


# 2014 Sustainability Report

Sustainability Report 2014

*Beautiful China,  
Beautiful Huaneng*

 中国华能集团公司  
CHINA HUANENG GROUP



We are supporter of Global Compact

CHINA HUANENG GROUP

 中国华能集团公司  
CHINA HUANENG GROUP

## About This Report

### Reporting Period

Jan 01, 2014-Dec 31, 2014. This report also includes additional content and information that pre-dates the stated reporting period.

### Reporting Cycle

Our report is annually published around the month of May. This edition is the ninth report released since 2006.

### Main Contents

This report outlines our performance in 2014 on safety, environmental, economic and social issues. It includes information and typical cases from documents, statements and information platforms of the Company and its grassroots-level enterprises.

### Compilation Conformance

Guidelines on Corporate Social Responsibility Reporting for Chinese Enterprises (CASS-CSR 3.0)

The Sustainability Reporting Guidelines (G4) from the Global Reporting Initiative (GRI)

ISO 26000: Guidance on Social Responsibility

Guidelines on Social Responsibilities of Chinese Industrial Enterprises and Industrial Associations

### References to China Huaneng Group

In this report, "Huaneng Group", "Huaneng", "CHNG", "the Company" and "we" refer to the "China Huaneng Group".

### Online Access to the Report

The report is prepared and released in Chinese and English. For more information, please go to our website:

<http://www.chng.com.cn>.

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## Declaration on Sustainable Development

- Persist in serving national interests and development strategies, so as to set an example in promoting economic and social development in all respects.
- Persist in scientific development and technological innovation, so as to set an example in building a resource-conserving and environmentally-friendly society.
- Persist in pursuing operational performance in a rational way, so as to set an example in promoting harmony between enterprises and society.
- Persist in relying on employees and working with the public to develop the enterprise so as to set an example in putting people first and sharing benefits.
- Persist in contributing to society and benefiting the people, so as to set an example in practicing social ethics.

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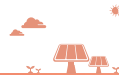
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### Special Feature

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Message from the Company



## Message from the Company



Cao Peixi

President of China Huaneng Group and  
Vice Secretary of the CPC Huaneng Committee



Huang Yongda

Secretary of the CPC Huaneng Committee and  
Vice President of China Huaneng Group

Energy constitutes an important foundation for economic and social development of a country. President Xi Jinping stresses that energy security is an overarching and strategic issue related to the national economic and social development, to the national prosperity and development, to the improvement of people's lives and the essential stability in society. Faced with the new changes in the pattern of energy supply and demand and the new trend in international development of energy, we must promote energy revolution to safeguard national energy security. This is an inevitable requirement for energy industry to achieve sustainable development.

Over the past few years, China Huaneng Group has strived to ensure national energy security, has borne in mind its economic, political and social responsibilities and has provided sufficient, clean and reliable power. In 2014, we followed the leadership of the CPC Central Committee and the State Council, persevered in our objective of building an internationally competitive company focusing on better development quality and efficiency and faster industrial transformation and upgrading, and implemented the CPC's mass line education and practice requirement. Motivated by them, we persisted in transforming development modes, making structural adjustment, promoting growth and creating the first-class enterprise, which has led to our great progress in production and operation. Specifically, we greatly increased comprehensive strength and achieved the world's largest installed capacity. We continually increased the proportion of low-carbon clean energy by new breakthroughs in structural adjustment, further reduced energy consumption per unit generation and kept emission reduction of SO<sub>2</sub>, NO<sub>x</sub>, dust and other pollutants through our unprecedented efforts. We achieved continuous improvement in management and put our economic benefits to a new high. Consequently, we have stepped forward towards building a world-class enterprise with international competitiveness.



President Xi Jinping has called for more efforts to revolutionize energy consumption, energy supply, energy technology and energy system, and strengthen the international energy cooperation, which has been a beacon to the sustainable development of energy enterprises. In the current and future periods, Huaneng, as an electricity-based integrated energy group, will take it as a central task to promote sustainable development.

At present, China's economic development is experiencing profound changes, from focusing on growth scale and speed to its quality and efficiency. Its focus has changed from the increase of production capacity to the adjustment and good use of existing and incremental capacity, and from traditional growth points to the development of new growth areas. Under the "new normal" of economic development, energy, resource and environment remain the core issues hindering sustainable development. This shows that energy industry has much work to do in this respect. Mr. Xi Jinping, President of China, has instructed that we should make more efforts to revolutionize energy consumption, energy supply, energy technology and energy system, and strengthen the international energy cooperation. His important instruction has pointed out the direction for the sustainable development of energy companies. In the current and future periods, Huaneng, as an electricity-based integrated energy group, will take it as a central task in promoting sustainable development.

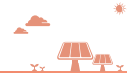
We will be adamant in advancing sustainable development, establish the senses of risk, opportunities and innovation, and pay greater attention to the improvement of development quality and benefits to promote a stronger and better enterprise. We will put more efforts in increasing market competitiveness to consolidate and maintain our leading position, focus on structural adjustment to optimize the allocation of enterprise resources, and lay more emphasis on reform and innovation to release more vitality. We will also strive to manage enterprise by laws, control risks and ensure law-abiding operation through stringent management. On top of that, we will focus more on strictly following political rules and disciplines, and resolutely combat all corruption to ensure the healthy development of enterprises.

2015 marks the year for China to end the Twelfth Five-Year Plan and lay out the Thirteenth Five-Year Plan, and the year for Huaneng to celebrate its 30th anniversary. We will always adhere to the mission of "three Color Corporation", bear in

mind our economic, political and social responsibility, and adhere to the general principle of seeking progress while maintaining performance stable. To this end, we will focus on the enhancement of competitiveness in management, customer-oriented operation and market-based development. We will further strengthen production safety and environmental protection, and promote the construction of safety management system and build a resource-saving and environmental-friendly enterprise. Besides, we will do whatever is necessary to improve benefits through strengthening operational management and paying special attention to key elements, key points and difficulty. We will accelerate the industrial transformation and upgrading through the strategic guidance, benefit-oriented policy and optimal power source structure, industrial structure and development layout. We will raise independent innovation capacity by innovation-driven development and improve management through the in-depth reform and the management of enterprise by laws. We will also reinforce team building and education program.

Responsibility implies driving force and development creates bright future. We will unswervingly implement the national energy development strategy, practice our declaration on sustainable development and stick to our sacred duty to ensure national energy security. While joining hands with stakeholders for common development, we will be committed to being a responsible corporate citizen and the practitioner and promoter of sustainable development. By doing so, we will make new and greater contributions towards building a prosperous society.

蔡启芳 黄永达



## Management Team



Cao Peixi, President of CHNG and Vice Secretary of the CPC Huaneng Committee (third from left in the front row)

Huang Yongda, Secretary of the CPC Huaneng Committee and Vice President of CHNG (third from right in the front row)

Zhang Tingke, Vice President of CHNG and Member of the CPC Huaneng Committee (second from left in the front row)

Guo Junming, Chief Accountant of CHNG and Member of the CPC Huaneng Committee (second from right in the front row)

Kou Wei, Vice President of CHNG and Member of the CPC Huaneng Committee (first from left in the front row)

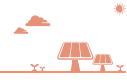
Liu Guoyue, Vice President of CHNG and Member of the CPC Huaneng Committee (first from right in the front row)

Sun Zhiyong, Vice President of CHNG and Member of the CPC Huaneng Committee (second from left in the back row)

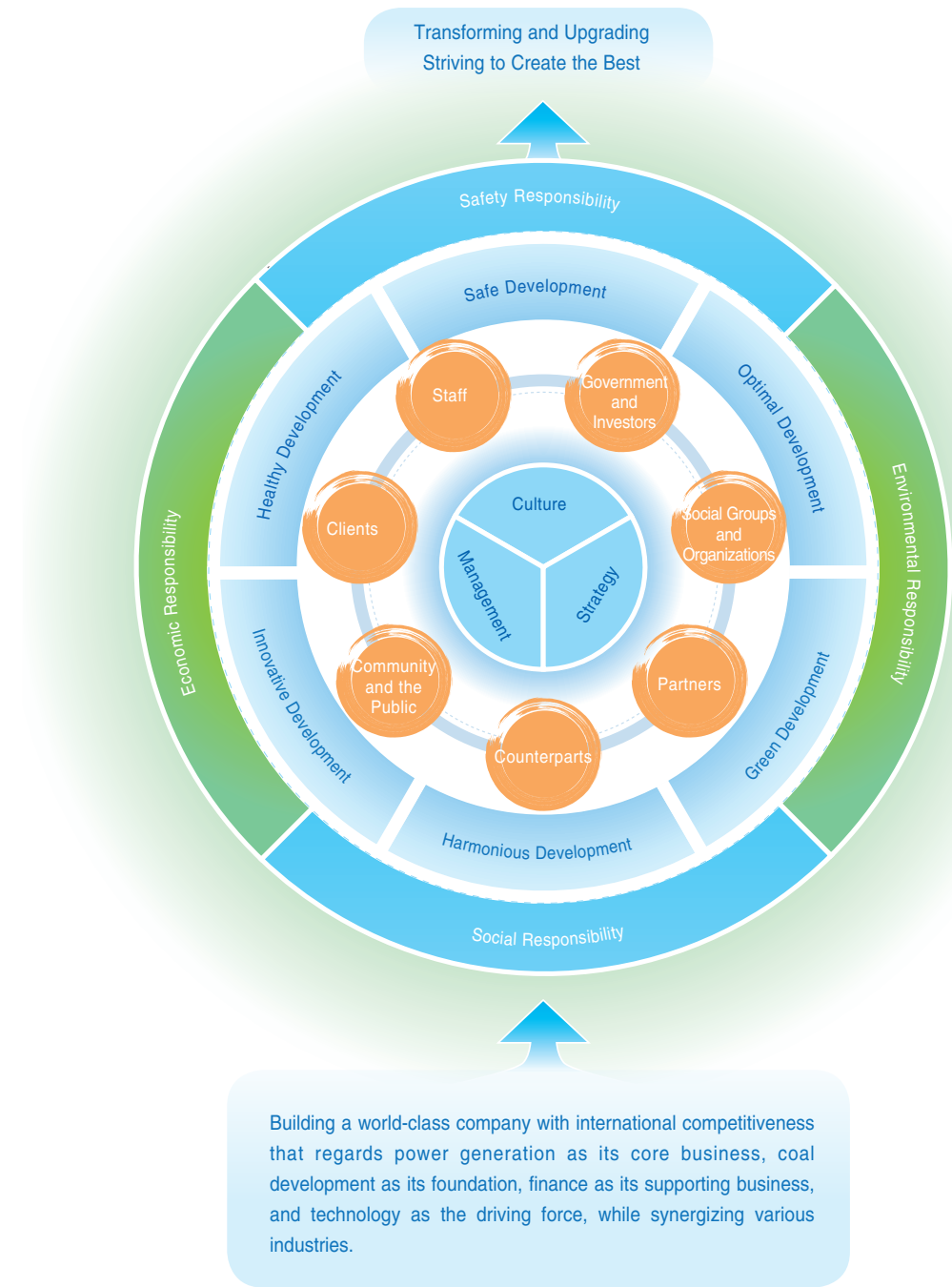
Zhao Jianming, Member of the CPC Huaneng Committee and Discipline Inspection Group Leader (second from right in the back row)

Ye Xiangdong, Vice President of CHNG and Member of the CPC Huaneng Committee (first from left in the back row)

Liu Wencheng, Chief Economist of CHNG (first from right in the back row)



## Huaneng's Sustainable Development Mode





## Key Performance

Safe Development	2010	2011	2012	2013	2014
Major equipment accident (times)	0	0	0	0	0
Ordinary equipment accident (times)	0	6	1	3	2
Casualty-causing accident (times)	1	1	1	2*	6*
First class equipment failure (times)	54	62	52	55	40
Unplanned outages (times)	83	91	89	86	71
Equipment utilization ratios (%)	94.87	94.17	94.46	94.58	94.52

Optimal Development	2010	2011	2012	2013	2014
Installed capacity (10MW)	11,343	12,538	13,508	14,224	15,149
Including: Hydropower (10MW)	1,082	1,133	1,417	1,835	2,045
Coal-fired power (10MW)	9,776	10,672	11,235	11,356	11,867
Wind power (10MW)	484	726	848	973	1,151
Solar PV (10MW)	1	6	8	60	85
Coal production capacity (10 thousand tons/year)	6,412	6,817	7,817	8,464	8,660
Coal output (10 thousand tons/year)	4,886	6,406	6,858	7,156	7,418

Green Development	2010	2011	2012	2013	2014
Low-carbon clean energy installed capacity (10MW)	2,003	2,397	2,830	3,504	4,100
Proportion of low-carbon clean energy (%)	17.70	19.12	20.95	24.64	27.10
Specific coal consumption (g/kWh)	322.72	318.68	316.52	312.89	310.00
Station service power consumption rate (%)	5.22	5.08	4.83	4.59	4.40
Slag and ash utilization rate (%)	74.15	76.34	77.08	78.14	79.50
Water consumption per unit power generated (kg/kWh)	1.30	1.28	1.25	1.22	1.15



Healthy Development	2010	2011	2012	2013	2014
Power output (100GWh)	5,376	6,046	6,092	6,493	6,461
Total assets (100 million Yuan)	6,624	7,532	7,950	8,552	9,282
Total revenue (100 million Yuan)	2,280	2,682	2,798	2,932	2,921
Tax paid (100 million Yuan)	173	196	261	328	332
Total profit (100 million Yuan)	78	61	140	236	268
Performance evaluation by SASAC (Grade)	A	A	A	A	A

Innovative Development	2010	2011	2012	2013	2014
Total number of technicians (People)	-	1,170	2,017	2,202	2,325
Number of experts from Recruitment Program of Global Experts (People)	3	6	7	8	7
National patents (items)	47	45	96	83	166
Including: Patent for invention (items)	15	22	28	29	27
Scientific achievement award at or above provincial level	19	9	9	20	10

Harmonious Development	2010	2011	2012	2013	2014
Number of staff (People)	131,816	13,3270	136,510	137,779	139,780
Number of female staff (People)	27,088	31,384	32,636	32,696	35,047
Signing rate of labor contracts (%)	100	100	100	100	100
Signing rate of collective contracts (%)	100	100	100	100	100
Rate of participation in the Labor Union (%)	100	100	100	100	100
Rate of physical examinations (%)	100	100	100	100	100
Donations (10,000 Yuan)	10,770	4,603	7,439	11,425	8,188
Number of volunteers among employees (person-times)	25,600	43,500	51,000	63,800	71,700

(Note: "-" means no statistics of that year, "\*" means the data from coal industry is included.)



# Huaneng's Sustainable Development in 2014

In 2014, we proactively adapted ourselves to the new normal of economic development, firmly transformed development mode, improved development quality and benefits, and push forward the green, clean and conservation development. As a result, we further increased our profitability, competitiveness and sustainable development capabilities.

## Significantly improved overall strength

Total installed capacity exceeded

**151** GW

Profit reached

**26.8** billion CNY

- ◆ **Installed capacity reaching a new stage** Marked by the completion of Unit 2 in Changxing Power Plant, our installed capacity exceeded 151GW, becoming the world's largest power generation enterprise. We have further enhanced our ability to fulfill our responsibility for economic and social development.
- ◆ **Profitability reaching a new height** We made effective response to market challenges and made scientific coordination of coal, electricity, capital and other operating elements to control cost, increase output and income and turn loss into gain. In 2014, we achieved the annual profit of 26.8 billion CNY, reaching a new height.

## Structural adjustment further optimized

Clean energy capacity reached

**41** GW

The proportion of clean energy

**27.1** %

- ◆ **Rapid increase of "clean" low-carbon production** Our installed capacity of low-carbon energy reached 41GW, accounting for 27.1% in total installed capacity, up by 2.4% over the previous year.
- ◆ **Increased development capacity** Out of the newly-approved, newly-built and newly-operated projects, low-carbon energy projects accounted for over 54%, 79% and 74% respectively.
- ◆ **Optimization for coal-based projects** Over 70% of our units are CHP (combined heat and power) units or supercritical and ultra-supercritical generating units with single capacity of 300MW or above.



Hezhang Jiucaiping Wind Farm

## Greatly reducing the emission of pollutants

- ◆ **Unprecedented effort in emission reduction** Our annual investment in retrofit for heat supply, energy conservation and environmental protection conversions reached a new record of 15.3 billion CNY. We promoted environmental protection and have significantly reduced our impact on the environment.
- ◆ **Energy consumption decreased significantly** We achieved specific coal consumption of 310 g/kWh, a year-on-year decrease of 2.89 g/kWh, and station service power consumption rate of 4.4%, 0.19 percentage lower than last year, maintaining a leading level in the world. Based on the annual power output, we reduced coal consumption of 1.55 million tons per year, saving electricity of 1,128 million kWh. A great number of our power plants have been ranked by national organizations as excellent energy-conservation and environmentally-friendly enterprises.
- ◆ **Emission of pollutants reduced greatly** In our coal-based units, the installed rate of dust removal, de-sulfurization and de-nitration facilities reached 100%, 100% and 94% respectively, with a high level of management and operation. The emission of SO<sub>2</sub>, NO<sub>x</sub> and dusts dropped by 33%, 32% and 21% over the previous year, maintaining a leadership position in the industry.

Investment in retrofit for heat supply, energy conservation and environmental protection reached

**15.3** billion CNY

The emission of pollutants achieved year-on-year decrease

The emission of SO<sub>2</sub> dropped by

**33** %

The emission of NO<sub>x</sub> dropped by

**32** %

The emission of dusts dropped by

**21** %



# 01 About Us

Committed to building a world-class enterprise

Total installed capacity

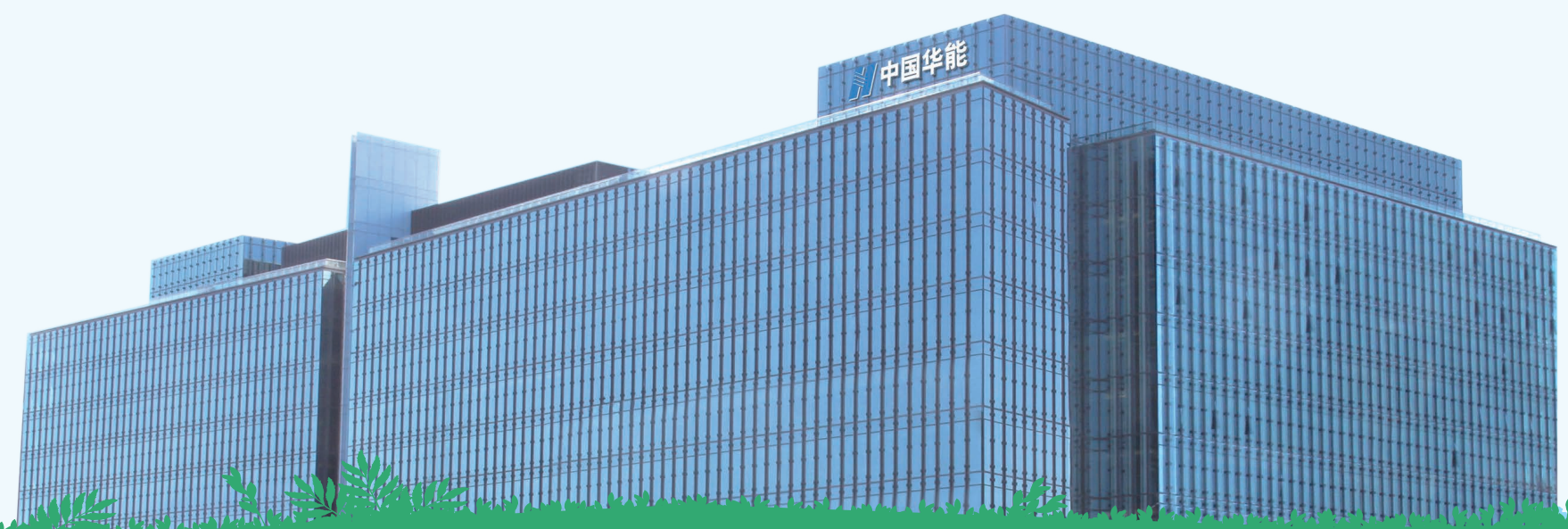
**151** GW  
the largest in the world

Fortune Global 500

Ranking No.  
**221**

The development index of social responsibility

**5**-star level





## Company Profile

China Huaneng Group is a key state-owned enterprise approved by the State Council. The Company is engaged in the following businesses: development, investment, construction, operation and management of power sources; production and sale of power (heat); development, investment, construction, production and sale of business and products related to finance, coal, transportation, renewable energy and environmental protection; industrial investment, operation and management.

During its years of development history, CHNG has provided rich experience in the reform, development and technological innovation for the power industry and has played an exemplary role in improving enterprise management and increasing economic benefit for power enterprises. Also, the Company made a great contribution in meeting power demand for economic and social growth, as well as in maintaining and adding value to state-owned assets.

CHNG is committed to building itself into a world-class enterprise with international competitiveness. By the end of 2014, the Company had total installed capacity of 151GW, with assets distributed all over China and overseas. The Company is also engaged in sectors of coal, finance, technology R&D and transportation, etc. that support the core business of power. The Company was the first Chinese power producer to be enlisted in the rank of Fortune Global 500 in 2009, ranking 221st in 2014, while 231st in 2013.

Ranking in Fortune Global 500



## Industrial Distribution

### Coal Industry

Our annual production capacity was 86.60 million tons in 2014, and our coal output was 74.18 million tons.



### Power Industry

Power is the core business of the Company. In 2014, we had wholly-owned and holding power plants with 151.49GW of installed capacity in total and 646,100GWh of electricity generation.



### Technology Industry

Our principal scientific research and development system consists of seven national key laboratories (R&D centers), two scientific research bases and several company-level laboratories.



### Transportation Industry

Ports that we wholly own or control had a handling capacity of 55.62 million tons per year, and our shipping fleets had a shipping capacity of 2.11 million DWT.



### Financial Industry

Our financial enterprises cover capital services, securities, insurance and trust, etc. The assets under management exceeded 600 billion CNY.





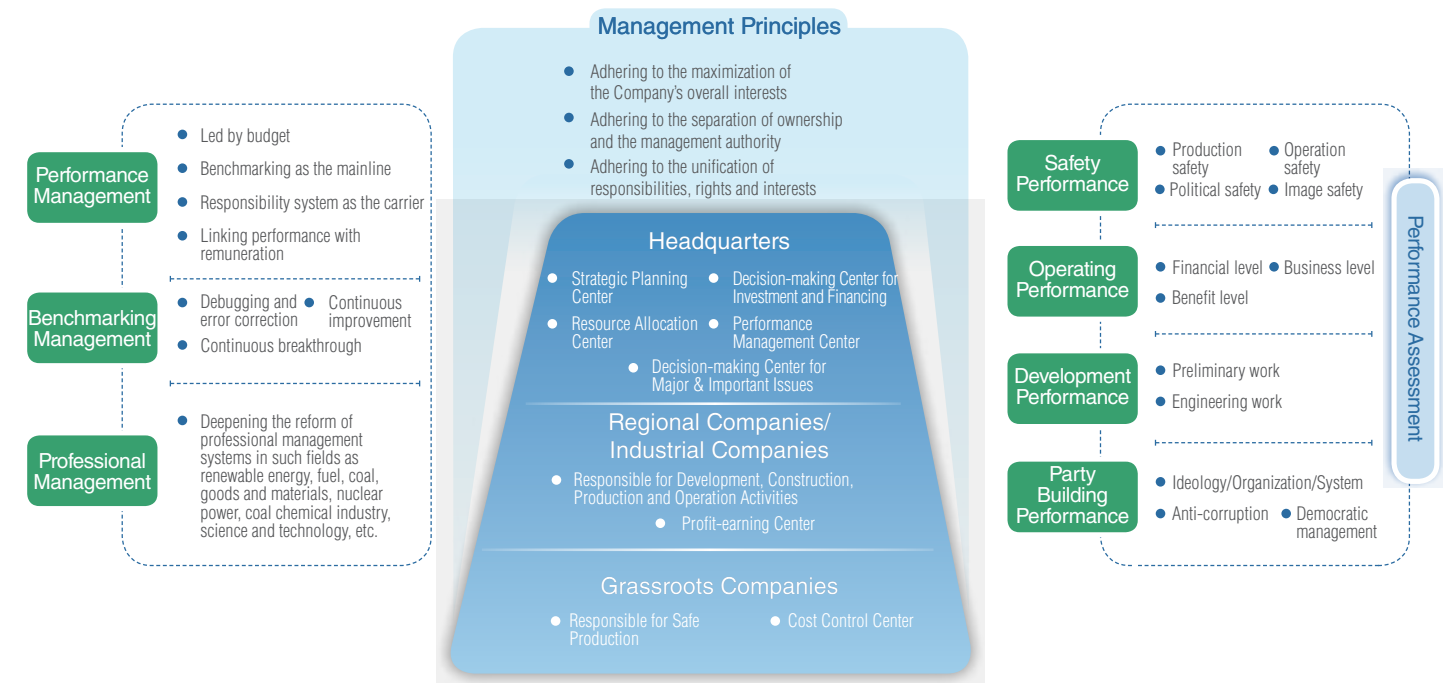
## Organization Structure

Departments of the Headquarters		
General Administration Department (News Center)	Finance Department	International Cooperation Department
Department of Planning and Development	Department of Capital Operations and Equity Management	Human Resources Department
Department of Budget and General Planning	Department of Safety Supervision and Production	Office of Retiree Affairs
Department of Corporate Governance and Legal Affairs	Department of Science and Technology and Environmental Protection	Supervision Department
Department of Operations	Engineering Department	Auditing Department
	Material Department	Department of Ideological and Political Work
		Labor Union Working Committee
Business Departments and Professional Office		
Power Development Business Department	Coal Business Department	Shale Gas Development and Utilization Office
Nuclear Power Business Department	Coal Chemical Management Office	
Units Directly under China Huaneng Group		
CPC China Huaneng Group Party School (Education and Training Center)	Technical Economics Research Institute IT Center	Talent Base Construction Office (Talent Base Construction Management Center)
Industrial Companies		
Huaneng International Power Development Corporation (HIPDC)	Huaneng Energy and Transportation (Holding) Co., Ltd.	Huaneng Integrated Industries Company
GreenGen Co., Ltd.	Huaneng Coal Industry Co., Ltd.	Huaneng Properties Co., Ltd.
Huaneng Power International Inc. (HPI)	China Huaneng Group Fuel Co., Ltd.	China Huaneng Group Hong Kong Co., Ltd.
Huaneng Renewables Corporation	Huaneng Capital Services Co., Ltd.	Huaneng Overseas Enterprises Management and Service Co., Ltd.
Huaneng Nuclear Power Development Co., Ltd.	China Huaneng Group Clean Energy Technology Research Institute	Xi'an Thermal Power Research Institute Co., Ltd.
		China Huaneng Group Technology Innovation Center
Regional Branch Companies		
China Huaneng Group North China Branch	China Huaneng Group Shanxi Branch	China Huaneng Group Hunan Branch
China Huaneng Group Northeast China Branch	China Huaneng Group Jiangsu Branch	China Huaneng Group Hainan Branch
China Huaneng Group East China Branch	China Huaneng Group Zhejiang Branch	China Huaneng Group Chongqing Branch
China Huaneng Group Central China Branch	China Huaneng Group Anhui Branch	China Huaneng Group Yunnan Branch
China Huaneng Group South China Branch	China Huaneng Group Fujian Branch	China Huaneng Group Qinghai Branch
China Huaneng Group Northwest China Branch	China Huaneng Group Jiangxi Branch	China Huaneng Group Guangxi Branch (Preparatory Office)
China Huaneng Group Hebei Branch	China Huaneng Group Henan Branch	China Huaneng Group Guizhou Branch (Preparatory Office)
Regional Subsidiaries		
North United Power Co., Ltd.	Huaneng Sichuan Hydropower Co., Ltd.	Huaneng Ningxia Energy Co., Ltd.
Huaneng Lancang River Hydropower Co., Ltd.	Huaneng Jilin Power Generation Co., Ltd.	Huaneng Gansu Energy Development Co., Ltd.
Huaneng Hulunbuir Energy Development Co., Ltd.	Huaneng Heilongjiang Power Generation Co., Ltd.	Huaneng Tibet Power Generation Co., Ltd.
Huaneng Shandong Power Generation Co., Ltd.	Huaneng Shaanxi Power Generation Co., Ltd.	Huaneng Xinjiang Energy Development Co., Ltd.
Units Directly Managed by China Huaneng Group		
Huaneng Shandong Shidaowan Nuclear Power Co., Ltd.	Huaneng Hainan Industrial Co., Ltd.	
Huaneng Shidaowan Nuclear Power Development Co., Ltd.	Huaneng Tendering Co., Ltd.	



## Management System

Following the "three-color" corporate mission and focusing on building a world-class enterprise with international competitiveness, Huaneng continues to improve the "three-level management system" comprising of the "headquarters – regional companies/ industrial companies – grassroots-level enterprises" and the performance evaluation system focusing on safety, operation, development and party building, so as to make solid progress in management and constantly improve the scientific management level.



## Corporate Strategy

- Transforming and Upgrading Strategy**  
Focus on optimizing and adjusting the power structure, industrial structure and regional distribution. Concentrate on the development of renewable energy, highly-efficient and clean use of traditional energy and energy service. Eliminate backward production capacity and build a synergistic and efficient industrial system.
- Technology Innovation Strategy**  
Persist in supporting the core business while being geared to the needs of production, the leading edge and industrialization; improve technological innovation system and mechanism; enhance the capacity of independent innovation and research on international cutting-edge technology to lead technological progress of the power industry.
- Green Development Strategy**  
Intensify our effort in the development of low-carbon and clean energy and reduce emissions of greenhouse gases and pollutants; rely on technological progress and scientific management and develop the circular economy to constantly improve the level of energy conservation and environment protection.
- International Operation Strategy**  
Based on global perspective, speed up the pace of "going global" and deepen international exchange and cooperation; allocate the resources of capital, talent and markets effectively; gradually expand the business abroad and strengthen the operational supervision and risk prevention to improve the level of international operations.
- Operation Excellence Strategy**  
Give full play to the supporting role of scientific management through constantly improving the whole process management of production and operation, marketing, financial costs and project construction, effectively integrating economic factors and system resources, and continuously improving the profitability and management of the Company.
- Talent-Intensive Strategy**  
Stick to the "Scientific Outlook on Development" as the overall guidance in the recruiting and management of talents through constantly improving the incentive mechanism for fostering, attracting, employing and managing talents, while positively developing high-end, complex, innovative and international talent team to support the Company's development.
- Harmonious Development Strategy**  
Operate the business according to laws and regulations. Strengthen the construction of corporate culture through wholeheartedly relying on employees in conducting the business and actively performing corporate social responsibilities, while enhancing the economic, social and environmental value creation capabilities and shaping Huaneng's good image to build a harmonious enterprise.

## CSR Management

### CSR Strategy

#### CSR Culture

CHNG is committed to building a Red company serving the needs of socialism with Chinese characteristics; a Green company advocating technological innovation and environmental protection; and a Blue company advancing through innovation and internationalization. Building a "three-color" company is CHNG's corporate mission and core concept in the fulfillment of its economic, political and social responsibility.

Red	is the essence of the Company and the foundation for our mission. The construction of a Red company is our fundamental attitude and spirit, the concentrated embodiment of our efforts to the national economic development, social progress and people's higher living standards, as well as the reflection of our responsibilities.
Green	symbolizes the coordinated development and harmonious progress between human and natural environment. The construction of a Green company manifests our humanistic values and scientific attitude to advocate science, respect talents, focus on technology, protect environment and promote the sustainable development of society.
Blue	is the basic color of the logo. It implies that we will develop our business through keeping pace with times, striving for innovation, expanding internationally and absorbing the essence of all advanced technologies and cultures in the world, and embodies CHNG's ability and ambition to coexist with various enterprises.

#### CSR Planning

We follow the guidance of *Guideline on Fulfilling Social Responsibility by State-owned Enterprises* and *Implementation Outline of Harmonious Development for State-owned Enterprises during the Twelfth Five-Year Plan*, persist in our objective of building a world-class enterprise with international competitiveness, and implement "one strategy and two plans" to improve our social responsibility.

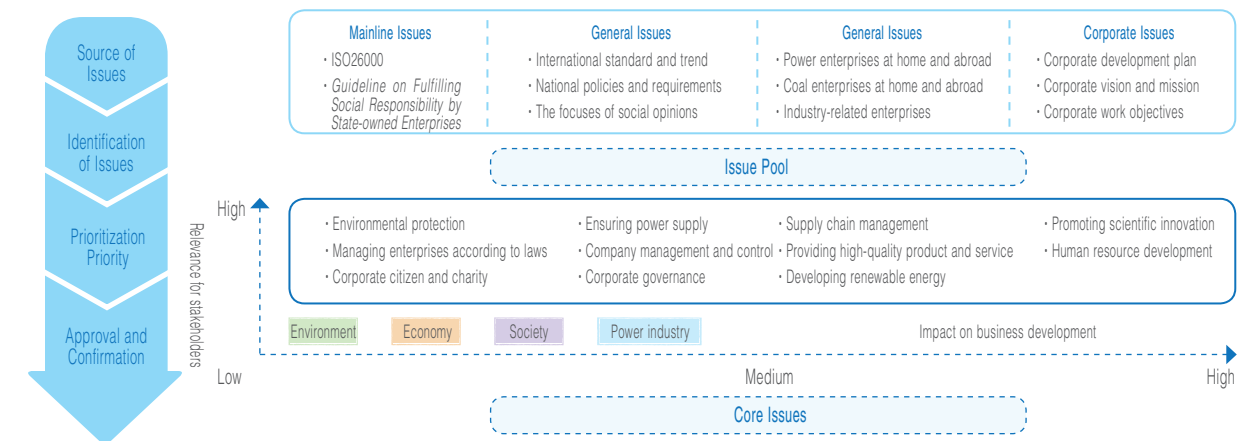
One Strategy	The harmonious development strategy to create a world-class enterprise. We incorporate harmonious development strategy into our seven strategies to create a world-class enterprise, integrate it into our top design of "Creating the Best", and clear our objectives and missions to build CHNG into an enterprise with integrity, humanity and responsibility and into an honorable brand.
Two Plans	The <i>Planning for Improving Social Responsibility Management</i> and the <i>Planning for Advancing Social Responsibility Management</i> . Both plans have followed the requirements of the implementation outline of harmonious development and taken the fulfillment of social responsibility as the carrier to detail the requirements to improve social responsibility management, and clear the key tasks of social responsibility work from 2013 to 2015.
Overall Objective	To maintain advanced domestically in social responsibility. We will achieve and maintain advanced domestically in social responsibility by three years' efforts, highlight the role of "Five Examples" of social responsibility, and improve the Company's image and social influence.

### Our Social Responsibility Work Planning (2013-2015)



#### Core Issues

Responding to the Global Reporting Initiative (GRI) (G4), Chinese Academy of Social Sciences CASS 3.0 and other standards and initiatives and combining the actual situation of enterprise, we have identified CSR core issues to clear major social responsibility issues, scientifically determined the content boundary of the report, disclosed social responsibility practice and performance and answered the concerns of stakeholders.



### CSR Governance

We have established a Social Responsibility Management Committee to develop our strategy for social responsibility and our medium and long-term development program, deliberate over and decide major social responsibility issues, designate the related management department and agency, and take the responsibility for the coordination of daily work for the construction of social responsibility and harmonious enterprise. We have also developed a three-level social responsibility system comprised of the headquarters, secondary units and grassroots-level enterprises. In this system, the headquarter has appointed a part-time manager of social responsibility; each secondary unit has set up social responsibility leading groups; and grassroots-level enterprises have also identified departments and staff who are responsible for developing social responsibility activities and reporting the related performance to CHNG.

### CSR Communication

We have constantly improved our trinity CSR information communication system to make daily, regular and yearly communication with stakeholders. We have also implemented press spokesman system, established media open day, and released sustainability reports regularly. Besides, we have set up a special CSR column on our website, taken an active part in various CSR exchanges and made effective interactions with stakeholders. By doing so, we'd like to enable all of social sectors to understand our social responsibility practice and performance.



### CSR Public Classroom at Tianjin IGCC Power Station

On April 25, 2014, Chinese Academy of Social Sciences organized "Sharing Responsibility – CSR Public Classroom (the 4th session)" activity at Tianjin IGCC Demonstration Plant. During the activity, the manager of the plant introduced to a crowd of more than 120 trainees what CHNG has done and achieved in recent years in the development of "green" coal generation technology, in the research of advanced energy technology and in the construction of demonstration projects.

Trainees visited the centralized control center, air separation, gasification, and power generation areas to learn more about the principle of IGCC power station, operating condition and development prospects. They were profoundly impressed by CHNG's actions in spearheading cleaner coal generation technology and earnest social responsibility.

"CHNG Tianjin IGCC Demonstration Plant has done its best in scientific innovation, environmental protection and social responsibility."

— A trainee from the 4th CSR Public Classroom



### Membership in Major Social Group and Organizations

Name of Organization	Title	Name of Organization	Title
China Center for International Economic Exchanges	Standing Director	China Association of Chief Financial Officers	Standing Director
United Nations Global Compact	Member	National Association of Financial Market Institutional Investors	Standing Director
Association of the Electricity Supply Industry of East Asia and the Western Pacific	Member	China Federation of Industrial Economics	Standing Director
State-owned Enterprises Party Building & Ideological and Political Work Seminar	Vice Chairman	China Corporate Culture Institute	Standing Director
China Electricity Council	Vice Director-General	China Electric Power Equipment Management Association	Vice Director-General
China Electric Power Employees Ideological & Political Work Seminar	Vice Chairman	China Nuclear Society	Standing Director
China Enterprise Confederation & China Enterprise Directors Association	Director	China Nuclear Energy Association	Vice Director-General
China Group Companies Association	Vice Chairman	China International Institute of Multinational Corporations	Vice Chairman
China Society for Electrical Engineering	Vice Director-General	Chinese Society for Hydroelectric Engineering	Vice Director-General
China Power Supervision Standardization Technical Committee	Member	China Institute of Internal Audit	Standing Director
China Association of Work Safety	Vice Chairman	China Electric Power Construction Association	Vice Chairman
China Association for the Promotion of Industrial Development	Director	China Information Industry Association	Vice Director-General
China Supervision Association Power Branch	Vice Chairman	World Association of Nuclear Operators (WANO)	First-class Member
China Association of Resource Comprehensive Utilization	Vice Chairman	China Promotion Consortium for Special Equipment and Energy-saving	Vice Chairman
CCUS Industrial Tech Innovative and Strategic League	Vice Chairman		



### CSR Capacity

**Advancing harmonious development.** Based on the fulfillment of social responsibility, we deepen the construction of harmonious enterprises and build demonstration unit for harmonious enterprises. In eight demonstration units including Huangtai Power Plant and Tongliao Wind Power Farm, basing on their different sectors, working foundation and external environment, we refined the objectives and requirements into concrete measures and formed lots of useful experience and practices. The SASAC and other agencies spoke highly of our efforts in the construction of harmonious enterprises.

**Intensifying CSR training.** We continued to carry out social responsibility training programs through inviting experts and scholars to train our employees on social responsibility management, practices and indicators, and helped them embed social responsibility into their management and business so that they could develop social responsibility work in an in-depth and effective manner.

**Conducting theoretical research.** We combined our theoretical research with the specific practices from within the power generation industry by engaging in the discussion and formulation of domestic and overseas social responsibility standards, studying social responsibility issues, supporting the activities organized by UN Global Compact and the Chinese Academy of Social Sciences, and participating in the social responsibility seminars at home and abroad. In this way, we have laid a solid foundation for deepening our social responsibility practices.

CHNG has done a respectable job in the construction of exemplary harmonious enterprise and the implementation of *Program on Harmonious Development Strategy of State-owned Enterprises During the 12th Five-Year Period*. We have also explored and enriched the effective ways to strengthen CSR construction and set a worthy example for state-owned enterprises.

— Houjie, Deputy Director of Research Bureau, SASAC of the State Council

### CSR Performance

- ◆ Our Sustainability Report 2013 was rated as a five-star excellent social responsibility report by the Chinese Academy of Social Sciences.
- ◆ On November 13, our company was ranked the fifth among Top 300 enterprises and being rated as a five-star enterprise in the Corporate Social Responsibility Blue Paper issued by the Chinese Academy of Social Sciences, with CSR index of 84.3 points.
- ◆ On December 3, our Sustainability Report 2013 was awarded "Evergreen Prize for Golden Bee Excellent CSR Report 2014" at the 7th China CSR International Seminar.
- ◆ Our practice of "cultural integration promoting sustainable development of overseas projects" was selected as "Best Practices to Promote Social Development and Cooperation in 2014" at the 2014 annual meeting of the Global Compact China Network.



Baicheng Zhaobei Wind Farm

# 02 Safety Responsibility

Providing reliable energy for economic and social development

Major equipment accident

0

Forced outages

71

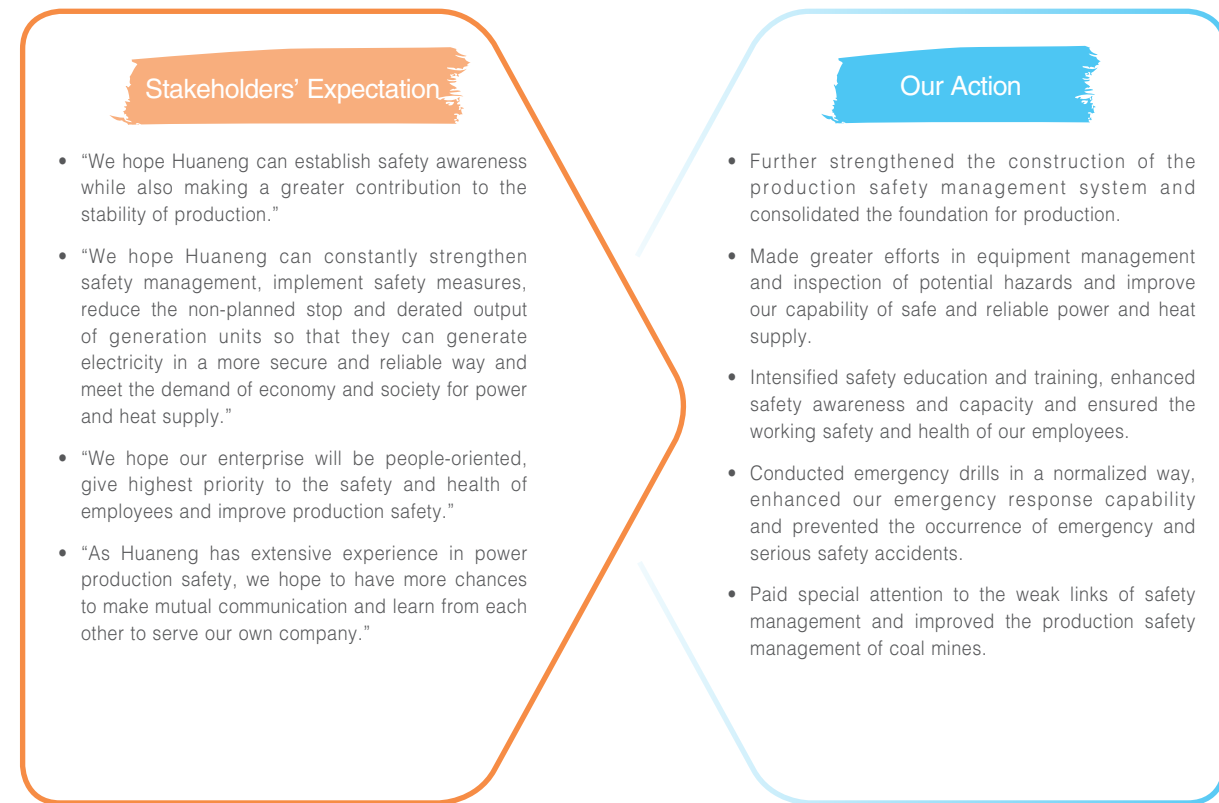
times

Equipment equivalent availability factor (%)

94.52

%





## Improving Safety Management System

### Institutional Construction

We took the institutional construction as the key measure to build a long-term safety mechanism and strived to improve production safety management.

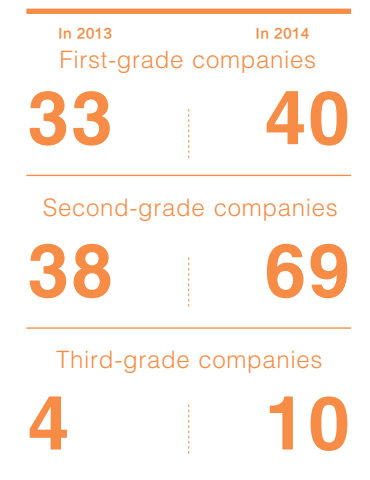
- ◆ Revised the *Regulations of Rewards and Reprimands for Safe Electricity Production*, the *Regulations of Safe Operation in Power Industry* and the *Management Measures for the Safety of Power Generation Enterprise Contracting Engineering* in 2014.
- ◆ Issued four technological standards for wind farm operation, repair and maintenance and the quota standard for the maintenance cost of coal-fired units.
- ◆ Revised the technical supervision standards for thermal and hydro power generation, formulated the technical standard for photovoltaic power generation and its maintenance guidelines, and prepared the technical supervision standard for combined cycle generating units.

### System Construction

We promoted the construction of production safety in a systematic way, focusing on the quality of our system documentation and made their content in accordance with operation requirements and management practices. We also paid special attention to the implementation and execution of system documentation, with the idea of making the standard a habit and making the habit become the standard.



- ◆ 39 power plants in Xiaowan, Yunhe, Yimin, Shangdu, Dalian, Fuzhou and other locations completed their production safety systems. 55% of power plants passed company's system verification process.
- ◆ All of our subsidiaries standardized their management processes and daily operations in accordance with the system documents and made continuous improvement in safety management. The shareholding companies and Hulun Buir completed a system with complete coverage.
- ◆ Huiliuhe Power Plant, Jialingjiang Company and other grassroots-level enterprises strengthened the information management for system operations and formed a closed-loop management system, from production to execution and finally records.



### Progressing towards Standardization

The Company deeply promoted production safety standardization and constantly strengthened organizational leadership, plan management, talent training and culture cultivation. We combined the work toward standardization with the construction of production safety management system and safety evaluation and worked to build a long-term mechanism for continuous improvement of safety performance.

In 2014, our power plants completed production safety standardization and 40 of them reached the first-grade standard. Nantong Power Plant reached the first-grade standardization in its infrastructure construction and the Zangmu, Guoduo and Liangjiang power plants reached the second-grade standardization in their infrastructure construction of gas turbine and other projects.

### Safety Concerns for Outsourcing Projects

The safety management of outsourcing projects is the vulnerable link of our production safety management. For this reason, we have strictly executed the *Management Method for the Safety of Outsourcing Projects*. More specifically, we have incorporated outsourcing companies into our safety production management system, carefully selected outsourcing companies and resolutely cleared those companies with incomplete qualifications, chaotic management and higher occurrence of problems. We have also tightened on-site management and control in the major technical innovation and key areas and links of outsourcing projects to effectively improve the management of outsourcing projects.

Our special program to address the safety problems of outsourcing projects

Major practices	Key work	Achievements
<ul style="list-style-type: none"> <li>◆ Implemented the main production safety responsibility of outsourcing projects;</li> <li>◆ Strengthened the safety supervision of outsourcing projects;</li> <li>◆ Promoted their own construction of outsourcing companies;</li> <li>◆ Made inspection of unrecognized hazards in outsourcing projects;</li> <li>◆ Fostered an enabling environment for the positive development of enterprises and their outsourcing companies.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Tightened the bidding management and inspection of qualifications to prune and optimize contractor teams;</li> <li>◆ Standardized on-site operation procedures and technical process, improve the pre-control measures at hazardous points and strictly followed the principles of "no monitoring, no work";</li> <li>◆ Incorporated outsourcing companies into the production safety management system and provide them with support and training;</li> <li>◆ Inspected safety management problems or risks of outsourcing projects;</li> <li>◆ Carried out various activities to enhance comradery with outsourcing staff.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Put an end to illegal "kick-back" bidding and partial or whole sub-contracting;</li> <li>◆ Fully controlled the safety risks on site;</li> <li>◆ Enhanced the self-management of outsourcing companies and the quality of their staff and thereby significantly improved the safety management of outsourcing projects;</li> <li>◆ Checked 3,500 potential problems and hazards;</li> <li>◆ Improved sense of responsibility and mission of out-sourced staff.</li> </ul>

### Taicang Power Plant's "Innovative Outsourcing Management Workshop"

In June 2014, Taicang Power Plant established an Innovative Outsourcing Management Workshop, which is comprised of staff in charge of outsourcing management and the manager of outsourcing companies. This is a useful attempt to implement outsourcing management, and also an effective measure to carry out the national push to improve the management of outsourcing projects.

- ◆ Strengthened the team building of outsourcing companies and skill training for outsourcing staff, researched the solution to outsourcing management problems and improved the management of outsourcing companies and the skills of their staff.
- ◆ Established a robust mechanism for evaluating, rewarding and reprimanding outsourcing companies, and cooperated with outsourcing companies which have excellent qualifications, identify Huaneng's management concepts and conduct stable safety management.
- ◆ Explored the effective mechanism for outsourcing management, developed a standardization system, established a comprehensive evaluation system and formed outsourcing project management modes that have shown meaningful results.

*Outsourcing companies implement the same safety requirement, same safety management, same safety requirements for employees and same staff management as the developer's.*

## Strengthening Equipment Management

### Standardized Overhaul

Focusing on improving the reliability of equipment, we implemented the Guidelines to Implement the Standard Management of Electric Power Overhaul and improved the working condition of equipment through strengthening standardized overhaul management of generating units and promoting modification of equipment. We inspected the implementation of the Guidelines in Huaneng Shandong Power Generation Co., Ltd., North United Power Co., Ltd., Huaneng Heilongjiang Power Generation Co., Ltd. and Huaneng Ningxia Energy Co., Ltd..

- ◆ In 2014, we completed 410 overhauls of hydro and coal-fired generating units with C-level and above, achieving daily average maintenance capacity of 8,905MW. The excellent rate of overhaul units was 74%, up by 1.5% over the previous year. 29 of 52 A/B level overhaul coal units achieved continuous operation. The circulating fluidized bed boiler of Unit 10 in Baoyi Power Plant achieved continuous operation for 191 days after overhaul, setting an up time record.
- ◆ We inspected the overhaul plan and document package of 12 overhaul units including Yueyang No. 3 unit and Shidongkou I No. 2 unit, and checked their implementation of overhaul standards to ensure the effective execution of technological supervision mechanism.
- ◆ The power plants in Rizhao, Weihai, Dezhou and other places modularized their overhaul plan, material plan, project planning, overhaul package and process and quality inspection into their SAP system and realized full-process overhaul standardization management.



The turbine overhaul at Haikou Power Plant

The investment in the overhaul and modification of equipment reached

**5.35** billion CNY

Equipment equivalent availability factor reached

**94.52%**

### Daily supervision and management

We continued to strengthen daily supervision and management of equipment through careful statistical analysis of indicators and strict equipment condition monitoring and fault diagnosis. The industrial/regional companies improved the good working condition of equipment by reduction of equipment defects, control of the occurrence of unplanned outage, dynamic inspection of technical supervision and timely rectification of early warning problems and unrecognized dangers of equipment.

- ◆ We completed dynamic inspection of technical supervision in 19 thermal power plants, 5 hydropower plants and 13 wind farms, followed the rectification of early warning problems, and conducted closed-loop management.

- ◆ Huaneng Renewables Corporation strengthened the management of regular overhaul and electrical pretest, and reduced fan failure rate by 5% and loss of power failures by 8% over the previous year.
- ◆ 41 power plants in Tongchuan, Hanfeng, Jingangshan, Xiaowan and other places achieved zero unplanned outage throughout the year, and 9 generating units including Taicang No. 4, Rizhao No. 3, Daba No. 3 and Yimin No. 3, 5 and 9 achieved uninterrupted operation throughout 2013.
- ◆ We achieved equipment equivalent availability factor of 94.52% and unplanned outage factor of 0.1%, down by 0.02% over the previous year.

### National Gold-medal Machine Units of Thermal Power Generation in Reliability

Capacity	Prize-winning Units
1,000MW	Unit 1 of Haimen Power Plant
600MW	Unit 1 of Shidongkou II Power Plant
	Unit 2 of Jiutai Power Plant
300MW	Unit 1 of Dalate Power Plant
	Unit 2 of Dalate Power Plant
	Unit 3 of Dezhou Power Plant
	Unit 1 of Shang'an Power Plant
	Unit 8 of Haikou Power Plant

### First Prize of National Thermal Power Units Competition

Capacity	Prize-winning Units
	Unit 4 of Shidongkou II Power Plant
600MW	Unit 6 of Dezhou Power Plant
	Unit 5 of Weihai Power Plant
300MW	Unit 3 of Dezhou Power Plant
	Unit 3 of Fuzhou Power Plant
	Unit 2 of Dalian Power Plant

### Ensuring reliable heat supply

We established and improved heat supply management rules and regulations and strengthened our foundation for heat supply management. Our subsidiaries' parameter control curve varying with the ambient temperature, detailed operational adjustment specification, and strictly enforced discipline on duty to ensure the economical and stable operation of heating network system. We also strengthened the construction of the emergency team and the reserve of emergency supplies, arranged 24-hour emergency maintenance teams during the period of heat supply and enhanced customer management to properly solve their problems in a timely manner. By doing so, we strived to ensure safe and reliable heat supply.



### "Heat current" streaming across the pole of cold in China

Genhe city, located in the north of Hulun Buir city of the Inner Mongolia Autonomous Region, is one of the most northern cities in China. As its annual average temperature is minus 6°C with the lowest temperature of minus 40 or 50°C, it is also nicknamed the arctic of China. Its heat supply period lasts 9 months.

Genhe Thermal Power Plant is the major heat supplier in the city. Since it started heat supply in 2,000, it has increased its heating area from 420,000 m<sup>2</sup> to 1.46 million m<sup>2</sup>. With the increase of heating network capacity, the number of maintenance tasks rose sharply. In each summer, the Power plant inspected and eliminated the unrecognized dangers of equipment. In less than 90 days of overhaul, the workers were committed to maintaining every pipe, each valve and each bolt. They also carried out emergency drills in their 76 distribution stations and across over 30 kilometers of pipeline. During the heating period, the indoor and outdoor temperature difference was nearly 60°C, and thus they had to scramble to monitor pressure, temperature and flow of the heating network. During 24 hours on duty, they solved problems in a rapid and timely manner. By doing so, they have achieved safe heat supply for 13 consecutive years.

## Emphasizing on Safety Education

### Safety Education and Training

We have implemented our Management Method of Production Safety Training for Employees in Power Generation Company and increased our input into safety education and training. We have paid great attention to the training and certificate of safety supervisor, and the pre-examination training and re-education of registered safety engineer, and continued to promote the certification of thermal power, hydropower, wind power technical supervisors in shareholding companies, Huaneng Shandong Power Generation Co., Ltd. and North United Power Co., Ltd.. Through launching the power technology forum on the internet and making use of this platform, we encourage our electricity technicians to learn from each other and make progress, bringing Company to a higher level of expertise.

Huaneng held a variety of safety education and trainings and provided special trainings for **650** safety managers.

Huaneng organized technical supervisor training and qualification examination for **1,504** persons.

The number of our registered safety engineers came to **1,008** persons, a year-on-year increase of **32%**.

**100%** of technical supervisors were certified for 11 thermal power technologies in 10 power plants including Qinbei Power Plant and Shidongkou Power Plant I.

### The Construction of Safety Culture

The Company has attached great importance to the construction of a culture of safety. Through safety oaths, essays, speeches and contests on safety knowledge, we educated and guided our employees to improve their sense of safety and responsibility. Moreover, we created a strong atmosphere about safety, and realized the shift from "I was wanted to be safe" to "I want to, I will and I can be safe" to effectively ensure employees' and production safety.



Employees from Zhangbei Wind Power Plant

## Improving Emergency Response Capabilities

In 2014, we summarized the emergency management systems and rules and revised our Emergency Management Methods of Major Events and the related emergency response plan to enhance our capability of preventing and handling all types of emergencies.

- ◆ The Company departments and subsidiaries carried out emergency drills to deal with power failures, geological disasters and fire hazards, and organized the first anti-terrorist emergency drill in Beijing Thermal Power Plant, which was affirmed by the National Energy Board.
- ◆ Hainan Company reduced the losses to the minimum through its early deployment, effective measures and proper disposal in the face of super typhoon Rammasun and Seagull.
- ◆ After 6.5 earthquake hit Ludian county, Yunnan province, Diandong Mining Industry Company and Lancan River Company arrived at the disaster-stricken area at first time and participated in the rescue and removal of dammed lake danger, which was highly praised by Yunnan Municipal Government.
- ◆ Huaneng successfully completed the power guarantee task during APEC meeting and other key periods by its careful arrangement and the strict watch on duty, well-functioning organization and measures and the good work of Beijing, Yangliuqing and Shangdu Power Plants.

### Hainan Company Combated the Typhoon Rammasun

On July 18, the super typhoon Rommasun moved into Wenchang city, Hainan province, which resulted in continuous storms with packing winds of up to a force of 17. Haikou Power Plant suffered severe impacts, leading to failure of transmission lines, the outages at Unit 5 and 8 by water intrusion. The scheduled shutdown of Unit 9 also exacerbated the issue.

Hainan Company initiated the contingency plan immediately and made proper arrangements for on-site equipment protection, evacuation of employees and logistics material support to ensure the safety of personnel and equipment. In the meanwhile, it strengthened technical support and emergency response to ensure the safe and stable operation of Unit 4. It is the full-load operation of Eastern Power Plant that provided strong support for the security of power grid.





Overview of the Company's Production Safety from 2010 to 2014

	2010	2011	2012	2013	2014
Major equipment accident (times)	0	0	0	0	0
Common equipment accident (times)	0	6	1	3	2
First-Class equipment failure (times)	54	62	52	55	40
Unplanned outages (times)	83	91	89	86	71
Equipment equivalent availability factor (%)	94.87	94.17	94.46	94.58	94.52

Improving Production Safety in Coal Mines

We continued to strengthen the standardized management of production safety of coal enterprises and carried out the construction of safety management by the implementation of two 7 point guidelines. the prevention of major disasters, the basic construction of safety, the safety management of projects under construction and the accountability of safety supervision. On this basis, we paid special attention to the vulnerable links in production safety such as gas prevention and strong pressure and increased related input to improve the production safety in coal mines.

- ◆ Formulated the management methods of safety risk mortgage for coal industry, we came up with a 10 point guidelines for gas management and mine fire prevention and control plan.
- ◆ Carried out "the Year of Special Program to Address Safety Problems of Outsourcing Projects" and the special campaign "six combats and six governances" to crack down illegal production safety practices.
- ◆ Developed Work Plan on Preventing Serious and Major Accidents in Coal Mine, made great efforts in research and prevention of serious disasters in mines such as flood, fire, gas leakage and strong mine pressure, and controlled the occurrence of major accidents.
- ◆ Made special inspection of mechanical and electrical transport of coal industry and made special rectification of problems identified, and implemented closed-loop management in production safety.
- ◆ Diandong Mining Company learned from the accident on September 1st, 2013 and implemented rectification measures until Mine No. 1 of Bailongshan Coal Mine passed the inspection of government and restored the building.
- ◆ Matigou Coal Mine achieved consecutive safe production for 3,934 days and Dongxia and Yinmin Coal Mines won the title of "Double Top 10 Coal Mine". The proportion of coal mines reaching the national level-I safety quality standard was 63%, up by 18.5% over the previous year.
- ◆ Effectively prevented and eliminated serious and major accidents and reduced the mortality rate (in million ton+ coal production) by 0.248 over the previous year, a level better than the national average.

The proportion of mines reaching the national Level-I safety quality standard was

63%

a year-on-year increase of

18.5%



9 mines including Huating Coal Industry reached the national primary standard

In strict accordance with *Coal Mine Safety Evaluation Method Based on Safety Quality Standardization (Trial)* and other relevant regulations, Huating Coal Industry carried out safety quality standardization activities in its coal mines to consolidate the foundation for safety management, strengthen safety assurance and meet the post standards in a dynamic and professional manner. On June 25th, Huating, Yanbei, Chenjiagou, Matigou, Xinyao, Xinbai, Jingshigou and Dalu coal mines were rated as the level-I safety quality standard coals mines in 2013.



Alarm Bells and Reflection: Failed to achieve the accident-free goal in production safety

In 2014, the Company maintained general stability in production safety and achieved good results, but failed to effectively prevent accidents. In particular, 6 deaths revealed that our foundation for production safety was still weak and the principle of "safety first" wasn't fully implemented. The Company investigated the accident, analyzing accident causes, extracting lessons from the accident and developing prevention measures, in order to prevent the recurrence of similar accidents.

Analysis of accident causes

We didn't effectively implement the principle of instilling the responsibility of safety on employees. Some companies discussed the staff responsibility system but they didn't put it into effective practices or ensure full implementation, nor did they give top priority on safety management.

We didn't strictly manage outsourcing projects. Some companies didn't make strict requirements on contractors. Their contractors couldn't meet the Company's requirements because of inadequate safety education, ineffective supervision and administration inconsistencies.

We didn't fully control on-site safety. The individual companies failed to form an effective process control because they neither gave complete or targeted disclosure of safety technology nor strictly enforce management regulations. In addition their staff didn't have a thorough understanding of safety risks on site.

We didn't deeply draw lessons from the accident. Some companies didn't truly implement the requirement of "An accident in a factory sounds an alarm for all the others, the hidden danger in a place arouses the vigilance of whole country" so that unsafe events reoccurred.



Improvement measures

Fully implement the *Law on Safety Production*, improve safety responsibility system featuring "the responsibility of the Party and government, one post with dual responsibilities, and equal emphasis and co-administration of production and safety", and fulfill the main responsibility of enterprise to ensure the fulfillment of production safety responsibility of personnel at all levels.

Draw on the experience from our special programs to address safety problems of outsourcing projects, incorporate outsourcing companies and their staff into our management to follow the same standards, requirements, training, rewards and punishments, and promote them to shift from passive to active management.

Strengthen the control of risks and inspection of unrecognized danger on site, move its focus to the group and frontline workers, play the role of safety management system, solve the pending problems in safety supervision and management, and build a long-term mechanism for safety risk management and control.

Severely reprimand unsafe practices, learn from the accidents in other companies and industries, and keep high vigilance to all accidents to prevent the reoccurrence of unsafe events.

# Typical Cases

Matigou coal mine is one of backbone mines of Huating Coal Industry Company, a subsidiary of Huaneng. Currently, the mine has two mining areas, two working surfaces, one fully mechanized mining surface and one tunneling surface. In 2014, the mine produced 1.21 million tons of raw coal. Over past years, the mine has given top priority to production safety in connection with the objective of "creating an intrinsically safe mine". It consolidated its safety standards and put production as the forefront of its company culture, on-site management and control and systematic promotion, and concentrating on staff training, mass participation and technology improvements.

## Focusing on cultural guidance to embed safety concepts into employees' minds

Matigou's coal mine focused on preventive and pre-control measures, developed and practiced the concept of "Building safety by prevention and strict consequences for violations." Guided by the characteristic safety concept, the coal mine inspired employees' wisdom and created a series of distinct production safety concepts. By doing so, employees embedded safety concepts into their mind and enhanced fundamental safety awareness.

## Reinforcing innovative on-site management and control

The coal mine persisted in the implementation of "frontline working", that is, leaders and managers go into the frontline to command and work, solve problems, sum up experience and deliver results. The coal mine leaders went into the workshop to make on-site inspection during regular shifts and even on weekends, and the team leaders joined the morning, afternoon and night shifts to inspect potential hazards on key projects. In addition, the coal mine focused its work on production and formed a level-by-level management system. By doing so, they have assigned the production safety responsibility, its stress and its implementation to each position of departments at all levels.



## Strengthening systematic and stringent management

The coal mine learned from previous accidents and avoided being caught in a situation of "always putting out fires." While concentrating on work procedure, work quality, elimination of unrecognized dangers, education on three violations, quality improvement and project quality, it conducted PDCA closed-loop management through the establishment of action plans. Through work procedures and quality, and elimination of potential hazards and other management measures, it ensured that their management reaches every aspect of production safety. In 2014, the major violations in mine fell by 59.67% and equipment failure rate dropped by 0.8% year on year.

## Intensifying staff training to improve their competence

The coal mine focused on the development of technical talents and established a technology and business training base. It has organized "Job Skill Competition" for 10 consecutive years and built a platform for talented employees. While combining theory with practice in the staff training, they organized the training at different stages, focuses and positions. Through text messages, wechat and other channels, it carried out safety trivia activity. It also organized "one helping one", "the experienced training the green" for young workers and introduced mentoring program to pass on the experience. It followed the "go out" strategy and sent staff to other companies, aiming to learn advanced experience, find out its own shortcoming and improve technical competence of employees.

# Matigou Coal Mine

## Focusing on six fundamental management tasks to build a first-class safe mine



## Paying great attention to concerted efforts and mass participation

We gave full play to the role of concerted efforts through security teams, supervisor organizations, youth safety surveillance posts and family coordinators, and carried out production safety activities among Party members, such as "pilot post", "top-notch pioneer post" and "responsible area for production safety". Our mass safety supervisors conducted frequent patrols, observations, reminders, processes and reports. We also established a detailed working mechanism for selecting, evaluating and appointing the leader and member of safety supervision posts, accident and potential hazard alarm sheet, and feedback records of youth safety surveillance post to document safety hazards and supervise rectification. Families of employees regularly sent well wishes to them at the pit head.

## Focusing on improving and safeguarding production safety by technology

In the coal mine, we put great energy into promoting mechanized production through carrying out mechanized mining, informative production scheduling and intelligent monitoring and control, and popularizing a number of new technologies, technical processes and equipment. This has bettered the underground working environment, reduced labor intensity of workers and improved production efficiency. More importantly, it has enhanced the capacity of the mine to prevent and fight disasters. We also increased investment to build a full-mine safety monitoring system, through which we have realized monitoring and control under the mine and on the ground, industrial video monitoring, automatic transmission and other real-time monitoring and early warning systems. In addition, we enhanced the capacity of the mine to resist risks through building the monitoring system for fire prevention and response, nitrogen injection and grouting, personnel tracking, underground communication, online ventilation monitoring and other production safety management systems.

Relying on advanced technology and excellent management, Matigou Mine has achieved a number of good results. In 2014, it achieve 3,934 days of continuous safe production, the highest record for a single mine in Huating Coal Industry, and what's more, it was awarded a number of national honors.



# 03 Economic Responsibility

Performing our responsibilities to preserve and increase the value of state-owned assets

Total installed capacity

151.49  
GW

Total profit

26.8  
billion CNY

Total revenue

29.2  
billion CNY





### Stakeholders' Expectation

- "Under the current economic development, state-owned enterprises should keep steady growth and facilitate the stable and sustainable development of national economy through focusing on transforming development mode, adjusting structure, promoting reform and strengthening management."
- "We hope Huaneng can strengthen risk control, improve management and profitability, and create better performance to return our country and society."
- "We hope the Company can conduct integrity management and combat all corruptions in accordance with national laws and regulations, because this is the foundation for the sustainable development of enterprise."
- "We expect the Company can actively follow the strategy of going global and make use of market and resources at home and abroad to compete with other world-class enterprises."

### Our Action

- Advanced the conversion of development mode and the adjustment of development pattern, focused on the improvement of quality and efficiency to get us stronger and better.
- Optimized industrial structure, enhanced industrial collaboration, and worked to increase production and income to achieve maximum benefit.
- Paid attention to turning loss into profit, strengthened supervision and risk control to ensure our healthy and stable operation.
- Targeted the world-class level, intensified benchmarking management and accelerate the creation of world-class enterprise with international competitiveness.
- Opened up overseas markets and steadily implemented a "going global" strategy to improve our international operations.

## Enhancing Comprehensive Strength

### Enhancing Power Supply Structure

We implemented the national energy development strategy and seized the opportunity of strategic adjustment of energy structure to promote the structural adjustment of installed capacity. To this end, we made adjustment plans and phased out a number of less competitive projects with poor expected earning. We invest resources to more effective and strategic low-carbon clean energy resources. We also devoted great energy to develop hydropower, gas power, wind power, solar, nuclear power and other clean energy. Besides, we steadily advanced clean and efficient coal-fired power project by developing coal-fired units with high-efficiency, large capacity and low emission, and improved the efficient and clean use of traditional energy.

- ◆ In 2014, our total installed capacity reached 151.49GW, a year-on-year increase of 6.5%, accounting for about 11% in China's total installed capacity. We became the world's largest power generator, increasing our comprehensive strength and improving our ability to serve economic and social development.
- ◆ Co-generation units and 30MW and above supercritical or ultra-supercritical units accounted for 71.8% of coal units, up by 1.8% over the previous year.
- ◆ Our installed capacity of low-carbon energy reached 4,100MW, accounting for 27.1% of total installed capacity, a year-on-year increase of 2.4%. The newly-approved, newly-built and newly-operated low-carbon and clean energy projects accounted for 54%, 79% and 74%, respectively.

Total installed capacity

**151.49**<sub>GW</sub>

a year-on-year increase of

**6.5**%



Changxing Power Plant

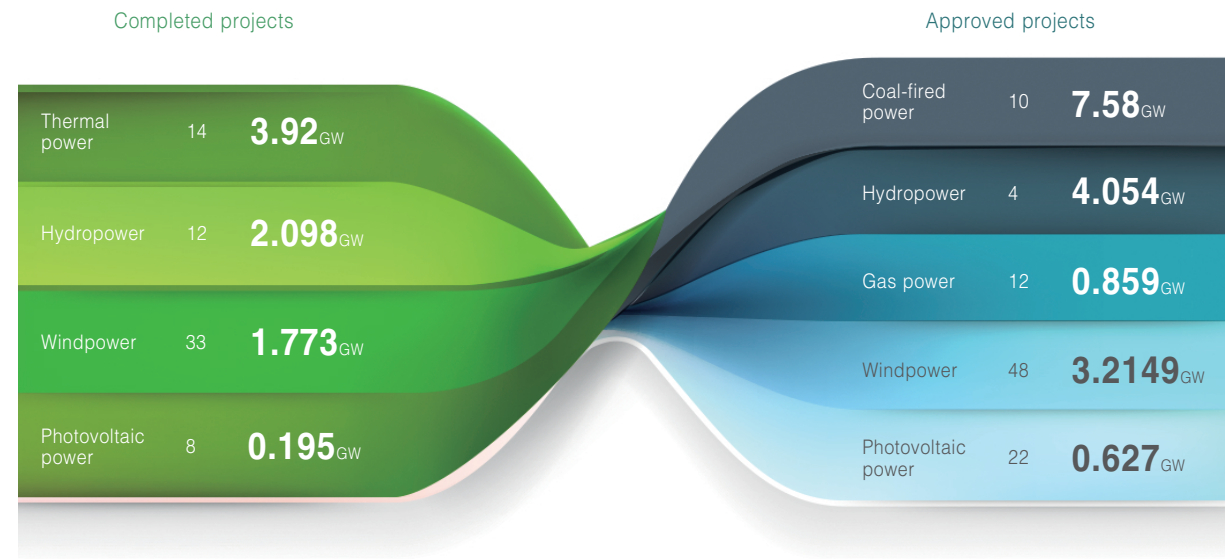
### Unit 2 of Changxing Power Plant -- Huaneng's installed capacity exceeds 150GW

On December 29, Unit 2 of Changxing Power Plant successfully passed the 168-hour commission period, which not only responded to national requirements of reducing inefficient projects but also marked the completion of a "green" and modern power plant. At present, the unit is China's most advanced 660MW coal generating unit. Its successful operation marked Huaneng's controllable installed capacity exceeding 150GW, becoming the world's largest generation enterprise in terms of installed capacity.

Changxing Power Plant is Huaneng's key construction project during the period of the Twelfth Five-Year Plan, with dynamic investment of 5.5 billion CNY. In this project, 2 sets of 66MW efficient ultra-supercritical coal generating units were made up of domestic ultra-supercritical boiler and turbine generator. The host parameters are 28 MPa/600°C/620°C, the highest among reheat units in China. The generating units adopted the combined armament of steam-drive feed pump, fan, and booster fan and the latest cutting-edge technology such as additional low temperature economizer, digital bus and square silos, which kept its main economic indicators leading in the industry. We took the lead in adopting flue gas collaborative treatment technology and kept the emission of main pollutants reaching and exceeding the emission standards of gas turbine. When the project is fully put into operation, it can generate electricity of about 7.2 billion kWh each year, becoming a powerful leverage of power grid in the north of Zhejiang.

#### Main technical indicators of generating unit in 168-hour commissioning

Unit	Indicator	Unit	Value	Unit	Indicator	Unit	Value
No. 1	Coal consumption of power generation	g/kWh	277.94	No. 2	Coal consumption of power generation	g/kWh	283.80
	Specific coal consumption	g/kWh	287.34		Specific coal consumption	g/kWh	294.00
	Station service power consumption rate	%	3.27		Station service power consumption rate	%	3.50
	Dust	mg/Nm <sup>3</sup>	3.64		Dust	mg/Nm <sup>3</sup>	3.32
	SO <sub>2</sub>	mg/Nm <sup>3</sup>	2.91		SO <sub>2</sub>	mg/Nm <sup>3</sup>	5.91
	NO <sub>x</sub>	mg/Nm <sup>3</sup>	13.6		NO <sub>x</sub>	mg/Nm <sup>3</sup>	15.8



Power projects approved and completed in 2014

### Strengthening Industrial Collaboration

We continued to follow a power-centered, coal-based and technology-led development strategy with financial support and industrial collaboration. Moving ahead with the objective of getting our core industry stronger and better, we gave further play to the effect of industrial collaboration through the optimization of coal projects, development of resources, expansion of financial fields, in-depth combination of industry and finance, and faster development of technology industry.

#### Coal Industry

We positively reacted to the difficult business situation within the coal industry and optimized the layout of industrial development. To this end, we focused more on the development of coal resources with good reservation and stronger industrial collaboration, and terminated the projects with poor expected economic returns.

- ◆ In 2014, our approved coal capacity was 920 million tons per year. Gaotouyao Coal Mine was completed and commenced operation and Mine 1 of Diandong Bailongshan Coal Mine resumed construction. Our annual production capacity reached 86.60 million tons, and our coal output reached 74.18 million tons.
- ◆ Our coal output reached 74.18 million tons, a year-on-year increase of 3.7%. The amount of coal supplied by our internal suppliers increased by 4.33 million tons, up by 2.4% over the previous year, further improving the collaboration between coal and power industry. Our coal companies like Huating Coal Industry, Liuxiang, and Qinggangping remained profitable in the context of widespread loss in the coal industry of China.

Coal production capacity  
**86.6** million tons/year

Coal output  
**74.18** million tons



#### Finance Industry

Our financial enterprises highlighted the service and supporting role of the industry via expansion among business fields, in-depth collaboration between industry and finance, stronger risk monitoring and control, and effective prevention of financial risks. Their operating income created a new record and their managed assets exceeded 600 billion CNY.

- ◆ **Construction of Platform** We built a power supplier platform for finance, lease and wealth management, developed new business channels and new sources for profit growth. In 2014, our financial enterprises obtained 9 new business permits like internet banking pilot and launched 12 innovation financial products.
- ◆ **Integration of resources** We drove financial cooperation towards diversified collaborative development, established China's first solar industry development fund, integrated industrial resources, and expanded new collaborations for the industry and finance. In 2014, the scale of this collaboration serving main production business increased by 8.34% over the previous year.

#### Technology Industry

We strengthened the application of innovative and technological achievements, and constantly improved industrialized technological development to accelerate the development of technology industry. Throughout 2014, we signed 3,716 technology contracts in the amount of 3.87 billion CNY, and increased profit by 66% over the previous year.

- ◆ **Effective application of technological achievements** We accelerated the research and application of high-efficient and energy-saving technology, and demonstrated and promoted a number of advanced technologies such as wet dust removal, integrated removal of flue gas pollutants and de-nitration catalyst regeneration.
- ◆ **Faster promotion of industrialization** We strengthened the cooperation of upstream and downstream enterprises in the industry chain, and created asset-light and technology-heavy business model, focusing on the power technological service, the collaboration of social enterprises and the wide integration of social resources to put the development of technology industry on a fast track.

The assets under management exceeded  
**600** billion CNY

Number of signed technology contracts  
**3,716**

#### Faster Application of Technological Achievements in Xi'an Thermal Power Research Institute

Xi'an Thermal Power Research Institute continued market oriented research, spearheading research in production and industrialization. It accelerated the research of energy-saving technology, technological integration and promotion of achievements, developed and applied high-efficient energy-saving technology, and reserved key technologies with great market prospects. It also put more energy into improving technological services for electric power production, and promoted the effective conversion of technological achievements into practical applications. By doing so, it has consolidated its leading position in the field of power plant production technology and services.

In 2014, the Institute carried out more than 60 production technology and service projects and put all of them into safe operation. It made smooth progress in the development and demonstration of key technologies for power station. In particular, its double reheat technology provided support for power plants in An Yuan and Laiwu and its denitration catalyst regeneration technology was successfully applied to the Eastern Power Plant, significantly reducing the cost of denitration.

### Logistics Industry

We set up a port and shipping management department in a fuel company to strengthen the management functions of company-owned ports and shipping enterprises. We launched a direct coal transportation service to 12 power plants including Luohuang, Xinbei and Jinggangshan. In addition, we put the advantages of imported coal business into good use, and made rational allocation of resources, transport capacity and demand of power plants to ensure internal industrial collaboration.

In 2014, the internal coal transport volume of our shareholding shipping companies accounted for 34.8% of total volume of seaborne coal, and the shipping volume of our shipping companies reached 37.6 million tons, a year-on-year increase of 9.8%. Taicang Port Phase II and Haimen Port Phase I projects commenced operation.

#### Shipping volume

**37.6** million tons

#### An year-on-year increase of

**9.8**%



Haimen Power Plant

### Promoting Capital Operation

We attached great importance to capital operation and included it into budget management and performance assessment, so as to propel the optimization of equity and industry structures.

- ◆ **Asset integration** We completed the asset integration of the Company and development companies, and injected the equity of Fengzhen Power Plant and Monda Company into Inner Mongolia Huaneng Thermal Power Plant, and listed coal power in the stock market. By doing so, we increased our comprehensive strength greatly.
- ◆ **Equity transfer** We increased our proportion of equity by acquisition of the development company's equity held by the other shareholders. We introduced the additional capital of national nuclear power into Shidaowan nuclear power project, and issued the additional share H of shareholding and Huaneng Renewables Corporation.
- ◆ **Asset disposal** We disposed inefficient assets of 1.95 billion CNY, shut down and transferred Changchun Biomass Thermal Power Plant, and promoted equity restructuring of Yushe, Qinling, Mengxi, and Haibowan Power Plants and Baotou Thermal Power Plant I.

### Successful trial operation of Taicang Port Wharf

On August 5, 2014, Taicang Port Wharf berthed a 70,000-ton and a 50,000-ton coal ship for the first time while also being able to discharge cargo into storage yards and water transshipment. Noticeably, the berthing of a 70,000-ton coal ship, which is 235 meters long, 35 meters wide, and a draft of 11.9 meters, is the largest coal shipment to have been transported through inland waterways to the coastal sea. Its successful berth showed that Taicang Port Wharf has largest loading and unloading capacity among the Yangtze River's transit terminal. On September 2, the terminal successfully berthed the first 100,000-ton seagoing trade ship, indicating its successful trial operation.

### "Three Gases" Industry

We developed *Shale Gas*, *Coalbed Methane*, *Coal Gasification* and other renewable energy sources and took it as an important measure to foster new growth. For this reason, we made preparations for technical support and steadily advanced the exploration and development of projects.

#### Shale gas

We accelerated the exploration of shale East of Youyang. After completing the pre-drilling engineering design and construction and the geological engineering design of well drilling of well 1 of Youyang East, we started drilling on August 20 and completed it on December 14. Now the pre-drilling work of well 2 is already underway. In addition, we steadily push forward the preliminary work of shale gas exploration in Qianjiang and Yunnan.

#### Coalbed Methane

We channeled great energy in advancing the demonstration project of exploring and developing coal bed methane resource in Chongqing and started the exploration of a coal bed methane well in Songzao block. We also promoted the gas control work in east of Yunnan and formulated *Diandong Surface CBM Extraction Plan*, aiming to achieve environmentally friendly extraction and circular development.

#### Coal Gasification

We promoted the preliminary work of Zhudong coal gas project in an orderly way and developed the construction preparation work steadily, making comparative analysis of gasification technology and similar projects, enhancing investigation and demonstration of technical lines and starting the preparation for project design.

### Transferring shut-down assets of Changchun Biomass Thermal Power Plant

Huaneng has stepped up its pace in the elimination of losses and increase of profits and intensified its efforts in the disposal of inefficient and ineffective assets. Through asset reorganization and liquidation, we have improved asset quality and optimized its asset structure. We closed down the loss-making Changchun Biomass Thermal Power Plant on November 5, 2014, auctioned off its shut-down assets at Beijing Equity Exchange with the final bid price of 116.5 million CNY.

We made active communication and negotiation with auction brokerage firm Beijing Equity Exchange. In accordance with the evaluated value of asset and the actual condition of capital market, we made listing and delisting plans, determined the reasonable listing price and strategy, and made widespread publicity. In the end, we achieved the premium rate of 118.8% and effectively revitalized stock assets.

### Increasing Profitability

#### Focusing on the increase of production and income

In 2014, the pronounced slowdown of electricity consumption in society resulted in the growth rate of market demand lower than that of new installed capacity, surplus electricity production capacity, and significantly decreased power utilization hours. Faced with the current of economy, we strengthened the analysis and study of business situation and enhanced benchmark. While adhering to a strategy of tailoring each plan unique to each plant and implementing the requirements for stabilizing growth, we worked hard to further open up the electricity and heat market and took heat supply as a new measure to increase production and income. By doing so, we achieved remarkable results, reducing the losses of power generation enterprises by 7.3% over the previous year.

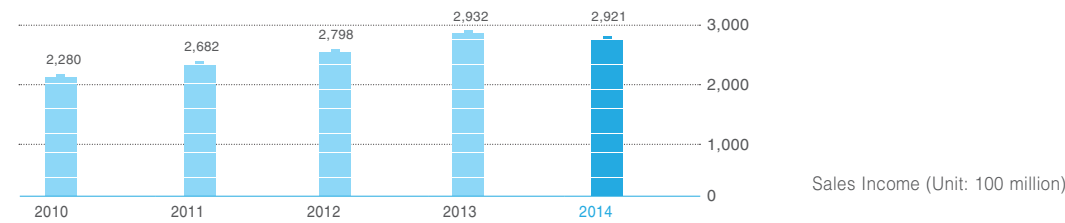
- ◆ **Consolidating power market** Our different industries, regions and enterprises developed their measures to increase electricity output and income. Our market share of power generation was 0.5% higher than that of installed capacity and our utilization hours of composite, hydropower and coal power led in the industry. In addition, our utilization hours of coal power were ranked the first place in 12 regions and our growth rate of electricity in 11 regions was higher than the local average level.
- ◆ **Expanding heating market** We issued *Heat Supply Management Measures* and implemented the measure of "opening up more heating markets and fostering new sources of economic growth". We added another 131.1 million square meters of heating area, increased the heat supply and income by 16% and 28% respectively, and reduced the losses of heating industry by 140 million CNY.



### "Trinity" Heating Supply Mode

Linyi Blue Sky Heating Company adopted a trinity mode to directly supply heat to users. In this way, it realized full-process management and control of heat supply from production, then to pipeline transmission, and finally terminal sales. The Company made full use of the advantages of 4 sets of 140MW and 2 sets of 350MW cogeneration units in Linyi Thermal Power Plant, and took them as the main source of central heating in Linyi city. After completing 229 kilometers of pipelines, 4 relay pumping stations and 202 secondary heat transfer stations, it was responsible for supplying heat to more than 60% of urban area, heating area reaching 185.7 million square meters and heat users exceeding 150,000. One-stop stable heating service was greatly praised by society.

The diagram illustrates the Trinity Heat Supply Mode. It shows a central 'Heat Source Heat Supply Unit' connected to a 'Heating Network' which includes 'Heat supply station, Heat transfer station, Relay pumping station'. This network leads to 'Users'. The entire process is managed by four key centers: 'Control Center', 'Operation Team', 'Toll Collection Center', and 'Customer Service Center', all interconnected with the heating network and users.



### Strengthening Cost Control

While firmly establishing the cost control concept of "a penny saved is a penny earned" throughout the Company, we put more energy in strengthening the cost control in the entire production process, tapping into the potential of cost reduction, tightening up fuel procurement management, controlling fuel cost, enhancing financial management and optimizing financing structure. By doing so, we achieved tangible results in cost control.

Fuel Cost	Cost Control	Financing Cost
<ul style="list-style-type: none"> <li>We optimized and adjusted coal procurement strategy, signed multi-year contracts with large coal mines and strengthened the medium- and long-term cooperation.</li> <li>We intensified the intensive management of seaborne coal, maximized the price advantage of imported coal and got refined our imported coal business.</li> <li>We enhanced internal coal management. 19 power plants including Yingkou Thermal Power Plant passed the acceptance for fuel management model power plant.</li> </ul>	<ul style="list-style-type: none"> <li>We strengthened budget execution and cost control, by which the cost of production and three items lowered 4.1% and 1.4% than the budget.</li> <li>We gave play to the Company's overall advantage, strengthened the centralized fund management and achieved fund collection rate of over 95%.</li> <li>We intensified the efforts to collect arrears and clear debts. Huaneng Renewables Corporation made encouraging progress in the collection of CDM arrears.</li> </ul>	<ul style="list-style-type: none"> <li>We persisted in the strategy involving a focus on credit and securities and a supplement of diversified products, optimized financing structure to lower financing cost.</li> <li>We created financing modes, explored a variety of financing channels such as ultra-long-term debt and finance leases to ensure capital needs.</li> <li>We closely followed the production needs and the changes of capital market and timely solved problems to prevent capital risks.</li> </ul>



### Improving Performance Management

We strengthened the monitoring and execution of key budget elements and made reasonable adjustment of assessment indicators in accordance with the different characteristics of finance, technology, coal and other enterprises. We also improved performance assessment management, regulated the setting of incentives for windfalls to highlight the orientation of value creation and enhance the contribution of value.

In 2014, our combined profit, net profit, EVA and other key performance indicators reached a new high and our asset-liability ratio dropped to 82.39%, the lowest in recent years.

Asset-liability ratio

**82.39%**

A year-on-year decrease

**0.12%**

### Consolidating Our Management Basis

#### Promoting the Creation of the Best

We formulated the *Regulations on Creating the Best and Management Improvements*, established an effective mechanism for it, and strengthened the tracking analysis of the overall process of "Creating the Best" to drive these two tasks forward in a stable and sustainable way.

- We formulated the *Guidelines for Enterprises on Planning the Creating the Best, the Examples of Index Database for Creating the Best in Enterprises and the Formation of Index System for Creating the Best in Enterprises and the Examples of Index Evaluation*.
- We prepared the comprehensive analysis report on

enhancement of indicators for Creating the Best, put forward improvement suggestions for the problems reflected by the indicators, and developed improvement measures to realize closed-loop management.

- We organized meetings to plan and promote how best to develop and move forward.

#### Deepening Enterprise Reform

We developed guidelines to deepen reform, establish leadership and special groups for comprehensively deepening reform and determined objectives, principles and measures by 2020.

- We formulated a plan to integrate infrastructure construction with material management, completed the joint operation of development companies and GreenGen and integrated shale gas, coal bed methane and coal-to-gas management resources to establish specialized management.
- We promoted intensive regional management of renewable energy projects. Huaneng Renewables Corporation in Liaoning completed their integration. Fuel company realized the direct management of Ruining Shipping Company and the entrusted management of Caofeidian Port.
- The innovative management achievements of Shandong, Lancangjiang and Huaneng Renewables Corporation were awarded the Prize of 21st National Business Administration Modern Innovation Achievement.

#### Informatization System Construction

We moved ahead with our objective of improving fine, intensive and real-time management to promote information system construction and strengthen information security and its maintenance and management.

- We formulated the *Plan for Promoting Information Technology Application Projects 2014-2015 and the Regulations on Information System Management* to improve information system construction.
- We put the Online Business Analysis System into operation, covering more than 30 business entities including company's headquarter and shareholding companies, and saw to the online integration of financial assets in 148 subsidiaries.
- We carried out the research of soft science subjects like "Research of IT Application in Energy Group" to provide support for the construction of an information system.

## Strengthening Supervision and Control

### ◆ Making Greater Efforts to Combat Corruption and Uphold Integrity

**Implementing "Two Responsibilities"** We issued and implemented *Opinions of China Huaneng Group Corporation on the Implementation of Main Responsibility for Improving Party's Style and Building a Clean Enterprise (Trial)* and *Opinions of China Huaneng's Party Group and Discipline Inspection Group on the Implementation of Main Responsibility for Improving Party's Style and Building a Clean Enterprise (Trial)*, interviewed the secretaries of Party leadership group (committee) and leader (secretary) of the discipline group (committee) and made a thorough inspection on the implementation of responsibility system for improving the Party's style and building an above board enterprise.

**Preventing and controlling corruption risks** We revised and improved 741 anti-corruption rules, improved 456 collective decision-making systems including 343 revised ones, and promoted the construction of rules and systems that enterprise officials dare not, can not and do not want to entertain the possibility of unethical or questionable business practices.

**Constructing anti-corruption culture** We strengthened law-compliance and warning education, carried out the education and training on professional integrity and ethical quality, and reinforced our anti-corruption culture by tracking transactions via 5 indicators

**Strengthening efficiency inspection** We inspected 463 projects, developed 1,183 regulations and systems, avoided the potential loss of 7.6 million CNY, recovered the economic losses of 5 million CNY, saved 160 million CNY and achieved an additional economic benefit of 283.4 million CNY.

### ◆ Strengthening Internal Audit

We put more effort in the economic responsibility audit, infrastructure investment audit and special audits and strengthened auditing supervision. We also promoted the management of enterprises by laws, regulated internal management and prevented operational risks to improve economic benefits.

- ◆ **Economic Responsibility Audit** Our audit agencies at all levels examined 159 leaders at the end of their term, and 102 leaders during their term.
- ◆ **Infrastructure Investment Audit** We conducted 232 engineering settlement audit, project completion settlement audit and follow-up auditing among various infrastructure engineering, involving a total investment of 77 billion CNY.
- ◆ **Special Audit** We completed 1,039 audits of financial revenues, equipment overhaul, fuel management, internal risk control, procurement and other special audits, as well as audit investigations.
- ◆ **Audit Corrective Action** We implemented 2,402 corrective recommendations of previous year, corrected 4,359 problems discovered last year, achieved a correction rate of 86%, and revised and supplemented 333 rules and systems.



Employees of Huaneng Singapore Tuas Power Ltd.

Improving

**456**

collective decision-making systems

Inspected

**463**

efficiency inspection projects

The number of audited enterprises

**248**

The amount of audited assets

**657.5** billion CNY

### ◆ Intensifying Risk Management and Control

In 2014, we continued to intensify risk management mechanism and promoted the construction of internal control system. While putting the internal control evaluation into full swing, we established the internal control evaluation and accountability system for the Company and secondary units. In our entire system, we eliminated, revised and established 160 rules and systems, and completed the three-year legal work plan. By doing so, we further improved our legal management system and mechanism, and increased our legal risk prevention capacity significantly.

- ◆ We carried out the risk evaluation 2014, prepared Comprehensive Risk Management Report 2014, and issued and implemented the common internal control evaluation standards for hydropower and renewable energy sectors.
- ◆ We stepped up the construction of internal risk management information platform and started the construction of internal control management module in the system.
- ◆ We established an appraisal system for legal risk prevention.
- ◆ We promoted the application of the online contract system of legal management information system throughout the Company.

## Globalizing Business

We proactively adapted ourselves to new situations and requirements, developed the strategy to implement international operations, and improved its management system and mechanism. While paying as much attention to domestic development, we focused more on foreign assets management, risk prevention and benefit improvement to enhance all-round international cooperation and push international operations to a new level.

#### Strategic Guidance

We established a leadership group for international operations, and formulated and implemented the *Strategy for International Operations* and the *Instructions on Improving the Management System of International Operations*. We also cleared our strategic direction, basic principles and tasks, reinforced organizational and institutional construction, and guaranteed qualified personnel. By doing so, we laid a solid foundation for international operations.

#### Improved Benefits

Based on improving the profitability of overseas assets, we strengthened power production management of Huaneng Singapore Tuas Power Ltd, Australia Power Company and International Power Company, tapped into the potential to reduce cost and increase efficiency, strengthened risk control and management, and regulated the disposal of inefficient and ineffective assets. By doing so, we further improved the profitability of our overseas assets.

#### Project Development

We maintained steady progress in the development and construction of new projects, completing Project A of Tembusu Phase II of Huaneng Singapore Tuas Power Ltd. and putting it into production, starting the construction of Grade II hydropower project on River San, Cambodia, and steadily propelling the development of projects in Mexico, Pakistan, Myanmar and other countries.

#### In-depth Cooperation

In response to the national OBOR initiative, we expanded international cooperation in the energy field, communicated with United States Department of Energy, Singapore Economic Development Board and other governmental organizations, and exchanged ideas with enterprises in America, Italy, France, Japan, Denmark, Kazakhstan and other countries to seek cooperation opportunities and increase our international influence.

### Huaneng Tembusu Coal Power Project -- the Successful Model of State-owned Enterprises Going Global

In 2013, Phase I of Huaneng Singapore Tembusu Cogeneration Project -- our first large-scale clean coal overseas power plant -- was put into operation. In 2014, its Phase II project commenced production. This is the first coal power station we built in Singapore with our world's leading technology and experience in the coal-fire power field and built.

**Clean Production Model** The emission of CO, NOx, SO<sub>2</sub>, mercury and solid particles in Tembusu Project is much lower than the emission limits set by Singapore Environmental Protection Department. More noticeably, the emission of CO, SO<sub>2</sub> and mercury kept the same level as natural gas unit and the emission of NOx and solid particles was even lower than that of natural gas unit.

**Financing Mode Model** We adopted international syndicated loan without recourse for project financing.

**Project Operation Model** We gave play to the financial leverage effect of market financing, increased return on investment and achieved positive results. Through Tuas Power, we developed a number of professional talents who are familiar with international market operation rules and good at the management of international operations.



# Typical cases

In 2014, Shandong Company moved ahead with its objective of improving intensive production management capacity, lean management capacity and market competitiveness. Through more intensive operation and synergistic effect, it coordinated and optimized electricity, coal, fund, materials and other operating elements to operate the Company strategically to maximize its benefits. It also intensified production and management performance assessment and on-line monitoring to ensure the realization of its objectives. In addition, they worked hard to establish its differentiated competitive advantage and maximize its profit through focusing on conversion and upgrading, putting the existing and additional financial resources to good use, giving equal attention to the extension and intension of development, adjusting installed structure, expanding heat supply market and reinforcing capital operation.

## Focusing on collaboration to improve intensive operation capacity

Moving ahead with its core work such as improving net profit, turning loss into gain and maintaining growth, Shandong Company made overall optimization of operating elements and increased synergistic effect. To control the downside risks in power market, it scientifically organized regional power generation plan, strengthened the adjustment of power structure, and gave priority to large-scale clean and high-efficient generating units. In 2014, the company achieved alternative power generation of 585 million kWh among power plants. Its utilization hours of 60MW generating units were 450 hours, 1,056 hours and 1,606 hours higher than 30MW, 20MW and 10MW generating units. Through its scientific and practical plan on arrangements of plant operations, it reduced the startup and shutdown of generating units, a year-on-year decrease of 14 times, saving more than 300 tons of fuel oil. It also strengthened coal collaborative management through building stable fuel supply channels, signing long-term cooperation contracts with Yanmei, Jinneng, Yanzhou and other key coal companies, implementing market-based price adjustment mechanism and promoting unified distribution. In this way, it regulated 1.4 million tons of coal across power plants. Through the coordination of funds and materials management, it worked to meet the needs of production and operation, adjusting internal idle materials of 4.79 million CNY, and maximizing the overall benefit.



## Strengthening management and control to enhance lean management capacity

The company put online business platform into good use, and gave full play to its management and decision-supporting role. It also strengthened the prediction of monthly operating performance and comprehensive budget management to provide effective support for production and operation. By full-process fuel management and non-persistent fuel data, it aimed to achieve closed-loop management of fuel contracts. In order to mobilize the grassroot-level enterprises, the company improved performance assessment structure, and strengthened the orientation of business objectives. It also focused on the assessment of key performance and the implementation of key measures and applied motivation and reprimands consistently. Besides, it deepened the integration of information technology and management, and promoted



# Shandong Company

## Enhancing three capacities to promote the improvement of quality and efficiency

the standardized maintenance management. It built "one-stop platform" for maintenance management and incorporated environmental data into real-time production monitoring platform. By doing so, it realized full-process monitoring of production performance.

More importantly, it conducted internal control evaluation, strengthened auditing supervision and efficiency inspection, and standardized management of labor force to prevent and eliminate major operational risks. It also improved standard management and innovative management to provide powerful support for production and management.

## Sharpening focuses to enhance market competitiveness

Moving ahead with its focus on differentiated competitiveness and marketing management, the company made differentiated analysis and put the advantages of large-scale high-efficient and clean generating units into good use to deal with the actual condition of more small and ageing generation units. It also strived for annual electricity plan and improved the utilization hours of units to create both economic and social benefits. It channeled effort toward expanding the heat supply market, focusing particularly on direct supply, to foster a new economic growth point. It increased another 9.89 million square meters of heating area and by the end of the year, its heating area exceeded 100 million square meters. Through strengthening heating business management and striving for reasonable heat prices, it increased marginal contribution of heat supply and protected its own interests while ensuring heat supply to residents. In terms of fuel cost, it paid great attention to competitive price-based procurement, promoted this procurement mode and took advantage of central procurement of key accounts to effectively control fuel cost. Moreover, it focused on innovative financing, adopted a variety of financing channels like financing lease to ensure the fund needs of production and operation and effectively reduce the cost of capital.

In 2014, Shandong Company created a new record in its business performance and increased its profit sharply. Through significant reduction of the loss-making scale among thermal power plants and optimization of the profit structure, its net asset yield was 0.49% higher than the budget and its EVA increased by 1.312 billion CNY year on year. In terms of the Company's annual performance assessment, its composite score of four performance indicators stayed ahead and earned A-level performance.



# 04 Environmental Responsibility

Contributing clean energy to economic and social development

Investment in heat supply, energy conservation and environmental conversions reached

**15.3**  
billion CNY

Installed capacity of low-carbon and clean energy

**41**  
GW

Specific coal consumption

**310**  
g/kWh

Station service power consumption rate

**4.4**  
%



### Stakeholders' Expectation

- "We hope for clearer sky's, safer water, cleaner air and better life."
- "In the context of global warming, frequent haze and other extreme environmental problems, we hope Huaneng can take more actions to cope with climate change and develop clean energy."
- "We need more clean energy to meet the demands of social development and environmental protection."
- "We wish to join hands with Huaneng to develop innovative environmental technology and step up energy conservation and emission reduction."
- "We hope we have a healthy and green working environment to discharge our duties in the construction of beautiful China and beautiful Huaneng."

### Our Action

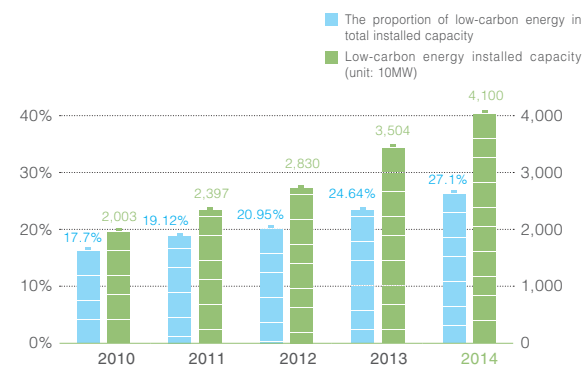
- Put great weight behind the development of hydropower, wind power, nuclear power, solar and other clean energy sources and promoted the strategic adjustment of installed structure.
- Strictly implemented the national environmental laws and regulations, and put greater energy in the more environment-beneficial conversions of coal units to further enhance the level of clean production.
- Strengthened adequate management in energy conservation, developed and applied advanced energy-saving technology, and strived to produce more electricity with less coal.
- Intensified our efforts in technological innovation, enhanced innovation and application of cutting-edge technology, and promoted the conversion of energy production.
- Protected biodiversity, advocated low-carbon life and work and started to protect natural environment from ourselves.

## Developing Clean Energy

Following the guidance of national energy development strategy, we seized the strategic opportunity to adjust energy structure and speeded up the conversion of development mode to put great weight behind the development of low-carbon and clean energy project. We pressed ahead with the steady development of hydropower projects in combination with the construction of the transmission channel, stepped up the construction of wind power projects on the basis of optimized layout, and actively developed solar and other low-carbon and clean power projects with reliance in the adjustment of investment strategy.

In 2014, our low-carbon energy installed capacity exceeded 41GW, of which the installed capacity of hydropower, wind power and solar energy exceeded 20GW, 11GW and 800MW. The proportion of clean energy installed capacity reached 27.1%, up 2.4% over last year and nearly 10% over 2010.

Clean energy installed capacity from 2010 to 2014



### Hydropower

In 2014, another 2098MW of hydropower went into operation. Nuozhadu hydropower station, the largest station along the Lancang River. We pressed ahead with the steady development of hydropower stations on upper stream of the Lancang River and middle reaches of Yajiang, and made solid progress in the preliminary survey and design of controlling reservoir for hydropower on the downstream of Yajiang. The hydropower projects in Huangdeng, Wunonglong and Dahuaqiao have been approved.

In 2014, another  
**2098** MW  
of hydropower went into  
operation

### Wind power

- ◆ We actively promoted the adjustment of energy layout, and speeded up the development and construction of wind power projects in Yunnan, Guizhou, Sichuan and Guangdong.
- ◆ 1.773GW of wind power units went into production and the total installed capacity of wind power exceeded 11GW.
- ◆ 2.95GW wind power projects were listed into the fourth group of national approved projects, and 1.2GW offshore wind power projects were included in national development and construction program.

### Gas turbines

- ◆ The new gas turbine project in Dongshan Thermal Power Plant was approved. The gas turbine extension project in Beijing Co-generation Thermal Power Plant and the new gas turbine project in Jiangyin Power Plant have been green lighted.
- ◆ We conducted distributed energy trials at Shanghai Mansion and Qingdao Emergency Center.
- ◆ The gas turbine projects in Zhejiang, Chongqing and Tianjin went into production, and the scale of gas turbine reached 7.9GW.
- ◆ Jinling gas turbine co-generation project was awarded the National Quality Awards.

### Nuclear Power

- ◆ We improved the top design of the nuclear power management framework and established a robust integrated management system to enhance the management and control capability of nuclear power.
- ◆ We set up a nuclear power expert committee, developed the guidance to the development of nuclear power, and formulated the development strategy the 13th Five-Year Plan for nuclear power industry.
- ◆ We pressed ahead with the steady development of HTGR nuclear power demonstration project and ensured its safety, quality, progress and investment under control.
- ◆ The feasibility report of large advanced PWR CAP1400 demonstration project passed the review and its construction engineering contract was officially signed.

### Photovoltaic Power

- ◆ We focused on the reserve of photovoltaic power resources and the preliminary work of project and put greater energy in the development of photovoltaic project.
- ◆ 195MW of photovoltaic power projects went into operation and 627MW of photovoltaic projects were filed.
- ◆ The installed capacity of photovoltaic power reached 850MW.

## Improving Clean Production

### Intensified efforts to Environmental Conversion

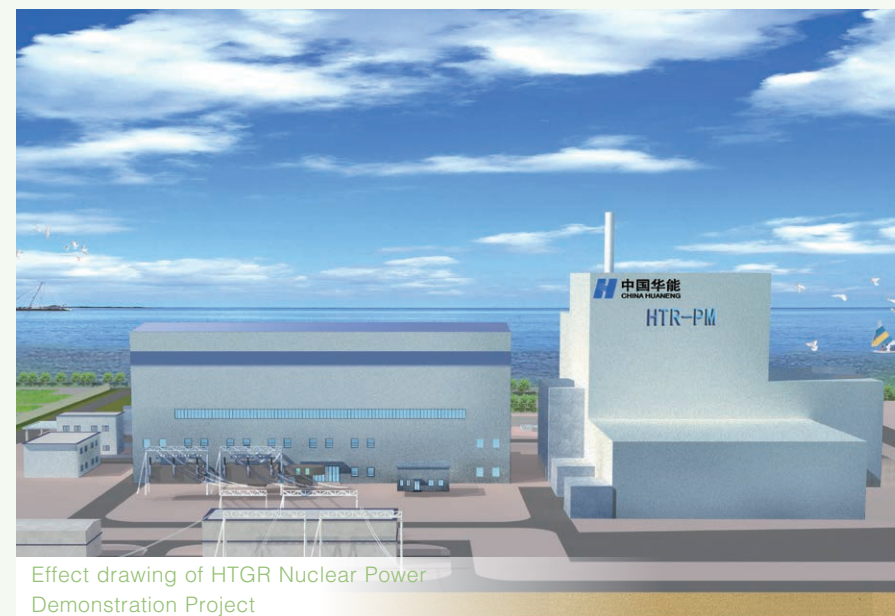
- ◆ **Reinforcement of measures** We issued *Notice on Improving Environmental Protection Level of coal Units in Key Control Region and implemented Technical Conversion Line for Improving Environmental Protection Level of Typical Units*.
- ◆ **Increase of investment** We increased our investment in heat supply, energy conservation and environmental conversions. In 2014, we invested 15.3 billion CNY, accounting for 16.7 of total investment, an increase of 4.75 billion CNY over the previous year.
- ◆ **Standardization conversion** We made intensive efforts to de-sulphurization, de-nitration and dust removal engineering, and raised the environmental design standards for our projects.
- ◆ **Upgrading conversion** We formulated technical conversion plan for increasing emission limits, built coal ultra-low emission conversion demonstration project. Unit 9 of Huangtai Power Plant was included in the national demonstration projects. 12 sets of 4.44GW units reached ultra-low emission standard.

### Performance of Environmental Conversions in 2014

Item	De-nitration	Increased De-nitration capacity	dust control
Transformed unit (set)	104	44	65
Transformed capacity (10MW)	2,995	1,713	2,243
Installed rate (%)	94	100	100

In 2014, we continued to give the central attention to the construction of nuclear power projects and effectively fulfilled our management and control responsibility for nuclear safety. We pressed ahead with the steady construction of Shidaowan HTGR nuclear power demonstration project, ensured the safety, quality, progress and investment of projects under control, and made positive progress in the development of nuclear power talents and the construction of nuclear safety culture.

- ◆ We set up an on-site headquarters for demonstration projects, established a chief commander meeting system to make on-site coordination, strengthened the management and control of project and made overall coordination to promote the progress of project.
- ◆ The main construction carried out smoothly, building nuclear island plant to 20.45 meters high, starting the main construction of conventional island and completing the installation of shield cooling water module D in the cabin of reactor.
- ◆ We completed consecutive 500-hour full-load operation of helium circulator engineering prototype, the heart of nuclear power plant, and completed all experimental verification of key equipment.
- ◆ We pressed ahead with the manufacture of main equipment, and completed the test of HTGR fuel elements. Its indicators reached international advanced level.
- ◆ We carried out production preparation work and 27 of our second round of reserved operators were awarded HTR-10 advanced operator license by the National Nuclear Security Administration.
- ◆ We intensified efforts towards nuclear safety, and organized the first self-assessment on nuclear safety culture. Our management system entered the stage to integrate management and embed rules and systems.



Effect drawing of HTGR Nuclear Power Demonstration Project



The construction site of HTGR Nuclear Power Demonstration Project

### Strengthening Environmental Management

- ◆ We strengthened real-time monitoring of pollutant emission, and made pollutant emission of coal units be a part of the Company's real-time supervision. In 2014, we inspected more than 50 power plants and implemented corrective measures.
- ◆ We strictly implemented the environmental impact assessment (EIA) system of construction projects. In 2014, a group of key projects in Yingliangbao, Caohu Phase II, Zhengning and Yushen obtained the EIA approval. The EIA of Dailan Thermal Power Plant II and Daba Phase IV were accepted.

### Strengthening Carbon Asset Management

In a major push to advance carbon asset management, we implemented a carbon trading strategy in pilot enterprises, and established the emission inventory of our thermal power units to provide the basis for drawing a plan for carbon emission control. We implemented 31 voluntary emission reduction projects. 5 of them became part of the national emission reduction program approved by the National Development and Reform Commission.

#### Huaneng established China's first carbon fund

In November, 2014, our carbon asset company initiated and issued China's first carbon fund – Lion Fund Win 1 carbon emissions special asset management plan. According to the plan, the first round of 30 million CNY was invested in Hubei Carbon Trading Market with the fund trade targeting carbon credit and CCER. We aimed to achieve total control of greenhouse gas emission through financial pressure and thus have created a practical impetus for emission reduction. This is useful for pushing innovation in carbon financial models, integration of social resources, and expansion of business market.

**Carbon credit:** It refers to a permit representing the right to emit a certain amount of CO<sub>2</sub> and other greenhouse gases into the atmosphere according to the laws. The government allocates the credit to each enterprise. When the actual carbon emission of enterprises exceeds the resulting credits, they must purchase the credit at carbon trading market, paying for their excessive emission. On the contrary, they can also sell their surplus credits at the market, gaining the benefits of emission reduction.

**CCER (China Certified Emission Reduction):** Through renewable energy or energy-saving technology, enterprises achieved surplus energy for their projects. After their energy-saving projects are certified by third-party agencies, the National Development and Reform Commission will issue enterprises with CCER, which can be used to offset carbon emission targets of enterprises under carbon emission control.



Technological transformation of generator

### Tapping into Energy Conservation Potential

#### Strengthening fine management

Moving ahead with our starting point to create the excellence of main model indicators and build excellent environment-friendly and conservation-minded enterprises, we strengthened fine management in energy conservation through the implementation of energy-saving measures, the energy-saving benchmark analysis, the improvement of energy-saving incentives, and the mobilization of enthusiasm in various sectors, aiming to promote the continuous improvement of energy consumption indicators of units and achieve the industry-leading position in the energy consumption, especially large high-efficient units.

- ◆ We advanced the standardization of small indexes, optimized and enhanced major indexes by improving small ones and created demonstration unit in the industry.
- ◆ We issued the Rewarding Methods on Creating Excellence and Improvement in Energy Consumption Indexes of Supercritical or Ultra-supercritical Generating Units, and focused on improving energy consumption indexes of 1,000MW and 600MW supercritical or ultra-supercritical units and main model units.
- ◆ In 2014, 24 power plants reduced specific coal consumption by over 5 g/kWh and 13 power generation enterprises reduced station service power consumption rate by over 0.3%.

#### Best Thermal Power Generating Units in the Energy Efficiency Benchmarking of State-owned Enterprises of Power Industry

Capacity	Prize-winning Unit
600MW	Unit 4 of Shidongkou II Power Plant
	Unit 5 of Weihai Power Plant
	Unit 6 of Pingliang Power Plant
	Unit 2 of Shidongkou II Power Plant
350MW	Unit 7 of Qinling Power Plant
	Unit 3 of Fuzhou Power Plant
300MW	Unit 1 of Nantong Power Plant
	Unit 4 of Pingliang Power Plant
	Unit 3 of Yushe Power Plant

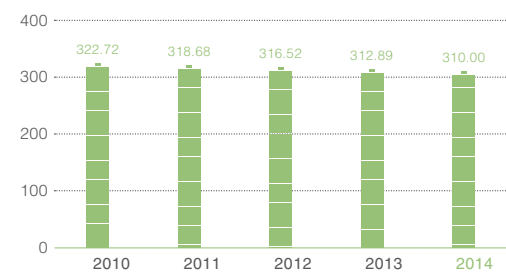
#### Promoting Energy Conservation Conversion

Upholding the energy conservation conversion principles of "Led by institutions, safeguarded by innovation and focused on implementation", we formulated the *Energy Conservation Conversion Action Plan 2014-2020*, and promoted energy conservation conversion throughout the Company by means of technological conversion in heat supply, turbine flow and others.

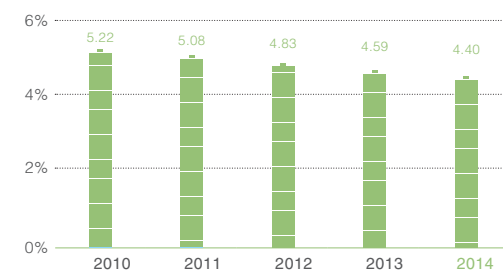
- ◆ In 2014, we held a conference to discuss and demonstrate renewable energy conservation technology and its application, organized field investigation in power plants and carried out the overall energy conservation optimization of Weihai Unit 6 and Shangdu Unit 2 and demonstration of advanced technology integration.
- ◆ We put greater efforts in screening and approval of comprehensive upgrading and conversion projects. 11 conversion projects in Yangliuqing, Xindian and other places passed the review of National Energy Administration, which was evaluated to save 300,000 tons of standard coal each year. The projects passed the review can save a total of 2 million tons of standard coal. Shangdu Unit 4 and Weihai Unit 4 were listed as comprehensive upgrading and conversion demonstration projects by National Energy Administration.



Specific coal consumption (g/kWh)



Station service power consumption rate (%)



### Tongchuan Zhaojin Power Plant Achieved Remarkable Effect in Energy Conservation Conversion

Tongchuan Zhaojin Power Plant was the supporting project of national air cooling unit localization. Its 2 sets of 60MW generating unit in the first phase went into operation at the end of 2007. In particular, Unit 1 was first China-made 60MW sub-critical condensing air cooling coal power unit with desulphurization facilities.

With the objective of creating a conservation-minded and environment-friendly power plant, the Tongchuan Zhaojin constantly improved its management and optimized its technical and economic indicators through benchmarking and promoting production management and energy conservation conversion at the same pace. It completed 17 major energy-saving technological conversions including condensate pump frequency conversion and steal turbine seal, and made continuous improvement of unit energy efficiency. Noticeably, the average efficiency of induced draft fan increased by 20% after it was retrofitted, thereby reducing specific power consumption rate by 0.2%. After conversion to the turbine seals of Unit 1 and 2, the power plant reduced coal consumption by 3.5 g/kWh and 2.2 g/kWh respectively. What's more, the power consumption of ESP power control system dropped by 50% after its conversion.

In 2014, the Power Plant achieved specific coal consumption of 328.53 g/kWh and specific power consumption rate of 5.29%, a decrease of 21.4 g/kWh and 1.69% respectively over the initial period of operation, saving a total of 620,000 tons of standard coal. The specific power consumption rate and net coal consumption rate of Unit 1 was the best among similar units across China.

### Carrying out Green Office

We strengthened the publicity of "green" development concept, energy conservation and environmental protection, guided our employees to low-carbon life, and enhanced their awareness in this respect.

The Company sharply streamlined meetings and briefings and gave high priority to video conferences;	The Company advanced information construction and paperless office;	The Company purchased and used office supplies as required, and advocated replacing new cartridge with the old one and printing on both sides of paper;	The Company strictly controlled the temperature of air-conditioners and promoted the use of energy-saving lights;	The Company used water-saving devices, and used reclaimed water as supporting resources for production, greenery and landscape;	The Company strictly regulated the use of official vehicles and controlled the purchase of vehicles and the fuel consumption of each vehicle.



## Promoting Technological Innovation

### Strengthening Technological Innovation Management

Following the requirements of national policies, we worked to grasp the trend of technological change and innovation. From our Xi'an Thermal Power Research Institute and Clean Energy Technology Research Institute, we created the *Medium and Long-term Development Plan for Science and Technology (2014-2030)*, and issued the *Guidelines on Strengthening the Management of Patents and Other Intellectual Property Rights*. In addition, we set up a special technological innovation award, strengthened initialization management of major technological projects and encouraged multi-level technological innovation.

### Propelling the Development of Technological Projects

We increased our resources towards technological development by putting more than 500 million CNY towards research and development. We have set up 32 technological projects at the corporate level, 130 projects in industrial companies, and carried out 170 projects. Among them, there were 7 national-level and 3 provincial-level technological projects.

- ◆ We continued to advocate research in cutting-edge technology of alternative and renewable energy such as solar power, wave power, shale gas and coal bed methane.
- ◆ We completed 6 special studies of double reheat technology, and technical design review of national 700°C experimental platform and 200 KW wave power generation devices.
- ◆ We made great breakthroughs in the development of 700 high-temperature materials, methane catalyst and others, and achieved 166 national patents, including 27 invention patents.

**166** national patents

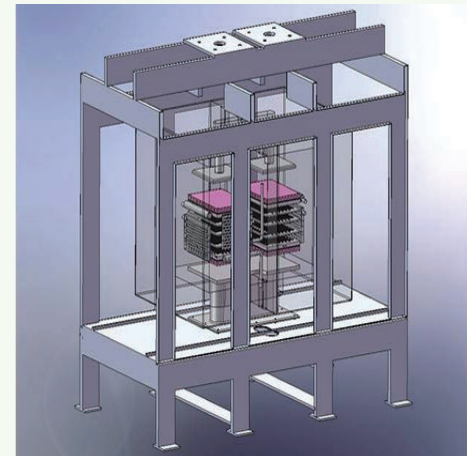
**27** invention patents



### Successfully developed 2 KW MCFC power generation system

On December 30, 2014, the 2 KW molten carbonate fuel cell (MCFC) power generation system developed by Clean Energy Technology Research Institute successfully went into operation. Its peak output power was up to 3.16 KW, achieving the currently highest power output in China. With a load of 220V bulb, the entire system converts direct current into alternate current through DC-AC converter and conducts discharge test, producing stable output power of 2.16 KW. The entire system at a load of 220V, converted direct current into alternate current and produced a stable output power of 2.16 KW.

The successful development of MCFC marks that we have completely mastered the key technology of MCFC and have been able to meet international standards. It has also laid a good foundation for the development of large-area and high-power MCFC power generation systems and provided assurance for a coal-fire power plan to have a comparatively lower environmental impact.



Technological Awards		
SN	Project	Award
1	Ultra-high Core Rockfill Dam Key Technology and its Application	The Second-class National Science and Technology Progress Award
2	Development and Application of Trace Amount TOC Analyzer for Power Plant	The First-class China Electric Power Science and Technology Award
3	Oxide Scale Growth and Exfoliation Mechanism on Heat-absorbing Surface of Inner Wall of Boiler and Research of Control Measures	The Second-class China Electric Power Science and Technology Award
4	Design of IGCC Power Station Controlling System and Application	The Second-class China Electric Power Science and Technology Award
5	Research and Application of SSR Mitigation by Extreme Damping Control Technology	The Third-class China Electric Power Science and Technology Award
6	Key Technology and Engineering Application of Recycled Filter Element and Extending Lifespan	The Third-class China Electric Power Science and Technology Award
7	Development and Application of Fieldbus Device Monitoring and Management System	The Third-class China Electric Power Science and Technology Award
8	Independent Research of Large CFB Boiler Simultaneous Efficient Denitration Key Technology and its Engineering Application	The Third-class China Electric Power Science and Technology Award
9	Line-focus Direct Steam Condensing Solar Power Technology and its Demonstration	The Third-class China Electric Power Science and Technology Award



### Leading innovation in industry collaboration

We compiled the Thermal Power Industry Technology Innovation and Development Plan (2015-2020), successfully hosted CCUS Beijing International Forum, and participated in the demonstration of national major technological mechanism for gas turbine system. Huaneng Nanjing Power Plant and its Unit 2 were named as "national experimental platform for key components of 700 supercritical or ultra-supercritical power generation technology" and as "host unit" by the National Energy Administration.

### Construction Demonstration Project

We pressed ahead and made progress with the construction and operation of technological innovation demonstration projects. The IGCC project acts as the supporting engineering for major projects in the national "863 Program" and also China's first large-scale IGCC generating unit. In 2014, Tianjin IGCC Power Plant made breakthroughs in the operation, management and optimization of IGCC demonstration projects. It was able to maintain high-loads for over 1500 hours with the highest load of 265MW. Its emission of SO<sub>2</sub>, NO<sub>x</sub>, dust and other pollutants matched that of gas-based units. As supporting part of IGCC demonstration power station, the main construction of China's first pre-burning CO<sub>2</sub> capture device will be completed and be put into commission. Shidaowan HTGR nuclear power demonstration project which is an important national major scientific and technological project, is also currently being constructed. We have made dramatic breakthroughs in the production of main equipment and have completed tests and verification.

To be a world-class enterprise requires three elements to be in place: being ranked among the world Top 500 enterprises, being ranked among the first 10 places of the global industry and creating its own brand and mastering independent core technology. The third one is the most critical element. Tianjin IGCC demonstration station is characterized by its "green" development, optimized coal power generation and technological innovation. In particular, its gasification equipment was made with Huaneng's own independent technology. It is the first time to design and manufacture two-stage dry pulverized coal gasifier in China. This has greatly improved the core competitiveness of Huaneng Group.

– Hu Anang, Director of National Conditions Research Institute, Tsinghua University

### The main capturing part in the pre-combustion CO<sub>2</sub> capture demonstration device is nearly completed

China's first set of pre-combustion CO<sub>2</sub> capture device with complete independent intellectual property rights starts its construction in Tianjin IGCC Power Plant and is scheduled to complete the construction and commissioning of the capturing part in 2015.

This 30MWth pre-combustion CO<sub>2</sub> capture device is designed and developed on the basis of Tianjin IGCC Power Plant and the National 863 Project — "The research and demonstration of CCUS technology of IGCC system". It is a coal-based clean energy technology innovation project developed by Huaneng Clean Energy Technology Research Institute. This demonstration system with the annual capturing capacity of 6 to 10 tons of CO<sub>2</sub> has opened a new channel to the reduction of CO<sub>2</sub> emission.



## Protecting Ecological Environment

### Development and Construction of Coal Mines

In the process of opencast mining, we reclaimed the mining area in time through backfilling, planting trees and grass and other ways, and made ecological restoration and protection of land destroyed by mining activities, improper excavation and cover occupation.

- ◆ By the end of 2014, Yimin Open Mine Company put a total of 72 million CNY into ecological environment recovery and management, completed reclamation area of over 600 hectares, and landscaping of nearly 500 hectares, keeping reclamation and landscaped rates above 95%.
- ◆ We reclaimed Gaotouyao Coal Mine by flattening Gangue mountain, covering the area with soil and planted shrubbery, pine, alfalfa, hickory, wild apricot trees and other plants.

### Development and Construction of Power Projects

In the construction of hydropower projects, we took into account the requirements of utilization in the aspects of power generation, flood control, irrigation, sediment interception, shipping, water conservation, aquaculture, tourism and regional development. We implemented the measures to protect the surrounding environment and biodiversity, and carried out environmental protection measures to protect biodiversity. By doing so, we strive to achieve harmony between project development and eco-environment.

- ◆ Nuozhadu Hydropower Station used gated stratified water intake facilities to take water and adjust water temperature. This measure effectively reduced the impact of low-temperature discharged water on river ecosystem and fish breeding.
- ◆ In 2014, Nuozhadu Hydropower Station, just as an illustrative example, released 2.15 million fishes into the reservoir, including 100,000 fishes native to the Lancang River.
- ◆ Ziyili Hydropower Station built an overflow dam in its river reaches, promoted the application of cushioned surge chambers, prevented more than 200,000 square meters of vegetation from damage, and effectively protected the river wetland.
- ◆ In the development of Huoxi River, we built more than 90 overflow dams (0.3-0.8 meters high) with about 16,000 cubic meters of stone to reduce the flow of river reaches according to the local conditions in order to maintain the ecology. By doing so, we maintained the water table within the river and irrigated the surrounding vegetation.

### Fostering environmental protection awareness

We propagated environmental protection concepts, spread awareness among our employees and advocated energy-saving and living a low-carbon lifestyle. We also organized employees to participate in environmental public actions and worked hard to create a positive atmosphere of environmental protection with concerted efforts.

- ◆ Hohhot Thermal Power Plant, Dalian Power Plant and others carried the activity "Energy conservation, Youth first" to publicize environmental welfare.

### Waste Recovery

We channeled great energy in advocating the development mode of "resource > product > waste > renewable resources". Through ash separation and grinding, processing gypsum into new building materials and other technology, we promoted the comprehensive utilization of ash and desulfurization byproducts to reduce the emission of solid waste from coal power plants and realized the closed-loop circulation and recovery of resources as much as possible.

- ◆ Luohuang Power Plant is one of many power plants that spearheaded the utilization of desulphurization gypsum and ash, which helped maintain a ~100% utilization rate for several years.

### Building a Water-saving Enterprise

We adopted a series of water-saving technology such as air-cooling technology, sea water desalination, sewage treatment, water reclamation, dry slag removal and pneumatic ash conveying, built water-saving power plants in line with the local conditions and treated coal mine drainage water. According to the level of water quality, we used cascading water to effectively use reclaimed water, reduce consumption of freshwater and achieve zero sewage discharge.

- ◆ Yuhuan Power Plant first applied dual membrane technology to sea water desalination and built the largest desalination projects among the coastal power plants, saving more than 10 million tons of fresh water each year. Sea water desalination has become a major water source for coastal power plants.
- ◆ Huating Coal Industry invested more than 30 million CNY and built 10 sewage treatment plants with the daily treatment capacity of 15,000 cubic meters of waste water. Over 90% of mine water was treated and over 85% of water was reused.



# Typical Cases

The conflict between economic development and environmental protection is increasingly obvious in China. In particular, the air pollution has given such a serious threat to people's health that we have had a thorough understanding of our responsibility. Since 2010, we have implemented the Green Development Action Plan which focuses on green, low-carbon and circular-economic development. Since 2013, we have put greater attention on clean production. We took the lead in transforming coal units to ultra-low emission in the eastern developed regions with the independent research and pilot application of advanced technology to further reduce pollutant emission of coal units and improve traditional clean coal power production to a new level.

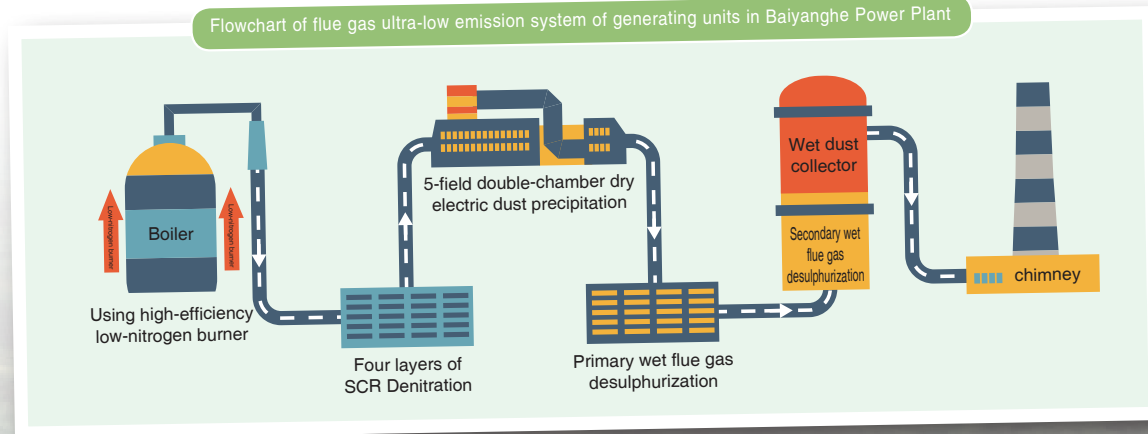
## Tackling more technological problems to develop and apply new technology

We have equipped our units with desulfurization, denitrification and dust removal and other conventional environmental protection equipment. On this basis, we organized the Xi'an Thermal Power Research Institute and other research agencies to tackle technological problems to improve clean coal production. They developed and promoted de-nitration conversion and secondary desulfurization technology to further increase the efficiency of desulfurization and de-nitration. Through application of wet electrostatic precipitator (ESP) and other advanced technology, they helped power plants increase the efficiency of dust removal and made the pollutant emission of their coal units comparatively to that of gas units. In 2014, wet ESP technology was successfully applied to a number of units in Huangtai, Mengxi, Shidongkou and other power plants, which laid a technological foundation for the further improvement of clean coal power generation.

## Achieving ultra-low emission of flue gas advances environmental protection

We increased investment in environmental conversion to promote the environmental technology to a new level. For example, Baiyanghe Power Plant upgraded its 300MW generating units. On the basis of its original environmental protection facilities, it added a secondary serial desulphurization tower and converted to low nitrogen burners. After improving efficiency by four layers of SCR denitration, the Power Plant installed another six-field wet ESP device. As it acted like a dust removal mask on the purged flue gas before emission, the device can give a better filtering of dust and reduce emission of SO<sub>2</sub> and NO<sub>x</sub>. After conversion, its emission of flue gas pollutants can be comparable with that of gas-fired units, burning a ton of coal is the equivalent to burning a piece of charcoal at home in term of their emission. The Power Plant achieved its emission reduction target in *Action Program on Energy Conservation Conversion of coal Units (2014-2020)* 6 years ahead of schedule.

Flowchart of flue gas ultra-low emission system of generating units in Baiyanghe Power Plant



# Improving traditional clean coal power production through ultra-low emission conversion

## Playing an exemplary role to bring a clearer sky and cleaner water

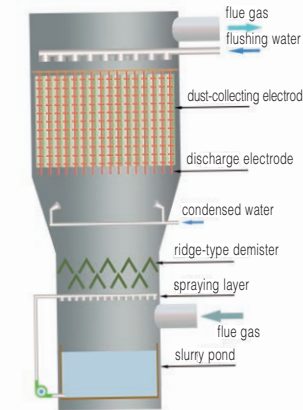
Since 2013, we have completed the ultra-low emission conversion of 12 sets of 444MW generating units in Huangtai, Baiyanghe and Jinling power plants. Among them, Unit 6 and 7 in Baiyanghe Power Plant were included in Shandong Demonstration projects of ultra-low emission technology; Unit 1 in Jinling Power Plant and Unit 9 in Huangtai Power Plant were listed into National Energy Administration's coal unit conversion demonstration projects meeting the emission standard of gas units. These projects have played a better demonstration effect.

We put greater energy in tapping into the existing technological potential and converting units to allow for ultra-low emissions conversion, which is not only the full manifestation of implementing the national energy strategy of "economical, clean and safe", but also an effective way to improve clean production of urban coal power plants and achieve sustainable development. This has proven to be of great significance to national energy production and improve the development of traditional clean coal power generation.

At present, coal power generation accounts for nearly 70% of the energy mix in our country. The natural endowment in China's primary energy mix has determined the cost of coal power generation is much lower than that of gas power, wind power and solar power generation. Faced with the severe situation of air pollution in our country, the ultra-low emission of coal-fire units is an appropriate roadmap to ensure both the continuous improvement of air quality and stable energy supply. Huaneng's success in its ultra-low emission demonstration projects has fully demonstrated the feasibility of this technology. It will play a stronger effect in high-efficient control of flue gas in the coal-fired power industry.

- Economic Daily

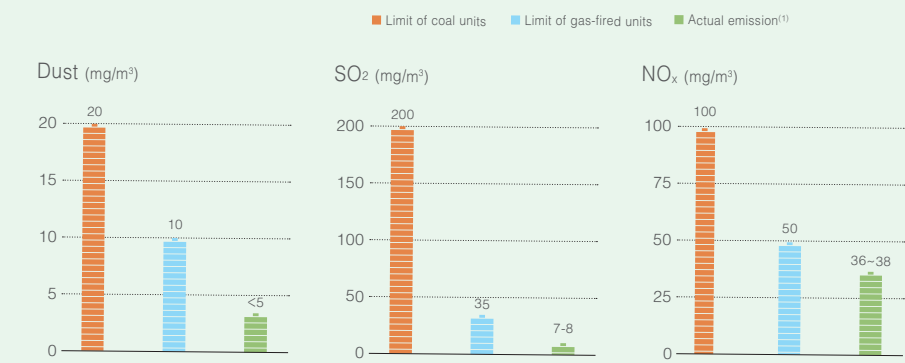
Diagram of wet ESP and secondary desulphurization system



Wet ESP is currently one of the most advanced technologies to control fine dust.

- ◆ It has low power consumption (the power consumption of 300MW unit is less than 300 KW) and low resistance (less than 350 Pa).
- ◆ It has higher efficiency of fine particle removal. Fine dust emission concentration is less than 1.5 mg/m<sup>3</sup> and particulate emission concentrations is less than 10 mg/m<sup>3</sup>.
- ◆ It can effectively remove the gypsum generated from desulfurization system, and solved the current problem of "gypsum rain".

Emission indicators of Unit 7 after ultra-low emission conversion in Baiyanghe Power Plant



(1) The unit was commissioned for 168 hours after its conversion on November 26, 2014. Testing conditions: 100% power load, about 1.7% of sulfur in fired coal, and 6% of reference amount of oxygen.

# 05 Social Responsibility

Dedicating to the promotion of social harmony

Coverage of labor contract



Benefits of employees' technical innovation



Amount of donations

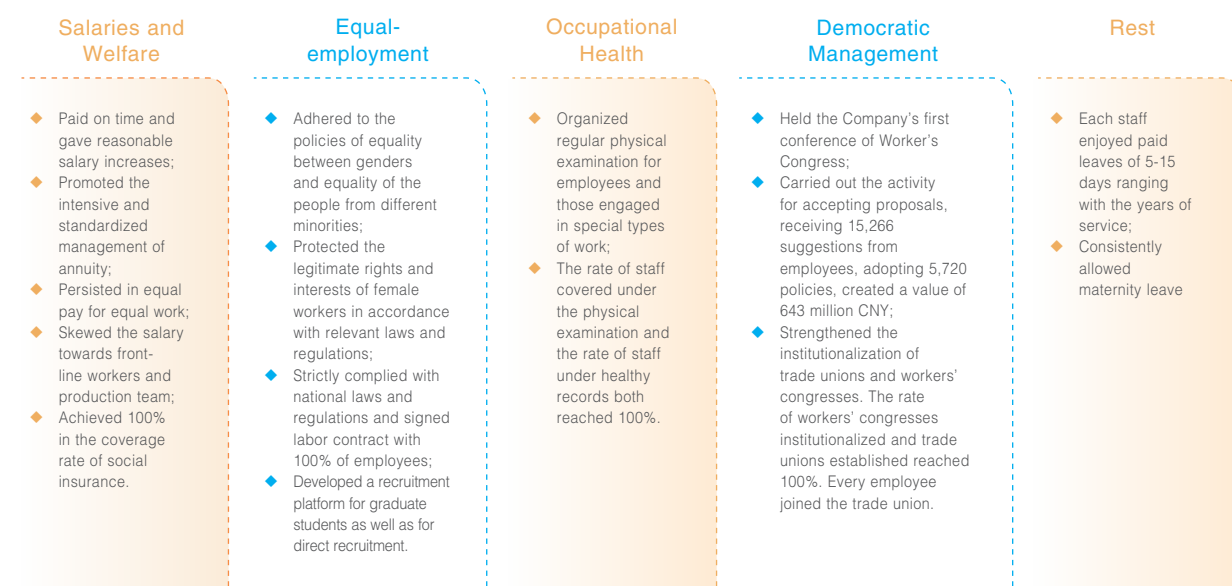




## Caring for Employees

### Safeguarding employees' rights and interests

Abiding by the Labor Contract Law and the relevant laws and regulations, we sign labor contracts with employees, pay them social insurance and protect their privacy to improve the management foundation for labor and employment. By the end of 2014, we had 139,780 employees.



### Improving education and training

We implemented the strategy of developing the enterprise by talent management and established multi-level education and training system, in which the Company is responsible for management training, secondary units for professional training and grassroots-level enterprises for skill training. We strive to improve the overall quality of our staff through special training, workshop for technology and exchanges and discussions.

- ◆ We established a training base for the first round of skilled talents and advanced the investigation and development of our "Huaneng Networking Training Academy".
- ◆ We set up 72 labor model innovation workshops and developed 1,687 technical innovation activities, yielding economic benefits of 418 million CNY.
- ◆ We organized 14 company-level technical talents workshops and 28 skilled talents trainings for 1,971 employees.
- ◆ We organized labor competition for more than 88,000 employees. 7 achievements and 3 operating methods were rated as innovative achievements and advanced operating method by China Energy Chemistry Trade Union.
- ◆ We carried out competitions for relay protection and wind power operations, with more than 200 participants entering the finals.
- ◆ We provided company-level trainings for more than 4,500 managers, 5,000 technicians and 5,500 skilled workers over past five years.
- ◆ Our industrial/regional companies held 94 skill contests for 10,978 employees and grassroots-level enterprises organized 875 competitions for 37,358 employees.



"Huaneng's Example"—Fan Zhiquan

### "Huaneng's Example" Fan Zhiquan

Mr. Fan Zhiquan has worked in Wulashan Power Plant for more than 40 years. In his electrical operation position, he made electrical indication plates and simulation diagrams for primary electrical system and DC system by hand, saving more than 70,000 CNY for the Plant. So promptly and successfully were the equipment failures found and handled at his job that four major accidents were avoided. Even more remarkably, he worked two years of overtime than the others in more than 9 years, in which he devoted much of his rest time of shift work to major and minor overhauls and urgent repair work.

When working as Party branch secretary in the boiler workshop, he led workers to tackle tough technological problems, repair the old and utilize the waste. Led by him, more than 30 equipment transformation and technological innovation were completed, creating benefits of more than 5 million CNY for the Plant. After being promoted to Deputy Director of the Plant, he, together with greening group, tackled the greening problem of salt marshes. With seven years of hard work, they changed the plant into an oasis of a barren hill.

Over past forty years, he and his wife have lived a frugal life but donated a total of 110,000 CNY to needy students, lonely old people, employees in trouble and people in disaster-stricken areas. He has been known as the living Leifeng around Wula Mountain. In 2014, he was awarded the titles of "Northern Great Model" and "Huaneng's Example" by Propaganda Department of Party Committee of Inner Mongolia Autonomous Region and the Party Committee of Huaneng Group, respectively.



### ◆ Promoting Career Development

We issued the *Management Methods to Select Senior Professional and Technical Talents*, established a three-tier talent selection mechanism comprised of the Company, Industrial/regional companies and grassroots-level enterprises, and built Huaneng talent pool. We also built a platform for career development and a career development channel for technical and skilled talents.

- ◆ We introduced 7 experts in the Thousand Talents Program and had 140 national-level technical talents including academics and experts who have outstanding contributions and receive a special grant award by the government.
- ◆ We launched the first round of chief engineer and expert selection activity, in which Yangxun and Yang Shoumin were appointed as honorary chief expert, Yao Wei and other 11 persons as chief expert, as well as Wang Jian and 16 others as chief engineer. Their tenure is three years.
- ◆ We organized job title assessment and engineer and senior engineer evaluation. Throughout 2014, a total of 60 people got the title of state-owned enterprises, power industry or the Company technical expert, 336 people got the senior titles and 158 people obtained engineer or senior engineer qualifications.
- ◆ We made public selection of talents for overseas companies and 63 people were selected as the reserved general manager, manager of functional departments and senior manager.



Vibrant and youthful Huaneng employees

"Everyone has a lot of dreams in his life. After we have experienced these dreams in our life, the rest is what we should follow. My dream is to work carefully and to hope my family happy and healthy. I am grateful to Huaneng for its support to hold our dreams."

– Wu Wei from Xiaowan Hydropower Station

### Offering heartfelt services with heart-to-heart care

We adhere to the mission to develop enterprises by relying on employees wholeheartedly. Along with the goals to build harmonious labor relations, inspire the creativity of workers and promote the common development between enterprises and its staff, we have started with the efforts to solve the most basic, practical and direct concerns of employees. We have also explored a normalized mechanism that can well serve employees and safeguard their rights and interests. In 2014, we formulated the *Management Method on Aiding Needy Employees (Trial)* on the basis of in-depth investigation of various needy employees and serious summary of our experience in assisting the treatment of serious diseases.

*The Method* follows the principles of caring the poor, giving continuous support, making all-round arrangements, and easing the urgent situation. It aims to extend the assistance to more people, clear the specific requirements, strictly obey the rules for use of funds and intensify process control. Through the establishment of sound and complete records for needy employees in a scientific and standard way, we can really have a comprehensive and timely understanding of their situation, conduct dynamic management and implement responsibility at all levels. By means of living allowance for needy employees and subsistence allowances caused by natural disasters and serious disease, we provide support and assistance for our employees and perform our responsibility of doing good and practical things and solving problems. In 2014, we assisted the first group of 984 needy workers, bringing our care and warmth to them.



Visited need employees

**10,332** persons

Distributed funds and materials

**35.09** million CNY

### ◆ Strengthening Employees' Care

We issued the *Management Methods to Assist Needy Staff* and improved our three-tier assistance system. We also organized a variety of recreational activities to help our employees achieve work-life balance.

- ◆ We paid visits to 223 enterprises and more than 5,300 employees and gave out funds and goods worth 9.81 million CNY during New Year's Day and Spring Festival.
- ◆ We had more than 500 venues for leisure activities and held more than 1,800 cultural and sport activities.
- ◆ We distributed financial and material support worthy of 35.09 million CNY to help 10,332 needy employees throughout 2014.
- ◆ We sponsored micro-film competitions themed like "The Most Beautiful Huaneng Employee" and "Huaneng Dream • Youth Promotion", and recognized and exhibited 47 outstanding works.

### ◆ Join Hands with Partners to Achieve a Win-win Outcome

#### ◆ Improving responsible procurement system

In a major push to improve procurement management regulations, we strengthened the bidding management, implemented the accountability system in offers and hiring and strictly regulated offer letters. We also completed the functional development of material management platform and strengthened the dynamic management of supplier and realtime monitoring to build a responsible industry chain. In 2014, the amount of material purchase through e-commerce platform increased by 40% over the previous year and the proportion of centralized procurement of materials rose by 192%.

#### ◆ Building Strategic Cooperation Platforms

We have further improved our industrial/regional layout and expand regional energy cooperation. While proactively building platforms for communication and cooperation with local governments and enterprises, we signed cooperation agreements with Xinjiang Production and Construction Corps, Shenhua Group and Shanghai Electric Company to promote mutually beneficial cooperation and common development.

While deepening the construction of international platforms, we signed the letter of intent for strategic cooperation with Joint Stock Company Inter RAO UES and signed a cooperation framework agreement with Enel. In addition, Huaneng Power International signed strategic cooperation memorandums with Siemens and Shanghai Electric.

## Contributing to Social Welfare

### Financing and Caring students

We persist in the philosophy of “constructing a power plant, stimulating the local economy, protecting the local environment, benefiting the local people and promoting complete harmony”, and follow the general strategy that we should synchronize industrial stimulation with poverty alleviation and pay equal attention to the development and the improvement of people’s livelihood. Along with such philosophy and strategy, we give full play to our advantages, devote to supporting and aiding the people in difficulties and strive for harmonious development between the enterprise and society. Over the past years, we have participated in various activities to support students. We hope to empower people in poverty-stricken areas by improving educational infrastructure conditions and providing financial aid to students. In 2014, we donated a total of 81.882 million CNY toward poverty alleviation.

#### Our key poverty alleviation projects in 2014

Projects	Amount (10,000 CNY)
Co-built No. 2 National Secondary School in Jiazha County, Qinghai Province	460
Co-built Yalangqi New Town Primary School in Akqi County, Xinjiang Uygur Autonomous Region	670
Donated to Hope Project in Kunming	648
Co-built Jiaxiaowagou Primary School in Guanghe County, Gansu Province	200
Supported the construction of new countryside in Shantou City, Guangdong Province	100
Built primary and secondary schools for immigrant children near Lancang River	529
Helped one of old revolutionary bases in Hengshan County, Shaanxi Province	423



Huaneng • Tuohe Primary School built by the Company in Akqi County, Xinjiang Uygur Autonomous Region



No. 2 National Secondary School built by Huaneng in Jianzha County, Qinghai province



### Making efforts in disaster relief and reconstruction

At 16:30 on August 3, 2014, the 6.5 magnitude earthquake hit Ludian County, Shaotong City, Yunnan Province. The Company and Lancangjiang subsidiary immediately responded:

- ◆ Donated 5.26 million CNY (including employees’ contribution of 260,000 RMB) at the earliest time to assist the people in earthquake-hit area and rebuild their home.
- ◆ Diandong Mine rescue team saved two seriously wounded people and transferred three victims. They searched 64 houses, cleaned up a collapse area of 640 square meters and moved more than 60 tons of relief supplies.
- ◆ The rescue team of Lancangjiang company travelled 800 km to join the relief effort. They suffered over 100 aftershocks and made emergency evacuation 5 times and removed over 1,500 cubic meters of debris, which ensured the smooth transportation of relief supplies.

“Huaneng Diandong mine rescue team is the last one to be called, but was the first to arrive – Longjing Village. They are real heroes.”

–Yang Xuehui,  
an official of Yunnan  
Administration  
of Coal Mine Safety

### Advocating Volunteer Work

Adhering to the volunteer spirit of “dedication, friendship, mutual support and progress”, we strengthened the construction of volunteer teams and organized employees for various volunteer work. In 2014, we carried out more than 1,000 volunteer activities involving more than 70,000 volunteers.

#### Spreading the “three-color sail” volunteer services in Huailai County

Upholding the mission of building a three-color company, our Youth League created “three-color sail” volunteer activities. After we cooperated with Huailai county at the beginning of 2012, we recruited more than 600 volunteers, raised more than 1.5 million CNY, and organized “Guomingyi volunteer team” to Huailai county nine times. We carried out a variety of activities to support student and education, optimize ecological environment and exchange and communicate with youth. By the end of 2014, we donated 14 rural primary schools, benefiting more than 2,000 students.

#### Efforts Towards the “Shangri-La”

— Wunonglong • Lidi Project Management Bureau assisted the development in Tibet

**Dedicated Khatag to “Shangri-La”** Meri Snow Mountain is near the legendary area known as Shangri-La. Wunonglong • Lidi Project Management Bureau is building Yuliu Road at the foot the mountain. The road is about 31 kilometers long with a total investment budget of more than 800 million CNY. After its completion, the project will greatly improve the local traffic conditions and completely solve the traffic difficulties of travelers.

**From “survival” to “life”** While promoting the construction of a power plant, the project management bureau organized the “100-1000-10000” Campaign. It started from solving the most urgent, realistic and necessary problem of the migrant population and donated over 8 million CNY to support the construction of new countryside in Diqing and Weixi counties. In 2014, the bureau intensified its effort in the development of countryside and invested more than 1.4 million CNY to gradually change rain-dependent production mode and living conditions of farmers and create a more comfortable life for them.

**Education ignites the future** Since 2009, the project management bureau has donated more than 2.3 million CNY to Hope Project and supported the development of local education. The bureau also carried out activities to support students in hope to bring promising future to the children in mountain regions.

# Typical Cases

Tibet is a snow-covered sacred land. However, the under-developed power capacity has been a bottleneck to its economic and social development and its long-term stability. We entered Tibet in 2004, as an earnest response to the instructions of the Party Central Committee for developing western regions, in order to solve the most pressing problems of local people and providing for their urgent needs. At that time, we were the first company of China's power industry to start aiding Tibet.

## Aiding Tibet for free to remove the obstacle to power supply in Medog County

In August, 2009, facing the challenge of power supply caused by the dry season in autumn and winter of Tibet, we invested 360 million CNY to build a 11MW emergency power source from Lhasa to Ali. We transferred technical infrastructure and completed the project at an unprecedented speed. Before the arrival of a blizzard in 2010, the project went into operation, which ensured a warm winter for the local people. In remote Motuo County, one fourth of people had no access to electricity. On March 25, 2013, Huaneng Tibet Subsidiary officially took over 9 micro power stations and assets including Yadong Power Plant in Motuo County, and spent eight times as much as the average cost of power plant in the inland of China building the power station. By the end of 2014, we completed 12 small rural hydropower stations, solving the electricity problem for 3,392 inhabitants. In the future, the completion of Yarang Hydropower station will completely solve the power supply shortage.



## Developing hydropower to fuel the local development

Tibet abounds with hydropower resources in China and even in the world. Its theoretical reserve reaches 201.36GW. In order to convert hydropower resources into the driving force to the development of Tibet, our company speeded up the development of hydropower stations. On July 8, 2010, Zangmu hydropower station was approved by the National Development and Reform Commission (NDRC) and it started construction in September of the same year. Huaneng's employees challenged the engineering limits on low oxygen-containing and high-radiation Zangmu site with their strict control of quality and technological innovation. On November 23, 2014, the first unit of Zangmu Hydropower Station went into operation. This is the world's highest-altitude large hydropower project and also a landmark project in the history of Tibet's power industry, increasing the level of hydropower station from 100MW to 500MW. This project has injected new impetus to the construction and development of Tibet.

# Walking into Tibet and sending our love and power to Tibetan Plateau to light up the snow-covered area

## Consolidated the foundation for benefiting local people

By the end of 2014, more than 300 of our employees have been established in Tibet. They have provided much needed support which has also helped improve relations with the Tibetan people.

Ten years of time is replaced with a miracle. Over the past ten years, Huaneng's employees in Tibet closely followed the instruction of CPC committee of Tibet Autonomous Region "consolidating the foundation for benefiting people's livelihood". They organized working group to develop targeted poverty-alleviation and work in villages such as Maluo Village in Lasui Town, Jiacha County and Zatang Village in Baidi Town, Laqiazi County. Tibet subsidiary invested a total of 221 million CNY in the improvement of power supply facilities and school conditions, the promotion of agricultural technology, the construction of roads and canals and other projects benefiting people. By the end of 2014, we provided job opportunities for 23 local university students and gave priority to take on more than 10,000 local people for our projects. This has effectively boosted the local economic and social development.



At Huaneng Zangmu Hydropower Station, the builders have overcome numerous difficulties and done a lot of effective and fruitful work. They have fully performed the social responsibility of state-owned enterprises. Our Tibetan people have seen their efforts and kept it in mind.

– Luosang Jiangcun, Chairman of the People's Government of Tibet Autonomous Region

"With the rapid economic and social development today, Huaneng's employees have retained the essence of old Tibetan spirit: having special ability to endure hardship, to go into battle, to overcome difficulties, to keep solidarity, and to make contributions."

– Local cadres and masses in Tibet



"Our town is bright and our hearts are brighter still. Without your presence, we wouldn't realize our dream of having access to electricity. With electricity, we can connect with the world."

– Words of local youth after electricity was supplied to Motuo County

# Our Commitment to Responsibility in 2015



## Safety Responsibility

### Goals

- ◆ To prevent serious accidents;
- ◆ To prevent incidents that may exert negative impacts on the image of our Company.

### Measures

- ◆ Fully implement the *Law on Safety Production*, and improve safety production responsibility system focusing on "the responsibility of the Party and government, one post with dual responsibilities, and equal emphasis and co-administration of production and safety";
- ◆ Strengthen the construction of long-term mechanisms, focus on safety at an institutional level, establish institutional authority and develop consistent production safety;
- ◆ Intensify safety education and skill training, increase technical supervision and equipment management, and drive safety work towards more scientific and standard development;
- ◆ Rigorously implement the main responsibility, strengthen on-site management and control, promote experience and practice and effectively improve the management of outsourcing projects;
- ◆ Enhance risk management, strengthen the construction of coal mine safety production system and effectively curb the occurrence of major accidents.



## Economic Responsibility

### Goals

- ◆ To examine and approve a power source project capable of 10GW;
- ◆ To raise the proportion of installed low-carbon energy facilities to over 28%;
- ◆ To achieve electricity output of 657.8 billion kWh;
- ◆ To achieve coal output of 72.35 million tons;
- ◆ To achieve operation revenue of 291 billion CNY.

### Measures

- ◆ Strengthen full-process management, optimize power source structure and promote upgrading and conversion;
- ◆ Channel energy to the development of low-carbon energy projects and optimize the development of profitable clean and efficient coal power;
- ◆ Intensify budget management, give play to the directing role of performance evaluation, and focus on the improvement of business performance;
- ◆ Persist in market-based direction, tighten up marketing management, and actively expand power, heating and coal markets;
- ◆ Fully advance lean cost management, strictly control various expense and ensure to control each expense in the budget scope;
- ◆ Strengthen capital operation and prevent funding risks.



## Environmental Responsibility

### Goals

- ◆ To achieve special coal consumption of 308 g/kWh and achieve an industry-leading position in major energy consumption indexes;
- ◆ To complete the tasks related to environmental responsibility of the Twelfth Five-Year Plan;
- ◆ To achieve the annual goal of energy conservation upgrades and conversions;
- ◆ To improve the construction of technological innovation management system;
- ◆ To enhance the innovation and application of cutting-edge technology;
- ◆ To improve the development of technological industrialization.

### Measures

- ◆ To promote the construction of excellent environment-friendly and conservation-minded enterprises;
- ◆ Strengthen fine management in energy conservation and promote the development, application and integration of renewable energy-saving technologies;
- ◆ Carry out the "Year of Improving Environmental Protection", and promote the ultra-low emission conversion;
- ◆ Enhance carbon asset management and put greater efforts to the development of voluntary emission reduction projects;
- ◆ Strengthen top design and planning and establish a mechanism suitable for technological innovation;
- ◆ Accelerate the development of technological industry focusing on energy conservation, environmental protection and intelligence.



## Social Responsibility

### Goals

- ◆ To achieve common growth of both enterprise and our employees;
- ◆ To achieve mutual benefits and outcomes between the enterprise and its partners;
- ◆ To achieve positive progress together with society.

### Measures

- ◆ Strengthen team construction, channel greater energy to implement the strategy of developing the enterprise by talent management, and optimize an enabling environment for talent growth;
- ◆ Intensify human care and mental counseling and increase the employee mental health;
- ◆ Enhance the cooperation with regions and partners, and actively expand cooperation;
- ◆ Put resources targeted at alleviating poverty and participate in social public welfare.



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## Implementation of the United Nations Global Compact

The United Nations Global Compact requires companies to comply with, support and carry out a set of ten universally accepted principles in the aspects of human rights, labor standards, environment and anti-corruption within. These principles are from Universal Declaration of Human Rights, Declaration on Fundamental Principles and Rights at Work by International Labor Organization, and Rio Declaration on Environment and Development.

Huaneng joined the United Nations Global Compact in November, 2007, becoming the first power generation company in China to join the United Nations Global Compact. It actively performs the ten basic principles of the UN Global Compact through promoting safe development, optimal development, green development, healthy development, innovative development and harmonious development.

	Ten Principles	Page Number	Implementation
Human Right	Respect and support the protection of internationally proclaimed human rights	P66-67	Abide by laws and regulations at home and abroad, support international conventions on human rights approval by the central government, safeguard and respect human rights, and guarantee employees' legal rights and interest.
	Not complicit in human rights abuses	P68	
Labor	Uphold the freedom of association and recognize	P66	Abide by the national laws and regulations on labor issue, forbide the use of child labor, and oppose any forms of forced labor; adhere to equal and just labor policies and democratic management, make public the affairs of enterprises, and respect the rights of labor.
	Eliminate all forms of forced and compulsory labor	P66	
	Effective abolition of child labor	P66	
	Eliminate discrimination in employment and industry	P66	
Environment	Take a precautionary approach to environmental challenges	P50-52	Continue to optimize industrial structure, accelerate the elimination of outdated capacity and develop various clean energies to cope with global climate change; Develop clean coal power generation technology, establish energy conserving and environmental-friendly coal-fired.
	Actively increase responsibilities on environmental protection	P55-56	
	Encourage the development and promotion of environmental-friendly technologies	P50-51	
Anti-corruption	Counter any forms of corruption, including fraud, blackmail and offering or accepting bribery	P10-11, P69	Continue to optimize industrial structure, accelerate the elimination of outdated capacity and develop various clean energies to cope with global climate change; Develop clean coal power generation technology, establish energy conserving and environmental-friendly coal-fired.





## Rating Report on Sustainability Report of China Huaneng Group 2014

Upon the delegation of China Huaneng Group, Research Center for Corporate Social Responsibility of Chinese Academy of Social Science selected experts from Chinese Expert Committee on CSR Report Rating to form China Huaneng Group Sustainability Report 2014 Rating Team. The rating team rated the China Huaneng Sustainability Report 2014 (hereinafter referred to as the Report)

### I. Rating Basis

Guidelines for China Corporate Social Responsibility Reporting (CASS-CSR 3.0), and the Standard for China Corporate Social Responsibility Rating (2014).

### II. Rating Procedures

1. The Process Evaluation Group interviewed members of China Huaneng Group's social responsibility department.
2. The Process Evaluation Group reviewed on site the documents involved in the compiling process of the Sustainability Report of China Huaneng Group and its subsidiary companies.
3. The Rating Group evaluated the management procedure of China Huaneng Group's sustainability report and the information disclosed in the Report, management procedures and the information disclosed in the Report.

### III. Rating Results

Process : ( ★★★★★ )

The Political Work Department of China Huaneng Group led the reporting team, and the senior leaders were engaged in facilitating the compilation and review of the report; 2) the team identified the stakeholders, and collected suggestions from some stakeholders through interview, expert workshop and other ways; 3) the team identified the essential subjects based on China Huaneng's strategy and industrial benchmark analysis; and 4) the team planned to release the report on Huaneng's official website and presented the report in printed, electronic, and H5 versions. A transparent exhibition of the process has been observed.

Materiality: ( ★★★★★ )

The Report discloses in details the key issues in the power industry, including "implementing macro policies", "power supply assurance", "green power development", "production safety", "resource and energy conservation", "eco-environment protection". An outstanding substantiality has thus been observed. It shows a high degree of substance.

Completeness: ( ★★★★★ )

The Report covers 83% of the core indicators in the power generation industry from the perspective of "safety responsibility", "economic responsibility", "environmental responsibility", and "social responsibility". An excellent degree of completeness has thus been observed.

Balance: ( ★★★★★ )

The Report contains negative information and data including "the number of serious equipment accidents", "the number of human casualties", "the number of unplanned outage". It discloses in the form of special features the cause of the accident and the corrective measures. An outstanding balance has thus been observed.

Comparability: ( ★★★★★ )

The Report contains historical data of 38 key performance indicators in 3 consecutive years and makes horizontal comparison of the "installed capacity", "world Top 500 enterprises" and other facts. An excellent comparability has thus been observed.

Readability ( ★★★★★ )

The Report is well written in a reasonable structure and rich in cases, properly arranged with a large variety of expressive forms including images and tables to complement each other, and is well designed. An outstanding readability has thus been observed.

Innovativeness: ( ★★★★★ )

The Report is well arranged, starting with its description with "Stakeholders' expectation - Our action" to summarize the focuses of each chapter and ending with "typical cases" to reflect Huaneng' practices in fulfillment of social responsibility. An excellent capability to advance has thus been observed.

Overall rating: ( ★★★★★ )

Upon evaluation by the Rating Group, China Huaneng Group's Sustainability Report 2013 is awarded five stars and acknowledged as an outstanding CSR report.

### IV. Suggestions

1. Strengthen the management of full life circles of reporting and boost stakeholder engagement.

The Rating Group

Head: Zhong Hongwu, Director of the Research Center for Corporate Social Responsibility of Chinese Academy of Social Science

Members: Wang Zhixuan, Secretary General of China Electricity Council

Xiuli Wei, Associate Professor of the School of Economics and Management, North China University

Central Process Evaluators: Wang Mengjuan, Chen Xiaofei

Chairman of Rating Panel  
Executive Vice Chairman  
of the Research Center  
for Corporate Social  
Responsibility of Chinese  
Academy of Social  
Science

Head of Rating Panel  
Director of the  
Research Center  
for Corporate Social  
Responsibility of  
Chinese Academy of  
Social Science

## Feedback Questionnaire

Dear Readers,

This report is a Sustainability Report (2013) issued to the public by China Huaneng Group. We are looking forward to your advice and suggestions so that we can improve our reporting in the future. We would be grateful if you would answer the following questions and send this questionnaire back to us in one of the following ways.

Fax: +86-10-63228866

Mail to: No. 6, Fuxingmennei Street, Xicheng District, Beijing (100031)

Your Personal Information

Name: \_\_\_\_\_

Organization: \_\_\_\_\_

Position: \_\_\_\_\_

Tel: \_\_\_\_\_

Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

### Readers Feedback Questionnaire on this Sustainability Report

Single Choice (Please mark your choice with "√")

	Yes	Average	No
1. Do you think this report reflects Huaneng's significant impacts on safety, environment, economy and society?			
2. Do you think this report makes an accurate and complete analysis of the relations between Huaneng and its stakeholders?			
3. Do you think the information disclosed in this report is clear, accurate and complete?			
4. Do you think this report is convenient for reading with respect to contents and design?			

### Open Question

1. In your opinion, which part of this report is most satisfactory?

2. What information that you need to know is not included in this report?

3. What's your advice on our future sustainability reports?

Thank you for your support and cooperation.



1 0 0 0 3 1

Stamp

No.6, Fuxingmennei Street, Xicheng District, Beijing

**China Huaneng Group**



Postal Code :