the Environmental Protection Department of Hong Kong

Pingwei Power Plant

Facilitated the joint development of beautiful rural areas, new energy projects and integrated energy service projects under the strategic agreement for county energy development entered into with the People's Government of Xiejiaji District in Huainan

CP Changxing

Established comprehensive cooperation in intelligent energy, clean energy supply and circular economy under the strategic cooperation framework agreement for rural revitalization entered into with Jiebang Village in Pudong New Area, Shanghai

Wuhu Power Plant

Commenced the cooperation in the joint implementation of new energy base projects and the construction of integrated intelligent energy cities under the strategic cooperation agreement and the investment development agreement for the integrated wind and photovoltaic power generation and storage projects entered into with Suibin County Government in Hegang City



China Power signed strategic cooperation agreement for the development of beautiful rural areas with Chaoyang municipal government



China Power signed strategic cooperation agreement with Tencent Cloud



China Power signed strategic cooperation agreement with Huawei



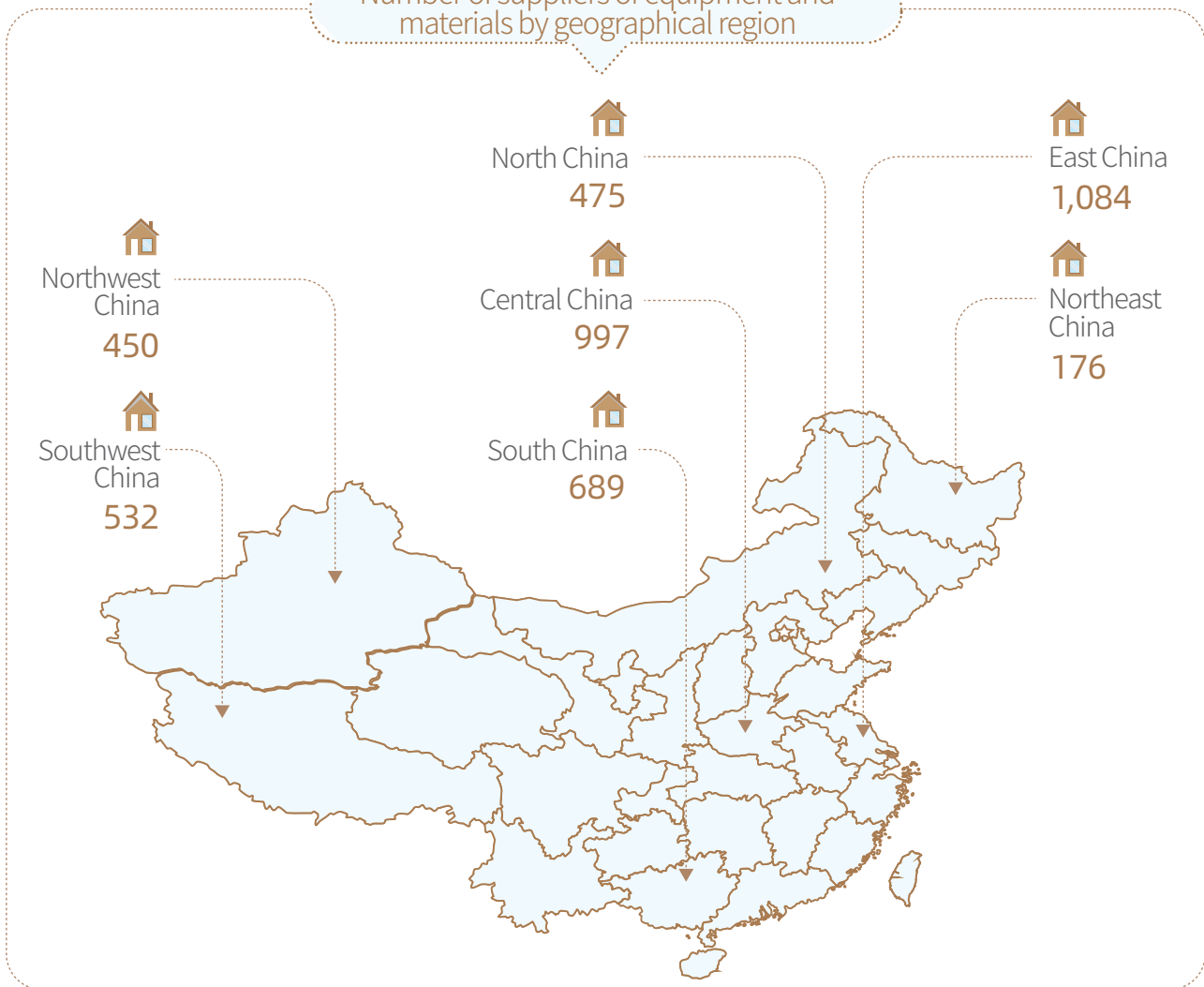
China Power signed strategic cooperation agreements with the People's Government of Tangshan City and the People's Government of Luannan County

Enhancing Supply Chain Management

We have formulated a series of regulations related to the management of fuel, procurement and suppliers, such as the Management Measures for Fuel Suppliers, Management Measures for Material Procurement, Management Measures for Material Suppliers, to achieve a comprehensive management and control over the Group's procurement activities and supplier selection. We have been strengthening the supply chain management on a continuous basis with a view to building a responsible supply chain.

2021	Audits carried out for	No. of suppliers found defective	No. of suppliers blacklisted
	4,403 suppliers	163	135

Number of suppliers of equipment and materials by geographical region





Optimizing supplier management

- Compiled the List of Qualified Suppliers for Technical Consultancy Service and the List of Qualifier Suppliers for Limestone Granules (Powder) to meet the procurement needs of project units of China Power
- Enhanced supplier and contractor management by taking action against the serious misconducts of 92 suppliers and contractors, and applying the evaluation results in the ERP system



Conducting supplier evaluation

- Assessed suppliers' performance on a case-by-case basis with the supplier evaluation system of the group companies to improve the quality of supplier evaluation
- Established the supplier and contractor evaluation and application mechanism to promote closed-loop supplier and contractor management covering the "selection, evaluation and application" processes

Case Standardizing contractor management

On 21 January 2021, Pingwei Power Plant implemented standardized management requirements for contractors of China Power. It also offered safety training to long-term contractors to regulate their operating practices and promote production safety. The training program lasted for 10 days and covered both theories and practical skills. Following which, contractors were examined and accredited by Pingwei Power Plant, so as to evaluate the effectiveness of the training and enhance the safety management standards of contractors.



Supporting Healthy Staff Development

We have formulated various regulations relating to employee relationship management, talent and workforce development, as well as compensation and benefits, which include the "Management Measures for Labour Contracts", the "Management Measures for Employees' Career Development" and the "Management Measures for Employees' Welfare Expenses". Apart from resolutely safeguarding employees' rights and interests, we also offer full guidance and support for their development, and care about their physical and mental well-being in the pursuit of mutual growth and better future.

Protecting employees' rights and interests

We consider our employees as the primary assets and align them with the Group's development plan in terms of the scale, quality and structure of the workforce. We maintain strict compliance with national laws and regulations in protecting the human rights of employees. Meanwhile, we continue to optimize our performance management system and enhance democratic management to open up the feedback and communication channel for employees.

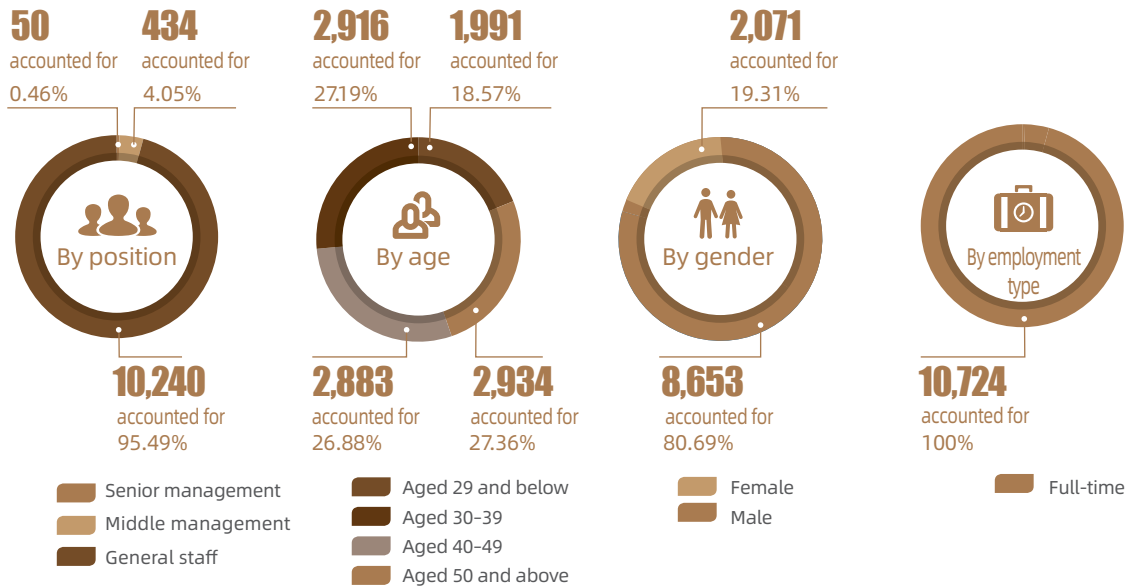
2021

Percentage of employees covered by labour contracts and social insurance maintained at
100%

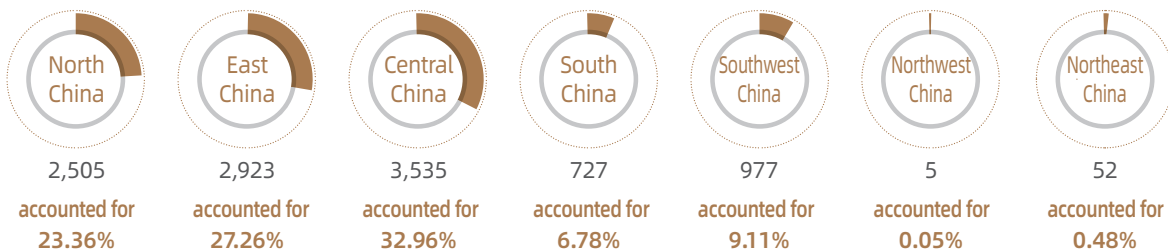
Total number of the Group's employees
10,724

Newly joined fresh graduates
393

Total Workforce in 2021



By geographical region



Employee Turnover Rate in 2021

By employment type	No. of person	Proportion
Full-time	207	1.93%
Part-time	0	0

By gender	No. of person	Proportion
Female	101	4.88%
Male	106	1.23%

By geographical region	No. of person	Proportion
North China	26	1.04%
East China	29	0.99%
Central China	100	2.83%
South China	37	5.09%
Southwest China	15	1.54%
Northwest China	0	0
Northeast China	0	0

By position	No. of person	Proportion
Senior management	3	6%
Middle management	22	5.07%
General staff	182	1.78%

By age	No. of person	Proportion
Aged 29 and below	83	4.17%
Aged 30–39	61	2.09%
Aged 40–49	38	1.32%
Aged 50 and above	25	0.85%

Protection of human rights

- Strictly abided by the “Labor Law of the People’s Republic of China”, the “Labor Contract Law of the People’s Republic of China”, the “Provisions on the Prohibition of Using Child Labor” and other laws and regulations
- Prohibited all kinds of discrimination in recruitment. We opposed forced labor and banned the recruitment of child labor. We also ensured equal pay for equal work without discrimination on grounds such as religion, race, region, age and disability

Compensation and incentive

- Introduced extra criteria for business development assessment on the basis of closely linking the annual remuneration of business unit leaders with their JYKJ appraisal results
- Optimized the special incentive and immediate incentive system, and encouraged all employees to strive for better performance by offering special progress awards for transformation and development projects
- Adopted term-based contractual management for employees at the management level, and signed employment agreements and commitment letters regarding the operating results for the term of office with all employees at the headquarters and those at the executive and management level of the business unit

Democratic management

- Convened staff representative meetings and received 29 proposals from staff representatives to encourage employees to participate in corporate development as stakeholders
- Formulated the Implementation Rules of the Administrative Measures for Establishing Direct Communication between SPIC and Employees by China Power, which motivated staff participation
- Collected 85 reasonable suggestions for the “Doing Real Works for Employees” program and strengthened the supervision and implementation of these measures

Supporting employees' development

By increasing the efforts in talent support and development and enhancing employees' professional skills, we motivated staff and broadened their horizons. We established diversified career development paths and set up the employee development platform to build a strong workforce for the new era.

2021

Percentage of employees who received training

100%

Total training hours of employees

750,218 hours

Total investment in employee training

47,208,500 RMB

Awards received

Skill Competition (Team)
1,000MW Coal-fired Power Centralized Control Operator Skill Competition — First Prize

Skill Competition (Team)
Power Sales and Marketing Skill Competition — First Prize

Skill Competition (Team)
600MW Coal-fired Power Centralized Control Operator Skill Competition — First Prize

Employees Training by Position

Type	No. of Training Sessions	Hours per Capita	Training Coverage Rate (%)
Senior management	155	64.46	100
Middle management	817	82.21	100
General staff	35,271	63.21	100



Strengthening skills training

- Launched the vocational skill enhancement program and held the "World Class Construction" skills competition for employees
- Provided internationalization courses on English, Spanish and other less popular languages for all employees
- Offered 7 sessions of training lectures and organized various training sessions to sharpen the skills of the employees



Facilitating career development

- Published the "Management Measures for Employees' Career Development" and established the career development path for employees in different positions, which covered operation and management staff, professional technicians and operators
- For orientation training of new staff, we offered courses on career management and planning so that they had a clear idea of their career development path

Case Nurturing talents for new energy operation and maintenance

On 28 September 2021, CP Shentou organized the basic knowledge training on new energy and photovoltaic power operation and maintenance, which covered an analysis of the current state and future trends of new energy development. Taking case studies of career development as examples, employees were encouraged to adopt a different mindset and learn new knowledge to realize their potential and apply what they learned during training.

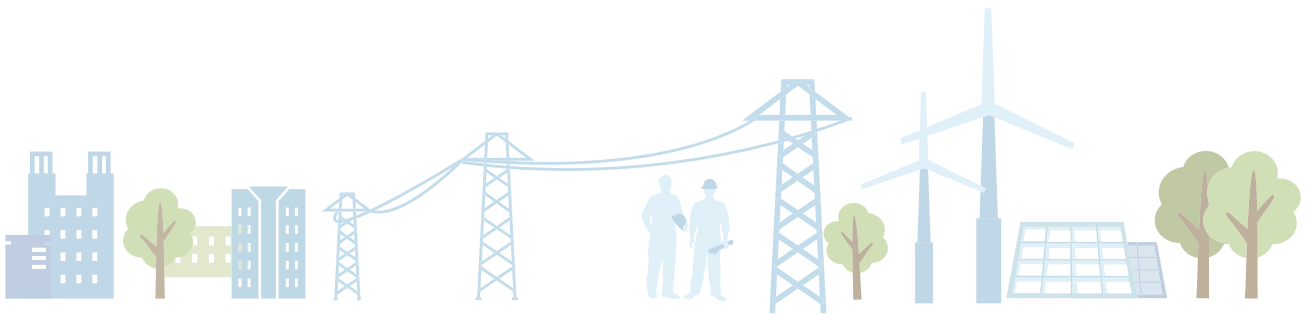
Case Practicing by competing and learning through competition

From 6 to 9 December 2021, China Power held the 2021 “World Class Construction” Centralized Control and Operation for Environmentally Friendly Power Generation Simulation Skills Competition in Chengmai, Hainan. The event focused on contestants’ decision-making, response and coordination skills in case of accidents. It also served as a quality training and demonstration platform for all environmentally friendly power generation companies within the Group, thereby further improving the general business strengths and vocational skills of their centralized control and operation staff.



Case Practicing by competing and learning through competition

On 20 May 2021, China Power organized the 3rd “Grow with the Company” Youth Forum to discuss mainly our transformational development and missions. During the event, the senior management of the Company met face-to-face with young staff and addressed their concerns on new energy development trends, skills enhancement, career planning and county development. Through elaborate explanation and interaction, we pointed young employees in the right direction. The forum was live-streamed on a cloud platform and attracted wide attention online, with nearly 3,000 viewers in total.



Enhancing employee caring activities

We have put the "Implementation Measures for Employee Caring Activities" in place and pushed forward the "Cohesion Building Program" by setting up detailed files for employees in difficulties and optimizing the mechanism for regular targeted support. To further strengthen employees' sense of accomplishment and belonging, we organized 2021 Retreats for Model Workers and Advanced Individuals and rolled out employee caring activities, such as sending warm wishes to them at festivals and extending sincere greetings to model workers and overseas colleagues.

2021	Grant for employees with serious and critical illnesses	Helped children of staff with difficulties pursuing further studies	Solved problems for staff through the "Doing Real Works for Employees" program
	RMB 755,400 Assistance to employees with difficulties 211 cases	17 cases Grant under the "Golden Autumn Education Fund" RMB 64,500	Nearly 500 cases Organized employee caring activities 235 events

The infographic features three heart-shaped callouts connected by dotted lines to various images:

- Care for vulnerable groups:** An orange heart callout points to a sign for "International Women's Day March 8th" and a pink heart-shaped basket.
- Care for employees' livelihood:** A blue heart callout points to a photograph of an elderly man in a blue cap and jacket being assisted by a staff member in a blue uniform.
- Care for employee's health:** A green heart callout points to a photograph of a busy hospital or clinic setting with many staff members in blue scrubs.

Case Changshu Power Plant offering better meals and accommodation for employees

Given the rising expectation of living standards, more and more employees of Changshu Power Plant demanded “better canteen and kitchen conditions to maintain food hygiene of staff more effectively”. On 2 December 2021, the staff canteen and kitchen of Changshu Power Plant passed the acceptance inspection and commenced operation after renovation and upgrade as part of the plant’s “Doing Real Works for Employees” program. The refurbishment work has improved the safety and conditions of the interior and facilities of the canteen and kitchen, which could help maintain the safety and hygiene of employees’ meals. In 2021, Changshu Power Plant concentrated on launching themed activities under the “Doing Real Works for Employees” program and completed 40 projects including the revamping of the break room for night shift staff, the construction of new charging piles for electric vehicles and the upgrade of living conditions in the youth apartment.

Case CP Shentou caring about employees’ cultural lives

CP Shentou aimed at creating a better working experience for employees from four perspectives. Firstly, it cheered employees up by forming 8 cultural and sports clubs to improve their physical health and spiritual lives. Secondly, it decorated the workplace by renovating and transforming the old canteen into a multi-purpose venue for basketball, air volleyball and table tennis games. Thirdly, it increased employee benefits and offered discounts for consumer staples. Fourthly, it introduced employee caring initiatives and revised the Management Measures for Caring Activities of the Labour Union to specify 8 major types of caring activities and greeting standards, which motivated the “comprehensive development for all employees” by doing real works that warmed their hearts.

“We have to incorporate doing real works for employees as part of our routine, so that our colleagues feel attached and see the plant as the “home” that they love and want to come back to.”

— Xue Huiping,
Chairman of the Labour Union of
CP Shentou



China Power’s “Flowery Life, Elegant China Power” floral design activity for female employees



Pingwei Power Plant sent greetings to the staff responsible for securing the energy supply



Wuhu Power Plant organized cultural and sports activities



CP Hua Chuang established the reading corner



CP Huayuan delivered a mental health talk for staff

Cooperation for Social Progress

We have formulated various regulations relating to poverty alleviation and relief management, information disclosure and donation management of the Group, including the “Management Measures for Poverty Alleviation and Relief”, the “Management Measures for Information Disclosure” and the “Management Measures for External Donation”. In the pursuit of rural revitalization and common prosperity, we put into practice the spirit of volunteering and promote “dedication, love, mutual help and progress” to build a better future together.

Supporting rural revitalization

We have planned ahead to lay a solid foundation for county development and integrated intelligent energy development. With the establishment of the county development company specialized in rural revitalization and the construction of beautiful rural areas, we are able to accelerate integrated intelligent energy development in county areas, build demonstration villages and towns for green revitalization and old revolutionary district development, thereby realizing rural revitalization, the goals of “carbon emission peak and carbon neutrality”, as well as common prosperity.



The Beautiful Rural Areas Integrated Intelligent Energy Project in Xiaogang Village was awarded the “Outstanding Demonstration Project for Integrated Intelligent Energy” at the 2021 Integrated Intelligent Energy Conference cum Outstanding Demonstration Project Presentation Ceremony

Facilitating the building of beautiful rural areas

- Taking into account the progress of the Jiangxiang Village Beautiful Rural Area Development Project in Jiangsu, we established CP Changxing as a wholly-owned subsidiary of China Power
- Leveraging the existing resources in rural areas (such as solar energy, geothermal energy, water resources, straw and other resources), Yaomeng Power Plant launched integrated intelligent energy projects in beautiful rural areas based on the concept of “environmentally friendly, low-carbon, energy-saving and ecological”
- CP Changxing commenced the Jiangxiang Village Zero-Carbon and Digital Rural Revitalization Project, which could save 1,708 tonnes of standard coal and reduce carbon dioxide emission by 4,780 tonnes per year after the completion of the distributed power generation projects
- Anhui New Energy launched the Beautiful Rural Area Integrated Intelligent Energy Project in Xiaogang Village and initiated the “green revolution” in the community

Driving local economic development

- Officially signed the contract with Changshu City and commenced the first county-wide distributed rooftop photovoltaic power project in one of China’s top 100 counties
- Launched “Hundred Red Years” special projects, which included the intense development of integrated intelligent energy starting with counties with red resources. In 2021, Changshu Power Plant and the Shajiabang Town Government of Changshu City entered into the “Red + Integrated Intelligent Energy” Development Strategic Agreement to develop integrated intelligent energy in the Shajiabang Scenic Area, Ludang Village and the industrial area
- CP Shentou established the on-site poverty alleviation team at Nuanquan Village of Lidayao Township, Youyu County and completed over 20 projects for the villagers

Case Driving zero-carbon and digital development in rural areas

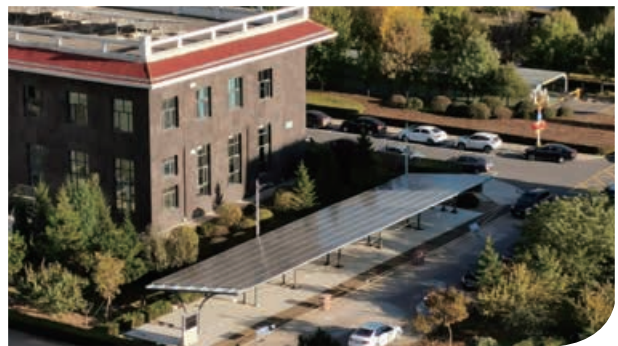
On 27 April 2021, CP Changxing and Changshu City of Jiangsu Province entered into the strategic cooperation agreement for the joint development of the “Jiangxiang Village Zero-Carbon and Digital Rural Revitalization Project”. Capitalizing on integrated energy utilisation and digital platform development, the project realized investment value and supported the comprehensive development of ecosystem, production and livelihood in rural areas through various business models, including the sales of agricultural by-products and the cooperation on cultural and tourism projects. The first phase of the project will involve the design and construction of photovoltaic corridors, intelligent seats and smart lampposts, so as to create tourist spots with micro-grids. It will also combine photovoltaic power generation and charging by building photovoltaic carports and charging piles at existing car parks.



CP Changxing’s Jiangxiang Village Zero-Carbon Rural Revitalization Project

Case Building beautiful villages with green energy

On 30 November 2021, one of the Group’s first county development demonstration projects of “Typical Model House”, namely the Chaoyang County Integrated Intelligent Energy Project of Shenyang Energy Investment, was connected to the power grid for the first time. The connection was marked by the success of “reverse power transmission to the power grid by users” in Caojia Village of Nanshuangmiao Town in Chaoyang County. The project was also the Group’s first integrated intelligent energy demonstration project of “Typical Model House” to complete plan preparation and commence construction. Focusing on distributed photovoltaic power development, it aimed at setting a good example of integrated intelligent energy projects that featured the “beautiful rural areas + three-grid integration + thousands of households”.



Chaoyang Integrated Intelligent Energy Project

Case Facilitating integrated intelligent energy development in rural areas

On 30 August 2021, the 2MW “Photovoltaic Power Generation, Storage, Direct Current Distribution and Flexible Interaction” Direct Current Micro-grid Project commenced construction in Zhuangshang Village of Ruicheng County, Shanxi Province. This represented the official launch of the first large-scale integrated intelligent energy project in China by SPIC and China Power using “photovoltaic power generation, storage, direct current distribution and flexible interaction” technology.

The project served as a demonstration for SPIC’s first 7 county market development projects undertaken by China Power. It also set a new example for integrated intelligent energy development in county areas, with over 100 villagers in the Zhuangshang Village installing rooftop photovoltaic power system for their own houses, complemented by the “power storage, direct current micro-grid and flexible system” technology. Subsequent projects will continue to incorporate the concepts of “rural revitalisation + beautiful rural areas + county economy + patriotic education” into integrated intelligent energy development projects in counties to facilitate implementation of the rural revitalisation strategy.



Maintaining transparent communication

We always put emphasis on stakeholder engagement and promote the two-way communication of the Group's operational information and stakeholders' expectations. Through open days and other activities, we build a stronger connection with stakeholders and enhance our operational transparency.



Opening up diversified communication channels

- Conducted regular research on ESG topics to understand the concerns of stakeholders about the Company
- Held annual open days on a regular basis and invited external parties such as employees' families and students to visit China Power
- Overcame pandemic-related obstacles and organised various roadshows in 2021 by combining online and offline means

Enhancing information disclosure

- Improved communication with media and notified major media platforms of corporate news in a timely manner to increase our influence
- Produced promotional videos on our new strategic mission from a new perspective, so that the capital market could quickly understand China Power's goals and position, the direction of transformation and the roadmap to implementation



Open days

Case CP Shentou — Sharing knowledge of new energy and promoting new development concepts

On 22 October 2021, CP Shentou invited the teachers and students of Sucheng District Nanmoshi School, a beneficiary of the Company's "Yingshanhong Targeted Poverty Alleviation Program", to visit Hongtao Photovoltaic Power Station, where they gained first-hand experience of China Power's significant achievements in green development, clean production, ecological protection and community service. During the event, we shared knowledge of new energy development with young people and the general public, promoted new development concepts to foster fundamental change in mindset, further improved public recognition of green development, and enhanced our corporate influence.

**Case** Changshu Power Plant — Expanding cooperation to open up channels for gaining new knowledge

On 4 August 2021, Changshu Power Plant organised the first "Cloud Open Day". During the event, it received students from the Nanjing Institute of Technology through cloud video-conferencing. The power plant introduced our history of development and cultural achievements, our power generation process and our measures on reaching the goals of "carbon emission peak and carbon neutrality" to students in great detail, offering them new channels to enrich their knowledge and at the same time expanding the cooperation between institutions and the Company.



"The Open Day gives me a preliminary idea of the power sector in which I wish to pursue my career in the future. I also understand that "carbon emission peak and carbon neutrality" is not just a slogan, but a huge systematic project that requires our relentless efforts."

—— Student at the Nanjing Institute of Technology

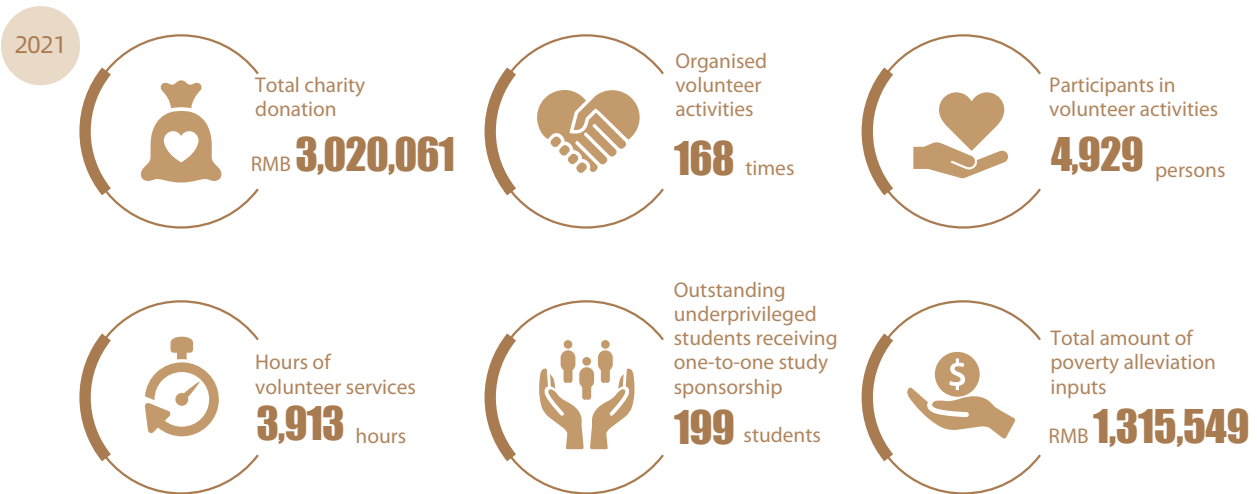
Case Pingwei Power Plant — Pursuing dreams and a better future with talent and moral support

On 4 June 2021, Pingwei Power Plant held the "Talent and Moral Support to Build Brighter Tomorrow with Children" Volunteer Activity. More than 60 teachers and students from Tianji Township Liwei Primary School in Panji District, Huainan City, had a lively lesson and a safety experience lecture during their visit to Pingwei Power Plant. The event took place just before the International Children's Day on 1 June. On this open day, Pingwei Power Plant promoted patriotism to teachers and student representatives from Liwei Primary School and broadened their horizons with new knowledge, so as to encourage them to devote themselves to the country, love science and enjoy learning.



Passing on the spirit of volunteering

China Power continues to build the brand of the “Yingshanhong — CP Act of Light” Volunteer Program and dedicates itself to volunteering services. It has participated in pandemic prevention, flood control and other volunteer activities through making monetary and in-kind donations and helping with rebuilding after disasters. We seek to fill the world with love and light by sending warmth to people in need.



Helping students to pursue their studies and dreams

- Carried out education support activities under the “Yingshanhong — CP Act of Light” Program on an ongoing basis
- Operated the “Chaoyang Study Sponsorship” One-to-one Education Support Program of the Company through Chaoyang Power Station, which donated study sponsorship amounting to RMB600,000 and over 100 textbooks and other school supplies to help 225 underprivileged students to complete their studies
- Launched the charity education partnership program and entered into education-aid partnership agreements with the less well-off students

Committing to volunteer services

- China Power organised 18 local employees from its Hong Kong companies to volunteer at a six-week street counter, which attracted more than 160 participants
- Employees at Shangqiu Power Plant made voluntary donations and raised RMB19,470 in one day to help flood victims in Henan

Case Facilitating post-disaster rebuilding through monetary and in-kind donations

In September 2021, the sustained heavy rainfall that hit Ye County of Pingdingshan caused severe damage and huge property loss in Xiali Township, Chang Village and Longquan Township. In view of this, Yaomeng Power Plant swiftly proposed to make voluntary donations and raised a total of RMB70,929 within two days. Besides, it also contributed and timely sent 20 submersible pumps, 30 tonnes of urea and 20 tonnes of cement, along with other disaster relief supplies and charity donation, to the affected region for rebuilding after the disaster.



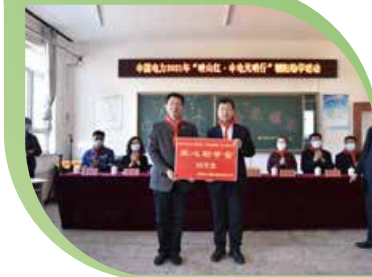
Donation to Pingdingshan

"We sincerely thank Yaomeng Power Plant for its charitable acts and kindness. At the critical moments when everyone worked together in rebuilding Ye County after the disaster, Yaomeng Power Plant made generous donations and offered warm-hearted support. This not only demonstrated their love and strong sense of responsibility for the local community, but also set an example for the general public!"

— Hu Weizhe, a standing committee member of the Ye County Committee and the deputy executive head of the Ye County Government

"Yingshanhong — CP Act of Light" Volunteer Program

"Yingshanhong — CP Act of Light" Chaoyang Study Sponsorship Donation Ceremony



Dabieshan Power Plant held the volunteer cleaning activity



China Power organised a volunteer tree planting activity



Volunteers of Wuhu Power Plant cleaned the activity centre for retired and resigned employees





FUTURE OUTLOOK AND STRATEGIC DIRECTION

2022 is the year of battling for the Three-year Action Plan of the reform of State-owned enterprises. It is also the first year of implementing the new development strategy by China Power. Embracing the new era of “Carbon Emission Peak and Carbon Neutrality” and “new power systems which mainly composed of new energy” we are well poised to develop ourselves into a “World-class Green and Low-carbon Energy Provider”, striding proudly ahead from the new starting point to the new arena.

Green-empowerment

In addition to actively promoting sustainable investment and development, we will explore quality clean energy projects and take a leading role in developing the new segments of the industry.

- Expanding the business presence in emerging industries such as hydrogen power, energy storage, green power transportation, rural revitalization and geothermal power based on precise planning, with a view to enhancing the market competitiveness of our professional companies in these new industries;
- Continuing to optimize the asset structure through the development of new energy projects and gradual divestment of traditional coal-fired power business, striving to increase the proportion of clean energy of the listed company to 65% by the end of 2022; and
- Promoting proprietary investment and development projects at full steam in a bid to realise the rapid launch of large base projects by seizing the opportunities arising from the national development of major clean energy bases and ultra-high voltage (UHV) power transmission channels.



Intelligent Innovation

We will capitalize on the development trend of the in-depth innovative integration of energy technology and digital technology to develop integrated intelligent energy in full swing.

- Building diversified energy ecological system with power as its core to drive the transformation and upgrade of the industry and accelerate the implementation of the innovative development model featuring digital and smart elements of the new energy industry;
- Supporting the innovation of production technologies such as robot development to solve the difficulties and key problems involved in power production and operation, thereby establishing our core technologies and competitiveness; and
- Focusing on the investment in technological research and development and protection of intellectual property rights in the emerging green energy industries, at the same time giving robust resource support to and safeguarding the interests in the innovation of energy technologies and business models.

Mutual Achievement

We will join efforts with the employees, the society, customers and working partners to mutually share the results of green development and thus maximize the investment value of our shareholders.

- Strengthening the building of the management leadership and cadre talent team generally, further motivating the team vitality and improving talent introduction, training and management systems so as to provide employees with more development opportunities and hence fulfil the mutual growth of employees and the Company;
- Developing new markets in the county areas proactively and putting greater efforts to enhance the communication and engagement with various county or regional governments and working parties with the orientation of “Resource, Market, Companion and Value”; and
- Strengthening the in-depth collaboration with major customers, providing customers with low-carbon products and services with higher values and continuing to expand the “partnership network” of our business on the foundation of consolidating the relationship with existing key and major customers.

Staying committed to become the pioneer of top class low-carbon production and zero-carbon living, we will join hands with various stakeholders to develop a sustainable future on a win-win basis, thereby mutually creating a low-carbon and zero-carbon lifestyle for better life!



Technical Glossary and Definitions

“ASEAN”	Association of Southeast Asian Nations
“average utilization hours”	for a specified period, the amount of electricity (MWh) produced in such period divided by the average installed capacity (MW) in such period
“Board”	the board of Directors of the Company
“Changshu Power Plant”	Jiangsu Changshu Electric Power Generating Company Limited (江蘇常熟發電有限公司), an associate of the Company
“Chaoyang Power Station”	China Power Chaoyang New Energy Company Limited (中電(朝陽)新能源有限公司), a subsidiary of the Company
“China Power” or “Company”	China Power International Development Limited
“consolidated installed capacity”	100% installed capacity of a company that is deemed as a subsidiary in the Group’s consolidated financial statements
“CP Changxing”	Shanghai China Power Changxing Future Development Limited* (上海中電長興未來發展有限公司), a subsidiary of the Company
“CP Guorui”	China Power Guorui Supply Chain Management Co., Ltd.* (formerly known as China Power Guorui Logistics Company Limited*) (中電國瑞供應鏈管理有限公司(前稱中電國瑞物流有限公司)), a subsidiary of the Company
“CP Hua Chuang”	China Power Hua Chuang Electric Power Technology Research Company Limited* (中電華創電力技術研究有限公司), a subsidiary of the Company
“CP Huayuan”	CP Huayuan Nuclear Power Engineering Technical Co., Ltd.* (中電華元核電工程技術有限公司), a subsidiary of the Company
“CP Shentou”	China Power Shentou Power Generating Company Limited* (中電神頭發電有限責任公司), an associate of the Company
“CP Zhihui”	Zhongdian Zhihui Comprehensive Energy Limited* (中電智慧綜合能源有限責任公司), a subsidiary of the Company
“CPI Holding”	China Power International Holding Limited (中國電力國際有限公司), the intermediate holding company of the Company and a subsidiary of SPIC
“CPNL”	China Power New Life Town Technology Co., Ltd* (中電投新農創科技有限公司), an associate of the Company
“Dabieshan Power Plant”	Huanggang Dabieshan Power Company Limited* (黃岡大別山發電有限責任公司), a subsidiary of the Company
“Director(s)”	director(s) of the Company
“Fuxi Power Plant”	Sichuan CPI Fuxi Power Company Limited (四川中電福溪電力開發有限公司), a subsidiary of the Company
“Group” or “We”	the Company and its subsidiaries from time to time
“Guangxi Overseas”	Guangxi SPIC Overseas Energy Investment Co., Ltd.* (廣西國電投海外能源投資有限公司), a joint venture of the Company
“Haiyang Power Storage”	Haiyang SPIC Power Storage Technology Co., Ltd.* (海陽國電投儲能科技有限責任公司), a subsidiary of the Company
“HK\$”	Hong Kong dollars, the lawful currency of Hong Kong
“Hong Kong”	Hong Kong Special Administrative Region of the PRC
“Hong Kong Companies Ordinance”	Companies Ordinance, Chapter 622 of the Laws of Hong Kong (as amended from time to time)

“Hong Kong Stock Exchange”	The Stock Exchange of Hong Kong Limited
“installed capacity”	the manufacturers’ rated power output of a generating unit or a power plant, usually denominated in MW
“Jingmen Power Station”	SPIC Jingmen Lvdong Energy Company Limited* (國家電投集團荊門綠動能源有限公司), a subsidiary of the Company
“JKY”	an employee remuneration scheme based on Plan-Budget-Assessment-Incentive (基於計劃—預算—考核—激勵的員工薪酬方案)
“kWh”	kilowatt-hour, a standard unit of energy used in the electric power industry. One kilowatt-hour is the amount of energy that would be produced by a generator producing one thousand watts for one hour
“Listing Rules”	the Rules Governing the Listing of Securities on the Hong Kong Stock Exchange
“MW”	megawatt, that is, one million watts. The installed capacity of a power plant is generally expressed in MW
“MWh”	megawatt-hour, which is equal to one thousand kWh
“net coal consumption rate”	average consumption of standard coal for supplying 1 kWh power (deducting self-used power)
“Pingwei Power Plant”	Anhui Huainan Pingwei Electric Power Company Limited (安徽淮南平圩發電有限責任公司), a subsidiary of the Company
“PRC” or “China” or “State”	the People’s Republic of China (for the purpose of this report excluding Hong Kong, Special Administrative Region of Macau of the PRC and Taiwan)
“Pu’an Power Plant”	China Power (Pu’an) Power Generating Company Limited* (中電(普安)發電有限責任公司), a subsidiary of the Company
“Qiyuanxin Power”	Shanghai Qiyuanxin Power Technology Co., Ltd.* (上海啟源芯動力科技有限公司), an associate of the Company
“RMB”	Renminbi, the lawful currency of the PRC
“Shanghai Power”	Shanghai Electric Power Co., Ltd.* (上海電力股份有限公司), an investment holding company of the Company
“Shanxi Shentou”	Shanxi Shentou Power Generating Company Limited* (山西神頭發電有限責任公司), a subsidiary of the Company
“Sichuan Energy Investment”	Sichuan Energy Investment Development Co., Ltd.* (四川能投發展股份有限公司), an associate of the Company
“SPIC”	State Power Investment Corporation Limited* (國家電力投資集團有限公司), the ultimate holding company of the Company
“SPIC Finance HK”	SPIC International Finance (Hong Kong) Company Limited (國家電投香港財資管理有限公司), a subsidiary of SPIC
“standard coal”	coal with an energy content of 7,000 kilocalories per kilogram
“Suzhou Shared Service Company”	China Power (Suzhou) Shared Service Co., Ltd* (中電(蘇州)共享服務有限公司), a subsidiary of the Company
“Wu Ling Power”	Wu Ling Power Corporation* (五凌電力有限公司), a subsidiary of the Company
“Wuhu Power Plant”	Wuhu Electric Power Generating Company Limited* (蕪湖發電有限責任公司), a subsidiary of the Company
“Xinyuan Smart Storage”	Xinyuan Smart Storage Energy Development (Beijing) Co., Ltd.* (新源智儲能源發展(北京)有限公司), a subsidiary of the Company
“Xinyuan Yunneng”	Xinyuan Yunneng Technology Development (Beijing) Co., Ltd* (新源蘊能科技開發(北京)有限公司), a subsidiary of the Company
“Yaomeng Power Plant”	Pingdingshan Yaomeng Power Company Limited (平頂山姚孟發電有限責任公司), a subsidiary of the Company

* For identification purpose only

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CHINA POWER INTERNATIONAL DEVELOPMENT LIMITED
中國電力國際發展有限公司

Hong Kong Office:

Suite 6301, 63/F, Central Plaza,
18 Harbour Road,
Wanchai, Hong Kong
Tel.: (852) 2802 3861
Fax: (852) 2802 3922

Beijing Office:

East Building, Hui Huang Shi Dai Plaza,
56 North West Fourth Ring Road, Haidian District,
Beijing, China
Tel.: (86-10) 6260 1888
Fax: (86-10) 6260 1777