In order to solve issues such as enhanced integration of main equipment, ceaselessly increased single cabinet power and high energy consumption of traditional operation room, idea of constructing energy-saving machine room is proposed. From customisation, modularisation, zoning and other perspectives, this proposal achieved air distribution optimisation in machine room and modularisation construction of machine room, carrying out the research and standardisation of green mode construction of machine room and pushed forward main equipment standardisation, as well as completed the standards for the air distribution specifications and size of the main equipment.

Green data center

- **Hohhot Data Center was awarded as advanced energy-saving technological innovation company in the telecom industry for two consecutive years;**
- **Langfang Data Center was awarded as advanced energy-saving technological innovation company in the telecom industry for two consecutive years; acquired AAAA grade certificate of data center green energy conservation demonstration project; and won the qualification of China green data center pilot unit which was jointly issued by MIIT, National Government Offices Administration and National Energy Administration;**
- **Gui'an Data Center was awarded the qualification of China green data center pilot unit.**

Implement co-building and co-sharing

Actively fulfilling the requirements of the State to promote construction of ecological civilisation, the Company carefully implements the yearly guideline of MIIT and NDRC "Opinions on Implementation of Telecommunication Infrastructure Co-Building and Co-Sharing", and deepens cooperation among enterprises in construction fields of pole line, pipeline and indoor distribution system, reducing repeated construction and strengthening resource sharing. In 2016, the Company cooperated with China Tower and built 160,000 base stations and saved RMB11.5 billion of investment.

Responsible performance indicator	2014	2015	2016
Co-building rate of indoor distribution system (%)	64.56	69.07	73
Co-sharing rate of indoor distribution system (%)	98.19	94.66	63
Pole line co-building rate (%)	71.46	67.76	85
Pole line co-sharing rate (%)	94.79	94.16	92
Pipeline co-building rate (%)	83.90	82.17	85
Pipeline co-sharing rate (%)	92.55	92.23	86

Electromagnetic radiation management

The Company strengthens application of new technology, and adopts such advanced technical means such as Micro BS in densely populated cities as to optimise the layout of wireless network, making the electromagnetic radiation indicators of base stations being better than national standards. During the construction process of the base stations, the Company performed assessment on electromagnetic environmental impact, as well as testing on acceptance upon completion of the base stations, and conscientiously accepted supervision, administration and inspection of environmental protection departments, in accordance with the relevant national requirements of *the Measures on the Management of Electromagnetic Radiation Environmental Protection*.

By bringing new media platform into full play and actively publicise electromagnetic radiation knowledge, telecommunication knowledge has been popularised by continuously collaborate with governmental agencies and public-welfare organisations; Through collaboration with multi-parties and active communication, as well as introducing the public to learn the correct electromagnetic radiation influence of base stations, public doubts and misunderstanding are eliminated through on-site demonstration, field inspection and testing, and popularisation of base station equipment and telecommunication knowledge.

China Unicom Guangxi Branch strengthened the management of electromagnetic radiation, and minimised the impact of battery radiation in the following five aspects:

- **Purchase equipment according to the frequency scope and rated power output as required in national regulations, and change to low radiation equipment when proper;**
- **Adopt advanced technical means to optimise layout of wireless network and make electromagnetic radiation indicators better than national standards;**
- **Avoid kindergartens and primary schools when selecting the site of base station, and communicate with nearby companies and residents to seek for understanding and support on a regular basis;**
- **Evaluate environmental impact of base station, disclose relevant reports in a timely manner and accept public supervision;**
- **Conduct activities to popularise knowledge of electromagnetic radiation, and offer professional explanation and carry out on-site inspection on radiation at base stations to eliminate public doubts;**

In 2016, over 14,000 base stations passed the environmental impact assessment carried out by professional environmental administrations such as the Environmental Protection Bureau and the Radiation Environment Supervision and Management Station.

PROMOTE GREEN OPERATION

China Unicom continuously carries out green operation. In 2016, it designated approximately RMB200 million to conduct special projects for energy conservation in technology and management, streamlined network and machine room integration, effectively reduced energy consumption in the network.

Promote energy conservation technology

- The Company promoted new technical application such as high-frequency UPS and efficient module for switch power supply, improving operating efficiency of power supply by 4-5%. The promotion of equipment application such as the smart double-circulation air conditioner and others have reduced the energy consumption in air conditioning by 20%; The inspection on power supply switch in the entire network and UPS configuration, and the closure of over-configured module for switch power supply and UPS equipment, both improved system efficiency by 2%;
- Based on the characteristic of different indoor phone traffic at different time periods, the "time controller" is installed on the indoor distribution equipment targeting in office buildings, stations, large-scale supermarkets, shopping malls and shopping areas. From 10:00pm-6:00am in which there is almost no phone traffic in the aforementioned places, the "time controller" would reduce power supply by periods and achieves the purpose of energy conservation and consumption reduction. For double-frequency high configuration stations and high configuration 3G network base stations, there will be automatic reduction during night time when there is low phone traffic and automatic start-up in the morning.

China Unicom Jiangxi Branch strengthened management and technical innovation to promote energy conservation and emission reduction with the focus in the large energy-consumed core machine room and basic station. The first measure is to set up theoretical benchmark for basic electricity consumption, and analyze the difference between actual electricity consumption with the benchmark every month to find out the problems; the second is to install power supply time controller in indoor distribution equipment, and turn the power off during 0:00am-6:00am every day to accomplish energy conservation; the third is to adopt underground power storage for outdoor (ground) base stations, which not only to serve to theft-proof, but also to extend the service life of the power storage. Furthermore, unfolding the waste power storage and replacing the old with the new ones would replenish approximately RMB1.6 million worth of power storage, which helped reducing environmental pollution.

China Unicom Zhejiang Taizhou Branch implemented frequency band and capacity reduction of 2G/3G networks, removing old equipment from the fixed network; independently researched and developed base station air conditioning controller to automatically turn on/off power of the air conditioning according to temperature change in the machine room of base stations; automatically reduced configuration during night idle hours and started up in the morning for macro cellular base stations with extremely low phone traffic; eliminated old electrical equipment in complex buildings, and used energy-saving air conditioning and lighting. During the year, the Company saved a total of 3.987 million KWH of electricity, which is equivalent to 1,610.75 tons of standard coal, and reduced 3,975.04 tons of CO_2 emission.

Implement energy conservation management

- Set up benchmark value of electricity consumption for machine rooms where various types of base stations, indoor distribution systems and access sites are located. By benchmarking, the difference between electricity consumption in machine room of similar type and the benchmark value could be less than 10%, as to eradicate issues arising out of evaporation, emission, dripping or leakage;
- Implement list-based PUE management and control for communication machine room while setting up historical account, and gradually reduce PUE value at machine room by measures such as reasonably increasing pre-set temperature of air conditioning at communication machine room, switching off redundancy equipment, and saving electricity of lighting;
- Actively negotiate with China Tower to adopt lump-sum charging of China Tower bills.

China Unicom Jiangsu Branch strengthened electricity bill management, especially focused on analyzing and finding out the issues for base station and machine rooms with abnormal difference between actual electricity consumption and theoretical electricity volume. Through over one year of efforts, the phenomenon of "evaporation, emission, dripping or leakage" associated with electricity at base stations is significantly reduced.

Promote streamlined network

- The Company promoted frequency band and capacity reduction of 2G/3G networks, and pushed forward SDR base station to replace old 2G equipment by evaluating energy consumption, continuously urge withdrawal from fixed network of old equipment with high failure rate and high energy consumption; during the year, a total of 18,556 base stations are closed, 28,694 SDR base stations are newly added, saving energy conservation cost of over RMB200 million.
- The integration of station and machine room location for optical fibre reconstruction is carried out; a total of 1,311 stations and 5,705 machine rooms are integrated, which in turn, vacate an area of 375,000m^2 for machine room, and save electricity of RMB196 million per year.

China Unicom Yunnan Branch greatly downsized network. In 2016, 531 base stations withdrew from the network and reduced energy consumption of 279,000W; 77 utilised old 2G base stations withdrew from the network and reduced repeated investment costs in network; special project of ES energy-saving aiming at 4G network was carried out, with an average daily electricity conservation of 7,102KWH; business platform downsizing plan was carried out, and removed 118 sets of equipment, released 17 cabinets of machine room space, and reduced 13.79kW energy consumption. Since 2013, China Unicom Yunnan Branch has been rewarded corporate income tax exemption of a total of RMB1.23 million by energy conservation and emission reduction projects for three consecutive years.

Cyclic utilisation of materials

In 2016, the Company ceaselessly improved material vitalisation and reutilisation rate. During the year, the value of materials it reutilised reached RMB300 million, its amount of recycling upon scrappage and disposal reached RMB2.711 billion, and the value acquired by material vitalisation and reutilisation reached RMB810 million.

300 RMB MILLION — VALUE OF MATERIALS REUTILISED

AMOUNT OF RECYCLING UPON SCRAPPAGE AND DISPOSAL — **2.711** RMB BILLION

VALUE ACQUIRED BY MATERIAL VITALISATION AND REUTILISATION — **810** RMB MILLION

Popularise paperless handling

Online paperless handling system was launched nationwide, realising automatic ID card information reading and preservation by taking photos while users can put down electronic signature on handwriting panel to create e-handling form. The paperless handling saves large amount of paper, consumables, printing, and inventory management costs, shortens handling time and users' time for queuing, and realises automatic generation of accounts, electronic audit and electronic retrieval, enhances work efficiency and reduces errors.