

環境、社會及管治報告
Environmental, Social and
Governance Report

2022





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CHAIRMAN'S STATEMENT



In 2022, Huaneng International concentrated on the mission of the new journey in the new era. We responded actively to the impact of the power supply shortage. We took the initiative, strived to overcome difficulties, made efforts to promote the high-quality development of the Company, and achieved new results in all aspects of our work. Our production remained safe and stable, the pace of transformation and development kept accelerating, the quality and efficiency improvement continued to elevate. Our scientific and technological innovation was quick and steady, the outcomes of our overseas projects were outstanding, and our management strategy was continuously refined.

Focus on power supply assurance, take on the responsibility. In 2022, the Company comprehensively committed to the deployment by the State Council Safety Committee, coordinated both development and safety, enhanced the red line awareness and bottom-line thinking, built a "trinity" for infrastructure safety responsibility system, conducted a large-scale investigation and rectification over production safety, and provided energy backup during several events of significance, such as the 20th Party Congress and the Olympic and Paralympic Winter Games.

Focus on green development, accelerate the pace of transition. In 2022, the Company kept the new strategy of energy security as the guide and the work around "double carbon" as the traction. We aimed to build an innovative power supply system with new energies as the major power source. The number of approvals (filings) on new energy project has reached a record high. Breakthroughs were made in the development of offshore wind power generation. Ultra-low emission was realized for all coal-fired generator units. The Company is still industry-leading in major energy consumption index and pollutant emission performance.

Focus on quality and efficiency improvement, maintain the steady operation. In 2022, the Company implemented the State Council's package of measures for economic stabilization. The Company's operation remained stable with potential risks under observation and control. Compared with last year, direct income from operation increased, and the loss in the coal and power segment decreased. The process of carbon quota trading was smooth and sound. The restriction on capital costs and expenses was strict and stringent. Our financial management was proved to be effective, and we kept working on dealing with the inactive branches of the Company.



Focus on technological innovation, enhance the core competency. In 2022, the Company prioritized serving the national strategic requirements and vigorously pushed the research and development of key core technology. Breakthroughs were made in several key projects. The benefits of science and technology management became visible. The process of digitalization and intellectualization in the Company kept accelerating. The ability of technological innovation was evidently vitalized.

Focus on global development, remain open and cooperative. In 2022, the Company followed globalized development strategy and actively participated in the establishment of “the Belt and Road.” The “Four Breakthroughs” in Tuas Power’s operation performance, shareholders’ dividends, independent financing, and project development were remarkable. The level of management of Sahiwal Coal-fired Power Plant project was effectively improved. We were continuously working on the optimization of our international management system and mechanism. The name of state-owned enterprises with high-quality development resounded even outside the country.

Time never waits, so we should seize the day. Huaneng International shall never stray from the path of green and low-carbon development while moving forward. We constantly promote the “three major revolutions” of quality, efficiency, and motivation, and strive resolutely to win the “three major battles” of quality and efficiency improvement, industrial transition and development, and risk management and control. We attempt to break the new ground for the high-quality development of the Company, accelerate the process of shaping a top tier listed international power generation company, and make more contribution to the high-quality development of China’s power generation and energy industry.

Zhao Keyu

Chairman
Huaneng Power International, Inc.



02 ABOUT US



About Us

2.1 Company Profile

Huaneng Power International, Inc. (“Huaneng International”, “the Company” or “we”) was incorporated on June 30, 1994. The core business of the Company is, by making use of modern technology and equipment and also financial resources available domestically and internationally, to develop, construct, operate and manage power plants throughout China. The Company is one of the largest listed power generation companies in China, and is the first power generation company in China to list in New York, Hong Kong and Shanghai.

Huaneng International is committed to be a world-class listed power generation company, always adhere to providing sufficient, reliable, and eco-friendly energy to the community, and insists on innovations in technologies, structure, and management. On aspects regarding the advancement in power technologies and construction and management of power plants, the Company has been the pioneer and has created various milestones within the domestic power industry, which facilitated the great leap development of the power business and technological advancement of the power station equipment manufacturing industry in China, and also significantly contributed to the improvement of technical and management standards of the domestic power generation enterprises.

Throughout the years, with dedicated efforts, the Company has expanded successively with steady growth in competitive strengths. The success of the Company is attributable to its various advantages, including advantages in scale and equipment, advantages in positive transformation to low carbon, clean energy, advantages in scientific and technological innovation and environmental protection, advantages in geographic layout of power plants, sound corporate governance structure, advantages in market reputation, extensive experience in the capital markets, advantages in overseas development, staff with high caliber and professional management as well as strong support from major shareholders.

As at December 31, 2022, the Company had controlled installed capacity of 127,228 MW, and the proportion of the installed capacity of low-carbon clean energy installation reached 26.07%. The Company’s domestic power plants are located in 26 provinces, autonomous regions and municipalities. The Company wholly owns a power company in Singapore and invests in a power company in Pakistan.

As at 31 December 2022,
Controlled Installed
Capacity



127,228_{MW}



Installed Capacity of Low-carbon
Clean Energy Installation Reached

26.07_%

In 2022, the Company won the titles of the “Most Valuable Listed Company with High Quality Development” and the “Most Valuable Listed Company for Investment” in the selection event of the 12th China Securities Golden Bauhinia Awards, the “Outstanding Board of Directors” in the 17th Golden Roundtable Award of the Board of Directors of Listed Companies in China, the 5A Rating of “Performance Assessment of the Secretary of the Board of Listed Companies in 2022” and the “Best Practice of the Office of the Board of Listed Companies in 2022” awarded by the China Association for Public Companies, the “A” grade rating for the annual information disclosure granted by the Shanghai Stock Exchange. The Company was successfully selected into the “List of ESG Best Practice Cases of A-share Listed Companies in 2022” issued by China Association for Public Companies, and was invited to share experiences at the ESG Training Conference of Directors and Supervisors of Listed Companies held by the Beijing Securities Regulatory Bureau. The achievement of various honors is the full affirmation of the capital market for the Company’s continuous high-quality development, the continuous improvement of enterprise value and the prospect of low-carbon transformation since the “14th Five-Year Plan”, which shows the Company’s good brand image. The external auditor has issued standard audit reports on the Company’s internal control without reservation for seventeen consecutive years.

2.2 Corporate Governance

As a public company listed both domestically and internationally, the Company is subject to the regulations of the security regulatory authorities of the different listing venues and the supervision of investors at large. Since its establishment, the Company has been strictly complying with the laws and regulations of its listing place and continuously completing and improving its modern governance system and capacity. The Company has established and improved a corporate governance structure consisting of the shareholders’ general meeting, the Board, the Supervisory Committee, and management team and built an operating mechanism with clear separation of powers and responsibilities, mutual checks and balances and coordinated operations between proprietorship, decision-making power, supervisory power, and management power, ensuring the effective enforcement of the decision making power of the shareholders’ general meeting and the Board, and the supervisory power of the Supervisory Committee, ensuring the efficient and compliant management of the management team.

After years of exploration and practice, the Company has built up a normal and sound corporate governance system that caters for the development of the Company. The Company regularly evaluated the applicability and effectiveness of the management system and revised and improved it to achieve dynamic maintenance of the system.

2.3 Development Strategy

The Company fully implements the new development philosophy of “innovation, coordination, green, openness and sharing,” adheres to the idea of systemization, follows the requirements of establishing a clean, low-carbon, safe and efficient modern energy regime, adheres to the principle of treating quality and efficiency as the key focus, reform and innovation as the driving force, institutional mechanism as the safeguard, and deepening the supply-side structural reforms as the cardinal line, coordinates the energy safety and green development, comprehensively promotes the high-quality developments, and aims to further develop the Company into a proper managed, leading in technology, energy saving and environmental friendly, reasonable structured, excellently operated world-class listed power generation company with outstanding corporate governance and market value.



The Company adheres to the new energy safety strategy of “Four Revolutions and One Cooperation,” promotes the green and low-carbon transformation of energy with the aims of peak carbon emission and carbon neutrality, prioritizes the quality and efficiency, insists on principles of “centralized and distributed construction of equal importance, and independent construction of priority”. Making full use of the favorable conditions for centralized development of new energy power in “Three- North Area,” coastal region, Southwest China region and certain areas in Central China region, the Company further develops large-scale clean energy production base, with the idea of “Three-types and Three-izations” namely “base-type, clean-type and complementary-type, together with intensification, digitalization and standardization”, promotes the leap-forward development of new energy production, accelerates the optimization and upgrading of coal-power structure, prioritizes the gas power and other clean energy power, and provides more competitive and finer comprehensive energy services. The Company proactively adapts to the national structural reform of energy supply, persists on accelerating digitalized transformation, actively develops strategic emerging industries, and carries out transformation of diversified supply and energy service around core industries. Adhering to the new development pattern of integrating domestic and international dual circulations, the Company will strengthen international cooperation with the principles of clean being primary, profitability being first and prudence being essential, to reinforce the efficient operation of oversea assets and to enhance the anti-risk ability and profitability. The Company aims to actively implement innovative development strategy, focuses on high-quality development led by technological innovation mechanisms, continues to serve the nationwide strategy, and adhere to the facing towards the Company’s major demands. The Company adheres to digital & intelligent development, deepens and enhances the ability of independent innovation, implements scientific and technological demonstration projects, and strengthens basic and forward-looking technical research. The Company aims to vigorously implement the excellent operation strategy, adhere to the strategies of increasing profitability, improving efficiency and creating value, reinforce its operational management, improve its management efficiency, optimize its asset structure, comprehensively improve its modern operating and management level, vigorously promote the improvement of quality and efficiency, improve corporate governance, enhance the Company’s brand value and conscientiously perform its social responsibilities.

2.4 Company Philosophy

Corporate Missions	<ul style="list-style-type: none"> ■ Becoming a “red” company that serves national strategies, ensures energy security, and serves socialism with Chinese characteristics ■ Becoming a “green” company that carries out energy revolution, helps construct an ecological civilization, and provides clean energy and power to meet the needs of the people for living beautiful lives ■ Becoming a “blue” company that participates in global energy stewardship, serves the “Belt and Road” construction and positively contributes to building a community of shared future for mankind
Corporate Core Values	<ul style="list-style-type: none"> ■ Upholding integrity, focusing on cooperation ■ Innovating continuously, progressing actively ■ Creating achievements, serving the Country
Corporate Target	<ul style="list-style-type: none"> ■ Developing itself into an international leading power generation listed Company
Corporate Responsibilities	<ul style="list-style-type: none"> ■ Provision of sufficient, reliable and environmental-friendly power for the society ■ Strive for delivery of long-term, stable and increasing returns to shareholders ■ Support the fully development for employees to establish self-achievements
Corporate Spirits	<ul style="list-style-type: none"> ■ Spirit of professional dedication – undergoing all conceivable hardships and using every conceivable means ■ Spirit of pioneering – cutting paths through mountains and building bridges across rivers ■ Spirit of progress – finding oneself gaps and pushing oneself ahead ■ Spirit of innovation – daring to lead and venturing to do the impossible
Corporate Manner	<ul style="list-style-type: none"> ■ Being good at pioneering, focusing on efficiency, caring for reputation, thrifty in working

2.5 ESG Responsibility Management

The Board of Directors assumes the overall responsibility for the Company's tactics and reports on environmental, social and governance ("ESG") as well as for the assessment and determination of risks concerning ESG, and ensures the establishment of a proper and effective system of risk management and internal supervision thereto. The Company's management provides information to the Board of Directors to assess the effectiveness of the system. The effective ESG management of the Company's Board of Directors and management drives the improvement of operation and management of Huaneng International.

Situations Faced with the Company's ESG

The Central Economic Work Conference emphasized that we should adhere to the general principle of seeking progress while maintaining stability, comprehensively deepen reform and opening up, and vigorously boost market confidence in 2023. The Conference called for adhering to the principle of "priority on stabilization, and advancement from stabilization", continuing to implement a proactive fiscal policy and a stable monetary policy, intensifying macro-policy control, coordinating with various policies, and forming a joint force to promote high-quality development. We should optimize the implementation of industrial policies, pay close attention to the transformation and upgrading of traditional industries and the cultivation and expansion of strategic emerging industries, and forge new industrial competitive advantages in the process of implementing the objectives and tasks of carbon peak and carbon neutralization.

In terms of the power supply and demand, according to the analysis and forecast of the China Electricity Council, with the considerations such as the domestic and international economic situation, temperature in winter and summer and low base in 2022, it is estimated that the electricity consumption of the whole society will have a year-on-year increase of approximately 6% in 2023; driven by the rapid development of new energy power generation, it is estimated that the total installed power generation capacity and the installed power generation capacity of non-fossil energy will reach a new high in 2023, and the newly installed power generation capacity nationwide is expected to reach about 250 million kilowatts.

In terms of the power market, the requirements of "the Notice on Further Deepening the Market-based Reform of the On-grid Tariff for Coal-fired Power Generation" (《關於進一步深化燃煤發電上網電價市場化改革的通知》) issued by the NDRC in 2022 have been implemented. The electricity generated by coal-fired has been totally entered into trade within the electricity grid market and the floating range of transaction prices of the electricity has been expanded to 20%. In 2023, the state requires a high proportion of medium-and long-term electricity transactions to be signed, and the directories of high-energy-consuming enterprises in various places will be launched one after another, and the coal price is expected to decline, so the operating conditions of coal-fired power generation enterprises will be improved to some extent. However, with the full spread of the spot market and the intensified competition in the electricity market, the market uncertainty will further increase. Due to the increase in new energy parity production projects and the increase in market entry rate, the electricity prices of wind power and photovoltaic are expected to decline.

In terms of the carbon market, the Ministry of Ecology and Environment of the People's Republic of China issued the Notice of Implementation of Relevant Work on Distribution of National Carbon Emission Rights Trading Quota for 2021 and 2022 (《關於做好二零二一、二零二二年度全國碳排放權交易配額分配相關工作的通知》) on 15 March. According to the quota distribution plan, the carbon emission benchmark value has been adjusted downward and the quota distribution has been greatly tightened. With the gradual promotion of peak carbon emissions and carbon neutrality, the cost of carbon emission performance will increase.

In terms of the coal market, policy-based supply guarantee will continue to exert efforts to promote the release of advanced coal production of newly licensed capacity. However, since most of the newly licensed capacity has been released in the previous two years, there is limited room for substantial increase in production. In the international market, with the increase of coal production in Indonesia and India, the import and purchase opportunities of Mongolian coal, Russian coal and Australian coal increase, and the supplementary role of imported coal in China is enhanced. On the demand side, the proportion of non-fossil energy electricity will continue to increase in 2023, and the growth rate of coal consumption will further slow down. In 2023, under the policy guarantee, the performance rate of mid-term and long-term contracts for coal will be improved, and the “cornerstone” role of long-term coal associations will be effectively brought into play. It is expected that the supply and demand of the coal market will be eased and the coal price center will move down.

In terms of the capital market, according to the report on the work of the State Council and the monetary policy implementation report of the People’s Bank of China, in 2023, a stable monetary policy will be precise and powerful to make cross-cycle adjustment, which will not only support the expansion of domestic demand and provide stronger support for the real economy, but also give consideration to short-term and long-term, economic growth and price stability, internal balance and external balance, stabilize the sustainable support for the real economy and maintain reasonable and abundant liquidity.

ESG Governance and Management

In addition to providing supervision and guidance, the Company’s Board of Directors holds regular meetings at which senior management present their reports on strategic development, production safety, operation and management, internal controls, and corporate social responsibility. There are four committees under the board, namely strategy, audit, nomination, and remuneration and evaluation. According to the division of responsibilities, the Strategy Committee under the Board of Directors is responsible for the decision-making of the Company’s overall risk management and listens regularly to the relevant reports, and its responsibilities include but are not limited to the assessment of the risk management and the assessment of its effectiveness, examination and approval of the Company’s annual report on the overall risk management and the risk assessment reports for significant decisions. The Audit Committee under the Board is responsible for identifying and evaluating the fraud risk of senior management and the Board of Directors, and forming an independent fraud risk assessment report. It also regularly reviews reports on the Company’s internal controls, evaluates the effectiveness of the internal control system, and communicates with the Human Resources Department on issues concerning recruitment and code of conduct. It is composed of independent directors of the Company, who carry out onsite inspection every year to monitor and make recommendations on production safety, operation and management, internal controls, and corporate culture of the Company’s subsidiaries. The management of production safety, employee health, energy conservation and environmental protection, fraud risk, internal control and corporate culture has already been incorporated into the daily work of the Board and various special committees, which also closely monitor current hot issues such as climate change response and ESG information disclosure, and propel the Company toward balanced development in economic benefits, social benefits and ecological benefits.

To ensure that the requirements of Environmental, Social and Governance Reporting Guide (《環境、社會及管治報告指引》) (“ESG Reporting Guide”) issued by The Stock Exchange of Hong Kong Limited (“Hong Kong Stock Exchange” or “HKEX”) are effectively implemented, the Company has established an ESG work leading group. A dedicated principal of the Company has been assigned as the group leader, with principals of different departments and offices being vice group leaders. They make decisions on major issues during the implementation of the guidelines. All departments of the Company’s headquarters and the subordinate base units have also assigned certain relevant personnel as group members to take charge of daily communication and detailed implementation of ESG actions. With the establishment of ESG work leading group, the contact mechanism of ESG management has made its appearance in the Company, which essentially formed an ESG management framework guided by the Board of Directors, led by the management, and supported by all departments of the headquarters and the subordinate base units. This well-established framework ensures horizontal coordination and vertical interaction within the Company’s management structure. It guarantees the maximum coverage, effectiveness, and sustainability of the Company’s ESG management.



Trainings for Directors, Supervisors, and Senior Management

In 2022, the Directors, Supervisors and senior management of the Company attached great importance to strengthening their awareness of compliance and enhancing their ability to perform their duties, actively participated in various special trainings held by regulatory bodies and industry associations, and kept abreast of the updates of regulations and relevant policies in listed places. Throughout the year, the Directors, Supervisors and senior management of the Company attended the important meetings such as annual and interim supervisory meeting and bond and asset securitization business supervision conference of CSRC Beijing Bureau, training conference on corporate governance of China Association for Public Companies, to continuously and thoroughly study the cases of illegal and unlawful investigation and punishment, and the cases of anti-corruption and anti-fraud. All the Directors, Supervisors and senior management of the Company consciously abide by the laws, regulations and Articles of Association of the Company, and take the lead in "knowing the fear and keeping the bottom line" to provide a guarantee for the continuous improvement of corporate governance.



2.6 Table of Key Performance Indicators

Based on the requirements of HKEX's ESG Reporting Guide and the Global Reporting Initiative (GRI)'s Sustainability Reporting Standards (《可持續發展報告標準》), Huaneng International has prepared and analyzed the Company's ESG 2022 key performance indicators, benchmarking against the guidelines' requirements and its peer companies, as set out below.

Performance Categories	Performance Indicators	2022	2021
Economy	Operating revenue ¹ (RMB100 million)	2,467.25	2,050.79
	Sales of power and heat ¹ (RMB100 million)	2,360.91	1,941.25
	Sales of coal ash, coal and raw materials ¹ (RMB100 million)	17.65	30.41
	Port service ¹ (RMB100 million)	2.59	2.42
	Transportation service ¹ (RMB100 million)	0.44	0.60
	Others ¹ (RMB100 million)	85.66	76.11
	Total operating expenses ¹ (RMB100 million)	2,476.57	2,105.47
	Net profit ¹ (RMB100 million)	-109.73	-129.34
	Controlled installed capacity ¹ (MW)	127,228	118,695
	Domestic power generation (100 million kWh)	4,510.70	4,573.36
	Average annual unplanned outage (times/unit-annum)	0.21	0.22
Environment	Coal consumption rate for thermal power unit (g/kWh)	287.69	290.69
	Year-on-year change of coal consumption rate for thermal power unit (%)	1.03 ↓	0.13 ↓
	Consumption of standard coal (ten thousand tons of standard coal) ²	12,724.33	13,200.22
	Oil consumption in production (tons)	39,332.41	37,709.02

¹ The scope of statistic of Operating revenue (including Sales of power and heat, Sales of coal ash, coal and raw materials, Port service, Transportation service and Others), Total operating expenses, Net profit and Total amount of full-time contractual employees, takes Singapore Tuas Power Ltd., the wholly owned subsidiary of Huaneng International and Huaneng Shandong Ruyi (Pakistan) Energy (Private) Limited into consideration, of which the Operating revenue (including Sales of power and heat, Sales of coal ash, coal and raw materials, Port service, Transportation service and Others), Total operating expenses, and Net profit are published in accordance with the International Financial Reporting Standards, Others including Lease income. The statistical range of controlled installed capacity includes Singapore Tuas Power Ltd., the wholly owned subsidiary of Huaneng International. According to the amendments to IAS 16 Property, Plant and Equipment: Proceeds before Intended Use issued by the International Accounting Standards Board in May 2020, which was related to the proceeds from trial run stage, the Company has made retrospective adjustments to the financial data (Operating revenue (including Sales of power and heat), Total operating expenses, and Net profit) for the same period of last year.

² The Consumption of standard coal is the sum of various types of energy consumption, calculated according to the General Principles for the Calculation of Comprehensive Energy Consumption (《綜合能耗計算通則》)(GB/T 2589-2020).

Performance Categories	Performance Indicators	2022	2021
Environment	Natural gas consumption (ten thousand of standard cubic meters)	572,616.41	581,655.30
	House consumption rate of thermal power unit (%)	4.37	4.34
	Overall water consumption (million tons)	17,696.70	23,126.31
	Fresh water consumption in power generation (million tons)	380.43	361.16
	Water consumption in open cooling circulation (million tons)	17,316.27	22,765.15
	Performance value of consumption of fresh water in power generation (kg/kWh)	0.84	0.79
	Performance value of emission of sulphur dioxide (g/kWh) ³	0.06	0.07
	Performance value of emission of nitrogen oxides (g/kWh) ³	0.13	0.14
	Performance value of soot emission (g/kWh) ³	0.01	0.01
	Sulphur dioxide emissions (tons) ³	26,509.41	28,712.24
	Nitrogen oxides emissions (tons) ³	55,303.98	58,347.32
	Soot emissions (tons) ³	3,503.33	3,636.08
	Total amount of energy-related direct greenhouse gas emissions (ten thousand tons of carbon dioxide equivalent) ⁴	—	—
	Greenhouse gas emissions generated by coal consumption (ten thousand tons of carbon dioxide equivalent) ⁴	—	—
	Greenhouse gas emissions generated by natural gas consumption (ten thousand tons of carbon dioxide equivalent) ⁴	—	—
	Greenhouse gas emissions generated by fuel consumption (ten thousand tons of carbon dioxide equivalent) ⁴	—	—
	Greenhouse gas emissions generated by desulphurization (ten thousand tons of carbon dioxide equivalent) ⁴	—	—
	Energy-related direct greenhouse gas emission intensity (grams of carbon dioxide equivalent/kWh) ⁴	—	—
	Total amount of energy-related indirect greenhouse gas emissions (ten thousand tons of carbon dioxide equivalent) ⁴	—	—
	Energy-related indirect greenhouse gas emission intensity (grams of carbon dioxide equivalent/kWh) ⁴	—	—

³ The Company's exhaust gas emissions are counted and calculated according to the actual concentration of pollutants.

⁴ On March 15, 2023, the Ministry of Ecology and Environment of the People's Republic of China issued the Notice of Implementation of Relevant Work on Distribution of National Carbon Emission Rights Trading Quota for 2021 and 2022 (《關於做好2021、2022年度全國碳排放權交易配額分配相關工作的通知》(國環規氣候[2023]1號)). According to the Plan, the associated organizations shall complete their quota payment of the second compliance cycle (2021-2022) by the end of 2023. Therefore, information about the Company's actual greenhouse gas emissions in 2021 and 2022 is considered trade secret and will not be disclosed until the performance of the contract.

Performance Categories	Performance Indicators	2022	2021
Environment	Total water discharge (million tons)	15,434.81	20,781.65
	Total discharge of sewage (million tons)	25.38	26.54
	Total discharge of open cooling circulation water (million tons)	15,409.43	20,755.11
	Hazardous liquid water production (tons)	973.94	1,277.32
	Production of denitration catalysts (tons)	7,937.36	7,602.35
	Production of other hazardous solid waste (tons)	436.09	577.15
	Intensity of hazardous waste (g/kWh)	0.02	0.02
	Production of general solid waste (ten thousand tons)	4,342.80	4,707.38
	Production of fly ash and cinder (ten thousand tons)	3,303.73	3,738.26
	Production of desulphurized gypsum (ten thousand tons)	1,039.07	969.12
	Intensity of general solid waste (kg/kWh)	0.10	0.10
	Comprehensive utilization rate of fly ash and cinder (%)	96.96	92.20
	Desulphurization gypsum disposal utilization rate (%)	85.31	87.07
	Amount of grievous (and above) environmental accidents (times)	0	0
Society	Total amount of full-time contractual employees ¹ (persons)	57,069	57,513
	Total number of male employees (persons)	44,800	44,959
	Total number of female employees (persons)	12,269	12,554
	Total number of employees aged 30 and below (persons)	10,955	11,386
	Total number of employees aged between 31 and 50 (persons)	30,142	31,540
	Total number of employees aged above 50 (persons)	15,972	14,587
	Total number of employees in China (persons)	56,454	56,915
	Total number of employees in overseas regions (including Hong Kong, Macao and Taiwan) (persons)	615	598
	Total number of full-time employees (persons)	57,069	57,513
	Total number of part-time employees (persons)	0	0

Performance Categories	Performance Indicators	2022	2021
Society	Employee turnover rate (%)	0.39	0.36
	Turnover rate of male employees (%)	0.39	0.36
	Turnover rate of female employees (%)	0.37	0.37
	Turnover rate of employees aged 30 and below (%)	1.02	0.97
	Turnover rate of employees aged between 31 and 50 (%)	0.33	0.28
	Turnover rate of employees aged above 50 (%)	0.05	0.07
	Turnover rate of employees in China (%)	0.30	0.29
	Turnover rate of employees in overseas regions (including Hong Kong, Macao and Taiwan) (%)	7.80	7.02
	Number of employees received trainings (persons)	53,890	54,720
	Proportion of employees received trainings (%)	94.43	95.14
	Proportion of male employees received trainings (%)	95.54	96.15
	Proportion of female employees received trainings (%)	90.39	91.53
	Proportion of management personnel received trainings (%)	96.65	95.16
	Proportion of non-management personnel received trainings (%)	94.25	95.14
	Training hours per employee (hours)	160	133
	Training hours per male employee (hours)	159	134
	Training hours per female employee (hours)	164	130
	Training hours per management personnel (hours)	100	93
	Training hours per non-management personnel (hours)	165	137

Performance
Categories

Performance Indicators

2022

2021

Society

Number of employee deaths due to duty ⁵ (persons)	0	1
Number of contractor and subcontractor deaths due to duty ⁶ (persons)	0	0
Grievous personal injury and death accidents employees (times)	0	0
Personal injury and death accidents during the power production (times)	0	1
Accidents that endangered safe operation of power grid (times)	0	0
Days lost due to work injury (days)	0	0
Rate of work-related deaths (%)	0	0.0017
Total suppliers (number)	93,198	54,294
Domestic suppliers from Mainland China (number)	91,828	53,910
Overseas suppliers including Hong Kong, Macao and Taiwan (number)	1,370	384
Customer complaints (number)	0	0
Concluded lawsuits on corruption against the Company and its employees (number)	0	0
Average equivalent availability of thermal power units (%)	93.37	93.26

⁵ Number of employee deaths due to duty: the number of employees who died from production safety incidents. In 2020, no work-related death occurred within the Company.

⁶ Number of contractor and subcontractor deaths due to duty: the number of deaths of contractors and subcontractors during production for which the Company is responsible.



2.7 Communication with Stakeholder and Identification of Material Issues

2.7.1 Information about and Communication with Stakeholder

Huaneng International has always been adhering to the corporate responsibilities of “providing sufficient, reliable and environmental-friendly electrical power to the society, creating a long-term, stable and incremental return to our shareholders, and providing our staff with an environment which encourages contribution and facilitates career development and integrated development” by fully considering and effectively responding to stakeholders’ demands, and worked together with all stakeholders to promote economic and social development and share corporate development achievements.

Stakeholders	Expectations of Stakeholders	Main Mechanisms of Communication and Participation	Responses from the Company
Investors	Increase of the Company's market value and profitability; continuing improvement of the Company's environmental and social responsibility performance	Shareholders' meeting; information disclosure; Company's website	Truthful and thorough disclosure of information; investment of efforts in improving business performance and generating profits; absorption of market opinions for rectification of operating behaviors; investment of efforts in the improvement of environmental and social responsibility management
Clients	Assurance of high-quality products; guarantee of good service	Making contracts and agreements	Supply of sufficient, reliable and eco-friendly energy and services; guarantee of safe stable delivery of power and heating
Employees	Guarantee of welfare, health and security; improvement of communication mechanism; impartiality concerning in chances of promotion and development	Employment contracts; employees' assembly	Strict observance of provisions within employment contracts; improvement of the institution of employee's assembly; improvement of administration of salary and welfare; provision of healthy and safe work environment; provision of avenues for vocational advancement and training
Suppliers	Honest, fair and just cooperation; mutual benefits and win-win scenarios	Making contracts and agreements; regular communication through mutual visits; correspondence through files, letters and telegraphs	Adherence to open and transparent business principles and processes; active fulfillment of contracts and agreement; promotion of mutual visits
Communities	Joint cultivation of communal civility; support for public welfare; focus on social development	Promotion and organization of public welfare activities; participation in volunteer activities; guarantee of employment	Organization of and participation in public welfare undertakings; building harmonious and civilized communities; attempts at growth of local employments
Regulatory Authority	Observance of disciplines and laws; compliance with operation; green energy; energy conservation and emission reduction	Participation in relevant energy meetings, work reports, policy consultation and information submissions	Strict observance of relevant laws and stipulations; vigorous advocacy and promotion of energy conservation and emission reduction
Competitors	Fair competition; honest cooperation; joint development; safe production	Participation in industry associations ⁷ , policy studies, daily meetings and business exchanges	Competition and cooperation with competitors; jointly creation of a healthy and orderly competitive environment; mutual benefits and joint progress

⁷ Such as China Electricity Council, Chinese Society for Electrical Engineering, Global Energy Interconnection Development and Cooperation Organization, etc.

2.7.2 Process of Identification of Material Issues

According to requirements of HKEX's ESG Reporting Guide, Huaneng International refers to relevant procedures for substantive analyses from GRI, collects and identifies issues at the heart of key stakeholders' interests by way of questionnaires, interviews, etc. Huaneng International analyses and prioritizes collected information and determines the Company's material issues with respect to ESG disclosed in the report.

The process of identification of material issues is divided into four steps:

01

Identifying relevant issues: sources of issues include Environmental, Social and Governance Reporting Guide of HKEX, GRI Sustainability Reporting Standards (《可持續發展報告標準》) and matters disclosed by domestic and international peers.

02

Prioritizing issues: internal stakeholders, when it comes to prioritization, mainly consider impacts on the Company's strategies, policies, processes and objectives, on the Company's competitive advantage and management excellence, and the Company's current and future financial status; external stakeholders, with respect to prioritization, largely focus on the extent to which a certain issue has impacts on assessment and decision-making of the Company as well as on its own interests.

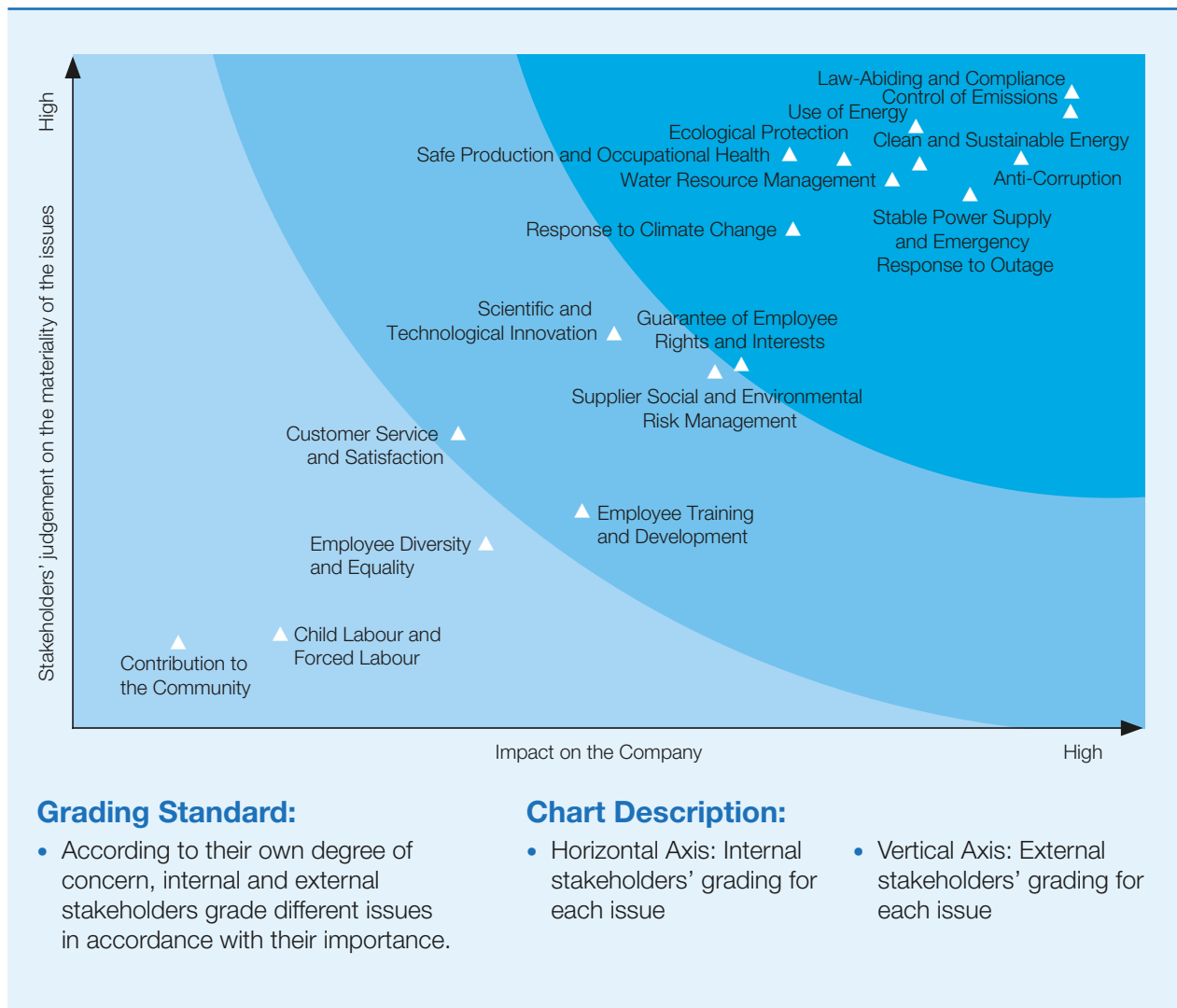
03

Deliberating: the Company management assesses and approves identified issues and their prioritization.


04

Reviewing: after the end of the reporting period, the Company will request internal and external stakeholders to provide feedback on the contents of this report to enhance future disclosure.

Following our communication with various stakeholders, the Company has identified the following issues as well as their respective priorities.



DISTRIBUTION OF POWER PLANTS OF THE COMPANY



The controlled installed capacity of the Company as at 31 December 2022 was 127,228 MW, distributed in areas as depicted in the chart (Unit: MW)

LEGENDS



Wind-power



PV Power



Coal-fired



Combined Cycle



Hydro-power



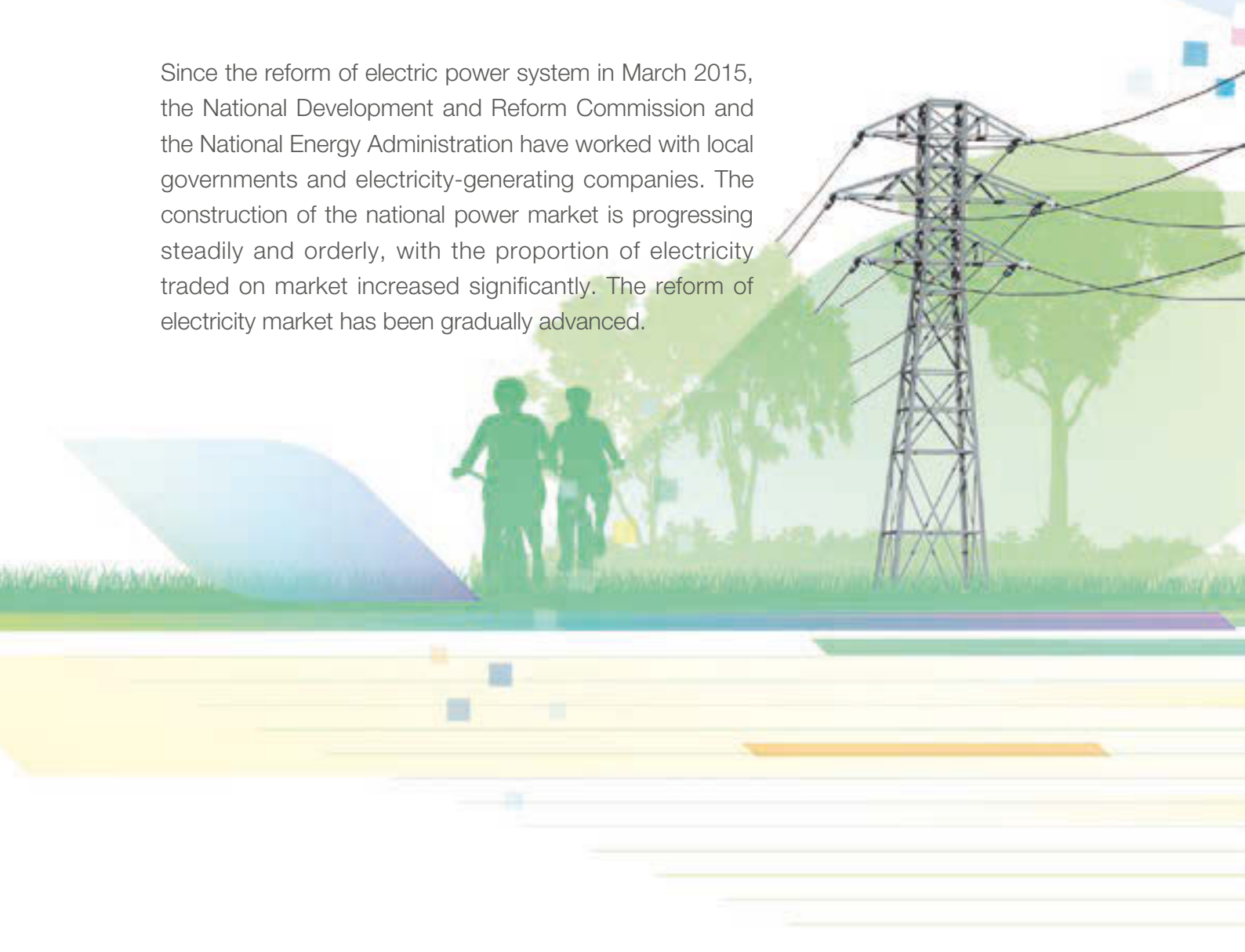
Biomass Power

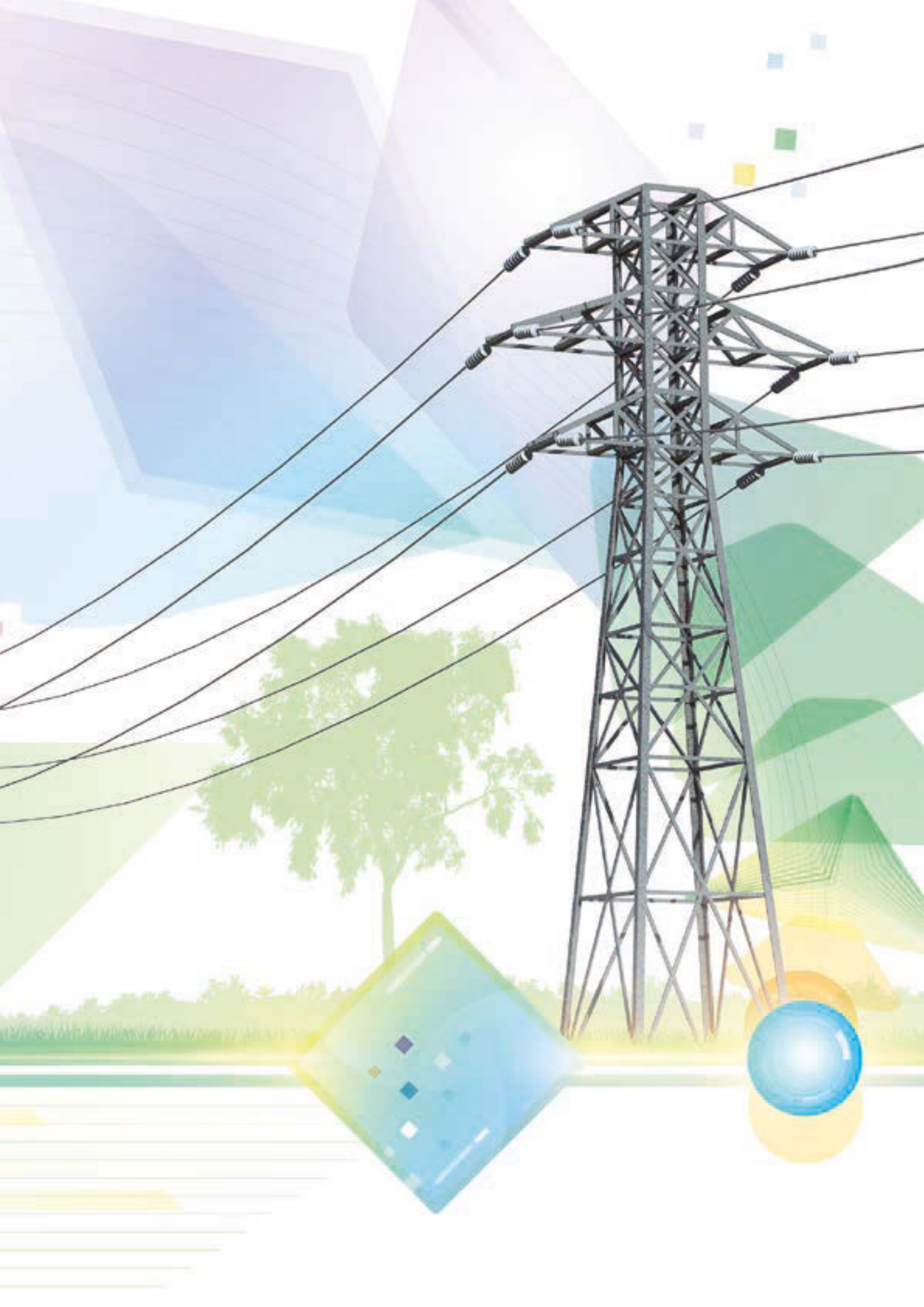
CHINA
NETWORKHeilongjiang
4,086Jilin
3,598Liaoning
6,506Inner
Mongolia
273Hebei
3,455Gansu
3,897Ningxia
20Beijing
2,766Tianjin
1,675Shanxi
3,760Shandong
23,151Henan
8,235Jiangsu
11,935Shanghai
5,713Chongqing
3,800Zhejiang
6,778Hubei
4,650Hunan
3,312Jiangxi
7,039Anhui
2,043Fujian
4,174Guangdong
6,350Guangxi
512Yunnan
3,800Guizhou
775Hainan
2,916OVERSEAS
NETWORKSingapore
2,009Total **127,228**

03

ADVANCING THE REFORM OF ELECTRIC POWER SYSTEM TO PROMOTE DEVELOPMENT

Since the reform of electric power system in March 2015, the National Development and Reform Commission and the National Energy Administration have worked with local governments and electricity-generating companies. The construction of the national power market is progressing steadily and orderly, with the proportion of electricity traded on market increased significantly. The reform of electricity market has been gradually advanced.





Advancing the Reform of Electric Power System to Promote Development

The reform of electric power system has been pushed forward. In 2022, the Notice on Further Improving the Market-based Coal Price Mechanism (《關於進一步完善煤炭市場化價格形成機制的通知》), the Guiding Opinions on Accelerating the Construction of a National Unified Electricity Market System (《關於加快建設全國統一電力市場體系的指導意見》), the Notice on Accelerating the Construction of Electricity Spot Market (《關於加快推進電力現貨市場建設工作的通知》), the Notice on Promoting Green Electricity Certificate Trading by Electricity Trading Institutions (《關於推動電力交易機構開展綠色電力證書交易的通知》), the Notice on Matters related to the Orderly Promotion of Green Electricity Trading (《關於有序推進綠色電力交易有關事項的通知》) and other reform policies were introduced, the transformation towards coordinated operation system of various markets at all levels was accelerated, and further progress was made in the reform of market-oriented electricity prices. The medium and long-term trading prices of electricity and coal continued to be linked such that the price of electricity can better reflect the price of coal. Electricity spot trading with volatile prices and fluctuating ranges extended to all provinces and regions. The regional unified electricity market was piloted in the South China and Yangtze River Delta. An unprecedented breakthrough was achieved in capacity compensation mechanism of large wind power and photovoltaic bases. The green electricity trading with affordable new energy projects at the core was proceeded in an orderly manner. Those price-centered initiatives inspired the motivation and initiative of each party to achieve the balance of power supply and demand, and to consume green power.

The electricity market witnesses intensified competition. Differences in resource endowments, market rules, market players and interests bring new challenges to power generation enterprises in terms of policy support, industry synergy and regional coordination. Due to the mounting pressure of maintaining stable economy, it is expected that in the short run, the rise of the medium and long-term trading prices of coal and electricity will be retained within 20% based on the benchmark price. Especially with the forecast of lowering coal price regulations, coal and electricity enterprises will become differentiated in bidding strategies. As different types of electricity generators will develop trading strategy based on their own characteristics and core demands, the competitive differentiation in the coal and electricity market is expected to intensify. The discrepancy in the structure of power purchase by electricity providers increases as new energy prevails in the market. Since the integration cost (i.e., the cost of balancing services provided by coal, electricity and other regulatory power sources for new energy integration) is beyond consideration when purchasing new energy power, the overall cost of purchasing new energy power maintains on the low side. Electricity providers purchasing greater new energy leverage their cost advantages to attract customers with competitive prices, which will ratchet up the forecast of a downward trend in electricity prices and is not conducive to the healthy and stable development of the retail market.

As one of the most influential enterprises in the electric power industry, Huaneng International will lend its full support to national policies and work conscientiously for arrangements concerning the Central Economic Work Conference and various government work reports by participating in the build-up of electricity market and transactions, and by playing the role of market mechanisms, enhancing security of power supply and supply capacity of clean electricity under market mechanism. Huaneng International enhances communication with electric power end customers, enters strategic cooperation and explores potential. In 2022, the Company participated in the green power trading for 2023 for the core office area in subcentral Beijing as the exclusive power generation company headquarters, and our headquarters is now 100% fueled by green power, improving the image of a green enterprise. Besides, Huaneng International makes active response to auxiliary services and demand-side requirements. In Zhejiang, we put into operation China's first virtual power plant featuring dispatching systems and real-time systematic adjustment. We provide value-added services to enhance customer engagement and improve the reputation and market recognition of our brand in terms of customer services and social responsibility fulfillment. We work together with power users to revolutionize energy production and consumption and build a clean, low-carbon, safe and efficient energy system.

Our Targets

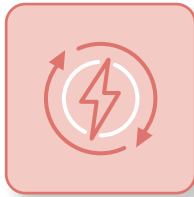
Against the backdrop of the reform of the electric power industry, Huaneng International has established the marketing concept of "efficiency first with price at the core", under which we put emphasis on the coordination of price and volume and improve the level of digitalization, in a bid to achieve further breakthroughs in revenue and benefits generation and cultivate the market competitiveness of a world-class enterprise.

The goal of wholesale market trading is to make the utmost of the national power price policies, speed up the establishment of transaction assistance decision-making systems, and achieve breakthrough in the integrated trading power prices by spot trading, time-of-day trading, energy-intensive trading, and other means to ensure that they are higher than the market average.

The objective of retail market trading is to reasonably expand the sales of electricity and enlarge the market share of electricity sales while better reflecting the purchase prices at the wholesale side, thus catching up with and surpassing the share of installation. As the load management is reinforced in China, the Company will work with electricity providers to deepen the development of adjustable resources such as virtual power plants. We will make active response to auxiliary services and demand-side requirements, open up new path for profit growth, and develop a unified service concept in power sales and social responsibility fulfillment to strengthen brand competitiveness.

Management Mechanism

In 2022, confronted with challenges brought by the advance of electricity reform and the tough task of guaranteeing energy supply, Huaneng International took positive actions to improve efficiency and raise electricity and heat prices, thus recording a year-on-year increase in revenue of over RMB6.14 billion while ensuring power supply. The major measures adopted are as follows:



1 Sparing No Effort to Implement Supporting Policies. The Company facilitated the transformation of power transmission pricing mechanism from the benchmark coal price at sending end to a market-based pricing, promoted the green certificate as the only proof of green power consumption, and expanded the scope of applying the coal and electricity capacity compensation mechanism. We helped to ensure electricity pricing policies were fully delivered in certain areas, raised the monthly trading prices in Chongqing, Guangdong Province, Hunan Province and Yunnan Province to the expected range, and increased the price of electricity from Gansu Province to Hunan Province year-on-year. In addition, the Company enabled the adjustment of the regulatory parameters for market force behavior in Shandong, raising the ceiling of spot clearing price from RMB0.55/kWh to RMB0.76/kWh. The two-part tariff for Chongqing Liangjiang Gas Turbine was subject to consistent pricing policies instead of year-by-year approval, and a gas-electricity pricing linkage mechanism was established, marking a historic breakthrough.



2 Making Flexible Adjustment of Power Generation Strategy. We insistently kept an eye on and studied the national macro-economy, the supply and demand of power, and the situation of the coal market. From the perspective of maximizing the overall benefit of the Company, we coordinated all subsidiaries and power plants to adjust power generation and trading strategies, explored the potential of internal coordination and peak regulation, and encouraged units with positive contribution margin to maximum their power generation while securing electricity and heating supply. The Company's medium and long-term trading at 1.2 times the benchmark coal price contributed over 80% of coal power revenue. Four regions participated in intra-provincial spot trading saw increase in revenue of RMB2.4 billion compared to under medium and long-term contracts, and eight regions participated in inter-provincial spot trading witnessed increase in revenue of RMB1.61 billion. The revenue from cross-provincial power transfers in northeast and southern regions grew by RMB280 million, up by five times year on year. The Company's net revenue from auxiliary services was RMB1.47 billion, increased by 19.7% year-on-year. The prices of new energy at affordable prices participating in green power trading surpassed the benchmark price, achieving a premium of 7.5 cents, up by 18.8%.

3 Enhancing Talent Management and Team Building. The Company boosted the physical operation of the operation center of the spot pilot subsidiaries, guided the pilot subsidiaries to accelerate the selection, training and reserve of trading personnel, and organized power trading skills competitions to promote practical use and to enhance the technical level of trading personnel. In the 2022 National Power Industry Vocational Skills Competition (Power Trader) organized by the China Electricity Council, the Company's marketing team won two first prizes by group and two third prize by group, five players were awarded the title of "Industry Technical Expert" and nine were awarded the title of "Outstanding Operator". Outstanding operators were selected to lead the training of inter-disciplinary personnel with practical trading skills and ability of policy studying and market analysis in each subsidiary, in a bid to cultivate a first-class marketing team in China's power sector.



*PERFORMING
DUTIES BY
ASSIDUOUS
ACTION*

04

To speed up the construction of a world-class listed power generator and pursue new development philosophy, Huaneng International coordinates production safety and green development and plays an active part as a state-owned enterprise, devoting every effort to serving national development and securing energy supply. The Company optimizes the system to guarantee power supply, adjusts corporate governance structure and deepen corporate reform to steadily reinforce the compliance management capabilities and achieve high-quality development in compliance with the law.



Performing Duties by Assiduous Action

4.1 Improving Capability of Guaranteeing Energy Supply

Huaneng International is committed to developing itself into an international leading power generation listed company and providing sufficient, reliable and environmentally friendly power and high-quality energy services for the customers. Each of the Company's power plants has put in place contingency plans and response measures to ensure a safe and stable power supply.

Establishing a Policy Guarantee Mechanism

In accordance with the Company's emergency management measures for major incidents and accidents and the contingency plans for major production accidents and large-scale blackouts in case of accidents such as power units tripping, alternating current and direct current power outages, bus bar outages and large-scale power grid outages caused by system collapses, all units of the Company have formulated Emergency Plan for Thorough Power Failure (《全廠失電應急預案》), Emergency Plan for Black Start (《黑啟動應急預案》), Plan for Island Operation (《孤島運行方案》) and other preparatory measures and established corresponding emergency handling organizations in order to minimize negative impacts on society. These include unified leadership, clear division of labor, rapid response and fluent communication upon occurrence of accidents. Besides, in case of an emergency, the Company and subsidiaries will also manage accident report to power dispatch department and offices of local governments, handle examination and approval of information disclosed to the public, start emergency measures and be attentive to public concern to reduce the negative impact on society. We put in rescue control measures with inspection, prevention and repair of power outage to ensure timely recovery of power generation and resumption of power supply.

Strengthening Daily Equipment Management

The Company has focused on its equipment and technology transformation management to ensure the safety, reliability and advanced nature of equipment. The Company has been pushing ahead with the work of "reducing deficiencies and controlling unplanned power outages", strengthening generator units' unplanned power outage control with the unplanned power outage control as a breakthrough point, issuing unplanned power outage analysis report and conducting related monthly performance reporting. The Company initiated equipment management and risk investigation for several power plants, as well as project planning and process quality inspection for Grade A/B⁸ overhauling units to enable full process management of reliability indicators for the main engine and key auxiliaries. We also strengthened technical supervision and management, conducted site evaluation and stepped up the efforts in technology transformation projects to constantly improve equipment health and ensure the safety of equipment and our staff.

As of December 31, 2022, the Company had achieved an average 0.21 times of unplanned outages per unit per year.

⁸ A/B: Level-A maintenance refers to an overall dismantling, inspection and repair of the generator unit to maintain, restore or improve the performance of equipment; Level-B maintenance refers to a portion of level-A maintenance items carried out conditionally and specifically based on the equipment status, system features and operation conditions of the unit.

Strengthening the Guarantee of Heating Safety

With earnest implementation of the requirements of China and industry regulators on heat supply, the Company has established a leadership team for power and heat supply guarantee in a timely manner, arranged a supply-guarantee plan, conducted daily supervisions, weekly supervision and monthly summary, made assiduous efforts in ensuring the security of supply-guarantee funds, and promoted the implementation of various measures. All the subsidiaries resolutely shoulder their political and social responsibilities, source coal through various channels, strengthen equipment maintenance, and strictly implement instructions of power grid dispatching, with coal-fired power generator units operating as per requirements of such instructions. By doing so, the Company has fully performed its responsibilities and duties. In addition, the Company has also taken the following measures to strengthen the guarantee of heating safety.

- 1 Enhancing the management of boiler fuel.** We formulated specific plans for fuel procurement, storage and transportation, optimized plans for mixed burning of coal and improved the measures for low-load and stable burning, so as to ensure steady operation of power units.
- 2 Ensuring personnel safety in heating production.** With improvement to the accountability system, regulations and operating instructions related to production safety, we enhanced safety education and training for relevant personnel, provided inspection equipment and protective materials, and organized drills for emergency rescue.
- 3 Attaching great importance to management of direct heating network.** We maintained the normal operation of the heating network by conducting routine management of heating network equipment, ensuring sufficient reserve of materials and human resources, timely eliminating the defects of heating network equipment and pipes, and focusing on the operation and management of water replenishing for heating network.
- 4 Being well prepared for heating emergency.** We improved our capabilities of dealing with disastrous events by preparing emergency heating measures in advance, formulating emergency plans in case of outage of heating equipment, quickly identifying, treating and recovering failure equipment, establishing emergency plans for personal injury and death accidents, and enhancing the communication between local government and heating companies.
- 5 Strengthening the on-duty work of heating.** We strengthened the policy of personnel on duty on holidays, executed the policy of major operations with the attendance of leaders. We reported the operation of heating units in a regular basis and reported the heating emergencies in a timely manner.
- 6 Enhancing the awareness of heating services.** By taking the initiative to find out the outstanding heating issues raised by our people, we gained understanding of their demands, and resolved the issues effectively.



Successfully Coping with Natural Disasters and Extreme Weather

In 2022, the subsidiaries of the Company worked together to overcome severe tests, and successfully accomplished the task of ensuring power supply in this crucial period. The production safety of the Company's system overall maintains stable. The Company always considers stable supply of power and heat as highly urgent political tasks, assumes duty to guarantee energy consumption for people's livelihood, and resolutely overcomes the adverse effects of the continuous sharp increase of coal prices and lower-than-cost price. The Company resolutely shoulders and implements the political responsibility of guaranteeing the security of electricity and heat supply.

Multiple Measures were Taken at Huangtai Power Plant to Cope with Extreme Weather and Secure Power Supply

Huangtai Power Plant kept a watchful eye on energy supply guarantee, potential risks identification and other major issues, and implemented a power supply package in winter to ensure stable supply of power and heat in cold wave and extreme low temperature:

1. The Plant made a full preparation to protect equipment and devices against cold and freezing conditions in winter. It pre-checked the cold and freezing conditions on site on a timely manner, performed self-inspection and self-correction in strict accordance with the Anti-freezing and Anti-coagulation Measures (《防寒防冻措施》), and set out clear responsibilities and tasks for personnel at each profession and position to avoid equipment and furnace shut-down due to low temperature.
2. In the face of power and heating peak in winter, the Fuel Department of the Plant looked back at the pictures of coal storage in winter of previous years and arranged the operation of coal yards in advance to strengthen the management of coal receipt and unloading and improve the inventory level.
3. The fuel unloading personnel of the Plant was on duty at any time to facilitate vehicles to unload as they arrived without delay or overstock, so as to avoid any coal shortage affecting the power generation of the units. Based on the principle of "separate piles in storage, first-in first-out, and regular replacement", the Plant stored coal appropriately, minimized the loss of calorific value of the stored coal, integrated coal receipt, unloading and storage for the balance between receipt and consumption and sufficient inventory to meet the coal demand of units for power generation and heat supply in this winter.



Personnel Checking Equipment at Huangtai Power Plant in Response to Extreme Weather



Successfully Guaranteeing Energy for Important Periods

Confronted with unprecedented pressure on supply in 2022, the Company worked united as one in effectively minimizing the impact caused by drastic drop in imported coal, cold wave and extreme high temperature, drought in major river basins and other adverse factors, and maintained stable fuel supply. We successfully accomplished our task of supply guarantee for the Olympic and Paralympic Winter Games, the peak season in summer, the 20th National Congress and other important periods and major events, winning recognition and praise from national ministries and local governments for our fulfillment of duty.

During important periods such as the beginning of the year and the Spring Festival, the Company took various production safety measures to ensure safe and stable power production and reliable heat and steam supply:

- 1 Performing safety management for operating power units.** Learning from the internal and external production safety accidents, we seriously implemented the policy of “Two Tickets and Three Systems”⁹, strengthened operation management and routine inspection, improved equipment defect management and attached great importance to equipment defect elimination.
- 2 Strengthening the management of external supply of heating and steam.** By earnestly implementing various measures of the Company, we enhanced the inspection and maintenance on heating equipment and heating pipe network and improved relevant emergency plans and early warning mechanism.
- 3 Attaching great importance to fuel support.** Giving priority to ensuring people’s livelihood and supply, we took into account the price control and effectively enhanced allocation and transportation, so as to ensure the supply.
- 4 Enhancing allocation and transportation.** We managed to match the resources with the transport capacity and made arrangement for urging of delivery and shipment. Considering the potential adverse effects of extreme weather on transportation, we made application for green channel support to local traffic management department in advance.
- 5 Continuing the pandemic prevention and control.** We strengthened the pandemic prevention and control in production, and adhered to the implementation of all precautionary measures, so as to guarantee for the life and health of employees and ensure stable and orderly conduction of routine production work.

⁹ Two Tickets and Three Systems: work ticket and operation ticket; shift system, patrol inspection system and the system of periodic test and rotation of equipment.

4.2 Sticking to Honest and Law-abiding Practices for Compliant Operation

Huaneng International continuously enhances its anti-corruption efforts, insists on clean and honest business practice, strictly manage enterprises in accordance with the law, practice compliance operations, and formulate sound rules and regulations and supervision systems. We closely monitor new changes in regulatory laws and regulations in the place of listing to grasp the regulatory trends and effectively implement the new regulatory requirements. The Company is committed to operational compliance, regulated operation to continually improve its risk prevention ability and corporate governance, and building a corporate culture that values integrity and compliance.

4.2.1 Governance by Law

In 2022, upholding Xi Jinping Thought on Rule of Law, the Company thoroughly implemented the strategic plan of the CPC Central Committee on comprehensively advancing the rule of law. Under the unified leadership of the Party committee and management of the Company, the Company comprehensively advanced the rule of law and deepened reform of the rule of law by integrating the concept of governing businesses by law into corporate governance, improving the management of compliant operation, enhancing the capability of the team engaged in the rule of law. With the strengthening of the construction of corporate rule of law culture as a guarantee, comprehensively promote the construction of rule of law of Huaneng and deepen reform to improve the level of rule of law construction.

Improving the Corporate Governance Structure

After years of exploration and practice, the Company has insisted on deepening reforms based on the requirements of the modern enterprise system, upgraded the organizational system, and improved our modern governance system and governance capacity to form a standardized and sound corporate governance system in all respects. We have established and improved the corporate governance structure consisting of the shareholders' meeting, the Board of Directors, the Board of Supervisors, and management, and continuously improved the system of decision-making, execution and supervision on the basis of equal rights and responsibilities, coordinated operation, and effective checks and balances.

Strengthening the Mechanism of Litigation Risk Prevention and Control

The Company insistently strengthens the management of litigation and disputes, and supervises the handling of the cases carried over from the past following a problem-oriented approach. For the significant cases that have impaired the Company's reputation or caused heavy losses, the Company strengthens coordination and urges relevant subsidiaries to make active and responsible response, handling cases in a standardized and effective manner. The Company has also strengthened the management of filing and statistics of litigation cases, improved the quality of case information reporting, and paid attention to the progress of cases in real time. We have carried out the identification of legal and management risks of cases, checked vulnerabilities in the system and management, and issued targeted risk warning to improve the management level.



Enhancing the Review of Legal Issues

Following the strategy of governing the enterprise by law and the idea of solving the difficulties of reform with a thinking and methodology based on the rule of law, the Company promoted the thorough integration of legal affair management and operation management to ensure mutual cooperation and efficient coordination between the legal affair department and other business departments and regulate the working process. The Company improved its engagement in legal issues review, regulations and systems, asset disposal, project development, capital operation, legal authorization, contracts and business administration, etc., to fully control legal risks and ensure that all operations will be carried out in a lawful and reliable manner. By promoting the integration and the interfacing of the legal management information system and other business operation systems, the Company fully exploits the management efficiency of the information system, and continuously improves the level of information management of legal affairs.

Improving Staff's Awareness of Laws by Various Activities

The Company further advances various publicity and education campaigns on laws in innovative manner, and promotes the implementation of the relevant requirements. In 2022, the Company carried out publicity on laws comprehensively and systematically based on ours needs, as required by the higher authorities.

1

Conducting publicity on laws in areas closely related to the development of the Company. The Company has strengthened the promotion and study of the Constitution of the People's Republic of China (《憲法》) and the Civil Code (《民法典》), focusing on the laws and regulations related to intercompany transactions and information disclosure of listed companies. We have thoroughly learned the laws and regulations on enterprise reform and promotion of the high-quality development, and made further research of policies and regulations regarding environmental protection and safety.

2

Continuing with various legal awareness campaigns associated with employees' work and lives. A series of briefings on the new laws were released via online columns for the purpose of further publicizing the laws and regulations and regulatory requirements such as the Securities Law (《證券法》), the Company Law (《公司法》), the Administrative Measures for the Disclosure of Information of Listed Companies (《上市公司信息披露管理辦法》), the Guidelines for the Implementation of Affiliated Transactions of the Shanghai Stock Exchange (《上交所關聯交易實施指引》), etc. The Company continues to pay attention to the trends of external regulations, and incorporates new regulatory requirements and policies into its plan of law publicity in a timely manner, in a bid to legally guarantee the standardization and institutionalization of the Company's information disclosure system.

3

Carrying out intensive legal awareness campaigns. Through the Constitution Awareness Week, National Security Education Day and other major occasions for publicity on laws, the Company will create a sound atmosphere for publicity on laws and cultivation of legal awareness by distributing books, putting up posters and showing promotional films.



4.2.2 Anti-corruption

In 2022, strictly complying with the Oversight Law of the People's Republic of China (《中華人民共和國監察法》), the Regulation on the Implementation of the Oversight Law of the People's Republic of China (《中華人民共和國監察法實施條例》), and the Criminal Law of the People's Republic of China (《中華人民共和國刑法》) and other laws and regulations, the Company assiduously carried out conduct improvement and anti-corruption campaigns, urged all employees to uphold ethics as well as Party disciplines and state laws and created an atmosphere where everyone remained disciplined, abided by the law, discharged duties in a standardized fashion, and practiced clean operation so as to provide reliable support for the Company's high-quality business development.

In 2022, the number of lawsuits on corruption raised and concluded against the Company or its employees was zero.

Implementing the Responsibility System for Conduct Improvement and Clean Governance

- 1 The Company held the 2022 conference of conduct improvement, clean governance and anti-corruption campaigns.
- 2 The Company formulated and issued the Key Task Division Plan for Conduct Improvement, Clean Governance and Anti-corruption Campaigns of the Company's Party Committee for 2022 (《公司黨委2022年黨風廉政建設和反腐敗工作重點任務分工方案》) which broke down the annual conduct improvement and anti-corruption campaigns into 35 specific tasks in seven aspects and defined the division of responsibilities.
- 3 All the departments and offices signed a total of 12 letters of commitment to integrity for 2022 under the organization of the Company, and carried out the segregation of duties for conduct improvement and clean governance among staff at all levels.
- 4 The Company convened a special report meeting on comprehensive and strict party governance by the Company's party committee, listened to the "dual responsibilities" of the Company's team members, the special supervision of the Company's discipline inspection commission, and the work reports of various departments and offices at the management, supervision, and execution levels, and consolidated the responsibility for managing the party and governing the party.

Enhancing Inspections, Rectifications and Practical Use of Results

- 1 The Work Plan for Inspections and Rectifications (《巡視整改工作方案》) and the Supervisory Ledger for Inspections and Rectifications (《巡視整改監督台賬》) have been established. Findings and rectification measures are recorded in the Supervisory Ledger and the “case cancellation system”¹⁰ management is implemented. The Report on the Progress of Inspection and Rectification (《巡視整改進展情況報告》) was prepared to improve the information management system of inspections.
- 2 The Company sent out work tips in a timely manner, held 12 meetings of the rectification office, compiled and released four issues of Briefing on the Inspection and Rectification (《巡視整改工作簡報》), and carried out “one-to-one” supervision of the rectification on 13 departments and offices to facilitate inspection and rectification.
- 3 The problems and rectification tasks of the Company’s Party Committee were basically solved and completed, which strongly promoted the Company’s high-quality development.

Strengthening Daily Supervision and Targeted Supervision

- 1 The Company has explored and established an overall supervision system enforced by the Discipline Inspection Commission to promote the coordination of supervisions at all levels. The Company also has set up the Overall Supervision Ledger by the Discipline Inspection Commission in 2022 (《公司紀委2022年度綜合監督台賬》) and rectified problems identified from the ledger check according to their fulfillment on a regular basis.
- 2 The Company strengthens the supervision of the “top leaders” and the leadership team. To effectively strengthen the supervision of the “top leaders”, the secretary of the Party committee and the secretary of the Discipline Inspection Commission of the Company carry out “one-on-one” key point interviews with principals of 13 departments and offices to point out problems in person and urge them to rectify.
- 3 The Company has established the integrity archives of middle-level management cadres of the Company’s Party committee and implemented dynamic management.
- 4 The Company strictly assesses the integrity when appointing and promoting cadres to prevent the promotion or appointment of any cadre with improper conduct.
- 5 The Company strengthens the risk prevention and control of overseas projects. We assiduously carry out education on ideals and principles and compliance management for overseas staff by formulating the Implementing Opinions on Governance of Overseas Corruption (《公司境外腐敗治理工作實施意見》) and promoting the formulation of the Implementation Rules for Enhancing Party Branches Building of Tuas Power (《關於加強大士黨支部建設的實施細則》), so as to constantly improve overseas staff’s awareness of integrity.

¹⁰ Case cancellation system: the process of rectifying items identified and recorded in the Supervision Ledger. The item should and only should be removed from the ledger once the rectification of it is completed.

Strengthening Integrity Campaigns

- 1 The Company sends integrity message at important moments. On major holidays such as the New Year's Day, the Spring Festival, the Labor Day, the Dragon Boat Festival, the Mid-Autumn Festival, and the National Day, we send integrity messages to the Company's employees to urge cadres at all levels to uphold integrity, frugality, and high moral standards.
- 2 Based on the typical cases of violating the eight-point decision on improving work conduct announced by the CPC Central Commission for Discipline Inspection and the National Supervisory Commission, we strengthen warning education to enhance cadres' awareness of practicing the eight-point decision on improving work conduct and the relevant implementation rules on their own initiative.
- 3 The Company vigorously rectifies the formalism and bureaucratism and carries out targeted supervision of relevant problems. The Company conducts self-inspection, investigation, and supervision. All identified problems have been immediately handled and rectified.

Conducting Education on Professional Integrity

- 1 The Company practically carries out disciplinary interviews under the "four forms". The Company formulated the disciplinary interview plan under the "four forms" in 2022. We urge all departments and offices of the Company to arrange reasonable interview time and give reminders on a regular basis to ensure smooth progress of interviews as scheduled. Throughout the year, 60 routine interviews were conducted.
- 2 The Company holds onto the warning education on integrity. During the year, 21 warning educations were conducted, through which we further raised employee awareness of self-discipline and integrity. A solid foundation for uprightness and entrepreneurship was laid for the Company.

Facilitating the Construction of Discipline Inspection Teams

- 1 The Company strengthens the standardized management of letters, visits and reports, strictly implement the Detailed Rules for the Implementation of the Discipline Inspection Commission of the Company (Trial) (《公司紀委執紀工作實施細則(試行)》), and the Company sets up reception places, recording phones, reporting mailboxes, etc. to accept letters, visits and telephone reports. The management of complaint reporting and problem clues shall adhere to the principles of centralized management, standardized procedures and strict discipline, strictly implement the handling procedures according to the management authority, and establish a management account. The personnel of the Company's Discipline Inspection Commission strictly implement the confidentiality system and avoidance system, strictly control the scope of knowledge of the review and investigation work, and are not allowed to privately retain, conceal, consult, extract, copy, or carry clues to issues and information related to the case, as well as to disclose the review and investigation work. We improved the mechanism for assisting in investigation and evidence collection, developed the Form of Transferring Relevant Evidence and Documents (《協助調取有關證據材料審批表》) and the Form of Providing Relevant Evidence and Documents (《協助提供有關證據材料審批表》) to further standardize the investigation and evidence collection disposal and approval processes.
- 2 The Company intensifies training for full-time and part-time discipline inspection personnel. We organized 8 trainings on discipline inspection and supervision for discipline inspection personnel, and distributed training materials for them to consistently improve their political awareness of and competence in discipline inspection.
- 3 The Company rigidly follows the requirements of discipline inspection to strengthen self-supervision. Through daily work exchanges, and routine interviews, we conduct strict education, management and supervision on discipline inspection personnel to prevent any unnoticed corruption practices.

4.2.3 Protection of Intellectual Property Rights

The Company earnestly implements the decisions and arrangements of the central government on protection of intellectual property rights to further enhance the protection of intellectual property rights, and thoroughly implements the requirements of the Plan on the Development of Intellectual Property Rights Power (2021-2035) (《知識產權強國建設綱要(2021-2035年)》) and the Plan for Protection and Application of Intellectual Property Rights for the 14th Five-Year Plan Period (《“十四五”國家知識產權保護和運用規劃》) so as to facilitate the high-quality development in patent and technological innovation of the Company. The Company constantly establishes and improves the intellectual property rights protection systems, and based on patents-related needs, unremittably refines the requirements and policies for intellectual property rights agency to open and optimize channels for patent application, guarantee the efficiency of patent application, and promote the steady development of quality and quantity of patents. To effectively strengthen the strategic layout of intellectual property rights, the Company launched a special project for patent enhancement, and cooperated with professional organizations to optimize the cooperation mechanism, integrate resources and coordinate and carry out patent application and renewal based on the Company's management conditions, further standardizing the management, development and application of intellectual property rights, refining the protection mechanism for technological achievements and facilitating the formation and transformation of technological innovation and proprietary intellectual property rights. As of December 2022, the Company had coordinated with the agency partners to file 206 applications for patents and utility model patents and carry out 481 patent renewals.

In 2022, the Company strictly followed the Patent Law of the People's Republic of China (《中華人民共和國專利法》), the Copyright Law of the People's Republic of China (《中華人民共和國著作權法》), the Trademark Law of the People's Republic of China (《中華人民共和國商標法》), the Rules for the Implementation of the Patent Law of the People's Republic of China (《中華人民共和國專利法實施細則》), the Regulations for the Implementation of the Copyright Law of the People's Republic of China (《中華人民共和國著作權法實施條例》), the Detailed Rules for the Implementation of the Trademark Law of the People's Republic of China (《中華人民共和國商標法實施條例》) and other laws and regulations related to intellectual property rights, abided by the international conventions and general standards related to protection of intellectual property rights to ensure that the Company is protected in the ownership and use of intellectual property rights under applicable laws, and received no punishment or lawsuit from the government for intellectual property infringement.



Formulating Patent Improvement Measures

Patent quality is an important symbol to measure technological innovation. The head of the Company's secondary unit division and the chief engineer took the lead in establishing a special working group to explore the establishment of a responsibility system for technological innovation headed by the chief engineer, and refine and implement various patent indicators, deeply integrating the patent work with scientific research, planning, infrastructure and technical transformation of production, and formulating patent improvement measures appropriate to the Company.

Strengthening Trainings for Intellectual Property Rights

The Company actively conducts research on the compliance management of intellectual property rights. We organize patent work trainings within the system and complete the patent application and protection as well as the trademark protection and publicity to improve the patent application knowledge of frontline employees and guide all units to achieve Industry-University-Research-Practice cooperation, in an effort to promote joint application, ownership and use of patents.

Protecting and Maintaining Intellectual Property Rights

Huaneng International attaches great importance to the protection and maintenance of intellectual property rights, and requires all units to strictly follow relevant laws, regulations and policies. In accordance with the management requirements, the Company constantly improves and optimizes the top-level design. In the light of the Measures for the Management of Trademarks and Fonts of the Company (《商標及字號管理辦法》), we continuously strengthen the protection for intellectual properties such as core technologies, trademarks and fonts, proactively investigate the use of Huaneng fonts, fight against infringement, and prudently decide on the transfer and licensing of core intellectual property rights, so as to safeguard the legitimate rights and interests of the Company. Meanwhile, the Company further enhances all-round management of core technical secrets and business secrets, and reinforces competition restrictions on key talents knowing the Company's core technology secrets. With respect to intellectual property rights of others, we, adhering to the principle of full respect and proper use, define the use, methods, prohibited acts and liability for breach through a license agreement to use such intellectual property rights in a legal and compliant manner. In addition, the Company establishes and improves the coordination mechanism between intellectual property rights agencies and Legal Department of the Company so as to better deal with disputes arising from intellectual property rights, enhance risk control and establish a multi-level intellectual property protection system.

Strengthening the Management of Patent Information

The Company establishes a patent information management system covering the whole process. Starting from the patent application, we dynamically monitor and maintain the patent information using technological means, and link all patents to relevant project, realizing full tracking management throughout the life cycle of patent application, authorization, maintenance, achievement transformation and invalidation.



05



As a responsible company, Huaneng International strongly promotes ecological development, vigorously develops clean energy, continuously optimizes the industrial strategic plan, actively engages in technological innovation, strengthens environmental protection, maximizes energy efficiency, and boosts the development of the green management system, so as to promote the green development of the Company.



The background features two wind turbines on the left side. Overlaid on the image are several large, semi-transparent geometric shapes: a large light blue circle at the top, a large purple trapezoid on the right, and several green and yellow polygons at the bottom. Small, colorful squares (blue, green, red, purple) are scattered across the composition.

*TRANSFORMATION
DEVELOPMENT DRIVEN
BY INNOVATION*

Transformation Development Driven by Innovation

5.1 Advancing the Energy Revolution

“Innovation, coordination, greenness, openness and sharing” are the five key development concepts of our country. President Xi Jinping has stated the goal to have CO₂ emissions peak before 2030 and achieve carbon neutrality before 2060, and the Chinese government’s response to climate change has been accorded as a major strategy for national economic and social development. The country vigorously develops a green economy and earnestly promotes various emissions reduction measures as core climate change policies.

The “14th Five-Year Plan” period is the first five years of a new journey towards building China into a modern socialist country in an all-round way, the start of a new normal in China’s economic and social development, as well as a crucial period for developing Huaneng International into a world-class listed power generation company. In the meantime, Huaneng International redoubled its efforts to promote the development of low-carbon and clean energy by continuously improving the development quality, and advanced business transformation and upgrading by introducing low-carbon and clean energy power units. We proactively adapted to the development of the power generating industry to accelerate the green development.

Optimizing the Energy Structure Constantly

In 2022, moving towards the goal of “carbon peaking and neutrality”, Huaneng International focused on promoting low-carbon clean energy development, continuously improved the proportion of installed capacity of low-carbon clean energy, and vigorously facilitated the development and construction of new energy projects such as PV and wind power generation, achieving a larger increase in the low-carbon clean energy installed capacity.

During the “14th Five-Year Plan” period, the Company has been optimizing the energy structure. In detail, we coordinate energy security and green development, deepen the supply-side structural reform to thoroughly drive the high-quality development and accelerate the leap-forward development of new energy, and speed up the optimization and upgrading of the coal power structure.

Sticking to the goal of carbon peaking and neutrality, the Company promotes the green and low-carbon energy transformation. Specifically, we adopt renewable energy sources and vigorously develop new energy resources to build a new power system with new energy as the main body. Moreover, we transform to develop coal power, prioritize gas and other clean energy power generation, and actively plan pumped storage power generation to achieve an integration of sources, network, loads and storage and a pattern of multi-energy complementary development.

We focus on developing gas power generation projects in areas with unstable gas sources and gas price, strict environmental protection requirements, strong bearing capacities for electricity price, and large peak load distribution demands. In areas with large installed capacity of gas turbine, we tap into the integrated development mode of gas and electricity by utilizing existing pipeline natural gas, LNG receiving stations and self-built LNG receiving stations, or by way of cooperative development with upstream gas suppliers. Focusing on combining with the peak load distribution demand of the receiving end of the clean energy bases and utilizing relevant policies of the State that support the development of pumped storage, we put efforts to strength cooperation with power grid enterprises in areas with mature ancillary service markets and peak-valley electricity prices by taking regional companies as the main body and giving full play to the role of professional companies, forming a business model of mutual benefit, optimally planning pumped storage power stations, and promoting the development of pumped storage power stations. The Company does well in site protection and resource reserve while taking a large proportion of shares in Hainan Changjiang Nuclear Power Plant Phase I, Shidao Bay Nuclear Power Plant and Xiapu Nuclear Power Plant. We pay close attention to the application of other new energy sources for power generation, and actively seek investment opportunities for project development cooperation, merger and acquisition of properties of renewable energy power generation. We build biomass power units in combination with citizen’s heat supply. We develop energy storage industry according to local conditions, combining with the development of new energy and the requirements of regional peak load distribution. We optimally launch comprehensive energy supply and service stations such as distributed energy and microgrid.

Developing Clean Energy Vigorously

The Company gives priority to quality and benefit and adheres to the principle of “adopting centralization and decentralization and focusing on self-sustaining development”, and strives to gain resources that match its market share. The Company continued to focus on green development, vigorously developed new energy and made full use of the favorable conditions for the centralized development of new energy in the country’s “Three-North”, coastal regions, southwest and part of the central China, and further built an energy base of “base type, clean type, and complementary type; intensification, digitalization, and standardization”. The Company developed and constructed offshore wind power bases in areas such as Guangdong, Jiangsu, Zhejiang, Shandong and Liaoning, and actively planned a new model of scattered and distributed development throughout counties. The Company optimally developed gas power and other clean energy power generation, and steadily developed pumped storage power generation to promote the development of pumped storage power stations by taking into account the peak load distribution demand of the receiving end of the clean energy bases. Besides, the Company actively implemented major regional strategies of the State, such as Guangdong-Hong Kong-Macao Greater Bay Area, Yangtze River Delta and Beijing-Tianjin-Hebei, to integrate ourselves into the new development pattern.

Huaneng Hunan Jiangkou 100,000 kW Wind Power Project

On April 25, 2022, all wind turbines of Huaneng International 100,000 kW Wind Power Project were connected to the grid for power generation. The Project, located in Xupu County, Huaihua City and Dongkou County, Shaoyang City, Hunan Province, has 20 wind turbines with installed capacity of 3.6 MW and 7 wind turbines with 4 MW. Adhering to the philosophy of intensive management, we practiced the new control model “0+1+N” of new energy in Hunan throughout the process of project design, construction and trial operation, achieving annual on-grid energy output of over 200 million kWh, equivalently saving standard coal of 62.8 thousand tons per year and reducing carbon dioxide emission of 188.3 thousand tons. This significantly promotes the adjustment of local energy mix and the sustainability of economy and society.



Huaneng Hunan Jiangkou 100,000 kWh Wind Power Project

5.2 Pursuing and Accelerating Innovation

Technological innovation drives business development. Huaneng International is committed to becoming an innovation-driven enterprise by improving technological innovation, adhering to the improvement of technological innovation as the main line, continuously enhancing our innovation capability, earnestly investing in research and development, optimizing the systems for innovation decision making and management, and relentlessly developing innovation platforms to accelerate the development of the Company.

Innovation Management

The Company implements the new development concept in an all-round way. We earnestly implement the decisions and arrangements of the central government and the SASAC on technological innovation, thoroughly practice the technological innovation strategy, and vigorously embrace the challenges and opportunities in technological innovation arising from the “carbon neutrality” and the new round of revolution in the energy industry. In alignment with the strategy of serving the country and the major demands for the Company’s development, we improve our competence in independent innovation and significantly raise the industrialized level of technological achievements by adhering to making breakthroughs in key technologies, focusing on improving innovation systems and mechanisms, and relying on strengthening the construction of technological talent teams and innovation platforms. In addition, we take the lead in technological innovation to support and usher in the high-quality development of the Company, while accelerating the construction of an international first-class listed power generation company to promote the high-quality development of the domestic energy industry.

In 2022, Huaneng International was committed to serving the national strategies and accelerating innovative development. We strengthened efforts to tackle key and core technologies in an effort to facilitate the national major strategies. Since industrial application verification project of burning high alkali coal technology was officially launched, the technology will push forward the appreciation of wet fly ash and cinder produced by Thermal Power Plant, achieving good economic effectiveness. We have made breakthrough in R&D of over 10 proprietary technologies such as 700 °C high-temperature materials and gas turbine. We have completed the test of projects of energy saving through effective peak load distribution of coal-fired power plant and launched demonstration projects. Our power network security range was recognized as the national level. In Zhejiang, we have put the first virtual power plant under direct instructions of power grid into operation in the country. Ruijin Phase-2 and Shidongkou Plant 1 intelligent power plant systems have been launched. With respect to the development of digital technology and economy information management system, we have completed the Phase-1 development of main functions, established intelligent infrastructure system development team and completed the design of development program.

In 2022, the Company’s R&D investment increased continuously, and 264 patents, 4,357 utility model patents and 113 international patents were authorized.



Innovation Achievements

- 1 “High Alkali Coal Wet Bottom Boiler Full-Combustion Technology” is appraised to take the leading position in the world by the Chinese Society for Electrical Engineering.
- 2 With respect to national major R&D programs, the R&D task of our offshore wind power projects has been prudently promoted, and application verification wind farms of 5MW and 6MW offshore wind power units have been installed and connected to the grid.
- 3 Three proprietary technologies from the automation of gas turbines, that is, the failure analysis and the non-destructive testing and evaluation for key components of gas turbines, as well as efficiency monitoring and diagnosis of gas turbines have been included in the Catalogue for the Recommendation on Scientific and Technological Innovation Achievements of Central Enterprises (《中央企業科技創新成果推薦目錄》) and put into practice.
- 4 Trial operation of 700℃ high-temperature materials was launched in Huaneng Ruijin Ultra-Supercritical Power Plant, taking the first step in practice.
- 5 Huaneng Ruiwo has completed the Phase-1 R&D of DCS system localization, and put 2 sets into pilot operation in Yuhuan Power Plant and Fuzhou Power Plant, and applied 17 sets for promotion in Ruijin Power Plant, etc.
- 6 With respect to network security R&D, we have built the network security simulation and verification environment, which is accredited as the “national power network security range” by the National Energy Administration.

Development Directions

Huaneng International puts technological innovation in a more prominent position according to the requirements of the Company's strategic development. Next, the Company will strengthen efforts to tackle core technologies and accelerate R&D with a focus on clean combustion, network security, automation of gas turbines, intellectual heat supply and other fields, so as to further improve the independent innovation capability. We will make overall plan and improvement on key projects and tasks required for the Company's production safety, infrastructure, management and development, and maintain advanced technical and economic indicators in environmental protection, materials, operation and maintenance and heat supply, forming a high-quality patent system that leads domestic and international markets.

In addition, the Company will also actively promote the integration of technologies, such as carbon capture, fuel cell, AI, IoT, block chain, cloud computing and big data, with all aspects of the energy industry. With the implementation of the “Digital Huaneng, Intelligent Huaneng” strategy and the national “carbon peaking and neutrality” strategy, a number of scientific and technological achievements with significant impact at home and abroad have been made in the field of clean and highly-efficient power generation technology. The Company will also carry out demonstration projects and focus on industrial restructuring to enhance core competitiveness.

5.3 Actively Practicing Low-Carbon Operation

In 2022, embracing the spirit of the annual production conference, the Company carried out the rating work of units in an all-round way, and promoted the energy-saving upgrading and transformation of coal-fired power, and high-quality heat supply renovation. These were effectively implemented with the goals of improving major technical and economic indicators and realizing energy consumption index's "leading positions in overall energy consumption efficiency", under the principles of improving the quality of energy management, focusing on energy consumption index benchmarking and ensuring key generating units' outstanding performance. In 2022, the Company did not incur any environmental accident that was defined as major or above grade.

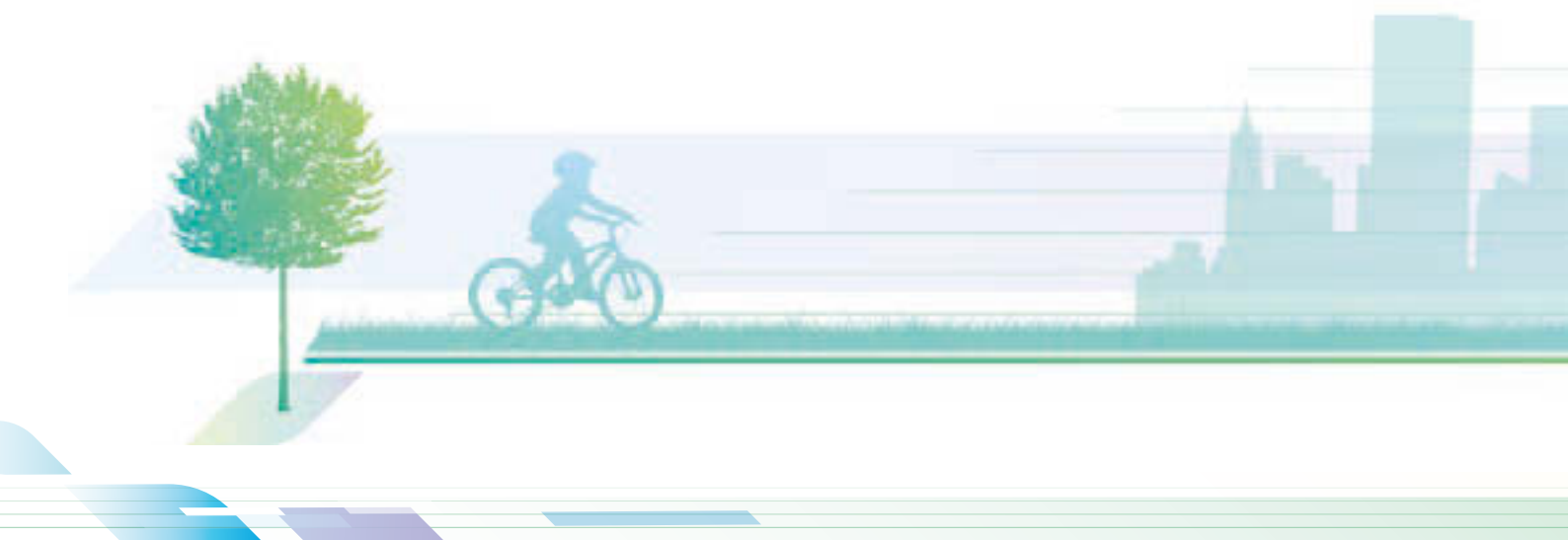
5.3.1 Overall Planning

Committed to an industry leader in overall energy consumption efficiency and ultra-supercritical unit energy consumption efficiency, Huaneng International has formulated rules and regulations, such as the Measures for Energy Saving Management (《節能管理辦法》), the Regulations on Environmental Protection Management (《環境保護管理規定》), the Standards and Acceptance Measures for Energy Saving and Environmentally Friendly Coal-Fired Power Plants (《節約環保型燃煤發電廠標準及驗收考核辦法》), and the Incentive Measures for Achievement of Energy Efficiency Excellence and Enhancement in (Ultra-) Supercritical Power Units (《超(超)臨界機組能耗指標創優及能耗指標提升獎勵辦法》), and effectively implemented energy saving and consumption reduction responsibilities. The Company actively promotes coal-fired power units' energy saving and emission reduction, plans to carry out energy saving and environmental protection, and has successfully fulfilled its targets and responsibilities of energy saving and emission reduction to ensure that the Company's coal-fired units continuously lead in energy conservation and environmental protection and maintain its competitive advantage, contribute to the reform of the national energy production and consumption and enhance the clean and efficient development of coal power generation.

5.3.2 Energy Consumption Management

As an advanced power company, Huaneng International strictly abides by the Environmental Protection Law of the People's Republic of China (《中華人民共和國環境保護法》), the Energy Conservation Law of the People's Republic of China (《中華人民共和國節約能源法》) and other relevant laws during its development.

The Company mainly consumes coal and natural gas in the power generation process and consumes a certain amount of oil during the start-up ignition and production combustion process. In 2022, the Company's coal consumption rate for thermal power units was 287.69 g/kWh. The house consumption rate of plants was 4.37%. The annual consumption of standard coal was 127,243.3 thousand tons. Oil consumption in production totaled 39,332.41 tons, while natural gas consumption was 5,726,164.1 thousand standard cubic meters.



Management Objective

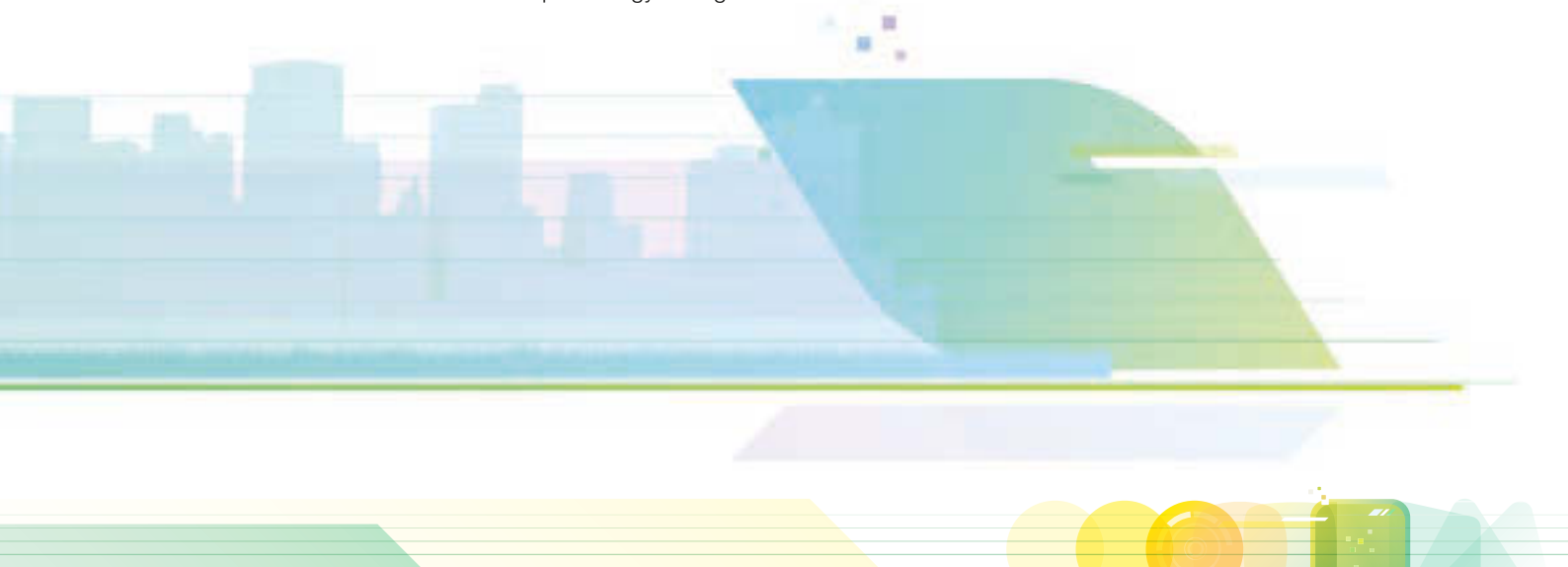
Through multiple measures, the Company strives to reduce the coal consumption rate for thermal power units by about 5 g/kWh compared with 2020 and below 286 g/kWh by 2025. To achieve the objective, in 2022, the Company further tapped the energy saving potential of the thermal power stock, explored the heating market, implemented in-depth energy saving transformation of some units, and actively carried out maintenance optimization, operation adjustment and technical supervision of units, so as to contribute to the inhibition of coal consumption growth, reducing the coal consumption rate by 3.01 g/kWh year on year.

Management Mechanism

The Company's regional branches are responsible for the energy saving management. In accordance with the Law of the People's Republic of China on Conserving Energy (《中華人民共和國節約能源法》), and with the consideration of actual operations, we have formulated regulations and guidance related to energy saving, such as the Measures for Energy Saving Management (《節能管理辦法》), the Incentive Measures for Achievement of Energy Efficiency Excellence and Enhancement in (Ultra-) Supercritical Power Units (《超(超)臨界機組能耗指標創優及能耗指標提升獎勵辦法》), the Standards for Energy Saving and Environmentally Friendly Coal-Fired Power Plants (《節約環保型燃煤發電廠標準》), the Acceptance Measures for Energy Saving and Environmentally Friendly Coal-Fired Power Plants (《節約環保型燃煤發電廠驗收考核辦法》), the Measures for the Selection of Advanced Energy Saving Units (《節能先進單位評選辦法》) and the Implementation Plan for the Comprehensive Upgrading and Retrofitting and Energy Saving Replacement of Coal-Fired Power Plants (《燃煤電廠綜合升級改造及節能替代實施方案》) and other rules, regulations and work guidelines for energy conservation.

During the construction period, each project formulates the Overall Planning of Green Construction Project (《綠色建造工程總體規劃》) to specify detailed plans for the quantitative control of construction water and electricity indicators, and establishes the Implementation Plan and Rules of Green Construction Project (《綠色建造工程實施方案與細則》) and the Measures for Green Construction, Energy Saving and Emission Reduction (《綠色施工及節能減排措施》), and other management policies to define specific control measures.

With respect to the energy saving target, the Company maintains its leading position in energy consumption indicators by vigorously developing heat supply renovation, implementing energy-saving projects and practicing effective energy-saving management measures. Huaneng International strengthens the budget management of energy consumption indicators and has formulated special assessment regulations to ensure that each unit can achieve optimal consumption of coal, electricity, oil, natural gas, etc. The Company adopts an approach that combines goal management and process management. Firstly, we set the annual energy consumption indicators taking into account specific energy efficiency level of each basic-level power generation unit and carry out assessment on the degree to which the reference target is met. Secondly, regarding those units which have difficulty in meeting the target or unsatisfactory energy consumption outcome, the Company will arrange on-site inspection performed by professionals, who then carry out comprehensive investigations according to specialties and systems, provide recommendations and take remedial measures to ensure the fulfillment of target energy saving and emission reduction assigned by the State and the Company, and ensure that the Company's coal-fired units maintain the leadership in energy saving.



Management Measures

In 2022, the Company continued to meet stringent key energy consumption performance targets and focused on energy saving and consumption reduction measures in three areas, namely management, structure and technology. With the concerted effort of various units, the Company has maintained its industry-leading position in terms of its achieved key energy consumption performance targets by various key energy attributes.

On energy saving through management, we improved the three-level energy saving management system, optimized the three-level energy saving supervision network for basic-level units and introduced energy saving benchmarks into basic-level units' performance management. First, we strengthened the management of energy saving targets by following up with units that were behind the annual energy saving targets and holding dialogue with key units. Second, we enhanced the implementation and management of energy saving and consumption reduction responsibilities by urging a breakdown of the responsibilities of all personnel in regional branches and basic-level thermal power plants by job nature for looking after energy saving-related tech-economic indicators, made everyone assume energy saving and consumption reduction indicators to raise energy saving awareness. Third, we enhanced benchmark checking for power units of the same type to identify discrepancies against management, technology, safety, fuel and market benchmarks and improve energy saving management. Fourth, we initiated the selection of advanced energy saving units and benchmark power plants, promotion of the review and verification of energy saving and environmental protection excellence power plants, and a reward system for energy saving excellence and enhancement with incentive funds, and evaluation as well as encouragement of pioneering and improvement of energy consumption indicators.

On energy saving through structure, first, we organized power plants to explore their heat supply potential and tap into a wider heat supply market according to local conditions. Second, we urged regional branches to optimize their operating capacity through electricity transfers and enabled low energy consumption power units to absorb the additional power generation capacity. Third, we suggested that basic-level units modulate energy saving economics to increase the output coefficient of their power units where policies allow. Fourth, we stepped up fuel procurement work and management of blended coal as fired to ensure that the heating value of coal as fired is consistent across all power plants and that the heating value of coal as fired remained at a high level for ultra-supercritical power units.



On energy saving through technology, we focused on promoting the transformation of existing power units for thermoelectric power cogeneration, facilitating the clean and efficient utilization of coal with a further testament to energy utilization enhancement. In 2022, the Company's overall energy saving indicator and the energy consumption indicators of seven key models (e.g., 1,000 MW ultra-supercritical wet cooling, 600 MW ultra-supercritical wet cooling, 600 MW supercritical wet cooling, 600 MW supercritical air cooling, 600 MW sub-critical wet cooling, 350 MW standard wet cooling and 300 MW standard wet cooling) maintained a leading position in the industry. In 2022, The Company's 24 wind farms achieved excellent performance in wind power operation efficiency of power industry in 2021.

In terms of engineering construction, the Company formulated reasonable construction energy consumption indicators to improve construction energy utilization. Based on the principle of energy conservation, each infrastructure project carefully calculated the power load and load usage time, rationally designed temporary office and living facilities in accordance with the natural conditions of the site, and selected the construction transformers with reasonable capacity and optimized the layout location of construction transformers. The power devices for construction were fully equipped with electricity meters and hierarchical management was adopted in calculating power consumption. The Company set power consumption control indicators, regularly performed calculating, accounting, and comparative analysis, and formulated preventive and corrective measures to reduce construction power consumption. The Company gave priority to the use of energy-saving, efficient, and environmentally friendly construction equipment and machinery, preferred to use energy-saving construction process, rationally reduced the time for night work through reasonable arrangement of construction procedures and progress with sharing of construction machinery, and carried out construction and commissioning in a refined manner to strive for the success of each trial operation and test with consideration of trial operation condition of power units at all stages. During the construction period of each project, the power and fuel consumption were kept under control.

In 2022, the Company made steady progress with positive momentum in its production and environmental protection. In terms of equipment management, reliability was improved year by year and outperformed industry peers, and the unplanned outage times of generating units decreased year by year. In terms of energy saving and consumption reduction, the coal consumption for power supply decreased year-on-year, and the energy efficiency of thermal power units remained industry-leading for many years. The Company paid close attention to optimizing the energy consumption and achieving the environmental protection targets, and stepped on a new journey of high-efficiency and low-carbon development. The Company strived for excellence of energy consumption indicators, guided and assisted backward power units, and conducted the applications of advanced energy-saving technologies such as wide-load high-efficiency power generation and generalized regeneration in a targeted manner. The leading advantage of key models was continuously consolidated. In addition, the Company consistently drove the green and low-carbon development.

In the future, the Company will continue to promote the transformation of existing power units for thermoelectric power cogeneration technology, implement energy-saving technical retrofits of existing power units and deepen the application of generator unit ratings to facilitate management improvement.



Huaneng Beijing Thermal Power Plant Launched Flue Gas Waste Heat Utilization Project of Gas Turbines

Huaneng Beijing Thermal Power Plant has launched the flue gas waste heat utilization project of gas turbines, which firstly adopted the waste heat recovery technology of “flue gas – water plate heat exchanger + lithium bromide absorption heat pump unit” with the largest waste heat recovery capacity in the country.

The implementation of the project will further improve the regional heat supply network and enhance the heat supply capacity by transferring excessive heat produced by the thermal power plant to the heat supply pipe network of sub-city center in an effort to meet the demand of the eastern extension line of Guangqu Road and the sub-city center for heat previously supplied by scattered small boiler rooms. This could realize differentiated energy utilization, better heat supply and less peripheral pollutant emission so as to achieve energy saving and emission reduction. The newly built flue gas waste heat recovery equipment can supply heat to area of over 5 million square meters, saving natural gas of over 67 million cubic meters and reducing carbon dioxide emission of 130 thousand tons and nitrogen dioxide emission of 16.8 tons per year.



Beijing Thermal Power Plant

Huaneng Qinbei Power Plant #5 Million-kW Unit Flow Renovation Project was Put into Commercial Operation

In December 2022, #5 million-kW unit flow renovation project of Huaneng Qinbei Power Generation Co., Ltd. was successfully put into commercial operation after passing through relevant tests. The renovation project uses advanced technology to increase flow efficiency, reduce steam intake loss, and improve the unit's adaptation to load change, operating safety, economic efficiency and flexibility. The economic indicators of the unit take a leading position among units with same capacity in the country, and play an important role in reducing power generation cost, saving energy and promoting sustainable development of local economy.



Qinbei Power Plant #5 Million-kW Unit

5.3.3 Water Resources Management

The Company strictly follows the government's requirements for the protection of fresh water, we will comprehensively promote the comprehensive treatment of water-saving wastewater from thermal power plants and issued the Guiding Opinions for Thermal Power Plant's Water Saving and Wastewater Treatment (《火電廠全廠節水及廢水綜合治理指導意見》) to guide and push forward the plant-wide water saving and comprehensive wastewater treatment work. The main water consumption of Huaneng International is for generating electricity with power units, replenishing water for closed circulating water, and wet desulphurization, etc. Surface water, urban water, and a small amount of groundwater, etc. are used for generating power, and river water or sea water is used for circulating. In 2022, the overall water consumption of the Company was 17,696.70 million tons, the freshwater consumption for power generation was 380.43 million tons, the open cooling circulation water consumption was 17,316.27 million tons, and the performance value of freshwater consumption for power generation was 0.84 kg/kWh.

Management Objective

By 2025, the Company is committed to devoting greater effort in the transformation of water conservation for the purpose of zero discharge of wastewater. To achieve the objective, the Company strengthened efforts in the transformation of energy conservation, and approved and launched water saving transformation projects related to the transformation project of recycled water fed from Lanjia Wastewater Treatment Plant to Changchun Thermal Power Plant in 2022.

Management Mechanism

In accordance with the Company's management systems for technical supervision, maintenance, technical transformation and energy conservation, the various thermal power plants have established a set of water consumption management systems and procedures, which include:

- 1 A water management system has been established and managed by professional personnel, who shall formulate rules for water usage, instruments maintenance and management. All water usage sectors and professionals conduct regular maintenance and calibration for water metering, water quality testing instruments and water-usage equipment, etc., so as to eliminate unreasonable water usage.
- 2 An account management system has been constructed, including the whole plant account and drainage account, water quality monitoring, water metering instrument basic information table, equipment installation location and parameter table, records of instrument test, calibration and maintenance, etc. They also regularly calculate the water management index of the whole plant, and the water usage account is based on the actual monitoring data.
- 3 The thermal power plants also comprehensively utilized various wastewater of the plant area and reduced discharge rate, according to the principles of shunting sewage and clean water, classification and recovery, and disposal and reuse.

Management Measures

In 2022, Huaneng International launched the water saving and wastewater treatment work plan in its power plants. As at the date of the report, all its subordinate power plants actively enforced the water saving and wastewater treatment measures. Upon the treatment, the freshwater consumption for power generation has met the criteria set out in the Standards for Energy Saving and Environmentally Friendly Coal-Fired Power Plants of the Company (《節約環保型燃煤發電廠標準》), with wastewater discharge meeting the requirements set out in the waste discharge permits and local environmental regulations.

In 2022, the Company faced no imminent threats in terms of tapping water resources. To address the water shortage risk, the Company adopted a precise management approach for water supply and consumption based on the Guiding Opinion for Thermal Power Plant's Water Saving and Wastewater Treatment (《火電廠全廠節水及廢水綜合治理指導意見》) to refine the criteria for recycle of water and classification of use of water and reduce the fresh water consumption. Currently, Weihai Power Plant's seawater desalination project has been put into operation. The projects of water saving and wastewater treatment of all plants in key areas such as Beijing-Tianjin-Hebei and neighboring "2+26" cities, Yangtze River Delta and Fen-Wei Plain are advanced in an orderly manner.

During the construction period, the Company's infrastructure projects respectively determined domestic water and construction water quota indicators based on the characteristics of projects and on-site construction conditions, and conducted calculation and assessment management separately. When a service contract was signed with the construction unit, the water conservation quota indicators were included in the contract terms for calculation and assessment. In the design stage, the supply and drainage systems of the office and living areas at the construction site shall be reasonably arranged, and a water-saving system shall be applied for domestic water with obvious water-saving marks set at the water source location. In addition, on-site construction organization shall be strengthened for each project, and the on-site water supply pipe network shall be simple, reasonable, and leak-free through design analysis and rational arrangement at the construction site, a reusable water collection and treatment system shall be established at the construction site to make water resources available for cascade recycling, rainwater collection tanks shall be set up to recover rainwater, which will be used for road spraying, vehicle washing and greening after treatment, domestic sewage treatment stations shall be designed, constructed and put into use in advance, and all the domestic sewage in the construction area will be treated by the sewage treatment stations, and the treated water shall be reused for secondary recycling applications such as vegetation greening, road spraying, etc. The Company's water resource consumption during the construction of various projects shall be kept within the scope of management objectives.

5.3.4 Emissions Management

The Company abides by laws and regulations such as the Environmental Protection Law of the People's Republic of China (《中華人民共和國環境保護法》), the Law of the People's Republic of China on Prevention and Control of Environmental Pollution Caused by Solid Wastes (《中華人民共和國固體廢物污染環境防治法》), Atmospheric Pollution Prevention and Control Law of the People's Republic of China (《中華人民共和國大氣污染防治法》) and the Law of the People's Republic of China on Prevention and Control of Pollution from Environmental Noise (《中華人民共和國環境噪聲污染防治法》), and in accordance with the national policies on environmental protection and policy documents regarding ecological environment and energy conservation and emission reduction and the requirements of relevant authorities, the Company has put forward the plan to become a first-class enterprise for environmental protection based on the aim to build a world-class listed power generation company and in consideration of its actual situation. In addition, the ultra-low emission transformation, water saving and wastewater treatment, and comprehensive utilization of solid waste are fully deployed. The Company attaches great importance to the discharge management of pollutants. All thermal power units are required to install desulphurization, denitration and dust removal devices and wastewater treatment and other environmental protection facilities. We strengthen the operation, maintenance and repair of environmental protection facilities, and strictly abide by the requirements of sewage permits, and the discharge of pollutants meets national standards and territorial requirements.

During the construction period, the construction unit and each participating unit established a green construction management system, and formulated management systems such as the Overall Planning of Green Construction Project, the Implementation Plan and Detailed Rules of Green Construction Project and the Measures for Green Construction and Energy Saving and Emission Reduction, which were independently defined in the general design of the engineering construction organization with detailed regulations on green construction and environmental protection. The quantitative control targets for controlling emissions during the green construction process were clarified with specific pollution control measures. The Company's construction projects strictly implemented the requirements of "Three Simultaneity"¹¹ for environmental protection, in accordance with various environmental protection work and environmental protection measures recommended by the environmental impact assessment approval. In addition, we strengthened the stable operation of environmental protection facilities, ensured the emission of pollutants met the standards, and entrusted an environmental protection supervisor to supervise, inspect and guide the implementation.

5.3.4.1 Exhaust Gas Management

The exhaust gas discharged by Huaneng International is mainly carbon dioxide, sulphur dioxide, nitrogen oxides and soot generated from its subordinate power plants during the process of combustion in the coal-fired unit boiler. The Company's emissions of sulphur dioxide, nitrogen oxides and soot were 26,509.41 tons, 55,303.98 tons and 3,503.33 tons respectively, with emission performance values of 0.06 g/kWh, 0.13 g/kWh and 0.01 g/kWh respectively.

Management Objective

In 2021, the Company's goal was to enclose all major coal fields of 19 coal-fired power plants in Beijing-Tianjin-Hebei and neighboring "2+26" cities, strictly implement the local environmental protection and non-organized emission requirements, and it was expected that the Company's ultra-low emission unit capacity would reach 100% by 2022. To achieve the objective, the Company enclosed all major coal fields of 19 coal-fired power plants in Beijing-Tianjin-Hebei and neighboring "2+26" cities, achieving 100% ultra-low emission unit capacity in 2022.

Now that the above targets have been achieved, we have updated the target for the next stage to complete the coal field closure retrofits in key areas such as the Yangtze River Delta and Fen-Wei Plain by the mid-term of the 14th Five-Year Plan, strictly enforce the local authority's requirements of fugitive emissions and ensure that there is no major environmental protection safety accident during the "14th Five-Year Plan" period.



¹¹ Three Simultaneity: Simultaneous design, simultaneous construction, simultaneous use.

Management Mechanism

The Company formulated the Regulations on Environmental Protection Management (《環境保護管理規定》), Measures for Evaluation and Accountability for Environmental Protection Work (《環境保護工作考核及責任追究辦法》), Operation Management Rules (《運行管理規定》), Overhaul Management Rules (《檢修管理辦法》), Technical Supervision Management Measures (《技術監督管理辦法》) and Management Measures for Capital Expenditure in Electricity Generation (《電力生產資本性支出項目管理辦法》) to ensure the progress on the work related to ecological environment protection and air pollution prevention and control projects.

The Company made full use of its internal information platform to grasp the situation of excessive emission, focused on the analysis of events with long duration, seriously excessive emissions and typical causes, and guided all units to learn from one another and take active measures to improve the Company's overall environmental protection management capability. In addition, giving consideration to the promotion of annual key tasks, major projects, air quality assurance tasks, etc., the Company launched environmental protection inspections irregularly to ensure active and effective rectification of the environmental risk.

Management Measures

To enhance waste gas management, the Company has taken the following measures:

- 1 Enhancing the supervision and implementation of work tasks. The Company has enhanced the review management of environmental protection renovation projects, optimized review procedures, secured renovation investment, strengthen supervision and management of key processes such as bidding process and inspect and supervise key work tasks to carry forward the pollution prevention and control tasks.
- 2 Ensuring effective clean production. The Company has continuously maintained the safe and reliable operation of environmental protection facilities, strengthened real-time monitoring of pollutant discharge, ensured discharge compliance, and effectively controlled pollutant discharge in accordance with requirements set out in the pollutant discharge permit to secure a leading position in terms of pollutant discharge in the industry.
- 3 Successfully completed the air quality assurance tasks. The Company has ensured good air quality during key hours and weathers with serious pollution, ensured effective pollution prevention and control in key regions such as Beijing-Tianjin-Hebei and neighboring region, Yangtze River Delta and Fen-Wei Plain, and fully adopted measures such as load reduction of diesel trucks, non-peak-hour transportation and control of fugitive emissions to fulfil the Company's social responsibilities.
- 4 In accordance with the "Four Conservations and Environmental Protection"¹² standard, the Company made specific optimization of the corresponding requirements of green construction in the design process. Emission of hazardous gases from machinery and equipment and vehicles entering and leaving the site has met the requirements of national annual inspection, and the emission of welding fume shall comply with the Integrated Emission Standard of Air Pollutants (《大氣污染物綜合排放標準》). The project environment shall be assessed and a report shall be issued on a monthly basis. A continuous emission monitoring system (CEMS) was installed at the site to monitor the soot of flue gas pollutants, sulphur dioxide and nitrogen oxides in real time. There was no excessive emission of hazardous gases during the construction of each infrastructure project.

¹² "Four Conservations and Environmental Protection" refers to energy conservation, land conservation, water conservation, material conservation and environmental protection.

Work Achievements

With careful maintenance of the desulphurization and denitration equipment and facilities of coal-fired units, the Company has maintained a stable standard emission, and completed the flue gas ultra-clean renovation of all the coal-fired units.

Coal Field Closure and Retrofits Project in Huaneng Yueyang Power Plant All Completed

On December 9, 2022, the coal field closure and retrofits project in Yueyang Power Plant was all completed. The project officially commenced on November 9, 2021 to retrofit 8 coal fields of Yueyang Power Plant in total across Phase I, Phase II and Phase III, with a total area of approximately 33,000 square meters and a structure in the form of 5 separate arch-shaped steel frame coal sheds.

Acting upon the policy of “jointly promoting environmental protection, and not engaging in large-scale development” in the Yangtze River economic belt, and responding to the national, provincial and municipal governments’ call to improve ecology of the Yangtze River shoreline and make it the most beautiful shoreline, we launched the coal field closure and retrofits project, which also marks an important milestone in the roadmap to a digital and green coal field at the power plant.



Coal Field Closure and Retrofits Project in Yueyang Power Plant

Future Plan

First, the Company will continue to drive its pollution prevention and control efforts, focus on environmental protection transformation projects in key regions, including close-down of coal field, wastewater treatment, and ash field treatment for power plants, while expediting pollution prevention and control projects such as ultra-low emission renovation for clean energy heating units in the northern region.

Second, the Company will continuously promote clean production practices, enhance permit-based waste discharge management, ensure effective management and control for air quality in key hours and weathers with serious pollution, strengthen the inspection management for environmental protection supervision at different level and improve the prevention and response for public opinion risk related to environmental protection.

Third, the Company will maintain vigorous environmental protection supervision and management, strictly comply with the requirements set out in the Environmental Protection and Pollution Control Accountability Measures (《生態環境保護及污染防治攻堅工作責任追究辦法》), strengthen supervision and site inspection to ensure effective supervision and management of the implementation of air pollution prevention and control tasks.

Fourth, the Company will establish a sound environmental protection standard system, promote the research and development and application of technologies such as integrative removal of pollutants and comprehensive energy saving and environmental protection transformation, and summarize experience from demonstrative projects to provide guidance to other projects.

5.3.4.2 Management of Greenhouse Gas

In 2020, China made a solemn commitment to reach “peak carbon dioxide emissions” by 2030 and achieve “carbon neutrality” by 2060. During the “14th Five-Year Plan” period, the Company will promote the green transformation and increase the use of clean energy. In specific, great efforts will be made to strengthen the transformation of environmental protection equipment of coal-fired units, and to reduce energy consumption and carbon emission through management, structure and technology optimization, thereby succeeding in lowering total carbon emission and carbon intensity.

By staying up on relevant national policies regarding carbon emission and trade, the Company actively participates in the construction of the national carbon market, and issues regulations on the administration of carbon trading, which specifies the carbon trading management institutions and responsibilities, along with the requirements of carbon trading preparation, transactions and contract performance and risk management. As part of our efforts to “peak carbon dioxide emissions” and achieve “carbon neutrality”, we take part in carbon trading via the national carbon market in a steady and orderly manner, so as to fulfil our obligations concerning carbon emission.

On March 15, 2023, the Ministry of Ecology and Environment of the People's Republic of China issued the Notice of Implementation of Relevant Work on Distribution of National Carbon Emission Rights Trading Quota for 2021 and 2022 (《關於做好2021、2022年度全國碳排放權交易配額分配相關工作的通知》(國環規氣候〔2023〕1號)). According to the Plan, the performance unit shall settle its quota payment for the second compliance cycle (2021-2022) by the end of 2023. Therefore, the Company's data relating to actual greenhouse gas emissions in 2021 and 2022 are considered as trade secrets and will not be disclosed, until the contract performance is all completed.

Carbon Reduction Goals

The Company will make efforts on structural adjustment and energy saving and consumption reduction, so as to achieve peak carbon emission as soon as possible. In 2022, the Company's carbon intensity from all emission sources against this goal decreased by 1.4% year-on-year.

Carbon Asset Management

The Company carried out the following work:

- 1 The Company actively participated in the construction of the national carbon trade market, and delved into key management rules for the carbon market, including regulations on the administration of carbon trading, quota allocation plan, and accounting methods for carbon emission.
- 2 The Company issued regulations on the administration of carbon trading, specifying the management institutions and their responsibilities, along with various requirements of transactions and contract performance and risk management. According to the regulations, the Company put greater emphasis on the centralized and professional management of carbon trading. Professional institutions were therefore engaged to provide one-on-one professional services for the grassroots enterprises, and carbon trading-based business training was also held, so as to continuously improve management capability on the carbon trading, thus aligning its management model with the national carbon market.
- 3 The Company advocated refined management of carbon trading and dynamic calculation on quota surplus and deficit of grassroots enterprises, made the annual trading work arrangement, and carried out some transactions in advance to reduce the performance pressure arising from the carbon trading at the end of the performance period. Besides, the contract performance tasks in Beijing pilot carbon market were successfully completed with the targets met.

Contract Performance in the Pilot Carbon Market

In accordance with the national and pilot carbon market work arrangements, Beijing Thermal Power Plant coal-fired units, the only one that needed to complete the contract performance tasks in Beijing pilot carbon market, appointed Huaneng Carbon Asset Management Co. Ltd to conduct carbon emission accounting and carbon emission trading, and successfully met the annual contract performance targets of carbon trading as required by local competent authorities of carbon trading.

Participation in National Carbon Emission Trading Market

The national carbon emission trading market was officially launched in 2021. In accordance with the relevant requirements, the Company excluding several units participated in carbon trading via the national carbon market and successfully completed the performance task for the first compliance cycle (2019-2020). The Company's units stayed ahead in the industry in terms of the overall energy consumption, and there was some surplus of carbon quota after the completion of the performance task. On March 15, 2023, the Ministry of Ecology and Environment of the People's Republic of China issued the Notice of Implementation of Relevant Work on Distribution of National Carbon Emission Rights Trading Quota for 2021 and 2022 (《關於做好2021、2022年度全國碳排放權交易配額分配相關工作的通知》(國環規氣候〔2023〕1號)). According to the Plan, the carbon emission baseline will be lowered, and quota issuance will be significantly tightened, the Company will complete the two-year performance task of carbon trading by the end of 2023, with an increase in the performance cost.

The Demonstration Project for Online Monitoring of Carbon Emission in Huaneng Haimen Power Plant Completed

On December 31, 2022, the demonstration project for continuous online monitoring of carbon emission of Haimen Power Plant unit 3 and unit 4 was successfully put into operation. This project was aimed to provide technology support in analyzing carbon emission data in 2022 of the China Huaneng Group Co., Ltd. ("Huaneng Group" or "Group Company"). Facing challenges such as the shortage of equipment and materials, and difficulty of construction inside the chimney, Haimen Power Plant boasted the advanced technologies of the industry including dual-channel concentration sampling detection, plug-in ultrasonic gas flow measurement, and average-line multi-point flow measurement to complete the demonstration project with high quality and efficiency and thus bring huge improvement to the accuracy and reliability of carbon emission measurement. All these efforts lay a solid foundation for the thermal power plants to conduct follow-up research of carbon emission monitoring, and serve as data basis for building strategic targets and roadmap towards carbon reduction.



Haimen Power Plant

Future Plan

Keeping an eye on the carbon emission data verification and quota allocation policy, the Company will conduct a dynamic calculation on quota surplus and deficit, and arrange a calculation on operational indicators in advance. Besides, the performance strategies of carbon trading will be optimized, eyeing the opportunities for the coordinated trading of quotas and products with environmental rights and interests. In doing so, the Company strives to reduce performance costs while ensuring the completion of performance tasks.

5.3.4.3 Wastewater Management

The Company, with coal-fired power generation as its main business, generates a certain amount of wastewater in the process of electricity production, including those from the concentration of steam turbine circulating cooling water, the wet desulphurization facilities, the auxiliary production facilities of the generator set, the coal field flush as well as sanitary sewage.

In 2022, the total water discharge of the Company amounted to 15,434.81 million tons, the discharge of open cooling circulation water totaled 15,409.43 million tons, and the total discharge of sewage (including industrial and desulphurization wastewater) was 25.38 million tons. Some of the wastewater was allowed to be discharged when they reached a certain standard after treatment, e.g., wastewater from circulating water; some was reused after treatment and cannot be discharged, e.g., those from desulphurization facilities and coal field flush; and zero discharge is required for certain power plants which were not allowed to discharge any wastewater.

The Company adopted the following measures in the management of wastewater treatment and discharge:

- 1 The Company rigorously implemented the applicable water pollution prevention and control policies and sewage discharge licensing requirements. All thermal power plants of the Company obtained the corresponding sewage discharge licenses as scheduled.
- 2 Inspection and rectification were carried out against the sewage discharge licensing requirements. A comprehensive pollution prevention and control plan at the company level was formulated based on environmental protection requirements at various levels, and power plant water saving, and wastewater treatment transformation projects were launched in an orderly manner in accordance with the requirements of local governments and environmental assessment.
- 3 The Company performed on-site checks and inspections of environmental protection facilities, including wastewater treatment units.
- 4 The Company built a sound standard system for environmental protection, formulated guiding opinions on water saving and wastewater discharge transformation to ensure the compliance with environmental protection requirements through research and optimization.
- 5 The Company actively adopted the latest wastewater treatment technology and launched wastewater transformation demonstrative projects.

Future Plan

The Company will continue to strengthen water pollution control and promote the enhanced treatment and comprehensive utilization of industrial wastewater and domestic sewage, as well as launch wastewater zero discharge transformation projects in an orderly manner in areas where specific environmental protection requirements apply.

With the gradual deepening of wastewater treatment work as well as the increased wastewater treatment technology research efforts by domestic tertiary institute, Xi'an Thermal Power Research Institute Co., Ltd. ("Xi'an Thermal") and Huaneng Clean Energy Research Institute, we will formulate a roadmap for developing practical, reliable and cost-effective wastewater treatment technology. We will gradually carry out thermal power plant water saving and wastewater comprehensive treatment transformation in key areas in order to eventually enable all thermal power plants to comply with the updated pollutant discharge licensing requirements, with some reaching even higher standards.

5.3.4.4 Waste Management

The Company's disposal of wastes strictly complies with laws and regulations such as the Law of the People's Republic of China on Prevention and Control of Environment Pollution Caused by Solid Wastes (《中華人民共和國固體廢物污染環境防治法》) as well as the Company's regulations including the Regulations on Environmental Protection Management (《環境保護管理規定》), the Measures for Evaluation and Accountability for Environmental Protection Work (《環境保護工作考核及責任追究辦法》), the Management Standards for Solid Waste (《固體廢棄物管理規範》), the Governance and Management Standards for Desulphurization By-products (《脫硫副產品治理管理規範》), the Governance and Management Standards for Fly Ash (《粉煤灰治理管理規範》), etc. The Company requires that the storage, discharge, and disposal of waste comply with national laws and local policies. We also cooperate with qualified third parties to deal with waste and strengthen waste recycling to minimize waste emissions.

Management Objective

In accordance with the Law of the People's Republic of China on Prevention and Control of Environment Pollution Caused by Solid Wastes (《中華人民共和國固體廢物污染環境防治法》) and the principles of "reduction, recycling, harmlessness" in the prevention and control of solid waste pollution, the Company actively promotes the compliant and comprehensive utilization of solid waste and insists on source management with whole-process responsibility system and traceable information management in place. The hazardous waste management plan is filed in accordance with regulations with such waste stored, transported and disposed of as required. The comprehensive ecological protection treatment and transformation for ash disposal area, which is expected to be completed by 2025, is being proceeded in an orderly way by the Company. In 2022, the reconstruction of the drainage facilities for ash disposal area of Zuoquan Power Plant was completed, and the capacity expansion project for ash disposal area of Yichun Thermal Power Plant is still ongoing.

Non-Hazardous Waste

Huaneng International's production activities are mainly concentrated in the area of power production and the main solid waste generated during the Company's power generation process includes fly ash and cinder produced during the combustion process of the boiler, and gypsum produced during the limestone wet desulphurization in power plants. In 2022, the Company produced 43.4280 million tons of solid waste, including 33.0373 million tons of fly ash and cinder, and 10.3907 million tons of desulphurized gypsum. The comprehensive utilization rate of fly ash and cinder stood at 96.96% and the desulphurization gypsum disposal utilization rate was 85.31%.

Fly ash and cinder, desulphurization gypsum and other solid waste can be sold as raw materials in related industries, such as cement, concrete, aerated blocks and gypsum board. The Company has established an environmental protection supervision and management system in accordance with the requirements of national and local standards and policies on environmental protection to effectively control the canning, stacking and marketing of fly ash and cinder and desulphurization gypsum.

When loading fly ash and cinder and gypsum, the Company rigorously follows the operational norm for load control, separates the fly ash and cinder from gypsum and controls the load capacity during transportation and conducts thorough check and cleaning before vehicle entry to prevent "escaping, spilling over, dripping and leakage" of solid wastes. Most of the fly ash and cinder and gypsum collected from boilers will be directly transported to the processing plants for secondary use. The Company closely monitors where the by-products of power generation are being transported and how they are going to be used to prevent environmental pollution and public issues that have a negative impact on society.

Some fly ash and cinder in the power plants will be temporarily stored in the ash field, and the Company strengthens supervision and management of the ash field. In accordance with the requirements of local environmental protection authorities, construction and retrofitting of wind-proof and dust control facilities have been carried out to ensure that the storage of ash and gypsum is in line with local environmental protection standards.

In the construction project, the generation of waste is effectively reduced at the project site through relevant measures such as permanent and temporary combination of roads and office locations. The project waste is collected by classification, stored in a centralized way and cleaned up regularly, and corresponding units are entrusted to clear and transport it regularly. The gravel and earthwork construction waste from the project is used as the on-site roadbed backfill material to realize harmless treatment.

The Commissioning of “Municipal Waste Pre-Treatment System” Successfully Completed

In 2022, the commissioning of “municipal waste pre-treatment system”, independently developed by Xi'an Thermal, was successfully completed in Huaneng Taicang Power Plant, with expected sludge and wastewater treatment results and a far lower treatment cost than that under the conventional operation. The system, which can be used to not only incinerate waste, but also treat wastewater, sludge and other different forms of waste, without generating waste leachate and even dioxins, is expected to play a key role in the recycling and reduction of urban waste.



Taicang Power Plant

Sludge Pre-Drying Carbonization Technology of Huaneng Fuzhou Power Plant

Huaneng Fuzhou Power Plant launched a new upgraded sludge treatment technology – sludge pre-drying carbonization treatment technology in February 2022. The project contains sludge drying system and in-plant supporting system, which can directly feed thermal dried and pulverized urban domestic sludge into the boiler for combustion and power generation, with totally enclosed and harmless treatment of generated pollutants thereof including flue gas and wastewater.

Totally enclosed technology, integration, negative pressure and other advanced technologies were applied to improve the sludge treatment efficiency, so as to realize the harmless, reduced, scale-based and resource-based treatment, with certain economic benefits gained. The maximum capacity for daily sludge treatment will increase to 300 tons upon the operation of the project. In consideration of the annual operation of 6,400 hours of the machine, the annual capacity for sludge treatment is about 80,000 tons. Based on this and 65.60kg of coal saved by drying each ton of wet sludge, 5,248 tons of coal will be saved and 19 million kilowatt-hours of additional electricity will be generated.



The Sludge Pre-Drying Carbonization Technology of Fuzhou Power Plant

Hazardous Waste

The main hazardous waste produced by the Company during the process of power generation includes such hazardous solid waste as used denitration catalysts and ion exchange resin deactivated in wastewater treatment, as well as hazardous liquid waste like waste oil produced during the operation of power plant units. The Company regenerates the denitration catalysts which have reached their life limit and continues to charge them into denitration devices for use. Inactivated ion-exchange resin from chemical water treatment can be restored to its original state for reuse after being rinsed with mineral acids or alkalis of a certain concentration. The Company will, based on relevant requirements, hire qualified recycling agencies to deal with denitration catalysts that could not be renewable anymore, ion exchange resins that cannot be reused and hazardous liquid waste such as lubricant and other waste oil during operations. Besides, through managing the accounts, we will detail statistics on the amount of waste generated, the amount of disposal, and the audit of the qualifications of disposal units, etc., and strictly manage the generation and disposal of waste. In 2022, the Company, in the process of production and operation, generated 7,937.36 tons of denitration catalysts, 436.09 tons of ion exchange resin and other hazardous solid waste and 973.94 tons of waste oil and other hazardous liquid waste.

Future Plan

The Company will continue to strengthen waste recycling and strive to minimize waste emissions. In addition, the Company will well implement environmental protection transformation projects in key regions, including close-down of coal field and treatment of ash field for power plants.

5.3.5 Other Environmental Impacts

Huaneng International always handles its operations with great care to minimize their impact on the environment, and performs strict management of noise, dust and the environmental impacts of engineering projects in accordance with the Law of the People's Republic of China on Prevention and Control of Pollution from Environmental Noise (《中華人民共和國環境噪聲污染防治法》).

5.3.5.1 Noise Management

During the initial stage of the construction of power plants subordinated to the Company, relevant departments of environmental protection determined the sensitive points of noise along the boundaries of the power plants and their relevant noise control level in accordance with the requirements in the environmental impact assessment approval. Each construction site formulated noise reduction measures in strict accordance with the requirements of the state's Emission Standard of Environment Noise for Boundary of Construction Site (《建築施工場界環境噪聲排放標準》) and performed regular inspection and recording of noise at the construction sites. Noise control during the construction period was mainly to control the noise source. Quiet construction machinery and transportation vehicles were used for each project, and the repair, maintenance and management of equipment, construction machinery and transportation vehicles were enhanced to avoid noise due to malfunctioning. Noise reduction and sound insulation measures have been adopted for major noise sources such as construction machinery and equipment, pipe flushing, sandblasting, and spraying operation. The equipment with substantial noise generation on the construction site was placed on the side further away from the residential area, and these equipment was treated by noise reduction measures such as encasing or setting up noise reduction walls. Steam pipe blowing operations were announced in advance. The noise control during the construction of each project met the national standards. For the environmental completion and acceptance of the power units in all power plants, the monitoring authorities will conduct investigate the site based on the requirements in the environmental impact assessment approval, and only when the monitoring results are qualified will the acceptance concerning noise control pass. During the operation of power units, the power plants commissioned relevant monitoring authorities to investigate the noise control regularly in accordance with the requirements of the environmental protection authorities and published the monitoring reports through multiple ways. The power plants installed acoustic enclosures for major noise sources such as fans and other equipment in the plant and built noise walls for key areas such as the cooling water tower area. When excessive noise happens during events like power units renovation or equipment failures, the Company will implement noise control for equipment that generates excessive noise accordingly.

In 2022, the Company increased its attention to noise management and published Design Guidelines for Managing Noise of Gas Turbines (《燃機噪聲治理設計導則》). The technical standards could effectively guide the power plants to improve noise control post-construction and post-renovation.

5.3.5.2 Dust Impact

Coal field dust, ash field dust and unorganized emissions from non-road machinery are also environmental impacts caused by power plants. All power plants owned by the Company are required to obtain the environmental impact assessment approval by the relevant environmental protection departments during their initial stage of construction to avoid severe impact on the surrounding environment and natural resources during operations. The power plants strictly abide by national environmental emission standards during operations and discharge wastes according to the standards. When the requirements of surrounding environment change, the affected power plants actively respond to ensure that the surrounding environment and natural resources are protected. To enhance the management of unorganized emissions from coal yards, the Company has carried out segregated coal field retrofits for key areas and for other areas, the Company introduced wind and dust suppression nets, covers and sprays to effectively control coal dust pollution from coal fields and improve the surrounding environments. In terms of engineering construction, all participating units have carried out construction in strict accordance with the green construction plan and organizational measures, and suppressed the generation of dust by taking measures such as regular spraying and construction road pavement hardening.

5.3.5.3 Environmental Impact of Engineering Projects

The environmental impacts of the Company's projects are fully comprehended during feasibility study before the projects enter the approval or filing stage. Following national policies and requirements on environmental protection and the land use planning by the government, the Company avoid choosing location in or near the ecological red lines such as nature reserves or agricultural land to prevent the consequent ecological problems. After the site selection, the Company conducts a systematic survey of the surrounding environment during the feasibility study stage and prepares a detailed environmental management and monitoring plan based on actual condition and relevant regulations. In strict compliance with the environmental protection standards, the Company implements control measures against air pollution, water pollution and noise, actively initiates water and soil conservation design and analyses environmental impact, and accepts assessment on the impact to biodiversity.



The Company contemplates on the environmental protection measures for all stages of the projects' construction and operation prior to construction. During the construction, relevant regulations are strictly obeyed, and construction teams are informed about the national laws and regulations on biodiversity, relevant operating regulations on animal and vegetation protection, and knowledge on animal and vegetation conservation to improve their willingness to biodiversity conservation. The construction should be suspended in the case of wildlife appearance until they are away from the site and its surrounding area; construction personnel are prohibited from poaching wildlife and digging local wild plants to avoid impact on biodiversity.

To restore the environment, measures such as land reclamation and vegetation restoration are taken after the completion of the construction. Pollutants, electromagnetic noise, other noise, etc. are monitored and treated strictly based on the requirements of relevant laws and regulations on environmental protection. When economic benefits permit, we strive to integrate power generation projects with environmental protection, promote the preliminary investigation and implementation of ecological projects, and make positive contributions to local environmental governance and improvement.



The background is a light cream color with large, overlapping, semi-transparent geometric shapes in shades of blue, purple, and green. These shapes have a subtle grid pattern. Scattered throughout are small, colorful squares (blue, green, red, yellow) and faint, stylized icons representing industrial and natural elements: a wind turbine, a dam, a bridge, and a forest of evergreen trees.

*ENSURING
SAFETY BY
IDENTIFYING AND
ADDRESSING
HIDDEN HAZARD*

06

Safety is the foundation for the development of an enterprise. Huaneng International always adheres to bottom-line thinking and red-line awareness, and solidly implements its three-year rectification action for production safety to improve the system and capability of safe production management, thus fundamentally eliminating potential dangers and preventing and resolving major safety risks to ensure the safety of our people and facilitate high-quality development of the Company.



Ensuring Safety by Identifying and Addressing Hidden Hazard

In accordance with the Production Safety Law of the People's Republic of China (《中華人民共和國安全生產法》) and other production safety laws and regulations, Huaneng International regards safety as its top priority and builds a solid foundation for production safety. Adhering to the production safety principles of “people-oriented, safety first, prevention first, comprehensive management” and upholding the safety conception of “safety is credibility, safety is efficiency, safety is competitiveness, and safety responsibility is of the utmost importance”, the Company pays attention to the inspection and remedial of safety hazards and insists on zero-tolerance policy for safety incidents. In addition, the Company aims to prevent fatal production accident, mishandling of operations with malicious intent, major equipment damage, serious and extraordinary equipment incidents, fire outbreaks, traffic accidents induced by human factors, environmental pollution disasters and other incidents that may adversely affect the Company's reputation. The Company places safety in the first place and attaches great importance to the personal safety and occupational health of our employees. We strengthen the red-line awareness to ensure production safety is properly conducted.

Typhoon, flooding, and other natural disasters are becoming more and more frequent in recent years, and they threaten the life safety and production safety of local enterprises and their employees. The Company has identified five key safety management tasks for this year: (1) continuously carried out inspections and evaluations of the production safety responsibility system, ensured the establishment of a list of responsibilities for each post, standards for the work in place, and accountability mechanisms, sorted out, summarized, and notified common problems to encourage enterprises to rectify jointly; (2) promoted a dual prevention mechanism and made earnest efforts in the implementation of Guidelines for Classified Production Safety Risk Control (《安全生產風險分級管控導則》); (3) vigorously strengthened safety management in infrastructure construction and promoted an intrinsic safety management system in this regard; (4) learned from the accidents and monitored the shortcomings in outsourcing safety management and the system implementation to enhance outsourcing safety management, strictly controlled outsourcing personnel's entry, and enhanced rectifications for violations to ensure construction safety; (5) arranged tasks for safety production and prepared for major floodings during flood seasons to get through the flood season safely. The Company is committed to strengthening the implementation of safety responsibility and outsourcing management to mitigate the impact of natural disasters on employees and production safety through the above key tasks.

In 2022, there was no significant violation identified in the Company related to providing a safe working environment and protecting the employees from occupational hazards. In 2022, the number and ratio of employee occupational death were 0. In 2021, there was 1 occupational death, and the ratio was 0.0017%. In 2020, the number and ratio of employee occupational death were 0.

6.1 Consolidating Intrinsic Safety System

According to the national laws and regulations on production safety, the Company, taking actualities of its subsidiaries into consideration, has established its own fourfold Intrinsic Safety System, which comprises intrinsic safety of personnel, process equipment, environment and management, including:

Ensuring Intrinsic Safety of Personnel

Intrinsic safety of personnel includes management staff and all employees' safety awareness, safety conception and safety management knowledge and skills. Management staff are required to have safety management knowledge and skills and lead by example, while employees are required to ensure safe operation by carrying out adequate controls. The safety behaviors of employees should gradually change from passive to active, and we urge employees to act in accordance with rules and regulations and show good safety behavior everywhere.

Ensuring Intrinsic Safety of Equipment

Intrinsic safety of equipment refers to that equipment, facilities, or process technologies possess inherent mechanisms for accident prevention. We adhere to high design and manufacturing standards and conduct systematic safety risk analysis for all stages, including the construction stages such as proposal and design, as well as the routine inspection and maintenance during operation. We also proposed and implemented risk control measures and installed proper protection mechanisms for our processes and equipment to ensure the safe, stable and normal operation of equipment and systems within the prescribed operating and maintain effective control.

Ensuring Intrinsic Safety of Environment

Environment includes spatial environment, physical and chemical environment, natural environment, etc. Environments should meet all kinds of requirements. For the intrinsic safety of the spatial environment, we make sure that the production space, layout, various safety and sanitation facilities and passages comply with the state's relevant regulations and national standards. For the intrinsic safety of the physical and chemical environment, effective measures are taken to manage and control lighting, ventilation, temperature and humidity, noise, dust and toxic and harmful substances in compliance with national standards to ensure workers' health and safety. As for the intrinsic safety of the natural environment, we enhance the disaster resistance and prevention capabilities of process and equipment and implement emergency response and precautionary measures.

Ensuring Intrinsic Safety of Management

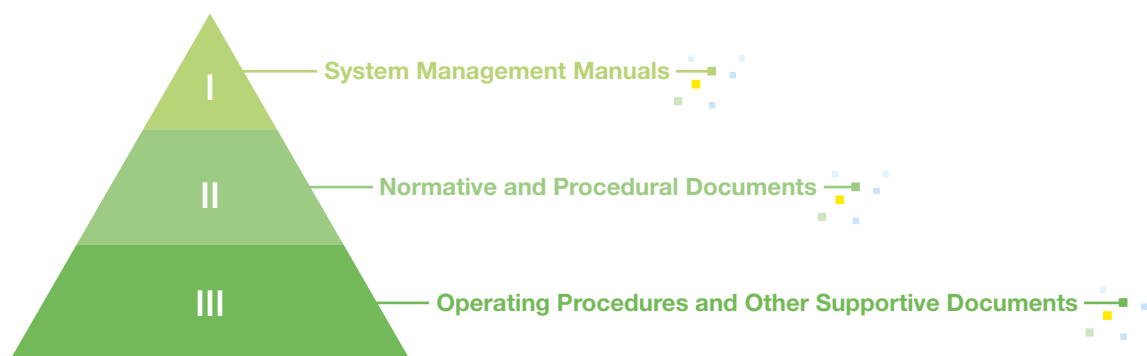
Intrinsic safety of management requires, under the condition of abiding by the national laws and regulations, companies' formulation and implementation of higher standards on safety, norms, and regulations, as well as their development of a comprehensive management system. In respect of safety management, we are transitioning from post-incident based to identification-based in our safety management, and we are emphasizing more on process controls rather than remedial efforts when responding to safety incidents. We also seek to apply safety system engineering principles and conduct scientific analysis in formulating pre-emptive measures.

The PDCA Management Model of Intrinsic Safety System

The Company's Intrinsic Safety System follows the PDCA management model, i.e., PLAN, DO, CHECK and ACTION, and this loop-closed system can enable continuous improvement. The management model consists of six key elements: leaders' commitments, policies concerning safety, health and environment, planning, implementation and operation, inspection and corrective measure, and management review.



The Company's documents concerning Intrinsic Safety System consist of system management manuals, normative and procedural documents, as well as operating procedures and other supportive documents. Some major documents include the Administrative Measures for Production Safety Supervision (《安全生產監督工作管理辦法》), the Regulations on Production Safety (《安全生產工作規定》), the Implementation Rules for Safety Performance Assessment (《安全績效考核實施細則》), and the Emergency Management Measures for Major Incidents (Accidents) (《重大突發事件(事故)應急管理辦法》) of the Company, etc.



In 2022, the Company continued to develop its Intrinsic Safety System:

- 1 The Company was fully prepared for the standard production safety work under the pandemic prevention and control and issued the Highlights on the Priorities for Safety Management During the Pandemic Prevention and Control (《疫情防控期間安全管理重點工作提示》) and the Selected Production Safety Accident Cases (《生產安全事故案例選編》) to guide grassroots enterprises in developing production resumption plans, delivering risk alert or warning education through accident case studies and strictly practicing pandemic prevention and control and production safety.
- 2 In line with the State Council Work Safety Committee's deployment, the Company implemented special rectifications for production safety, and formulated the Three-year Action Plan for Special Rectifications for Production Safety (《安全生產專項整治三年行動方案》). The Company managed the "Two Lists"¹³ in a dynamic manner, reviewed and evaluated the responsibility system in 18 units including Huangtai Power Plant, and carried out inspections following the principle of "Site Visit subject to Four Noes"¹⁴ in Dezhou Power Plant and other 8 units, reported issues promptly and fulfilled responsibilities for the purpose of simultaneous inspection, rectification, and improvement.
- 3 In order to enhance risk control and prevent safety risks, the Company issued and implemented the Guidance on Classified Control and Management of Production Safety Risk (《安全生產風險分級管控導則》), comprehensively promoted the construction of the "dual" prevention mechanism of graded risk control and hidden danger detection and management and implemented the intrinsic safety management system for infrastructure construction. The Company also developed a regulating system for contractors and introduced detailed rules to launch a "blacklist" to manage contractors. Meanwhile, the Company conducted special inspections on hazardous chemicals, network-related safety, restricted space, and power supply during special event periods.
- 4 The Company strengthened emergency management and scientific innovation, explored the construction of emergency scenarios, carried out more emergency drills to enhance its emergency response capability, and promoted its achievements in safety technologies.

¹³ Two Lists: the risk list and potential hazards inspection and clearance list.

¹⁴ Site Visit subject to Four Noes: site inspection or visit by going straight to grassroots enterprises or sites with no announcement issued, no notice given in advance, no briefing accepted and no accompanying person required.

6.2 Strengthening Safety Governance

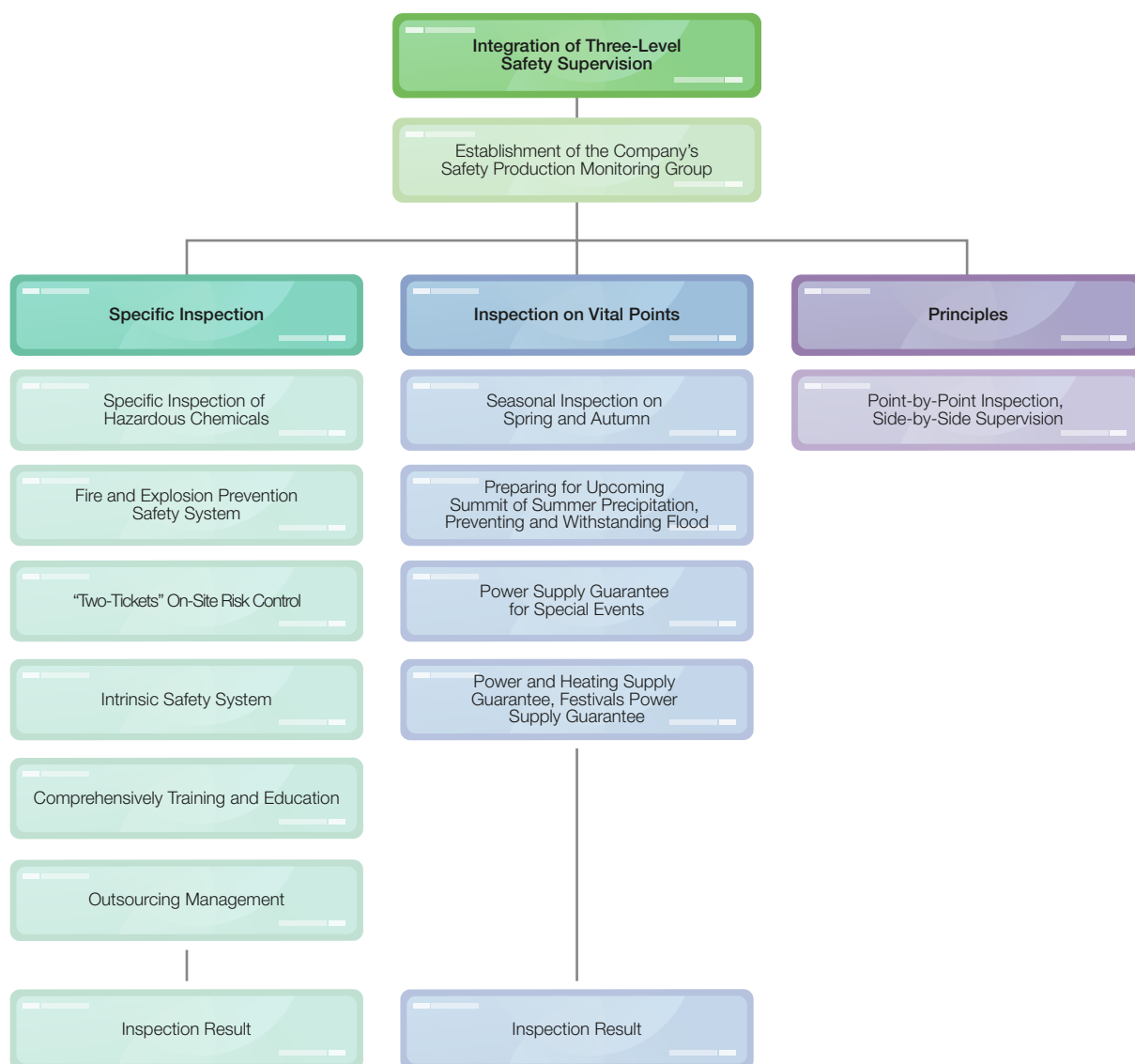
The Company and all its affiliated units have established a robust safety management structure and a complete set of safety supervision mechanisms to fulfil safety supervision responsibility. As the management, construction and operation maintenance team and other business functions incorporate the production safety principle with their business line to better form a production safety protection system. The interaction of safety supervision and protection ensures the accomplishment of production safety targets.

Establishing a Three-Tier Safety Supervision System

Huaneng International has set up a Committee of Safety, Occupational Health and Environmental Protection, whose main mission is to adhere to the policy of “safety first, prevention first, comprehensive management”, implement the national, industrial, and Huaneng Group’s guidance and arrangements on production safety, organize and guide the Company’s internal work on production safety, analyze and propose essential decisions and measures concerning production safety, and coordinate and solve critical issues in production safety. Under the leadership of the Committee of Safety, Occupational Health and Environmental Protection, the Company built a three-level safety supervision system of “headquarters – regional branches – grassroots business units” to ensure intrinsic safety is implemented for every stage of production and operation. The Company takes charge of system design, business strategy, on-site supervision and work assessment. Regional branches are responsible for implementing the Company’s various safety management requirements, work plans and deployment decisions, and fulfilling the duty of organization and coordination as well as specifying the major responsibilities of their affiliated grassroots units. Grassroots business units are tasked with implementing the Standard on the Fulfillment of Production Safety Responsibilities (《各級人員安全生產責任到位標準》) and the safety responsibility of all levels and positions, establishing the responsibility consciousness of “the one who is responsible is the one who works, the one who inspects, the one who is in charge and the one who approves”.



The Company and all its affiliated units established a robust safety management structure and a complete set of safety supervision mechanisms to fulfil safety supervision responsibility. This management structure works together with the production safety protection mechanisms to ensure the accomplishment of production safety targets.



Production Safety Target Responsibility System

The Company and its subsidiaries adopted a target responsibility system concerning production safety. The Company's management and their subordinate unit's personnel in charge sign the Production Safety Target Responsibility Memorandum (《安全生產目標責任書》) each year and carry out monthly pre-assessment and annual final assessment to guarantee that the responsibilities are fulfilled at each level. The Company's target of production safety abides by "one vote veto", which refers to a quantitative evaluation of production safety performance of each unit with a starting score of 100 points. If there is any injury or death accident of employees, injury or death accident of contracted personnel for which the Company is responsible, serious equipment accidents for which the Company is responsible, fire disasters, environmental pollution and damage accidents for which the Company is responsible, 100 points will be deducted.

6.3 Implementing Safety Measures

Huaneng International sees production safety as paramount. The Company has taken comprehensive and effective measures in system improvement, risk control reinforcement and emergency management through the responsibility system to promote the implementation of production safety, and solidly implemented special rectifications for production safety, contributing to the continuous enhancement of production safety.

Overall Production Safety

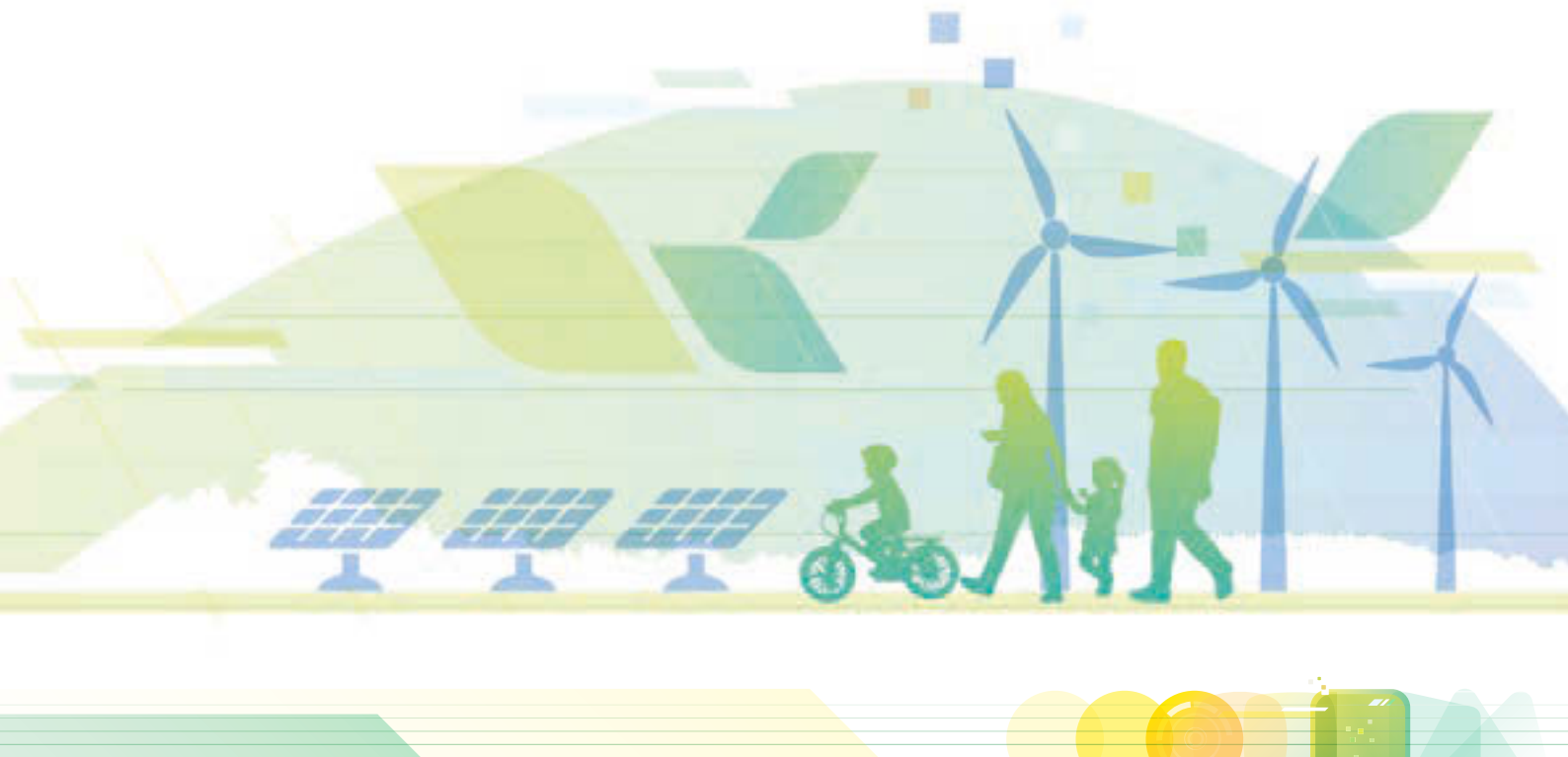
The Company made concerted efforts to prevent and control the impact of the pandemic, ensuring the power supply in Wuhan and other critical areas. In line with the deployment in the State Council Work Safety Committee's Three-year Action Plan for Special Rectifications for Production Safety throughout the country, Huaneng International implemented special rectifications and ensured power supply during important events and periods. The Company also conducted flooding prevention and control to defend against the natural disasters. In 2022, there was no major or above accidents that occurred in the Company.

Huaneng Liaocheng Thermal Power Plant Made Solid Efforts to Build a “Firewall” of Production Safety

During the pandemic, Liaocheng Thermal Power Plant launched an emergency plan requiring employees to be well prepared for emergencies anytime and anywhere. The production management personnel at all levels in the plant monitored site work constantly and provide more supervision and guidance for key tasks and operations. Personnel at all levels from departments including operation, maintenance and fuel enhanced the inspection, maintenance, and defect elimination of equipment to ensure the continuous and stable production of the unit in a secure manner.



Liaocheng Thermal Power Plant



Carrying out Comprehensive Safety Inspections to Eliminate Hazards in Time

- 1** Strengthening process tracking and making decisions in real time. We hold daily morning meetings concerning production safety to analyze problems, keep abreast of the production safety conditions of the grassroots units, provide security instructions, and commence related work in time. We established three WeChat Groups for flood prevention to post early warning promptly and exchange unimpeded flood information. We also prepare daily reporting of dynamic flood information, providing information support for flood condition analysis and deployment decisions.
- 2** Enhancing organization management to ensure that responsibilities are individual-specific and the on-duty policy is strictly implemented. The leading groups at all levels take the lead in fighting the flood.
- 3** Strengthening the routine investigation and handling of potential hazards. We focus on the hazards identified to ensure thorough risk prevention and control with measures in place and hazards being properly managed.
- 4** Putting emphasis on "Personnel Safety". We inspect the slopes around the production and living areas, as well as the prevention and avoidance of debris flow, to ensure that production and living facilities are away from hazardous areas.
- 5** Strengthening emergency management, performing emergency drills, improving emergency plans and ensuring sufficient material reserve for emergency.
- 6** Strengthening monitoring and early warning, taking emergency response measures promptly and scientifically. We cooperate with local governments by following the orders, actively participating in emergency rescue and evacuate personnel in time.



Implementing Safety Responsibility Assessment to Strengthen the Responsibility

In line with the State Council Work Safety Committee's deployment, the Company put ongoing efforts in safety responsibility assessments, developed position responsibility list, performance indicators and accountability mechanisms, and summarized and reported safety issues for enterprises to rectify jointly. As part of the efforts to achieve better management of production safety, the Company has prepared "the 14th Five-Year Plan" Action Plan of Production Safety in Power Supply (《電力安全生產“十四五”行動規劃》).

Strengthening On-site Management and Control, and Improving Safety Risk Management and Control Ability



1

We urged each business unit to conduct on-site risk investigation and analysis to "identify potential dangers and quantify risks" from the perspectives of personal safety, equipment safety and environment safety based on the "Two Tickets" policy, putting together a risk identification database and standardizing the "Two Tickets" management process. We continued to promote the construction of the "dual prevention" mechanism combining graded risk control and potential risk inspection and clearance, systematizing and standardizing potential risk inspection and graded risk control. In addition, the abilities of grassroots business units in risk identification, analysis and control were further improved.

2

Based on the construction of the dual prevention mechanism, the Company strengthened potential risk inspection and clearance and on-site supervision while standardizing the "Two-ticket, Three-policy" management process for grassroots units. We took a zero-tolerance attitude towards non-compliance and applied stringent controls to key areas, key procedures, key event periods, key positions and key persons to enhance safety protection and prevent casualties. We focused on the investigation of fire risks in electricity systems, coal transportation, boiler fuel oil, lubricating oil, desulphurization, hydrogen, and other systems, as well as the management of liquid ammonia tanks, the four major pipelines and pressure vessels to prevent explosions and avoid severe accidents.

3

The Company continued the implementation of a series of special treatment projects and special inspections on dangerous chemicals, major hazards, fuel systems, outsourcing standardized acceptance, metal supervision, flood prevention and control, fire safety and fall prevention to prevent the occurrence of accidents. The Company promoted the construction of the production safety risk monitoring and warning system for hazardous chemicals, urged business units to inventory and classify their existing risk sources and connect to the government's production safety risk monitoring and warning system for hazardous chemicals in accordance with local governments' requirements and time limits.

4

The Company enhanced the safety management for natural gas pipelines and issued the Notice on Enhancing the Safety Management of Natural Gas Pipelines (《關於加強天然氣管道安全管理的通知》), conducted more patrols and inspections on equipment pipelines, strengthened the control to third party construction risk, established accountability for the safety management of natural gas pipelines, enhanced pipeline corrosion control and management and facilitated the implementation of internal and external inspection to ensure effective risk control for gas pipelines. The Company also invited experts to conduct special safety inspections for Suzhou Thermal Power Plant and Guilin Gas Turbine Power Plant.

An Elaborate Production “Safety Net” was Put in Place and Further Improved in Huaneng Yangluo Power Plant

With the aim of improving safety in power generation and preventing and mitigating safety risks, in 2022, Huaneng Yangluo Power Plant launched a comprehensive project to manage major hazardous sources in ammonia area. Prior to this project, the six units of the power plant adapted the selective catalytic reduction (SCR) process in the flue gas denitration system, sharing the same set of equipment for production and storage, produce and provide liquid ammonia. Upon completion of this project, liquid nitrogen can be converted to urea during storage which reduces the safety risks in the transport and storage of liquid ammonia, and improves the operation safety of the denitrification system, further enhancing the foundation for production safety. In this regard, we will further improve production safety and get well-prepared for power supply assurance requirement.



Commencement Ceremony for the Comprehensive Project for Management and Renovation of the Ammonia Area in Yangluo Power Plant



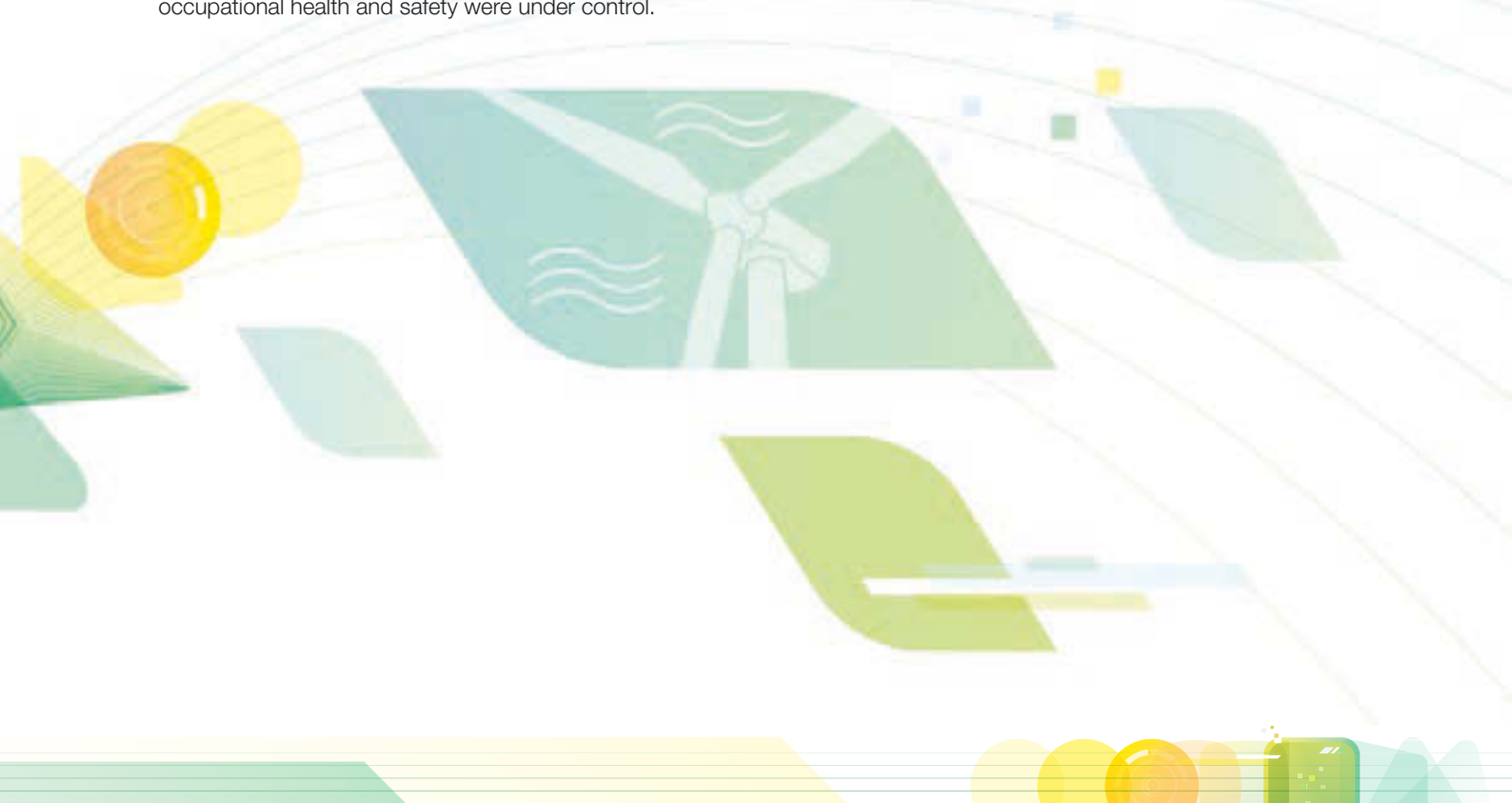
Enhancing Safety Risk Awareness, and Improving Staff's Emergency Response

Huaneng International proactively arranged tasks regarding production safety via video conferences and took solid steps in carrying out Production Safety Promotion Year Action. We formulated Production Safety Promotion Year Action Plan (《安全生產提升年行動方案》) which was submitted to the Office of the Chairman for review and approval. Through Production Safety Promotion Year Action, the Company reinforced its achievements of the three-year special rectification action for production safety, strengthened the safety management in key areas and weak links, and further fulfilled safety responsibilities. We promoted the implementation of the “dual prevention” mechanism combining classified risk control and potential risk inspection and clearance in all respects, effectively containing production safety accidents and facilitating high-quality development of the Company.

The Company continued to promote scenario-based emergency drills expanding from traditional accident scene emergency simulation to enterprise-local government cooperation in disaster relief, crisis response, and aftermath recovery. From the comprehensive scenario-based drills, the Company identified issues, refined its emergency response processes and enhanced its emergency response capacity and efficiency. The Company organized emergency drills regarding black-start and liquid ammonia leakage in Laiwu Power Plant and Changchun Thermal Power Plant, further developing the emergency management team and enhancing the staff's emergency response.

6.4 Safeguarding Occupational Health

The occupational health of our employees has always remained Huaneng International's top concern. In compliance with the Labor Law of the People's Republic of China (《中華人民共和國勞動法》), the Production Safety Law of the People's Republic of China (《中華人民共和國安全生產法》), the Law of the People's Republic of China on Prevention and Control of Occupational Diseases (《中華人民共和國職業病防治法》) and other laws and regulations, the affiliated units of the Company formulated the Occupational Disease and Hazard Management Standards (《職業病危害管理規範》) and the Occupational Health Supervision and Management Standards (《職工健康監護管理規範》) in accordance with the requirements of the Company's intrinsic safety management system. We always put our employees' health and safety first by raising awareness of work safety and preventing accidents. The Company strictly implemented regular safety hazard inspection, hazard notification, prevention and control and offered regular health checks for positions with exposure to occupational hazards and established a health monitoring file inventory for positions at different levels to ensure that occupational health and safety were under control.



All grassroots business units set up occupational disease prevention organizations to implement occupational disease prevention responsibilities as well as identify and evaluate workplaces with occupational hazards against relevant standards to categorize the hazards. Employees are trained on occupational disease prevention, while clear warnings are put up in workplaces with potential occupational hazards where regular inspection is carried out. Regular occupational health examinations, i.e., chest X-ray and hearing test, were conducted for employees in relevant production positions such as fuel supply, boiler operation and overhaul, and an established occupational health management database was in place. To safeguard staff's health, the Company installed climbers or elevators for all new projects to reduce the possibility of typical occupational diseases, such as lumbar disc herniation in the wind power industry. Projects that had already been put into production were also required to install the equipment to reduce the staff's climbing exercise intensity and reduce the inducing factor for diseases.

6.5 Raising Employees' Safety Awareness

Raising employees' safety awareness is the key to the Company's safety management. Developing and encouraging employees to participate in the Company's safety activities to become aware of the importance of safety and practice appropriate safety behaviors is the key guarantee to creating an intrinsically safe enterprise.

Huaneng International incorporated safety education and training into the Company's annual and medium-term and long-term plan. It established double-level and triple-level educational and training mechanisms and ensured the supply of required coaches, funds and logistics. The Company is responsible for preparing training plans according to the safety education outline, organizing safety education and training, and recording and archiving of safety training. All business units of the Company ensured that employees receive adequate training and adjust safety education plans and organize training for power plants, departments, and teams based on their production characteristics.



6.6 Strengthening Infrastructure Security

The Company is devoted to infrastructure safety management and promoted the execution of the intrinsic safety management system in this regard. The Company monitored the weaknesses in outsourcing safety management and the system implementation to improve outsourcing safety management. The Company strictly controlled the entry of outsourcing personnel and enhanced rectification measures for violations to ensure construction safety. The Company formulated the Regulations for the Safety Management of Power Engineering Construction (《電力工程建設安全管理規定》), specifying rules on how contractors should fulfill safety management when contracting power engineering construction and regulating the accomplishment of the safety management target.

Strictly Managing Contractors' Qualifications

The Company ensures that only qualified contractors can participate in the construction of the Company's projects. The contractors' qualifications, performance records and bidding documents are strictly evaluated. Bidding is only open to contractors with appropriate qualifications, proven performance records and adequate capabilities for the project. Those with a history of major safety accidents are prohibited from bidding for the Company's projects.

Strictly Managing Subcontracting

Any form of illegal subcontracting is strictly prohibited by the Company. The contractor must obtain the construction unit's consent for subcontracting and the subcontractor must have corresponding qualifications and work safety licenses. Contractors assume overall responsibilities for on-site construction safety. They shall strengthen on-site management and control by incorporating their subcontractors into their safety management system and implementing similar safety measures.

Strictly Managing Safety Training and Education

The Company requires contractors to organize production safety training and education, establish a safety training system, specify the production safety training department and its principal, formulate an education and training plan for production safety, establish employee safety training filing records, regularly identify safety education and training needs, and assess the effectiveness of training to continuously improve employees' awareness of safety and self-protection.

Deepening the Implementation of the Responsibility Subject

The Company has established a sound production safety responsibility system, specified the responsible personnel, scope of responsibility and assessment standards for each production safety position, as well as safety management responsibilities for engineering construction at all levels, and strengthened safety supervision and management, ensuring the effective operation of the safety supervision and assurance system.

Enhancing On-site Safety Control

The Company vigorously improves safety through technology, develops and promotes the function of smart infrastructure security modules to assist on-site safety control, implements closed management of construction sites by strict access control, tightens management and control of employees' actions and working process, and reduces habitual violations. The Company also prepares and approves a technical scheme for operation safety and fulfills technical disclosure for construction safety and on-site safety supervision to control safety risks of contractors effectively.

Enhancing Potential Risk Inspection and Mitigation

The Company organizes contractors to carry out large-scale on-site safety inspection on a regular basis to assess, record and file the potential safety risks identified. The Company is responsible for supervising contractors to formulate and implement rigorous mitigation plans as well as performing acceptance inspection of the potential hazards mitigation for closed-loop management of potential risk inspection and mitigation to consolidate and improve the infrastructure safety.

07



Human resource is our primary resource. The sustainable development of talents is the driving force for the sustainable development of the Company. Human resource is essential to the success of the Company. Regarding employees as the foundation for the Company's long-lasting prosperity, Huaneng International is dedicated to building professional teams, prioritizing employees' rights and interests, recognizing employees' value and building a development platform to promote joint development of the Company and its employees.





*PROMOTING
SYNERGY
BETWEEN
TALENTS AND
EXCELLENT
ENTERPRISE*

Promoting Synergy between Talents and Excellent Enterprise

7.1 Protecting Employees' Rights and Interests

We are devoted to the goal of “maintaining long-term, stable and good relationships with the employees” and the principle of “lawful employment and equal employment opportunity”. We created an environment where everyone has a chance to contribute and achieve career development and self-worth. We are dedicated to improving employees' sense of fulfillment and happiness while continuously enhancing unity within the Company.

Lawful Employment Equity

The Company adheres to two major principles, namely lawful employment and equal employment opportunity, strictly abides by the Labor Law of the People's Republic of China (《中華人民共和國勞動法》), the Labor Contract Law of the People's Republic of China (《中華人民共和國勞動合同法》) and the Provisions on the Prohibition of Use of Child Labor (《禁止使用童工規定》), as well as the Administrative Measures for the Recruitment of College Graduates (Trial) (《高校畢業生招聘管理辦法(試行)》), signs employment contracts with all staff and prohibits the employment of any minor under the age of 16. The Company has consistently and strictly implemented national laws and regulations on the minimum age limit and clarified the rights and obligations of both parties regarding labor and employment to avoid the risks of violation such as child labor and forced employment at the institutional and operational levels. The Company provides equal opportunity and protection to staff with different nationalities, races, genders, religious beliefs and cultural backgrounds. We offer equal terms to male and female employees, oppose forced labor and job discrimination and adopt an equal employment policy through the entire employment period of each employee. As the risk of the Company employing child labor and forced labor is rather low, there is no need to establish remedial measures for identified violations.

As of the end of 2022, the Company had a total of 57,069 employees, of whom 81% had received college qualifications or above. In 2022, no labor dispute arising from breaches of laws and regulations occurred.

Protection of Employee Rights and Interests

Upholding our “people-oriented” principle, the Company regards employees as the primary resource and has established a comprehensive and robust system to protect employees' fundamental rights and interests. We strive to be a caring employer and improve employees' loyalty, and we take employees' concerns to heart.

Basic Protection: In strict accordance with the requirements of the Labor Law of the People's Republic of China (《中華人民共和國勞動法》) and the Social Insurance Law of the People's Republic of China (《中華人民共和國社會保險法》) concerning employees' rights and obligations, the Company has set up several social insurances including basic pension, basic medical insurance, work-related injury insurance, unemployment insurance and childbirth insurance as well as housing provident funds, annuities and supplementary medical insurances to ensure that employees' rights are protected in the event of retirement, medical treatment, work-related injuries, unemployment or childbirth. In 2022, the Company did not have any social insurance violations or defaults.

Compensation System: The Company, based on the employee's “position, performance, work efficiency and the principle of equality”, has established an effective incentive mechanism under which employee's compensation is linked to the Company's operating result and the employee's individual performance. An employee's total compensation includes basic salary, bonus, and allowance, and is paid on time in full amount.

Right for Leave and Vacation: The Company and its subsidiaries have established sound leave systems in accordance with the state regulations and local policies. Either the standard working hour system and the flexible and aggregated working hour system may be adopted based on the Company's production condition and the employee's position to protect the employee's right to take leave. The leave system specifies that leaves shall include statutory holidays, paid annual leave, home leave, marriage leave, funeral leave, maternity leave, sick leave and personal leave, thereby protecting staff's right to take a vacation.

Democratic Management and Openness of Factory Affairs

The Company continuously deepens democratic management and makes factory affairs more transparent to standardize the operation of employees' assembly and clarify its functions. In 2022, the Company successfully held the 2022 annual employees' assembly and 2022 work conference. The Company's proposals were solicited and handled during the meeting with a response and handling rate of 100%. The Company guided the employee representative supervisors

to standardize their management and fulfill their responsibilities and allowed employee representatives to participate in the enterprise governance in an orderly manner, which fully activated employees' proactiveness and enthusiasm in participating in the Company's management. In addition, we deepened our efforts in transparent business and democratic management to enhance scientific and democratic management and uploaded policies regarding the labor union to the Openness of Factory Affairs tab on our official website, thus protecting employees' rights to know, participate, express and supervise and promoting joint development of the Company and our employees.

7.2 Promoting Employee Development

In the spirit of "human resource as the primary resources of the Company", Huaneng International vigorously promotes its talent-driven development strategy. With talent capacity building as the core and optimization of talent structure as the main task, we develop talent resources, optimize talent allocation, improve talent ability and quality, create an enabling environment for talent growth, and inspire talent innovation by seizing the three links of attracting, training and making good use of talents. In doing so, we build a loyal, honest and responsible team of talents with excellent quality and proficiency, which is well structured, professionally equipped, devoted to careers in Huaneng and in line with the Company's development and strategic needs.

Training and Development

To strengthen the construction of a training organization system and further improve the three-level training system consisting of "headquarters – regional branches – grassroots business units", the Company has established nine group-level training bases (training classrooms). All grassroots business units have training centers to actively carry out training related to technology, skills and management.

The Company strictly follows the Regulations on Team Leader Training (《班組長培訓規定》) and the Regulations on Production Worker Training (《生產人員培訓規定》) to facilitate training that meets the needs of the Company and employees at the regional branches and grassroots business units based on the actual situation. Focusing on the critical tasks of the year, the Company has developed the 2022 training plan, actively and steadily promoting training related to professions, skills and management. Based on the actual situation, each regional branch has formulated its training plan, comprehensively summarizing the training work of this year, studying and proposing training plans and ideas for the next year, to further improve the training work.

In 2022, the Company, regional branches and grassroots business units conscientiously implemented the annual training plans, coordinating and organizing on-board training for new recruits, business management training and production skill training. We also carried out various skill contests, technical competitions and on-the-job exercises where 1 employee was awarded the "National Technical Expert" title, 1 was selected for the "Central Enterprise Great National Craftsmen Support Program", 3 were awarded the "National Archival Craftsman" title, 5 were awarded the "Power Industry Outstanding Operator" title, 15 were awarded the "Huaneng Craftsmen" title, and 70 were awarded the "Huaneng Group Technical Expert" title. The Company also proactively arranged recognition of occupational skills and occupational skill appraisals, and deepened the reform of evaluation on skilled talents, so as to effectively enhance employees' management ability as well as professional and production skills.

Career Development

The Company focuses on employees' career development. The Company continues to optimize the talent allocation and growth environment, provides diversified career development paths and further promotes the dual hierarchical promotion mechanism whereby employees can move up the corporate ladder either by post or job function. The system is aimed at stimulating talents' enthusiasm and injecting vitality into the Company.

The Company makes more efforts to refine its talent system and mechanism and optimize the recruitment procedure and evaluation mechanism for professional and technical positions. The Company promotes employees with outstanding skill sets and performance or those well-recognized by their peers. Through this approach, the Company has built an excellent platform for talents to showcase their potential.

The Company continues to strengthen its core management team. Upholding Xi Jinping's Thoughts on Socialism with Chinese Characteristics for a New Era, and implementing CPC's roadmap in the New Era, we adhere to the basic principles of "evaluating candidates by their moral integrity and professional competence with priority given to the former

and appointing those with good merits” to select and appoint cadres. Moreover, we persist in the correct orientation for the selection and appointment of people and concentrate on developing both the Company and Huaneng’s business to select the cadres with the right political ideology, a strong sense of responsibility and great performance. We train the leaders in practice through job rotation and more extensive communication, thereby facilitating talent flow and optimizing human resource structure. We continuously improve management’s performance to handle complex situations and build a talented team of high-quality and professional cadres, which meets the standards of qualified management in the new era who are loyal, honest and responsible.

The Company continuously strengthens talent development, deepens the cultivation of international talents, actively and steadily carries out training work, proactively carries out title management and talent evaluation work, and optimizes employee recruitment to improve core management and professional teams’ comprehensive skills and management capability.

In 2022, the Company further strengthened the selection and training of young cadres, continuously improving the age structure and stimulating young employees’ working enthusiasm. The Company formulated development plans for young talents and enhanced talent training with the consideration of the Youth League Committee’s work, providing a platform for outstanding youth to practice and strengthen their ability to help the Company develop versatile talents.

In the future, the Company will deepen the reform of labor, personnel and distribution system, further improve the talent cultivation mechanism, optimize talent development environment, strengthen talent resource development and encourage staff to continuously improve themselves in their positions to achieve self-realization and joint development with the Company and staff.

7.3 Caring Employee Health

Employees are fundamental to the development of the Company. Huaneng International can only continuously and steadily supply energy for economic and social development based on the hard work and dedication of all employees. The Company always adheres to the people-oriented development concept and vigorously implements the talent-driven development strategy to enable staff and the enterprise to grow together, sharing the fruits of reform and development, thus filling employees’ work and life with happiness.

In 2022, adhering to the newly-revised Labor Union Law (《工會法》), Huaneng International was devoted to serving the employees. Given the pandemic prevention and control in both domestic and foreign COVID-19-stricken areas, efforts were made in organizing psychological consultation lectures, paying visits and expressing gratitude to our overseas employees. Moreover, the Company has reached strategic cooperation framework agreements with companies in the pharmaceutical and healthcare industry, providing more professional health services such as post-physical examination services, healthcare management, medical insurance, medical assistance and cloud platform data support to our employees. In addition, the Company helped employees solve problems and difficulties in their work and life, so that employees can feel the care and warmth of the Party Committee of the Company and feel happier and more secure. In doing so, the unity, cohesion and synergy of the Company can be promoted.



Signing Strategic Cooperation Framework Agreements with Companies in the Pharmaceutical and Healthcare Industry

Under the theme of “Welcoming the 20th National Congress of the CPC and Striving for a New Journey”, the Company has organized colorful online and offline cultural and sports activities in various forms, encouraging employees to participate in the calligraphy, painting and photography collection activities hosted by the All-China Federation of Trade Unions, the Energy and Chemical Geology Union, the Labor Union of the Group and other organizations, and won a prize in the “Changes in the Three-year Reform” essay activities. As the initiating unit of the Table Tennis Association of the Group, complying with the policies concerning the pandemic prevention and control, the Company has set up 6 association groups to carry out regular activities and logistic work such as event organization, management and promotion and management of dues. The representatives of the Company won the third place in “STIGA-HUADING” 5th Table-tennis Invitational Tournament for Agency in Beijing (Season 1)”.



The Company Organized to Participate in the “STIGA-HUADING” 5th Table-tennis Invitational Tournament for Agency in Beijing

Actively responding to national fertility policy, the Company strives to address the concerns of female employees. At the International Women’s Day on March 8, the Company expressed its gratitude to female employees by holding activities such as “Cultivating Reading Culture at Women’s Day” reading activity and “Graceful Women with Charm” decoration-making activity.



Holding “Graceful Women with Charm” Decoration-Making Activity to Celebrate Women’s Day

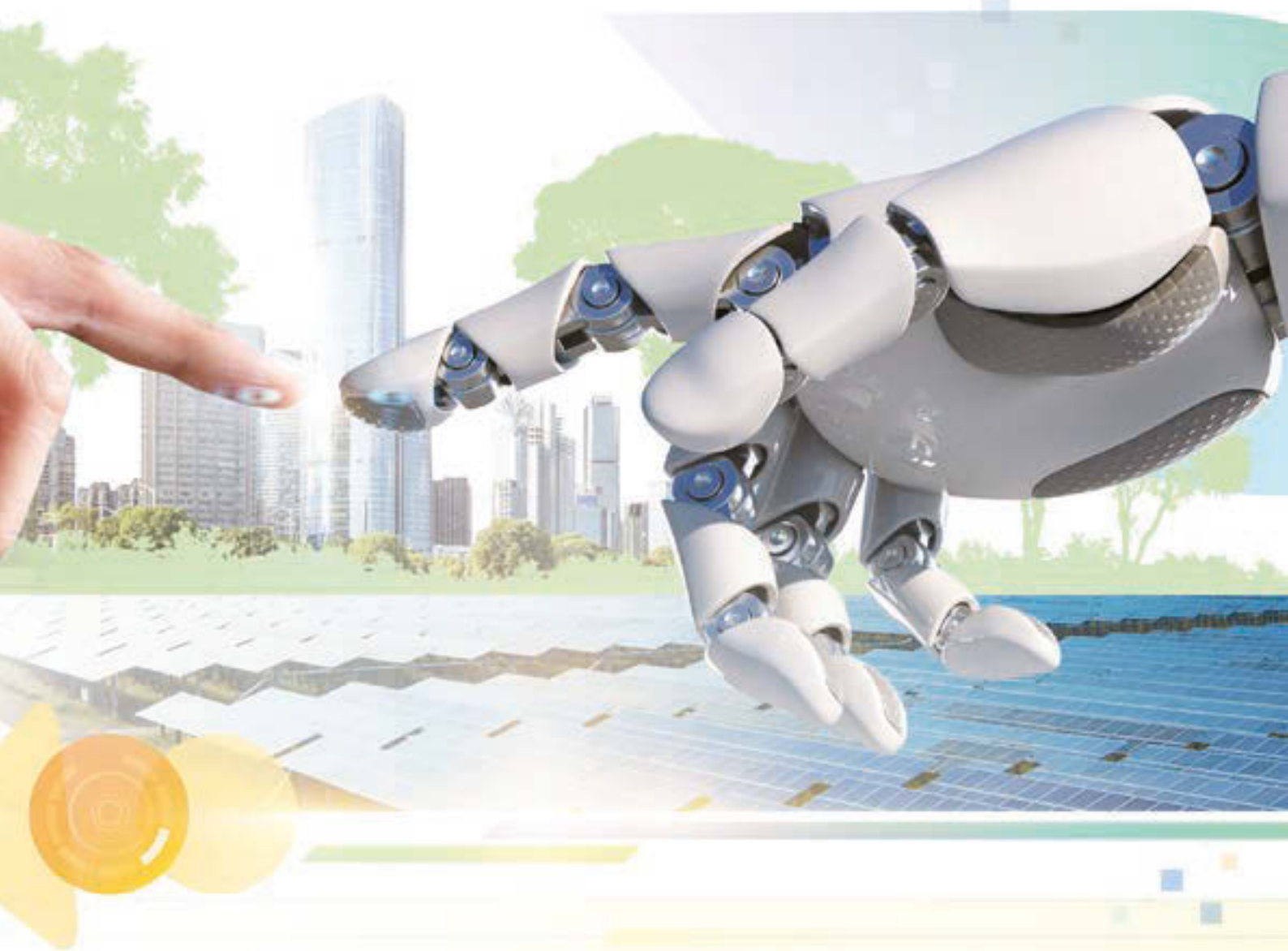




REALIZING MUTUAL BENEFITS AND WIN-WIN RESULTS

08

As a responsible corporate citizen, Huaneng International has always adhered to the harmonious development concept of “serving the nation, benefiting the society, seeking multiple wins and growing together”. We fully consider and effectively respond to the demands of stakeholders and actively devote ourselves to serving or operating areas. Furthermore, we cooperate with stakeholders to push forward economic and social development, share development fruits to give an impetus to build a harmonious and win-win society.



Realizing Mutual Benefits and Win-win Results

8.1 Making Concerted Efforts to Seek Common Development

Building trusted and cooperative relationships with suppliers is crucial to realizing the Company's strategy. Our policy is to remain open, fair and just in working with suppliers, and we emphasize effective communication to strive for suppliers' understanding and recognition of the Company's corporate values and culture. We hope to maintain long-term and mutually beneficial relationships with suppliers and jointly promote the stable and sustainable development of the industry.

Based on the supply category, the Company divides our suppliers into three categories: material, service and engineering. The Company's supplier management emphasizes the principle of "Classified management, stringent acceptance control, quantitative assessment and dynamic maintenance".

Supplier Development

The Company's business units at all levels conduct supplier stocktaking and analysis each year to identify more high-quality suppliers for our supplier inventory. Meanwhile, the Company solicits eligible suppliers through various channels, such as procurement guides, mass media, product launches, product showcase (sales) events, industry associations, employee recommendations, public tenders and supplier liaisons.

Supplier Acceptance

The Company's business units at all levels impose stringent controls on supplier acceptance. Only suppliers with a good reputation, advanced technologies, excellent product performance and strong ability to perform are accepted, and accepted suppliers are scrutinized for the legality of their business operations and the authenticity of their qualifications, among other things.

Supplier Selection

We select suppliers in an open, fair and just manner, considering their environmental and social impact. Procurement activities are classified into two categories, namely tendering procurement and non-tendering procurement. Tendering procurement includes open tender and invitation to tender, while non-tendering procurement includes competitive negotiation, quotation and single-source procurement. For tender projects that are required to be conducted openly according to the law, the related work procedures are carried out in strict accordance with national laws and management systems of the Company, and all procurement activities are implemented publicly through the procurement management platform and e-commerce platform to achieve the goal of "every effort shall be made for tender and all activities shall be carried out publicly".

The Company requires all suppliers taking part in a tender to have the ISO 14001 environmental management systems certification and the ISO 9001 quality management systems certification. Suppliers included in the List of Enterprises with Serious Illegal and Dishonest Acts by the industry and commerce administration authorities in the National Enterprise Credit Information Publicity System, or the List of Dishonest Persons Subject to Enforcement by the Supreme People's Court on the website of "Credit China" or credit information sharing platforms at all levels are prohibited from participating in procurement activities. If the supplier has already participated in procurement activities, the tendering documents or response documents will be rendered invalid. Suppliers whose related relationships are prohibited by law and agents and suppliers sub-authorized are prohibited from participating in the procurement activities of the same project. The tendering documents or response documents of those who have participated in procurement activities will also be rendered invalid.

Supplier Assessment

Supplier assessment is based on the “user assesses” principle. Based on Huaneng’s procurement management platform, each of the Company’s various business units conducts comprehensive and annual assessments on the project implementation of suppliers who have contractual relationships with the unit. Suppliers will receive assessment feedback through the e-commerce platform, which serves as an essential reference for future procurement.

Supplier Monitoring

In response to the quality problems occurring in the provision of procurement services by suppliers as well as the problems in suppliers’ integrity, delivery, and service during their participation in warehousing applications, procurement activities, and contract performance, the Company will, depending on the severity of the problems, take punitive measures such as downgrading, suspension of the award of contracts, and suspension of cooperation for a limited time.

Coal Procurement

As a large power-generating company, Huaneng International places much emphasis on fuel supplier management. The Company has formulated the Fuel Supplier Management Measures (《燃料供應商管理辦法》), which specifies the classifications of suppliers and their corresponding management measures and regulates the supply channels and procurement activities for fuel purchase. Suppliers are generally divided into four categories: A: strategic suppliers, B: general long-term suppliers, C: key market suppliers, and D: general market suppliers. The Fuel Supplier Management Measures (《供應商管理辦法》) also stipulates responsibilities for the development and review of suppliers at all levels, selection criteria, supplier approval and decision-making institutions and procedures, supplier assessment, supplier upgrading and downgrading, exit mechanism, etc.

Regarding the monitoring and management of suppliers, the Company’s subsidiaries assess suppliers each year in terms of coal supply stability, contract performance, contract fulfillment, production volume, procurement pricing and dispute resolution. The Company’s fuel supplier assessment principles include: (1) Classified management; (2) User assesses; (3) Regular assessment; (4) Dynamic management with an exit mechanism. The Company’s various business units perform fuel supplier management inspections from time to time, examining: (1) Whether the relevant supplier management system is sound, whether the decision-making institutions at all levels of supplier management are established, and whether the institutions operate normally; (2) Whether such system is effectively implemented and whether the acceptance approval is standardized; (3) Whether fuel supplier assessments are objective and accurate; (4) Whether dynamic management of suppliers is carried out based on assessment results; and (5) Whether the exit mechanism is put in place.



In 2022, Huaneng International implemented the procurement mode of “long-term agreement + spot” in fuel procurement. Aiming at large coal mine operators, the Company negotiates directly with the suppliers to sign long-term agreements, and procurement is carried out in spot trading through open tender, tender follow-up and tender negotiation. To avoid causing substantial disturbance to the market during the process of fuel tender, Huaneng International adopts the strategy of “Achieving rapid development by small steps”, controls the procurement scale of each batch, selects representative coal types and flow directions each time, and creates a competitive procurement environment. In doing so, Huaneng International has precise control over coal procurement, which enables the Company to guide downturns in the market, seek resources of “dead end”, and reduce procurement prices. At the same time, Huaneng International performs tender follow-up and tender negotiation with competent suppliers at the tender price to keep the source of goods in batch and meet the demand.

The Company selects suppliers with great care and carries out the authorized approval procedures for shortlisted suppliers. Priority is given to state-owned large mine operators and large coal mine operators, and a “plant-mine direct supply” model is adopted. In our view, state-owned large mine operators possess higher capability to fulfill contracts, have more stringent product quality controls, are more compliant with laws and regulations and are more likely to take social and environmental responsibilities. In addition, large coal mine operators are subject to stringent environmental protection requirements imposed by the state concerning their planning, design, infrastructure, exploitation and mining area management. Only those coal mine operators that meet these requirements are allowed for construction and operation. With constantly intensified efforts in releasing quality production capacity in recent years, coal production work has further improved in terms of quality, environmental protection standards, safety and labor protection. There is also a specific set of requirements formulated by the state for the recruitment of miners in large coal mines. By selecting state-owned large mine operators and large coal mine operators, we ensure that suppliers fulfill their social, environmental, and labor protection responsibilities and obligations.

Always taking the green development concept of “energy saving, emission reduction, clean and environmental protection” as the guide, Huaneng International regards environmental protection as a prerequisite for the survival and development of the Company with the basis on national conditions and energy reform trends. Correspondingly, the coal-fired structure is optimized ceaselessly during the development process to improve resource utilization efficiency. In the process of fuel procurement, strictly abiding by the Interim Measures for the Quality Management of Commodity Coal (《商品煤質量管理暫行辦法》) announced by the state, the Company prohibits the purchase of low-quality coal that fails to meet the national control standards while encouraging the use of high-quality resources of high-calorie, low-sulphur and low-ash, which has made outstanding contributions to the national targets of achieving the annual target of controlling energy consumption and carbon emissions and promoting energy saving and emission reduction.



8.2 Providing Quality Service

Huaneng International is devoted to providing power grid companies and other downstream enterprise consumers with high-quality power products and services in sharing the Company's achievements with clients whilst ensuring a safe and stable power supply. The Company formulated Marketing Management Regulations (《市場營銷管理規定》), Electricity Market Trading Management Measures (《電力市場交易工作管理辦法》), Heat Supply Management Measures (《供熱管理辦法》) and other marketing-related systems to regulate customer service processes. In 2022, the scale of electricity transactions in the provincial and municipal electricity markets accelerated. The Company made use of various channels through electricity sales companies to strengthen the development of power users. It had a variety of customer types, a relatively stable number and electricity consumption of large users signed for the whole year, and a rapid increase in the number and electricity consumption of small and medium-sized users. Adhering to the customer-oriented service concept, the Company established a customer service mechanism, and conducted promotion meetings, regular communication via telephone and regular return visits to understand customer needs and solve their problems with electricity. The Company also actively developed value-added services for customers, providing information consultation, quotation agency, electricity consumption monitoring, energy consumption diagnosis, energy saving renovation, operation and maintenance, financial service, etc., to continuously improve customer satisfaction and maintain harmonious customer relationships. When receiving customer complaints, the Company immediately transfers the complaints to regional branches and grassroots units and supervises them to handle the complaints in accordance with the management regulations and procedures.

The Company adopted the following three approaches to improve customer service quality and customer satisfaction and gain greater access to the end customer market:

- 1** Continuously improve the level of professional technology and electricity sales services, fully consider the differentiated needs of users, and provide users with accurate and high-quality services.
- 2** Establish the service concept and a customer service system, which reflects the warmth of our service and technical professionalism, thus drawing customer relationships closer and improving the adhesiveness of users.
- 3** Encourage the development of chargeable value-added services for individual needs, promote the rapid development of value-added services, and actively explore business models that combine carbon trading with electricity trading.



8.3 Creating a Better Society

Huaneng International has always adhered to the harmonious development concept of “serving the nation, benefiting the society, seeking multiple wins and growing together”, by actively responding to the call of the state, providing supports and assistance, earnestly fulfilling our social responsibilities and giving an impetus to build a harmonious and win-win society. Major energy media such as xuexi.cn, China Electric Power News, CPNN.com.cn announced the Company’s 2021 Sustainability Report (《2021年度可持續發展報告》) upon its release in August 2022, which received attention from a wide range of the industry and enhanced the Company’s brand influence and reputation.

Assisting in Rural Revitalization

In 2022, guided by Xi Jinping Thoughts on Socialism with Chinese Characteristics for a New Era, the Company has thoroughly implemented the guiding principles of the 20th CPC National Congress, improved and optimized support measures, implementing support projects in a precise manner to effectively promote the implementation of the rural revitalization strategy of the state in accordance with the overall requirement of “developing rural areas into places with thriving businesses, pleasant living environments, social etiquette and civility, effective governance, and prosperity”. Based on the resources in targeted assistant areas, the Company has been playing the advantages of its main business, and invested in the construction of photovoltaic projects to improve the energy has been playing and stimulate local economic growth. In addition, the Company strengthened the support for characteristic industries and construction of public infrastructure to improve local economic vitality and promote sustainable rural development. The Company has invested RMB12.982 million in assistance throughout the year. Besides, the Company made every effort to implement consumption assistance and promote the stable increase of income of the people in the assistant areas, and purchased agricultural products worth more than RMB45 million in the targeted assistant areas.

Henan Branch Stationed in the Village to Help Farmers Which Won Their Approval

To implement the guiding principles of the 20th CPC National Congress, Henan Branch’s assistant working team stationed in the village and carried out the “care for everyone, warm every family” farmer aiding activities, closely integrated the work of farmer aiding and village-stationed assistance, further consolidated the achievements made in poverty alleviation, and sent winter warmth to the people with a focus on solving their most concerned problems. In Hao Village, Xiaohu Town, Hebi, Henan Province, Henan Branch’s assistant working team stationed in the village helped vegetable farmers sell slow-selling vegetables in Xun County through promotion and purchase of local vegetables, solving their “urgent difficulties”.



Henan Branch “Care for Everyone, Warm Every Family” Farmer Aiding Activities

Huaneng Luoyuan Power Plant Delivered Water to the Villagers of Bili

Since the earlier summer in 2022, continuous heat wave in Luoyuan County has made the only village river in Lian’ao Village, Bili Township dried up, and nearly 100 households in the village have been in urgent need of domestic water. After receiving the water supply request from the Bili Township Government, Luoyuan Power Plant immediately sent fresh water to Lian’ao Village, providing “showers after a long drought” to the villagers who had been without water for several days, effectively alleviating the problem of water shortage among local villagers.



Luoyuan Power Plant Delivered Water to the Villagers of Bili

Guangxi Branch Supported Consumption Assistance

Guangxi Branch made use of the internal resources of the Company and encouraged the internal canteen to purchase local products from key national assistance areas. The Company's canteen purchased products from Huanjiang County directly, while Guilin Branch's canteen purchased products from Longsheng County directly, employees and their families purchased products from the targeted assistance areas by the Company online, and all members of the Company at different levels actively participated in consumption assistance.

Huaneng Yingkou Power Plant's Education Assistance Activities Boosted Rural Revitalization

Huaneng Yingkou Power Plant carried out education assistance activities by organizing young volunteers to visit the children in Gaizhou Lutun Ciai Orphanage and Anping School in Bayu District prior to the holiday. They donated daily necessities and anti-pandemic materials to orphanages and donated daily necessities to 16 underprivileged students at Anping School. In addition, Yingkou Power Plant leveraged their advantage to carry out a volunteer teaching activity with the theme of "warming hearts and supporting dreams".



Yingkou Power Plant's Volunteer Activities at Anping School

Huaneng Pakistan Branch Made Donation to the Local Floods Disaster

In the summer of 2022, Pakistan was hit by severe floodings, affecting one-third of the country's population. Besides the donation made by the Company, Huaneng Pakistan Branch encouraged individual donations by its employees both in China and Pakistan and delivered them to Pakistan's "2022 Prime Minister's Disaster Relief Fund" as soon as possible to help the Pakistani people overcome difficulties caused by the flooding and rebuild their homes.



Donations for the Flood Disaster in Pakistan

09



COMPETING IN OVERSEAS MARKET FOR FURTHER DEVELOPMENT

Huaneng International successfully acquired 100% equity in Singapore Tuas Power Ltd. ("Tuas Power") in 2008. Tuas Power is one of the three major power-generating companies in Singapore and one of Singapore's major public utility and environmental service providers.





Competing in Overseas Market for Further Development

About Tuas Power

Tuas Power owns Tuas Power Station and Tembusu Multi-Utilities Complex (TMUC). In 2022, the cumulative electricity market share of Tuas Power was 22.3%.

Tuas Power Station has been providing safe, reliable and efficient electricity supply to Singapore since 1999. The Station currently has five units of gas-fired Combined Cycle Plants (CCP) in operation that contribute to the country's electricity demand at a highly-reliable performance of over 99%.

The Tembusu Multi-Utilities Complex commenced operation in 2013, and it serves the petrochemical industries in the Tembusu area of Jurong Island. TMUC comprises a Biomass Clean-Coal (BMCC) cogeneration plant, seawater desalination treatment plant and wastewater treatment plant, which provides different types of utilities – electricity, steam, high-quality industrial water and demineralized water for industrial customers. In respect of steam supply, TMUC provides a variety of pressure grades of steam to meet the differentiated needs of different customers while generating electricity. This process is completed by steam turbine generator sets. This cogeneration process helps to further improve the efficiency of the Tembusu thermal power plant.

Going beyond providing energy service, Tuas Power enlarged its operations to cover multi-utility, environmental, oil terminals and storage and oil tank lease services – all of which utilized cutting-edge technologies and world-class practices to power today's industries.

Tuas Power emphasizes efficient and environmentally responsible energy solutions for modern business and industrial needs. Tuas Power insists on conducting operations in an environmentally responsible manner by maximizing plant efficiency, resource conservation, reducing waste and controlling emissions. The systems of both Tuas Power Station and TMUC for the management and planning of its environment, occupational health and safety have obtained ISO 45001: Occupational Health and Safety Management Systems in 2018, ISO 14001 (Environmental Management System) and ISO 50001 (Energy Management System) certification.

In 2022, Tuas Power had no reportable environment-related incidents. In the future, Tuas Power will continue to enhance environmental protection and safeguard measures.

Energy Conservation

With the availability of natural gas and the development of combined cycle power plants, Tuas Power Station adopted a strategic transformation to more energy-efficient and cleaner power generation. Since 2000, the Station started developing combined cycle power plants and retired generator sets. The Station now owned five most advanced F-class CCP generation units with an average efficiency of 48.5%. In 2019, TMUC launched the second phase of its digitalization project to improve efficiency and reduce heat loss, which was completed in 2020. In 2021, work for the mitigation of steam loss was initiated at TMUC. This was achieved by installing Hi-stop (live seal) adaptors at identified passing header drains to prevent steam losses at steam traps and valves without shutting the LP header. 3 of these live seals were installed in September 2021. The above initiatives further improved TMUC's plant efficiency and energy conservation. In 2022, TMUC renewed its ISO 14001, ISO 45001 and ISO 50001 certifications, which fully reflected the enterprise's unremitting efforts and achievements in implementing energy saving and compliance.



Tuas Power Station



Tembusu Multi-Utilities Complex

Tuas Power also uses well-tested and calibrated thermodynamic models to perform off-line heat balance calculations to monitor the efficiency performance of each CCP unit. To minimize overall fuel consumption of the station, Tuas Power developed a software named “Load Optimizer” to automatically calculate the load of each generator unit based on the overall load requirement during a specific trading period and each CCP unit’s efficiency curve that is updated on a monthly basis.

Emissions Management

Greenhouse Gas Management

In terms of greenhouse gas management, the carbon emission of the five units of CCP of Tuas Power Station is lower than that of the national average of all power plants in Singapore. Tuas Power Station has commenced the CCP3 and CCP4 Unit F upgrade project, which is expected to reduce carbon emissions by 19,500 tons per year. It is scheduled to be carried out during the CCP4 Unit overhaul from November 2022 to January 2023 and the CCP3 Unit overhaul from October to November 2023. The usage of 20% carbon-neutral biomass (Palm Shells & Woodchips) is a mandatory requirement by the local authority to lower the carbon footprint of TMUC. By co-firing 80% coal with 20% carbon-neutral biomass, TMUC has lowered the carbon emission and thus lowered the carbon tax. To remain competitive, TMUC gradually increased the proportion of wood chips in its fuel mix. An increased usage of wood chips provided greater flexibility for fuel mix ratio to maintain a higher percentage of carbon-neutral biomass fuel and reduce fuel costs. In addition, mitigation measures that reduce energy losses from power plants or increase the power generation efficiency of power plants can also help reduce greenhouse gas emissions. In accordance with the measurement and reporting requirements for greenhouse gas emissions from Singapore’s National Environment Agency, Tuas Power and TMUC submitted their plans and supporting documents for the measurement of greenhouse gas emissions to the Singapore authorities and received approvals in December 2018. In 2022, Tuas Power and TMUC submitted their annual emission reports based on these approved documents and paid the relevant carbon taxes accordingly.

Other Exhaust Gas Management

In terms of other exhaust gas management, Tuas Power Plant operated five units of natural gas-fired CCP generators to achieve zero emission of Sulphur dioxide. TMUC reduces NO_x and SO₂ emissions by using advanced Circulating Fluidized Bed (CFB) boilers and purchasing low-Sulphur low-ash coal. The low furnace temperature of the boilers and the use of low-Sulphur low-ash coal have ensured a low NO_x and low SO₂ emission, utilization of high-efficiency bag filters at the boilers has ensured the emission is within the compliance limit, which made TMUC able to meet the stringent air emission limits set by the Air Impurities Regulation of the Singapore Environmental Protection and Management Act (《環境保護和管理法案》).

Ash Recycling

In ash recycling, TMUC has achieved 100% comprehensive utilization of ash (fly ash and bed ash) by working together with local building materials companies.

Wastewater Management

In the case of water treatment, the TMUC project has established wastewater treatment facilities to treat the wastewater produced internally and the wastewater generated by the petrochemical industry in compliance with relevant regulations. To fully utilize the well-designed water cycle, customers are incentivized to return clean condensate for TMUC's steam production. High-temperature return condensate from the customers is used to pre-heat deaerator feed water to improve efficiency. Boiler blowdown water is recycled back to the Water Treatment Plant as an alternative source of raw water. Partially treated water from the wastewater treatment plant is being reused for plant washing in TMUC Site 2.

Customer Service

Since 2003, Tuas Power has been serving many groups of customers from residential customers, individual businesses, to developers, landlords and tenants of commercial buildings. In a recent customer satisfaction survey by Singapore's Energy Market Authority, Tuas Power has been rated 4.5 stars (5 stars in total) since 2019.

Green Plan

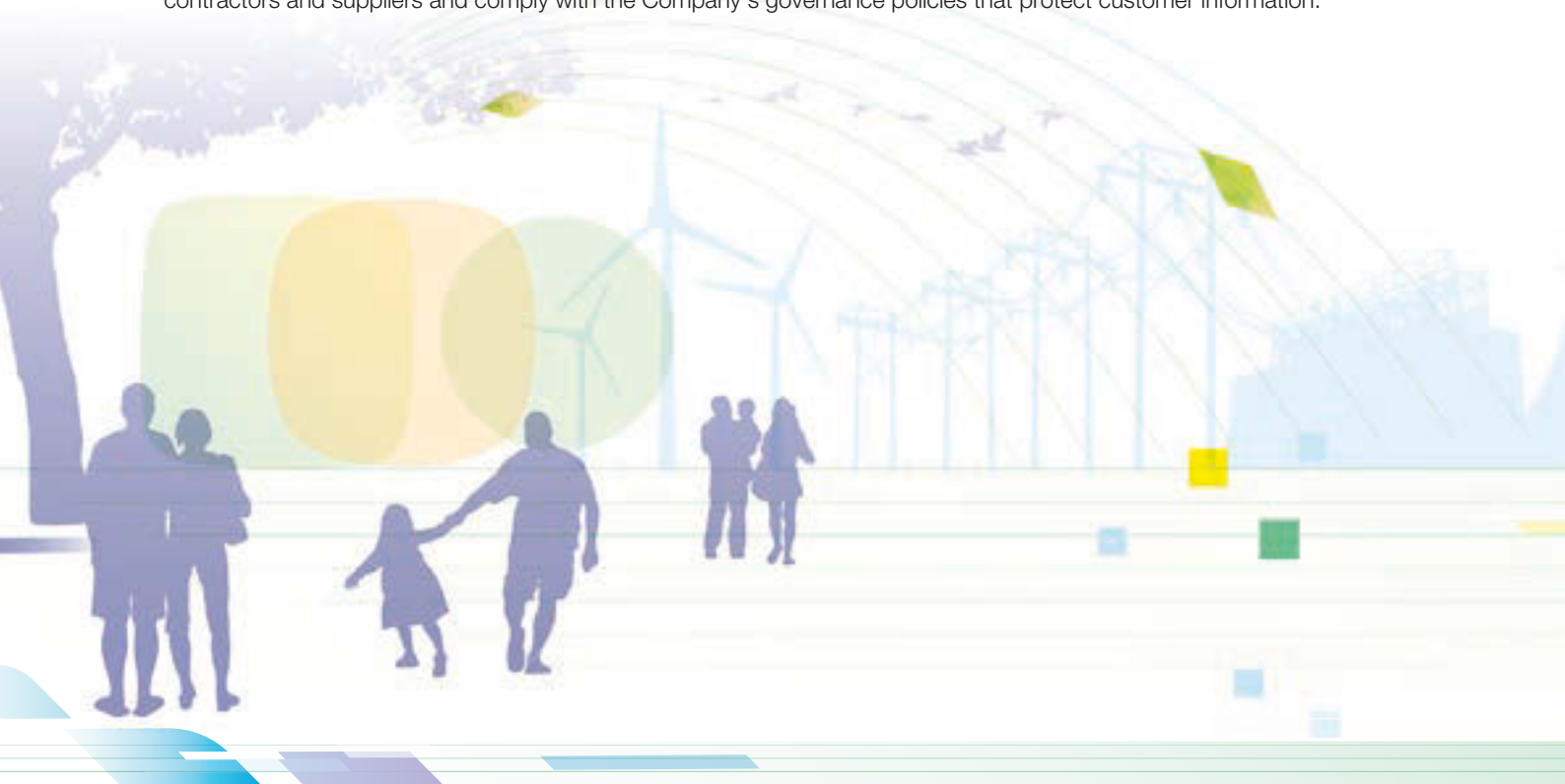
Tuas Power has embarked on various initiatives in support of carbon emission reduction to address the challenges posed by climate change and meet carbon reduction goals. Our initiatives include exploring and participating in importing renewable energy and providing carbon-reduction solutions for customers, such as charging electric vehicles, solar energy generation, energy efficiency improvements and Renewable Energy Certificates (RECs). In the future, Tuas Power will continue its exploration for solutions such as hydrogen power generation.

Comprehensive Energy Management System

Tuas Power introduced a comprehensive energy management system in January 2016, with the implementation of automated metering devices for commercial buildings. The meter can record electricity consumption on a half-hourly basis in real-time for customers to review through a mobile application, enabling adjustment in energy usage to be activated promptly. The system has also improved the efficiency and accuracy of billing to tenants. As of 2022, Tuas Power had provided this service to more than 200 buildings and installed more than 8,000 electricity meters and related infrastructure.

Customer Information Protection

In handling customer information, Tuas Power formed an agreement with contractors and suppliers to protect customer information. Its own employees are subject to the related compliance trainings and the same requirements as the contractors and suppliers and comply with the Company's governance policies that protect customer information.



Community Building

Tuas Power actively cooperated with Statutory Boards of the Singapore Government, charity organizations and non-profit organizations to give back to the society through volunteer activities, funding public welfare and welfare organizations, etc., and has established a good corporate culture and responsible corporate image. In 2022, Tuas Power provided funds to charitable, voluntary and welfare organizations such as Metta Welfare Association, PCS Living Blood Centre, Food From The Heart (FFTH), Garden City Fund, Power and Gas Industry Unions, Singapore Children's Society, Focus on the Family Singapore, Gardens by the Bay, The Straits Times Campus Subsidy Fund to help groups and families in need, and support horticultural research and conservation to protect Singapore's green environment.

Meanwhile, Tuas Power cooperated with the Ministry of Education (MOE), Energy Market Authority (EMA) and other government organizations to provide funds to students from local universities and vocational and technical colleges. At the Youth Event of Singapore Energy Week 2022, Liu Yanling, the Minister of Commerce and Industry and the Minister of Culture, Community and Youth Affairs of Singapore, and the Tuas team had a discussion with two students winning the EIS Scholarship sponsored by Tuas. The two scholarship recipients will join Tuas Power and Tuas Utility next year. Scholarship activities help shape the Tuas brand and attract competent students to join the Company as interns or graduates.

Digital Intelligence

Based on digital software such as power plant load optimizer, Tuas Power conducted unified blueprint design, step-by-step implementation and promotion of the smart operation platform. Under the guidance of "consolidating the data foundation, building key modules and establishing the unified platform", Tuas Power promoted the development of an information system following these three steps, and drove the lean management of overseas enterprises with digital technology to effectively improve their overall economic efficiency and risk resistance capacity, which had strong reference significance. At the same time, Tuas Power completed the management innovation project Development of Digital Lean Management System for Power Generation Enterprises Oriented by Value Portfolio Optimization (《以價值組合優化為導向的發電企業數字化精益管理體系構建》), which won the second prize in the Power Innovation Award issued by China Electricity Council in 2022.

International Communication

There are frequent interactions and mutual assistance between Tuas Power and the Company. Staff from Tuas Power and Huaneng regularly consult and discuss technical, production and engineering matters through online methods such as virtual meetings to further improve and strengthen operational efficiency of the Tuas Power Station and TMUC. The Company dispatched several management personnel to Tuas Power headquarters, Tuas Power Station and TMUC. While working in Singapore, they provided local power plants with advanced management experience and professional technical support of domestic power plants and benefited from cross-cultural work practices. Thanks to this, Tuas Power has achieved cultural integration, management synergy and operational improvement at home and abroad.



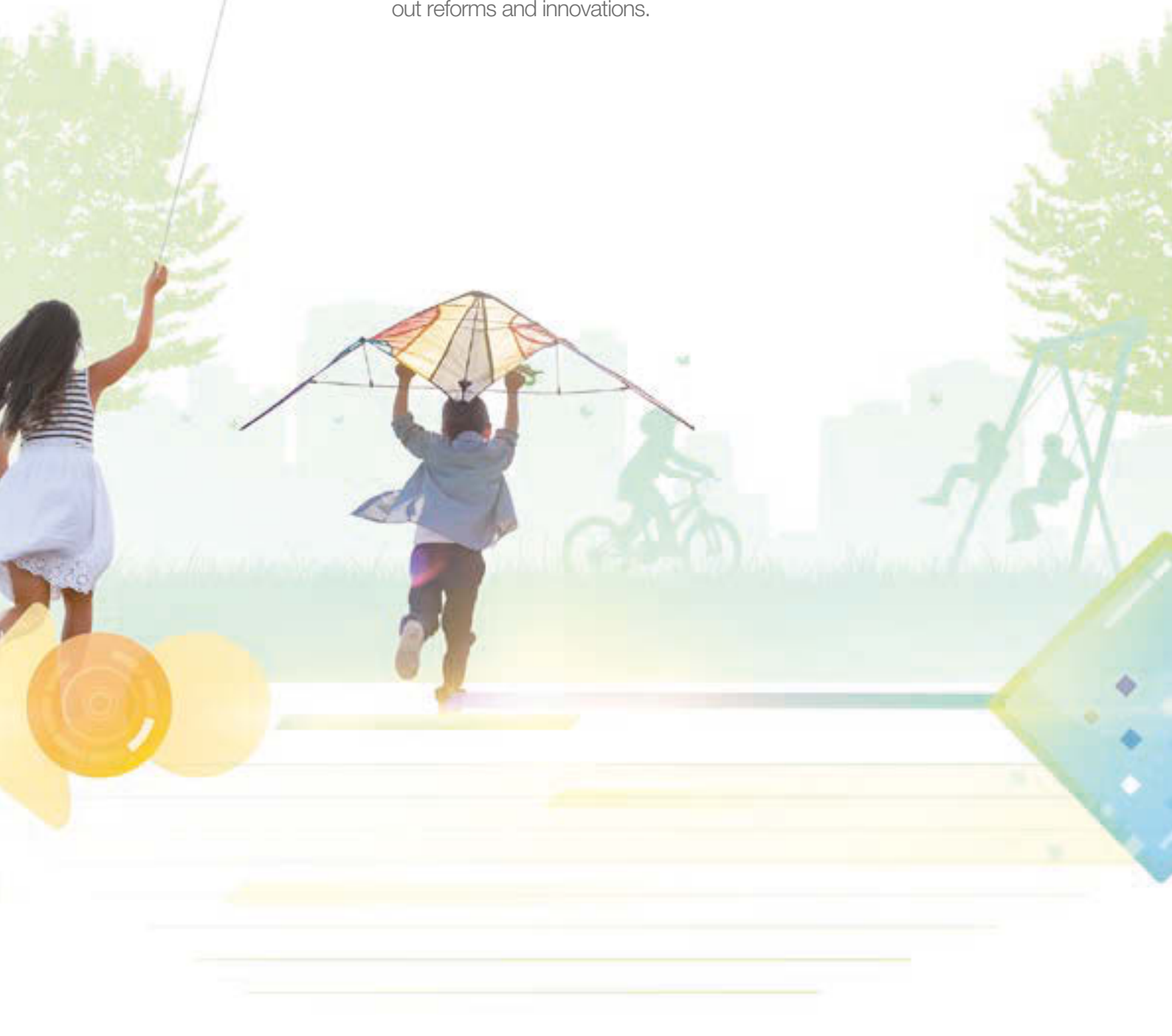


*FORGING AHEAD TO
THE FUTURE*

10



We look forward to the future and continuously accumulate experience for long-term sustainable development. We forge ahead and make sound development for a far-reaching success. The electric power industry is closely related to national development and people's lives. Although it has existed for over a century, it is still vibrant. As a responsible enterprise, we will continuously explore our potentials and improve quality and efficiency. Facing the current co-existing situations of both risks and opportunities, Huaneng International, has implemented the Company's development strategy whilst adhering to steady progress, promoting transformation and upgrading, and actively carrying out reforms and innovations.



Forging Ahead to the Future

By 2025, Huaneng International will complete the foundation of an electricity-centered and innovation-oriented modern energy industry system with multi-energy synergy and global layout. With all major indicators reaching the advanced level of peer energy enterprises worldwide, Huaneng International will become one of the world-class listed power generation companies.

To promote green, low-carbon and circular development, we will promote the development of an integration of sources, networks, loads and storage and the multi-energy complementary smart energy system. Sticking to the objectives of “carbon peak” and “carbon neutrality”, we promote green and low-carbon energy transformation, and adhere to the principle of “national overall planning, priority to conservation, dual-wheel drive, smooth cost alleviation mechanism, and prevention of risks”. During the “14th Five-Year Plan” period, we will effectively reduce carbon emissions, strive to achieve carbon peaks, and lay a solid foundation for carbon neutrality. On the one hand, we adopt renewable energy alternatives and vigorously develop the new energy business to build a new power system with a large-scale wind power base as the basis and the surrounding clean, efficient, advanced and energy-saving coal power plants as support. On the other hand, we transform the development of coal power, prioritize gas and other clean energy power generation, actively deploy pumped storage power generation to achieve an integration of sources, networks, loads and storage and the multi-energy complementary development. By 2025, the Company’s installed capacity of low-carbon clean energy will account for about 45%.

We will strengthen and improve the comprehensive energy services, actively adapt to the transformation of China’s energy supply structure and continue to develop strategy-focused emerging industries through digitalization. To carry out diversified supply and energy service transformation centered on core industries, we actively develop energy storage, and participate in the demonstration of integrated green hydrogen industry of “production, storage, transportation and utilization”.

Adhere to the new “dual circulation” development pattern, and the principle of “clean, benefit, steady”, the Company will strengthen the international cooperation, relying on Tuas Power, to build the Company’s overseas innovation and development platform. We will strengthen efficient operation of overseas assets, optimize the asset portfolio, and improve the risk resistance and profitability of overseas assets.

To take the lead in scientific and technological innovation, support the high-quality development of the Company, we will promote the high-quality science and technology innovation development, adhere to the strategy of serving the country, adapt to the need of the Company development, adhere to the digital intelligent development, further enhance the independent innovation ability and the implementation of demonstrative project of science and technology, and strengthen the basic and forward-looking technology research.

The Company adheres to the orientation of promoting profitability, improving efficiency and creating value, works hard to ensure the safety of production, conserve energy and improve efficiency, and protect the ecological environment. We will strengthen and optimize major industries and improve industrial coordination. Focusing on the “one benefits and five rates”¹⁵, the Company strives to improve quality and efficiency as well as deal with difficulties. The Company’s operational vitality is enhanced, and its operational efficiency and other indicators reach the international advanced level.

¹⁵ One benefits and five rates: total profit, and asset-liability ratio, operating cash ratio, return on net assets, R&D investment intensity and total labor productivity of all employees.

11 Appendix

11.1 About this Report

This report is the seventh “Environmental, Social and Governance Report” (《環境、社會及管治報告》) released by Huaneng International. This report focuses on the Company’s efforts and contributions to the environment, society and governance, as well as our outlook for the future. We hope that through the publication of this report, we can strengthen communication and liaison with our stakeholders.

The Board of Directors and all the Directors hereby warrant that the contents of this report do not contain any false representations, misleading statements or material omissions and take joint and several liabilities for the authenticity, accuracy and completeness of the contents.

The Scope of the Subject of this Report

Huaneng International and its domestic and overseas affiliated branches and its wholly owned and controlled companies. Unless otherwise stated, the data disclosed in this report are about Huaneng International and its affiliated domestic subsidiaries and its wholly-owned and controlled companies.

No major adjustments have been made to the disclosure scope hereof compared with that of the Company’s previous ESG reports, and the statistical approaches adopted remains consistent.

Reporting Period

The Company’s “Environmental, Social and Governance Report” (《環境、社會及管治報告》) is an annual report for the period from 1 January 2022 to 31 December 2022, and some of the statements and data are traced back to the previous year.

Reference Remarks

In order to facilitate the presentation and be easy to read, “Huaneng Power International, Inc.” in this report is referred to as “Huaneng International”, “the Company” or “we”. “China Huaneng Group Co., Ltd.” in this report is referred to as “Huaneng Group” and “Group Company”.

Content Compiling

The contents of this report are prepared in the light of the HKEX’s “Environmental, Social and Governance Reporting Guide” (《環境、社會及管治報告指引》), and the Global Reporting Initiative (GRI) Sustainability Reporting Standards (GRI Standards) (《可持續發展報告標準》). Currency used in this report is expressed in RMB unless otherwise specified.

Access to this Report

You can download the Chinese and English version of this report on Huaneng International’s website at <http://www.hpi.com.cn>. This report is published in both Chinese and English. In case of any discrepancies among the different versions, the Chinese version shall prevail. If you have any questions or suggestions, please call 010-63226582.

11.2 Statement of the Board of Directors

The Board of Directors assumes the overall responsibility for the Company's ESG management and disclosure and holds annual board meetings to discuss important ESG-related issues.

The strategy committee is in charge of supervising the Company's comprehensive risk management. The Company has incorporated safe production, environmental protection and other ESG material topics into the comprehensive risk management assessment process. The strategy committee meets regularly every year to discuss assessment over the comprehensive risk management. In 2022, the strategy committee deliberated on and approved the 2022 Comprehensive Risk Management Report (《公司2022年度全面風險管理報告》), which comprehensively summarized safe production, environmental protection and other ESG-related risks, and formulated detailed responses, with changes in material risks closely tracked and monitored.

At the 2022 annual Board meeting, the Board emphasized the review of the assessment of ESG material topics, the establishment of environmental targets, and the targets completion progress. The Company identified 18 ESG reporting topics, including 6 material topics, i.e., Compliance with laws and regulations, Emissions Control, Energy Use, Anti-Corruption, Clean and Sustainable Energy, Production safety and Occupational Health. The Company sets five environmental performance targets in emission reduction, carbon reduction, waste reduction, energy saving and water conservation, covering Emissions Management, Energy Consumption Management, and Water Resources Management.

2022 ESG Report provides detailed disclosure of the progress and key performance indicators in relation to the above work and ESG topics. The report was reviewed and approved by the Board of Directors in March 2023.



11.3 Contents Index of the Environmental, Social and Governance (ESG) Reporting Guide by the Hong Kong Stock Exchange

Environmental, Social and Governance Reporting Guide	Page Number	Report Content
Statement of the Board of Directors		
<ul style="list-style-type: none"> A disclosure of the Board's oversight of ESG issues. A disclosure of the Board's ESG management approach and strategy, including the process used to evaluate, prioritise and manage material ESG-related issue-s (including risks to the issuer's businesses). A disclosure that how the board reviews progress made against ESG-related goals and targets with an explanation of how they relate to the issuer's businesses. 	102	11.2 Statement of the Board of Directors
Reporting Principles		
Materiality: (i) the process to identify and the criteria for the selection of material ESG factors; (ii) if a stakeholder engagement is conducted, a description of significant stakeholders identified, and the process and results of the issuer's stakeholder engagement.	17-19	2.7 Communication with Stakeholder and Identification of Material Issues
Quantitative: Information on the standards, methodologies, assumptions and/or calculation tools used, and source of conversion factors used, for the reporting of emissions/energy consumption (where applicable) should be disclosed.	12-16 101	2.6 Table of Key Performance Indicators 11.1 About this Report
Consistency: The issuer should disclose in the ESG report any changes to the methods or KPIs used, or any other relevant factors affecting a meaningful comparison.	101	11.1 About this Report
Reporting Boundary		
A narrative explaining the reporting boundaries of the ESG report and describing the process used to identify which entities or operations are included in the ESG report. If there is a change in the scope, the issuer should explain the difference and reason for the change.	101	11.1 About this Report

Environmental, Social and Governance Reporting Guide		Page Number	Report Content
Subject Area A: Environment			
Aspect A1: Emissions			
A1	General Disclosure	52-61	5.3.4 Emissions Management
A1.1	The type of emissions and respective emission data.	12-16 52-61	2.6 Table of Key Performance Indicators 5.3.4 Emissions Management
A1.2	Direct (Scope 1) and energy indirect (Scope 2) greenhouse gas emissions (in tons) and, where appropriate, intensity (e.g. per unit of production volume, per facility).	12-16 52-61	2.6 Table of Key Performance Indicators 5.3.4 Emissions Management
A1.3	Total hazardous waste produced (in tonnes) and, where appropriate, intensity (e.g. per unit of production volume, per facility).	12-16 52-61	2.6 Table of Key Performance Indicators 5.3.4 Emissions Management
A1.4	Total non-hazardous waste produced (in tonnes) and, where appropriate, intensity (e.g. per unit of production volume, per facility).	12-16 52-61	2.6 Table of Key Performance Indicators 5.3.4 Emissions Management
A1.5	Description of emission target(s) set and steps taken to achieve them.	52-61 92-97	5.3.4 Emissions Management 9 Competing in Overseas Market for Further Development
A1.6	Description of how hazardous and non-hazardous wastes are handled, and a description of reduction target(s) set and steps taken to achieve them.	52-61 92-97	5.3.4 Emissions Management 9 Competing in Overseas Market for Further Development



Environmental, Social and Governance Reporting Guide		Page Number	Report Content
Aspect A2: Use of Resources			
A2	General Disclosure	46-50 51-52	5.3.2 Energy Consumption Management 5.3.3 Water Resources Management
A2.1	Direct and/or indirect energy consumption by type (e.g. electricity, gas or oil) in total (kWh in '000s) and intensity (e.g. per unit of production volume, per facility).	12-16 46-50	2.6 Table of Key Performance Indicators 5.3.2 Energy Consumption Management
A2.2	Water consumption in total and intensity (e.g. per unit of production volume, per facility).	12-16 51-52	2.6 Table of Key Performance Indicators 5.3.3 Water Resources Management
A2.3	Description of energy use efficiency target(s) set and steps taken to achieve them.	46-50 92-97	5.3.2 Energy Consumption Management 9 Competing in Overseas Market for Further Development
A2.4	Description of whether there is any issue in sourcing water that is fit for purpose, water efficiency target(s) set and steps taken to achieve them.	51-52	5.3.3 Water Resources Management
A2.5	Total packaging material used for finished products (in tons) and, if applicable, with reference to per unit produced.	–	Not applicable due to product nature
Aspect A3: The Environment and Natural Resources			
A3	General Disclosure	40-63	5 Transformation Development Driven by Innovation
A3.1	Description of the significant impacts of activities on the environment and natural resources and the actions taken to manage them.	40-63	5 Transformation Development Driven by Innovation
Aspect A4: Climate Change			
A4	General Disclosure	56-57	5.3.4.2 Management of Greenhouse Gas
A4.1	Description of the significant climate-related issues which have impacted, and those which may impact, the issuer, and the actions taken to manage them.	56-57	5.3.4.2 Management of Greenhouse Gas

Environmental, Social and Governance Reporting Guide		Page Number	Report Content
Subject Area B: Social			
Employment and Labour Practices			
Aspect B1: Employment			
B1	General Disclosure	80-81	7.1 Protecting Employees' Rights and Interests
B1.1	Total workforce by gender, employment type (for example, full- or part-time), age group and geographical region.	12-16	2.6 Table of Key Performance Indicators
B1.2	Employee turnover rate by gender, age group and geographical region.	12-16	2.6 Table of Key Performance Indicators
Aspect B2: Health and Safety			
B2	General Disclosure	64-77	6 Ensuring Safety by Identifying and Addressing Hidden Hazard
B2.1	Number and rate of work-related fatalities occurred in each of the past three years including the reporting year.	12-16	2.6 Table of Key Performance Indicators
		64-77	6 Ensuring Safety by Identifying and Addressing Hidden Hazard
B2.2	Lost days due to work injury.	12-16	2.6 Table of Key Performance Indicators
B2.3	Description of occupational health and safety measures adopted and how they are implemented and monitored.	71-75	6.3 Implementing Safety Measures
		75-76	6.4 Safeguarding Occupational Health
		82-83	7.3 Caring Employee Health

Environmental, Social and Governance Reporting Guide		Page Number	Report Content
Aspect B3: Development and Training			
B3	General Disclosure	76 81-82	6.5 Raising Employees' Safety Awareness 7.2 Promoting Employee Development
B3.1	The percentage of employees trained by gender and employee category (e.g. senior management, middle management).	12-16	2.6 Table of Key Performance Indicators
B3.2	The average training hours completed per employee by gender and employee category.	12-16	2.6 Table of Key Performance Indicators
Aspect B4: Labour Standards			
B4	General Disclosure	80-81	7.1 Protecting Employees' Rights and Interests
B4.1	Description of measures to review employment practices to avoid child and forced labour.	80-81	7.1 Protecting Employees' Rights and Interests
B4.2	Description of steps taken to eliminate such practices when discovered.	80-81	7.1 Protecting Employees' Rights and Interests
Operating Practices			
Aspect B5: Supply Chain Management			
B5	General Disclosure	86-88	8.1 Making Concerted Efforts to Seek Common Development
B5.1	Number of suppliers by geographical region.	12-16	2.6 Table of Key Performance Indicators
B5.2	Description of practices relating to engaging suppliers, number of suppliers where the practices are being implemented, and how they are implemented and monitored.	86-88	8.1 Making Concerted Efforts to Seek Common Development
B5.3	Description of practices used to identify environmental and social risks along the supply chain, and how they are implemented and monitored.	86-88	8.1 Making Concerted Efforts to Seek Common Development
B5.4	Description of practices used to promote environmentally preferable products and services when selecting suppliers, and how they are implemented and monitored.	86-88	8.1 Making Concerted Efforts to Seek Common Development

Environmental, Social and Governance Reporting Guide		Page Number	Report Content
Aspect B6: Product Responsibility			
B6	General Disclosure	28-31	4.1 Improving Capability of Guaranteeing Energy Supply
B6.1	Percentage of total products sold or shipped subject to recalls for safety and health reasons.	–	Not applicable due to product nature
B6.2	Number of products and service related complaints received and how they are dealt with.	89 12-16	8.2 Providing Quality Service 2.6 Table of Key Performance Indicators
B6.3	Description of practices relating to observing and protecting intellectual property rights.	38-39	4.2.3 Protection of Intellectual Property Rights
B6.4	Description of quality assurance process and recall procedures.	–	Not applicable due to product nature
B6.5	Description of consumer data protection and privacy policies, and how they are implemented and monitored.	–	Not applicable due to business nature

Environmental, Social and Governance Reporting Guide		Page Number	Report Content
Aspect B7: Anti-corruption			
B7	General Disclosure	34-37	4.2.2 Anti-corruption
B7.1	Number of concluded legal cases regarding corrupt practices brought against the issuer or its employees during the reporting period and the outcomes of the cases.	34-37	4.2.2 Anti-corruption
B7.2	Description of preventive measures and whistle-blowing procedures, and how they are implemented and monitored.	34-37	4.2.2 Anti-corruption
B7.3	Description of anti-corruption training provided to directors and staff.	9-11 34-37	2.5 ESG Responsibility Management 4.2.2 Anti-corruption
Community			
Aspect B8: Community Investment			
B8	General Disclosure	90-91 92-97	8.3 Creating a Better Society 9 Competing in Overseas Market for Further Development
B8.1	Focus areas of contribution (e.g. education, environmental concerns, labour needs, health, culture, sport).	90-91 92-97	8.3 Creating a Better Society 9 Competing in Overseas Market for Further Development
B8.2	Resources contributed (e.g. money or time) to the focus area.	90-91	8.3 Creating a Better Society

11.4 Contents Index of GRI Sustainability Reporting Standards (GRI Standards) of Global Reporting Initiative

GRI Standards Indicator	GRI Standards Description	Page Number	Report Content
GRI 101: Foundation 2016			
GRI 102: General Disclosures 2016			
102-1	Name of the organisation	6-7	2.1 Company Profile
102-2	Activities, brands, products, and services	6-7	2.1 Company Profile
102-3	Location of headquarters	119	11.5 Readers' Feedback
102-4	Location of operations	6-7	2.1 Company Profile
102-5	Ownership and legal form	6-7	2.1 Company Profile
102-6	Markets served	6-7	2.1 Company Profile
102-7	Scale of the organisation	6-7 12-16	2.1 Company Profile 2.6 Table of Key Performance Indicators
102-8	Information on employees and other workers	80-81	7.1 Protecting Employees' Rights and Interests
102-9	Supply chain	86-88	8.1 Making Concerted Efforts to Seek Common Development
102-10	Significant changes to the organisation and its supply chain	101	11.1 About this Report
102-11	Precautionary principle or approach	7 9-11	2.2 Corporate Governance 2.5 ESG Responsibility Management
102-12	External initiatives	9-11	2.5 ESG Responsibility Management
102-13	Membership of associations	17	2.7.1 Information about and Communication with Stakeholder
102-14	Statement from senior decision-maker	2-3	1 Chairman's Statement

GRI Standards Indicator	GRI Standards Description	Page Number	Report Content
102-16	Values, principles, standards, and norms of behaviour	7-8 8	2.3 Development Strategy 2.4 Company Philosophy
102-18	Governance structure	7	2.2 Corporate Governance
102-40	List of stakeholder groups	17	2.7.1 Information about and Communication with Stakeholder
102-41	Collective bargaining agreements	80-81	7.1 Protecting Employees' Rights and Interests
102-42	Identifying and selecting stakeholders	17	2.7.1 Information about and Communication with Stakeholder
102-43	Approach to stakeholder engagement	17	2.7.1 Information about and Communication with Stakeholder
102-44	Key topics and concerns raised	17	2.7.1 Information about and Communication with Stakeholder
102-45	Entities included in the consolidated financial statements	101	11.1 About this Report
102-46	Defining report content and topic boundaries	101	11.1 About this Report
102-47	List of material topics	18-19	2.7.2 Process of Identification of Material Issues
102-48	Restatements of information	–	No previous reports have been rewritten
102-49	Changes in reporting	–	No major changes
102-50	Reporting period	101	11.1 About this Report
102-51	Date of most recent report	101	11.1 About this Report
102-52	Reporting cycle	101	11.1 About this Report
102-53	Contact point for questions regarding the report	101	11.1 About this Report
102-54	Claims of reporting in accordance with the GRI Standards	–	Core suitable plan

GRI Standards Indicator	GRI Standards Description	Page Number	Report Content
102-55	GRI content index	110-118	11.4 Contents Index of GRI Sustainability Reporting Standards (GRI Standards) of Global Reporting Initiative
102-56	External assurance	–	No external review temporarily
EU1	Install capacity by primary energy and regulatory mechanism	6-7 12-16	2.1 Company Profile 2.6 Table of Key Performance Indicators
GRI 200 Economic			
Economic Performance			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	4-21	2 About Us
103-2	The management approach and its component	4-21	2 About Us
103-3	Evaluation of the management approach	4-21	2 About Us
GRI 201: Economic Performance 2016			
201-1	Direct economic value generated and distributed	12-16 90-91	2.6 Table of Key Performance Indicators 8.3 Creating a Better Society
Anti-Corruption (Material Issue: Management by Law and Anti-Corruption)			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 34-37	2.7.2 Process of Identification of Material Issues 4.2.2 Anti-corruption
103-2	The management approach and its component	34-37	4.2.2 Anti-corruption
103-3	Evaluation of the management approach	34-37	4.2.2 Anti-corruption
GRI 205: Anti-Corruption 2016			
205-1	Operations assessed for risks related to corruption	34-37	4.2.2 Anti-corruption
205-2	Communication and training about anti-corruption policies and procedures	34-37	4.2.2 Anti-corruption
205-3	Confirmed incidents of corruption and actions taken	34-37	4.2.2 Anti-corruption

GRI Standards Indicator	GRI Standards Description	Page Number	Report Content
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GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 40-63	2.7.2 Process of Identification of Material Issues 5 Transformation Development Driven by Innovation
103-2	The management approach and its component	42-43 44-45	5.1 Advancing the Energy Revolution 5.2 Pursuing and Accelerating Innovation
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GRI 302: Energy 2016			
302-1	Energy consumption within the organisation	46-50	5.3.2 Energy Consumption Management
302-3	Energy intensity	46-50 28-31	5.3.2 Energy Consumption Management 4.1 Improving capabilities of guaranteeing energy supply
Water Resources and Sewage			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 51-52	2.7.2 Process of Identification of Material Issues 5.3.3 Water Resources Management
103-2	The management approach and its component	51-52	5.3.3 Water Resources Management
103-3	Evaluation of the management approach	51-52	5.3.3 Water Resources Management

GRI Standards Indicator	GRI Standards Description	Page Number	Report Content
GRI 303: Water Resources and Sewage 2018			
303-2	Management of impacts related to discharge	58	5.3.4.3 Wastewater Management
303-3	Water withdrawal by source	51-52	5.3.3 Water Resources Management
303-4	Water withdrawal by destination	58	5.3.4.3 Wastewater Management
Emissions (Material Issues: Reduction of Carbon Dioxide Emission and Emission of Control Components)			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 52-61	2.7.2 Process of Identification of Material Issues 5.3.4 Emissions Management
103-2	The management approach and its component	52-61	5.3.4 Emissions Management
103-3	Evaluation of the management approach	52-61	5.3.4 Emissions Management
GRI 305: Emissions 2016			
305-1	Direct (Scope 1) Green house gas (GHG) emissions	56-57	5.3.4.2 Management of Greenhouse Gas
305-2	Energy indirect (Scope 2) GHG emissions	56-57	5.3.4.2 Management of Greenhouse Gas
305-4	GHG emissions intensity	56-57	5.3.4.2 Management of Greenhouse Gas
305-7	Nitrogen oxides (NOx), sulphur oxides (SOx), and other significant air emissions	53-55	5.3.4.1 Exhaust Gas Management
Effluents and Waste			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 58 59-61	2.7.2 Process of Identification of Material Issues 5.3.4.3 Wastewater Management 5.3.4.4 Waste Management
103-2	The management approach and its component	58 59-61	5.3.4.3 Wastewater Management 5.3.4.4 Waste Management
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GRI Standards Indicator	GRI Standards Description	Page Number	Report Content
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306-1	Water discharge by quality and destination	58	5.3.4.3 Wastewater Management
306-2	Waste by type and disposal method	59-61	5.3.4.4 Waste Management
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GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 46-63	2.7.2 Process of Identification of Material Issues 5.3 Actively Practicing Low-Carbon Operation
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103-3	Evaluation of the management approach	46-63	5.3 Actively Practicing Low-Carbon Operation
GRI 307: Environmental Compliance 2016			
307-1	Non-compliance with environmental laws and regulations	46-63	5.3 Actively Practicing Low-Carbon Operation
Supplier Environmental Assessment			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 86-88	2.7.2 Process of Identification of Material Issues 8.1 Making Concerted Efforts to Seek Common Development
103-2	The management approach and its component	86-88	8.1 Making Concerted Efforts to Seek Common Development
103-3	Evaluation of the management approach	86-88	8.1 Making Concerted Efforts to Seek Common Development
GRI 308: Supplier Environmental Assessment 2016			
308-2	Negative environmental impacts in the supply chain and actions taken	86-88	8.1 Making Concerted Efforts to Seek Common Development

GRI Standards Indicator	GRI Standards Description	Page Number	Report Content
GRI 400 Social			
Occupational Health and Safety (Material Issue: Safe Production and Occupational Health)			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 75-76 76 77	2.7.2 Process of Identification of Material Issues 6.4 Safeguarding Occupational Health 6.5 Raising Employees' Safety Awareness 6.6 Strengthening Infrastructure Security
103-2	The management approach and its component	75-76 76 77	6.4 Safeguarding Occupational Health 6.5 Raising Employees' Safety Awareness 6.6 Strengthening Infrastructure Security
103-3	Evaluation of the management approach	75-76 76 77	6.4 Safeguarding Occupational Health 6.5 Raising Employees' Safety Awareness 6.6 Strengthening Infrastructure Security
GRI 403: Occupational Health and Safety 2018			
403-2	Hazard identification, risk assessment and incident investigation	75-76	6.4 Safeguarding Occupational Health
403-7	Prevention and mitigation of occupational health and safety impacts directly related to business relationship	75-76	6.4 Safeguarding Occupational Health
403-9	Occupational injury	12-16	2.6 Table of Key Performance Indicators

GRI Standards Indicator	GRI Standards Description	Page Number	Report Content
Training and Education (Material Issue: Staff Training and Development)			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 81-82	2.7.2 Process of Identification of Material Issues 7.2 Promoting Employee Development
103-2	The management approach and its component	81-82	7.2 Promoting Employee Development
103-3	Evaluation of the management approach	81-82	7.2 Promoting Employee Development
GRI 404: Training and Education 2016			
404-2	Programs for upgrading employee skills and transition assistance programs	81-82	7.2 Promoting Employee Development
Child Labour			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 80-81	2.7.2 Process of Identification of Material Issues 7.1 Protecting Employees' Rights and Interests
103-2	The management approach and its component	80-81	7.1 Protecting Employees' Rights and Interests
103-3	Evaluation of the management approach	80-81	7.1 Protecting Employees' Rights and Interests
GRI 408: Child Labour 2016			
408-1	Operations and suppliers at significant risk for incidents of child labour	80-81	7.1 Protecting Employees' Rights and Interests

GRI Standards Indicator	GRI Standards Description	Page Number	Report Content
Forced or Compulsory Labour			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	80-81	7.1 Protecting Employees' Rights and Interests
103-2	The management approach and its component	80-81	7.1 Protecting Employees' Rights and Interests
103-3	Evaluation of the management approach	80-81	7.1 Protecting Employees' Rights and Interests
GRI 409: Forced or Compulsory Labour 2016			
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labour	80-81 86-88	7.1 Protecting Employees' Rights and Interests 8.1 Making Concerted Efforts to Seek Common Development
Supplier Social Assessment			
GRI 103: Management Approach 2016			
103-1	Explanation of the material topic and its boundary	18-19 86-88	2.7.2 Process of Identification of Material Issues 8.1 Making Concerted Efforts to Seek Common Development
103-2	The management approach and its component	86-88	8.1 Making Concerted Efforts to Seek Common Development
103-3	Evaluation of the management approach	86-88	8.1 Making Concerted Efforts to Seek Common Development
GRI 414: Supplier Environmental Assessment 2016			
414-2	Negative social impacts in the supply chain and actions taken	86-88	8.1 Making Concerted Efforts to Seek Common Development

11.5 Readers' Feedback

Dear readers:

Hello! Thank you for reading this report. We particularly wish to listen to your comments and suggestions, and your comments and suggestions are the driving force behind our continuous improvement of our report.

Please help to complete the relevant questions raised in the feedback form and mail it to the headquarters of the Company (headquarters address: Huaneng Building, Fuxingmennei Street 6, Xicheng District, Beijing).

1. Your overall assessment of the Company's "Environmental, Social and Governance Report" is:
☐ good ☐ fair ☐ poor
2. Do you think this report reflects the Company's significant impacts on the environmental, social and governance?
☐ good ☐ fair ☐ poor
3. What do you think of the information, and the accuracy and completeness of the indicator data disclosed in this report?
☐ good ☐ fair ☐ poor
4. What do you think of the Company in serving its customers and protecting the interests of its stakeholders?
☐ good ☐ fair ☐ poor
5. Which part of the report do you concern the most?

6. Is there any content that you are looking for but not found in this report? If yes, please write down what you are concerned about.

If you wish, you are welcome to provide personal information to facilitate further communication with you:

Name:

Occupation:

Organization:

Contact Address:

Postal Code:

Tel:

Fax:

E-mail:

