

HUANENG POWER INTERNATIONAL INC
Form 6-K
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FORM 6-K

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

Report of Foreign Private Issuer
Pursuant to Rule 13a-16 or 15d-16 of
The Securities Exchange Act of 1934

For the month of April 2017

(Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F.)

Form 20-F Form 40-F _____

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Yes _____ No

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This Form 6-K consists of:

A copy of 2016 Environmental, Social and Governance Report of Huaneng Power International, Inc. (the “Registrant”), submitted by the Registrant to Hong Kong Exchanges and Clearing Limited on April 19, 2017.

Contents

1	Chairman’s Statement	02
2	About Us	04
2.1	Company Profile	05
2.2	Corporate Governance	05
2.3	Development Strategy	06
2.4	Company Philosophy	06
2.5	ESG Responsibility Management	07
2.6	Table of Key Performance Indicators in 2016	08
2.7	Stakeholders Engagement and Identification of Material Issues	10
2.7.1	Information about and Communication with Stakeholders	10
2.7.2	Processes of Identification of Material Issues	11
3	Serving the Society, Upholding Regulated Operation	12
3.1	Intensive Guarantee of Power Supply Stability	13
3.2	Thorough Implementation of Lawful Management	15
3.2.1	Reinforcement of Anti-corruption Management	15
3.2.2	Protection of Intellectual Property Right	16
4	Life First, Guaranteeing Production Safety	17
4.1	Promotion of Establishment of Intrinsic Safety System	18
4.2	Reinforcement of Foundation of Trifold Safety Supervision	20
4.3	Protection of Employees’ Occupational Safety and Health	21
4.4	Enhancement of Employees’ Safety Consciousness	23
5	Protecting Environment Effectively, Advancing Green Development	24
5.1	Vigorous Development of Clean Energy	25
5.2	Active Exploration of Innovative Technologies	27
5.3	Solid Promotion of Energy Conservation and Emission Reduction	28
5.3.1	Overall Planning	28
5.3.2	Energy Conservation and Consumption Reduction	28
5.3.3	Water Resources Management	30
5.3.4	Emissions Management	31
5.3.4.1	Exhaust Gas Management	31
5.3.4.2	Management of Greenhouse Gases	33
5.3.4.3	Wastewater Management	36
5.3.4.4	Waste Management	36
5.3.5	Noise and Other Environmental Impacts	37
6	Work Together with One Heart, to Promote Collective Growth	38
6.1	Equal Employment and Equity Protection	39
6.2	Employee Training and Career Development	40

6.3	Happy Work and Happy Life	42
7	Harmony and Win-win Share of Development Results	46
7.1	Continuously Strengthen Supplier Management	47
7.2	Build a Harmonious and Stable Customer Relationship	48
7.3	Actively Participate in Social Welfare	49
8	Embracing the World, Spreading Three-colour Culture	52
9	Looking Forward to the Future, Motivated for Tomorrow	57
10	Appendix	59
10.1	About this Report	59
10.2	Contents Index of Environmental, Social and Governance (ESG) of Hong Kong Exchanges and Clearing Limited (HKEx)	60
10.3	Contents Index of Global Reporting Initiative (GRI)	63
10.4	Readers' Feedback	68

01

01 Chairman's Statement
02

2016 is the opening year of China's 13th Five-Year Plan, as well as a crucial year when Huaneng Power International has developed itself into a world-class public power company. The Company has resolutely extended its businesses, moderately operated, increased competitive strength ceaselessly, and realized its healthy development.

As a responsible enterprise citizen, Huaneng Power International has persisted in the environment protection concepts of "energy conservation, emission reduction, and clean development", earnestly implemented national policy and target responsibility of energy conservation and emission reduction, consolidated its leading position in clean and efficient conventional energy, vigorously developed new energy, strived to reduce resource consumption and pollutant emission, enhanced efficiency of energy use, actualised the Company's "green" concepts of "emphasis on science and technology, protection of environment" in all aspects. In 2016, Huaneng Power International has continued to intensify its energy conservation and emission reduction, further reduced unit power consumption in power generation, uninterruptedly diminished emissions of sulphur dioxide, nitrogen oxides, soot and other pollutants, and made due contributions for the environmental, social and economic development.

As a responsible enterprise citizen, Huaneng Power International has insisted on harmonious development concepts of "serve the Country, benefit the society, seek multilateral benefits and develop together", and is committed to working with stakeholders to promote economic and social development. Through close cooperation with stakeholders, as well as thorough consideration of and effective response to their demands, Huaneng Power International has further enhanced its sustainable operational capacity, and meanwhile requited the society when it is prospering. During G20 Summit 2016, Huaneng Power International's 49 power units from 17 power plants, which were responsible for providing power guarantee, have not encountered any abnormal production nor environmentally unfriendly excessive emission events, completing successfully the task of power guarantee for G20 Summit.

In 2017, the Company will stick to the five vital developmental concepts of "innovation, coordination, green, openness, and sharing", become an industry leader in green development. Meanwhile, the Company will continuously persevere with the core values of "upholding integrity, emphasising cooperation; innovating constantly, progressing proactively; creating achievements, serving the Country", making contribution for the realisation of projected objectives of the "13th Five-year Plan".

Chairman of Huaneng Power International, Inc.

03

02 About Us
04

2.1 Company Profile

Huaneng Power International Co., Ltd. (“Huaneng Power International”, “the Company”) was incorporated on June 30, 1994, whose core business is to develop, construct and operate power plants throughout China by making use of modern technology and equipment and financial resources available domestically and internationally. It is one of China’s largest public power generation companies, as well as the first domestic power company that goes public in New York, Hong Kong and Shanghai.

As the core enterprise of China Huaneng Group’s (“Huaneng Group”) central industry, Huaneng Power International has been insisting on innovations in technologies, structure, and management since its incorporation; and on aspects regarding the advancement in power technologies and construction and management of power plant. The Company has been the pioneer and has created various milestones within the domestic power industry, which facilitated the great-leap development of the power business and technological advancement of the power station equipment manufacturing industry in China, and also significantly contributed to the improvement of technical and management standards of the domestic power generation enterprises.

As at 31 December 2016, the Company has controlling generation capacity of 83,878 MW and equity-based generation capacity of 76,618 MW and its domestic power plants are located in 22 provinces, municipalities and autonomous regions. The Company also has a wholly-owned power company in Singapore.

The Company was awarded the “Golden Governance 2016 Listed Company Outstanding Board Secretaries” (as to investor relations) () by the Shanghai Securities News, “the Most Investment Value Award for Listed “the Best Board Secretary” in the China Securities Golden Bauhinia Awards Competition. In addition, the Company’s 2015 annual report of the H shares won Gold Award in the 30th International ARC Awards Competition. Besides, the Company was on the list of “Platts Top 250 Global Energy Listed Companies Award” for eight consecutive years and ranked 27th in 2016 with its ranking continuing to move higher.

2.2 Corporate Governance

As a public company listed in three stock exchanges, the Company has been subject to regulation by securities regulatory authorities of the three domestic and overseas places of listing, and supervision from its vast shareholders. The Company has highly valued the importance of corporate governance by enhancing its corporate governance system, which comprises the general meetings, the Board, the Supervisory Committee and the operation team. It has established an operating mechanism with clear terms of reference among decision authority, supervisory authority and operation authority to enable each of them to perform their respective liabilities subject to balance and coordination among the same parties, so that the right of the Shareholders’ meeting and Board to make decision over material issues and the right of the Supervisory Committee to supervise relevant matters can be effectively exercised to ensure the operation team can deal with operational issues in an effective and regulatory way.

Through years of exploration and practice, it has gradually formulated a regulated, efficient and enhanced corporate governance structure, and also established a sound and effective system that suits the own development needs of the Company. The Company has assessed the applicability and effectiveness of the management system on a regular basis, carried out revision and improvement thereof timely, and has thus achieved the dynamic maintenance of the system.

2.3 Development Strategy

The Company is committed to innovation, coordination, green, open and shared development in line with China’s energy production and consumption reforms, taking initiatives to adapt to new norm, respond to new challenges, follow the objective to establish first-class

enterprise with international competitiveness, focus on improving the quality and performance of its development, and seek to accelerate transformation and upgrading. The Company will also put in place a new mechanism under the principle that management shall be centered on competitiveness improvement, operations shall be centered on customers, development shall be centered on market demands, so as to strengthen the strategic leadership and continuously improve its core competitiveness. The Company aims to consolidate its leading position in the conventional energy sector, speed up the new energy development, improve the synergy within the industry, expand the sales service region, accelerate the international layout, digitize Huaneng International, realize the all-around improvement of the Company's operating results, quality performance and corporate vitality, and build the Company into an internationally leading public power producer with standardized management, advanced technologies, energy saving and environment-friendly, reasonable operating structure, outstanding operations, sound corporate governance and superior market value.

2.4 Company Philosophy

Corporate Missions • Being a “red company” that serves the socialism country with the special characteristics of China
• Being a “green company” that focuses on science, technology, and environment protection
• Being a “blue company” that keeps abreast of the latest development and is open world widely for innovative learning

Corporate Core Values • Upholding integrity, focusing on cooperation
• Innovating continuously, progressing actively
• Creating achievements, serving the Country

Corporate Target • Developing itself as an international first-class listed power producer

Corporate Responsibilities • Provision of adequate, reliable and environmental friendly power for the society
• Strive for delivery of long-term, stable and increasing returns for shareholder
• Support the fully development for employee to establish self achievements

Corporate Spirits • Spirit of professional dedication – undergoing all conceivable hardships and using every conceivable means
• Spirit of pioneering – cutting paths through mountains and building bridges across rivers
• Spirit of progress – finding oneself gaps and pushing oneself ahead
• Spirit of innovation – daring to lead and venturing to do the impossible

Corporate Manner • Being good at pioneering; focusing on efficiency; caring for reputation; thrifty in working

Employee Image • Having high ideals, moral integrity, good education and a strong sense of discipline

2.5 ESG Responsibility Management

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

Situations Faced with the Company's ESG

At present, the international and domestic economic situation has undergone profound changes. Energy production and consumption revolution is in the ascendant. Electricity and resource markets influence each other. Ecological civilization construction continues deepening. The operation and development of industries and companies are faced with new situations. First, new economic normalities will profoundly affect energy supply and demand. Economic and social development steps into new normalities. Economic structure has been optimised and upgraded, transforming from factor-driven and investment-driven to innovation-driven. In the context of decline of GDP growth and industrial restructuring, the momentum that supports China's many years' rapid growth of energy needs has undergone profound changes. Energy demand growth has showed a gradual downward trend. Second, the construction of ecological civilization has put forward new requirements for energy production. Environmental constraints for energy exploitation have been more stringent. The pace of energy structure adjustment will be significantly accelerated. Third, to deepen the reform has created conditions for companies' strategic transformation, and they will help further release the inherent potential of companies' development and enhance their competitiveness. Power system reform will enable energy companies to face a more open market setup and more competitive situation. The overall efficiency of the industry will get promoted. Fourth, "the Belt and Road" strategy brings new opportunities for international development. With the deepening of foreign cooperation, resource allocation also becomes an international rather than domestic matter, providing companies with broad market space for energy investment.

The Company is committed to innovation, coordination, green, open and shared development in line with China's energy production and consumption reforms, taking initiatives to adapt to new norm, respond to new challenges, actively participate in power system reform, accelerate transformation and upgrading, and consistently promote the Company's comprehensive advantage.

ESG Management Mechanism of the Company

To ensure that the requirements of Reporting Guidelines on Environmental, Social and Governance ("ESG Reporting Guidelines") issued by HKEx are effectively implemented, the Company has established ESG work leading group. A dedicated principal of the Company has been assigned as group leader, with principals of different departments and offices being vice group leaders. They make decisions on major issues during the process of the guidelines' implementation. Meanwhile, different departments also have assigned certain relevant personnel as group members to take charge of daily communication and detailed implementation of ESG management. With the establishment of ESG work leading group, the contact mechanism of ESG management has made its appearance in the Company. This has established a work model of ESG management, which is guided by heads of Boards of Directors, led by the Company's managements and participated by many departments together, and comprehensively guaranteed the effectiveness and applicability of the Company's ESG management.

2.6 Table of Key Performance Indicators in 2016

Based on requirements from HKEx's ESG Reporting Guidelines and Global Reporting Initiative (GRI)'s Guidelines for Sustainable Development Reporting (G4 Version), Huaneng Power International has analysed the Company's environmental, social and governing status, carried out the standard analysis with respect to guidelines' requirements and peer companies' situations, and finally laid down key performance indicators of year 2016. Please see the table below.

Performance Categories	Performance Indicators	2016
Economy	Donation in the Company's name (ten thousand CNY)	667.64
	Controlling generation capacity (MW) ¹	83,878
	Equity-based generation capacity (MW) ¹	76,618
	Average annual unplanned outage (times/unit.annum)	0.20
	Average coal consumption rate for power sold (g/kWh)	307.69
	Year-on-year decrease of average coal consumption rate for power sold (%)	0.28
	Consumption of standard coal (ten thousand tons of standard coal)	8,782.18
	Oil consumption in production (tons)	24,249.43
Environment	Natural gas consumption (ten thousand of standard cubic meters)	308,488.33
	Weighted average house consumption rate (%)	4.57
	Overall water consumption (million tons)	18,985.39
	Fresh water consumption in power generation (million tons)	294.70
	Water consumption in open cooling circulation (million tons)	18,690.69
	Performance value of consumption of fresh water in power generation (kg/kWh)	0.94
	Performance value of emission of sulphur dioxide (g/kWh)	0.17
	Performance value of emission of nitrogen oxides (g/kWh)	0.21
	Performance value of soot emission (g/kWh)	0.03
	Sulphur dioxide emissions (tons)	52,451.82
	Nitrogen oxide emissions (tons)	66,169.68
Soot emissions (tons)	9,051.72	
Greenhouse gas emissions generated by coal consumption (ten thousand tons of carbon dioxide equivalent)	24,556.61	

Performance Categories	Performance Indicators	2016
	Greenhouse gas emissions generated by natural gas consumption (ten thousand tons of carbon dioxide equivalent)	550.65
	Greenhouse gas emissions generated by oil consumption (ten thousand tons of carbon dioxide equivalent)	8.77
	Direct greenhouse gas emission intensity (grams of carbon dioxide equivalent/kWh)	756.62
	Total amount of indirect greenhouse gas emission in energy consumption (ten thousand tons of carbon dioxide equivalent)	15.84
Environment	Indirect greenhouse gas emission intensity in energy consumption (grams of carbon dioxide equivalent/kWh)	0.47
	Total water discharge (million tons)	18,233.25
	Total discharge of sewage (million tons)	14.60
	Total discharge of open cooling circulation water (million tons)	18,218.65
	Hazardous liquid waste (e.g. Lubricant) production (tons)	659.94
	Production of denitrated catalyst (tons)	2,192.38
	Production of other hazardous solid waste (e.g. Ion Exchange Resin) (tons)	322.86
	Production of general solid waste (ten thousand tons)	169.57
	Production of fly ash and cinder (ten thousand tons)	103.94
	Production of desulphurised gypsum (ten thousand tons)	65.63
	Amount of grievous (and above) environmental accidents (times)	0
	Total amount of full-time contractual employees (persons) ¹	42,210
	Employees died in line of duty (persons)	0
Society	Contractors or subcontractors died in line of duty (persons)	0
	Grievous personal injury and death accidents (employees) (times)	0
	Electricity generation personal injury and death accidents (times)	0
	Accidents that endangered safe operation of power grid (times)	0
	Lawsuits on corruption raised or concluded against the Company or its employees (items)	0

¹ The scope of statistic of Donation in the Company's name, Controlling generation capacity, Equity-based generation capacity, and Total amount of full-time contractual employees, takes Tuas Power, the wholly owned subsidiary of Huaneng Power International, into consideration.

2.7 Stakeholders Engagement and Identification of Material Issues

2.7.1 Information about and Communication with Stakeholders

Huaneng Power International has always been adhering to concepts of harmonious development of “serve the Country, benefit the society, seek multilateral benefits and develop together”, worked together with all stakeholders to promote economic and social development and share corporate development achievements.

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

exchanges.

environment; mutual benefits and
joint progress.

² China Electricity Council, Chinese Society for Electrical Engineering and etc.

10

2.7.2 Processes of Identification of Material Issues

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

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

Identifying relevant issues: sources of issues include Guidelines on Environmental, Social and Governance Reporting of HKEx, Guidelines for Sustainable Development Reporting (G4 Version) of Global Reporting Initiative (GRI), and issues disclosed by domestic and international peers;

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

Verifying: the Company management assesses and approves identified issues and their prioritisation;

Reviewing: after the end of one reporting period, the Company will organize internal and external stakeholders to provide feedbacks on contents of this report in order to prepare for the next one.

See the chart below for issues identified by the Company in the end and their prioritisation.

Grading standard

- According to their own degree of concern, internal and external stakeholders grade different issues in accordance with their importance.

Chart description

- Horizontal axis : Internal Stakeholders' grading for each issue
- Vertical axis : External Stakeholders' grading for each issue

Social issues

Environmental issues

03 Serving the Society, Upholding Regulated Operation

12

3.1 Intensive Guarantee of Power Supply Stability

Huaneng Power International is committed to develop itself as an international first-class listed power producer, always consistently provides users with safe, efficient and clean energy as well as with high-quality energy services. The Company attaches great importance to power supply guarantee, for the sake of which every power plant has developed corresponding emergency work plans and disposal measures in order to ensure safe and stable power generation.

Based on China Huaneng Power International Group Corporation's Emergency Management Measures for Major Incidents (Accidents) and Huaneng Power International Group's Emergency Plan for Thorough Power Failure, all departments of the Company, in view of possible large area power-off and other accidents caused by the trip of all power units, alternating current and direct current power outage, busbar outage and system disruption, has jointly composed Emergency Plan for Thorough Power Failure, Emergency Plan for Black Start, Plan for Island Operation and other preparatory measures and established corresponding emergency handling organizations in order to minimize negative impacts on society, upon occurrence of accidents, by unified leadership, clear division of labour, rapid response and fluent communication. Besides, the Company will also manage accident report to power dispatch department and due offices of local governments, handle examination and approval of information disclosed to the public, start emergency measures, and be attentive to public concern, in order to reduce adverse impacts on society. Meanwhile we will do well in check and preparation for restart in the aftermath of power outage, making sure that after troubles hooting we can timely restart power units to resume power supply.

The Company quarterly checks the implementation of rectification of accidental power outage to ensure that the implementation is effectively realised. The Company has established a monthly analysis system for accidental power outage, and finishes the composition of monthly report of accidental power outage at the beginning of the following month. We carry out year-on-year analyses and analyses of accidental power outage for regional companies and power plants with respect to dimensions such as specialities, processes, continuously operational condition of overhauled power units, etc. Were we to find major or common problems, we would give timely notification to all power plants, and supervise and inspect their rectification. We quarterly check the implementation of the rectification of accidental outages in order to guarantee that it is effectively implemented. In 2016, the Company incurred an average of 0.2 unplanned outages per unit per annum, representing a decrease of 0.04 outages per unit per annum as compared to the corresponding period of last year.

In order to thoroughly investigate causes for accidental power outage and improve analysis quality, we have added worksite pictures, SOE² record and trend graphs, the first occurrence of MFT³, photos of motion process, historical record of accidents, etc. in accidental power outage analyses. At the same time, we have carried out management analyses concerning equipment, techniques, personnel and footing, which have further enhanced power units' managerial intensity and depth against accidental power outage.

³SOE is short for Sequence of Event.

⁴MFT is short for Master Fuel Trip.

The Company pays permanent attention to information of real-time weather forecast, disseminates emergency notifications in advance in response to forthcoming radical weathers such as typhoon, dramatic drop in temperature, torrential precipitation, ect., and declares detailed requirements concerning emergency management of secured power generation and heating supply to all power plants. Meanwhile the Company appoints relevant personnel to check power plants for the implementation of emergency measures and seriously carries out analyses of problems, in order to effectively work out detailed preventive and emergency measures against radical weathers, which have secured safe and stable power supply against dramatic temperature drop, torrential precipitation, and typhoon.

In early June 2016, there was a national wide strong precipitation, the Company paid major attention to arrangements such as the preparation for materials against flood and waterlogging, inspection of dam of water source, equipment maintenance and water supply, which ensured the safe and stable production of power plants. After extremely strong precipitation, the Company has timely summarised and distributed Announcements on Tasks concerning Preparation for Upcoming Summit of Summer Precipitation in 2016, mainly supervised and directed the safety management during the summit of summer precipitation, preventing and withstanding flood, and fuel supply condition, and guaranteed the effective implementation of all major tasks during the summit of summer precipitation.

The year of 2016 has witnessed eight typhoons of different levels landing in China's coastal areas, which has affected all relevant power plants in Haikou, Dongfang, Shantou, Haimen, Fuzhou, Yuhuan and other places to varying degrees. The Company has paid close attention to warning information of the Central Meteorological Station, timely dispatched them to relevant power plants, meanwhile collected information from all power plants about their implementation of emergency plans against typhoon and flood, kept itself timely informed of all power plants' fuel storage, protection of harbour coal-unloading equipment against wind and typhoon, marine coal vessels' elusion from typhoon, subsequent coal supply plan, and information about typhoon's influence on equipment, crew, setting up wires and so on, and comprehensively grasped overall operational situation of all power plants. After the typhoon, the Company has sorted out and reported relevant information, and carried out analyses and summaries which reserved experience for the subsequent managemental work against wind and typhoon.

During the year of 2016, the Company did not experience any accidents that endangered operation safety of power grid.

Huaneng Power International's Contribution to the Power Supply of G20 Summit

In 2016 China hosted the G20 summit for the first time. Ensuring the stability of the power supply during the summit became Huaneng Power International's glorious and arduous task. Concerning this, the Company has organised a G20 Summit leading group. Production department and Safety department, under the guidance of Work Plan for Ensuring Power Safety of G20 Summit 2016 and G20 Summit 2016 Work Program for Power Guarantee, Safety, Stability and Anti-Terrorism, which are promulgated by the group and the Company respectively, have carried out inspection of power security of 49 power units from 17 power plants, which were involved in the work of power supply security, accomplished, with respect to problems found during inspection, tasks of timely feedback, rectification plan formulation, continuous track, focal points supervision, etc., and collected entirely power security information from power plants, which, after analyses and summarization, have been reported to the Company's Leading Group of G20 Summit and other relevant departments. Under strong management of Production department and active and effective cooperation with Safety department and power plants, the 49 power units from 17 power plants, which provided support to power supply security of G20 summit, has successfully completed the task without abnormal productions or excessive emissions.

3.2 Thorough Implementation of Lawful Management

Lawful management is a fundamental measure that considerably rectifies and regulates orders of market economy, a pivotal move that promotes companies' lawful management and lawful protection of self-interests, a consequential premise for companies' transformation of operating mechanism, reinforcement of scientific management, furtherance of economic efficiency, endeavour to establish first-class companies, and effectuation of institution as well as management innovations. Lawful management is the inevitable direction of Company survival and development, and the protective for modern companies' entrance into markets. Applicable rules and regulations are the basis of regulative management of companies.

3.2.1 Reinforcement of Anti-Corruption Management

Joint Application of Punishment and Prevention, Emphasis on Prevention

In order to prevent corruption, bribery and other acts of the sort, Huaneng Power International steadily combines anti-fraud education firmly with attainment of anti-corruption and with implementation of what is stipulated in the Manual of Prevention and Control of Risks of Corruption ("Manual"), so as to energetically carry out education on anti-fraud and clean career and continuously strengthen control on risks of corruption. First, the Company strictly effectuates responsibility system for the establishment of an incorrupt party, and party members of each level give a written undertaking thereof. Second, the Company rigidly implements stipulations within the spirit of the "eight-point" guideline for fighting bureaucracy and formalism and rejecting extravagance among party members and Huaneng Power International's own 30 stipulations on improving working manners. Third, the Company vigorously develop anti-trickery education. Fourth, the Company firmly takes good care of the effectuation of the Manual and makes the prevention and control of risks of corruption a crucial means for anti-trickery, which further serve as the promotion for amendment and improvement of relevant management system and for establishment of long-term mechanism of prevention and control of risks of corruption. Fifth, the Company attaches great importance to the work of handling complaints expressed in letters or visits.

Channels of Handling People's Complaints Expressed in Letters or Visits

The Company has offense reporting hotline and email, opens channels of handling complaints expressed in letters or visits, welcomes letter and visits, regularly collects, analyses clues reported by all units that have to do with corruption, bribery and other undisciplined or unlawful cases.

According to statistics, in 2016 the Company headquarters and subsidiaries did not have any illegal matters of significant influence, and there were also no lawsuits on corruption raised or concluded in 2016.

Serious Development of Anti-corruption and Anti-bribery Activities

Within report period, the Company has developed various anti-corruption and anti-bribery activities, including:

- (1) The Company has systematically carried out disciplinary conversations 12,060 person-times in daily manners, reminded them to comply with laws and regulations at work, and resolutely opposed corruption and bribery. Through organising annual report and discussion of vocational integrity as well as other activities, all units of the Company, have formed a good atmosphere of vocational integrity.
- (2) The Company has made use of a variety of methods to train the regulatory body within the system of the Company and enhance its professional capacity and vocational ability.
- (3) The Company has intensified supervision and guidance, carried out special inspection and realignment of areas which are inclined to corruption and bribery, and reinforced disciplinary accountability and awareness of the bottom line.

Training Courses for Managements of Discipline Inspection and Supervision

From August 22 to 25, 2016, the Company organized training courses for managements of discipline inspection and supervision at Jinggangshan Cadre College. Participants of the training included the Company's party leadership group member and discipline inspection team leader Wu Senrong, all employees of the Company's discipline inspection and supervision department, all regional companies' discipline inspection team leaders, principals of discipline inspection and supervision department, and basic units' secretaries of commission for discipline inspection and principals of discipline inspection and supervision.

The training courses invited experts and professors from Jiangxi Provincial Commission for Discipline Inspection and Party School of Jiangxi Provincial Party Committee to explain current situations and tasks of the Party's construction of incorrupt manner, strategies and methods of discipline inspection and handling of cases, operating practices of letters and calls and so on. This was a vocational training held after substitution of the Company system's previous discipline inspection team leader, establishment of the specific office of secretary of commission of discipline, and setting up of institutes of discipline inspection and supervision. The training content is close to needs of actual work, which is very instructive to enhance the performance of cadres of discipline inspection and supervision, broaden their thoughts, and innovate working methods of discipline inspection and supervision.

3.2.2 Protection of Intellectual Property Right

With goals and tasks of comprehensive promotion of the nation's rule of law being proposed, the Company, when meanwhile gradually expanding its business scope, also comprehensively promotes its own rule of law, focuses on scientific innovation, and enhances research level of soft sciences, especially reinforcing management and protection of intellectual property right.

According to the Intellectual Property Management System, which was promulgated in January 2012, the Company puts Legal Affairs department as centralized management department to effectively manage and maintain the registered and unregistered intellectual property rights in accordance with the management process of "application-audit-approval-declaration/registration", which is beneficial to overall enhancement of core competitiveness of the Company, but even more the key guarantee for the Company's maintenance of sustainable innovation and for its obtainment of competitive advantage.

The Company's major achievements in the protection of intellectual property rights in the year 2016 include:

- (1) Patent protection: On March 7, 2016 the Company was granted "A chimney" invention patent;
- (2) Trademark protection: In 2016 the Company had 34 applications of "H-type" trademark renewal. All have been passed the Trademark Office's check, and obtained approval proof.

At present, the Company is exploring the international patent protection project of intellectual property rights. Legal Affairs department has conducted a number of communication and consultation, improved project plan and program, and discussed the contract with relevant departments with the Company and intellectual property agencies. Approved by the Company, this international patent protection project has been initiated, which aims at comprehensively enhancing the Company's level of intellectual property protection.

04 Life First, Guaranteeing Production Safety

Huaneng Power International regards safety as its own life, tolerates no safety incidents, always adheres to the production safety principles of “life-oriented, safety first, prevention first, comprehensive management,” upholds the safety conception of “safety is credibility, efficiency, competitiveness, responsibility of safety is of the greatest significance”, places in any case safety in the first place, attaches great importance to safety and occupational health of employees, strengthens bottom line awareness, and effectively implements safe production.

17

4.1 Promotion of Establishment of Intrinsic Safety System

According to laws and regulations on production safety stipulated by the state, the Company, taking into consideration actualities of its subsidiaries, has established its own fourfold Intrinsic Safety System (“ISS”), which comprises intrinsic safety of personnel, process equipment, environment and management.

Realising Intrinsic Safety of Personnel

Intrinsic Safety of personnel includes and all employees’ safety awareness, safety conception and safety management knowledge and skills. It requires not only that managers should have security management knowledge, skills and exemplary actions, but also that employees should have the ability to effectively control all kinds of situation in a variety of links during producing process so as to ensure safe operation. The safety behaviour of employees should be transformed from a passive pattern to an active one, so that employees autonomously implement rules and regulations and behave well accordingly.

Realising Intrinsic Safety of Equipment

Intrinsic safety of equipment refers to the fact that equipment, facilities, or process technologies contain inherently functions that prevent accidents from occurrence. The Company applies high standards to design and manufacture, that is, to apply systematic safety analyses on every link after being put into use, from application of technologies, equipment design and other manufacture links to daily inspection and maintenance. The risk control scheme must be proposed and implemented so that process equipment have a perfect protection to ensure that equipment and system can operate safely, stably and normally during the specified operating cycle and are in a controlled state from beginning to end.

Realising Intrinsic Safety of Environment

Environment includes space environment, physical and chemical environment, the natural environment, etc. Environment safety thus means to meet all kinds of requires. To achieve intrinsic safety of space environment requires production areas, arrangements, safety and health facilities, and roads are in line with relevant national laws and regulations. According tonational standards, physical and chemical environment’s intrinsic safety relies on the control of lighting, ventilation, temperature and humidity, noise, dust, toxic and hazardous substances under effective measures, so as to protect workers’ health and safety. Natural environment’s intrinsic safety requires not only the improvement of equipment’s protection against disasters, but also effective application of emergency and preventive techniques against accidents and disasters.

Realising Intrinsic Safety of Management

Intrinsic safety of management requires, under the condition of fulfilling national laws and regulations, companies’ formulation and implementation of higher standards on safety, norms, and regulations, as well as their development of a comprehensive management system. Companies’ safety management should change from the traditional problem-encountering management to the modern problem-finding management. Accident management should transform from the current result-oriented management gradually to the process-oriented, and apply principles from safety system engineering to carry out scientific analyses and predict in advance.

The Company's intrinsic safety system follows the PDCA management model, i.e. PLAN, DO, CHECK, and ACTION, establishes circulation and improves continuously. The management model consists of six key elements: leaders' commitments, policies of safety, health and environment, planning, implementation and operation, inspection and corrective measure, and management review.

The Company's Intrinsic Safety System's documents consist of system management manuals, normative and procedural documents, as well as operating procedures and other supportive documents.

4.2 Reinforcement of Foundation of Trifold Safety Supervision

Huaneng Power International has set up the Committee of Safety, Occupational Health and Environmental Protection, whose main aims are to adhere to the policy of “safety first, prevention first, comprehensive management”, implement the national, industrial, and Huaneng Group’s own guidance and arrangements on safety production, organize and guide the Company’s work of production safety, analyse and propose important decisions and measures concerning production safety, and coordinate and solve key problems therein.

Under the leadership of the Committee of Safety, Occupational Health and Environmental Protection, the Company has built a three-level security inspection system made up of “headquarters – regional companies – production units”, and ensured that the intrinsic safety be implemented in every aspect of operations. The headquarters is responsible for system design, business guidance, worksite monitoring services, assessment and evaluation, etc. Regional companies are responsible for the implementation of the Company’s safety management requirements, work plans and decision deployments, give full play to the role of organization and coordination, and supervise basic production units’ implementation of responsibility of subjects. Production units are responsible for the implementation of Comprehensive Standard of Production Safety Responsibility, implement security responsibility of the Company’s all levels and posts, and set up the sense of responsibility of “whoever works is responsible, whoever checks is responsible, whoever supervises is responsible, and whoever approves is responsible”.

The Company promotes in depth the construction of intrinsic safety system, carries out production units’ verification and confirmation of intrinsic safety system, regularly organises comprehensive safety assessment, and complies with regulations of management of safety assessment. Experts of all subjects and professionals at all levels cooperate to complete comprehensive inspection and meticulous assessment for power plants’ guarantee of safe production.

Being in accordance with national requirements and taking into consideration production units’ circumstances of overall production, the Company has devised 2016 safety monitoring plan, organised comprehensive safety inspection in spring and autumn, specific safety inspection of flood period, established regular mechanism, combined regular with specific inspection, realised regularisation and standardisation of investigation and management against violations and hidden troubles, and constituted a high-pressure atmosphere against violation.

4.3 Protection of Employees' Occupational Safety and Health

Huaneng Power International sees safe production and employees' occupational safety and health as paramount. In order to guarantee production safety, the Company has taken comprehensive and effective measures, continuously updated methodology, and contributed to lasting enhancement of the level of production safety.

Production Safety

The Company establishes and improves managemental and organisational institutions of production safety, forms complete supervisory system of production safety, performs duties of supervising production safety, and guarantees the realisation of aims of production safety with the system of production safety system.

Target Responsibility System Concerning Production Safety

The Company and its subsidiaries apply target responsibility system concerning production safety. Every year the Company's managements sign a memorandum concerning target responsibility of production safety with principals from subsidiaries, carry out monthly pre-assessment and yearly final assessment, and guarantee the implementation of responsibility at every level. The Company's target of production safety abides by "one vote veto", which refers to a quantitative evaluation on production safety performance of each unit with starting score of 100 points. Whenever employees' injury or death accident, injury accidents of outsourcing personnel for whom the Company is responsible, serious and aboveequipment accidents for which the Company is responsible, or fire disasters, environmental pollution and devastation accidents happen, 100 points will be deducted.

The Company works out an annual plan of major tasks for production safety. After being examined and verified by responsible managements, the official work plan will be published in the Company's annual production safety meeting. It includes continuous inspecting and handling hidden troubles, specific rectification against violation, comprehensive inspection of production safety in especially important periods, and carrying out activities like safety month and emergency drills, which all aim at continuous promotion of the Company's managemental level of production safety. In the intrinsic safety management system, "management procedures of safe routine work" clarifies specific control processes for inspection of production safety, and all units are required to seriously implement thereof.

According to the annual work plan of production safety and principles of "point-by-point inspection, side-by-side supervision", the Company carries out worksite inspection in production units with respect to implementation of responsibility of subjects for production safety, implementation of production safety system, management of outsourcing regulations, worksite risk control through double tickets (work ticket and operation ticket), intrinsic safety managemental system, development of safety training, etc., issues worksite supervision handbook to regional companies according to results of inspection, and requires that subordinate power plants of these regional companies be self-reflective and comprehensive reformative and that they report reformation results to the Company to form an enclosed management. The Company carries out public supervision on hidden troubles reported by production units, helping and directing regional companies to organise experts' re-examination and acceptance of safety inspection of production units. In 2016, the Company supervised production units for 109 times, and issued 91 copies of rectification handbook. Seen from worksite supervision, all units attach great importance to safety management, and the overall security situation is controllable and in control.

The Company not only concerns about the personal safety of employees, but also takes outsourcing team who is responsible for long-term check and maintenance into the Company's safety management system, shifting contractors from "the required" to "the managed" to make outsourcing operations controllable and stay in control, so as to effectively protect the personal safety of outsourcing construction workers.

As per statistics, in 2016 the Company did not have any personal injury or death which was serious or which occurred during power generation. There are no workplace fatality of employees, contractors and subcontractors.

Work Ticket Management

A work ticket is a written order that permits work on electrical or thermomechanical equipment and other production-related activities. It is a licensed execution procedure based on hazard analysis and a written basis for the enforcement of technical measure of safety guarantee. Concerning installation, recondition, maintenance, testing and operation mode changes in the production equipment and system, subsidiaries must comply with requirements of work tickets. Work tickets are divided into two types: one is for internal use, and the other is for outsourcing projects. Internally used work tickets include electric work tickets, thermal machinery work tickets, production area work tickets, accident rush repair orders, safety measure tickets of fire work, and safety measure work tickets for special operations, etc. Tickets for outsourcing projects include tickets for outsourcing projects of electric work and tickets for outsourcing projects for thermomechanical work.

In order to well identify and analyse the hazards on the worksite, strengthen risk control and improve worksite risk management, the Company has combined production safety's theoretical research and its productive practice, fully carried out systematic construction of "operational risk control system through work ticket and operation ticket", issued Huaneng Power International Co., Ltd.'s Execution Plan of Systematic Constructing Worksite Risk Control, refined and standardised managements of "double votes", improved people's understanding of "double votes" and the seriousness and normativity of its implementation, established the idea that "double votes are an important means for power plants' labour organization", made worksite risk control system play its role, made "danger visible, risk quantified" on the worksite, made risks and dangers of worksite operations controllable and be in control, enhanced the index of personnel's and equipment' intrinsic safety during power generation, supervised and guided the production units to establish and improve the risk analysis database, done a good job in operational hazard analysis and pre-control work, developed comprehensive technical measures, organizational measures, and security measures, ensured their effective implementation, made employees at all levels carefully study and familiarise themselves with Working Rules on Power Safety, and urged production units to solidly carry out activities of "focusing on double votes, recalling safety regulations".

The Safety and Production departments of the Company and its subsidiaries have inspected the implementation of work ticket on both regular or irregular basis, timely detected problems, summed up experience, timely rectified, constantly improved work tickets' security measures, supervised department principals' procedures of termination after timely completing tasks on work tickets, and established open risk identification database through data collected and extracted through everyday work tickets, so as to establish standardised and comprehensive risk prevention and control measures.

Occupational Health and Safety

According to the rules of Intrinsic Safety System, the Company has established Management Regulations of Occupational Hazards and Supervisory and Management Regulations on Employees' Health, paid attention to employees' health and safety, enhanced their safety awareness, and prevented the occurrence of harm events.

The Company has established management organization of occupational diseases, clarified and implemented different departments' or personnel's occupational disease prevention and control duties, identified and assessed, according to the relevant standards, workplaces with occupational hazards, in order to determine the degree of harm, placed obvious signs in places where occupational diseases may exist, and done regularly supervisory work well.

4.4 Enhancement of Employees' Safety Consciousness

Employees' participation is the key to success of the Company's security management. To best develop and encourage employees to participate in the Company's all kinds of security activities in order to establish good security behaviours is the key guarantee to create an intrinsic safety enterprise.

Safety Training Management System

Huaneng Power International's management has incorporated safety education and training into the Company's annual and long-term plan, established double-level and triple-level educational and training mechanisms, and ensured the implementation of required coaches, funds and materials. The Company's Safety department is responsible for the preparation of safety education outline, design of plans, organisation of safety education and training, and sorting well the records and archives of safety trainings. All units of the Company ensure that employees receive adequate training, adjust safety education plan and organize training for power plants, departments, and teams according to the characteristics of departments' and teams' production.

Comprehensive Scope of Safety Training

Huaneng Power International has issued the "Regulations of Safety Training Management", which stipulates that the scope of safety training includes not only employees of the Company, but also external personnel working production areas, outsourcing construction personnel, labour dispatch personnel, contractor personnel, visitors, instructors, interns and other personnel to ensure the integrity of safety training.

Safety Education and Training for Outsourcing Personnel

Before the commencement of the project, the person in charge of the contracting unit shall organise the construction workers to carry out safety training and examination on the safety technical measures, safety disclosure, construction safety management and relevant contents in the Code for Safe Operation of Electric Power. Therefore, the construction workers can fully understand and master the characteristics of the project. The Company distributes the Employee's Manual on Professional Ethics and Safe Conduct to contractors, and strives to give one copy to every employee of contractors. While training contractors, the Company should also require them to organise internal trainings according to the regulations, so as to improve their own capacity and awareness of security.

In 2016, Huaneng Power International organized "Safety Management Training of the Company's Management of Heads of Power Plants", "Safety Management Training of Power Plant's Lightning Protection, Anti-static-electricity and Anti-hazardous-substances", "Training of Contractors' Safety Management Information System", "Seminar of Double Tickets", "Class on Risk Management, Examination and Verification", "Video Training for Safe Production Month", etc., carried out a total number of 96 times worksite tour-speeches in production units, actively promoted improvement and perfection of system functions of "Education and Training Platform for Safe Production", meanwhile, urged the production units to continually supplement and perfect existing courseware and teaching materials on the safety production and education platform, and developed a Standardised Examination and Verification Work Plan for "All Employees' Safety Training", which supervised the production units to perform well in safety training for all the employees.

05 Protecting Environment Effectively, Advancing Green Development

Environmental protection is an important issue of common concern for the whole world. As a responsible Company, Huaneng Power International regards environmental protection as a prerequisite for the survival and development for its Company, and actively takes environmental responsibility. Guided by developmental strategy, the Company is committed to promoting structural adjustment, optimizing industrial layout, vigorously developing clean energy, promoting scientific and technological innovation, increasing efforts on energy conservation and environmental protection, improving efficiency of resource consumption, and reducing pollutant emissions.

5.1 Vigorous Development of Clean Energy

China's government has elevated the respond to climate change into a major national economic and social developmental strategy to promote in-depth the construction of ecological civilization and achieve green development. During the "13th Five-Year Plan" period, the pace of China's power structure adjustment will be further accelerated. The proportion of installed capacity and power generation of low-carbon clean energy power will be further increased. There will be a more stringent requirement on the total power generation ratio of power generation companies' power generated by non-water renewable energy. Huaneng Power International closely focuses on improving the quality and efficiency of development, optimizes its industrial layout under the guidance of developmental strategy, and further accelerates its pace of power structure adjustment to achieve goals concerning low-carbon clean energy development.

Clean Energy Projects

At present, Huaneng Power International's clean energy types include wind power, hydropower, solar power, etc. As of the end of 2016, the Company has 38 clean energy production units with a total capacity of 2,931,500 kW; 24 wind power units with the capacity of 2,490,500 kW; 7 hydropower units with the capacity of 332,100 kW; 7 photovoltaic units with the capacity of 108,900 kW. In 2016, the Company's managed fans' availability reached 99.12%, and main equipment of clean energy is maintained well.

In 2016, the Company successively put into operation Tongshan wind power (50,000 kW), Huaining wind power (50,000 kW), Jieshan wind power Phase II (72,000 kW), Guoji wind power (32,000 kW), Liuhe wind power (50,000 kW), Hushaju wind power (26,000 kW), Shengjing wind power (48,000 kW) and other wind power projects; Dandong photovoltaic (10,000 kW), Yingkou thermoelectric photovoltaic (10,000 kW), Kangbao photovoltaic (20,000 kW), Dongfang photovoltaic (12,000 kW), Shantou photovoltaic (17,000 kW), Hongqiao photovoltaic (30,000 kW) and other photovoltaic projects.

Directions of Development

During “13th Five-Year Plan” period, Huaneng Power International will focus on promoting low-carbon clean energy development, and continuously improves installed capacity of the proportion of low-carbon clean energy. The main development directions include:

First, vigorously developing wind power. The Company is going to further increase the reserves of resources of high-quality wind power project, optimize the base-type wind power development program, speed up the development of efficient low-velocity wind power, increase the development of offshore wind power, develop and build complementary wind power projects according to local conditions.

Second, accelerating the development of solar power. The Company is going to vigorously promote the development of wind-photovoltaic power plants, make full use of its own land to build photovoltaic power plants, actively develop distributed photovoltaic, promote projects aiming at comprehensive utilization of photovoltaic power plants, research and pilot on relevant works on development of power generation through light and heat.

Third, optimally developing natural gas power generation. The Company is going to optimize the development of large-scale gas turbine cogeneration units, moderately increase reserves of gas spike power generation projects, accelerate the layout of natural gas distributed energy projects, strive to develop user-oriented co-production and co-suppliance of heating, electricity, and cold and integrated energy service that combines purchase, distribution and sell, and actively pilot complementary distributed energy system that combines gas, light, wind, and geothermal energy.

Fourth, discretionary layout of pumped storage power station. The Company is going to respond to the continuously increasing demand of safe, stable and economical operation of power grid and to the rapid rising need of improving the market share of new energy, and, when appropriate, carry out research on investment opportunities for pumped storage power stations.

Fifth, striving to participate in nuclear power investment. Given the owned shares of Shandong Shidaowan Nuclear Power, Hainan Changjiang Nuclear Power and Fujian Xiapu Nuclear Power, the Company attempts to participate in nuclear power investment, and perform well in site protection and reserving resources.

Sixth, actively seeking investment cooperation and opportunities for merger and acquisition of properties of new energy power generation.

5.2 Active Exploration of Innovative Technologies

Huaneng Power International sees technology innovation as the engine of Company progress. The Company is committed to creating an innovative drive-oriented Company by actively exploring, continually investing in research, strengthening core technologies, and improving innovative abilities, which have made fruitful achievements.

Innovation Input

Huaneng Power International persistently orients itself by demand, sticks to the combination of living in the present and planning in the long-term, plays its role as scientific and technological mainstay and leader, adheres to the combination of scientific and technological innovation and institution and mechanism innovation, strengthens its incentives, and resolutely combines independent innovation and collaborative innovation in order to improve innovation efficiency.

The Company has set up the Technology department to carry out research and development activities related to design, production, infrastructure and new technology study. At the same time, the Company, Xi'an Thermal Engineering Research Institute Co., Ltd., China Huaneng Group Clean Energy Technology Research Institute Co., Ltd. ("Huaneng Clean Energy Research Institute") cooperate to discuss and solve technical problems. The Company has cooperated with universities, manufacturers and other external parties to form a powerful alliance in order to complete project research.

During the year of 2016, the Company has arranged a total of CNY 137.4 million of funds for science and technology projects, of which 49.44 million of funds are arranged for 21 new projects.

Innovation Results

(1) The project of "Feasibility Study of 650°C Ultra-supercritical Generating Units System Integration and Key Technologies" has been progressed well in selection of pipeline materials. The Company has also determined the next direction and focus of work for thermal system, turbine technology, pipeline welding and boiler design.

(2) The project firstly developed by the Company named "Flue Gas Synergic Treatment Key Technology and Cluster Projects Application of Coal-Fired Power Plants" was awarded the China Power Science and Technology First Prize in 2016, which is considered the highest award of China's powering industry. The project has a total of 31 kinds of intellectual property rights, including 13 invention patents, 1 computer software copyright, 17 utility model patents.

The Company will continue its active exploration and progress, continuously enhance the service and support function of scientific and technological innovation, continuously lead the technological progress of power generation industry, actively promotes application of new technologies, gives full play to the role of technological innovation to enhance productivity, promote industrialization of science and technology, and ensure the Company's leading position with respect to innovation and application of power generation technologies.

5.3 Solid Promotion of Energy Conservation and Emission Reduction

Environment is the foundation of our survival and development. Huaneng Power International attaches great importance to environmental protection, strictly abides by the latest environmental laws and regulations of our country, takes the initiative to take environmental responsibility, actively promotes energy conservation, optimizes the energy structure, continuously improves the efficiency of resource use, and creates, through “efficient environmental protection and green ecology”, the world-class listed power generation company, leading the industry’s green development. In 2016, the Company did not experience any serious accidents.

5.3.1 Overall Planning

For the implementation of the State Council’s “Energy Development Action Plan (2014-2020)”, Huaneng Power International sets the goal of achieving “industrial leadership in overall energy consumption index and in ultra-supercritical unit energy consumption index”, actively promotes the Company’s coal-fired power units’ energy conservation and emission reduction, plans to carry out year by year energy conservation and environmental protection, strives to complete the national task of energy saving and emission reduction in advance and excess, ensures that the Company’s coal-fired units takes continues lead in energy conservation and environmental protection, ensures competitive advantage of coal-fired power generation units, and makes contributions on promoting revolution on the nation’s energy production and consumption, enhancing the clean and efficient development of coal power level, and achieving the 2020 national target of coal-fired power generation units’ energy conservation and emission reduction.

5.3.2 Energy Conservation and Consumption Reduction

In its development, the Company abides strictly by national energy conservation laws and regulations, actively implements energy-saving projects, promotes surplus heat recovery and other new energy conservation technologies, in-depth carries out activities of energy conservation and environmental protection, strengthens management of operation and maintenance of environmental protection facilities, and intensifies examination and assessment of energy conservation.

The Company mainly consumes coal and natural gas in the power generation process, and consumes a certain amount of oil during the start-up ignition and production combustion process. In 2016, the Company’s average coal consumption rate for power sold was 307.69 g/kWh, representing a decrease of 0.28% from that of the same period last year. A total of 8,782.18 ten thousand tons of standard coal, 24,249.43 tons of production oil, 308,488.33 ten thousand of standard cubic meters of natural gas have been consumed during Company’s power generating, and the weighted average house consumption rate was 4.57%.

Energy Conservation Management

In order to promote the work of energy-saving and emission reduction of coal-fired units, Huaneng Power International strengthens the budget management, implements triple-level management responsibilities concerning energy conservation and consumption reduction, vigorously promotes upgrades of energy conservation and environmental protection, and ensures that the state-issued energy conservation and emission reduction tasks be completed and that the Company's coal fired units continue to lead in the work of energy conservation and environmental protection.

The Company regularly collects and analyses data on energy conservation in production. According to information reported by the production units, the Company analyses the existing problems, develops measures, and supervises their implementation.

In 2016, the Company further taps its energy conservation potential, vigorously carries out power units' energy conservation diagnosis, equipment performance analysis, comprehensive compliance governance of power units' economic and technical indicators, and combustion adjustments and performance tests of new or overhaul power units, and continuously improves power units' economic operation level. The Company actively promotes the creation of outstanding environmental energy-saving and environmentally friendly coal-fired power plants, and active coal-fired power plants have all reached the standards of excellent environmental friendly coal-fired power plants.

In order to improve efficiency of energy utilization, the Company has enhanced structural energy conservation management, increasing the use of high-efficiency units in power generation, and vigorously implemented reformation projects concerning energy conservation techniques, which lead to many substantial achievements, including but not limited to improving flow capacity of gas turbine and expanding heat supply. In 2016, the Company has improved the power generation capacity of combustion engines by 13%. With respect to major technical and economic indicators, the Company has continually maintained domestic supremacy, with our 30 power units winning prizes in energy efficiency index comparisons and competitions held by the China Electricity Council.

Future Work Focus

Huaneng Power International is determined to remain leadership of being efficiency and environmentally friendly in powering industries by continuously improving newly production units' performance of energy saving and emission reduction.

The Company will actively implement a comprehensive energy-saving upgrading. Summarising the experience of the 11th Five-Year Plan and the 12th Five-Year Plan, the Company continues to actively carry out energy-saving work from three aspects: "managerial energy-saving, technological energy-saving and structural energy-saving". We should focus on the Company's main models and power units whose coal consumptions for power supply did not reach the advanced level, taking maximising the comprehensive benefits as the goal. After evaluating and sorting these models and units, we should pay more attention to them during maintenance and planning, project approval, and funding arrangements, etc. Besides, all units should declare to regional companies and put on records the comprehensive upgrade projects and their capacity.

5.3.3 Water Resources Management

Huaneng Power International has always been committed to the protection of water resources, strengthen water saving, deepen the recycling of water and improve water use efficiency. The water management system was set up in accordance with the national laws, regulations and standards, and meets the requirements of local laws and regulations of the power plants' regions. In 2016, the Company's total water consumption was 18,985.39 million tons, the fresh water for generating power was 294.70 million tons, the open cooling circulation water was 18,690.69 million tons, and the consumption performance value of fresh water for generating power was 0.94 kg/kWh.

Water usage

The main water consumptions of Huaneng Power International are for power units generating electricity, replenishing water for closed circulating water, and wet desulphurization, etc. Mostly, surface water such as rivers, urban water, a small amount of groundwater, etc., is used for generating power, and river water or sea water is used for circulating.

In the water management, first, all production unites have established water management systems and managed by specific personnel, who shall formulate rules for water usage, instruments maintenance and management. All water-usage sectors and professionals conduct regular maintenance and calibration for water metering, water quality testing instruments and water-usage equipment, etc., so as to eliminate unreasonable water usage. Second, all thermal power plants constructed an account management system, including the whole plant account, drainage account, water quality monitoring, water metering instrument basic information table, equipment installation location and parameter table, records of instrument test/calibration and maintenance, etc. They also regularly calculate the water management index of the whole plant, and the water usage account is based on the actual monitoring data. In addition, the Company's thermal power plants also comprehensively utilised various wastewater of the plant area and reduced discharge rate, according to the principles of shunting sewage and clean water, classification and recovery, and disposal and reuse.

The government of Hebei Province issued a policy requiring power plants to gradually replace groundwater usage by surface water usage. Shang'an Power Plant of the Company, meeting relevant requirements, actively carried out researches on the power plant, started transformations of equipment and adapted to government requirements. Shang'an Power Plant actively conducted feasibility study, and will gradually abandon the existing groundwater sources and use instead the treated city water as the water resource for the power plant.

Water Saving

Huaneng Power International established a sound water quantity and quality monitoring system at the energy-saving and environment-friendly thermal power plants, and adopted new technology, new craft and new equipment to improve water usage efficiency of the power plant. In the regions with strict environmental requirements and serious water shortages, the Company carried out in-depth technical transformation of water saving, and implemented the technical upgrading project of wastewater zero emission for the whole power plant. The plausibility, rationality and cost-effectiveness of its core processing technology have been simulated and demonstrated.

5.3.4 Emissions Management

Huaneng Power International vigorously carries out pollution prevention and control, actively and effectively deals with pollutant emissions, to become an industry leader in green development.

The Company requires that the emission of all kinds of pollutants in the power plants must comply with national and local standards, and strictly enforce the temporary pollution control measures of the local governments which are issued by law for abnormal weather and important social activities. The Environmental Protection Bureau of the Production Department of The Company is mainly responsible for the environmental management and pollutant emission control management of all power plants. The Company has formulated relevant systems of environmental management, set the pollutant performance control target for each unit, and demanded the pollutants of the power plants be discharged in strict accordance with the emission regulations. The Company uses the production real-time supervision system to monitor the pollutant discharge of the power units, strictly supervises and evaluates the excessive discharge, carries out strict examinations of the total salary of the unit which breaks through the assessment objectives, and at the same time formulates the environmental emergency plan and the management approach of the heavily polluted weather emergency plan.

In the energy saving and environmental protection planning, the Company also focused on the upgrading of coal-fired power units in different areas as Beijing-Tianjin-Hebei, Yangtze River Delta and Pearl River Delta, and selected large-capacity units in other regions to carry out environmental upgrading. We ensure to complete the transformation capacity targets issued by each provincial environmental protection department, and after the transformation, the air pollutant discharge concentration of the power plants is basically within the emission limit set for the gas units.

The Company has established a comprehensive information collection system, extensively collects various environmental public opinions and information, strengthens communications with the public, and jointly studies and improves measures. At the same time, the Company in accordance with the requirements of the National Ministry of Environmental Protection actively carries out self-monitoring of pollutants and the environmental information disclosure. In accordance with the requirements of local environmental management departments, we disclose pollutant emissions information through the Company official website or the network platform of the environmental protection department of local government.

5.3.4.1 Exhaust Gas Management

The exhaust gas discharged by Huaneng Power International is mainly carbon dioxide, sulphur dioxide, nitrogen oxides and soot generated from coal-fired power plants during the process of combustion in the coal-fired utility boiler.

Types of Exhaust Gas	The Absolute Quantity of Exhaust Emissions (tons)	The Performance Value of Exhaust Emissions (g/kWh)
Sulphur dioxide	52,451.82	0.17
Nitrogen oxides	66,169.68	0.21
Soot	9,051.72	0.03