



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

*(incorporated in Hong Kong with limited liability)*

(Stock Code : 2380)

Environmental Protection and  
Social Responsibility Report **2018**





# Environmental Protection and Social Responsibility Report

## ABOUT THIS REPORT

Since 2016, China Power International Development Limited (“China Power” or the “Company”) has disclosed its governance philosophy, strategies and achievements in environmental protection and social responsibility in the form of annual independent report to the public.

The Company regards this report as an internal and external communication platform, through which it expects to promote stakeholders’ understanding of and participation in the sustainable development progress of China Power by providing them with objective and reliable non-financial information.

## Principles of Reporting

This report was prepared with reference to the standards under the Global Reporting Initiative’s Sustainability Reporting Guidelines (“GRI Standards”) and the Guidelines on Compilation of Corporate Social Responsibility Reports for Chinese Enterprises, and in compliance with the Environmental, Social and Governance Reporting Guide (the “Guide”) as set out in Appendix 27 of the Listing Rules as well as the Guidelines to State-owned Enterprises on Fulfilling Corporate Social Responsibilities and Guidelines on Governance Report issued by the State-owned Assets Supervision and Administration Commission of the State Council of the PRC.

The compilation process of this report follows the reporting principles suggested by GRI Standards and the Guide, which include:

- **Materiality:** Based on the results of our communication with the stakeholders and in conjunction with the Group’s operating conditions, we concluded the following environmental and social issues of China Power in 2018 of high importance, and elaborated on the relevant works carried out for the respective issues and the results thereof.

Aspect	Issue
<b>ENVIRONMENTAL PROTECTION</b>	
Strategies and Actions Against Climate Change	Reduce air pollution and various emissions and waste discharges
	Optimize power generating units and enhance the utilization of resources
	Implement green office measures consistently
	Develop clean energy and introduce green construction
<b>SOCIAL RESPONSIBILITIES</b>	
Employment and Labour Practices	Health and safety of staff
	Development and training of staff
	Compliance with labour standards and regulations
	Care for staff
Operating Practices	Supply chain management
	Provide safe and reliable power supply
	Improve technological innovation and enhance operational efficiency
	Establish anti-corruption system



Aspect	Issue
Community Investment	Drive local economic growth
	Support for education, cultural activities and charity
	Environmental conservation

- **Quantitative:** Each of the departments and business units records and monitors various economic, environmental and social indicators with the use of data collection tools on a continuous basis. This report also covers some of the Group's historical data, indicating year-to-year changes in the Group's performance.
- **Consistency:** Unless otherwise stated, we collect and present information in the same manner as in the past to ensure comparability of the information.

## Scope of Reporting

This report covers the efforts and results of the Company and its subsidiaries in environmental, social and governance aspects for the period from 1 January 2018 to 31 December 2018.

The reporting scope of the performance indicators in this report covers the Company and its subsidiaries. Among which, the reporting scope of environmental KPIs mainly includes ten coal-fired power plants of the Group.

## Content of This Report

This report mainly discloses the Group's principles and practices in aspects of environmental protection and social responsibilities, and various issues under these two aspects (including our strategies and actions against climate change, employment and labour practices, operating practices and community investment).

## Sources of Information

The information used in this report is extracted from China Power's official documents and statistics reports, which has been reviewed by the relevant departments. Unless otherwise specified, the scope of information and statistics used in this report only covers the Group.

## Confirmation and Approval

The Board undertakes to monitor the content of this report and ensure that it does not contain any false records, misleading statements or material omissions. This report, which has been prepared based on the information extracted from the Company's official documents and statistics, had been reviewed and approved by the Board and Executive Committee.

## Access of This Report

This report is published in traditional Chinese and English. The electronic version of this report is available on China Power's website ([www.chinapower.hk](http://www.chinapower.hk)) or the Stock Exchange's website ([www.hkexnews.hk](http://www.hkexnews.hk)).



## ENVIRONMENTAL PROTECTION

Adhering firmly to our core value of “giving light and power to the world, leaving clear water and blue skies to the future generations”, the Group has been putting great efforts in exploring and improving technologies in relation to energy conservation and emission reduction, pushing forward the development of clean energy and actively promoting sustainable development in social, economic and environmental aspects, with an aim of becoming a resource-saving and environment-friendly enterprise with high proportion of clean energy, low consumption of energy and resources, and low discharge of pollutants.

### 1 Climate Change — Coping Strategies and Actions

The PRC government always places strong emphasis on environmental protection. Legislations were enacted to facilitate the development of renewable energy and a number of environmental protection policies were promulgated successively with a view to realizing sustainable development of both the economy and the environment. With China officially becoming a party to the Paris Climate Change Agreement in 2016 indicating a serious commitment to tackling climate change, the PRC government issued in the same year the national economic “13th Five-Year” plan for energy and power development, in which the targets for clean energy development up to 2020 were specified. In order to keep abreast of the trends and requirements on combating climate change overseas, the PRC government has imposed higher requirements on works in relation to combating climate changes at the National Conference on Ecological Environmental Protection held in 2018. In general, PRC enterprises were confronted with increasing number of new and more stringent requirements on environmental protection when fulfilling their social responsibilities. The Group acknowledges that it is incumbent upon, and obligatory for, energy and power companies such as the Group to actively cope with global climate change, formulate corresponding strategies and take relevant actions.

#### 1.1 Our Strategies

##### *Aims and directions for development*

The Group is committed to establishing itself as a clean low-carbon integrated energy company and contributing to the effective responses to global climate change. The Group’s directions for development to achieve its existing goals are as follows:

- (1) **Focus on the development of clean energy:** continue to increase the proportion of clean energy by maintaining our lead in hydropower and making further progress in the development of quality wind power and photovoltaic power projects, while controlling and slowing down the development of coal-fired power in a timely manner.
- (2) **Achieve comprehensive purification of the existing coal-fired power:** to complete the ultra-low emission technical upgrades for all coal-fired power generating units in order to reduce the pollutants and greenhouse gases emission per unit of power generated; to enhance the efficiency of the power generating units in order to reduce the consumption of fossil fuels per unit of power generated.
- (3) **Reduce investment in coal-fired power:** shutdown those coal-fired power generating units with small capacity, low parameters and not feasible to carry out the ultra-low emission technical upgrades; actively seek for cooperation with other enterprises to develop the existing coal-fired power in order to reduce the proportion of shareholding in coal-fired power enterprises.





- (4) **Promote technological innovation:** to strive for breakthroughs in the area of clean energy and low-carbon emission technologies with greater investment in technological research and development.
- (5) **Explore other types of energy:** actively explore new energy segments, and seek to participate in the hydrogen power application demonstration projects of Expo 2019 and Beijing 2022 Winter Olympic Games by promoting the development of hydrogen energy projects.

#### *Basis of actions*

The actions carried out by the Group are based on:

- (1) **Policy guidance:** commitments made by the PRC government upon joining the Paris Climate Change Agreement, targets as set out in the national economic “13th Five-Year” plan for energy and power development of the PRC, “Air Pollution Prevention and Control Action Plan (《大氣污染防治行動計劃》)”, “Action Plan of the Upgrade and Renovation for Coal-fired Units to Achieve Energy Saving and Emission Reduction (2014-2020) (《煤電節能減排升級與改造行動計劃(2014-2020年)》)”, among other policies.
- (2) **Regulatory standards:** “Environmental Protection Law of the People’s Republic of China (《中華人民共和國環境保護法》)”, “Air 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》)”, “Emission Standard of Air Pollutants for Coal-fired Power Plants (《火電廠大氣污染物排放標準》)” and other regulatory standards on environmental protection issued by the central and local governments.
- (3) **Working guidelines:** “Action Plan for Enhancing the Protection of Ecological Environment (《生態環境保護提升行動方案》)” and working guidelines regarding the protection of ecological environment issued by other business units.

#### *Strategic support*

The Group accelerates the implementation of its transformational development strategy and strives for development in clean energy, integration, smart technology and international expansion. In particular, development in modern clean energy was ramped up in a bid to reduce reliance on traditional energies as soon as possible and gradually transform from high-carbon into low-carbon generation, which is a major component in the Group’s transformational development strategy. The established strategy of the Group strongly supports various initiatives in coping with climate change.

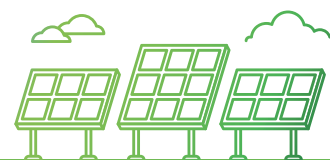
### **1.2 Our Works**

In strict compliance with the “Emission Standard of Air Pollutants for Coal-fired Power Plants (《火電廠大氣污染物排放標準》)” and other pertinent laws and regulations as well as in response to the requirements under “Action Plan of the Upgrade and Renovation for Coal-fired Units to Achieve Energy Saving and Emission Reduction (2014-2020) (《煤電節能減排升級與改造行動計劃(2014-2020年)》)”, the Group effectively controlled the emission of airborne pollutants by installing dedusting, desulfurization and denitration facilities and procuring coals with less pollutant contents.



*Basic measures adopted to reduce air pollution*

Develop Clean Energy	<ul style="list-style-type: none"> <li>Actively develop clean energy projects, such as hydropower, wind power, photovoltaic power and natural gas power</li> <li>Develop integrated intelligent energy projects to facilitate the developments of clean and highly efficient energy in various regions</li> </ul>
Strengthen Energy-saving Management	<ul style="list-style-type: none"> <li>Strengthen fuel management by enhancing calorific value of coals-as-received and coals-as-fired to reduce fuel wastage</li> <li>Optimize operational management by reducing oil usage for start-up of power generating units</li> <li>Maximize the load rate of power generating units to prevent and minimize oil usage for low-load stable combustion</li> <li>Enhance management of equipment depletion to minimize oil usage during malfunctioning of auxiliary machinery</li> </ul>
Enhance Coal Sourcing Management	<ul style="list-style-type: none"> <li>Enhance utilization efficiency of coal by procuring quality coal with high calorific values and low sulphur contents</li> </ul>
Promote Application of Clean Energy Technology	<ul style="list-style-type: none"> <li>Increase inputs in technical improvement with a stronger emphasis on desulphurization, denitration and capacity increase transformation, technical upgrades on power supply of high-frequency electrical dedusting and techniques for demolishing the exhaust bypass</li> </ul>
Commence Responsible Production	<ul style="list-style-type: none"> <li>Properly plan the production sites by planting trees and lawn, arranging sprinkler to conduct sprinkling in the plant area regularly and as needed</li> <li>Engage in the construction of dry coal sheds and install additional sprinklers and dust gauze in the coal fields for dust control with a view to improving the work environment on-site</li> <li>Timely cope with changes in the environment on-site by installing air pollution monitoring instruments to monitor air quality on a real-time basis</li> </ul>
Advocate for Transparency of Environmental Information	<ul style="list-style-type: none"> <li>Disclose emission information for pollutants such as sulphur dioxide, nitrogen oxide, and flue gas and dusts at production sites with reference to specified environmental standards in an effort to actively accept public scrutiny</li> </ul>



### Emissions

The Group formulates strategies for tackling air pollution issues with well-known environmental protection companies. With the goal of getting all our coal-fired generating units to achieve the ultra-low emission standards, the technical upgrade plan has been carried out consistently.

In 2018, a specialized group for dust control technology was established for the generating unit no. 1 of Fuxi Power Plant for the ultra-low emission technical upgrade. Subsequently, its dust emissions have been successfully maintained at a level of below 5 mg per standard cubic meter, allowing it to successfully pass the inspection and acceptance of ultra-low emission technical upgrade. Moreover, in 2018, windbreak and dust gauze were installed in the coalfields of Pingwei Power Plant, combined with sprinkling device, its dust control rate reached over 95%.

As of the end of 2018, more than 95% operating coal-fired power generating units of the Group met the standards of ultra-low emission, among which six power plants have received a total of approximately 1,154,000MWh incentive electricity for environmental protection from the local governments.

Emission of sulphur dioxides and flue gas and dusts by the Group further decreased as benefitted from the impressive results of the ultra-low emission technical upgrades for certain power plants, with the total emission decreased year-on-year by 83 tonnes and 197 tonnes, respectively.

Nature and type of emission	Unit	2018	2017	(Decrease)/ increase	Change
Density of nitrogen oxide emission	g/kWh	<b>0.097</b>	0.095	0.002	2.11%
Density of sulphur dioxide emission	g/kWh	<b>0.056</b>	0.063	(0.007)	-11.11%
Density of carbon dioxide emission	g/kWh	<b>795</b>	800	(5)	-0.63%
Density of flue gas and dusts emission	g/kWh	<b>0.008</b>	0.013	(0.005)	-38.46%
Total emission of nitrogen oxide	'000 tonnes	<b>5.097</b>	4.540	0.557	12.27%
Total emission of sulphur dioxide	'000 tonnes	<b>2.952</b>	3.035	(0.083)	-2.73%
Total emission of carbon dioxide	'000 tonnes	<b>40,802</b>	36,399	4,403	12.10%
Total emission of flue gas and dusts	'000 tonnes	<b>0.426</b>	0.623	(0.197)	-31.62%

Although carbon dioxide and nitrogen oxide emissions have risen due to the increase in coal-fired power generation during the year under review, the Group has substantially reduced the emission of greenhouse gases by developing clean energy projects, effectively curbing such increases. In 2018, the Group's clean energy power generation amounted to 20,159,816MWh, representing a reduction in carbon dioxide emission by 16,027,054 tonnes.



### Solid wastes

The Group strictly complies with the “Standard for Pollution Control on the Storage and Disposal Site for General Industrial Solid Wastes (《一般工業固體廢物貯存、處置場污染控制標準》)” and reduces its waste discharge by establishing a comprehensive residue and ash disposal system and upgrading the relevant equipment to enhance leakage prevention treatment. In order to recycle and reuse the wastes, the Group sets out administrative measures and annual targets for the comprehensive utilization of waste coal ashes to fully realize and explore the potential application of waste coal ashes. In 2018, the comprehensive utilization ratio of waste coal ashes in each of the power plants of the Group amounted to 86.94%, an increase of 5.48 percentage points from that of 2017.

Nature and type of discharge	Unit	2018	2017	(Decrease)/ increase	Change
Density of hazardous wastes discharge	g/kWh	0	0	-	-
Density of non-hazardous wastes discharge	g/kWh	25.8	28.8	(3.0)	-10.42%
Total discharge of hazardous wastes	'000 tonnes	0	0	-	-
Total discharge of non-hazardous wastes	'000 tonnes	1,323	1,381	(58)	-4.20%

### Wastewater

Each of the power plants of the Group discharges wastewater in strict compliance with national standards, including “Integrated Wastewater Discharge Standard (《污水綜合排放標準》)” and “Wastewater Quality Control Index for Limestone — Gypsum Wet Flue Gas Desulfurization of Coal-fired Power Plants (《火電廠石灰石 — 石膏濕法煙氣脫硫廢水水質控制指標》)”, and actively implements the “Action Plan on Prevention and Control of Water Pollution (《水污染防治行動計劃》)”. The Group thoroughly investigates the utilization of water resources, in-depth desulphurization treatment of wastewater (zero-discharge of wastewater) and water recycling treatment of each of its power plants, adopts corresponding technical policy for each individual power plant and strengthens the management of wastewater treatment, ensuring that the wastewater discharge is up to standard and maximizing the recycling and reuse of wastewater.

In 2018, the Group reduced the pollutant contents in the wastewater of Yaomeng Power Plant by way of technical upgrade to ensure that the wastewater discharge complies with national standards. As of the end of 2018, all power plants except Yaomeng Power Plant of the Group have realized zero-discharge of wastewater and wastewater discharge reduced significantly by 402,300 tonnes.

Nature and type of discharge	Unit	2018	2017	(Decrease)/ increase	Change
Discharge of industrial wastewater	'000 tonnes	339.9	742.2	(402.3)	-54.20%





### 1.3 Utilization of Resources

#### *Coal resources*

The Group continues to engage in in-depth optimization of its power mix and gradually closes down those coal-fired power generating units in the capacity of 300MW or below which have high coal consumption rate. Comprehensive environmental protection and energy-saving upgrades and transformation are conducted in a planned manner on existing regular coal-fired power generating units, increasing the comprehensive utilization rate of coal resources. Meanwhile, the Group continues to enhance its management of coal sourcing by procuring quality coal with high calorific values and low sulphur contents. Development of clean energy is greatly promoted to increase the proportion of power generation by using clean energy.

As of the end of 2018, over 95% of the Group's operating coal-fired power generating units have met the standards of ultra-low emission and continued to lower their exhaust gas emission and net coal consumption. The Group's net coal consumption rate in 2018 amounted to 302.41 g/kWh, representing a decrease of 1.82 g/kWh from last year, equivalent to a saving of approximately 93,389 tonnes of standard coal.

#### *Water resources*

In active response to the government's requirement of conserving energy and reducing consumption, the Group strictly complies with the "Quality Standard for Recycling and Reuse of Urban Wastewater for Industrial Use (城市污水再生利用工业用水水质)" and conducts in-depth study on water-saving techniques to comprehensively enhance the utilization rate of water resources. In the process of coal-fired power generation, water supply is derived from the recycled water discharged from power plant constructions by virtue of an improvement on the design plan of water supply system, extracting no water from natural sources. The overall water consumption ratio for power generation was lowered as water resources were recycled for repeated use through optimization and deployment in the process of hydropower generation.

In 2018, water consumption of the Group increased by 8,270,000 tonnes. The increase was mainly attributable to the consolidation of newly acquired companies during the year, which resulted in a substantial increase in the number of subsidiary companies and clean energy power plants, in addition to the increase in coal-fired power generation.

	2018	2017	(Decrease)/ increase	Change
Total water consumption (million tonnes)	<b>72.49</b>	64.22	8.27	12.88%
Water consumption per unit (g/kWh)	<b>1,352</b>	1,337	15	1.12%



*Other resources*

The Group incorporates the principle of low-carbon environmental protection into its daily operation and creates an energy-saving environment in a view to enhancing the staff's awareness of green office as well as their working efficiency. Despite the substantial increase in the number of subsidiary companies due to the Group's continuous efforts to expand its business during the year (in particular the consolidation of newly acquired companies), the Group achieved satisfactory results in terms of its green office effectiveness with its entire staff strictly implemented the green office measures.

*Green office measures*

Green Trips	<ul style="list-style-type: none"> <li>Enhance management and increase utilization rate of corporate vehicles</li> </ul>
	<ul style="list-style-type: none"> <li>Conduct monthly surveys and analyses to track fuel consumption of vehicles, and arrange necessary repairs and maintenance to reduce emission</li> </ul>
	<ul style="list-style-type: none"> <li>Encourage employees to commute by corporate shuttle bus</li> </ul>
	<ul style="list-style-type: none"> <li>Use video and telephone conferencing to replace certain business trips</li> </ul>
Enhance Power Management	<ul style="list-style-type: none"> <li>Clean and make energy-saving upgrades on boiler units and central air-conditioning system in the office by means of technical upgrade projects</li> </ul>
	<ul style="list-style-type: none"> <li>Adjust the central air-conditioning system and the street lights on and off time on real-time basis according to the temperature and sunshine duration</li> </ul>
	<ul style="list-style-type: none"> <li>Adjust the number of elevators in power and in use according to the commute traffic of employees</li> </ul>
	<ul style="list-style-type: none"> <li>Implement energy-saving plan from 6:00 p.m. and turn off unnecessary power supply after security checks every night</li> </ul>
"Paperless" Office	<ul style="list-style-type: none"> <li>Use synchronized OA office system and cell phone-based patrol system to realize a paperless low-carbon office</li> </ul>
	<ul style="list-style-type: none"> <li>Adopt double-sided printing to enhance paper utilization rate</li> </ul>
	<ul style="list-style-type: none"> <li>Realize paperless meetings by holding most conferences electronically and reading meeting documents via digital tablets</li> </ul>

*Green office effectiveness of the Group*

	2018	2017	(Decrease)/ increase	Change
Total power consumption (kWh)	<b>12,790,188</b>	8,973,920	3,816,268	42.53%
Total water consumption (tonnes)	<b>144,944</b>	95,112	49,832	52.39%
Total paper used (tonnes)	<b>38.46</b>	27.84	10.62	38.15%
Total fuel consumption of corporate vehicles (litres)	<b>776,855</b>	655,790	121,065	18.46%
Video conferencing (times)	<b>1,109</b>	575	534	92.87%



#### 1.4 Environmental Protection Development

##### *Investment in clean energy*

The Group's attributable installed capacity for clean energy in 2018 amounted to 6,487.9MW, accounting for 32.88% of the Group's total attributable installed capacity. The Group's power generation of clean energy such as hydropower, wind power and photovoltaic power in 2018 amounted to 20,159,816MWh, accounting for 27.21% of the Group's total power generation.

In 2018, through acquisitions of clean energy projects, a total of 1,824.5MW of new attributable installed capacity of clean energy was incorporated into the Group, which has not only increased the scale of its clean energy assets, but also helped reducing air pollution in the course of its business expansion.

The Group continued to achieve substantial breakthrough in the development of integrated energy projects. Among which, the Comprehensive Intelligent Energy Project of Beike Industrial Park (北科產業園區綜合智慧能源項目) commenced operation during the year, while Phase II of the Energy Demonstration Project of Beike Industrial Park (北科產業園區能源示範項目二期) also commenced construction. The development of clean energy projects continued to make progress with the Group successfully won the tender for Datong Phase II 4x100MW "Top-Runner" photovoltaic power project and continued to maintain a leading position in terms of "Top-Runner" photovoltaic power projects. The Group weighs equally on both onshore and offshore wind power generation. On one hand, onshore wind power generation projects are being promoted, for instance, the wind power projects for Dashetou Power Plant in Shanxi, Phases I and II of Dahuaishan Power Plant in Guangxi already obtained government approval. On the other hand, offshore wind power resources in places such as Shandong and Guangdong are being explored actively.

##### *Building clean coal-fired power*

The Group continues to increase its investment in environmental protection by taking proactive efforts to implement the ultra-low emission technical upgrades and install denitration and desulphurization facilities for its coal-fired power generating units. The Group's total capital investment in environmental protection in 2018 amounted to approximately RMB109,690,000.

The Group practically enhances the maintenance and operation management of its environmental protection facilities to ensure that discharge of pollutants complies with the required standards. In 2018, the operational ratio of desulphurization facilities for the Group's coal-fired power generating units was 100% (2017: 100%) at the desulphurization efficiency ratio of 99.20% (2017: 98.42%). Operational ratio of our denitration facilities reached 100% (2017: 100%) at the denitration efficiency ratio of 91.02% (2017: 92.98%). Control of emission of airborne pollutants has been improved effectively.



## *Introduction of green construction*

The Group adheres to the “Three Simultaneous” environmental protection principle for engineering projects, pursuant to which it has carried out environmental assessment in all the three stages of engineering design, construction as well as acceptance inspection with a view to realizing green construction by improving the construction sites and implementing pollution preventive measures in a timely manner.

In 2018, the Group implemented a number of green construction measures, including the three principles of energy conservation, land conservation and material conservation, and optimizing its engineering design with the use of new skills and new technologies, thereby realizing the conservation of materials and land, reducing the discharge of “three wastes” and lowering the cost of construction works. In addition, the Group has strengthened the work in relation to the conservation of ecological environment and biodiversity in places where its power plants are located. It also strengthened trainings on environmental protection, launched environmental charitable activities and enhanced the awareness of its staff and the public towards conservation of ecological environment. In 2018, there was no environmental emergency and environmental-related issue that required reporting at the construction sites.

## **SOCIAL RESPONSIBILITIES**

The Group complies with the quality, safe, healthy, and environmental protection principle of “Quality Products and Services, People-oriented, Risk Control and Green Operations”, pursuing high standards of operations and striving to minimize the adverse impact on the society and the environment. The Group has also raised the proportion of clean production so as to provide safe, economical and clean products and services to customers and the society. The Group has also strengthened the communication and cooperation with various stakeholders with a view to fostering a win-win society.

### **2 Employment and Labour Practices — A People-Oriented Approach**

Our employees are the driving force behind our sustainable development. We have always been committed to the provision of a sound workplace for employees and the protection of employees’ lawful rights. Health and safety of the employees are our concern and a wide-ranging platform has been in place for career development of the staff so as to create a corporate culture of loyalty and cohesiveness, promoting the mutual growth of the staff and the corporation.

#### **2.1 Employment**

In compliance with the requirements for protecting labours’ rights and responsibilities as set out in the “Labour Law of the People’s Republic of China (《中華人民共和國勞動法》)”, the Group establishes a social security system to make contribution for the required five types of insurance and one pension fund for the employees. In addition to the basic medical insurance plan, a sound corporate pension fund and a supplementary medical insurance system are in place. Meanwhile, the Group has established a comprehensive leave-taking system to safeguard employees’ rights effectively.

As of the end of 2018, the Group had a total of 10,269 registered employees, comprising 2,325 female employees which accounted for 22.64% (2017: 24.45%) of total employees. All employees are covered by labour contracts and social insurance, and there has been no infringement of employees’ rights. In 2018, the staff turnover rate of the Group was 2.82% (2017: 1.51%), i.e. 290 employees.



*Staff headcount by gender and its turnover rate for 2018*

Gender	Total number (person)	Percentage (%)	Number of resigned employees (person)	Turnover rate (%)
Female	2,325	22.64	77	3.31
Male	7,944	77.36	213	2.68

*Staff headcount by employment type and its turnover rate for 2018*

Employment type	Total number (person)	Percentage (%)	Number of resigned employees (person)	Turnover rate (%)
Senior management	36	0.35	0	-
Middle-level management	369	3.59	4	1.08
General staff	9,864	96.06	286	2.90

*Staff headcount by age group and its turnover rate for 2018*

Age group	Total number (person)	Percentage (%)	Number of resigned employees (person)	Turnover rate (%)
29 or under	1,936	18.85	152	7.85
30-39	2,417	23.54	50	2.07
40-49	3,478	33.87	74	2.13
50 or above	2,438	23.74	14	0.57

*Staff headcount by region and its turnover rate for 2018*

Region	Total number (person)	Percentage (%)	Number of resigned employees (person)	Turnover rate (%)
North China	2,592	25.24	34	1.31
East China	2,884	28.09	86	2.98
Central China	3,133	30.51	62	1.98
South China	529	5.15	38	7.18
Southwestern China	1,091	10.62	70	6.42
Northwestern China	40	0.39	0	-





## 2.2 Health and Safety

The Group strictly complies with the “Laws of the People’s Republic of China on the Prevention of Occupational Diseases (《中華人民共和國職業病防治法》)”, 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 laws and regulations relating to safety and hygiene, and improves the working conditions for construction on a continuous basis. The Group also implements visualized, regionalized and digitalized management for its safety works. Safety signages are complete and clear. Dangerous and hazardous zones are encircled with fences with access restrictions. Employees are equipped with labour tools and labour protection gear that are compliant with safety standards and the proper use of these tools and gear are being supervised. The Group consistently maintains sound and reliable facilities for prevention against occupational disease at the production sites and discloses the passing results of regular inspection on occupational hazardous factors. Staff health checks are organized regularly to protect the lives and properties of the employees. In 2018, there was no work-related death or working days lost due to work-related injury for the Group’s employees.

Raising employees’ awareness of work safety would help mitigate the risk of accidents and hence effectively protect the lives and properties of the employees. Providing production safety training for staff remains the Group’s first priority. In addition to the safety training for staff at various levels, the Group also provides special trainings such as management of hazardous chemicals and fire safety management. In 2018, the Group organized 785 trainings in respect of safety education with 88,432 participants in total, which reinforced the staff’s understanding and knowledge of the laws and regulations, procedures and systems as well as the protocols and standards for production safety, and clarified their rights and responsibilities in respect of production safety.

## 2.3 Development and Training

The Group optimizes its staff allocation to maximize the complementary effects in terms of age, know-how and expertise. We see the pooling of talents as a priority task, with special emphasis on training up high-calibre young employees to provide a solid talent foundation for the long-term development of the Group. Technical experts are groomed gradually to provide manpower and technical support for the Group’s development. In 2018, the Group invested approximately RMB34,394,960 in staff training.

In order to provide a smooth development channel for its staff, the Group actively understands its employees’ expectation for career development and arranges on-the-job studies and rotation of staff among various positions as well as various departments of business management, professional techniques and operation skills with a view to satisfying the employees’ need for diversified development.

In 2018, the Group provided induction training for its new employees to enhance their understanding of the basic information of the Company, the relevant management rules and regulations as well as their job duties. Staff can also master actual operation methods via experiential trainings. In addition, the Group organized regular training courses for outstanding core staff members to develop corporate governance ability of the middle-level management through accumulation of corporate operation and management experience.



The Group places emphasis on staff participation and learning, and frequently organizes various types of competitions. These competitions are used as a platform to promote team building and cultivate skilled talents. The Group also gradually expands the database for various core expertises with a view to widening the scope of skills and professional knowledge of its databases. Meanwhile, the Group also focuses on cultivating the comprehensive skills of its employees. An all-rounded training system is in place with diversified training programs and training bases, covering all staff members from senior, middle and junior level. In 2018, a training zone for safety experience has been set up in Pingwei Power Plant, while a talent training platform has been established in Wuhu Power Plant to provide professional and specific competency trainings.

*Training by employment type and its coverage for 2018*

Employment type	Number of training (times)	Training hour per person (hours)	Training coverage (%)
Senior management	65	60	100
Middle-level management	520	80	100
General staff	11,986	71	100

**2.4 Labour Practices**

The Group strictly complies with the “Labour Law (《勞動法》)”, “Labour Contract Law (《勞動合同法》)” and other laws and regulations of the PRC. We enter into labour contracts with employees and pay for their social insurance pursuant to the laws. We ensure no sexual or racial discrimination and equal salaries for male and female employees, while the practices of child labour and forced labour are strictly prohibited. The Group has established a democratic system for corporate administration with staff representative meeting and trade union as the basic form, which can offer genuine protection for employees’ rights of participation, expression and supervision. Employees may report incidents of violation to the Group at any time if they notice any violation in the process of recruitment or operation, such as child labour and forced labour.

The Group also takes the initiative to organize recruitment fairs in key colleges such as Tsinghua University, Chongqing University, Southeast University, Huazhong University of Science and Technology, Shanghai University of Electric Power and North China Electric Power University in strict compliance with campus recruitment procedures, and makes full use of the recruitment platform from SPIC to collect information on job candidates. Professional examination institutes are also engaged to draft questions and make objective and fair evaluations, ensuring a fair, just and open recruitment. In 2018, the Group enrolled a total of 297 fresh graduates.

During the year under review, all business units in which the Group has operational control, complied with the local labour laws. No fines or charges were imposed due to violation of laws.



## 2.5 Care for Staff

While assisting its staff to achieve continuous development and create values, the Group also places great emphasis on maintaining physical and psychological wellbeing of its staff. Apart from regular health checks, the Group also established a psychological counselling center for its staff to help relieving their psychological pressure whenever necessary.

The Group organizes and launches a diverse range of cultural and recreational activities that provide broad opportunities for employees to nurture interests and hobbies as well as to learn new skills, which has not only enhanced their sense of belonging, but also increased the cohesion and centripetal force among them, thereby promoting a harmonic environment within the Company. In addition to general cultural activities, talent shows and sports days, in 2018, the Group organized a special family day on Women's Day for mothers and their children to share a joyful experience through sports and teamwork, which further strengthened the emotional exchanges and the sense of cooperation among family and staff members.

The Group continues to operate the "Golden Autumn Schooling Assistance (金秋助學)" programme as part of its efforts to improve its mechanism for staff aid, helping out children of employees in financial difficulties by relieving their family burdens, thereby extending our care to the families of our employees. In 2018, the Group carried out 95 caring activities targeting specific groups such as employees in need, retired employees and disabled employees to have a total of 321 underprivileged staff relieved, and granted RMB631,000 as financial relief for serious illness, while offering "Golden Autumn Schooling Assistance" bursaries amounting to RMB103,840 to the children of 81 underprivileged employees to continue their studies.

## 3 Operating Practices — Securing a Stable Development

The Group works diligently to provide safe and reliable power supply for economic and social development and persists in value-sharing with the industry chain, seeking to drive economic development at the places where it operates and share with the community the results of its development. Taking into account the features of the power industry and its own characteristics, the Group incorporates the philosophy of social responsibilities in its management and operation and makes contribution to the sustainable development of the society and the environment, in a bid to constantly enhance its commitment to social responsibilities.

### 3.1 Supply Chain Management

The Group persists in developing fair and impartial working relationships with suppliers. Bulk purchases of fuels and other materials are subject to a management regime that separates the three functions of purchase, acceptance inspection and supervision with a view to eliminating corruption at source. The Group strives to establish fair, just and stable mid-to-long-term cooperation with its suppliers. Contracts and agreements are performed in stringent compliance with contractual requirements and each supplier is treated with respect and equality.

The Group's major suppliers are coal production and sales enterprises, while its coal-fired power plants purchase the majority of coal from neighboring coal production enterprises primarily under long-term contracts. The Group has been maintaining long-term and good relationships with major suppliers in order to ensure efficient coal procurement. During the year under review, the aggregate purchases from the Group's five largest suppliers (for production materials like coal and consumables) accounted for approximately 75.42% of the Group's total purchases. The Group will continue to explore different procurement channels to ensure the stability of coal supply.



While fulfilling its own social responsibilities, the Group also incorporates concepts and requirements of social responsibilities in the management of suppliers. The Group has formulated a stringent and standardized system for the selection and management of suppliers. It has also established a supplier review team, which will conduct strict reviews according to the integrity, quality assurance, punctuality of supply and price reasonableness, etc., to select more competent and reputable suppliers so as to jointly maintain a healthy and orderly marketplace in accordance with the “Implementation Measures for the Management and Evaluation of Fuel Suppliers (《燃料供應商管理與評價實施細則》)”, “Regulations for the Management of Material Suppliers (《物資供應商管理制度》)”, “Implementation Measures for the Evaluation of Tender Suppliers (《招標供應商評價實施細則》)”, “Administrative Measures for Recording the Misconduct of Suppliers (《供應商不良行為記錄管理辦法》)” and other pertinent regulations.

Approval of fuel suppliers is subject to the fulfilment of precedent conditions for cooperation between the relevant parties, which is, in principle, based on the mineral or logistics resources possessed. Suppliers are assessed and examined in a comprehensive manner with reference to their qualifications, skill competences, product qualities, pricing, after-sale services and reputation, and are graded as I, II and III accordingly in accordance with the “Catalogue for Grading and Classification of Materials (《物資等級分類目錄》)”. The Group focuses on examining suppliers of Grade I and II and those which are newly added and planned to be eliminated. The Group also incorporates concepts and requirements of social responsibilities in its supplier management, and clearly stipulates that materials must meet the relevant national environmental protection laws and standards while signing purchase contracts, in order to prevent pollutants from exceeding the emission standards at source. Moreover, it verifies suppliers’ qualifications on, among others, safety work and staff training, in order to raise suppliers’ awareness of social responsibility management. In 2018, the Group assessed a total of 2,212 (2017: 1,811) suppliers of fuels and other materials, and identified 131 unsatisfactory suppliers, 57 of which were blacklisted.

Fuel and equipment suppliers of the Group in 2018 analyzed by region are as follows:

Region	Number of suppliers
North China	272
East China	696
South China	293
Central China	462
Northwestern China	84
Southwestern China	288
Northeastern China	117

In terms of electricity production and sales, the Group’s major customers are regional and provincial power grid companies, through which it sells the electricity generated by its power plants to power users and settles the transactions. The Group has been maintaining long-term and good customer relationships with the power grid companies in various locations where its power plants are located. During the year under review, the aggregate turnover attributable to the Group’s five largest customers (regional power grid companies) accounted for 78.39% of the Group’s total turnover.



In recent years, with the PRC government moving forward the system reform in the power industry, the Group has further promoted the customer-centered philosophy and actively participated in market-oriented direct electricity transactions. It has also established and invested in electricity sales and distribution companies, and developed distributed and integrated intelligent energy projects. In the meantime, the Group has made direct connections with power users and maintained good cooperation with them by developing and providing value-added services. Due to the gradual advancement of market-oriented reform in the power industry, the share of open market transactions, such as direct power supply to the power users, will further increase.

We regard customers and suppliers as very important stakeholders, and have been maintaining good communication and establishing a good long-term and stable cooperative relationship with them. In 2018, the Group had no significant disputes with customers and suppliers.

### 3.2 Safe and Reliable Power Supply

The Group is dedicated to the building of a stable and reliable power generation system to ensure safer, cleaner, more economical and sustainable power supply.

#### *Safe production*

The Group regards safe production as the pre-requisite for maintaining stable power supply and ensuring the sustainable development of the Group and hence firmly adheres to the safety philosophy that “no risks are uncontrollable, no breaches are unpreventable and no accidents are unavoidable” and the safe production directives of “safety as priority, prevention rather than cure, and comprehensive management”. No major safety incident related to our employees, facilities or environmental protection occurred in 2018.

#### *Improving our safety management system*

- Improving management system: driving the upgrade and development of the quality, occupational health, safety and environment (“QHSE”) management system on all fronts, amending and improving the relevant QHSE management systems, procedures and standards, including the “Management System for Work Safety of Teams (《班組安全工作管理制度》)” and the “Measures for Evaluation and Reward for Teambuilding Works (《班組建設工作考評獎勵辦法》)”.
- Enhancing standardization: carrying out supervision and verification on the QHSE management system certification on all fronts. During the year, the Company’s quality, occupational health, safety and environment management system certification has been supervised and verified and confirmed as pass by Beijing Zhongan Zhihuan Certification Centre and British Standards Institution (BSI), respectively, signifying that the QHSE management system developed by the Company still meets the relevant international standards and its operation is compliant with the laws and regulations and remains effective.

#### *Enhancing safety awareness*

- Conducting trainings and examinations: the Group often invites experts to provide employees with training sessions on the laws and regulations regarding safe production, so as to enhance their safety awareness. It also uses the talent management software (SABA system) to organize members of the management and production staff to participate in safety exams on a regular basis. In 2018, the Group selected a total of 1,735 staff for examination.





- Conducting campaigns on safety culture: with media publicity via internet, WeChat, publications, poster boards, slogans and special trainings, all employees are familiar with the concept, approach and policy of quality, safety, health and environment. In order to enhance promotion for safety culture and effectively develop a sound atmosphere of working safety, the Group also organized a range of campaigns such as the Safe Production Promotion Day, Safety Culture Week, Safe Production Month and Safe Production Variety Show in 2018.

### *Ensuring reliable operation of production facilities*

- Improving facility management: series of facility management regulations such as “Regulations for the Management of Special Equipment (《特種設備管理制度》)”, “Regulations for the Management of Repair and Maintenance Preparations for Class A Generating Units (《機組A級檢修準備工作管理制度》)” and “Regulations for the Management of Repair and Maintenance (《檢修工作管理制度》)” have been formulated.
- Enhancing facility repair and maintenance: repair and maintenance of Class A/B/C generating units has been conducted, hidden hazard investigation and removal as well as rectification of irregularities, in particular the closed-loop rectification efforts for substantial hazards, have been reinforced to enhance reliability of the production facilities.

### *Ensuring safety of the production environment*

- Enhancing emergency response management: practical emergency trainings and drills were conducted where 1,142 on-site handling plans were formulated and 1,095 emergency drills were organized, with a turnout of 13,112 participants in 2018 (2017: 11,449 participants), which effectively enhanced the emergency response capability. All of the subsidiaries also entered into emergency rescue arrangements with local governments, hospitals, fire stations and other units to ensure the availability of professional support from external parties in case of emergency.
- Enhancing safety management: all new power plants have applied faces, fingerprints and other biometrics to effectively control the access of external visitors and ban the access of unauthorized personnel to the production areas. Mobile video surveillance system has also been installed in construction areas to perform 24-hour full-time monitoring to ensure the safety of production and construction areas.

### *Reliable supply*

The Group implements a stringent operation management regime and duly complies with the requirements for safe production. Emergency response capabilities have been continuously enhanced with a view to providing stable and reliable power supply. In 2018, the Group recorded a combined power generation of 74,101,429MWh (2017: 66,683,402MWh), providing assurance for stable energy supply for regional economic development.

To ensure stable power supply, the Group has formulated specific regulations for production and operation and set out plans for overhauls and technological upgrades, and adopted specific investigation to eliminate any hidden hazards in the power generating units and increase the utilization ratio of power generating units. In 2018, the Group conducted a total of 67 overhauls on Class A/B/C generating units to secure the stable operation of the generating units and successfully dealt with the challenges in the drought periods and the peak power consumption periods during summer/winter.



During the year under review, all operating power plants in which the Group has operational control complied with the relevant production safety regulations in the PRC. No fines or charges were imposed due to violation of regulations.

### 3.3 Technological Innovation

In order to achieve transformation and development, the Group actively responds to the challenges and opportunities arising from the technological reforms by continuously improving the technological innovation system and pushing ahead with the development of information infrastructure, with the aim of improving the quality and efficiency of the Company's development. Meanwhile, the Group's shared financial service centre has commenced operation, through which the Group has realized centralized management of various financial data and hence reduced its operation costs substantially.

To build a sound atmosphere for and enhance the capability of technological innovation, the Group strengthens the development of the supporting platform for technological innovation to facilitate the application of technological achievements and reinforces the management of intellectual property. During the year under review, the Group applied for 4 patents in cooperation with Tsinghua University, and joined hands with EQuota Energy Technology (Shanghai) Ltd. to conduct research and development for the software platforms in which the Group owns intellectual property.

Based on the "13th Five-Year" plan of informatization, the Group focused on the development of information system and data centres and optimized and upgraded its information system accordingly in a bid to ensure information security, at the same time boosting the development of corporate digitalization to enhance its core competitiveness. In 2018, the Group strenuously promoted the services of its e-commerce platform to attract more competent suppliers through public bidding. The Group also completed the separation of intranet from extranet to ensure network security. No incident related to information security occurred during the year.

In 2018, the Group launched 70 technology projects in total and 29 patents were approved, out of which the Group was granted 28 utility model patents and one invention patent, registered eight software copyrights, and chaired or participated in the formulation of 25 industry standards with technology investment of approximately RMB55,670,000. All business units of the Group have proactively carried out the "Innovative Workshop" and mass-oriented technological events to create an atmosphere that is conducive to technological innovation. In 2018, a total of 19 new innovative workshops were formed, which effectively incentivized our staff to engage in technological breakthroughs.

### 3.4 Anti-corruption

The Group has well-established management systems in place, namely the "Regulation of Collective Decision-Making for Significant Business Issues (《「三重一大」集體決策制度》)", "Administrative Regulations for Petitions and Whistle-blowings (《信訪舉報工作管理規定》)" and "Regulations for Integrity Talks (《廉潔談話制度》)". In 2018, the Group completed the establishment of the inspection system, announced the "Inspection Plan of China Power (2018-2022) (《中國電力巡察工作規劃(2018-2022年)》)" and implemented the "Joint Meeting System for Works under the Macro-supervision System (《大監督體系工作聯席會議制度》)", thereby forming a highly efficient supervision system. The concepts of "dual responsibilities" and "two-way investigation" are stringently implemented. Where significant disciplinary and legal violations occurs at a department or unit, both the culprit and the relevant supervisor should be held responsible. Supervision and governance over the exercise of power have been strengthened and all supervisory regulations have been stringently executed.



Disciplinary and legal violations are handled based on the circumstances established by incoming reports given by mail or in person or the concerns raised and clues given by complaints of the employees. Where the issues and clues reported are too vague for further investigation, written inquiry is made to allow the person named in the complaint to make actual pledges and explain the actual situation for further filing. If the reported issues are detailed and concrete enough for investigation but are subsequently found falsified, the person named in the complaint will be engaged in personal counseling on integrity as a reminder to prevent the occurrence of disciplinary or legal violations. If the complaint is substantiated, follow-up measures, such as cautionary lectures, report of criticism, re-designation, termination of labour contract and so on, will be implemented according to the severity of the situation. For serious disciplinary violations which are suspected breaches of laws and regulations, such cases would be referred to prosecution authority of the government.

The Group emphasizes the guidance of promotion and education and combines promotional campaigns with daily anti-corruption education. By promptly providing the latest information on anti-corruption and typical case analysis through new media platforms such as websites and WeChat, the Group has also enhanced its supervision and inspection, thereby enabling its employees to be well-educated in an imperceptible way. A range of activities, such as special seminars, counseling talks, admonitory videos, personal counseling on integrity and anti-corruption tests, are also regularly held by the Group to fortify the concept of legal and ethical compliance among employees, with a view to improving their self-alert and self-edifying abilities. In 2018, the Group organized 354 trainings on anti-corruption and integrity education, which registered a total of 12,015 participants (2017: 10,242 participants). No corruption litigation occurred throughout the year.

#### 4 Community Investment — Promoting Harmonious Development

The Group is actively involved in community building and conducts its business in a responsible manner in the places where it operates, with the aim of driving local economic and social development. In order to effectively fulfil its social responsibilities and contributes to the sustainable development of the communities, the Group by leveraging on its own advantages, actively encourages its employees to participate in volunteering services, supports rescue and relief efforts, organizes social charity events, science and technology education and other campaigns that contribute to the well-being of local communities based on their practical needs.

##### 4.1 Drive Local Economic Growth

While making substantial contributions to local finances through its tax payments according to laws, the Group also helps to drive the rapid development of the environmental protection, construction materials and servicing sectors and the formation of a cluster of power plant-related industries. In 2018, the Group paid approximately RMB1.94 billion in various taxes and created 243 new job opportunities in the places where it operates.

In 2018, the commencement of operation of Pu'an Power Plant enhanced the coal mining capacity of Qianxinan region, causing the principal business of the area to shift from transportation of coal to transmission of electricity and hence reduced the transportation cost of coal, which in turn promoted the economic development of Qianxinan region and the construction of local infrastructure, and increased the tax revenue of the local area.



#### 4.2 Support for Education, Cultural Activities and Charity

The Group is committed to promoting cultural and educational development in the places where it operates. We encourage and support staff to participate in volunteering activities to foster a sound learning environment for local youngsters. In 2018, the Group organized a corporate open day at its Beijing office, during which a representative group of over 30 talented students from North China Electric Power University visited the Company's showrooms, office area and staff activity rooms. They also attended seminars and simulation interviews with the Company's senior management to exchange ideas regarding students' criteria when making career choices and choosing companies to work with, talent cultivation and other topics. After the visit, the students gained better understanding of the Group's development history, corporate culture and development trends, which helped fostering a closer relationship between the Group and its stakeholders and enhancing the transparency of the Company.

The volunteers of the Group engaged with the community, paid visits to the families in need and provided care and support for the underprivileged communities. Currently, 2,697 volunteers have been registered under the Group's volunteer programme "Ying Shan Hong (映山紅)". In 2018, 149 voluntary activities were launched involving 3,626 participants with accumulated 7,721 service hours, donating a total sum of RMB152,207.

In 2018, Wuhu Power Plant continued to maintain long-term cooperation with local student aid associations to provide financial aids to impoverished primary and secondary students to finish their studies. Yaomeng Power Plant and CP Shentou Power Plant also kicked off the "Ying Shan Hong (映山紅)" donation campaign to help outstanding university students from poor families to finish their studies, which brought hope to these impoverished students.

#### 4.3 Environmental Conservation

The Group encourages staff to take an active part in environmental protection activities and to advocate the green philosophy of environmental protection, in a bid to highlight the importance of protecting the ecological environment and biodiversity among our staff and other members of the society. In 2018, Yaomeng Power Plant carried out maintenance work for and adoption of fruit trees in the green zone with a total of approximately 6,930 square meters of green zone and an aggregate of 348 fruit trees being adopted, which has helped reducing greenhouse gases in the atmosphere.

In order to promote sustainable development of the fisheries industry and maintain ecological balance of waters, Wu Ling Power has invested substantial capital to establish a fish breeding station which breeds fish and releases them to the wild every year as a means to alleviate the impact of its operation on the fauna. In 2018, San Ban Xi Power Plant and Tuoko Power Plant made nearly 395,000 and 760,000 fish fry release to the wild, respectively, which included the unique fish species of the basin. San Ban Xi Power Plant has carried out such activities for ten consecutive years, which fully demonstrated the Group's great emphasis on and social responsibility awareness towards protecting the aquatic ecosystem and fisheries resources of Yuanshui basin.

Capitalized terms used in this report shall have the same meanings as defined in the section headed "Technical Glossary and Definitions" of the 2018 Annual Report of the Company unless the context requires otherwise.



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