Green and Low-Carbon Operations

7 AFFORDABLE AND CLEAN ENERGY

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

15 LIFE ON LAND

Practicing Green and Low-Carbon Operations

Supporting Social Initiatives in Energy Saving and Environmental Protection

Climate change is a challenge facing all humanity. As a responsible country with a large economy, China announced the "3060" carbon peaking and carbon neutrality goals in September 2020, pledging to maximize efforts in combating climate change and promoting comprehensive green transformation of economic and social development. For the ICT sector, the carbon peaking and carbon neutrality goals mean on the one hand, stricter requirements for energy conservation and emission reduction and, on the other hand, important opportunities to empower the low-carbon transformation across sectors and industries through information technologies. China Mobile is committed to making our planet a beautiful home where people and the nature live in harmony. Through driving the green transformation of ourselves and the wider society, we aligned ourselves with and made contributions towards the national goals and strategies of carbon peaking and carbon neutrality.

Practicing Green and Low-Carbon Operations

In line with policies such as the *Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy* and the *Action Plan for Carbon Dioxide Peaking Before 2030*, China Mobile explored its paths to carbon neutrality at operational and business levels, infused an emphasis on environmental protection throughout the organization, and advanced green and low-carbon development at full speed.

Responding to Climate Change

In 2021, China Mobile upgraded its "Green Action Plan" to the "C^2 Three Energy — Carbon Peaking and Carbon Neutrality Action Plan" and created the new "three-energy and six-green" green development model to contribute to the carbon peaking and carbon neutrality goals.

C^2 Three Energy
China Mobile Carbon Peaking and Carbon Neutrality Action Plan
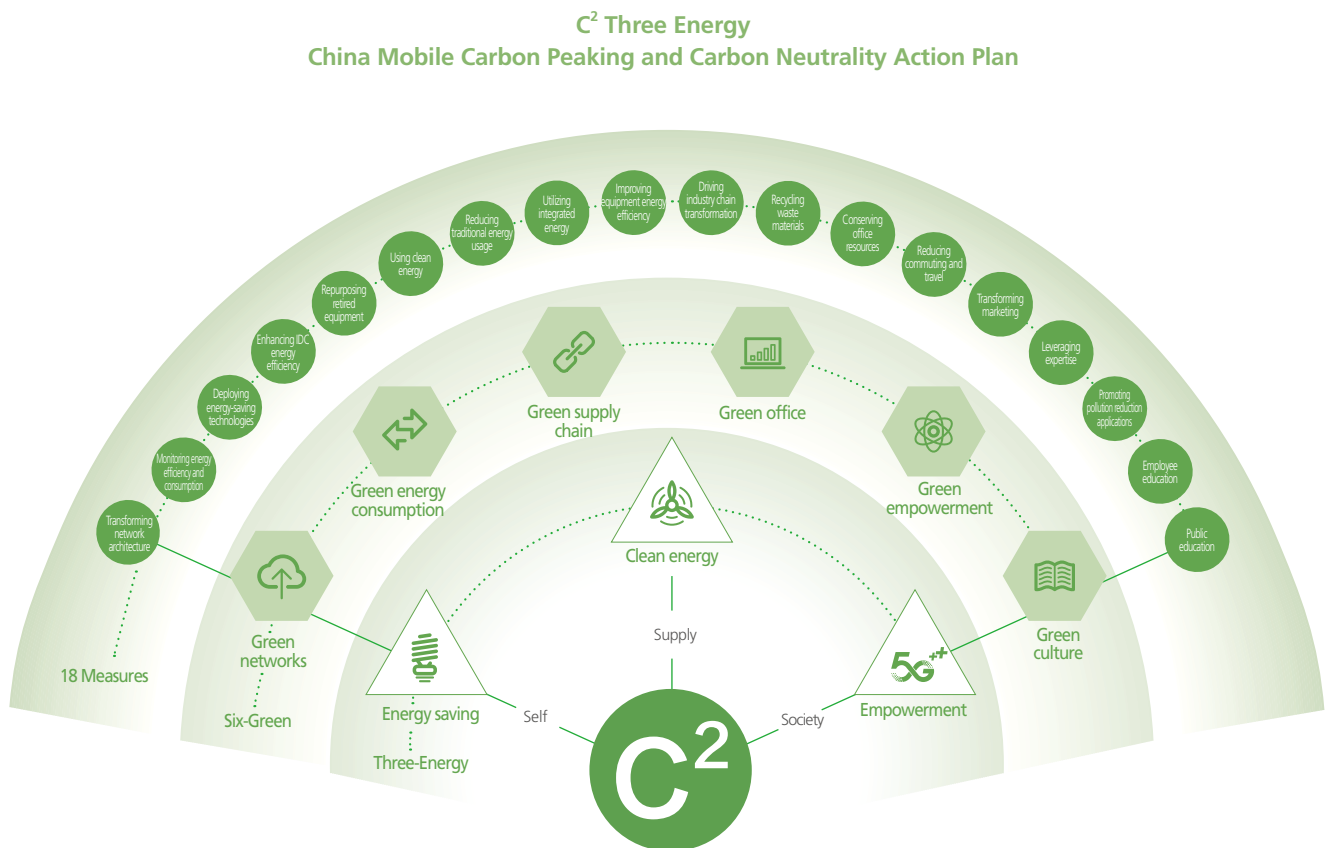
Optimizing Governance Structure

Our chairman is responsible for our environmental policies and performance, and leads our efforts in energy conservation, emission reduction and climate change. Our decision-making level reviews and approves climate-related strategies and key action plans and budgets for energy conservation and emission reduction. We have put in place a three-level governance structure comprising decision-making, management and execution, and standardized our organizational structure and division of labor, roles and responsibilities in accordance with the *China Mobile Energy Conservation Management Measures*.

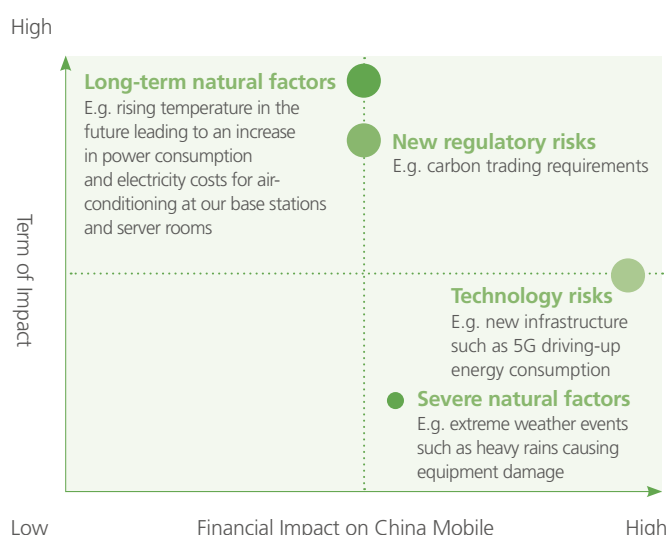## China Mobile Climate Change Governance Structure

Level of governance	Responsible organization(s)	Composition and primary responsibilities
Decision-Making Level	Leading Group for Pollution Prevention and Control and Energy Conservation	• Led by our chairman, it assumes the primary responsibility for environmental protection and energy conservation: it is subject to term assessment on energy conservation and environmental protection by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC), supervisor of the Parent Company; coordinates the Company's resources, investigates researches and formulates overall strategies for environmental protection, energy conservation and climate action.
Management Level	Working Group for Pollution Prevention and Control and Energy Conservation	• Led by our Vice President, it executes strategic decisions made at the decision-making level and approves climate-related budgets; group members are primarily the heads of headquarters departments and relevant specialized subsidiaries.
Execution Level	Planning and Construction Department	• It is fully responsible for the planning and implementation of climate-related work. It reviews the achievement of climate-related goals and indicators on a monthly basis, draws up implementation plans and budgets for energy conservation, emission reduction and climate action, and reports regularly to the management level, the decision-making level and the Board of Directors. • Climate-related work has been incorporated as part of the performance appraisal system of the Planning and Construction Department.
	Departments responsible for energy conservation and emission reduction and related business departments at the headquarters / subordinate units	• These departments manage and advance climate-related work from the six aspects of network, energy, supply chain, office, empowerment and culture. They hold regular meetings to assess the alignment of key activities and projects with the Company's strategic objectives with respect to climate and energy, draw lessons from the practice, and make recommendations to the management level. • Climate-related work has been incorporated into the performance appraisal system for general managers and energy conservation and emission reduction at each of our 31 subsidiaries in provinces, autonomous regions and directly-administered municipalities, 22 specialized subsidiaries, directly affiliated units, as well as ASPire Holdings. Indicators assessed include the absolute amount and year-on-year change of total energy consumption and energy consumption intensity, among others.

Undertaking Risk Assessment

We have streamlined climate-related risk management and fully integrated it throughout the risk management system. The Company's vice general manager, who is in charge of energy conservation and emission reduction, works together with members of the energy conservation and emission reduction working groups of the headquarters and provincial subsidiaries to identify, analyze, and address the risks and opportunities presented by climate change.

- Identification: Main departments at the headquarters collect information on, summarize, assess and classify climate-related information based on a holistic consideration of relevant laws and regulations, policies and procedures, and physical climate parameters, among other factors, and report to the department heads for deliberation on a regular basis.
- Assessment: Materiality of climate-related risks and opportunities is assessed from the two dimensions of "Financial Impact on China Mobile" and "Term of Impact" by benchmarking against international standards, reviewing the Company's practices and communicating with stakeholders.

China Mobile Climate-Related Risk Materiality Matrix

High

Long-term natural factors
E.g. rising temperature in the future leading to an increase in power consumption and electricity costs for air-conditioning at our base stations and server rooms

New regulatory risks
E.g. carbon trading requirements

Technology risks
E.g. new infrastructure such as 5G driving-up energy consumption

Severe natural factors
E.g. extreme weather events such as heavy rains causing equipment damage

Term of Impact

Low   Financial Impact on China Mobile   High

Formulating Coping Strategies

Based on the assessment of identified risks and opportunities relating to climate change, we analyzed the impact of each risk on the Company's finances, operations and development over different stages of time, based on which we formulated our mitigation plans.

Climate-Related Risks Facing China Mobile and Coping Measures
(* ●Short-term: 0-1 years; ●Medium-term: 1-3 years; ●Long-term: 3-5 years)

Nature of risk	Type of risk	Risk description	Primary financial impact	Primary impact on business and strategies	Term	Degree of impact	Coping measures
Transition risks	New regulatory risks	China Mobile headquarters, Beijing subsidiary, and China Mobile Tietong headquarters and its Beijing branch have been included in Beijing's Pilot Carbon Emission Trading System. The Company may face additional compliance costs if its certified emissions exceed its carbon credit.	Increased indirect (operating) costs ↑	Adaptation and mitigation actions	●	Moderate	• Conduct quarterly accounting of carbon emissions, assess compliance costs and the legal risks of failure to comply on time, and issue carbon emissions notifications. • Review the Company's carbon emission trading management system against regulatory requirements annually to assess alignment.
	Technological risks	The evolution of 5G has continued to drive an increase in the density of communications infrastructure. Failure to develop and use more efficient and energy-saving technologies will result in rapid growth in the usage and costs of energy.	Increased indirect (operating) costs ↑	Investment in R&D	●	Moderate to high	• Assess the financial impact of energy costs annually, select appropriate low-carbon technologies and devise schedules for phasing out energy-intensive facilities. • Explore possibilities of working with value chain partners to drive the application of low-carbon technologies.
Physical risks	Severe natural factors	Increasing severity and frequency of extreme weather events can cause varying degrees of damage to the Company's infrastructure and fixed assets and affect network quality, thereby increasing the Company's capital expenditures.	Increased capital expenditures ↑	Products and services, and business operations	●	High	• Assess the potential impact of natural disasters on fixed assets, production and operations, and the environment based on their frequency and scale; plan disaster relief funds based on the assessment and deploy contingency plans in advance.
	Long-term natural factors	Keeping the temperature of server rooms within a stable range is an important prerequisite for the stable operations of base stations, server rooms and data centers. As global warming continues, rising temperature in the future will lead to increases in power consumption and electricity costs for air-conditioning at our base stations and server rooms.	Increased indirect (operating) costs ↑	Business operations	●	Moderate	• Regularly assess and monitor the usage of air conditioners (ACs) in server rooms, and assess the financial impact of higher electricity costs resulting from increased AC usage; reserve funds for AC renovation at the base stations/server rooms when formulating investment budget at the beginning of each year to optimize the utilization and reduce the power consumption of ACs.

To understand the impact of major climate-related risks on the Company's business strategies and decisions over different stages of time, we also explored the application and analysis with industrial energy efficiency scenarios and models.

1. Scenarios selected

Scenario 1: By 2025, the overall energy consumption per unit of telecom business shall decrease by 15% compared with 2020 (as required by MIIT).

Scenario 2: By 2025, the overall energy consumption per unit of telecom business shall decrease by 20% compared with 2020 (China Mobile's target).

2. Scenario hypothesis

The scale of our network and energy requirements in 2025 were projected assuming we will continue to develop our technologies and scale of network at the current rate.

3. Result of analysis

Based on an analysis of Scenario 2, it was estimated that the Company needed to reduce energy consumption intensity by 6% in 2021.

4. Application of business strategies and decisions

The Company devised specific measures based on targets assigned to each year, including driving energy savings in 5G networks and data centers, increasing the proportion of clean energy, incorporating energy conservation indicators into procurement evaluation criteria, and advocating green office, among others. The implementation of these measures puts China Mobile on track to meet energy saving targets and industry regulatory requirements.

Specifying Management Goals

Our primary indicators for measuring and managing climate-related risks and opportunities include Scope 1 GHG emissions, Scope 2 GHG emissions, Scope 3 (e.g., employee commuting and travel) GHG emissions, GHG emission intensity, total energy consumption, energy consumption intensity and corresponding rates of change, among others.

Based on likely climate-related impact on our future operations, we pledge to reduce Scope 1 and Scope 2 GHG emission intensity by 20% by 2025 from the 2020 baseline.

Driving Internal Energy Saving and Carbon Reduction

While advancing digital-intelligent transformation and high-quality development, we remained firmly committed to our environmental responsibility, strictly controlling the increase in and continuously reducing the intensity of our energy consumption and carbon emissions.

Building Green Networks

We continued to innovate in technologies and management tools to drive energy savings in our 5G networks and data centers.

5G networks	Data centers
• **Equipment-level energy saving:** We led the industry in publishing a whitepaper on 5G energy saving in collaboration through a collaborative effort with the industry chain, laying out the roadmap for developing energy saving technologies in the next three years; we increased the weight on energy consumption-related criteria when selecting equipment and encouraged the industry chain to adopt more advanced technologies and more efficient architectures to continuously reduce the overall power consumption of equipment.	• With a focus on whole-process management that encompassed planning and layout, engineering design, project construction, and operations and maintenance, we built new large and mega data centers with design average annual power usage effectiveness (PUE) under 1.3, or in cold regions, under 1.25.
• **Site-level energy saving:** Besides subframe shutdown and channel shutdown and other features that were already in place since the 4G era, we also developed other energy-saving technologies together with our wireless equipment suppliers, such as sub-frame silence, channel silence, shallow hibernation, and deep hibernation. This has allowed us to dynamically allocate services and resources in terms of time, space and frequencies.	• We built green, energy-saving infrastructure for data centers using technologies like high-pressure variable-speed water-cooled chillers, in-row ACs, heat pipe backplates, high-voltage direct current (HVDC), direct utility power supply and modular uninterruptible power supply (UPS).
• **Network-level energy saving:** We increased the use of centralized-radio access network (C-RAN) architecture and built a minimalist base station construction model, optimizing our network equipment, removing air-conditioning and other supporting facilities, thereby reducing site energy consumption; took advantage of in-house technologies to conduct research on smart energy-saving; built a multi-mode and multi-frequency energy saving platform supported by AI algorithms to dynamically analyze and formulate different optimal energy saving strategies for different base stations on a refined "one-site, one-strategy" management model.	• We made full use of natural cold sources and raised the temperature of AC return air by precisely controlling its temperature and volume; maximized the usage of natural cold sources while improving the efficiency of refrigeration consoles using high-efficiency heat exchange equipment, among other measures.
	• We equipped 12 large data centers with waste heat recovery systems, using the heat produced during data center operations to offer heating to production and office areas or for boiling water, thereby optimizing the overall utilization of energy.
	• We carried out real-time monitoring, analysis, modeling, optimization and adjustments in selected data centers using big data, AI and other technologies to ensure smart operations under different weather conditions and loads.

China officially launched the green power exchange pilot scheme in September 2021. Our Beijing subsidiary and Shandong subsidiary actively participated, purchasing green power that came with the green power consumption certificate at the Beijing Power Exchange Center. In addition, 15 subsidiaries purchased an aggregate of 3.47 billion kWh of renewable energy, such as solar, wind and hydro energy, at local power exchange centers.

At the same time, we have been gradually replacing coal, gasoline, diesel and other traditional energy sources with clean energy. For instance, under the "Zero Carbon 100" project, our Fujian subsidiary and China Mobile Design Institute together built energy cabinets that combined solar energy and base stations, whereby solar energy absorbed by solar panels installed at the base stations was converted into electricity and transmitted to the cabinets to power facilities in conjunction with municipal power.

○ Fujian subsidiary piloted solar stacking with "solar energy + base station integrated energy cabinets"

Proportion of new 5G base stations that used C-RAN architecture was close to	Compared with 2020, the energy consumption of a new 5G base station decreased by	Compared with 2020, the PUE for the overall operations of all data center campuses and core machine buildings in our network decreased by
80 %	**10** %	**3.1** %

Saving energy and reducing carbon emissions with our new green and intelligent minimalist networks

Base stations, server rooms and data centers require a significant amount of of electricity. For this reason, our Shandong subsidiary introduced green and intelligent minimalist networks, through which we expected to save up to 183 million kWh of electricity per year, equivalent to a reduction of 106,000 tonnes in CO_2 emissions.

- **Low-carbon base stations:** We continued to explore and further refine power-saving management, maximizing energy savings with our 4G base stations and optimizing energy utilization with our 5G base stations on a "one-site, one-strategy" basis; gradually scaled up the proportion of clean energy by using photovoltaics; built minimalist base stations using the C-RAN architecture; realized accurate service prediction and hour-level cell shutdown/power-off/wake-up, among other features, with our "Power Saving+" smart power saving platform.

- **Low-carbon server rooms:** We fully tapped the potential of existing server rooms through minimalist renovations, increased energy efficiency in newly built server rooms by up to 30% and reduced energy consumption in expanded server rooms by up to 20%.

- **Low-carbon data centers:** We reduced waste of energy and improved efficiency of equipment using technological means such as our cloud computing-based integrated energy-saving solutions; made green renovations to data centers with focuses on improving the cooling efficiency, reducing waste of energy, and optimizing the cooling environment.

Our provincial subsidiaries also explored various initiatives aimed at energy-efficient and low-carbon development. For example, our Xizang subsidiary prioritized the use of new energy, such as solar energy and wind energy, for power supply. It operated 4,075 base stations powered by solar energy, accounting for 34.97% of all of its base stations. Our Zhejiang subsidiary piloted single-phase immersion liquid cooling technology, which brought down the PUE of the server rooms to below 1.1. The Zhongwei Data Center of our Ningxia subsidiary optimized the performance of the data center using AI technologies such as the DCIM (Data Center Infrastructure Management) system and neural network algorithm learning.

Endorsing Green Procurement

We also extended our green philosophy throughout the life cycle of our products and business. By advancing green packaging and logistics and paperless contracting, among other efforts, we continued to reduce the environmental footprint of our supply chain.

Institutionalizing "green procurement" criteria

Promoting green packaging and logistics

Promoting paperless contracting and "no-meeting" procurement
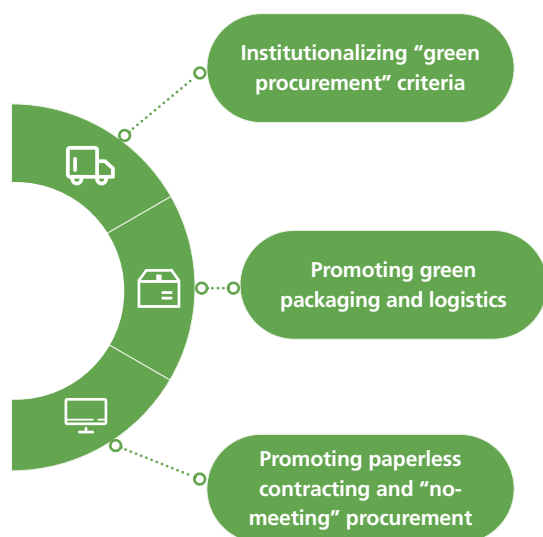
We incorporated green and energy conservation requirements into product procurement evaluation criteria, thereby encouraging centralized procurement suppliers to improve the energy efficiency of equipment; we added ISO 9001 (Quality Management System), ISO 14001 (Environmental Management System), and other requirements related to the environment, society and business ethics to our supplier review and evaluation criteria.

In terms of packaging, we reduced the use of packaging materials, recycled packaging waste, and used recycled paper and other environment-friendly packaging materials. In 2021, over 80% of our newly procured main equipment used green packaging, saving 262,000 cubic meters of timber resources. On the logistics front, we improved the efficiency of product entry and exit, reduced the use of wooden pallets through an upgrade to mixed pallets, and shortened the lighting time by modifying the lights, thereby promoting green logistics.

We built an online system digitalizing the whole process from announcement and tendering to bidding, bid review and contract-signing to reduce the use of paper; we realized online procurement based on the online system, video conferencing and remote monitoring, thereby reducing carbon emissions generated by traveling.

Supporting Social Initiatives in Energy Saving and Environmental Protection

China Mobile actively leveraged information technology to drive emission reduction in the whole society and explored digital solutions for environmental management and green transformation of industries. The Company fostered meaningful public engagement in environmental protection and the transition to a low-carbon society through awareness programs, volunteer services and other actions.

Delivering Innovative Green Solutions

Leveraging its leading capabilities in digital intelligent innovation and experience in building information infrastructure, China Mobile took an active role to create "smart environmental protection" solutions powered by 5G, IoT, cloud computing, AI and other technologies. The Company also harnessed the carbon reduction effect of digital-intelligent technologies to promote higher energy and production efficiencies across sectors and industries, and facilitated resource conservation, improved efficiency and reduced emissions in the whole society, thereby providing support to the transition to a green economy and society.

In 2021, China Mobile helped reduce

210 million tonnes
of CO_2 emissions in society using information technology

115 kg
of CO_2 emissions in society per TB of data traffic

Protecting the Environment in Intelligent Ways

We actively researched in and developed various digital solutions to enable more scientific and effective environmental management, thereby promoting continuous improvements in the environment.

Environmental monitoring and pollution prevention and control

In the upper watershed of Baiyangdian, Baoding, Hebei Province and the Ashi River watershed of Harbin, Heilongjiang Province, we set up a smart environmental monitoring system using IoT, big data and other advanced technologies. By enabling environmental monitoring and early warning, data analysis, and information sharing, the system informed scientific decision-making and helped local environmental departments improved the efficiency in pollution prevention, control and monitoring.

Biodiversity conservation

In Jiangsu Province, we built the Yangtze River Fishing Ban Digital Platform with big data, 5G+AI and other technologies. With smart monitoring equipment like panoramic AR starlight-level cameras and 24/7 smart patrol robots, the platform enabled 360-degree monitoring, early warning and information sharing, effectively protecting Yangtze River areas against illegal fishing activities.

Employing 5G+AI, IoT, cloud computing and big data, we observed, studied, collected data on and analyzed the animals and plants in the Gaoligong Mountains Reserve of Yunnan Province. This provided a comprehensive solution of "biological resources research, protection and development" based on timely warning of poaching risks and innovative cultural tourism services such as "slow live streaming" of rare animals and plants.

We built the first 5G smart migratory bird monitoring platform in Fujian Province with three core features, namely cloud data, comprehensive intelligence, and publicity and display. It provided solid data support for the construction of migratory bird habitats and the protection of animals under special national protection. We also launched the "China Bird Net" platform to educate people about birds, along with a WeChat mini program for displaying bird-related knowledge and status.

Wild animals captured by infrared cameras deployed in the Gaoligong Mountains by our Yunnan subsidiary


Fujian subsidiary built the province's first 5G smart migratory bird monitoring platform

Contributing to the green miracle of "A Sea of Forests in Saihanba"

Located in the northernmost part of Hebei Province, Saihanba was once a highland desert with plumes of yellow sand and no trees where birds could roost. Several decades on since the launch of the Mechanical Forest Farm project in 1962, Saihanba today boasts the world's largest artificial forests in terms of area. Our Hebei subsidiary has stood together with Saihanba through this process, contributing to the green miracle of "turning desert into oasis" in Saihanba using digital-intelligent tools.

- Optimized the power distribution model to reduce the risk of forest fires, and developed a fire prevention terminal and used fire safety SMS in forest area management to enhance visitors' fire safety awareness.

- Launched the integrated "Smart Tourism" application, with features like electronic tickets and forest monitoring; delivered on the construction of 5G base stations in the ice sports training centers and ski sports training bases for the Beijing 2022 Winter Olympics overcoming great construction challenges, and provided network and communications support.

- Provided volunteer services for forestry staff and helped plant more than 4,500 trees.
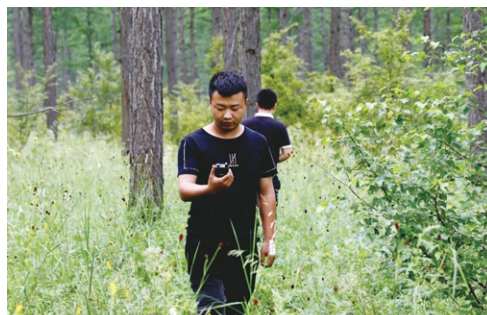
Hebei subsidiary equipped rangers with work phones that came with fire safety Apps

Empowering Green Transformation of Industries

We work with a broad range of stakeholders to promote the green transformation of industries. The "Carbon Peaking and Carbon Neutrality" and Green 5G Technology Summit, the release of the Green 5G Initiative and the establishment of the "Green 5G Innovation Joint Laboratory" were some of our collaborative explorations in 2021 in the potential of 5G and other emerging technologies for empowering green growth. We have also set up 5G "smart factories" in Guangxi, Yunnan, Tianjin, Ningxia and other places, to help industries like steel, non-ferrous metal smelting and PV new energy industries optimize their production, reduce energy consumption, and achieve intelligent low-carbon transformation.

Building 5G smart green factories

Our Guangxi subsidiary closely integrated 5G with the operations of traditional steel enterprises to help them reduce energy use while maintaining robust growth. "5G+AI" technologies in the upgraded smart green factories led to energy savings by optimizing the coal distribution and refining the management of coal use. At the same time, through analysis of environmental data, cloud computing allowed potential environmental risks and therefore more informed decision-making; by enabling intelligent assessment of the state of solid waste disposal, "5G+machine vision" ensured the standardized management and sound utilization of resources.

In terms of safety, the smart factories could execute emergency stop, interlocking, etc. of equipment using 5G and allow experts to provide audio guidance as on-site operations are remotely transmitted and shown to experts via AR glasses in real-time, thereby effectively minimizing safety hazards. The typical applications in the project have been promoted and rolled out in other steel enterprises , and have also been expanded to other industries such as the non-ferrous metal industry and the food industry, thereby empowering green manufacturing.

A worker operated a loader with a remote controller in the smart green factory built by Guangxi subsidiary

Raising Environmental Awareness

Through regular environmental events and campaigns held every year, such as the "Energy Conservation Awareness Week", China Mobile raises the public's awareness of energy conservation and fosters a green and eco-friendly culture and lifestyle. In 2021, low-carbon actions continued at the headquarters and subsidiaries, including campaigns in our offices like "Coffee Grounds Recycling" and waste paper and toner recycling. We also launched a personal "Carbon Accounting" gadget and organized tree planting, green photography and other events.

We published over 1,400 articles on energy conservation on social media to raise public awareness, and continued to host the Green Box environmental campaign to recycle waste electronic products from our customers and consumers. We conducted end-of-life product trade-in in Guangdong and other provinces to cultivate increased environmental awareness among users. China Mobile MIGU Coffee used paper straws and biodegradable cutlery in the physical stores across the country, developed reusable packaging with different forms and materials, and promoted carbon reduction and sustainable consumption by providing plant-based milk products and natural sugar substitute packets. In addition, we formulated clear rules on the registration of the environmental impact of base station electromagnetic radiation, and conducted relevant awareness campaigns through the media, community activities, publicity leaflets, educational articles and other means. By the end of 2021, we organized 711 awareness campaigns and activities on electromagnetic radiation in 489 districts and counties across 18 provinces.

○ Anhui subsidiary launched the "Green Box with You" campaign to recycle waste electronic products

○ Shandong subsidiary carried out the "Energy Saving and Emission Reduction – Go Low-Carbon Together" action to educate the public about low carbon environmental protection

○ Shanghai subsidiary mobilized the public to take part in ecological civilization conservation by organizing an interactive water forest trip

○ Hong Kong subsidiary organized the fourth "China Mobile Hong Kong Hiking Festival" to encourage Hong Kong citizens to "Hike Together for Health"

Spreading the beauty of biodiversity through an immersive experience

In the lead up to the 15th Conference of the Parties (COP15) to the UN Convention on Biological Diversity (CBD) to be held in Kunming, Yunnan Province, MIGU produced *Life in Yunnan*, China's first 8K ultra-high-definition panoramic-sound VR documentary. It used novel 5G-powered filming technologies including underwater VR, monocular 8K macro-VR, FlyCat field panorama, etc. The documentary vividly reproduced the brilliant beauty of Yunnan's plants and delivered an immersive experience for viewers. MIGU also worked with partners to collect short videos on biodiversity and launched an online exhibition of wildlife illustrations to raise public awareness and engagement in biodiversity conservation.