



GREEN AND ECO-FRIENDLY: HELPS PRESERVE THE GREEN ENVIRONMENT OF CHINA

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Ecological well-being matters to the sustainable development of the Chinese people for many era. China Unicom actively advocates and practises the philosophy of “Thinking Green is Thinking Gold and Silver”. Committed to the national policies on resource conservation and environmental protection, and in strict compliance with the Environmental Protection Law of the People's Republic of China, the Energy Conservation Law of the People's Republic of China and other laws and regulations related to environmental protection, the Company continued to strengthen initiatives such as green networks, green operations, green supply and green actions. It actively implemented the national supply-side reform and earnestly practised energy conservation and waste reduction, contributing to the harmonious co-existence between people and the nature while helping to build a “beautiful China”.

Measures adopted in 2017

- Committed RMB100 million in a special fund for energy conservation and emission reduction, with focus on energy conservation upgrades and technical application.
- Reinforced green procurement, implemented co-building and co-sharing, attached importance electromagnetic radiation management, while speeding up to streamline 2/3G networks, as well as carrying out the retirement of equipment and consolidation of switch rooms, all resulting in saving 550 million kwh/year in electricity consumption.
- Introduced paperless operations and made more efficient use of materials, resulting in an added value of RMB 84,305,500 via enhancing materials utilisation.
- Significant effort to drive green action and fulfill the green citizenship.

Actions in 2018

- Further advancement of network streamlining, ongoing development of technologies for energy conservation, and deepening co-building and co-sharing in telecommunication infrastructure.
- Stronger efforts in the disposal of retired materials to increase the efficiency of such disposal and reducing environmental pollution caused by such retired materials.
- Ongoing development of green actions and implementation of the green development to contribute to the building of the Beautiful China.

In 2017, the Company deeply implemented the overall work plan to “control costs and reform mechanism” and continued to develop initiatives for cost reduction and efficiency enhancement, in efforts to improve network competitiveness, further strengthened management in energy conservation, promoted energy-saving technologies and carried out energy conservation campaigns, all contributing to drive the Company to foster symbiotic harmonious growth with the environment.

PROMOTING GREEN MANAGEMENT

With the rapid development of new technologies such as mobile Internet, Cloud Computing and Internet of Things (IoT), in particular along with the fast-paced construction of 4G networks and all fibre networks, China Unicom experienced relative fast growth in energy consumption. To address such issue, China Unicom has actively facilitated the structural adjustment of its networks. Starting with network planning and design, and through network structural designs, equipment selection, applications of new power supply technology, demand-driven adjustments to network capacity and applying energy conservation and discharge reduction technologies, as well as measures to reduce the consumption of power and energy, the Company strives to lower discharge of greenhouse gases and regulates disposals of pollutants and wastes, in the effort to enhance the standard of meticulous management.

- Formulated the “Planning for Energy Conservation and Discharge Reduction 2017-2020” with the aim to enhance management over the consumption of resources and energy primarily through the control of total energy spending growth complemented by stronger efforts in energy conservation management. Capital committed exclusively to energy conservation and discharge reduction purposes amounted to RMB100 million in 2017, with a strong focus on energy conservation upgrades and application of energy conservation technologies.
- Strengthened the management of the responsibilities with authorities in energy consumption, and enhanced assessment by functions and process control for energy consumption.
- Established a working group for network streamlining and spectrum refarming, so as to reinforce the streamlining efforts of the 2/3G networks.
- Stipulated the network power supply structure and technology standards, while introducing “Wo” cloud storage module standards, as well as mapping out various enterprise-level standards such as the high-voltage direct-current power supply standards and high magnification discharge battery standards.
- Built energy consumption management system to carry out full inspection of daily energy consumption at switch rooms and complete audit and authentication on a regular basis to provide solid support for the implementation of energy consumption planning.

On 1 November 2017, the “Information and Communication Industry Alliance for Innovation in Energy Conservation” advocated by China Unicom was officially established, aiming to drive energy conservation and discharge reduction of information and communication equipment, platforms, power supply systems, refrigeration systems, maintenance systems and construction as an integrated unit with the aid of new-generation information and communication technologies and infrastructure integration. The initiative promoted the research in and application of energy conservation and related technological innovation, creating an innovative platform to drive technological innovations, standardisation and industry chain development in relation to energy conservation. Furthermore, it facilitated the value chain reform to achieve the infrastructure frameworks, thus driving energy conservation and discharge reduction in the information and communication industry.



Delegates raised hands to vote in favor of the establishment of the alliance

Note 1: As the Company mainly engages in the provision of telecommunication services, packaging material used for the finished products is not applicable to the Company's business practice.

Note 2: As China Unicom is a massive entity and its business covers a wide geographical region, currently the Company is not able yet to produce full statistics regarding its waste production. The Company will establish related data collection system as soon as possible.

DEPLOYING GREEN NETWORK

Implementing Green Procurement

China Unicom promoted centralised procurement of efficient and energy-saving equipment by increasing testing on UPS and air-conditioning technologies, as well as proposing to have TCO cost estimation to provide product-related energy conservation guidance to manufacturers. The Company also implemented quality accreditation for environmental management to clearly specify eco-friendly requirements, which, suppliers must obtain accreditations such as SA8000 and ISO14000. Meanwhile, e-tenders and electronic transactions had been introduced not only to lower the environmental costs in transactions, but also enhance suppliers' awareness and competency in environmental protection. To strictly comply with the national standard in environmental protection, the Company closely monitored the power consumption issues of terminal products and continued to make improvements with suppliers, so as to ensure the Company's customised terminals to be energy-saving, eco-friendly and safe.

Eliminating Obsolete Capacity

China Unicom reported electricity consumption savings of 250 million kwh following the shutdown of over 50,000 sets of equipment as part of its vigorous effort in service integration and retirement of equipment for traditional switch networks to accelerate the streamlining of 2/3G network capacity in a more intensive implementation of the national supply-side structural reforms. Meanwhile, the integration of 7,280 switch rooms at all of our 1,680 exchange bureaus was completed, vacating a gross floor area of 480,000 square metres of switch rooms and saving 300 million kwh per annum in electricity consumption.

China Unicom in Yantai, Shandong has enhanced its economic and environmental efficiency, with annual savings of RMB4.06 million in electricity charges after disconnecting power supply at 567 base stations, phasing out 4,817 2G base stations and 1,745 3G base stations in its day-to-day organisation and implementation of network streamlining and frequency refarming.

Networks Co-building and Co-Sharing

In adherence to the principle of "achieving win-win through cooperation and co-development", China Unicom continued to deepen cooperation with other companies in communication infrastructure facilities such as transmission pole lines, pipelines, underground cables and indoor distribution systems with an open-minded approach, in a bid to reduce duplicated construction and foster complementary advantages to enhance co-building and co-sharing levels in the deploying telecommunication infrastructure facilities.

- Co-built of 5,200 route-km of transmission pole lines, 6,300 route-km of pipelines and 7,860 indoor distribution systems.
- Co-shared usage of 12,100 route-km of transmission pole lines, 1,300 route-km of pipelines and 1,410 indoor distribution systems with partner operators.
- Opened up 24,000 route-km of transmission pole lines, 7,400 route-km of pipelines and 2,520 indoor distribution systems for co-sharing by partner operators.

Savings in project investments
of more than RMB

640 million

Responsibility performance indicators	2015	2016	2017
Co-building rate for indoor distribution system (%)	69.07	73	71
Co-sharing rate for indoor distribution system (%)	94.66	63	93
Pole line co-building rate (%)	67.76	85	88
Pole line co-sharing rate (%)	94.16	92	95
Pipeline co-building rate (%)	82.17	85	92
Pipeline co-sharing rate (%)	92.23	86	98

Managing Electromagnetic Radiation

China Unicom strengthened the management over electromagnetic radiation in the construction of mobile communication base stations in strict compliance with the provisions set out by the Ministry of Ecology and Environment and local environmental authorities to ensure compliance with national standards of our electromagnetic radiation levels. In accordance with the changes in the management of electromagnetic radiation stipulated by the Ministry of Ecology and Environment, the Company's network technology research institute conducted tests and researches on electromagnetic radiation at the mobile communication base stations on a number of branch offices. Meanwhile, "China Unicom Administrative Regulations for Environmental Protection in relation to Electromagnetic Radiation at Communication Base Stations (Trial)" was formulated, taking into the requirements of Ministry of Ecology and Environment and MIIT to provide for regulation in relation to base station registration and filing, electromagnetic radiation tests, information disclosure, and handling of complaints and rectification for non-compliant stations.

In order to enhance public knowledge in the scientific understanding of electromagnetism so that the public can enjoy using telecommunications services, China Unicom Fujian launched an electromagnetic radiation safety promotion campaign and employed the nation's first "Touring Bus for the Promotion of Scientific Knowledge relating to Electromagnetic Radiation" to perform comparative radiation tests with a high level of precision on home appliances such as electromagnetic boilers, TVs, computers and handsets to educate local residents on legal and scientific knowledge relating to electromagnetic radiation at base stations to eliminate misunderstandings.

DEEPENING GREEN OPERATION

Building Green Business Outlets

In tandem with the principle of “reducing carbon emission and creating a green office environment” and leveraging the construction of digitalised operating stores, China Unicom was driving the conversion of traditional communication service stores to experiential retail stores to create eco-friendly and smart business outlets characterised by “regulated management, standardised layout, modernised equipment, digitalised operation and paperless processing”. A total of 65,276,600 business transactions were completed through the centralised paperless system, resulting in cost savings of RMB250 million. The Company also advocated to conduct meetings over video conferencing, and most major work conferences in 2017 were held through live webcast, which reduced carbon emission. Moreover, the Company ensured zero discharge of waste water and pollutants by directing waste water and pollutants at all business locations to the waste water pipeline network system to process. The Company strived to increase the efficiency in the usage in water, actively pushed forward the recycling use of water resources. In response to the increasing awareness to preserve the use of water, the Company would conduct maintenance checks in each part of the water supply system and eliminated scenarios including water resources wasting and leaking. The Company mainly consumed tap water coming from the buildings or the properties. During the reported period, there is no issues regarding the use of water.

A total of **65,276,600** business transactions completed through the paperless system

Total cost savings amounted to approximately RMB **250** million

China Unicom Sichuan branch implemented paperless office in tandem with the green development principle. The OA system was improved with the construction of a green office platform. All paper meeting documents were eliminated, as notices for meetings had been facilitated through “E-Notice”, while PAD was introduced to disseminate speeches at major meetings. In 2017, 2,713 corporate documents were handled through the office system, saving more than 270,000 piece of paper. Paper consumption for major meetings was reduced by 60,000 piece and saved RMB22,365,000.

Promoting Energy-saving Green Technology

In 2017, China Unicom proposed the compartmentalisation, modularization and customisation of switch room energy conservation as a standardised model for the construction of eco-friendly switch rooms, complemented by the launch of Cloud Module (雲艙) 1.0 products to solve problems such as excessive power consumption and muddled airflow in existing networks. At the same time, planning for IT and CT integration were providing viable infrastructure solutions for the evolution towards cloudification.

Efforts were made to promote the application of 336V high-voltage direct-current system, high magnification discharge battery, and aluminum alloy cable. Currently, the 336V high-voltage direct-current system and high magnification discharge battery are under open testing, while preparations are being made for the launch of aluminum alloy cables, with a view to providing branch offices with viable options.

An efficient energy-saving solution was adopted with the application of new on/off power switches using high-efficiency modules which increased efficiency by 3%. The adoption of smart dual-circulatory air-conditioning in Northern and Central regions resulted in more than 15% energy saving. Annual savings in electricity charges amounted to more than 26 million kwh as compared to traditional construction plans.

The Company also involved in the promotion of the use of eSIM technology to replace the physical SIM card, in order to gradually reduce the massive costs incurred by telecom operators and users in the manufacturing, transportation, storage and physical replacements of SIM cards, while reducing consumption of raw materials to minimise pollution of the environment.

The “warehouse micro-module switch Room” of China Unicom (Gui An) Cloud Data Centre received a 4A global accreditation of green grading for data centres. Built in accordance with the internationally most advanced T3+ to T4 data centre standards, Gui An Cloud Data Centre features flexible customisation, adaptability and green energy conservation facilitated through micro-module technologies, electric technologies, refrigeration technologies and a unique distributed UPS system, with an overall PUE managed below 1.3.



Energy Conservation and Emission Reduction Conference of the Communications Industry in 2017

China Unicom Yunnan Branch reported savings of approximately RMB3 million in electricity charges, thanks to the employment of market-oriented transactions in major industry power market for core switch rooms, power disconnection for low-efficiency OLT, and the LET base station smart shutdown technology. The outcome of such energy conservation technology has received positive recognition from the Communication Network Operation Committee of China Association of Communication Enterprises, which awarded China Unicom Yunnan Branch with the title “Innovative Unit in Energy Conservation Management in the Communications Industry in 2016–2017”.

Commitment to Cost Reduction and Efficiency Enhancement

In 2017, China Unicom discontinued 49 inefficient systems, integrated 83 homogeneous systems, optimised capabilities for 8 systems and relocated 91 systems to cloud platforms. It made a major boost to the overall supporting functions of the systems by actively encouraging and instructing units at all levels to embark on technological innovations.

- Initiatives adopted by the headquarters included mainly quality and efficiency enhancement measures such as the “shutdown, suspension, integration and transfer” of equipment and application systems, clearance of data generation processes and statements, consolidation and vacating of stacks, electric circuit clearance and recycling of Internet address resources, which contributed to operating cost savings of approximately RMB12.23 million and savings in energy consumption of approximately RMB2.15 million.
- Initiatives adopted by provincial branches included mainly the “shutdown, suspension, integration and transfer” of equipment and application systems, exploration and breakthroughs in proprietary research & development and internally-supported maintenance, as well as technical and management innovations, resulting in improved IT support and response ability, along with improved quality and enhanced efficiency. Operating cost savings amounted to approximately RMB60.80 million, including savings in energy consumption of approximately RMB17 million.

Addressing Material Utilisation and Recycling

In 2017, China Unicom continued to adopt the reverse logistics management approach, as waste materials were passed on to professional third-party recycling companies for general disposal and recycling, in order to facilitate more effective recycled use of waste materials. Recycled materials amounted approximately RMB57,086,500, while the disposal of wires and cables, retired rechargeable batteries and general items amounted to RMB1.1 billion, RMB55,537,300 and RMB83,427,800, respectively. The added value of efficient re-utilisation of materials amounted to RMB84,305,500.

The Company vigorously built a smart platform for asset transactions by registering with Alibaba's auction platform. A total of 131 obsolete asset items were auctioned, resulting in an approximately 50% improvement in the yield rate for the disposal of terminals and an approximately 10% improvement in the yield rate for wires and cables. A range of measures, such as "matching terminal cards", have been adopted to enhance utilisation of inventory card products and reduce the volume of wasted resources. In 2017, 5.50 million inventory card products were put to effective consumption, reducing over RMB7 million in wasted resources.

Recycled materials valued
at approximately RMB

57,086,500

Disposal of general items
amounted to RMB

83,427,800

Added value of efficient utilisation of
materials amounted to RMB

84,305,500

Rizhao Branch of China Unicom Shandong rolled out a campaign to encourage recycling and reusing access materials, deploying locations and scenarios for reusing the materials, as well as the standard for reuse after the dismantle, as to increase the recycling rate. A total of 201,000 metres of 5 types of old cables have been removed for recycling in the city.

DRIVING GREEN ACTIONS

China Unicom actively advocates in environmental-friendly principles and has been making in-depth efforts to carry out green actions, thus contributing to building the beautiful China.

China Unicom Beijing actively responded to the requirement of "clean coal and nitrogen reduction" and zeroed-out all 119 coal-powered boilers and 22 gas-powered boilers. Dozens of transformations were completed within 2 months. By utilising the left-over room heat to achieve autonomous heating, carbon dioxide emissions reduced 620.61 tons. This action contributed to the Beautiful Blue Sky initiative in Beijing, as well as fulfilling the social responsibility for energy saving and emission reduction.



China Unicom Shaanxi organised a plantation activity to contribute to a "Greener Eastern Shaanxi and a Beautiful Homeland".



China Unicom Inner Mongolia organised a voluntary activity of garbage clearance, calling for green actions to protect Wuhai Lake from pollution.

China Unicom Lanzhou launched a green charity initiative, calling for "doing charity and be a dedicated contributor".



China Unicom Shanxi organised an eco-friendly cycling activity entitled "Healthy Cycling with 'Wo'".

Voluntary plantation activity organised by Unicompany Company.



China Unicom Changsha organised a voluntary eco-protection campaign, together with a plantation activity in Lushan.

