

China Unicom Liaoning branch launched a wide range of cybersecurity promotional activities: sending 12 million promotional SMSs, reaching out to 31.50 million users via our online stores and WeChat public account, organising 18 sessions of community outreach during the promotion week and over 400,000 showings of promotional messages at business outlets.



Rolling messages on LED screens at business outlets



Community outreach



Promotion via online stores

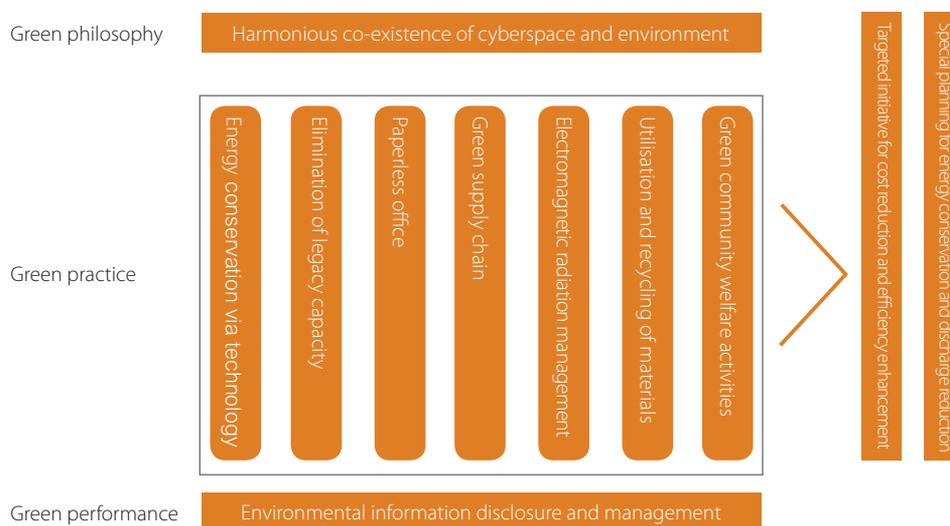
PERSISTING IN LOW-CARBON GREEN DEVELOPMENT

China Unicom is resolutely committed to pollution prevention and remedy. In strict accordance with laws and regulations pertaining to environmental protection, such as the Environmental Protection Law of the People's Republic of China and the Energy Conservation Law of the People's Republic of China, we have incorporated the low-carbon green development philosophy into our corporate strategy and production operations in active implementation of green management, green network, green operation and green application, with a view to contributing to the realisation of a beautiful China with blue sky, green land and clear waters, satisfying the growing demand for a pleasant ecological environment of the public.

Refining green management

Strengthening management system

China Unicom has developed a “three-in-one” green management system underpinned by the green philosophy, green practices and green performance. We implemented the general requirement for “cost control and mechanism reform” through targeted initiatives and special planning. We deeply engaged in energy conservation and eliminated inefficient capacity, so as to reduce network energy costs and mitigate the environmental impact resulting from greenhouse gas emission. We regulated the treatment of pollutants and wastes to enhance the standard of our refined green management. The Company is committed to increasing the efficiency of water consumption as active efforts have been made to promote the recycling of water resources. The Company promoted awareness in water conservation, while conducting regular maintenance checks in each part of the water supply system to eliminate water resource wastage and leaking. The Company's water resources mainly comprise tap water in buildings or properties. During the reporting period, there was no issue in sourcing water.



China Unicom's "Three-in-one" Green Management System

Driving Control work

China Unicom spares no effort in tackling the “three critical issues” to ensure practical implementation of key deployments in relation to eco-friendly development.

- We have formulated a particular implementation plan for pollution prevention and remedy, underpinned internally by low-carbon green development and externally by focused efforts on the ecological environment.
- A green development monitoring and data collection system¹ has been established. Pollutants discharged in 2018 included 5,296,000 tonnes of carbon dioxide and 2,400 tonnes of sulphur dioxide.
- Improvements have been made to the green procurement system and administrative systems for the disposal of wastes.

1. ESG indicators such as the density of water consumption, total volume and density of hazardous (non-hazardous) wastes have yet to be covered in full. We will next seek to improve China Unicom's environmental governance system in accordance with the ESG Reporting Guide issued by the Stock Exchange of Hong Kong.

- We highly regard environmental protection education, building green business outlets and promoting paperless office.
- We undertook major initiatives in water and power conservation, and formulated the “2018 China Unicom Building Energy Conservation and Discharge Reduction Plan”, resulting in a 18.2% reduction in power consumption and 24.6% reduction in water consumption on a per capita basis.
- We have supported low-carbon green development of the industry and launched training and exchange programmes in energy conservation and discharge reduction, and we have also joined the “Internet+ Energy Conservation” Industry Alliance.
- Dedicated funds for energy conservation and discharge reduction have been earmarked with a special focus on energy conservation upgrades and the application of energy conservation technologies.

China Unicom Cloud Data Company has established a working group for energy conservation and discharge reduction in data equipment rooms and published the “China Unicom Cloud Data Company Limited Administrative Measures for Energy Conservation and Discharge Reduction (Trial)”. It identified energy conservation potential of the power source systems and cooling systems at existing bases and conducted ongoing research and application of new energy conservation technologies.

In December 2018, China Unicom joined the “Internet+ Energy Conservation” Industry Alliance and was designated as a deputy general secretary unit. The Alliance is aimed at consolidating resources in the industry to deepen energy conservation efforts and assist the innovative development of sectors relating to “Internet+ Energy Conservation”, coordinating energy revolution and eco-friendly development on behalf of the government, enhancing macro-control of energy conservation and supporting the development of the energy conservation and environmental protection industry.



“Internet+ Energy Conservation” Industry Alliance Inauguration

Funds committed to energy conservation and discharge reduction exceeding **RMB100** million in 2018

◎ Building a green supply chain

China Unicom implements quality accreditation for environmental management, setting out clear environmental requirements and energy-saving conditions for equipment procurement. Suppliers are required to obtain accreditations such as SA8000 and ISO14000.

We comprehensively advanced the full operation of e-tenders and e-commerce with totally digitised “sunshine procurement” and “green procurement” in an effort to lower environmental costs in transactions and enhance environmental awareness on the part of suppliers.

We have tightened up the social responsibility requirements for terminal suppliers as we seek to build a responsible supply chain system. For customised terminal products, we focused on power consumption testing and continuously worked with manufacturers for improvements to ensure compliance of these terminals with energy conservation, environmental and safety standards.

📶 Construction of green networks

◎ Applying green technologies

China Unicom adopts highly energy-efficient network development strategy to drive cost reduction and efficiency enhancement for telecommunication facilities at source.

In 2018, we continued to employ efficient power modules and smart dual-circulation air-conditioning and achieved a 2-5% improvement in power system efficiency, a 30% air-conditioning energy saving and electricity saving of 20.54 million kWh for newly built systems in the first year.

The self-developed loose coupling channel closed-end technology (China Unicom Cloud Shelter) has been adopted to facilitate closure of the cooling passage of traditional telecommunication equipment. Compared to traditional methodology, machine room pPUE (partial power utilisation efficiency) decreased from over 2.0 to 1.5, delivering ongoing energy conservation throughout the entire life cycle of equipment operation.

To promote green data centres, energy-efficient and environmentally friendly equipment such as large cooling capacity centrifugal chillers, variable frequency circulation pumps, column precision air-conditioning, high-frequency UPS and amorphous alloy transformer have been employed in combination with energy-saving technologies such as residual heat recycling, natural cooling, HVDC, distributed power generation, photovoltaic power generation (lighting system). Through adjustments to the cooling system parameters and optimising UPS operating mode, etc., we enhanced our energy utilisation efficiency with PUE reaching as low as 1.33.

- Adjustments to the cooling system parameters: the temperature of water supply and recycling was raised from 7 °C -12 °C to 10 °C -15 °C. Approximately 2-4% electricity could be saved for every 1 °C raised.
- Natural cooling: the natural cooling mode was turned on according to weather conditions. The mode operated for approximately 3,600 hours annually and accounted for 41.1% of total cooling time in the year, contributing to a power saving of approximately 33.6%.
- Optimising UPS operating mode: highly redundant UPS with low loading rates have been closed down to raise the average loading rate. Meanwhile 10% of the degradation of fully loaded UPS can be saved.
- HVDC: compared to traditional UPS, fewer levels of variation can facilitate power saving of approximately 15%.

The cloud data base of China Unicom Huerhot branch trialed the “smart cloud energy conservation” unit and achieved 6% system energy conservation. It was named a Green Data Centre Exemplary Unit by the MIIT, and awarded the titles of “Unit of Innovation in Energy Conservation Technology for the Telecommunication Industry” and “Outstanding Data Centre Operation and Maintenance Award”.



At the Xiangjiang Road IDC Complex of China Unicom Harbin branch in Heilongjiang, power consumption for the operation of equipment and air-conditioning accounts for 20%-25% of the total power consumption for overall operations and maintenance and is hence a priority in energy conservation. Through the introduction of a ventilation energy conservation system, significant energy conservation have been achieved with energy saving of 72.3%. In the future, the system will be broadly deployed.

China Unicom (Hong Kong) Global Centre strictly complied with local ecological and environmental requirements in its IDC and terrestrial fibre cable projects. It also actively promoted collective fulfillment of environmental responsibilities by partners in the supply chain. The projects were awarded international LEED Gold certification and BEAM+ accreditation of Hong Kong in recognition of their top standards in green construction internationally.

◎ Capacity optimisation and upgrade

In deepening supply-side structural reform, China Unicom eliminated obsolete capacity and achieved network optimisation and upgrade as well as cost reduction and efficiency enhancement by stepping up 2/3G network streamlining, fixed-line business consolidation and decommissioning legacy equipment. In 2018, 500,000 square meters of equipment room area were vacated leading to close to 300 million kWh of power savings per year.

China Unicom Shandong branch has been actively driving innovation in energy conservation and consumption reduction models. Its hardware has been optimised to reduce energy consumption, while software optimisation has been focused mainly on frequency reduction for 2/3G networks to achieve cost reduction and efficiency enhancement for greater environmental, economic and social benefits.

◎ Managing Electromagnetic Radiation

China Unicom deploys mobile telecommunication base stations in strict accordance with the provisions of the Ministry of Ecology and Environment (“MEE”) and the local ecology and environment authorities, while strengthening management of electromagnetic radiation to ensure compliance with national standards in terms of electromagnetic radiation levels. In accordance with MEE Order No. 41, we have completed environmental impact registration forms for all of our construction projects.

In accordance with the “China Unicom Administrative Regulations for Environmental Protection in relation to Electromagnetic Radiation at Telecommunication Base Stations (Trial)”, we have enhanced the filing of mobile telecommunication base stations, testing for electromagnetic radiation, disclosure of testing results and handling of complaints.

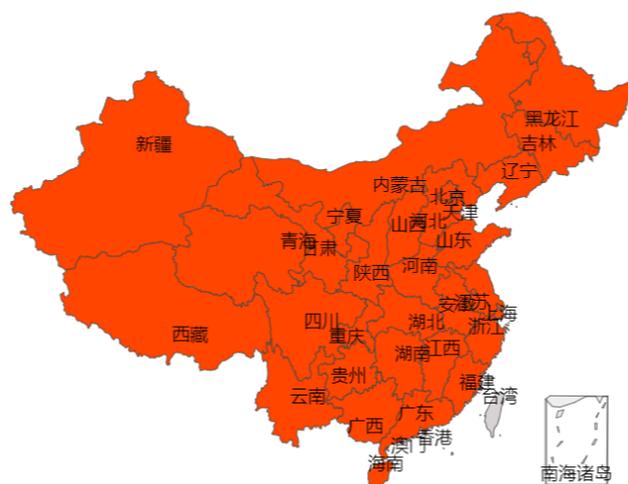
We were the first to develop a nationally centralised electromagnetic radiation monitoring and information disclosure system for mobile communication base stations, allowing the public to access electromagnetic radiation data and monitor China Unicom’s electromagnetic management in active response to stakeholders’ concerns.



中国联通基站电磁辐射信息公示平台
ChinaUnicom EMF Information Publicity System

请输入基站名称或站址

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Interface of China Unicom EMF Information Publicity System

Enhancing green operation

Building green office

In adherence to the notion of “low carbon, discharge reduction and green office”, China Unicom has built a green and intelligent store network characterised by “regulated management, standardised layout, modernised equipment, digitalised operation and paperless processing” through developing digitalised business outlets. Our centralised paperless system handled a total of 106 million business transactions in 2018, reducing paper and labour costs by approximately RMB112 million.

Facilities at business outlets have been consolidated into an integrated equipment. We promoted online order taking and centralised processing at the middle platform to enhance the ability to acquire customers through self-owned online channels while teaming up with third parties to expand online channels, so as to reduce the operating costs of business outlets and labour costs in implementation of the green operation philosophy.

106 million paperless business transactions

Total cost savings of approximately

RMB112 million

Upcycling materials

China Unicom continued to enhance the disposal of obsolete materials. Storage and management of materials pending disposal is conducted in strict accordance with environmental requirements. Additional methods of disposal compliant with such requirements have been introduced to increase the efficiency of disposal and reduce environmental pollution. In 2018, the reused materials were worth approximately RMB101.87 million. Proceeds from the disposal of obsolete wires and cables, obsolete batteries and miscellaneous assets amounted to RMB440.01 million, RMB94.46 million and RMB85.58 million, respectively. Upcycled materials were valued at RMB108.51 million.

We comprehensively advanced Internet-oriented operation in connection with asset disposal. We strengthened cooperation with Alibaba, jointly establishing an “open, transparent, sunshine and efficient” intelligent asset exchange platform and connecting China Unicom’s asset disposal bidding platform with Alibaba’s auction platform. 150 branches and subsidiaries of China Unicom have joined Alibaba’s auction platform, with 17 of them having conducted 131 auctions of obsolete assets. As a result, the yield rate of disposal has increased by about 50% for terminals and about 10% for wires and cables.

We have also introduced trade-in service, financial instalment and handset insurance services to lower the barriers for handset upgrade by users and to drive the green and healthy development of the industry. We teamed up with Apple to launch a handset upgrade campaign for existing customers, which not only met the handset upgrade demand of Apple fans but also effectively reduced wastage of resources.

Reuse of materials worth approximately **RMB102 million**

Proceeds from the disposal of miscellaneous assets amounting to **RMB85.58 million**

Upcycled materials valued at **RMB109 million**

China Unicom Guangxi branch has adopted an "Internet+" online platform auction model, to maximise value preservation and creation for the Company's obsolete assets. Throughout the year, 603 sets of obsolete batteries, 13,934 sets of obsolete telecommunication equipment, 4,164 sets of obsolete office equipment and 26 retired vehicles were auctioned for a total income of RMB4.013 million.

China Unicom Inner Mongolia branch reused old and redundant equipment to build cloud resource pools with a centralised intelligent platform for maintenance, operation and management. Infrastructure hardware was 100% sourced from retired old equipment, reducing purchase costs by approximately RMB2 million. The resource pool is equipped with 35 intelligent network management systems, resulting in hardware investment savings of approximately RMB3 million.

◎ Taking green actions

China Unicom is a strong advocate for environmental protection and places a strong emphasis on green charitable campaigns. Our staff contribute to the conservation of biodiversity and ecological restoration and the building of a beautiful China, starting from day-to-day matters.

In June 2018, the National Low Carbon Day promotional campaign was held in the office of the Beijing Winter Olympics Organising Committee. China Unicom signed the "Low Carbon Proposition" together with all Winter Olympics partners to kick-start a low-carbon initiative: "It is our collective vision and responsibility to fully implement the Olympic ideal of eco-friendliness, sharing, openness and integrity and organise a spectacular, extraordinary and superb Olympic event. To support the goal of low-carbon emission at the Beijing Winter Olympics, we, as official partners of the Beijing Winter Olympics, solemnly propose the joint adoption of low-carbon green actions to help achieve 'Green Olympic Games' at the Beijing Winter Olympics."



China Unicom participated in the National Low Carbon Day promotional campaign.



China Unicom Rizhao branch in Shandong province launched the "Tree Planting for Green Cities" initiative.



China Unicom Canzhou branch in Hebei province launched a collective volunteer service campaign to combat illegal mini-advertisements.

🔍 Exploring green applications

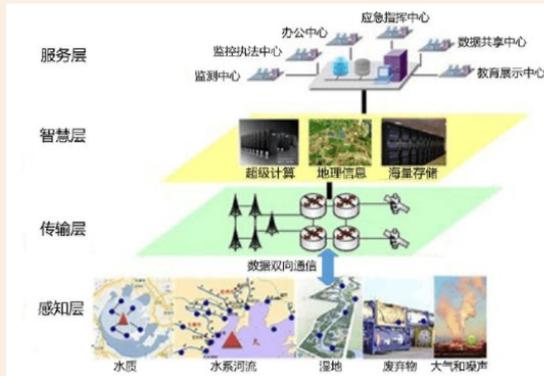
Externally, China Unicom is focused on the environmental vertical. Leveraging our technical strengths in Cloud, Big Data, IoT and mobile Internet, we continuously introduced innovative green products and applications and launched green informatisation solutions to support low-carbon industrial developments, thereby making active contributions to the realisation of low-carbon green development and pollution prevention and remedy.

- We promoted green electronic top-up cards to reduce the production of paper cards. In 2018, electronic top-up cards accounted for close to 90% of our total top-up card sales.

- We have been driving the replacement of physical SIM cards with eSIM to gradually reduce the significant costs associated with card production, transportation, storage and physical SIM card replacement incurred by carriers and users, reducing consumption of raw materials and environmental pollution.

- We have developed a process to rewrite used empty cards into blank cards for reuse to avoid wastage resulting from disposal. According to our estimates, more than 2 million empty cards can be reused.

China Unicom Hubei branch utilised modern information technology to build a smart environmental protection platform that integrates environmental monitoring, emergency command and mobile law enforcement, in order to enhance the ecological environment monitoring network as well as management and governance capabilities. Statistics showed that the percentage of good air quality reached 79.7% and 100% of water was qualified in cities engaging in smart environmental protection. It helped to solve environmental issues which the public was highly concerned about.



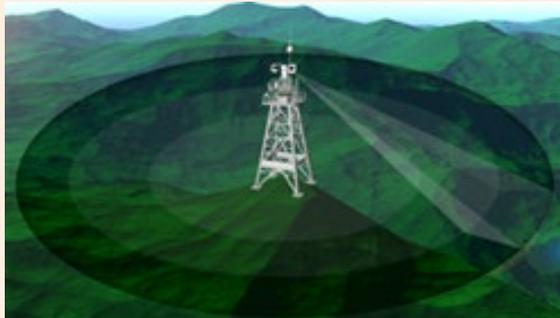
Overall Framework of Smart Environmental Protection.

Leveraging its integrated ability to employ systems integration + fibre network + IoT, China Unicom Chuzhou branch in Anhui province has built an integrated intelligent monitoring platform for mineral resource exploitation in Dingyuan County, deploying 22 monitoring points to effectively curb illegal mining and prevent environmental pollution and water / soil depletion. With a significant exemplary effect, the project is replicable in other parts of the country.

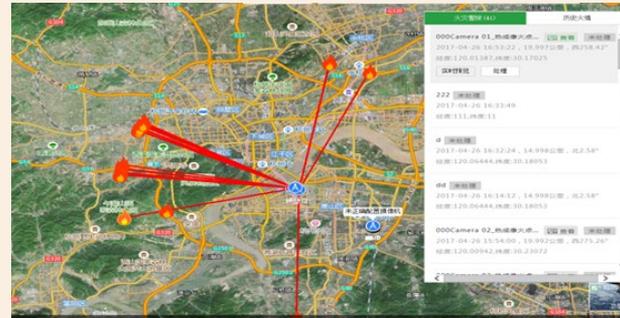


Integrated Intelligent Monitoring Platform for Mineral Resource Exploitation.

In 2018, China Unicom Hebei branch fully advanced the building of a monitoring platform for the prohibition of straw incineration with the use of infrared thermal imaging video surveillance, an internationally leading technology. The governance with respect to the prohibition of straw incineration in the province became more informatised and intelligent, resulting in "environmental management on one single platform". Currently, system development has completed at three cities, namely, Handan, Langfang and Zhangjiakou, and 803 monitoring points in 36 counties (cities / districts) have been put into full operation with strong approval from local environmental authorities.



Thermal imaging video cameras on the tower patrolling on a round-the-clock basis.



Fire is identified and located in a timely manner.

To enhance treatment of water pollution, China Unicom Fujian branch has built a green ecological water network and adopted an "Internet+ river chief system" philosophy to create a powerful tool for supervising river protection – the "integrated management and information platform for the river chief and lake chief system" – providing information support and a scientific management approach for the joint management and protection of rivers and lakes by the government and the community. China Unicom Fujian branch was contracted to build 16 district- or county-level platforms serving more than 20,000 users, winning recognition from the 5 cities of Nanping, Zhangzhou, Ningde, Longyan and Quanzhou.

SHARING BENEFITS WITH SOCIETY

With a strong focus on the responsibilities of a central state-owned enterprise and undertakings relevant to the current times, China Unicom holds in high regard social and livelihood issues and proactively takes part in community welfare on the back of our own expertise and technical strengths. We engaged in charitable donations, disaster and poverty relief and volunteer services in order to contribute to improvements in livelihood, spread our love, and facilitate shared and harmonious development for the Company and the society.