STATE GRID
CORPORATE SOCIAL RESPONSIBILITY REPORT
2016
Your Power, Our Care
This report is dedicated to illustrating State Grid Corporation of China’s aspiration, action, and performance in terms of maximizing the integrated economic, social and environmental value, as well as its fulfillment of its social responsibilities in 2016 and the future commitment for 2017.

.Statement

State Grid Corporation of China (we) declares that all information within this CSR report is substantiated, balanced, and comprehensive. It systematically illustrates State Grid’s aspiration, action, performance, commitment and future improvement in terms of maximizing the integrated economic, social and environmental value. We hereby ensure the authenticity, objectivity and promptness of this CSR report. We hope, by means of publishing the CSR report, to strengthen the communication with our stakeholders and the society in general, establish mutual trust and cooperation based on the same value recognition, and promote sustainable development.

February 2017
We continue collecting topics via:

- Suggestions from the management team;
- Analysis from external and internal experts;
- Topics from external stakeholders;
- Topics from other entities;
- Analysis from external and internal experts;
- Suggestions from the management team;

With reference to:

- Data gathered from 95598 hotline, supplier consultancy and staff service center as well as media analysis reports, government policy documents and stakeholders’ feedbacks.
- Practical analysis to the topics included in the topic pool according to their weighted contribution to the company’s economic, environmental and social value creation.

Analysis on Substantive Topics in the 2016 Report

Identify Topics

We continue collecting topics via:

- Suggestions from the management team;
- Analysis from external and internal experts;
- Topics from external stakeholders;
- Topics benchmarked with CSR standards.

Order of Topics

According to State Grid CSR Guide, we continue applying the “value creation-social concern” two-dimensional matrix to sort out the importance of topics. Value Creation Dimension: assess the degree of concern on specific topics by the stakeholders and the public in general. Social Concern Dimension: assess the relevance, importance, and feasibility of specific topics to integrated value creation.

Social Concern

- Power industry reform
- Electricity replacement
- Safe and reliable power supply
- Global Energy Interconnection
- UHV construction
- Urban-rural power supply integration
- Clean energy development and accommodation
- Localized operation
- Corporate governance
- Poverty Relief
- Customer service
- S&T innovation
- Employee Development
- Smart grid
- Value chain partnership
- Coordinated development of grids at all levels
- Secured power supply for major events
- Community development
- Staff volunteer service

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In 2016, State Grid Corporation of China (State Grid) resolutely implemented and carried out the CPC Central Committee and the State Council’s decisions, adhering to the “Four Comprehensives” (A Moderately Prosperous Society, Reform, Rule of Law and Party Discipline) national strategic planning initiatives. With focus on innovation, coordination, green development, openness and benefit sharing, State Grid proactively adapted itself to the new normal phase of economic development, fully fulfilling its political, economic and social responsibilities, speeding up the forging of a modernized company with STRONG GRID, EXCELLENT ASSETS, QUALITY SERVICES and OUTSTANDING PERFORMANCE, which in turn, realized state owned asset value preservation and appreciation. State Grid currently ranked 2nd on Fortune Global 500, and ranked 1st among country’s top 500 companies in China. For twelve consecutive years and four consecutive serving terms, State Grid has been rated as A-class enterprise for its operation performance by the State-owned Assets Supervision and Administration Commission of the State Council. State Grid brand value has been the 5th most valuable brand list in China. In general, State Grid has kicked off a good start in the nation’s 13th Five-Year Plan, with comprehensive developments in terms of operation performance, overall capability and brand influence.

We have strengthened the all-round improve- ment of the CPC, upholding leadership core by the Party. While acting with firm resolve to implement the guidelines from the Sixth Plenary Session of the 18th CPC Central Committee and the National SOE Party Construction Conference, we willingly maintain political integrity, think in big-picture terms, uphold the leadership core, and keep in alignment. To keep tightly consistent with the Party Central Committee with Comrade Xi Jinping at its core, we take ideology, political thinking and deeds, we carried out earnest activities to enable Party members to gain a good understanding of the Party Constitution, Party regulations, and General Secretary Xi Jinping’s major policy addresses and to meet Party standards. By requiring Party members to be well-disciplined, to change working styles and to set a good example, Party building has been integrated in our daily work. We try to build up service-oriented and learning-oriented Party organizations, and carried out Party construction activities such as 'Pioneer Party Branches of State Grid'. Severe natural disasters like torrential rain, flood, typhoon and tornado turned affected areas into a battlefield. We answered to people’s needs. The Party management team led in setting an example, when employees followed with their dedication. What’s worth mentioning is our Party Member service teams, our main emergency rescuers, who have been taking the lead in securing power supply in major events, serving as the backbone of this SOE.

Our persistence in innovation-driven development has resulted in great achieve- ments in entrepreneurship and innovation. In the principles of the National Science and Technology Conference, we implemented the innovation-driven development strategy, focusing on innovation for our overall development. As we were innovating our technology, business and management, we encouraged the entrepreneurship and innovation at the community level. The 2016 national innovation appliance was set up among our staff. In youth innovation competitions, a number of practical results have emerged. We received one first prize and seven second prizes of the National Award for S&T Progress. The National Wind and Solar Power Energy Technology We-hourly Joint Demonstration Project is the joint recipient of the China Industry Award. The ±800 kV Xiangjiaba-Shanghai UHV DC Transmission Demonstration Project won the excellent project of China Quality Award. Three of our projects got the first prize of China State Grid Innovation Award. Meanwhile, we won 18 national laboratories and our patent ownership and applications, ranking first among all central SOEs. New technologies like Big Data, cloud computing, Internet of Things and mobile Internet become the mainstream of technology. To push ahead the Belt and Road Initiative, we founded the Global Energy Interconnection Development and Cooperation Organization (GEIDCO) to enhance grid connectivity with neighboring countries and develop Global Energy Interconnection (GEI). In addition, our overseas mergers and acquisitions were getting ahead. We have purchased the shares of Independent Power Transmission Operation S.A. and Brazil’s CPFL. Our first intertransnational interconnection project overseas, the ±500 kV Ethiopia-Kenya DC Transmission Project, started construction. The Phase I of our first large-scale Greenfield project overseas, Brazil’s Telix Pára Hydropower Project, was put into operation. We have been a leader in exporting China’s high-end electric power equipment to neighboring countries and regions around the world. State Grid, which is “going global”, has earned a good reputation for China’s SOEs.

We encouraged shared development and managed to deliver the benefits from the reform. According to the CPC and State Council’s decisions on deepening the reform, we focused on the supply-side structural reform. Our promotion and actions in this regard have ensured more benefits for all. As the Beijing Power Exchange Center and 20 provincial power exchange centers were officially and independently set up, a power market featuring multiple sellers and buyers came into being, which saved nearly RMB 30 billion. We encouraged mixed ownership, opening the market to private sectors in concessions and construction of pumped storage power plants, distributed power integration and electric vehicle charging facilities. State Grid regarded the security of the large grid as top priority. We ensured power supply to 2016 G20 Hangzhou Summit and the launch of the Shanghai-11, creating a new record of the longest time span for keeping the safe operation of big power grid. We strive to make electricity accessible to more people, investing RMB 171.8 billion in a new round of rural power grid upgrading and providing rural residents with a better life. To comply with CPC’s Poverty Alleviation Plan, State Grid implemented Sunshine Poverty Alleviation Action and installed seven PV power stations with a total installed capacity of vehicles, integrating 100,000 charging piles. Our open development was conducive to new progress in our globalization. With no problems from under-voltage, power supply safety and reliability has been improved significantly. What’s more, our grids become smarter. A number of internationally advanced smart grid projects such as multi-terminal flexible DC lines have been built. We have newly deployed 70 million smart meters, with the total number reaching 400 million, giving a boost in our customer services.

State Grid Corporation of China was established on December 29, 2002, with construction and operation of power grids as its core business. As a mega state-owned enterprise crucial to China’s energy security and economic lifeblood, our mission is to provide safer, cleaner, more economical and sustainable power supply. State Grid supplies power to over 1.1 billion population in 26 provinces, autonomous regions and municipalities, covering 88% of the national territory. By the end of 2016, our total assets and revenue had reached 490 billion RMB and 300 billion USD respectively. State Grid ranked 2nd on Fortune Global 500 in 2016.

State Grid also owns and operates overseas assets in the Philippines, Brazil, Portugal, Australia, Italy and Hong Kong with a total assets and investment of 55 billion RMB and 15 billion USD respectively.

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Explore, practice, verify, and improve a scientific CSR Concept

Sustainable development is to meet the current demand yet not jeopardize the capability to satisfy the future demand.

Responsibilities Originate from Mission and Arise from Strategy

Introduce CSR concept to optimize State Grid’s mission

Construct and operate power grids as core business

Maintain and increase the value of state-owned assets to pursue maximized benefits

Ensure reliable & trustworthy power supply

Serves socio-economic development and maximize comprehensive value

State Grid’s Outlook on Sustainable Development

Sustainable economic development

Economic value

Self

Sustainable social development

Social value

Society

Sustainable environmental development

Environmental value

Industry

Implement comprehensive CSR management to coordinate the development of State Grid and the society

Comply with legal obligations and moral bottom line

Maximize the comprehensive value creation

Value

Win-win situation with stakeholders

Achieve win-win situation

Bottom line

Maximize the comprehensive value creation

Compliment the social base

Integrity, commitment, innovation and dedication

In search of excellence

In pursuit of outperformance

To serve the country, customers, power generation enterprises and the socio-economic development

Core Values

Corporate Spirit

Corporate Tenet

Corporate Philosophy

Delivery clean energy to a harmonious society

Corporate Mission

State Grid CSR Report 2016 • The Aspiration
Our social responsibilities are rooted into our daily operations

Promote CSR’s integration into the corporate strategic management

Overall Strategic Objectives

- Pursue the maximization of comprehensive value, improve operational transparency and build a reliable, trustworthy, responsible SOE brand

Comprehensive value

- Economic value
- Social value
- Environmental value

Transparency

- On-time information disclosure
- Initiating communication
- Accept social supervision

Responsible SOE brand

- Build the concept of branding
- Branding
- Formulate branding strategies

Down to business strategies

- Improve the planning of business strategies
- Responsible planning
- Responsible construction
- Responsible operation
- Responsible maintenance
- Responsible marketing

State Grid CSR Penetration Mechanism

The aim of CSR Penetration Mechanism

Direct goal: popularize a scientific perception of CSR in State Grid and promote the CSR-based management model to raise staff’s awareness of the benefits that being a responsible enterprise could generate.

Ultimate goal: Through the adoption of a comprehensive CSR management model, State Grid is able to nurture a new work style that leads to improved operation models, new ways to communicate with the society and optimized corporate management and development plans. In this way, State Grid’s ability and performance of carrying out its CSR can be greatly improved.

The Essence of CSR Penetration

The scientific outlook on CSR and the comprehensive CSR management model should be in constant improvement. First of all, the understanding and interpretation of the scientific outlook on CSR and the comprehensive CSR management model should be renewed and improved in implementation based on research and practice. Secondly, the implementation of related projects should be constantly promoted, as the pursuit of the maximization of comprehensive value is an endless process.

The Content of CSR Penetration

All kinds of projects, measures, activities and theories, methodology, tools, experience and cases that have been verified by practice in the implementation of the scientific outlook on CSR and the comprehensive CSR management model or those that keep improving.
Fulfill the responsibilities of scientific development, management excellence, safe power supply and technical innovation.

Ensure Reliable & Trustworthy Power Supply

Fulfill the responsibilities of scientific development, management excellence, safe power supply and technical innovation.

Stakeholder-related Social Responsibility Management

Implement the responsibility on quality service, the responsibility in Agriculture, Countryside and Farmers, the responsibility on win-win partnership and the responsibility as a corporate citizen.

Become a Role Model of Green Development

Responsibility on Environmental Protection and Low Carbon Emission

Develop Overseas Business with Responsibility

Implement the responsibility of global vision

Guarantee Operation Transparency and Open to Public Supervision

Implement Responsibility on Communication and Cooperation

Length of newly added transmission lines in 2016

48,000 km

Newly added transformation / converting capacity in 2016

310 GVA/GW

Investment in fixed assets in 2016

521 billion RMB

Revenue in 2016

2,094.6 billion RMB

1st on Top 500 Chinese enterprises
State Grid’s efforts in deepening Power industry reform achieved positive results:

- Effectively reduce consumers’ costs
- Expand the market and comprehensively finish the building of the power trade platform
- Create a market environment in which multiple buyers and multiple sellers compete on a level-playing field
- New progress has been made in clean energy consumption

- Lower the cost for commercial power use in 21 provinces by RMB 16.8 billion
- Lower the power purchase cost for users by RMB 30.6 billion
- Inter-provincial clean energy transmission reaches 362.8 TWh
- Conduct direct power trade with a capacity of 509.3 TWh

State Grid firmly supports the Party’s reform efforts and has been actively promoting the implementation of reform measures in all respects including coordinating with related state departments and local Party Committees and governments to promote the launching and implementation of policies and plans. With a market-oriented approach, State Grid is working hard to ensure that the dividend of reform benefits all.

Accelerate pilots for power transmission and distribution tariff reform

Promote the implementation of a variety of reform measures in electric power system

Support the building of an open market for investment in power distribution and related services

Take multiple measures to promote new energy consumption

Improve the services to power sellers and users

Promote the institutional construction of power trade with well-developed regulations
Comprehensively finish the building of the power trade platform

According to Zhongfa [2015] No.9 Document issued by the General Office of the CPC Central Committee and related response to local governments, State Grid comprehensively finished the building of Beijing Power Exchange Center and 26 provincial power trade platforms, available for all registered market entities. The platforms saw power trade of 790.7 TWh, accounting for 21.0% of the total power traded.

Accomplish the construction of power trade centers

- **National**
  - Beijing Power Exchange Center Co., Ltd.
- **Provincial**
  - Capital Power Exchange Center Co., Ltd.
  - Tianjin Power Exchange Center Co., Ltd.
  - Hebei Power Exchange Center Co., Ltd.
  - Jilin Power Exchange Center Co., Ltd.
  - Shanxi Power Exchange Center Co., Ltd.
  - Shandong Power Exchange Center Co., Ltd.
  - Shanghai Power Exchange Center Co., Ltd.
  - Jiangsu Power Exchange Center Co., Ltd.
  - Zhejiang Power Exchange Center Co., Ltd.
  - Anhui Power Exchange Center Co., Ltd.
  - Fujian Power Exchange Center Co., Ltd.
  - Hunan Power Exchange Center Co., Ltd.
  - Heilongjiang Power Exchange Center Co., Ltd.
  - Inner Mongolia East Power Exchange Center Co., Ltd.
  - Jiangsu Power Exchange Center Co., Ltd.
  - Shaanxi Power Exchange Center Co., Ltd.
  - Guangxi Power Exchange Center Co., Ltd.
  - Fujian Power Exchange Center Co., Ltd.
  - Ningxia Power Exchange Center Co., Ltd.
  - Xinjiang Power Exchange Center Co., Ltd.
  - Heilongjiang Power Exchange Center Co., Ltd.
  - Inner Mongolia East Power Exchange Center Co., Ltd.
Promote reforms of state-owned assets and SOEs

State Grid took a series of concrete measures to implement decisions of the Central Government to deepen state-owned enterprise reforms with the launching of State Grid’s Plan on Comprehensively Deepening Reforms that aims at promoting the implementation of reform in a gradual manner.

Progress has been made in reforms of state-owned assets and SOEs

- **Improve modern corporate system**
  - Identify targets to carry out reforms in different sectors
  - Identify the scope of reform for regulated grid companies and market competition-oriented companies.

- **Promote equity diversification reform**
  - Pumped-storage station, EV battery swapping and charging facilities and incremental distribution are open to social capitals.
  - Promote mixed ownership in all affiliated financial companies, with 8 listed companies.

- **Improve corporate governance**
  - Promote the regulated operation of the Board of Directors: 4 external directors were included in the decision-making of the company with 8 rules and regulations of the Board of Directors being launched.
  - Improve corporate governance: promote the corporate system reform and adopt an assessment system to provide incentives to subsidiary companies.

- **Promote supply-side reforms**
  - Promote power industry reform: advance the scientific price formation mechanism of transmission and distribution with the scale of market trade constantly expanding.
  - Streamline operations to improve quality and efficiency: consolidate core business, optimize industrial structure, manage money-losing companies and squeeze managerial level positions.

- **Strengthen and improve work on Party building**
  - Strengthen the top-level design of Party Building and the organizational construction of Party Committees of all levels to promote Party discipline and improve the democratic management system.
Comprehensively strengthen Party building

The Party Committee of State Grid organized in-depth study of the important speeches delivered by President Xi Jinping and took comprehensive efforts to carry out the spirit of the Sixth Plenary Session of the 18th CPC Central Committee. State Grid Party Committee firmly safeguards the authority of the CPC Central Committee, constantly strengthens the “Four Senses”, unswervingly sticks to the leading of the Party and strictly enforces Party Discipline to bring the role of Party organizations as the organizational leader and political leader, promote the comprehensive integration of Party Building in State Grid’s daily work and explore an innovative development path for State Grid with Chinese characteristics.

State Grid has established 4,095 Party member service teams in 27 provincial power companies and 16 subsidiaries with more than 91,000 employees, in which 73% are Party members. They have been active in dealing with emergencies, carrying out disaster relief, helping the poor and the fragile and organizing charity activities, which greatly promotes Party building, the building of corporate culture and team building. In 2016, State Grid Party member service team was awarded “SOE Volunteer Service Brand”.

Studies on the theoretical and practical issues of Party building

- Party committees on different levels are required to organize group study for at least once a month and thematic discussion for at least once every two months. Up to now, Party committees of different levels have organized more than 240,000 group studies in total.
- Party committees of all levels have organized more than 89,000 Party lectures.
- Conduct a number of thematic activities to promote Party discipline, Party culture and Party leadership. A total of 36,000 “Party Members’ Responsibility Areas” and 67,000 “Party Members’ Demonstration Posts” have been established.

State Grid Party Member Service Team

- Take part in safe and reliable power supply for major events
- 30,000 times emergency repairs and troubleshooting
- 1,700,000 person-times
- Construct 29,000 community service spots
- Help the community 67,000 person-times
Fruitful S&T innovations

Fruitful achievements have been made in technical innovations.

Technology is indispensable to the prosperity of a country and the development of a nation. State Grid places great emphasis on improving the capability of technical innovation to lay a solid foundation for the 13th Five-Year Plan. To achieve the goal, great efforts have been made to promote scientific planning, accelerate the R&D of key technologies, strengthen organizational management and speed up the construction of major demonstration projects.

State Grid also promoted the development of technical standards, proposed the founding of National Technical Innovation Center, strengthened the development of experimental and research systems and promoted the development of overseas branches. Additional efforts were also made in optimizing the mechanism of output transfer and HR incentive policies, with more reasonable assessment and management of new technological advancement and capability in management of patents.

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R&D expenditure in 2016

RMB 6.921 billion

Applied patents in 2016

20,853

National Science and Technology Awards in total

60

China Power Science and Technology Awards in total

632

National Labs

54

Memorial Award of China Patent

18

Memorial Award of the 18th China Patent Awards

14
The development of the society cannot be realized without advanced energy technologies as clean energy is the core of future energy transition. Against such background, State Grid has been making efforts to adjust the power structure, optimize distribution of power generation, develop clean energy and promote its efficient accommodation so as to address challenges such as resource constraints, environmental pollution and carbon emission.

Expand synchronized grid and promote outbound transmission of clean energy.
Optimize system operation to prioritize the use of clean energy.
Facilitate trans-provincial and inter-regional transmission of clean energy.
Promote the construction and management of flexible power sources and give full play to pumped storage units for load-shifting with clean energy.
Strive for major technological breakthroughs to fully unleash the potential of the grid system in clean energy accommodation.
Promote electricity replacement

China is faced with severe air pollution, which is largely due to the scattered burning of coal and consumption of direct-fuel oil. As a response to this challenge, State Grid follows Suggestions on Promoting Electricity Replacement issued by the National Energy Administration to take the initiative making efforts in energy conservation, emission reduction and air pollution control. To achieve the goal, State Grid advocates the new energy consumption model of “replacing coal and oil with clean electricity from afar” to reduce the scattered burning of coal and consumption of direct-fuel oil and make contributions to environmental governance.

In the year 2016

- **Accomplish 41,000 electricity replacement projects**
- **Accomplish 103 TWh of electricity replacement**
- **Replace 13.2 TWh of electricity in private coal-fired power plants**

Replacement technology extends to 20 categories.

Promote the release of 16 corporate standards on electricity replacement.

Since electricity replacement in 2013

- **Accomplish 243.3 TWh of electricity replacement**
- **Accomplish 103 TWh of electricity replacement projects**
- **Cut 109.485 million tons of SO_{2} and NO_{x} emissions**
- **Reduce direct burning of 136 million tons of coal**
- **Reduce 243 million tons of carbon dioxide emissions**
- **Deploy 70,000 electricity replacement projects accumulatively**

During the 13th Five-Year Plan period, State Grid plans to promote electricity replacement in five key sectors, including household heating, manufacturing, transportation, power supply and consumption, and household electrification so as to replace 500 TWh of energy. Besides, detailed plans for electricity replacement are also launched for 30 key projects in 8 areas.
Develop EVs

As an emerging industry of strategic significance and an important channel to realize a new round of economic growth and solve energy and environmental crisis, new energy cars have been under spotlight. State Grid has scientifically planned and organized the construction of charging and battery swapping facilities, accelerated the infrastructure construction, founded State Grid Electric Vehicle Service Co., Ltd, implemented the professionalized management of EV charging and battery changing facilities, developed standards for EV charging and battery swapping facilities with independent IPR to comprehensively improve services for electricity supply for EV charging facilities.

“Six vertical, six horizontal and two rings” highway quick charging network has reached 14,000 kilometers, covering 95 cities. Offline services including card purchasing have been made available in 1,023 business halls. A total of 107,000 charging piles have been built, of which 44,000 are run by State Grid and 63,000 by social operators.

Supply power to 48,000 households with a total connection capacity of 1.05 GW. State Grid plans to build 10,000 charging stations and 120,000 charging piles by 2020. It is expected that public quick charging networks with a radius of no more than 1 km will be built in Beijing, Shanghai and Hangzhou.
Secure power supply for important events

Securing reliable power supply is the mission of utilities. State Grid successfully secured power supply during major events in 2016 through comprehensively implementing practical measures to improve power supply services. With these efforts, State Grid was able to secure power supply during the Spring Festival, the “Two Sessions”, G20 Hangzhou Summit, Silk Road (Dunhuang) International Culture Expo, CAE Expo, the Sixth Plenary Session of the 18th CPC Central Committee, the launching of the Tiangong-2 Space Lab and Shenzhou-11.

Faced with major natural disasters, State Grid spared no effort to resume power supply for blackout areas as soon as possible, which helped local governments win the battle against Typhoon Meranti, Typhoon Megi, Tropical Storm Nepartak, the tornado in Yancheng, Jiangsu and heavy rainfalls in many places.

State Grid CSR Report 2016 - The Action

- 332,900 person-times of emergency repairs
- 78,400 emergency repair vehicles
- 9,928 deployment emergency and repair equipment
- 20,900 household-times of on-site services to high-risk and VIP warnings and inspections
- 3,644,600 household-times of on-site services to customers in blackout
Targeted poverty alleviation

Targeted poverty alleviation is the core and spotlight of the efforts taken by the Party and the country in poverty alleviation. The Poverty Alleviation and Development Work Conference of the Central Government emphasized improving the capacity of poverty alleviation in extremely poor areas. According to requirements raised on the Conference, priority will be given to these areas in transportation, water conservation, power, information and other major infrastructure construction projects and ecological projects decided in the 13th Five-Year Plan. State Grid took active response to these initiatives to establish a leading work group to pool strength from across the corporation to launch and implement a series of targeted poverty alleviation plans.

Prioritize State Grid Sunshine Poverty Relief Action

- "Dynamic power to every village" project
  - An investment of RMB 8.62 billion
  - Provide power access to 6,219 villages
  - Transform the power network of 15,371 villages

- The national PV integration projects for poverty alleviation
  - An investment of RMB 34.58 million
  - A total integrated installed capacity of 49 MW
  - Benefit 9,800 households living in poverty

- Targeted poverty alleviation projects in five counties in Hubei and Qinghai
  - Investment of RMB 270 million
  - Build 7 PV power stations for poverty alleviation
  - A total installed capacity of 29.8 MW

Investment in rural power grid upgrading
- RMB 171.8 billion

Upgrade rural power grids

Electrify
- 782,000 irrigation wells for farmland

Solve the undervoltage problem for
- 36,000 rural grid upgrade projects in small townships and key villages

- 3.357 million rural households
**Scientific Development**
Make power grids smarter
 Coordinate the development of power grids at all levels
 Promote GEI

**Secure Power Supply**
Accomplish power supply for major events
 Respond to storms and floods
 Improve intrinsic safety

**Management Excellence**
Optimize “3I5G” system
 Carry out big data analysis and application
 Promote industrial and financing businesses

**Reform Innovation**
Strengthen S&T innovations
 Standardize technologies
 Deepen power industry reform

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### Ensure Reliable & Trustworthy Power Supply
Fulfill the responsibilities of scientific development, management excellence, safe power supply and technical innovation.

- Total power transmission via UHV power grids: 615 TWh
- Construct and upgrade: 2,554 smart substations
- Grid investment in 2016: 497.7 billion RMB
- Cross-regional and inter-provincial power transaction at Beijing Power Exchange Center: 774.4 billion RMB

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Give full play to power grids as energy supply guarantee and optimal resource allocation to ensure a safe and reliable power supply and a safe and stable operation of the power system. Promote safe, clean, coordinated, and smart development of power grids at all levels and construct a first-class modern power grid which is strong, extensively interconnected, highly intelligent, open, and interactive. Implement different reform measures to bring the benefits to all.
Ensure the safe and stable operation of the power grid

State Grid sticks to innovative development to strengthen the grid safety management and control. With practical measures being taken, State Grid is able to overcome the challenges brought by the increasing pressure of grid operation control and management, the gap between energy supply and energy consumption and frequent natural disasters and equipment faults, safeguarding the stability of the grid.

Implement safety responsibilities at all levels. Clarify the safety responsibility of positions and individuals through the establishment of a safety responsibility system covering all employees throughout the whole process with all-round coverage to avoid blind zones in operation. Launch strict award and punishment rules bases on scientific assessment. Those acting against related rules and regulations will be held accountable.

Improve intrinsic safety. Intrinsic safety refers to the ability of preventing and controlling risks from the root, which is a reflection of equipment quality, grid structure, safety management and talent of employees. State Grid strictly implements The Decision on Improving Intrinsic Safety to act according to the 30 requirements concerning intrinsic safety with detailed implementation measures and effective execution. It strengthens the checking and control of potential safety risks, especially for power transmission lines across railways, highways and key areas to identify and eradicate all potential risks.

Push forward the checking and management of potential equipment fallout risks. Strengthen the management and control of equipment operation. Push forward with the checking and management of potential risks and carry out comprehensive assessment on equipment. Organize live detection on equipment fallout risks. Strengthen the management and control of grid equipment operation, the gap between energy supply and energy consumption and frequent natural disasters and equipment faults, safeguarding the stability of the grid.

State Grid successfully ensured power supply for the G20 Summit. A power security work group was established with 49,600 workers and 7,210 vehicles to carry out inspection, checking and examination for 322,800 workers and 78,500 vehicles to repair the damaged facilities to resume power supply. To cope with the situation, State Grid strengthened the inspection, checking and examination of lines and strictly implemented accident prevention measures by making scientific operation arrangement to ensure power supply in a safe and sufficient manner.

Under the impact of heavy rains and floods as well as Typhoon Meranti, grid facilities in 17 provinces and municipalities including Fujian, Jiansu, Hubei, Hunan, Hebei, Shaanxi, Shandong, Jiangsu and Chongqing were badly damaged, causing power failure in 22.15 million households in the power supply area of 350,000 stations. State Grid took quick actions to dispatch 332,900 workers and 78,500 vehicles to repair the damaged facilities to resume power supply. State Grid developed a coordinated plan for cross-regional and trans-provincial UHV AC and DC power transmission to successfully complete the power security task and realize safe and reliable power supply during important events such as “the Two Sessions”, the Winter Olympics, the Summer Davos, G20 Summit, The Six Plenary Session of the 18th CPC Central Committee, the World Internet Conference and the Launching of Tiangong No.2 and Shenzhou No.11.

State Grid CSR Report 2016 The Action

Improve intrinsic safety

| 12 | trippings on 330kV and above transmission lines reduce by 7 times year on year |
| 301 | trippings on 330kV and above transmission lines reduce by 88 times year on year |
| 11 | trippings on DC system reduce by 1 time year-on-year |
| 80,100 | times of live work with power uninterrupted on distribution grid |
| 56,510,000 | hour·household |
| 79.11% | Rate of live work with power uninterrupted reaches |

With a sharp increase in the power load on rural power grid during the Spring Festival, State Grid implemented 74,000 power security projects in advance, finishing the maintenance of 176,000 distribution transformers, eliminating risks for 30,000 low voltage reactive power compensation equipment and upgrading 2,769 lines with heavy loads and overloads. For the first time, no transformers were burnt out, ensuring safe and reliable power supply during the Spring Festival.

During the load peak in summer, few regional power grids and 20 provincial power grids saw record breaking power load for 120 times with 53 major AC and DC power transmission arteries being overloaded. To cope with the situation, State Grid strengthened the inspection, checking and examination of lines and strictly implemented accident prevention measures by making scientific operation arrangement to ensure power supply in a safe and sufficient manner.

State Grid carried out analysis on the stability of grid, strengthened the management and control of grid and adopted standard procedures for risk warnings. With such measures in place, State Grid is able to cope with extreme weathers including cold spell, sun, snow, high temperature, flood and typhoon, keeping the safe operation of super large power grid for longest time than any other company in the world.

Improve intrinsic safety

Ensure the safe and reliable power supply

State Grid CSR Report 2016 The Action

State Grid successfully ensured power supply for the G20 Summit. A power security work group was established with 49,600 workers and 7,210 vehicles to carry out inspection, checking and examination for 661 lines, 672 substations, 17 important venues and 87 VIP clients, ensuring reliable power supply.
Smart Grid uses modern information and telecommunication technologies in every sector related to power grid in an integrated manner to realize the highly informationalized, automated and interactive operation of power grid. State Grid has been actively promoting Smart Grid. Currently, it has built and upgraded 2,554 smart substations, put into operation of 342 smart grid demonstration projects, installed 7,476 smart meters and realized data collection for 41.0 million households, covering 99% of the total, in which 1.83 million households realized the collection of data on the use of power, water, gas and heat with a single meter.

Build smart grid demonstration projects. State Grid has built seven smart grid demonstration grid projects demonstration projects in Yuhuang Economic Development Zone in Beijing, Changlang county in Tanyaod, Shandong, Shuishu Industrial Park in Jiangsu, Jiangdong New City District in Hangzhou, Zhujiang, Anhui Province in Liusha, Anhui, Zhangang in Jiangsu and Jiaotou in Jiangsu. It also finished the general development plan for smart grid in Zhangiaokuo Renewable Energy Demonstration Zone.

On October 20, 2016, all type tests on the DC circuit breaker project of Zhoushan flexible DC current system successfully completed. The project is a new energy demonstration project integrating wind power generation, photovoltaic power generation, energy storage system and smart transmission with the world’s largest scale and the highest level of comprehensive utilization. The demonstration project breaks the technical bottlenecks in large-scale grid-connected operation of new energies, adopts combined generation of wind, PV, transmission and storage, the world’s pioneer technical roadmap, solves problems from scientific theory to engineering application. A series of core technologies with international advanced level have been achieved: it is a Chinese path to tackle the international problem, putting China in a “high position” in the development of new energies.

Complete projects enhancing grid transmission capacity in 2016:
- Two 500kV projects, increasing 900MW of transmission capacity
- Nine 220kV projects, increasing 7,460MW of transmission capacity
- Eleven 110kV projects, increasing 320,560MW of transmission capacity

Promote the construction of key projects. State Grid put into operation 48,000km of 500kV/220kV power transmission lines with a transformation capacity of 115,000GW, significantly improving the 750kV main grid in Northwest China, accelerating the construction of back to back DC power transmission projects in Changgang and Hubi and implementing the renovation of Jianggang Dam.

Speed up the construction and upgrading of distribution networks. State Grid comprehensively promotes distribution automation and smart distribution network demonstration projects to realize automation in 38.26% of rural distribution networks. It strengthens operation maintenance and control of distribution network and facilitates the integration of the geophysical information system and the distribution network automation system to realize the comprehensive monitoring of information concerning low-voltage, heavy-overload operation and equipment failure and use such information in solving problems. Meanwhile State Grid actively promotes the typical design of 10kV (and below) distribution networks that could be used universally. 169 rural grid projects in East China and 1,285 rural grid projects in Midwest China were completed.

Promote pilots of power distribution tariff reform. The power transmission and distribution tariff adjustment in Anshu, Hubai and Ningxia within State Grid’s service area has been approved. The power transmission and distribution cost of ten provincial power grids including Beijing and Tianjin as well as North China has been examined. The power transmission and distribution tariffs were about to be approved. State Grid will strictly carry out the requirement of the National Development and Reform Commission to adjust the basic calculation method of electricity tariff and support the transmission and upgrade of suspended and semi-suspended enterprises. It is expected that with these measures, major industrial power consumers will see an annual power cost reduction by RMB1.5 billion.

Strengthen the building and regulation of power trading organizations. Establish one national power trading organization (Beijing Power Exchange Center) and 26 provincial power trading centers, which have been basically set up within State Grid’s service area. Currently, Beijing Power Exchange Center Market Management Committee composed of 41 representatives of power producers, purchasers, grid companies, trading organizations and third parties has been established. To now, a multilateral mechanism participated by multiple parties that is able to promote market development and operation has been established.

Build a fully-fledged multi-functional power market platform. Build an open and transparent power market trade platform that is compliant to law to create a fair, just, competitive and reliable market environment. In 2016, a total of 26,202 power producers and 8,501 power users have registered on these platforms. Power trade centers have generally established mid and long-term power trade mechanisms to organize direct trade between power users and power producers on an annual (quarterly) and monthly basis, which helps both sides to benefit from reforms and contributes to local economic growth, stability and restructuring.

Build a multi-buyer and multi-seller market competition mechanism. Nurture market entities to provide better services. Currently, 4,113 power producers and 4,900 power users and power sellers are participating in power trade on the platforms. The reform of power distribution networks in 30 key cities and 30 non-major cities have been finished, speeding up rural grid upgrading and proceeding strong grid support for positive competition of power trading. In this way, social capital could be guided to increase power distribution to diversify the investment in power distribution networks for its sound and sustainable development.

Promote coordination of the voice of China in international standards. In the Second prize of National Award for S&T Progress in 2016, multiple international standards mainly led by State Grid on UHV, smart grid and large grid were well applauded by over 3,800 delegates from over 90 countries. State Grid has become China’s role model in international standardization, making significant contributions to increasing the influences and the voice of China in international standards.

Promote Smart Grid

Coordinate grid development at all levels to boost their power transmission capability

Deeper the power industry reform

Strengthen S&T innovation and standard transfer

Enhance scientific and technological innovation and promote the transformation of scientific and technological achievements. State Grid constantly strengthens research on fundamental and advanced fields like UHV flexible transmission technologies, fully electromagnetic transient simulation of large grids, high power electronic components, high-voltage security and low-cost energy storage. Its S&T innovative capability keeps growing. The company explores the commercialization and the research results puts more efforts in the transformation and application of core patent to make them better applied in industries and facilitate the application of technical standards.

Transfer technologies to national or international standards.
- The National Wind/PV/Energy Storage and Smart Transmission Demonstration Project won China Industry Award, the highest award in China’s industrial sector.
- The project is a new energy demonstration project integrating wind power generation, photovoltaic power generation, energy storage system and smart transmission with the world’s largest scale and the highest level of comprehensive utilization. The demonstration project breaks the technical bottlenecks in large-scale grid-connected operation of new energies, adopts combined generation of wind, PV, transmission and storage, the world’s pioneer technical roadmap, solves problems from scientific theory to engineering application. A series of core technologies with international advanced level have been achieved: it is a Chinese path to tackle the international problem, putting China in a “high position” in the development of new energies.

The Second prize of National Award for Technological Invention

- Key technologies of photovoltaic energy conversion of 800kV UHV DC transmission and their application

The Second prize of National Award for S&T Progress

- Key technologies of large-area pollution flashover prevention and treatment of grid and their engineering application
- Key technologies of dispatching and operation of new energy power generation and their application
- Key technologies of reliable power supply for distribution network and engineering application
- Detection technologies for gas in oil hidden in transformers and their application
- Technologies and equipment to control and protect submersible insurance valve of the sponge-generator set and their application
- Innovation and better application of key control technologies for wind turbine generating units
- Key technologies to diagnose low-frequency faults of large wind turbines and hydroelectric generating units and their application
“UHV transmission” was included in the Government Work Report for the first time during the “Two Sessions” in 2016. In this context, State Grid accelerates UHV projects to enable them to play a crucial role in promoting national development, supply-side reform, the “Belt and Road” Initiative, the coordinated development of Beijing, Tianjin and Hebei, the construction of the Yangtze River Economic Belt and the rejuvenation of traditional industrial bases in Northeast China. In 2016, five UHV DC power transmission lines including the one from Xiangjiaba to Shanghai transmitted a total of 147.23 TWh of electricity, facilitating the massive and intensive development and safe, efficient outbound transmission of clean hydropower in Sichuan and other clean energy resources in Western China.

As a safe, reliable, green and low-carbon platform with a huge coverage and the ability to optimize resource allocation, UHV grid can generate significant economic benefit in the medium and long run. The “six UHV AC and five UHV DC” projects currently in operation increased power supply to East and Central China by 64GW, reducing annual coal transportation by 120 million tons, CO₂ emission by 340 million tons, SO₂ emission by 577,000 tons, NOₓ emission by 577,000 tons and smoke dust by 89,000 tons. Developing UHV grids has become a strategic priority in China’s endeavor to pursue the clean development of energy as it “benefits the development and use of clean energy in West China and helps to control smog in East and Central China”.

UHV projects are the highlight in China’s high-end manufacturing business.

**Zhundong-Southern Anhui ±1100kV UHV DC Transmission Project**
With the adoption of the most cutting-edge technologies, the project has the highest voltage, largest transmission capacity, and longest transmission distance of all UHV DC projects in the world. It is a milestone of the continuous innovation of State Grid in UHV DC power transmission and a demonstration in building Green Electric Infrastructure (GEI).

**Jarud Banner-Qingzhou ±800kV UHV DC Transmission Project**
The project is an important move in rejuvenating old industrial bases in Northeast China and promoting coordinated power development in the region, which is of great significance to solve the problem of oversupply in Northeast China, promoting the consumption of power generated in Northeast China nationwide and helping the region to turn its rich energy resources into economic growth.

**Jarud Banner-Qingzhou ±800kV UHV DC Transmission Project**

<table>
<thead>
<tr>
<th>UHV projects under operation and construction</th>
<th>Total length of UHV transmission lines</th>
<th>Transformation (converting) capacity</th>
<th>Total power transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>30,000 km</td>
<td>320 GW/GW</td>
<td>615 TWh</td>
</tr>
</tbody>
</table>

**6 AC and 5 DC UHV projects in operation**

- 1000kV UHV AC transmission and transformation projects:
  - Jindongnan-Nanyang-Jingmen (1×640km)
  - Huainan-Northern Zhejiang-Nanjing (2×649km)
  - Northern Zhejiang-Fuzhou (2×663km)
  - Xilin Gol League-Shandong (2×730km)
  - Huainan-Nanjing-Shanghai (2×774km)
  - Western Inner Mongolia-Southern Tianjin (2×616km)

- ±800kV UHV DC transmission projects:
  - Xiangjiaba-Shanghai (1,907km)
  - Jinbei-Jiangsu (1,119km)
  - Jiuquan-Hunan (2,383km)
  - Xilingol League-Taizhou (1,620km)
  - Shanghaimiao-Shandong (1,238km)
  - Jarud Banner-Qingzhou (1,234km)

- ±1100kV UHV DC transmission projects:
  - Jarud Banner-Qingzhou (1,234km)
  - Zhundong-Southern Anhui (1,524km)

**3 AC and 6 DC UHV projects under construction**

<table>
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GEI (Global Energy Interconnection) builds a new pattern for energy development

Promote key demonstration projects. Domestically, State Grid explores the possibility of widely applying UHV grid, flexible DC grid and wind/PV/transmission/storage technologies in Zhandianxiu Innovation Demonstration Area and West China Demonstration Base. Globally, State Grid carries out extensive research on trans-national and intercontinental grid interconnection projects and promotes grid interconnection with countries along the “Belt and Road” Initiative. It has signed an MOU for Power Interconnection spanning across Northeast Asia with KEPCO from South Korea, SoftBank from Japan and PJSC Rosseti from Russia and actively advances the China-Mongolia-UHV-DC project and preliminary study of the China-South Korea-Japan energy interconnection projects.

Deepen research on major issues. State Grid released the White Paper on Global Energy Interconnection in the 80th IEC General Meeting held in 2016, completed assessment on wind power in the Arctic, solar power in the equatorial area and clean energies on all continents, and proposed the idea of grid interconnection in Northeast Asia, Asia, Africa-Eurasia and Americas. Apart from releasing the Global Energy-Analyze and Outlook on the Development of Global Energy Interconnection, State Grid also compiled a development plan for technical equipment of GEI and organized to develop technical standards on GEI.

Keep boosting operation and management performance

Optimize and upgrade “13IG” system. State Grid continues to operate in a centralized, flat and professional way, prioritizes effectiveness and efficiency, balances standardized and differentiated operation, orderly centralizes and integrates the municipal-level and county-level operations and reintegrates operation in large- and medium-sized cities based on local conditions. With these measures, it further promotes the efficiency of the “13IG” system. State Grid gives full play to the three-tier operation monitoring centers, focuses on process monitoring and data analysis, enhances monitoring on core resources and grass-roots operation to identify and solve common and tendency problems and enhance lean management.

Strict comprehensive plan and budget control. State Grid insists on making ends meet, makes plans and projects according to its long-term plan, strengthens rigid requisites on the implementation of plans and budgets, and controls unplanned projects and extra-budget costs. It monitors and controls major operations, core resources and key process by fully utilizing operation monitoring centers at all levels. It puts more efforts in managing and controlling well-targeted investment, optimizes investment scale and order, and performs post-assessment analysis to increase the input-output ratio.

Apply big data analysis

- Plans and budgets: State Grid carried out 43 applications on planned budgets, involving 23.78 billion pieces of business data and 102 investments.
- Grid operation: With the data of equipment archives and real-time operation of maintenance, dispatching, and marketing, (ST) data 3.735 million units of equipment of four types, 9,545 supply districts falling in six types and 2.281 million transformers of public distribution stations, 58 applications were adopted to optimize the operation efficiency, power supply capacity and voltage level of stations at 110kV and below.
- Key processes and core resources: State Grid applied 26 applications for key processes and core resources, involving 128 million pieces of business data and making 115 achievements.

Promote manufacturing and financial businesses

Reinforce core competitiveness. State Grid implements the action plan of “Made in China 2025”, focuses on high-end industries in the industrial chain and strategically emerging industries, further promotes restructuring and integration and optimizes the layout. It strengthens the manufacturing of electrical equipment, intensifies efforts in independent R&D of high-end equipment and core components and increases the capacity of equipment test and product design. With the experience gained in typical demonstration projects, State Grid vigorously expands markets in electric vehicles, electricity replacement, energy saving and environmental protection and information communication to find new growth points. Taking asset securitization as the starting point, State Grid promotes the mixed ownership reform, quickens asset reorganization of listed holding companies and tightens market value management of listed companies.

Enhance capabilities to provide better financial services. State Grid integrates production with finance, plays its functions of providing financial services and continuously improves the performance of its main operation in centralized management of funds, internal and external financing, insurance and other aspects. It also develops new financing channel and successfully issued bonds of RMB9.9 billion in China, and bonds of 1 billion U.S. dollars and 1 billion Euros abroad. It saves an interest expense of RMB1.7 billion throughout the year.

Deepen the integration of industry and finance. Based on the power industrial chain, State Grid provides innovative financial products and services to improve its market share and competitiveness. Moreover, it highlights the benefit-oriented idea, relies on overseas investment companies to create a global fund management system, build a cross-border two-way capital channel, and introduce low-cost capital. State Grid coordinates resources including customers, data and e-commerce platforms to fuel the development of internet finance.
Stakeholder-related Social Responsibility Management

Responsible for customers
Ensure reliable power consumption for customers
Optimize customer services
Improve supply-demand management efficiency
Build an e-commerce platform

Responsible for agriculture, countryside and farmers
Ensure urban-rural power supply integration
Improve rural power supply service
Consolidate safety management for rural power consumption

Responsibilities in partnership
Develop together with power generation companies
Innovate together with external S&T research institutes
Promote responsible procurement

Community responsibilities
Power supply boosts poverty alleviation
Extensively carry out employee volunteer service
Continue to strengthen the aid to Xinjiang and Tibet

Responsibilities in staff
Protect employees’ health and safety
Ensure staff development
Enhance the vitality of employee organizations

State Grid takes the responsibilities for customers, Agriculture, Countryside and Farmers, partners, communities, and employees. It keeps improving power supply services to make electricity safer, smarter and more convenient. It plays the exemplary role of a state-owned enterprise to promote the socio-economic development in poverty-stricken areas by constructing power infrastructure for rural prosperity, agricultural development, and farmers’ affluence. It also co-creates a sustainable industrial chain for mutual benefits with its partners. State Grid promotes the growth and development of its staff to provide talent support for maximizing its comprehensive value.
Pre-judge failure and take the initiative to implement emergency repairs. State Grid uses a power failure research system to analyze massive data, follows the “substation - transmission line - transformer - distribution box - user” chain, combining abnormal and warning information sent by the automatic power distribution system and the communication network management system. In this way, it can identify and analyze fault sections and power outages in a comprehensive and automatic way and position those sections fast and accurately, send analysis results to 95598 call center to match fault sections and teams in charge of repair. And the center will send a work order to a repair team before customers call and inform customers of the outage. Repairs used to be made upon customers’ calls. Now the faults have been pre-judged and emergency repairs take place in a proactive way.

Ensure customers’ reliable power consumption

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Implement proactive maintenance on power distribution network

State Grid Beijing Electric Power Company upgrades the data collection mode, enables data access of 1.1 million gauging points in 180,000 meters used in distribution transformers of 16 districts and part of customers in Beijing. With the effective support of massive data, the branch successfully used the power failure research system in 23 cases. In one case, customers called 95598 to report failure 41 minutes later than the detection of the failure.

State Grid staff examined power consumption in form days.

Reliability of urban power supply 99.946%
Voltage qualification rate for urban areas 99.993%
Voltage qualification rate for rural areas 99.491%

Comprehensive “health examination” on equipment. State Grid organized activities to conduct live examination and upgrading of power transmission equipment, including 11 UHV substations, 4,500kV DC converter stations and 141 330kV substations and above and removing 635 defects. Moreover, State Grid identified hidden defects for UHV and cross-distinct lines, removing 2,670 hidden defects. By further inspecting hidden defects in the distribution network, 615,000 defects were eliminated in time.

State Grid staff examined power consumption in form days.

Reliability of urban power supply 99.946%
Voltage qualification rate for urban areas 99.993%
Voltage qualification rate for rural areas 99.491%
Supply side: carry out power supply and demand analysis and prospect to ensure power supply in peak seasons (summer and winter) and help governments to work out orderly power consumption plans. With effective measures in place, orderly power consumption plans were carried out with 420,000 customers with a power load of 3.52GW with ensuring residential power consumption and controlling power use in corporate users with high energy consumption, high emission and surplus productive capacity as the priority. State Grid organized 10 provincial companies including State Grid Shandong Electric Power Company to implement orderly power consumption plans with maximum peak load shifting reaching 2.06 GW, enough to cope with the local power shortage caused by peak load in summer and winter and guarantee power use for residents and important users.

State Grid values customer experience management. It developed a new four-level customer service mechanism (HQ, provincial, prefecture and county), established general and professional customer service standards. Trainings were organized to improve the skill of workers and the quality of service to make services more standardized and customized with streamlined procedures.

"Internet +" Service

Make full efforts to improve the application of IT in social and economic development, support the use of the Internet to innovate service models and promote the development of the service industry including finance, logistics and trade, and vigorously promote cross-border e-commerce to establish an e-commerce ecosystem and provide guidance and regulation of online finance.

State Grid CSR Report 2016 — Outline of National Informatization Development Strategy

Provide power-related special financial services. Launch “Jiao Fei Ying” account balance wealth management product in cooperation with quality open-ended monetary funds to provide easily accessible, low risk and highly flexible online wealth management services to power consumers. Jointly launch scenario-based online financial products such as “high temperature power rate insurance”, “insurance for accidents caused by power use” and “account security insurance” together with Yingda Chang’an Insurance Brokers Co., Ltd., which are well received by consumers for their innovation and flexibility.

Promote EVs. Initiate and found China’s first online EV sales union to realize mutually beneficial win-win cooperation through resource sharing and complementation. Carry out the marketing and promoting activity of “A Thousand EVs in Five Cities” to provide consumers with an integrated automobile financial solution covering "vehicles, charging stations, loans, insurance, networks and payment", which significantly improved the purchasing and driving experience of consumers.

Develop vertical e-commerce platform. State Grid online shopping mall "electric power e-mail" customer project service platform was launched with its unique "S2M2B" business model for the electric power industry ("S" refers to electric parts supplier, "M" refers to electric system equipment manufacturer and "B" refers to electric project product and service demand side) to realize online negotiation and trade, smart quotation and business cluster management.

Renewable energy: carry out power demand response. The newly revised Regulations on Power Demand Side Management issued by the National Development and Reform Commission incorporates demand response and electricity replacement in power consumption to highlight the role of grid companies as main subjects in project implementation. In response to the new Regulations, State Grid organized and carried out demand response, significantly reducing the pressure on the safe operation of power grids, reported the progress to authorities in charge and extensively promoted demand response in the media.

Unify the optimization of customer service standards
State Grid sparing no effort to implement the development strategy of "new village, new power, new service" to continuously increase investment, significantly improving rural grid in the areas concerned.

In 2016, State Grid took the power upgrade in small towns (key villages), "power access to all wells" and "dynamic electricity to every village" projects as the priority. State Grid signed cooperation agreements with 22 provincial governments to decide the goal and investment of each project, identify the duties and responsibilities of grid companies and local governments and actively asking for local financial and policy support.

Compile the two-year plan for rural power grid upgrading. According to the plan, by the end of 2017, 1.581 million irrigation wells will have access to electricity; 66,000 small towns (key villages) will complete rural grid upgrade; and 26,000 natural villages will have access to dynamic power and 52,000 villages will complete the dynamic power retrofit project.

**Promote the new round of rural power grid upgrade**

State Grid published Typical Design of Power Access for Wells, launched State Grid "Giving Well Access to Electric Power" 2016-2017 Project Implementation Plan with a total investment of RMB 48.5 billion, benefiting 104,000,000,000 square meters of farmland and realizing power access to all irrigation wells in plain areas covered by the project.

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2016 rural power grid upgrade projects

- Investment reached RMB 171.8 billion
- Put 1,296 substations into operation
- Put 436,000 km lines into operation
- Added 203,000 transformers

*Power Access to Every Well* safeguards farmland from drought

This year, with continued decrease in the incoming water in the Yellow River Basin, Ningxia faced the threat of severe water shortage for farmland irrigation. In response, State Grid Shizuishan Electric Power Supply Company signed agreements with local governments and farms to launch the "Power Access to Every Well" Project to protect farmland from drought. With an investment of RMB29.4364 million, the project completed the retrofit of the power grid and transformers for 721 wells, built 53,257 km of power supply lines and added and replaced 122 transformers, benefiting 96,666,667 square meters of farmland. With the help of the project, all irrigation wells in Shizuishan were able to have access to reliable electric power, effectively relieving the pressure of water shortage in the local area.

Small towns and key villages power grid upgrade.

With accelerated urbanization and agricultural modernization, power consumption in rural areas saw continuous and rapid growth. The upgraded power grid in small towns and key villages can not only effectively improve the living and production condition in the local area, but also attract more investment, drive industrial development, increase employment and make contributions to the steady development of rural areas.

Small towns and key villages power grid upgrade projects from 2016 to 2017

- Planned investment: RMB 84.3 billion
- Plan to build and reconstruct a transformation capacity of 9,35 GVA at 35~110kV with a line length of 9,416 km
- 110kV distribution transformer capacity reached 42,42 GVA with a line length of 112,000 km.

**Implementation of smart greenhouses**

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**Electricity replacement promotes the development of smart greenhouses**

State Grid Chahou Electric Power Supply Company pioneered the introduction of electrified greenhouses through replacing coal with electricity as the major energy for heating and replacing diesel engine pumping with electrified automatic sprinkling irrigation. Besides, the company also promoted the building of smart greenhouses for seeding and electrified processing and production lines with the help of the Internet of Things to promote reliable and economical intelligent greenhouses that can be applied to a wide range of areas. The implementation of the project made local agricultural production sales, more profitable and efficient and reduced pollutant discharge incurred in the process.

*Dynamic power also referred to as three phase power. The system is composed of two phase lines and one neutral conductor, with the two phase lines being 380V. The system is composed of two phase lines and one neutral conductor, with the voltage between the neutral conductor and each phase line being 220V and that between the two phase lines being 380V. Dynamic power is mainly used to power large machinery, equipment, blenders and mixers. Currently, small processing factories including family factories all need dynamic power.
State Grid Sunshine Poverty Relief Action

Implement “Dynamic Power Access to Every Village” Project. State Grid invested RMB 8.62 billion in the power grid construction and upgrade in 22,000 natural villages, significantly improving power supply in rural areas. Analysis of the implementation of “Power Access to Every Village” Project in some counties in Anhui, Henan and Gansu shows that the project brings about an increase of 4 businesses in every village on average, in which 2.52 are agricultural and side product processing factories, 0.87 are livestock companies and 0.29 are industrial companies, with a 15.7% increase in the per capital annual net income of the rural population.

State Grid carried out targeted poverty alleviating projects in “three counties and one district” in Hubei (Changyang Tujia Autonomous County, Zigui, Badong and Shennongjia) and Maduo County in Qinghai to ensure safe drinking water in rural areas. They support the development of agricultural products that can effectively drive local economic growth. It implemented 72 poverty alleviation projects in education and emergency treatment and control, benefiting more than 10,000 people living in poverty being included in the profile.

Improve auxiliary construction for national PV poverty alleviation projects. Work out plans for project implementation, improve auxiliary construction and grid interconnection services under the guidance of Suggestions on the Implementation of PV Power Generation Poverty Alleviation Project. Make full efforts to support the development of the first batch of PV poverty alleviation projects initiated by the National Energy Administration. Now the finished on-grid installed capacity reached 49 MW, of which, 486 power stations on village level (including household power consumption systems) have an installed capacity of 19.2 MW and 7 large centralized power stations have an installed capacity of 29.8 MW.

Promote the development of PV poverty alleviation power stations in targeted counties. Invest RMB 19.03 million to support the development of industries with local characteristics including crops farming, livestock and tourism; implement 27 poverty relief projects, benefiting 1,335 people living in poverty recorded by the government. It is expected that households covered by the projects in the “three counties and one district” in Hubei will witness a per capital income increase of RMB 1,000, while those in Maduo County, Qinghai will see a per capital income growth of RMB 400.

Invest RMB 280 million in rural power grid upgrade in the “three counties and one district” to solve the problem of power shortage in 176 villages; invest RMB 9.45 million in poverty reduction to implement 22 drinking water safety programs, to give access of clean drinking water to 17,000 people, in which 4,025 are people living in poverty recorded by the government.

Invest RMB 270 million to support poverty alleviation in Maduo County, Qinghai to build 7 PV power stations with a capacity of 29.8 MW. The net profit of these projects will be used to support poverty alleviation in the local area. Take the PV power stations for poverty alleviation in Maduo County, Qinghai as an example, with a total investment of RMB 92.82 million, the projects have an installed capacity of 10 MW, generating 110GWh of power annually, increasing the annual income of the 1,100 local households in poverty recorded by the government by RMB 1,300 with the support of the national subsidy on renewable energy.
State Grid CSR Report 2016  The Action

Consolidate safety management for rural power consumption

Establish a new type of rural electricity management system: The 1,733 county power suppliers affiliated by State Grid fully promote rural electricity safety service and protection system, and establish an innovation mechanism of "target & philosophy, control & protection, linkage for incentive, service for organization, publicity & guidance". On this basis, it further strengthens the rural power security management measures.

At present, State Grid has basically established in Jiangsu, Zhejiang, Beijing and other places a relatively sound safe power use working mechanism linking government and enterprise with implementation at the rural level for power services.

Improve power supply in rural areas

Build star-rated township power supply stations: State Grid prepared power supply station Star-rating and Evaluation Handbook, completed the acceptance and evaluation for the first batch of 100 "Five-star township power supply stations of State Grid". In addition, there are 1,759 four-star power supply stations, 6,663 three-star power supply stations, 5,287 two-star power supply stations, and 3,189 one-star power supply stations. It also formulated Management Approach on State Grid Rural Power Supply Commission to regulate the rural power supply commission.

Build an Integrated Business Monitoring Platform by Township Power Supply Stations as pilot. In building a pilot platform in Fujian that integrates 66 monitoring indicators, State Grid has promoted information integration at the terminal of the power supply stations by using “One-login button, indicator display, closed-loop management, evaluation and analysis” function, it has achieved whole process management over core business indicators and management quality of the power supply stations, to avoid redundant and ineffective labor, streamline 9 manual information registrations and reduce 93% of repeated type-in.

Carry out power safety inspection of agricultural production: State Grid organizes manpower to investigate hidden hazards for electricity consumption on agricultural equipment, urged and assisted timely in rectification of those risks, to ensure the safety and reliability of power supply for agricultural production. It takes good advantage of harvest, plowing, planting period in autumn, to go to villages and harvest sites to spread information on safety and emergency treatment after electric shock with slogan banners, publicity vehicles, brochures to improve farmers’ awareness of safe power use.

Strengthen technical guarantee to reduce rural security accidents: While putting more efforts in construction and renovation of rural power grids, State Grid has actively explored new ways and new methods to improve the safety of rural power supply, completed research and pilot application of low-voltage disconnection protection, and greatly enhanced the penetration rate of three-level residual current protection devices, and improved the safety in rural power transmission and distribution facilities, to further reduce accidents.

Construct a new type of rural electricity management system

- Three baselines
  - Participated by the public
  - Laid by governments
  - Special guidance from power suppliers

- Three mechanisms
  - Incentive and motivation mechanism
  - Publicity and guidance mechanism
  - Auxiliary service system

- Three systems
  - Technical protection system
  - Cost management system
  - Legal system

- The treatment system of hidden risks

- Coordination management mechanism

Solve the difficulty of electricity purchase

In order to solve the current difficulty of paying electricity bills in rural areas in Shangdi District, State Grid Beijing Electric Power Company has cooperated with convenience stores and entrusted these little stores and shops to sell prepaid cards. In this way, rural customer experience of paying bills improved to the benefit of sellers and customers as the profitability and service quality was also significantly enhanced. After the construction of the sales network, coverage rate in Shangdi District reaches 99.72% and sample survey shows that customer satisfaction for electricity prepaid card rises from 60% to 72%.
State Grid had nearly 70,000 suppliers. Facing rapid growth of customer groups and increasingly complex service needs, the supplier service center has established an efficient coordination mechanism, which gives full play to the leading role of Party members. The center also established the post of Role Model of Party Member and the position of experts to help get rid of professional barriers and optimize the business consulting process for professional coordination and rapid response. The center has made it possible that with a call to the hotline, all problems from the suppliers can be answered. At the same time, “e-commerce platform” and “State Grid Supplier Service WeChat Account” and other information systems are synchronized to related business to promote information sharing and service quality. In 2016, the supplier service center received a total of 156,000 hotline calls, and handled 62,000 times of related business to promote service innovation.

Innovate together with external research institutes
Cooperate with scientific and research institutes to make breakthroughs. Strengthen cooperation with Chinese Academy of Engineering and the National Natural Science Foundation of China. Work with Tsinghua University, North China Electric Power University, Tongji University, Huazhong University of Science and Technology, Shanghai Jiao Tong University and more than ten well-known scientific research institutes. We have co-developed the research in 9 major engineering projects including dynamic safety protection technology in interconnected grid, key technology and application of 800kV HVDC converter valve, and large-scale grid pollution flashover accident prevention and control technologies and engineering applications. These 9 projects have won the national science and technology awards.

Build overseas research institutions. State Grid has increased investment in 2 overseas institutes in the United States and the Europe, and completed the Overseas Innovation Fund Construction Program and Independent Project System Preparation, and organized overseas recruitment. Based on the company’s major needs, State Grid recruited talents overseas and supported projects from overseas universities in order to promote international cooperation with overseas institutions.

Develop together with design and construction companies
Strengthen construction subcontracting management. State Grid implemented the safety management responsibilities of project owners, construction units, supervisors and strengthened preparation, approval and execution of construction safety programs. It strictly carried out subcontractor qualification review and access management, and put those subcontractors with poor safety management frequent accidents into the “blacklist.”

Strengthen credit management of design contractors. State Grid organized this year’s design contractor credit evaluation, and conducted quantitative evaluation over all Class A and B design units that participated in power transmission engineering design. Through quantitative evaluation of credit, the company had a systematic “diagnosis” into these design units and guided the design units for innovation. The efforts have helped design companies to innovate and improve in key aspects such as their management and design capabilities. These measures will be conducive to improving the quality and performance indicators of engineering design.

Implement design competition in 8 projects. All participants carried out special research on intelligent technology, modular construction, mechanized construction, resource conserving, environmental friendly, new technology, new material, new technique and industrialization, design optimization, and environmental protection, making a large number of innovative achievements. Compared with the feasibility study program, the participating programs have been greatly optimized with improved indicators. Substation project investment decreased by 10% ~ 35%, construction area decreased by 40% ~ 65%, the walled area decreased by 25% ~ 50%, and line investment decreased by 15% ~ 35%. Iron tower steel consumption decreased by 10% ~ 20%; concrete consumption decreased by 15% ~ 45%. State Grid has summarized highlights and innovation of participating designs, compiled them into a book, and promoted these applications in the subordinate units, which have effectively improved the quality of engineering design.

Promote responsible procurement
Construct a responsible supply chain and guide suppliers to attach importance to protect employees’ rights, enhance safety and environmental protection management, and keep improving product quality and its environmental performance.

Promote information transparency. Enhance e-commerce and WeChat account and other information disclosure channels. Organize meetings with suppliers on a regular basis, timely release information of procurement biddings, and enhance the transparency to promote regulations.

Guide green bidding. For the first time in the non-material tender, State Grid adopted supplier qualification verifications to use more e-documents, which substantially reduced the number of paper used in tender. It helped to cut the bidding cost of supplier, promoting energy-saving and emission reduction. This safe and reliable service was widely welcomed by the suppliers.

Improve the level of compliance. State Grid has taken the initiative to carry out data collection and progress tracking, and actively communicated with the project management departments and suppliers to ensure various types of contracts to be signed, and match the procurement results seamlessly. It was in strict compliance with procedures for contract modification to ensure that the contract modification was in accordance with the law and the whole process was traceable. It also actively responded to the needs of suppliers, strengthened the sense of quality service, shortened process of contract modification, and effectively ensured the payment to suppliers.
Responsibilities in communities

State Grid Hangzhou Power Supply Company has built a “Classroom in the Air” as a teacher training and exchange platform between Zhejiang and Yushu, relying on “Lighting Yushu” Public Service Platform built during the reconstruction of earthquake-stricken Yushu in five years. The platform has made teaching by famous teachers in primary and middle schools in Zhejiang province available to students at the grassland in Yushu 3,000km away via the internet.

State Grid helps students, the elderly and the disabled

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Awarded the third UHV Power Grid Scholarship. In 2016, 180 undergraduates majoring in electrical engineering from 20 universities were granted UHV Power Grid Scholarship, which demonstrated the core values of power industry. State Grid made active efforts to enhance the cooperation with schools and other sectors, consciously shouldering its due social responsibility.

Power supply boosts poverty alleviation

State Grid earnestly implemented the decisions by CPC Central Committee and the State Council, and constantly increased investment to upgrade rural power grids, continued to carry out poverty alleviation to improve people’s livelihood, and vigorously promoted the “State Grid Sunshine Poverty Relief Action” to strengthen aid to Xinjiang and Tibet so that each village and well has access to power supply. The company also promoted PV projects for poverty alleviation by improving the infrastructure of poor areas and the production and living conditions of people in poor areas.

State Grid continued to carry out targeted poverty alleviation in Hubei and Qinghai provinces during the past 22 years. By allocating resources to poverty-stricken population, upgrading the power infrastructure in poor communities to promote their all-round development, we have made great progress from broad to targeted poverty alleviation. The company adheres to combine “blood transmission” with “blood formation”, helping to improve the poor’s livelihood by means of industry poverty alleviation, point-to-point assistance and talent aid for poverty-stricken population.
Adhere to the law and operate business with integrity

Build an anti-corruption system for clean governance. By combining strict management of the Party and the company by law, State Grid has improved prevention and control system against corruption, strengthened the image and work style, established prevention and control against corruption in major decision-making process and key business areas. It also built a dynamic database of violations, and established three lines of defense in regulation, discipline and law to consolidate and improve an effective mechanism with no corruption.

Orderly advance comprehensive risk management. State Grid has basically established a standardized and orderly risk control system. It formulated 1,500 supervision rules under 8 types and 7 categories, including fund and assets, consolidated the monitoring of 317 rules. It also promoted integration of the risk control into business management, and integrated 640 million pieces of ERP and financial control data.

Build an enterprise ruled by law. State Grid innovated the construction of the common system, and strove to achieve an institutionalized management on HR, power businesses and the company. It actively participated in drafting of power reform documents, cooperated with local legislation and pushed a total of 19 local regulations related to electric power to be released. By constructing a decision-making mechanism on major issues, major management appointments, major project investment decisions, and use to large amount of funds, State Grid enhanced the local decision-making capabilities. It took the lead among all central SOEs to formulate Behavior Guidelines for Corporate Goodwill in the Rule of Law, and enforced the rules and regulations into the code of conducts of the enterprise.

Promote full coverage of auditing. State Grid deepened economic responsibility audit and special audit, highlighted auditing focus, increased the review on decision-making, bidding and procurement, salary and benefits, marketing services, consumption of public funds on three kinds of business—office case, meals expenditure and expenditure on overseas visits, collective business management and international business management to identify and correct major problems. In this way, State Grid can prevent and resolve operational risks.

Strengthen lesson management of contracts. State Grid improved the authorization management, and ensure compliance with the law. It improved the comprehensive contract management and gradually integrated the core business system to enhance efficiency and efficiency of transaction. The contract execution system was improved for better risk prevention capabilities.

Strengthen protection of intellectual property. State Grid carried out special inspections on protection of intellectual property rights to prevent the legal risks of IP. It also enhanced creation, management, use and protection of intellectual property through self-examination and sample checks.

Create a brand for volunteering service. State Grid Party Member Service Teams gave full play to their leading role, elevate the satisfaction of people and actively fulfill their social responsibilities. The public can evaluate their service. Altogether 4095 Communist Party Member Service Teams, such as Red Boat Party Member Service Team, Zhang Side Communist Party Member Service Team, Hongyan Communist Party Member Service Team, Huaxiu Communist Party Member Service Team, Jianggang Communist Party Member Service Team, continuously improve their ability and work style to provide better service and forge a favorable service brand.

Deepen youth volunteer service. State Grid took the lead to establish a young volunteer service team in the SOEs and set up 5,200 volunteer service units with 100,000 volunteers registered. It formulated the Young Volunteer Service Activities Management Approaches, and established work mechanism for welfare activities. “Young Volunteers Action” Service Team has organized 2.5 million people per year to participate in volunteer service activities for 15 consecutive years, which have holistically helped more than 900,000 disadvantaged people.
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Responsibilities in staff

Ensure staff’s health and safety

Effectively protect staff safety. State Grid strengthened on-site security management and control, implemented accountability of project owners, construction units and supervision units, strictly carried out safety management of subcontracting and outsourcing, strengthened UHV, hydropower projects, rural-grid transformation and upgrading operations to ensure staff and grid safety. It rationally scheduled construction overhaul in strict compliance with prohibited ultra-stable limit and equipment capacity. State Grid also strictly implement standardization of power grid operations.

Focus on mental and physical health of employees. Through questionnaires, collective discussions, key interviews and field visits, State Grid has innovated employee assistance program (EAP) to enhance employee happiness index. It organized regular physical examination for staff, and established employee health records. All employees received annual health check-up.

Regular visit to staff at the emergency rescue frontline. State Grid organized condolence activities for staff at the frontline for flood relief and summer rescue work. In this way, we know more about the working and living conditions of those at the frontier of fighting flood, as a way to show our support.

Enrich employees’ life style. State Grid organized activities to deliver culture to the grassroots staff. By organizing contribution competition in key projects, team building, career building, home building and staff library, State Grid brought books, cultural activities and paintings to UHV AC/DC construction sites. State Grid initiated Sunshine Poverty Relief Action to offer assistance to targeted areas and grassroots teams.

Understand employee demands. State Grid gave full play to information technology to analyze demands of different positions, ages and gender, summed up the characteristics and patterns of staff demands to provide references for scientific decision-making.

Control and eliminate occupational hazards. For the sites with major risks of occupational disease such as pumped storage power stations and equipment manufacturing sites, State Grid designed, built and put into operation the prevention and control facilities at the same time with the main facility, so that we can eliminate occupational hazards from the source. The company organized occupational health research in equipment manufacturing, pumped storage power stations and conventional hydropower plants, biomass power plants and other industrial units to get a basic grasp of occupational health status.

Care for the retired. Respect and care for the elderly, look after old comrades in daily life. State Grid accumulatively established 2,275 elderly activity centers (stations, rooms) with average daily attendance of 63,100 people, and 58 elderly colleges with 7,323 students enrolled.

Adhere to the people-oriented strategy to boost a thriving enterprise. State Grid implemented national key talent projects. In 2016, 29 national talents joined State Grid, including 19 experts with special State Council allowances, 4 S&T innovation talents of “Ten Thousand Talent Program”, 2 China Skills Competition winners and 4 national technical experts. Currently we have 70,000 talents under four categories at four levels.

Carry out training for all employees systematically. According to position and training requirements of different levels of employees, State Grid carried out full-scale training through various means. The annual training penetration rate is 94.6%, with 89 training hours per capita. Planned off-the-job trainings reached 3,640,000 person-times. Online trainings reached 26,290,000 person-times and online tests reached 5,790,000 person-times.

Broaden staff development. State Grid improved the management system for different kinds of employees at different levels. It clarified standards, processes and evaluation criteria for selection, training, use, and assessment of national and corporate-level talents, which pointed a way for further development for the staff. It designed evaluation dimensions, indicators and weight that meet the characteristics of grassroots units, highlighted the performance, grass-roots and innovation-orientation. In this way, we have helped employees to plan their career so that outstanding talents can stand out.

Improve the incentive mechanism for personnel training. State Grid strengthened the training and developed training programs tailored to different positions, strengthened the training in workplaces and implemented compensation standards. Moreover, benefits package was also integrated into the performance evaluation system, combined with current and long-term incentives.

Ensure growth and development of employees

From a laidman of high-voltage lineworker to a "champion-level" skilled worker. For 34 years, Xu Qijin has been working hard with persistence to innovate and invent. Now, he is a national model worker, and is praised by his apprentices as a "Dancer on the high-voltage powerlines".

49 years' hard work and persistence made him a "champion-craftsman" of State Grid.

--- Xu Qijin

Live maintenance is an important technology in UHV project. State Grid Shandong Maintenance Company live operation group leader Wang Jin is a live maintenance worker. By virtue of year of hard work, goodwill, responsibility and professional skills, he walks on the UHV power line to ensure reliable supply of electricity to the households.

A man walking on UHV power line

--- Wang Jin

Zhang Liming has been engaged in power maintenance for 29 years. He is the leader of Distribution Repair Squad 1, and deputy secretary of Distribution Maintenance Office of State Grid Tianjin Binhai Power Supply Company. Zhang Liming leads the team members to go to the community and carries out projects such as "energysaving and mutual aid to illuminate the neighborhood". He also takes the lead in innovate and invent and培育 talented. I am a Communist Party member

--- Zhang Liming

--- Zhang Liming
Ensure decent work

Talent equivalent density 1.0366

Overall productivity RMB 709,000 per person-year

674,000 employees offer their reasonable advice

Deepen democratic management and supervision

Innovate on Labor Union. Integrate the elements of the Internet into labor union work, and create a new platform for Labor Union. Prepare Guidelines for Labor Union of State Grid, standardize the routine work and formulate the Measures for the Administration of State Grid Labor Union Funding, to manage the use of labor union funds. All employees are participated in the Union.

Implement staff democratic management. Formulate Thirteenth Five Year Democratic Management Action Plan for State Grid, attach great importance to proposal collection and processing from staff representatives, and steadily improve the efficiency of handling proposals. By far, the company has efficiently replied to 236 proposals collected from 1st Session of the 3rd Labor Union. All of them have been replied.

Conduct democratic supervision. Extensively source proposals and suggestions from employees, with 674,000 employees participating in the activities giving 244,000 recommendations and suggestions. Management has been promoted. Carefully select the third chairman liaison, and establish a reporting and information feedback mechanism for smooth bottom-up communications.

Enhance vitality of employees

Strengthen team building. Developed Guidance on the Upgrading of Team Building Work of the Thirteenth Five Year Plan, and compiled and published Work Manual for the Team-building in the Thirteenth Five Year Plan. Keep close contacts with grass-root team building units and simultaneously promote the Team As A Family Action to forge the team into “standardized, safe and efficient” operating units and “self-reliant, mutually helping and warm” families for the staff.

Promote staff’s technical innovation. By implementing national policy of “Mass Entrepreneurship and Massive Innovation” and innovation-driven strategy, State Grid regards front-line workers and grass-roots teams as the main body, and innovation offices as the pioneer. We have built technological innovation exchange platforms to improve conversion rate, and stimulate innovation and vitality. Model worker innovation offices were used as platforms to impart experiences, help and elevate younger employees. Taking youth innovation competitions as a method to stimulate passion, enthusiasm and vitality of the workers.

Promote the spirit of Model Worker. Set up WeChat account of “State Grid Home”, and use new media channels to cover “State Grid Stories” in an all-round, three-dimensional way. The spirit of model workers can bring the right momentum for the company to develop in a fine and fast way. Deepen the construction of model worker innovation offices to give full play to their radiation effect and branding image.

Ensure female employees to participate in decision-making. Vigorously promote the State Council’s Special Provisions on the Protection of Female Workers. Cultivate an elite female team. In the professional skills competition on dispatching, computer and Internet, meter installation, OC maintenance, relay protection, and star of services, the participation rate of female employees was 50%. In model workers selected by State Grid, the proportion of female representatives increased, which enhanced the enthusiasm of female staff.
Coping with Climate Action

Promote electricity replacement, which is to replace coal and oil with clean electricity from afar and practice green, circular and low-carbon development measures. Speed up construction of large power grids and a large market, make full use of wind, solar and coal resources in West and North China, and coordinate the construction of flexible energy sources such as pumped storage power stations to optimize resource allocations and clean energy accommodation in a larger scale and improve energy structure.

Become a Role Model of Green Development

Responsibility on Environmental Protection and Low Carbon Emission
China’s clean energy is mostly concentrated in the western and northern region, far away from the eastern and central load centers. In order to achieve efficient development and utilization of clean energy, State Grid has accelerated the development of UHV, large power grids and a large market to optimize the allocation of clean energy across the country. We have accelerated the coordinated construction of flexible energy source such as pumped-storage power stations to respond to urgent demands, tap into the peak-shaving potential to promote clean energy transmission and consumption.

Promote inter-provincial and cross-regional energy support. By increasing inter-provincial and cross-regional renewable energy transactions, we have enhanced the capacity for sending out electricity. In 2016, the cumulative inter-provincial and cross-regional renewable energy sent out reached 10.537 TWh in the northeast, an increase of 53.6%. Guansu, Ningxia and Xinjiang saw a year on year growth of 5%, 136.9%, and 129.7% respectively. The cumulative inter-provincial and cross-regional renewable energy sent out reached 11.302 TWh in the northeast, an increase of 12.07%. Inner Mongolia East, Liaoning, Jilin and Heilongjiang saw a year on year increase of 1.37%, 10.21%, 69.16% and 69.59% respectively.

Promote the accommodation of hydropower from Southwest China. In Beijing Power Exchange Center, the market oriented trade of southwest hydropower transmission was carried out for the first time and 252 hydropower generators in Sichuan and 3 in Tibet have actively participated. We have given play to the advantages of UHV for optimizing the allocation of resources. Clean hydropower in Southwest has been for the first time transmitted in a long distance to North China, East China, Central China and Northwest China. Tibet’s hydropower has for the first time entered into Beijing-Tianjin-Tangshan region through UHV power grid. In 2016, southwest hydropower set out reached 129.357 TWh, an increase of 4.98%.

Optimize system dispatching and operation, and prioritize renewable energy. Dispatching agencies at all levels have strengthened the system analysis and optimized generating unit structure to minimize the consumption of thermal power. In 2016, utilization hours of thermal power in North, Northeast, Northwest China were 4,663, 4,628 and 4,297, respectively, down by 132, 148 and 383 hours. Among them, utilization hours of thermal power in Guansu, Ningxia and Xinjiang reduced by 165, 518 and 383 hours respectively. A whole grid intelligent dispatching and control platform for renewable energy has been established to increase renewable energy consumption.

Support renewable energy accommodation with advanced technologies. All the provincial dispatching agencies of State Grid have been equipped with operation information monitoring, power generation capacity forecast and new energy planning function module, covering 1,300 wind farms and more than 1,200 PV plants. Renewable energy forecast accuracy reached 81% at a world-leading level. The “Three North” renewable energy-rich provinces and autonomous regions have built up a wind power and photovoltaic automatic power generation control system to control and regulate wind farms, giving full play to the capacity of transmission grid, and dynamically adjust the output power of wind farms.

Display pumped storage units to accommodate valley wind power at maximum

- Start construction of 5 pumped storage stations
  Zhejiang in Zhejiang Province, Qingyuan in Guangdong Province,  Jiujiang in Jiangxi Province, Xi’an in Shaanxi Province, and Lianyungang in Jiangsu Province
- Put 2 pumped storage stations into operation
  Hongxing in Jining and Ruanfu in Zhejiang Province
- Capacity of pumped storage stations in operation: 19.16GW
- Capacity of pumped storage stations under construction: 21.75GW
- Accumulative valley pumped storage capacity: 31.406GW
State Grid vigorously promotes electricity replacement to replace coal and oil by electricity and reduce direct and scattered burning of coal and direct burning of oil. Since the implementation of electricity replacement, it has promoted over 70,000 electricity replacement projects, replacing 243.37TWh of electricity, equivalent to reducing direct coal consumption by 136 million tons and energy consumption, cutting carbon dioxide emissions by 243 million tons, and sulfur dioxide and nitrogen oxides emissions by 10,946,500 tons.

Implement electricity replacement in all sectors. Encourage innovation in technologies. Replacement technologies are spanning 53 sub-areas in 20 categories, increased by 29 and 5 respectively. It formulated documents for replacement in self-owned power plants to promote electricity replacement. A total of 13.2 TWh of electricity has been replaced, promoting structural reform at the power supply side. It also organized activities of “grid connects homes to share electrification”, which have increased home appliances sales of 12.11 million units, increased potential load by about 10.17GW. People can share the benefits of grid upgrading and reform.

Promote electricity replacement

Promote green development on grid-side

State Grid scientifically planned the installation of charging and battery swapping facilities and sped up infrastructure construction. It established State Grid Electric Vehicle Service Co., Ltd. to specialize on the management on EV charging business, and set up standards on charging facilities with independent intellectual property rights so as to provide better charging services.

Speed up construction of fast charging network in cities and highways. State Grid has accumulated 5,528 charging stations, and 42,000 charging piles and built six vertical, six horizontal, and two rings highway quick charging networks on Beijing-Harbin, Beijing-Hong-Kong-Macao, Beijing-Shanghai, Shanghai-Chengdu, Shanghai-Chongqing, Capital Ring, and Hangzhou Bay Ring highways, covering 91 cities and 14,000 km of highways.

Promote EV industry

Provide good power supply service to charging and battery swapping facilities. In accordance with the reported capacity, State Grid has provided the installation and integration services at 220kV / 330kV, 10kV, 35kV and above. It has streamlined the procedures for reporting and application and opened green channels to speed up processing. The company accumulatedly completed the power transmission to 48,000 households with 2.05 GW of connection capacity. It fully supported the private sector to build recharging facilities, and serve national strategy to develop EVs.

Promote social energy conservation in an all-round way

In April 2016, initiated by State Grid Shanghai Electric Power, Shanghai Municipal Transportation Commission launched Shanghai Renewable Energy Vehicle Charging Facilities Alliance. Its 16 founding members covered fields such as R&D, production, construction and operation of renewable energy vehicle charging facilities. This will be an effective platform for breaking down the objectives and implementing the responsibility for rapid construction of the network.

Shore-to-ship technology

In 2016, State Grid Shanghai Electric Power Company completed the first high-voltage Shore-to-ship power system for ships—Yuanghe Wharf Project, which can generate more than 1.5 GW of electricity for ships, equivalent to replacing 303 tons of oil, reducing carbon dioxide emissions by 951 tons, sulfur and nitrogen oxides by 4-6 tons. It helped Yuyuan Wharf to become the first 100% electric, zero emissions, automatic wharf.

Shore-to-ship technology

Advocate green engineering of grid construction. Actively promote the modular construction of substations. In 2016, State Grid built 35 – 110 kV new substations in a modular way, which has substantially improved construction quality and efficiency. Relying on seven 500 kV transmission lines, State Grid has for the first time applied carbon fiber composite wire in a large scale, and also promoted the application of new materials in grid projects. In plans and bills, grid construction is all mechaniized, which has promoted the equipment R&D and application and improved the quality of construction.

Strength audit management of the disposal of waste material. In line with the characteristics of materials, State Grid put forward the classification of disposal methods to optimize disposal of the dangerous, contaminating wastes, and implement national environmental policy to promote a green development. As of 2016, in the e-commerce platform, State Grid has totally disposed 14,038 batches (packages) of waste materials. 11,968 batches (packages) succeeded in the auction. The success rate reached 85.21%, with a premium rate of 29.15%.

Comprehensively recollect SF6. State Grid operated SF6 gas disposal 149.01 million, with a premium rate of 29.15%.

Pave the way for renewable energy vehicles

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The Table of Internet Vehicles 3.0 and the operation monitoring center have been put into operation. A real-time monitoring system covering five levels, that is, national, provincial, prefecture, station, and pole to realize non-stop monitoring on charging operation, maintenance, and customer services. Now State Grid can diagnose the emergency of breakdowms in real time and arrange for maintenance. Availability of charging equipment standards is more than 99%, which effectively improves operating efficiency and safety.

Construct open, smart, interactive and efficient charging and battery swapping networks. The platform of the Internet Vehicles 3.0 and the operation monitoring center have been put into operation. A real-time monitoring system covering five levels, that is, national, provincial, prefecture, station, and pole to realize non-stop monitoring on charging operation, maintenance, and customer services. Now State Grid can diagnose the emergency of breakdowms in real time and arrange for maintenance. Availability of charging equipment standards is more than 99%, which effectively improves operating efficiency and safety.

State Grid CSR Report 2016 - The Action
Address climate change

On November 4, 2016, the Paris Agreement finally came into effect, which is the third landmark international legal document addressing climate change in human history, after the United Nations Framework Convention on Climate Change in 1992 and the Kyoto Protocol in 1997.

Under the framework of Paris Agreement, China has set four major emission reduction targets. First, by 2030 China’s carbon dioxide emissions per unit of GDP should decrease by 60% to 65% than that of 2005. Second, by 2030 non-fossil fuel’s proportion in the energy mix should be raised to about 20%. Third, by 2030 China’s carbon dioxide emissions should reach the peak, and China is striving to reach the peak as soon as possible. Fourth, increase forest reserve volume and carbon sinks, and by 2030 China’s forest reserve should be increased by 4.5 billion cubic meters than in 2005.

Accommodate clean energy. In 2016, the integrated capacity of clean energy of State Grid reached 431GW, including over 116GW of wind power. A total of 1,189.3TWh of clean energy was accommodated, reducing carbon dioxide emission by 950 million tons.

Conduct generation rights transaction and efficient generation and dispatching. The generation rights transaction reached 93.229TWh. It saved 6.4434 million tons of standard coal, cutting CO2 and SO2 emissions by 16.7046 million tons and 54.2 thousand tons respectively.

Encourage grid-side energy conservation and emission reduction

Construct an energy-saving service system. In 2016, it has saved 12.21TWh of capacity, 119% of the annual target. It saved 3.04GW of electric power, 150% of the annual target, reducing carbon dioxide emission by 3.95 million tons.

Implement electricity replacement. In 2016, the company has replaced other energies by 1.037TWh of electricity, which equals to reducing the consumption of 57.68 million tons of standard coal, cutting CO2 emission by 193 million tons and pollutants emission like SO2 and NOx by 4.635 million tons.

Recycle resources

A total of 51.2 tons of SF6 gas was recycled and purified, which equals a reduction on emission of 1,224 thousand tons of carbon dioxide.

Promote user-side energy conservation and emission reduction

Encourage energy conservation and emission reduction on the generation side

Lower the line loss rate

Comprehensive line loss rate was 6.75%

Inversely by 0.03 percentage points than 2015

Boost cross-regional and inter-provincial power transaction

Cross-regional and inter-provincial power transaction reached 774.4 TWh

Transaction of power transmitted by UHV was 180.7 TWh

Encourage grid-side energy conservation and emission reduction

Push for standardized construction

Limit on construction reduced by 15%~25%

Grid occupation within the walls reduced by 3%~5%

Recycle resources

A total of 1,224 thousand tons of carbon dioxide

Construct on-grid power from renewable energy generator units

279.865 TWh

On-grid hydropower

737.519 TWh

On-grid nuclear power

117.345 TWh

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Promote the sustainable development of global energy with the implementation of Belt and Road Initiative. We will also promote grid connectivity and push industries with advantages to go global and carry out technical cooperation. We will use technology and management to tap overseas market, and elevate our position in creating industry chain value. Through these efforts, we are aiming at building a win-win cooperation in the new international relations, and promoting sustainable development of the local community and environment.

Develop Overseas Business with a Strong Sense of Local Community

Fulfill the responsibility on global vision

Promote global energy sustainable development
- Participate in international energy plans and regulations
- Participate in global energy transition and develop our globalization strategy with a strong sense of local community

Support the sustainable development of overseas assets
- Stick to sustainable and harmonious development
- Develop overseas business with a strong sense of local community
- Carry out overseas CSR projects

Promote grid connectivity
- Promote grid connectivity with neighboring countries
- Push forward Sino-Russian energy cooperation
- Promote energy cooperation in China-Pakistan Economic Corridor

Participate in the making of international standards
- Participate in international organizations
- Lead the process of standardization
- Promote the cooperation and exchange on standardization

UN Sustainable Development Goals
- Affordable Clean Energy
- Industry, Innovation and Infrastructure
- Responsible Consumption and Production
- Peace, Justice and Strong Institutions
- Global Partnerships for the Goals

State Grid's overseas transmission lines in operation reached 126,500 kilometres
Overseas assets exceed 40 billion US dollars
10 interconnection power grids with neighboring countries
Lead the formulation of international standards
Participate in international energy planning. China was the host of G20 and B20 conference in 2016. State Grid participated in B20, and joined the B20 Taskforce Financing Growth & Infrastructure, serving as the vice chairman member. We have facilitated the inclusion of Global Energy Interconnection into the B20 Policy Recommendations.

Promote international energy revolution. “2016 International Forum on Energy Transitions” was held in Suzhou, Jiangsu province. Chairman Shu Yinbiao pointed out that as a response to energy and environmental challenges, energy revolution was inevitable. The world energy is transiting to a clean, global and intelligent development.

Promote sustainable development of global energy

Responsible advance globalization strategy. Based on the core advantages of power grid technology, we have won the equity and franchise bids of a number of national transmission grids and large power grids. Currently overseas assets totaled 40 billion US dollars. We are promoting all-round globalization in terms of development strategy, business layout, management standards, resource allocation, corporate culture, and brand image etc.

Invest in and operate overseas assets with responsibility

Serve the Belt and Road Initiative

Participate in the formulation of international standards

Develop Overseas Business with a Strong Sense of Local Community

Uphold localized operation and sustainable development

Carry out international energy cooperation

Promote grid connectivity

Jointly build a green, low-carbon global energy governance pattern, and promote global green development cooperation.

Xi Jinping Speech at B20 Summit

Serve the Belt and Road Initiative

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Operate the SGBH with responsibility

- Actively participate in social welfare. In 2016, we have taken advantage of “tax incentives”, and invested a total of 769,000 BRL to continue sponsoring public welfare programs like the “Cultural Exploration- Symphony of Male” program, Rio Tour of International Youth Table Tennis, and “Rio de Janeiro Four Seasons Long-distance Race”. We have served the local community, promoted cultural exchanges between China and Brazil with favorable social benefits.

- Secure power supply for the Rio Olympics. During the Rio Olympic Games in 2016, SGBH provided reliable, environmentally friendly and convenient power supply. The company organized more than 100 staff to check and correct six substations and 5,200km transmission lines with infrared thermal imaging and organized professional control & operations teams to uninterruptedly inspect important sections of the lines. Brazil Terry Pierce SBGBV transmission project was successfully put into operation before the Olympics to support a green Olympics with clean hydropower.

- Participate in community support. SGSPAA Jemena helps economically hardened residents to check household energy consumption and proposes solutions to reduce energy use. In the service area, thousands of portions of nutritious food are provided to poor communities each year. Employees are encouraged to serve as community volunteers to provide volunteer services and donations for volunteer organizations.

- Committed to risk prevention and control and safety publicity. Through careful management, line maintenance and regulations drafting, SGSPAA Jemena minimized the wildfire risks, set up a 24-hour service hotline, and popularized knowledge on safe power use to its clients through a variety of media.

Operate SGSPAA Jemena with responsibility

- Acquire CPFL equity
  - During September and October of 2016, State Grid and Brazilian company Camargos Correa SA signed an equity purchase agreement to officially acquire 54.64% stake in Brazil’s CPFL. CPFL is the largest private power company in Brazil and has eight power distribution concession companies. Its business covers Sao Paulo and Nanda, with 17 million million users and 247,000 kilometers of lines. The annual distribution capacity is 60 TWh, taking up 13% of the market share. It is Brazil’s largest power distributor. CPFL’s power supply reliability, line loss and other operating indicators are in a leading position in Brazil. CPFL controls Brazil’s largest renewable energy company, and its equity installed capacity in renewable energy is 1.01 GW.

Support the sustainable development of overseas equity assets

- National Grid Corporation of the Philippines (NGCP). State Grid holds a 40% stake of the concession. NGCP has been awarded by the Philippine Energy Regulatory Commission (ERC) for seven consecutive years. The company has been actively providing assistance and public welfare projects in the Philippines in response to natural disasters such as typhoons.

  - Provide free medical services to residents in 11 remote areas and poor communities, benefiting 3,836 people.
  - Give Christmas presents worth 6.6 million pesos to over 5,800 families in poverty.
  - Offer financial assistance to excellent students from poor families or minority ethnic groups, allocating 6 million pesos to 200 students.
  - Build 40 units of dormitories, bridges, multinational conference halls and water supply systems.

- ElectroNet. State Grid holds a 40.56% stake. ElectroNet is the only transmission network company in South Australia, consciously advocating a mutually beneficial and win-win sustainable development strategy. Through close communication with the community, and thorough consideration of the social, environmental and economic impact, it comes up with a win-win plan for both the community and ElectroNet. It provided support and assistance to the areas in which the grid equipment is located, and effectively improved the lives of the local community.

- AusNet Services. State Grid holds a 19.9% stake. AusNet Services has more than 670,000 users in power transmission, and power and gas distribution in Victoria, and has set up a dedicated foundation to support community development and philanthropy. In 2016, the company offered scholarships to female students majoring in electrical engineering and subsidized the handicapped young people in the community to get intern driver’s license. It actively explores the development and utilization of renewable energy, and comes out texts in micro-grid, committed to providing safe, reliable and clean energy to the local community.

- CDP Reti. State Grid holds a 35% stake. CDP Reti has subsidiaries such as Terna, SNAM and Italgas. Terna owns 99% of the Italian transmission grid. Before it plans the transmission lines, it seeks a coordinated solution to avoid environmental pollution caused by transmission infrastructure. SNAM is Italian national gas company. “SNAM Foundation” was established in 2016 to support the development, application and promotion of effective innovative practices. Italgas has always been engaged in Italian natural gas distribution for nearly two hundred years. And it has established a museum to support culture and education. Its reading activities cover 100 primary schools.

- HK Electric Investments Limited. State Grid holds a 21% stake. It uses clean energy to cope with climate change, and currently its clean energy generation has exceeded 30%. It established smart power consumption fund to enhance energy efficiency in public places. It invested RMB2.5 million to promote energy-saving education.

- SNAM Reti. State Grid holds a 33% and 4% stake. It has become an important practitioner in sustainable energy development capabilities in energy. It has become an important practitioner in sustainable energy development, as well as research and development capabilities in energy. It has become an important practitioner in sustainable energy development, as well as research and development capabilities in energy.

CSP awards received by REN in 2016

- First Place of “Most Attractive Employer” from Universum.
- “REN Investors and Media Applications” won the 2016 Quarterly Gold Prize.
- 2016 IR Magazine Award for Best European Investor Relations Award (“Low Market Cap”).
- Silver Prize for Best Workplace of 2016 Best International Business Award.
- Level A of MSCI’s environmental, social and management rating.
- The proposal named “Ren” won “Human Resource” title in the category of “CSR and Health Promotion – Best Policy”.
- Second Prize of “Healthy Workplace” in the category of large enterprises.

Phase I of Brazil’s Sede Metropolitano Transmission Project

State Grid CSR Report 2016 - The Action
Implement the Belt and Road Initiative

Promote the “China-Pakistan Economic Corridor Energy Cooperation”. Pakistan’s Matari-Lahore DC transmission project is Pakistan’s first DC transmission project, which was included in priority list of the “China-Pakistan Economic Corridor Energy Cooperation”. China Electric Power Equipment and Technology Co., Ltd. implements the project in a BOOT mode. Currently EPC contract has been signed, including 610MW ±500kVDC converter stations and an 878km DC transmission line. It is of great significance to improve Pakistan grid structure, make full use of energy and promote the friendly cooperation between China and Pakistan.

Investment in the Independent Power Transmission Operator S.A. In December, State Grid bought a 24 percent stake in Greece’s State Grid Operator ADME. It is an important strategic asset in Europe, and in the future it will further carry out island interconnection projects with further development potential. The acquisition will help the Belt and Road to extend westward and promote Sin-Greek power cooperation. Besides, it will further promote the Sino-Greek economic and trade development.

Carry out international cooperation on production capacity

Achieve a major milestone in China - Egypt production capacity cooperation. In January 2016, witnessed by the state heads of China and Egypt, State Grid and the Egyptian Ministry of Electricity and Energy signed an umbrella agreement on upgrading 100 kV national backbone grids. On November 3, Phase I of 3 transmission lines with a total length of 380 km were successfully put into operation. The two countries have together made four records, i.e. highest transmission tower (174 km), the heaviest tower weight, the longest span (918m) and the fastest construction in Egyptian Nile River Basin. China’s transmission construction programs and technical standards were successfully implemented in Egypt, marking a major milestone in the first China - Egypt capacity cooperation project.

Ethopia - Kenya HVDC project under construction. In March 2016, Ethiopian-Kenya S04V DC transmission project officially started construction. China Electric Power Equipment and Technology Co., Ltd. served as the general contractor. The Project plans to transmit Ethiopia’s abundant hydropower resources to Kenya to alleviate its pressing demand for electricity. The project is State Grid’s first overseas transnational grid transmission project, which is of great significance to promote the economic development of the two countries by using renewable energy.

Exert an important role in international organizations

IEC
At the 80th IEC General Meeting, Chairman Shi Yinbiao delivered a speech as Vice President of IEC. He said countries should further enhance cooperation, uphold the leading role of standards and promote the integration of standards of upstream and downstream industries. By making standards, we can comprehensively boost technological innovation and industrial upgrading, thereby contributing to energy connectivity around the world. During this conference, the White Paper on Global Energy Interconnection compiled under the leadership of State Grid was published.

G-SEP
During the presidency of G-SEP in 2016, State Grid held an annual meeting on June 2 and 3, 2016. When all member companies reached agreements on global energy development trends, advanced energy technologies, GEI and international exchange and cooperation. The Beijing Declaration was released at the meeting, laying the foundation for future development.

Participate in international standard making

In January, 2016, Terms and definitions of grid integration of wind power generation established.
In February, 2016, Renewable energy power production established.
In February, 2016, Direct acting indicating analogue electrical measuring instruments and their accessories. Part 1: Definition and general requirements common to all parts released.
In July, 2016, Electric vehicle battery swap system - Part 1: General and guidance released.
In September, 2016, Grid Common Model Description Specification (CIM/E Language) released.
In October, 2016, Electric vehicle battery swap system - Part 2: Safety Requirements published.
IEC
Proposals of four new projects, Global Electricity Interconnection Feasibility Study, Application of Robots at Substations, Standard Model of DC Grid for Systematic Research, Requirements for Electric Devices during in-situ Installation, were approved.

CGIRE
In September, 2016, Standard test procedures for Electric Energy Storage Equipment and Systems for Electric Power Systems Applications was released.

IEEE
State Grid signed the Share Sale and Purchase Agreement with Investment in the Independent Power Transmission Operator S.A.
State Grid insists on localized operation: Most of our managerial and technical employees are local residents. We respect local business rules, actively take social responsibilities and highly value communication and cooperation with shareholders, as well as our mutual benefits.

Adhere to localized workforce
State Grid insisted on recruiting local employees in its overseas companies, with a small number of board directors sent to participate in decision making of important issues. SGBH, of which State Grid is the sole shareholder, hired mostly local employees, including management and technical staff. State Grid sent a management team of only 30 people from China.

Respect local business rules
State Grid enhanced communication with shareholders overseas. Vigorously supported by all parties including the Brazilian government, SGBH strove to tap the Brazilian market, kept continuous development and operated Brazil's main grid safely and steadily. The company is highly acknowledged by shareholders.

Fulfill social responsibilities
State Grid lived up to its social responsibilities while operating its overseas assets. In the Philippines, the company actively responded to the typhoon and offered great assistance to post-disaster repair; helped REN obtain high international credit rating and concessional loans; actively fitted into the local society by supporting public welfare programs and offering financial assistance to symphony orchestra of schools in slums in Brazil; thus winning widespread reputation among the locals.
State Grid regards transparency as the strategic objective and intrinsic request of its scientific development. We hope, by means of ensuring operational transparency and being open to supervision of the government and society, we can strengthen the communication with stakeholders and the society, establish mutual trust and cooperation based on the same value recognition, and win over public understanding, trust and support.

**Guarantee Operation Transparency and Open to Public Supervision**

Implement Responsibility on Communication and Cooperation

- **Discuss grid construction together**
  Consult with governments of different levels on grid construction
  Enhance reporting to and communicating with the government

- **Continue to strengthen social communication**
  Comprehensively implement CSR management
  Strengthen information disclosure
  Popularize prioritized topics

- **Be open to supervision**
  Correct “Four Wrong Work Styles” and review the implementation
  Cooperate in industrial inspections and moral appraisal work
  Improve supervisory mechanism and expand supervision channels

- **Encourage stakeholders’ participation**
  Constantly perfect strategies and mechanisms that involve the participation of stakeholders
  CSR Penetration Mechanism results in improvement in stakeholders’ engagement

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State Grid CSR Report 2016 • The Action

- **Guarantee Operation Transparency and Open to Public Supervision**

- **Implement**
  731 CSR penetration projects

- **Conduct**
  8,333 self-examinations and investigations

- **Discuss grid construction together**
  Visits to State Grid website

- **Continue to strengthen social communication**
  Press conferences

- **Be open to supervision**
  CSR penetration projects

- **Encourage stakeholders’ participation**
  Implement

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Discuss grid construction together

Consult with governments of different levels on grid construction.
- Hold talks with governments of 13 provinces, autonomous regions and municipalities like Shanxi, and reach a wide consensus on issues like UHV and grid of all levels, smart grid and electric equipment industries, rural power grid upgrade, the development and export of renewable energy resources, and electricity system reform during the 13th Five-Year Plan period.
- Sign 13th Five-Year Plan strategic cooperation framework agreements with four provinces like Henan, to accelerate power grid development, promote quality services and boost socio-economic development.
- Sign agreements with 22 provincial governments on jointly pushing forward power grid upgrading in small towns (key villages) and electricity system reform during the Five-Year Plan period.

Enhance reporting to and communicating with the government. Reported to and communicated with superior departments on power reform and development, UHV construction, power generation, clean energy consumption, power supply for flood prevention and control, innovation projects of clean energies. State Grid agreed to appeal for Global Energy Interconnection, UHV power transmission and smart grid, and the development of clean energies. State Grid agreed to carry out 11 suggestions and motions put forward during the two sessions in written replies.

Accept supervision and regulation

Correct “Four Wrong Work Styles” and review the implementation. State Grid set up five teams to inspect eight provincial companies and two subsidiaries directly managed by State Grid, finding out problems in document writing, meeting discipline and official entertainment, inspection and assessment, official cars, buildings and small-scale infrastructure, work style construction, management of “new public expense”, and the management of going abroad to business, corporate development and grid development, quality power supply services, construction of “Four Wrong Work Styles”. Rectification measures were made and taken to solve these problems.

Cooperate in industrial inspections and moral appraisal work. State Grid strengthened supervision over work styles and established a processing mechanism to handover cases to wrong work styles. Through the 95598 customer service platform, we further normalized the handover, searching and screening, investigation and settlement of clues to wrong work styles. We directly and efficiently solved cases frequently complained by clients. As a consequence, all cases were closed in time. We secretly inspected subsidiaries in 14 provinces and municipalities. In addition, we also have conducted 8,553 self-checking, self-correction, and thorough investigations in all provincial companies, bringing forward 10,500 suggestions and effectively correcting wrong work styles.

Improve supervisory mechanism and expand supervisory channels. State Grid expanded supervisory channels, inviting supervisors on political industrial moral from all walks of the society. They are dedicated citizens, NPC members, CPPCC members, leaders and employees of enterprises, etc. Meetings are regularly held to solicit their opinions and suggestions, based on which we make according measures to improve our work styles and services.

Cooperate in audit supervision and inspection. State Grid strove to meet the higher requirements for supervision over state-owned enterprises and assets and for accountability made by the Central Party Committee and the State Council by improving its working mechanisms and methods of preparing for audit and inspection and offering accurate audit information and data. We strengthened audit analysis, risk assessment, report and communication, and took steps towards a comprehensive solution. We sent data regarding marketing and financial communication, and took steps towards a comprehensive solution. We sent data regarding marketing and financial communication, and took steps towards a comprehensive solution.
Continue to strengthen social communication

Enhance social responsibility information disclosure. State Grid has taken the lead to release CSR reports for 11 consecutive years, fully demonstrating itself as a model of a responsible state-owned enterprise. We proposed to implement national standards for social responsibility, further strengthening the influence of “White Paper on Serving the Development of Local Economy and Society.”

Continue to release important information. We recruited a spokesman team of 2,405 people. A total of 969 press conferences were held on issues like electric power system reform, major scientific and technological innovation, clean energy consumption, globalization development, quality service, poverty alleviation and post-disaster rehabilitation and reconstruction.

Hold extensive interactive exchanges. Using materials like narratives, pictures, cartoons, animations, micro-videos, songs, etc., we made a propagation of State Grid’s stories. Through establishing online demonstration platforms and comprehensively applying a variety of media, we organized extensive platforms and comprehensively applying various communication channels.

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Major reports

People’s Daily published Unwaveringly Strengthening Party Building in Enterprise and Making State Grid Stronger, Better and More Modern, noting that the convening of the 2016 International Conference on Global Energy Interconnection and the establishment of Global Energy Interconnection Development and Cooperation Organization defined the development direction of GEI. State Grid’s idea received attention from the energy sector globally and a large part of the company’s plan has been technically feasible.

Wall Street Journal reported that State Grid Put Forward Idea of Global Interconnection of Wind and Solar Power, noting that the convening of the 2016 International Conference on Global Energy Interconnection and the establishment of Global Energy Interconnection Development and Cooperation Organization defined the development direction of GEI. State Grid’s idea received attention from the energy sector globally and a large part of the company’s plan has been technically feasible.

CCTV News broadcast a report titled Patrolling under High Temperature. High temperature may lead to greater power load; thunderstorm and trees also pose threat to power lines. This report relates State Grid’s patrolmen patrolling at 40 degrees centigrade, showing how hard their work is.

Gov.cn, administered by the State Council of PRC, published Construction of Jarud-Qingzhou ±800 kV UHV DC Transmission Starts Construction. The project will greatly improve power system stability in the Eastern Inner Mongolia and even Northeast China, ensuring safe transmission of renewable energies like solar and wind power.

Science and Technology Daily published Saving Abandoned Wind and Solar Power and Building Stabilizer of Northwestern Power Grid. Pumped Storage Power Station in Shaanxi’s Zhen’an Put into Operation. The station can greatly enhance the flexibility and ability to prevent accidents of the sending end of northwestern power grid, coordinate the supply of thermal power, solar power and wind power in Northwest China, accommodate more surplus wind and solar power and significantly reduc energy consumption of the power system, thereby generating huge economic and environmental benefits.

We constructed a matrix of new media accounts of State Grid and its subsidiaries, as well as Power Grid Headline. Our official WeChat account of Power Grid Headline was ranked first on the list of Top 10 energy enterprises and was regarded the most influential official account in the energy industry. State Grid Jiangsu Electric Power Company’s official WeChat account was ranked as the 2016 most influential second-level new media account of SOEs.

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<td>Gov.cn, administered by the State Council of PRC, published Construction of Jarud-Qingzhou ±800 kV UHV DC Transmission Starts Construction</td>
<td></td>
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</tr>
<tr>
<td>Science and Technology Daily published Saving Abandoned Wind and Solar Power and Building Stabilizer of Northwestern Power Grid</td>
<td></td>
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</tr>
</tbody>
</table>
Comprehensively promote new models of shore-to-ship power service

In order to remove obstacles in the way of shore-to-ship power service promotion, such as lack of motivation, doubt and lack of habits, State Grid Taizhou Power Supply Company stimulated shareholders’ initiative and took a three-step strategy of communication, cooperation and creating shared values to get shareholders engaged into the promotion of shore-to-ship power service. In so doing, the company created incremental values to shore-to-ship power construction, and also made promotion of shore-to-ship power service meet shareholders’ common appeal for safety and environmental protection.

Solve “Tree-or-utility Conflict” through crop replacement

The common practice of solving the tree-or-utility Conflict can be depicted as a loop of “felling – compensating – new trees growing up – felling again – compensating again”. State Grid Chongqing Maintenance Company applied a new model of crop replacement. According to farmers’ needs, they planted substitute crops whose maximum heights are within prescribed safe distance and tracked subsequent processing of crops, thereby forming a post-industry chain and increasing local farmers’ incomes.

Multiple parties cooperate to deal with power cut of trafficlights

In Zhejiang’s Leqing City, power cuts of traffic lights often lead to traffic jams, influencing public transportation. State Grid’s subsidiary in Leqing actively communicated and coordinated with local stakeholders like traffic police, the government and media, and jointly figured out a long-term effective linkage mechanism, in which the company took charge of informing power cut of traffic lights, traffic police arranging personnel on duty and broadcasting traffic conditions.

Encourage stakeholders’ participation

Constantly perfect strategies and mechanisms that involve the participation of stakeholders. State Grid optimizes the stakeholders’ engagement mechanism through improving its various businesses and work process, and guarantees shareholders’ right to know, to supervise and to participate by enhancing institutional arrangement, resource guarantee and deployment, etc. in order to give full rein to shareholders’ potential to create comprehensive value. We have held “Into State Grid” activities for 11 consecutive years, remaining open to moral appraisal work and social monitoring, and listening to opinions and suggestions from all stakeholders.

CSR Penetration Mechanism results in improvement in stakeholders’ engagement. CSR Penetration Mechanism means applying project management to address prioritized concerns of the society. Concepts and methods of CSR are adopted to promote improvement in management, solve key and difficult issues in core businesses, thereby creating value increment to the company, improving corporate image and enhancing core competitiveness. This can also bring value increment to the society, strengthen the overall comprehensive value creation ability of the society, motivate stakeholders to conduct their work in a more socially responsible manner. Problems faced by both the company and the society may be solved in a more creative way. Till now, all subsidiaries of State Grid have set a number of examples that can be promoted and publicized as role models.
### Operational Efficiency

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Overall productivity (RMB yuan per person per year)</td>
<td>550,600</td>
<td>609,000</td>
<td>643,500</td>
<td>653,000</td>
<td>709,000</td>
</tr>
<tr>
<td>Total asset turnover period (Day)</td>
<td>444</td>
<td>439</td>
<td>474</td>
<td>521.7</td>
<td>558.4</td>
</tr>
<tr>
<td>Comprehensive line loss rate (%)</td>
<td>6.73</td>
<td>6.83</td>
<td>6.81</td>
<td>6.78</td>
<td>6.75</td>
</tr>
<tr>
<td>Number of equipment accidents</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number of power grid accidents</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Power Supply Performance

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Electricity sales (TWh)</td>
<td>3,253.9</td>
<td>3,522.7</td>
<td>3,469.4</td>
<td>3,406.7</td>
<td>3,605.1</td>
</tr>
<tr>
<td>Maximum load within State Grid’s service area (MW)</td>
<td>561,200</td>
<td>654,000</td>
<td>631,000</td>
<td>649,000</td>
<td>699,000</td>
</tr>
<tr>
<td>Number of customers (million)</td>
<td>309</td>
<td>345</td>
<td>378</td>
<td>420</td>
<td>431</td>
</tr>
<tr>
<td>Reliability of urban power supply (%)</td>
<td>99.941</td>
<td>99.956</td>
<td>99.967</td>
<td>99.957</td>
<td>99.946</td>
</tr>
<tr>
<td>Average blackout duration for urban users (Hour/household)</td>
<td>5.18</td>
<td>3.854</td>
<td>2.891</td>
<td>3.74</td>
<td>4.73</td>
</tr>
<tr>
<td>Reliability rate of rural grid power supply (%)</td>
<td>99.735</td>
<td>99.852</td>
<td>99.878</td>
<td>99.844</td>
<td>99.782</td>
</tr>
<tr>
<td>Average blackout duration for rural users (Hour/household)</td>
<td>23.21</td>
<td>12.965</td>
<td>10.64</td>
<td>13.71</td>
<td>19.14</td>
</tr>
<tr>
<td>Voltage qualification rate for rural users (%)</td>
<td>99.998</td>
<td>99.999</td>
<td>99.999</td>
<td>99.999</td>
<td>99.999</td>
</tr>
<tr>
<td>Inter-provincial Electricity Trading Volume (TWh)</td>
<td>515.89</td>
<td>601.9</td>
<td>678.9</td>
<td>722.1</td>
<td>774.4</td>
</tr>
</tbody>
</table>

### Grid Capability

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Investment in power grid (billion RMB)</td>
<td>305.4</td>
<td>303.482</td>
<td>385.504</td>
<td>451.8</td>
<td>497.7</td>
</tr>
<tr>
<td>Length of transmission lines * (km)</td>
<td>713,000</td>
<td>1,045,300</td>
<td>843,600</td>
<td>890,000</td>
<td>938,000</td>
</tr>
<tr>
<td>Transformation/converting capacity ** (TW/A/TW)</td>
<td>2.81</td>
<td>3.24</td>
<td>3.365</td>
<td>3.6</td>
<td>3.91</td>
</tr>
<tr>
<td>Integrated capacity (GW)</td>
<td>880</td>
<td>962</td>
<td>1,049</td>
<td>1,161</td>
<td>1,271</td>
</tr>
<tr>
<td>On-grid electricity of integrated capacity (TWh)</td>
<td>3,190</td>
<td>3,690</td>
<td>3,650</td>
<td>3,620</td>
<td>3,830</td>
</tr>
<tr>
<td>Technical R&amp;D input (billion RMB)</td>
<td>7.94</td>
<td>5.787</td>
<td>7.08</td>
<td>7.376</td>
<td>5.92</td>
</tr>
<tr>
<td>Total patents</td>
<td>16,399</td>
<td>28,311</td>
<td>40,143</td>
<td>50,165</td>
<td>62,036</td>
</tr>
<tr>
<td>Total National Science and Technology Awards</td>
<td>39</td>
<td>43</td>
<td>46</td>
<td>51</td>
<td>60</td>
</tr>
<tr>
<td>Trans-regional and trans-provincial UHV transmission (TWh)</td>
<td>72,034</td>
<td>72,788</td>
<td>136.7</td>
<td>160,518</td>
<td>186,165</td>
</tr>
<tr>
<td>National and industrial standards led and compiled by State Grid</td>
<td>176</td>
<td>206</td>
<td>144</td>
<td>185</td>
<td>236</td>
</tr>
</tbody>
</table>

### Financial Performance

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue (billion RMB)</td>
<td>2,011.4</td>
<td>2,071.35</td>
<td>2,094.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total assets (billion RMB)</td>
<td>2,750.1</td>
<td>2,892.9</td>
<td>3,107.44</td>
<td>3,389.8</td>
<td></td>
</tr>
<tr>
<td>Total profits (billion RMB)</td>
<td>109.03</td>
<td>81.21</td>
<td>86.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-tax profits (billion RMB)</td>
<td>210.15</td>
<td>197.17</td>
<td>203.57</td>
<td>223.88</td>
<td></td>
</tr>
<tr>
<td>Return on equity (%)</td>
<td>8.36</td>
<td>5.18</td>
<td>4.97</td>
<td>4.54</td>
<td></td>
</tr>
<tr>
<td>Asset-liability ratio (%)</td>
<td>57.02</td>
<td>56.1</td>
<td>55.3</td>
<td>53.9</td>
<td></td>
</tr>
<tr>
<td>SASAC Evaluation on Operation Performances (Class)</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>

### Economic Performance

The statistics for 2015 are final, which may differ from the ones in 2015 CSR Report.

The statistics for 2016 financial performance are from the financial express reports, which may differ from the final statistics.
### Environmental Performance

#### EV Development
<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total EV charging and battery swapping stations</td>
<td>359</td>
<td>400</td>
<td>618</td>
<td>1,537</td>
<td>5,526</td>
</tr>
<tr>
<td>Total EV charging and battery swapping spots</td>
<td>4,000</td>
<td>5,000</td>
<td>7,000</td>
<td>18,000</td>
<td>29,000</td>
</tr>
</tbody>
</table>

#### Carbon Dioxide Emission Reduction
<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission reduced by clean energy accommodation (Thousand tons)</td>
<td>552,649.3</td>
<td>668,291.3</td>
<td>741,620</td>
<td>810,000</td>
<td>950,000</td>
</tr>
<tr>
<td>Emission reduced by lowering the line loss (Thousand tons)</td>
<td>853.2</td>
<td>1,500</td>
<td>13,700</td>
<td>8,200</td>
<td>900</td>
</tr>
</tbody>
</table>

### Social Performance

#### Employee Development
<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training coverage rate (%)</td>
<td>93.5</td>
<td>94</td>
<td>94.6</td>
<td>94.6</td>
<td>94.6</td>
</tr>
<tr>
<td>Employee-training person-times (Thousand)</td>
<td>3,350</td>
<td>3,400</td>
<td>3,600</td>
<td>3,600</td>
<td>3,600</td>
</tr>
<tr>
<td>Proportion of female employees</td>
<td>27.3</td>
<td>26.9</td>
<td>27.2</td>
<td>27.3</td>
<td>27.5</td>
</tr>
<tr>
<td>Labor unions</td>
<td>1,252</td>
<td>1,936</td>
<td>1,303</td>
<td>1,522</td>
<td>1,535</td>
</tr>
</tbody>
</table>

#### Comprehensive Power Conservation
<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power saved by lowering the line loss (TWh)</td>
<td>1.05</td>
<td>1.89</td>
<td>17.1</td>
<td>10.36</td>
<td>1.16</td>
</tr>
<tr>
<td>Generation rights transactions (TWh)</td>
<td>109,748</td>
<td>113,848</td>
<td>116,785</td>
<td>113,154</td>
<td>93,229</td>
</tr>
<tr>
<td>Electricity replacement capacity (TWh)</td>
<td>56,760</td>
<td>59,590</td>
<td>87,900</td>
<td>102,757</td>
<td>116,542.4</td>
</tr>
</tbody>
</table>

#### Public Donations
<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centralized tendering volume (Billion RMB)</td>
<td>522.96</td>
<td>334.3</td>
<td>369</td>
<td>507.7</td>
<td>468.9</td>
</tr>
<tr>
<td>Luban Awards in total</td>
<td>18</td>
<td>20</td>
<td>22</td>
<td>23</td>
<td>27</td>
</tr>
</tbody>
</table>

#### Win-win Partnership
<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Grid website’s traffic statistics (Visits)</td>
<td>5,620,000</td>
<td>8,664,000</td>
<td>12,810,000</td>
<td>17,291,000</td>
<td>14,184,000</td>
</tr>
<tr>
<td>Information reported to governments from State Grid Headquarters (Piece)</td>
<td>205</td>
<td>203</td>
<td>198</td>
<td>215</td>
<td>180</td>
</tr>
</tbody>
</table>

#### Transparent Operation
<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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</thead>
<tbody>
<tr>
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<td>5,620,000</td>
<td>8,664,000</td>
<td>12,810,000</td>
<td>17,291,000</td>
<td>14,184,000</td>
</tr>
<tr>
<td>Information reported to governments from State Grid Headquarters (Piece)</td>
<td>205</td>
<td>203</td>
<td>198</td>
<td>215</td>
<td>180</td>
</tr>
</tbody>
</table>

#### General Service

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment in the rural grid (Billion RMB)</td>
<td>80.74</td>
<td>50.73</td>
<td>46.45</td>
<td>125.799</td>
<td>171.8</td>
</tr>
<tr>
<td>Households getting rid of under-voltage problem</td>
<td>207,000</td>
<td>3,360,000</td>
<td>6,635,000</td>
<td>3,357,000</td>
<td></td>
</tr>
<tr>
<td>The average gap between urban and rural annual blackout time (Hour/household)</td>
<td>18.03</td>
<td>9.11</td>
<td>7.8</td>
<td>9.97</td>
<td>14.41</td>
</tr>
</tbody>
</table>

*Note: State Grid had comprehensively solved the power problem for people without access to electricity in the extension range of the big grid in 2015.*
**Financial Performance**

- **Revenue (billion US dollar)**
  
  - Walmart: 492.1
  - China National Petroleum: 329.6
  - Sinopec: 299.3
  - Royal Dutch Shell: 272.2
  - Exxon Mobil: 266.4
  - Toyota: 236.6
  - Apple: 233.7
  - BP: 226.5
  - Michelin: 192.5

- **Asset (billion US dollar)**
  
  - Walmart: 492.1
  - China National Petroleum: 329.6
  - Sinopec: 299.3
  - Royal Dutch Shell: 272.2
  - Exxon Mobil: 266.4
  - Toyota: 236.6
  - Apple: 233.7
  - BP: 226.5
  - Michelin: 192.5

**Social Performance**

- **Highest Voltage Level (kV)**
  
  - China: 1000
  - US: 765
  - Japan: 765
  - UK: 500
  - France: 400
  - Germany: 400
  - Russia: 400
  - India: 400

**Environmental Performance**

- **Ratio of Trans-regional and Trans-national Power Transmission (%)**
  
  - China: 20.93%
  - US: 19.90%
  - Japan: 19.50%
  - UK: 18.00%
  - France: 10.52%
  - Germany: 9.99%
  - Russia: 5.00%

**Integrated Capacity of Clean Energy- excluding Nuclear (GW)**

- China: 373.58
  
  - The US: 200.05
  - Germany: 166.92
  - Japan: 80.03
  - India: 56.92
  - Russia: 48.00
  - France: 43.03
  - UK: 22.75
  - Greece: 6.99

**CSR fulfillment from provincial companies in 2016**

- Promote the replacement of coal and gas by electricity. Finish the "replacing coal by electricity" project for 194,000 rural households in 574 villages.

- The average annual blackout time for urban users in key areas is no more than 5 minutes.

- Promote various electricity replacement technologies and advance the replacement of coal-fired heating by electricity in cities and townships. Finish the replacement of coal by electricity for 205,000 households.

- Support the development of renewable energy. Integrate 1.39GW of installed capacity of renewable energy in the region.

- Promote the quick charging network construction on highways and in cities. finish the construction of 38 quick charging stations on highways and 5 municipal quick charging stations.

- Implement electricity replacement. Do a good job in the projects of replacing coal by electricity in key cities like Jinan, and accomplish 9.785 TWh of electricity replacement.

- Continue implementing the bright project and finish the maintenance and upgrade of power supply facilities before power meters in 965,000 households.

- Promote the operation and development of smart consumption and smart communities.

- Build a new model for the new energy explosion.

- Construct a smart, interactive service innovation system of "Internet + electricity marketing", and provide e-services for 5,000,000 power users.

- Promote the integration of 20,943 PV poverty relief projects into the grid and provide purchasing fees and subsidies in time.

- Promote electricity replacement in energy consumption and realize 4.2 TWh of electricity replacement.

- Accomplish a total of 57 TWh of hydropower within the province or power purchased outside the province, accounting for 39.36% of the total power consumption.

- Accomplish electric power facility upgrade in 1,000 administrative villages of the "Two livable projects".

- Popularize the deployment of 11,400,000 smart meters and accomplish constructing 3 new generation smart substations.

- Accelerate the roo-top PV Generation project on urban and rural residential buildings. Install this project on 15,886 households integrating 486.5 MW of electricity.

- Upgrade the county-level and rural power grids in Garze, Awa and Langshan and solve the under voltage problems for 1,470,000 households.

- Promote the "Xinjiang Plan" to cover 970 primary and secondary schools in high altitude to meet the electricity demand for heating in winter.

- Promote for the "Xinjiang Plan" to cover 970 primary and secondary schools in high altitude to meet the electricity demand for heating in winter.

- Govern the under voltage problems for 133,000 households and benefit 413,100 people.

- Invest RMB 620 million in rural grid projects and solve the under voltage problem for 95,000 rural households.

- Accomplish 8 TWh of wind power, accounting for 11.5% of the total electricity sales.

- Accomplish 15 TWh of wind power.

- Promote 10,000 smart purchase mobile terminals so that users can buy electricity without leaving homes.

- Finish targeted dynamic electricity access for poverty alleviation projects to ensure every household in 6,220 poor villages to have access to electric lighting and rural villages to have access to dynamic power.

- Accommodate over 10 TWh of renewable energies like PV generation and wind power.

- Support renewable energy generation and integration. The installed capacity of wind power and PV generation will reach 42.09% of the total installed capacity of Sinopec's grid.

- Export 10.7 TWh of electricity out of Xinjiang.

- Newly add these more ways to pay the bill: postal savings, Alipay and Unionpay.
The Commitment

Commitment for 2016

Fulfillment in 2016

Economic Performance
- Electricity sales reach 3,531TWh
- Complete inter-provincial power trade of 729TWh
- Invest RMB446.8 billion in fixed assets
- Invest over RMB419 billion in power grid construction
- Total assets reach RMB3,300 billion
- Revenue reaches RMB1,050 billion
- Construct 76,000km 110kV/66kV and above power lines with a transformation capacity of 315GVA
- Put 47,000km 110kV/66kV and above lines into operation with a transformation capacity of 315GVA
- Overall productivity is RMB686,600 per person-year
- The debt-asset ratio is no more than 55.9%
- Put 3 AC and 1 DC UHV projects into operation
- Build 552 smart grid pilot and demonstration projects altogether
- Urban distribution automation reached 38.26%
- Invest RMB6.6 billion in R&D
- Line loss is no more than 0.8%

Social Performance
- Bring electricity access to 13,000 natural villages within the year.
- Finish electric power upgrade projects in 27,000 natural villages.
- Begin the construction of 20 condensers during the year.
- Improve 750kV main grid in Northwest China.
- Expand the application scope of advanced technologies of new generation smart substations.
- Newly deploy 60,580,000 smart meters.
- Promote the metering of electricity, water, gas and heating “four in one”.
- Newly deploy 60,580,000 smart meters.
- Promote the metering of electricity, water, gas and heating “four in one”.
- Reliability of urban power supply reaches 99.94%.
- Reliability of rural power supply reaches 99.85%.
- The average gap between urban and rural annual blackout time is reduced to 9.5 hours per household.
- Solve the undervoltage problem for 3.357 million rural households within the year.
- Accomplish 800 thousand tasks with power uninterrupted on the distribution grid.
- Staff training coverage rate is over 94.6%.

Environmental Performance
- Accomplish 100TWh of electricity replacement.
- Build and put into operation the pumped storage power stations in Xianju of Zhejiang and Hongping of Jiangxi.
- Speed-up the construction of transmission channels for hydropower from Southwest China and from renewable energy bases.
- Newly build 2,450 charge stations and 28,000 charging piles during the year.
- Rebuild the interconnection of all cities in Beijing-Tianjin-Hebei-Shandong and the Yangtze-River Delta regions. Build a quick public charge network within a radius of less than 3 km in key cities.

Economic Performance
- Electricity sales reach 3,605 TWh
- Complete inter-provincial power trade of 774.4TWh
- Invest RMB521 billion in fixed assets
- Invest over RMB447 7 billion in power grid construction
- Total assets reach RMB3,390 billion
- Revenue reaches RMB2,044.5 billion
- Construct 53,000km 110kV/66kV and above power lines with a transformation / converting capacity of 310GVA/GW
- Put 48,000km 110kV/66kV and above lines into operation with a transformation / converting capacity of 310GVA/GW
- Overall productivity is RMB700,000 per person-year
- The debt-asset ratio is no more than 55.9%
- Put 3 AC and 1 DC UHV projects into operation
- Build 342 smart grid pilot and demonstration projects altogether
- Urban distribution automation reached 38.26%
- Invest RMB6,921 billion in R&D
- Line loss is 6.75%

Social Performance
- Bring electricity access to 6,219 natural villages within the year.
- Finish electric power upgrade projects in 15,571 natural villages.
- Begin the construction of 7 condensers during the year.
- Improve 750kV main grid in Northwest China.
- Expand the application scope of advanced technologies of new generation smart substations.
- Newly deploy 74,760,000 smart meters.
- Promote the metering of electricity, water, gas and heating “four in one”.
- Reliability of urban power supply reaches 99.94%.
- Reliability of rural power supply reaches 99.782%.
- The average gap between urban and rural annual blackout time is reduced to 4.73 hours per household.
- Solve the undervoltage problem for 3.357 million rural households within the year.
- Accomplish 401 thousand tasks with power uninterrupted on the distribution grid.
- Staff training coverage rate is 94.6%.

Environmental Performance
- Accomplish 102% of electricity replacement.
- Build and put into operation the pumped storage power stations in Xianju of Zhejiang and Hongping of Jiangxi.
- Speed-up the construction of transmission channels for hydropower from Southwest China and from renewable energy bases.
- Newly build 2,400 charge stations and 28,000 charging piles during the year.
- Rebuild the interconnection of all cities in Beijing-Tianjin-Hebei-Shandong and the Yangtze-River Delta regions. Build a quick public charge network within a radius of less than 1 km in key cities.

Commitment for 2017

Economic Performance
- Invest RMB 587.1 billion for the development
- Invest RMB 484.8 billion in fixed assets
- Invest RMB 465.7 billion in power grid
- Construct 67,000 km 110kV/66kV and above power lines with a transformation / converting capacity of 420 GVA/GW
- Put 60,000 km 110kV/66kV and above lines into operation with a transformation / converting capacity of 380 GVA/GW
- Electricity sales reach 3,767 TWh
- Inter-provincial power trade reaches 823 TWh
- Revenue reaches RMB 2,170 billion
- Profit reaches RMB 79.04 billion
- Added economic value reaches RMB 10.8 billion
- Total assets reach RMB 3.7 trillion
- Asset-liability ratio keeps at 58%
- Overall productivity reaches RMB 746,000 per person-year

Social Performance
- Finish the grid upgrade in township (key villages) and irrigation well electrification and upgrade.
- Replace oil by electricity for rural motor-pumped wells in plan areas according to local conditions.
- The scale of e-commerce reaches RMB 160 billion
- Accomplish equity transactions with Brazilian CIPFL and investment in the Independent Power Transmission Operator S.A.
- Complete 2 AC and 5 DC UHV projects in a quality and efficient manner.
- Complete key projects including Sichuan-Chongqing Third channel

Environmental Performance
- Accomplish 113 TWh of electricity replacement
- Put 54 key projects replacing coal by electricity in Beijing-Tianjin-Hebei region
- Newly integrate 26,000 charging piles and the total charging piles reach 160,000
- Build 9 vertical, 9 horizontal and 2 ring highway quick charging networks
- Put the 4 AC and 4 DC UHV projects into operation, which have been included in the Asian Development Bank’s Air Pollution Prevention and Control
### Environmental Performance

<table>
<thead>
<tr>
<th>Company</th>
<th>Commitment Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hebei Electric Power Company, State Grid</td>
<td>Ensure no wind/PV curtailment all round the year, total installed capacity of the renewables reached 4.59 GW</td>
</tr>
<tr>
<td>Jilin Electric Power Company, State Grid</td>
<td>Support the development of renewables energy. Integrate over 14GW of installed capacity of renewable energy in the region.</td>
</tr>
<tr>
<td>Jiangxi Electric Power Company, State Grid</td>
<td>Promote electricity replacement and realize 12.7TWh of electricity replacement.</td>
</tr>
<tr>
<td>Fujian Electric Power Company, State Grid</td>
<td>Installed capacity of clean energy in the province accounts for nearly 50%. Promote electricity replacement and realize 6TWh of electricity replacement.</td>
</tr>
<tr>
<td>Hunan Electric Power Company, State Grid</td>
<td>Promote electricity replacement and accomplish 4.5TWh of electricity replacement.</td>
</tr>
<tr>
<td>East Inner Mongolia Electric Power Company, State Grid</td>
<td>Accommodate 1.7TWh of wind power, accounting for 57.82% of the total electricity sales.</td>
</tr>
<tr>
<td>Heilongjiang Electric Power Company, State Grid</td>
<td>Accommodate 8.5TWh of wind power, accounting for 11.8% of the total electricity sales.</td>
</tr>
</tbody>
</table>

### Social Performance

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<tr>
<td>Beijing Electric Power Company, State Grid</td>
<td>Increase the proportion of heating fueled by clean energy during winter in Beijing and replace coal by electricity for 205,000 rural households in 522 villages.</td>
</tr>
<tr>
<td>Shandong Electric Power Company, State Grid</td>
<td>Upgrade the power grid in 2,119 small townships (key villages) and electrify 21,000 pumped wells.</td>
</tr>
<tr>
<td>Anhui Electric Power Company, State Grid</td>
<td>Build 158 quick charging stations with 632 DC quick charging piles at highway service areas in 16 cities.</td>
</tr>
<tr>
<td>Jiangsu Electric Power Company, State Grid</td>
<td>Invest RMB589 million on upgrading the power grids for 47 countries. Save industrial power consumption cost by RMB8100 million in the whole province.</td>
</tr>
<tr>
<td>Liaoning Electric Power Company, State Grid</td>
<td>Replace coal by electricity in 476 companies. The heating area reaches 5.545 million square meters. Annual electricity replacement reaches 550GWh.</td>
</tr>
<tr>
<td>Henan Electric Power Company, State Grid</td>
<td>Promote the export of electricity generated in Sichuan. Deliver over 1.3TWh of hydro-power out of the province.</td>
</tr>
<tr>
<td>Sichuan Electric Power Company, State Grid</td>
<td>Invest RMB1.2 billion in rural power grid and electricity for 11 impoverished counties. Realize 1.8TWh of electricity replacement.</td>
</tr>
<tr>
<td>Xinjiang Electric Power Company, State Grid</td>
<td>Help 500 poor villages in 11 impoverished counties. Implement point-to-point poverty alleviation projects in over 20 impoverished villages. Solve the problem of “dynamic power for every village” program in 644 villages.</td>
</tr>
<tr>
<td>Anhui Electric Power Company, State Grid</td>
<td>Upgrade and reconstruct the rural grids in 1,528 small townships (key villages). Electrify or reconstruct 35,900 pumped wells.</td>
</tr>
<tr>
<td>Zhejiang Electric Power Company, State Grid</td>
<td>All clean energy is accommodated. Implement two replacements and accomplish 91% of electricity replacement.</td>
</tr>
<tr>
<td>Henan Electric Power Company, State Grid</td>
<td>Upgrade and reconstruct the grids in 922 key villages and dynamic power in 317 villages.</td>
</tr>
<tr>
<td>Shandong Electric Power Company, State Grid</td>
<td>Implement point-to-point poverty alleviation projects in over 20 impoverished villages. Solve the problem of “dynamic power for every village” will be completed.</td>
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UN Sustainable Development Goals

UN Sustainable Development Goals

Action Framework of State Grid

Help Chinese poverty-stricken population in rural areas under poverty by 2020 under current standards by targeted poverty alleviation efforts through point-to-point assistance or fixed-point assistance. Eliminate all poor counties and solve the overall poverty of the region.

- Provide poverty relief (PR) station at Muduo County, Qinghai Province (P53)
- Promote sustainable targeted poverty-relief models in Maibian Yi Autonomous County, Sichuan Province (P53)

Ensure electricity for spring and autumn and guarantee power for small-scale grain producers’ agricultural production.

- Upgrade the power grid in small townships and carry out “electricity for every well” (PE)
- Set up a service team to ensure power use for fishermen (http://ah.people.com.cn/n/r/2014/0903/c358266-2219486.html)

Support rural medical infrastructure. Support regional AIDS and other epidemic diseases prevention and control.

- Establish “Love Red Ribbon” Party Member service team to send power to AIDS patients for 13 years (http://hbiana.com.cn/city/sqga/2014-12-09/04962040963.html)
- Help high school students from poverty-stricken families in three counties and one district in Hubei Province (P53)
- Establish an exchange platform of teachers and educational resources between Zhengjiang Province and Yushu (P53)
- Conduct “trainings on electrics” and exempt according to local conditions so as to enhance the villagers’ capacity of finding a job (P53)

Provide a corresponding welfare system for female workers to support their career development.

- Support the career development for female employees (PE)
- “16 square meters” maternal love hold up the life for children (http://paper.scol.cn/html/eh/2017/02/145670.shtml)

Protect natural water resources during project engineering.

- Construct rural safe drinking water project to solve the problem in 24 villages in three counties and one district of Hubei Province (P53)
- Construct an exchange platform of teachers and educational resources between Zhengjiang Province and Yushu (P53)
- Construct rural safe drinking water project to solve this problem in 24 villages in three counties and one district of Hubei Province (P53)

Support the development of distributed generation. Develop technologies to satisfy the power needs for people bring in sparsely populated areas such as small islands. Increase the accommodation of the renewables.

- Develop the micro-grid project on Huang Island of Zhengan Province to use smart grid technologies to solve the problem of power consumption on the island (http://www.sgcq.com.cn/ddh/nx2014/51b /06_374481.shtml)
- To meet the power needs of local residents and businesses in orchard management, irrigation and fruit storage and reservation in Luming National Key Apple Production Area, benefiting 17,500 fruit growers (PE)

Upgrade rural power grids in small townships and key villages. Implement “Dynamic power for every village” program to increase job opportunities. Guide suppliers to strengthen labor rights protection through supplier management.

- Develop the micro-grid project on Huang Island of Zhengan Province to use smart grid technologies to solve the problem of power consumption on the island (http://www.sgcq.com.cn/ddh/nx2014/51b /06_374481.shtml)
- Construct National Wind/Photo/Power Storage and Transmission Joint Demonstration Project, which won China Industry Award of the fourth session (P37)

Build strong grid and strengthen the upgrade of rural power grids. Increase R&D input.

- Complete the activity “safe power use in temples” (http://news.163.com/15/0507/16/ XN80031C00.html)

- To meet the power needs of local residents and businesses in orchard management, irrigation and fruit storage and reservation in Luming National Key Apple Production Area, benefiting 17,500 fruit growers (PE)

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Ten principles of the UN Global Compact

Human Rights
1. Businesses should support and respect the protection of internationally proclaimed human rights;
2. Make sure that they are not complicit in human rights abuses.

Labor
3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
4. The elimination of all forms of forced and compulsory labor;
5. The effective abolition of child labor;
6. The elimination of discrimination in respect of employment and occupation.

Environment
7. Businesses should support a precautionary approach to environmental challenges;
8. They should initiate and promote greater environmental responsibility; and

Anti-Corruption
10. Businesses should work against corruption in all its forms, including extortion and bribery.

Initiatives and Performance of UN Global Compact

Human Rights
- Abide by the international conventions, international practices signed or acknowledged by the Chinese government, follow the laws and regulations of the host countries, respect human rights in its operation, and promote human rights protection among stakeholders with its influence.
- Make sure that State Grid is not complicit in human rights abuses.
- Promote the upgrade and reconstruction of rural grids. Electrify 783,000 pumped irrigation wells. Upgrade the power grid in 30,000 small townships (key villages). Bring electricity access to and reform dynamic power in 22,000 natural villages.
- Provide barrier-free service to the disabled at business premises to ensure their rights.

Labor
- Promote frequent and normalized democratic management through the Staff Congress, President’s Liaison Meeting, and seminars to make public the affairs of the company. All 236 pieces of rational advice from employees have been processed and replied.
- Accept the employees’ suggestions, complaints and suggestions, and the number of rational advice and suggestions has reached a high level. And it is ensured that the employees have the right to information, consultation, participation in management in an orderly way. Be open to social supervision. Guard against the risk of corruption.
- Promote the development of friendly technologies.

Management in an orderly way. Be open to social supervision. Guard against the risk of corruption.

Social Performance Indicators
- Implement the principle of equal pay for equal work to men and women.
- Reject discrimination by nationality, gender, sex, age, disease, race or religion, pay staff on their performance and their position, and implement of the principle of equal pay for equal work to men and women.
- Ensure decent work, provide payment and treatment in law with the national and the company’s conditions, pay attention to the balance of employees’ life and work, establish a reasonable paid-leave system, pay the pension, medical care, unemployment insurance and other social insurances for all years.

Economic Performance Indicators
- Output electricity fueled by hydropower from Southwest China reached 129.357 TWh in 2016.
- Of clean hydropower from Southwest China in North, South, Central and Northwest China over a long distance. Exert the advantages of UHV grid in optimizing resource allocation. Realize large-scale accommodation of clean hydropower from Southwest China in North, South, Central and Northwest China over a long distance.

GRI Index

Note the index can be found on http://csr.sgcc.com.cn.
Your Power, Our Care
State Grid, always on your side