UNLEASHING THE INFINITE POWER OF DIGITALIZATION

CHINA TELECOM CSR REPORT 2022

CHINA TELECOMMUNICATIONS CORPORATION LIMITED

REPORT SPECIFICATION

Time Frame

This is the 2022 CSR Report of China Telecommunications Corporation Limited. It covers the whole year of 2022, from January 1 to December 31, with some sections beyond this time frame.

Scope of Organization

Organizations covered in this report include China Telecommunications Corporation Limited, its branches and subsidiaries held by it. In the report, China Telecommunications Corporation Limited is also referred to as "China Telecom (CT)", the "Group Company", "the Company", "we", etc.

Release Cycle

This is an annual report that is released every year.

Content Description

This report responds to the major topics concerned by China Telecom's stakeholders to the greatest extent, including regular topics and annual highlights. Data and stories are mainly collected internally with some references to public media news. Amounts of money herein are all in RMB unless otherwise stated.

Reference Standards

This report was compiled by taking references from the *Guidelines for Central SOEs to Fulfill Corporate Social Responsibilities* and *the Guidelines for SOEs to Better Fulfill Corporate Social Responsibilities* issued by the State Owned Assets Supervision and Administration Commission of the State Council (SASAC), the *Guidelines for Preparation of CSR Reports in China* (GB/T 36001-2015) issued by the State Administration for Market Regulation of China and the Standardization Administration of China, the CSR Management Scheme for ICT Industry in China (2016 version) issued by China Association of Communication Enterprises, the *Guidelines for Preparation of CSR Reports in China* (CASS-CSR4.0) issued by Chinese Academy of Social Sciences, as well as the *Sustainability Reporting Guidelines* (G4) by the Global Reporting Initiative (GRI).

Guarantee of Reliability

Information disclosed in this report is true and aims to reflect China Telecom's market, social and environment performance in an objective and comprehensive manner.

Access to Report and Extended Reading

Our CSR report is available in Chinese and English, in print and online. The online version can be downloaded from our website (http://www.chinatelecom.com.cn).

China Telecom has been publishing CSR reports for 13 years consecutively. For more information on the Company's fulfillment of its CSRs, please visit our website for inquiry or download previous CSR reports.

Contact

Address: Corporate Strategy Department, China Telecommunications Corporation Limited, No. 31 Financial Street, Xicheng District, Beijing

Zip Code: 100033   Fax: 86-10-58501484   E-mail: CSR@chinatelecom.cn

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DIALOGUE WITH THE MANAGEMENT

Chairman & Party Secretary, China Telecommunications Corporation Limited

KE Ruiwen

The year 2022 was of paramount importance in the history of both the CPC and China. The 20th CPC National Congress has drawn up an inspiring blueprint for building China into a great modern socialist country in all respects and advancing the rejuvenation of the Chinese nation on all fronts through a Chinese path to modernization. Remaining firm in implementing the guiding principles in the instructions from General Secretary Xi Jinping, China Telecom was committed to its mission and responsibility of boosting China's strength in cyberspace and digital development, and safeguarding network and information security. It implemented the strategy of cloudification and digital transformation in a comprehensive manner, with a view to build itself into a service-oriented, technology-based and security-oriented enterprise. It accelerated the development of digital information infrastructure to foster industrial digitalization development, and continued to make important contributions to enabling unblocked information "artery" for economic and social development.

Continue to promote cloud-network convergence to solidify the new foundation for Digital China. China Telecom accelerated the development of digital information infrastructure with cloud-network convergence at its core, enhanced technology innovation, and intensified efforts to make major breakthroughs in core technologies in key fields. As a result, the convergence of clouds and networks was steadily advanced into a new stage: cloud-network convergence 3.0. With coupled cloud-network technologies, our network layout shifted to flat deployment around data centers, data traffic was balanced in both vertical and horizontal directions, computing centers deployed to the edge at multiple levels and 5G core network was decoupled at three layers, the first of its kind in the world. eSurfing Cloud 4.0 was officially commercialized and became the world's largest operator cloud and the largest hybrid cloud in China, primarily taking shape as a national cloud framework. We fully implemented the national strategy of carbon peaking and neutrality, announced the "1248" Action Plan, and built the world's largest green, low-carbon and all-fiber network.

Facilitate the integration of applications at a faster pace to meet new demands for a digital life. China Telecom has always adhered to the people-centered development philosophy in accelerating the integration of digital technologies and applications. Driven by integrated clouds, AI, security and platform, it set out to create a number of new growth engines to boost the upgrading of industrial digital transformation at a faster pace. Drawing upon our abundant data resources, we vigorously promoted the cloud migration and smart digitalization of various industries. Committed to popularizing digital services, we launched smart home, smart community, digital village and other products for a digital life, satis-

fying the digital needs of thousands of households. We built information highways in rural areas so as to contribute to bridging the rural-urban digital divide and rural revitalization.

Work to strengthen capability integration to build new digital security shields. Ensuring both development and security, China Telecom worked to strengthen the integration of security capabilities and digital applications, so as to enhance security protection across the whole industry chain in multiple fields. We independently developed cloud-network security management platform and other core technologies in key fields, and actively built a security capability pool covering all clouds, networks, edges and terminals across 31 provinces. We continued to expand security products and services, promoted Tianyi Security Brain, quantum-encrypted phone call, anti-fraud network and other products and services, and built the "Cloud Dam" platform - the only one in China with full network coverage and global reach. We continued to deepen the anti-fraud campaigns and strengthened personal information protection, brand-building ourselves as a secure and reliable enterprise.

Deepen industrial integration in all aspects to create a new ecosystem for win-win cooperation. Adhering to the philosophy of openness and sharing, China Telecom focused on key areas such as cloud, AI, payment, security and video streaming to deepen the integration of industry and ecosystem, with a view to pool more strength from partners and promote broader and deeper ecosystem cooperation in greater scope. We actively engaged in global Internet governance, led the establishment of the World Broadband Association (WBBA), and continued to contribute China's wisdom in international standardization organizations.

The year 2023 is the first year for fully implementing the guiding principles from the Party's 20th National Congress. Following the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, China Telecom will be firmly committed to the mission and responsibility of boosting China's strength in cyberspace and digital development, and safeguarding network and information security; deepening the implementation of the strategy of cloudification and digital transformation in a comprehensive manner; and building itself into a world-class enterprise at a faster pace. While taking on new responsibilities and achieving new breakthroughs in our strive to build Digital China, we will make new and greater contributions to building China into a great modern socialist country in all respects.

President & Deputy Party Secretary, China Telecommunications Corporation Limited

SHAO Guanglu

In 2022, a new round of scientific and technological revolution and industrial transformation was deepened, and the wave of digitalization swept across the world. The 20th CPC National Congress drew up an inspiring blueprint for building China into a great modern socialist country in all respects and advancing the rejuvenation of the Chinese nation on all fronts through a Chinese path to modernization. Against such backdrop, China Telecom stood up to its responsibilities as a central SOE. It fully implemented the strategy of cloudification and digital transformation, strengthened reform, opening up and innovation, promoted high-quality business development, and empowered the digital transformation of the economy and the society, injecting new momentum into sustainable development.

Build a digital development engine. China Telecom continued to solidify the foundation of digitalization, and accelerated the development of intelligent and comprehensive digital information infrastructure with cloud-network convergence at its core. It implemented the East-to-West computing resource transfer project as an approach to continuously optimizing the layout of ubiquitous computing infrastructure, thus expanding the total computing capacity to 3.8EFLOPS, an increase of 81% year on year. It built the world's first, largest and fastest 5G SA network with co-construction and sharing mode, launched 1 million 5G sharing base stations, and enabled Gigabit fiber coverage in more than 290 million households. We empowered the digital transformation of the economy and the society through the launch of 5G+smart manufacturing, smart agriculture, smart healthcare and other industrial applications in key areas, as well as applications for various scenarios such as smart home, smart community and digital village. We facilitated the digital government program and built social governance platforms for better regional governance capacity. We improved the mechanism of network and information security, optimized the security capability system that integrates clouds, networks, edges and terminals, and launched security products and services that met customers' needs in the digital environment.

Stimulate the vitality of digital innovation. China Telecom pursued self-reliance and strength in science and technology, enhanced scientific and technological innovation system, laid a solid foundation with well-trained scientific and technological personnel, and strengthened efforts in making breakthroughs in core digital technologies in key fields. Xirang, our eSurfing Cloud 4.0 computing power distribution network platform, was selected as "Top Ten Super Projects of Central SOEs in 2022". We led the establishment of the World Broadband Association (WBBA) as an international cooperation and exchange platform for cloud-network technology innovation. We actively addressed climate change through the implementation of the national strategy of carbon peaking and neutrality, as well as the "1248" Action Plan. We promoted low-carbon operation with the country's first "zero-carbon data center" built in Qinghai, which achieved PUE below 1.2 and reduced greenhouse gas emissions by more than 13 million tons through co-construction and sharing and various energy-saving

measures. We empowered the green development of the economy and society by creating low-carbon digital platform to provide customers with new solutions to energy saving, carbon reduction, ecological protection, etc.

Consolidate the foundation of digital transformation. China Telecom deepened comprehensive reform in systems and mechanisms, and, focusing on meeting the digital needs of customers, continued to advance changes in the organizational mechanisms for government & enterprise business, technology innovation, and specialized companies to adapt to digital transformation. We constantly improved market-oriented operation mechanism to further release the vitality of business development. We made continued efforts to improve corporate governance, with additional motivation for our subsidiaries to follow suit, and enhance the vitality of business development. We promoted supply chain performance and strengthened supplier management to secure the supply chain. We enhanced compliance and risk management and production safety management, and continued financial and audit oversight to prevent and defuse major risks by multiple means. We cared for employees, protected their rights and interests, paid attention to their daily needs, and provided help in their professional development, constantly increasing the sense of gain, happiness and security among the majority of our employees.

Share digital intelligence achievements. To support rural revitalization, China Telecom made progressive efforts in targeted support and industry assistance, in bridging the digital divide and enabling universal services, and provided practical, purpose-made elderly care products and services, so that different groups of people could all be benefited by the dividends of digital development. We engaged enthusiastically in public-interest activities to help the poor, the disabled and the disadvantaged, with 96 "CT Love Stations" winning the title of "Most Beautiful Labor Union Service Station for Outdoor Workers" by the All-China Federation of Trade Unions. We strengthened smart service capabilities, and promoted the establishment of customer-centric mechanisms and process reforms, maintaining high overall satisfaction throughout the year. We participated in the development of digital infrastructure in Belt and Road countries to facilitate global network connectivity and support the development of local communities.

Forging ahead in a new journey for a new era, China Telecom will stay firm in fulfilling its mission and responsibility of boosting China's strength in cyberspace and digital development, and safeguarding network and information security. We will seize new opportunities in digital development by comprehensive implementation of the strategy of cloudification and digital transformation, make accelerated actions in building the company into a world-class enterprise, and contribute even greater share to sustainable economic and social development.

TOP MANAGEMENT

KE Ruiwen
Chairman, Secretary of Party Leadership Group

SHAO Guanglu
Director, President, Deputy Secretary of Party Leadership Group

LIU Guiqing
Director, Deputy Secretary of Party Leadership Group

FU Yongzhong
Head of Discipline Inspection and Supervision Team, Member of Party Leadership Group

TANG Ke
Vice President, Member of Party Leadership Group

XIA Bing
Vice President, Member of Party Leadership Group

LI Yinghui
Chief Accountant, Member of Party Leadership Group

LI Jun
Vice President, Member of Party Leadership Group

LUAN Xiaowei
Vice President, Member of Party Leadership Group

PARTY BUILDING TO LEAD THE NEW JOURNEY

The year 2022 is a year of paramount importance in the history of the Party and the country. Adhering to the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, China Telecom resolutely implemented the decisions and plans of the Party's 20th National Congress; gained a deep understanding of the decisive significance of establishing Comrade Xi Jinping's core position on the Party Central Committee and in the Party as a whole and establishing the guiding role of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era; and was keenly aware of the need to maintain political integrity, think in big-picture terms, follow the leadership core, and keep in alignment with the central Party leadership. We stayed confident in the path, theory, system and culture of socialism with Chinese characteristics; upheld General Secretary Xi Jinping's core position on the Party Central Committee and in the Party as a whole, and upheld the Party Central Committee's authority and its centralized, unified leadership. While consolidating and deepening our gains from implementing the guidelines from the National Conference on the Work of State-owned Enterprises on Party Building, we focused our efforts around production and operation, which were deeply integrated with our work in party building, so as to lead and guarantee high-quality development of the company with high-quality party building.

Study, Advocate and Implement the Guiding Principles of the Party's 20th National Congress

Before the Party's 20th National Congress, China Telecom, guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, carried out advocacy and education campaigns themed "CT's Contribution to National Rejuvenation" at all levels of its Party organizations. In such campaigns celebrating the Party's 20th National Congress, vivid examples were given to demonstrate China Telecom's high-quality development since the 18th National Congress of the Party via different media and from multiple angles and dimensions. These created a strong atmosphere group-wide to embrace the convening of the Party's 20th National Congress with practical actions.

Visiting the "Forging ahead toward a New Era" Themed Exhibition

On October 2, 2022, the CT Group organized a team of total 100 people - comprising members of the Party Leadership Group, persons in charge of various HQ departments, and representatives of managers and employees - to go to the Beijing Exhibition Center to visit the "Forging ahead toward a New Era" themed exhibition, where they drew great motivation from the hard work and the achievements of the Party and the country in the past decade.

CT's Contribution to National Rejuvenation

On June 23, 2022, CT's cloud company organized some representatives of its Party members to go to the Memorial for the Site of the Third National Congress of the Communist Party of China under theme activities. This gave Party members a deep understanding of the original aspiration and mission of the Communist Party of China, grew in them the ideals and convictions to serve the country as technology workers, and encouraged and mobilized the majority of Party members and employees not to forget their original aspiration, stay true to the Party's founding mission, and forge ahead with perseverance and resolve.

China Telecom strictly followed the requirements on securing communication for the Party's 20th National Congress against the highest standards. Guarantee was strengthened for communication network operation, network and information security, mission-critical businesses, and end-to-end services for VIP customers, and contingency plans, mechanisms and work processes were improved to cover all scenarios, successfully completing the task of communication guaranteeing for the Party's 20th National Congress against the highest standards and the most stringent requirements through the most practical measures.

Full Support to Successful Party's 20th National Congress

The 20th National Congress of the Communist Party of China was successfully held in Beijing from October 16 to 22, 2022. Resolutely following the plans made by the government, China Telecom successfully completed its task to guarantee a smooth conference against the highest standards and the most stringent requirements, and with the most practical measures, ensuring undisrupted communication, secure and reliable network and information, safety production without any accidents, satisfactory customer service without major complaints, and no occurrence of major public stirs.

On the opening day of the 20th National Party Congress, Party-member managers and employees throughout the CT Group were organized to listen to or watch the grand event by a variety of ways. Immediately upon the conclusion of the 20th Party Congress, the Party Leadership Group of the company made comprehensive arrangements and plans to study, advocate and implement the guiding principles of the Party's 20th National Congress, raising group-wide enthusiasm among the staff in response. CT's Party Leadership Group organized 11 study seminars to lead participants to comb through and digest major reports and resolution documents from the meeting paragraph by paragraph, as well as the Party Constitution, after which all participants shared their own observations and gains. The members of the Party Leadership Group of the company took the lead to give in-depth lectures on and advocate the Party's spirits in departments they were responsible for, the Party branch they belonged to and the Party building outreach point they supported, thus guiding Party members top-down to extensively study, fully understand and implement the guiding principles of the Party's 20th National Congress. Related workshops and online learning classes were also held, and trainings were carried out in several rounds for executives and managers in a centralized manner to prepare them for staff training later on. Innovative advocacy approaches were adopted with special columns develop for study and advocacy, thoroughly publicizing new practices, achievements, experiences, and features of Party organizations at all levels in studying and implementing the guiding principles of the Party's 20th National Congress. Other flexible forms were also used, such as online lectures, "mini" advocacy programs and "Party Lectures by Ten Thousand Party Secretaries", which invited Ke Ruiwen and Qiu Lina, delegates to the 20th CPC National Congress, as well as other experts and scholars to give lectures, communicating the guiding principles of the Party directly to the grassroots-level operations, the front lines, and the employees.

Party-Members Managers and Employees of China Telecom Listened to or Watched the Grand Event of the 20th CPC National Congress

On October 16, 2022, the majority of Party-members managers and employees of China Telecom were extremely excited to listen to or watch the grand meeting of the Party's 20th National Congress by a variety of means. They all believed that the event was a very important one held at a crucial moment when the whole Party and Chinese people of all ethnic groups embarked on a new journey to build China into a modern socialist country in all respects and to realize the Second Centenary Goal, and that it was a congress to hold high the banner, pool national strength and forge ahead in unity.

Special Workshop Held by China Telecom to Study, Advocate and Implement the Guiding Principles from the 20th CPC National Congress

From November 4 to 8, 2022, China Telecom held a 5-day special workshop to study, advocate and implement the guiding principles from the Party's 20th National Congress. In the first class that opened the workshop, Ke Ruiwen, delegate to the 20th CPC National Congress, CT's Secretary of Party Leadership Group and Chairman, gave a lecture titled "Study and Implement the Guiding Principles from the Party's 20th National Congress, Stay Firm in Fulfilling the Mission and Responsibility of Boosting China's Strength in Cyberspace and Digital Development, and Safeguarding Network and Information Security, and Accelerate Efforts to Grow into a World-class Enterprise", in which he focused on ways to study, advocacy and implementation in all respects. Shao Guanglu, Deputy Secretary of Party Leadership Group and President of China Telecom, made a keynote speech on "Studying and Implementing the Guiding Principles from the Party's 20th National Congress, Building World-class Enterprises and Promoting High-quality Development". The members of the Party Leadership Group then shared their observations, experiences and implementation ideas in combination with actual practices. Moreover, Qiu Lina, delegate to the 20th CPC National Congress, was invited to give interpretations of the guiding principles from the Party's 20th National Congress and share personal learning experiences.

China Telecom regarded the study, advocacy and implementation of the guiding principles from the Party's 20th National Congress as the primary political task both for present and the future terms. Always keeping in mind "what's most important for the country", China Telecom studied the guiding principles from the Party's 20th National Congress to gain a deeper understanding, and applied the knowledge learned to real practices in order to keep enhancing its capability for judgment, thinking and implementation. It firmly supported with practical actions the decisive significance of establishing Comrade Xi Jinping's core position on the Party Central Committee and in the Party as a whole and establishing the guiding role of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era; it resolutely upheld General Secretary Xi Jinping's core position on the Party Central Committee and in the Party as a whole, and upheld the Party Central Committee's authority and its centralized, unified leadership. It also gained deep understanding of the new mission and tasks entrusted by the Party's 20th National Congress to state-owned enterprises and the ICT industry. It stayed firm in fulfilling its mission and responsibility of boosting China's strength in cyberspace and digital development, and safeguarding network and information security, and accelerated efforts in growing itself into a world-class enterprise, with a view to contribute China Telecom's share of strength to building China into a modern socialist country in all respects and the rejuvenation of the Chinese nation.

Solid Progress in Nurturing Managerial Talents

China Telecom took solid steps in nurturing a team of high-quality managerial talents competent to shoulder the responsibility of national rejuvenation. It practiced the Party's organizational line for a new era, adhered to the "good official" standard and requirement for SOE executives: loyalty to the Party, courage to innovate, effective governance, capability in business growth, honesty and integrity. It cleanly defined criteria for talent selection and promotion in the new era, built management teams based on business development needs, and constantly optimized the age and professional structure of management teams. Focusing on the fundamental plan of growing the talent pool, China Telecom strengthened its efforts in regular selection and training of outstanding young talents while expanding the training and selection of scientific and technological talents. Coordination was also made to select a number of scientific and technological talents and establish a talent pool. It took learning Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era as the main content of official education and training to strengthen their ideals and convictions, providing strong organizational guarantee for fully implementing the strategy of cloudification and digitalization, accelerating efforts to grow into a world-class enterprise, and promoting high-quality development of the company.

China Telecom always regards science and technology as the first productive force, talent as the first resource, and innovation as the first driving force. It implemented the "Strong enterprise built on talents" program for a new era, and held a meeting on the work related to scientific and technological talents within the whole group; it issued an outline of scientific and technological talent development during the 14th Five-Year Plan period; it formulated and implemented 27 key measures in 10 aspects related to scientific and technological talents to build four China Telecom talent teams, namely strategic scientists, leading sci-tech and innovation team, outstanding engineers, and young sci-tech talents; it continued to deepen the reform of systems and mechanisms of talent development, and promoted the mechanisms of talent clouds, talent workstations and special talent zones to further stimulate the vitality of different talent teams.

Efforts in the training and selection of sci-tech officials were intensified, promoting a large number of sci-tech officials while establishing a candidate pool of about **150** sci-tech officials.

15 chief experts were selected, a pool of **63** chief expert candidates was established, and **44** leading talents in cloud computing, AI, big data, and financial technology were introduced across the year. The "Genuine talent training program" was implemented for the first time, under which agreements were signed with **22** organizations and 105 graduates were recruited.

New progress was made in the reform of the three systems. The tenure-based and contract-based management was adopted for managers at all levels, and the market-based employment system was improved, improving both the mechanism for total salary allocation and the economy of scale.

Twelve innovation studios of China Telecom were named as Demonstrative Innovation Studios for Model Workers and Craftsmanship in the National Defense, Post and Telecommunications Industries

In 2022, the National Committee of Trade Unions in the National Defense, Post and Telecommunications Industries of China named 100 Demonstrative Innovation Studios for Model Workers and Craftsmanship, of which 12 were China Telecom's studios, ranking first in the industry. Those 12 studios and their superior units were:

Zhangjiagang branch, Jiangsu Province "Li Gang Innovation Studio"	E-channel Operation Center, Hunan branch "Hongyan Innovation Studio"	Shenzhen branch, Guangdong Province "Yang Donglin Innovation Studio"	Wenzhou branch, Zhejiang Province "Wenzhou Big Data Innovation Studio"
Intelligent Marketing and Business Management Center, Anhui branch "Big Data/AI Empowered Innovation Studio"	Mianyang branch, Sichuan Province "Zheng Fuxiong Innovation Studio"	Network Operation and Maintenance Center, Shanghai branch "Blue Great Wall Innovation Studio"	Xi'an branch, Shaanxi Province "Siluyunfan Innovation Studio"
Aksu branch, Xinjiang Autonomous Region "Feng Junxiang Innovation Studio"	CCS Consulting and Design Institute "Wang Xiaopeng Innovation Studio"	CCS Zhongrui Communication Planning & Designing "Dong Li Innovation Studio"	Wireless Network Center, Chongqing branch "Wireless Network Innovation Studio"

Innovative Approaches to Expanding Grassroots-level Party Building

China Telecom continued to deepen the development of 100 Party branches with thousands of projects by tens of thousands of Party members, in order to promote the extension and coverage of the Party's organization to CT's new main businesses, and constantly consolidate the political and organizational functions of grass-roots Party organizations. It vigorously promoted good practices such as "Party building + national cloud development" and "Party building + sci-tech innovation", and actively organized Party units and Party members to play major roles in critical occasions including deepening reform, scientific and technological innovation, disaster relief and communication guarantee. Focusing on the industrial chain, supply chain and innovation chain, it intensified activities under the theme "Party Building to Connect China Telecom", and worked closely with the governments, communities, enterprises and other partner Party organizations in community governance and urban management, so that the fruits of the integration of industries and digitalization could better benefit the general public. It established the first workplace for non-Party representatives to provide suggestions, and organized United Front personnel to conduct extensive research among front-line workers to gave full play to the role of non-Party representatives. It continued to provide assistance to Tibet, Xinjiang and Qinghai, and deepened its paired support to promote the development of boarder regions.

"Dialogue with NPC Delegates" Online Government System Built by E Digital Technology

Drawing upon its own advantages, E Digital Technology entered into a contract with Shanghai's Hongkou District to build the "Dialogue with NPC Delegates" online government system. With the system, citizens can register and submit their comments online within 3 minutes, and the local NPCSC will receive the comments within 3 working days and reply within 15 working days. The system has played a significant role in collecting and listening to public opinions and effectively helped the development of digital NPC, making new attempts for NPC delegates to perform their duties in the wave of digital transformation.

"Party Building +" Neighborhood Platform Built by Fujian Branch, Pushing forward Advancement in Rural Revitalization

The Fujian branch gave full play to its technical advantages and joined hands with Liu Junmin, the First Secretary of Xingshen village, to explore new model of ICT-driven, intelligent rural governance and service. This helped create a "Party building +" neighborhood center integrating online and offline interaction, and expanded the depth and breadth of grassroots governance and services, pushing forward the advancement in rural revitalization led by Party building. Highly recognized by the Quanzhou government, this model was promoted throughout the city.

Full Support by Hegang Branch to Ensure Undisrupted National College Entrance Examination

The government and enterprise customer unit of Hegang branch built a "Front-end CT Love Stations" with active coordination in such materials as mineral water, masks and medicines, giving warmth to students and their parents. At back-end, the unit strengthened network guarantee to ensure smooth connection before, during and after the exam.

Advocacy and Awareness Campaigns

Closely following the main theme of embracing the 20th CPC National Congress and learning, advocating and implementing its guiding principles, China Telecom made coordinated plans to participate in relevant reporting by central government's mainstream media to embrace the convening of the Party's 20th National Congress. CCTV Finance "Renowned Enterprises in an Extraordinary Decade" produced a China Telecom edition, CCTV International "China in a New Era" reported China Telecom 5G empowering a fishing village in Fujian, and a CCTV documentary "Xiong'an Xiong'an" focused its story on the specific practice of China Telecom enabling a new city on the cloud by "5G+ cloud-network convergence". The SASAC website publicized a special column "China Telecom: Keeping in Mind the Entrusted Mission and Providing High-quality Information Services for People to Enjoy a Better Digital Life", and planned a feature story titled "Forging ahead toward a New Journey: SOEs in the Past Decade", shaping the image of China Telecom as a main force in boosting China's strength in cyberspace and digital development, and safeguarding network and information security. Focusing on a three-year action plan for scientific and technological innovation, China Telecom launched an advocacy campaign under the theme of "technology-driven enterprise", and a signed article by Ke Ruiwen, Secretary of Party Leadership Group and Chairman of China Telecom, titled "Accelerating Efforts to Build a Technology-driven Enterprise" was published in the State-owned Asset Report. China Telecom also worked with SASAC, People's Daily and ChinaNews.com in planning "Our past decade @ coordinate China" and "China Speed · Magic Speed". China Telecom ranked first in the New Media Index for Chinese Enterprises 2022 and the New Media Index for China Central SOEs 2022 by the SASAC News Center. Its official Weibo accounts were shortlisted as "Top 100 Accounts that Stand out in Following the Mass Line Online" by Cyberspace Administration of China in 2022, and its media works won the Excellent Organization Award and 10 individual awards in the fifth Excellent Stories on Central SOEs. In the ninth selection of "Good News of SOEs", it won 5 individual awards and 1 News Maker Nomination Award.

Individual awards won

5

News Maker Nomination Award

1

Renowned Enterprises in an Extraordinary Decade| China Telecom 5G Coverage in Border Towns to Help Expand Product Sale with Live Streaming

In 10 years, from "catching up in 3G" to "leadership in 5G", the revolution in mobile phones reflected a decade of profound changes in communication. In this decade, eSurfing Cloud become the world's largest operator cloud, taking us to embark on a new journey to build "home-grown cloud" boosted by cloud-network convergence.

HOME-GROWN CLOUD BUILT ON SYNERGY TO LEAD THE FUTURE WITH SMART INTELLIGENCE

Cloud computing plays a fundamental, strategic and leading role in building Digital China, and has become the cornerstone and hub of economic and social digital transformation. As the main force in the national informatization drive, China Telecom gained deep understanding of the ideological strength from Digital Fujian to Digital China. Passing on the revolutionary DNA, it stayed firm in fulfilling the mission and responsibility of boosting China's strength in cyberspace and digital development, and safeguarding network and information security, fully implemented the strategy of cloudification and digital transformation, and adhered to the leadership in scientific and technological innovation. It speeded up efforts in making breakthroughs in core technologies of cloud computing, with successive progress made in a series of key core technologies such as cloud operating system, elastic computing, cloud storage, cloud network, distributed database and CDN. These equipped China Telecom with full-stack cloud capability featuring independency, controllability, security, credibility, open cooperation and industry leadership, and enabled the company to actively engage in building Digital China in all aspects.

History

Registered on July 1, 2021, with registered address in Dongcheng District, Beijing, eSurfing Cloud Technology Co., Ltd. is a high-tech enterprise under China Telecom to operate cloud business in an intensive manner. In 2012, the Cloud Computing company was officially established, making China Telecom one of the earliest companies to identify cloud strategy in China. In 2015, General Secretary Xi Jinping visited China Telecom's Guizhou Information Park for Cloud Computing, where he expected the company to aim high. In 2020, eSurfing Cloud actively engaged the technology-driven fight against Covid-19, realizing fast cloudification of IT systems of Huoshenshan and Leishenshan Hospitals – the hospitals attracting hundreds of millions of online audiences to become "cloud supervisors". In 2021, eSurfing Cloud Technology transformed from a wholly-owned subsidiary of China Telecom into mixed ownership by introducing four strategic investors from among central SOEs, with a view to pool industrial advantages and accelerate the development of home-grown cloud. In 2022, eSurfing Cloud was selected by SASAC as "Enterprises Demonstrating Reform and Technology Innovation". As the world's leading cloud service provider, eSurfing Cloud committed itself to the mission as a central SOE and to the great cause of sharpening national science and technology competitiveness, providing users with secure and inclusive cloud services. The eSurfing Cloud has basically taken shape as a national cloud service.

2009
China Telecom launched the "eSurfing cloud initiative" for cloud computing.

2012
Cloud computing company was established, and eSurfing Cloud was officially commercialized.

2014
Technology R&D team was set up, starting efforts to make breakthroughs in the cloudification of China Telecom's IT architecture.

2015
On June 17, General Secretary Xi Jinping visited China Telecom's Guizhou Information Park for Cloud Computing.

2020
Technology-driven fight against Covid-19 attracted hundreds of millions of viewers to become "cloud supervisors";

The Warm Spring initiative was launched to provide free support to millions of SOEs in cloud migration;

Cloud computers, CDNs and other self-developed products were commercialized at large scale.

2018
China Telecom implemented the "IT on the cloud" project. The "eSurfing Cloud across China" program was launched more than 1,000 times in 31 provinces across the country.

2017
Cloud network resources covered every province with one pool. The action for enterprise cloud migration was started.

2021
The then-State Councilor Wang Yong unveiled eSurfing Cloud Technology Co., LTD., building home-grown cloud by the synergy of five central SOEs.

2022
The fifth Digital China Summit – State Cloud Ecology Conference held in Fujian a launch ceremony for the cloudification of state-owned assets and central SOEs & the supervision cloud for state-owned assets.

Core Technologies

Keeping in mind "what's important for the country", eSurfing Cloud enhanced technological innovation and intensified efforts to make major breakthroughs in core technologies, with continued advances in addressing bottlenecks in cloud computing. Jointly with outstanding domestic businesses, universities and research institutes, it benchmarked against global cloud computing champions to create TeleCloud OS4.0, a new generation of cloud foundation with large scale, strong availability and high reliability. Zijin DPU architecture went beyond network and storage unloading acceleration, greatly improving computing power and efficiency, and launched elastic bare metal servers in combination with customized servers, with the first batch of products put into large scale operation. Breakthroughs were also achieved in cloud-native platforms, and researches were carried out in micro-service and container technologies, as well as low-code platforms. Iteration and optimization were continued for cloud platforms to meet internal and external needs for cloudification. Cloud-native database with separate storage and computation was launched, the HTAP converged database architecture optimized, and breakthroughs achieved in active-active architecture in the same city and seamless cloudification for database transmission, solving the "last mile challenge" when migrating to the cloud.

China Telecom Digital Technology Ecosystem Conference 2022

On December 29, 2022, China Telecom Digital Technology Ecosystem Conference 2022 was held under the guidance of SASAC. With the theme "Digital Technology for A Better Future", the conference comprehensively displayed the latest achievements of the company in implementing the strategy of cloudification and digital transformation, in order to further explore new technologies for the digital economy, boost prosperous new digital ecosystem, and foster new consumption for a digital life. The conference announced scientific and technological innovation achievements such as a white paper on eSurfing Cloud, Zijin DPU of eSurfing Cloud, Xinghe AI platform and the digital platforms for eight major industries in the digital sector, and also kicked off the 2023 New Digital Consumption Festival. Yuan Ye, member of the CPC Committee and Vice Chairman of SASAC, and Huang Yan, member of the Party Leadership Group and Deputy Director General of the National Rural Revitalization Administration, attended the main forum of the conference and delivered a speech. Ke Ruiwen, Chairman and Secretary of the Party Leadership Group of China Telecom, gave a keynote speech, and Shao Guanglu, President and Deputy Secretary of the Party Leadership Group of China Telecom, announced scientific and technological innovation achievements.
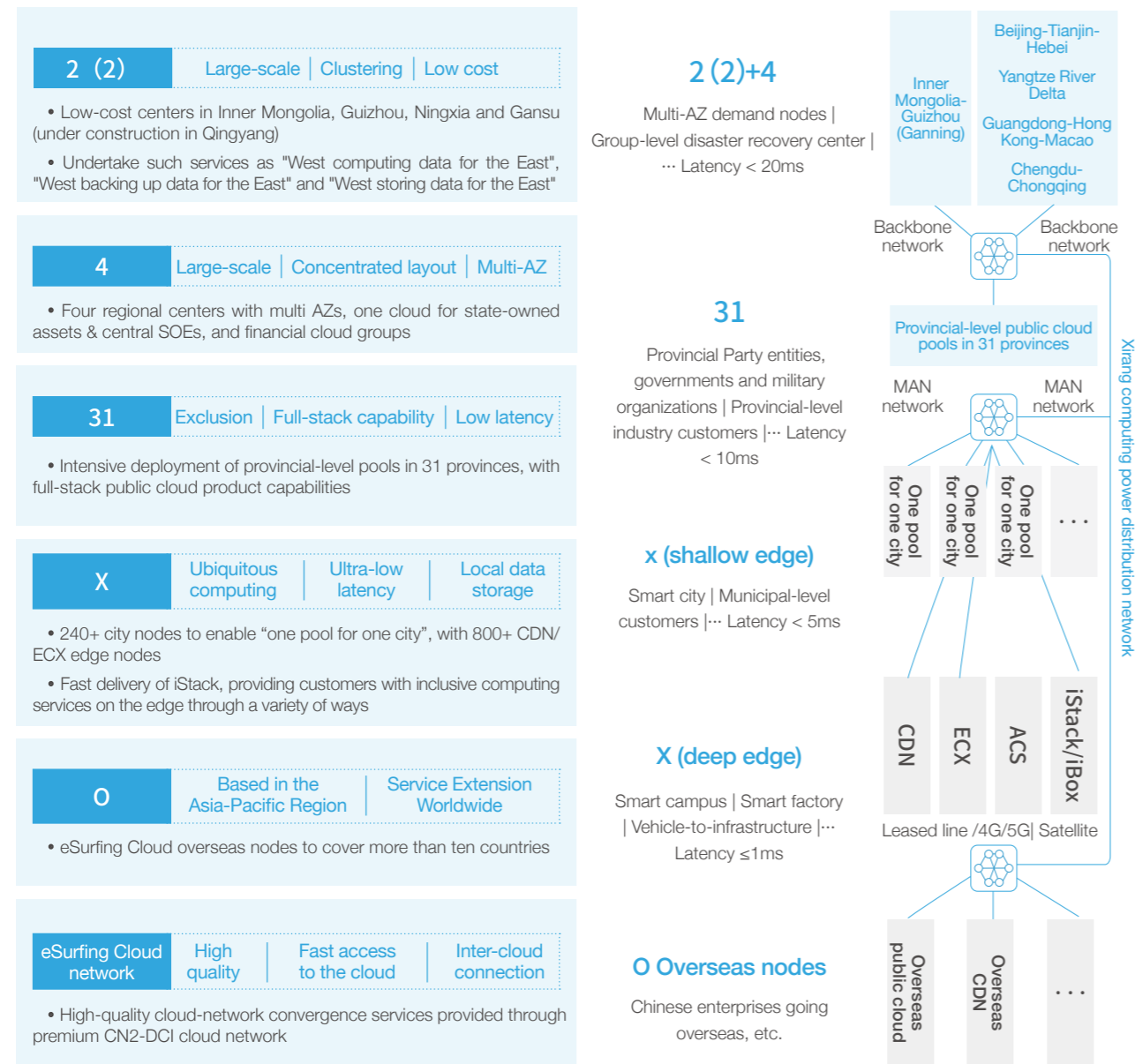
Products and Services

At present, eSurfing Cloud has full-stack cloud capabilities with a self-developed product system integrating clouds, networks, data, intelligence and security. It provides diversified portfolio such as computing, storage, network, database, CDN, terminal, big data and AI, and hyperintegration to empower enterprises in their digital transformation in a comprehensive manner. Breakthroughs were achieved in key technologies for cloud terminals to support full-link localization and innovative solutions to IT application, effectively addressing the risk of supply chain disruption. Independent research and development were performed in cloud host security, cloud key management and other core security capabilities, and the "Red Shield" security brand and product series were launched, to build a comprehensive defense system based on cloud-network convergence.

Infrastructure

ESurfing Cloud has accelerated the development of digital information infrastructure featuring cloud-network convergence with a "2(2)+4+31+X+O" resource layout. ESurfing Cloud 4.0 can provide a variety of cloud services in the form of public cloud, private cloud, hybrid cloud, exclusive cloud and edge cloud, and provide unified support to various computing power, including domestic CPUs. Based on "Xirang" platform - the computing power distribution network of eSurfing Cloud 4.0, an efficient computing network was created, which was selected as the "Top Ten Super Projects by Central SOEs in 2022" by SASAC, realizing coordinated scheduling of large-scale computing resources and highly efficient computing while laying a solid computing foundation for Digital China.

Build New Cloud-Network Infrastructure System of eSurfing Cloud

"2(2)+4+31+X+O" Cloud-Network Infrastructure Layout of eSurfing Cloud

2（2） — Large-scale | Clustering | Low cost
- Low-cost centers in Inner Mongolia, Guizhou, Ningxia and Gansu (under construction in Qingyang)
- Undertake such services as "West computing data for the East", "West backing up data for the East" and "West storing data for the East"

4 — Large-scale | Concentrated layout | Multi-AZ
- Four regional centers with multi AZs, one cloud for state-owned assets & central SOEs, and financial cloud groups

31 — Exclusion | Full-stack capability | Low latency
- Intensive deployment of provincial-level pools in 31 provinces, with full-stack public cloud product capabilities

X — Ubiquitous computing | Ultra-low latency | Local data storage
- 240+ city nodes to enable "one pool for one city", with 800+ CDN/ECX edge nodes
- Fast delivery of iStack, providing customers with inclusive computing services on the edge through a variety of ways

O — Based in the Asia-Pacific Region | Service Extension Worldwide
- eSurfing Cloud overseas nodes to cover more than ten countries

eSurfing Cloud network — High quality | Fast access to the cloud | Inter-cloud connection
- High-quality cloud-network convergence services provided through premium CN2-DCI cloud network

2（2）+4
Multi-AZ demand nodes | Group-level disaster recovery center | ··· Latency < 20ms

31
Provincial Party entities, governments and military organizations | Provincial-level industry customers |··· Latency < 10ms

x (shallow edge)
Smart city | Municipal-level customers |··· Latency < 5ms

X (deep edge)
Smart campus | Smart factory | Vehicle-to-infrastructure |··· Latency ≤1ms

O Overseas nodes
Chinese enterprises going overseas, etc.

Inner Mongolia-Guizhou (Ganning) / Beijing-Tianjin-Hebei / Yangtze River Delta / Guangdong-Hong Kong-Macao / Chengdu-Chongqing

Backbone network — Backbone network

Provincial-level public cloud pools in 31 provinces

MAN network — MAN network

One pool for one city | One pool for one city | One pool for one city | ···

CDN | ECX | ACS | iStack/iBox

Leased line /4G/5G| Satellite

Overseas public cloud | Overseas CDN | ···

Xirang computing power distribution network

Market Size

Relying on its keen market insight, mature products and services, and extensive industry practices, eSurfing Cloud continues to improve its market position, currently ranking among top public cloud IAAS, the first in private cloud service market in China, and the first in hybrid cloud in China. According to the "China Public Cloud Service Market (2H22) Tracker", a report released by the authoritative agency IDC, in the second half of 2022, eSurfing Cloud leapt to top three public cloud IAAS+PAAS in China by market share.

Ecosystem Cooperation

ESurfing Cloud served as a comprehensive boost to national digital transformation of the economy and society, with remarkable results in expanded adoption in key areas related to national economy and people's livelihood. It provided security cloud services to more than 2 million government and enterprise customers, supported the launch of the first supervision cloud for state-owned assets, and offered secure and reliable cloud services in the government market. It announced two cloud ecosystem cooperation plans, namely "Cloud Innovation Plan" and "Cloud Synergy Plan", and established a cloud computing community to pool strength from partners in the industry and across the industrial chains build home-grown cloud ecosystem, creating a wide range of cooperation opportunities for further enhancing the competitiveness of domestic industrial chains and for high level of self-reliance in the cloud computing industry.

The Fifth Digital China Summit · State Cloud Ecosystem Conference

On July 24, 2022, during the fifth Digital China Summit, SASAC, the People's Government of Fujian Province, China Telecom, CETC and CEC jointly hosted the 2022 State Cloud Ecosystem Conference, displaying the latest achievements of China Telecom in the field of cloud computing from all aspects. At the same time, a ceremony was held for the launch of state-owned assets and central SOEs on the cloud and the launch of state-owned assets supervision cloud, further consolidating the consensus of building home-grown cloud, enhancing the clustering of cloud industry, creating an open and win-win cloud ecosystem, and pooling strength from the ecosystem for secure and trusted information infrastructure for cloud computing.

Fulfill Responsibilities

Over the years, eSurfing Cloud has been active in fulfilling its social responsibility and demonstrating what's expected from a central SOE in serving the people. By "Party building + technology to fight Covid-19", it independently developed technologies that supported hundreds of millions of "cloud supervisors" and that enabled the Huoshenshan and Leishenshan Hospitals to swiftly migrate IT systems to the cloud. Under the Warm Spring initiative, it invested more than RMB 100 million to provide users with 3 months of free eSurfing cloud services and over 100 models of cloud application products, helping more than 1.4 million SMEs in resumption of work as well as more than 7,400 hospitals in cloudification, providing services to 56,000 customers in the education industry and supporting 4.8 million students in online learning. Giving full play to its cloud-network advantages, eSurfing Cloud provided network support and the application of a variety of new technologies and services for social poverty alleviation networks to expand ICT adoption, and worked with partners to explore a new model of "Internet +" social poverty alleviation. Moreover, it built "bridges of love" and promoted technology-driven poverty alleviation.

Build A Digital Development Engine

China Telecom accelerated its efforts in developing intelligent and comprehensive digital information infrastructure with cloud-network convergence as its core feature, promoted in-depth integration of digital technologies and the real economy, and ensured secure, undisrupted information networks, with a view to build a digital development engine.

Solidify Digital Foundation

Following General Secretary Xi Jinping's requirements on "accelerating the development of intelligent, comprehensive digital information infrastructure featuring high speed, ubiquitous access, space-ground connectivity, cloud-network convergence, smart intelligence, agility, eco-friendliness, low carbon, security and controllability", China Telecom adheres to the philosophy of "network as the foundation, cloud as the core, network adaptive to the cloud, and cloud integrated with the network" and continues to promote the integration of clouds and networks. With the current evolution to a new stage of cloud-network convergence 3.0, the Company is constantly consolidating the new foundation of digital development to drive high-quality socio-economic advancement.

Consolidate Network Foundation

China Telecom speeded up the development of "Dual-Gigabit" networks. In terms of mobile network, it built the world's first, largest and fastest 5G SA network with premium quality under co-construction and sharing mode, with 1 million shared 5G base stations activated. Multiple technology breakthroughs were achieved, including coordination for high, medium and low frequency bands, which enabled continuous outdoor coverage in all developed towns and above, hot spot coverage in administrative villages with high data traffic, and extensive indoor coverage for medium-to-high throughput scenarios, demonstrating for global industry how 5G SA could be better deployed. As for broadband network, it built the world's largest Gigabit fiber network, with 2.97 million new 10G PON ports newly opened and Gigabit fiber broadband covering more than 290 million households, effectively supporting the development of Gigabit connectivity in one thousand cities.

China Telecom has upgraded all its networks to fiber optical cables. It operates CHINANET, the world's leading broadband Internet; it built new platform for premium CN2 carrier network, reducing the average latency by 23%; it set up fiber trunk connectivity stretching a total of 470,000 kilometers across China; it created the world's largest all-fiber ROADM network with hybrid archeticture. Moreover, it connected Shanghai and Guangzhou with the first full-G.654E land fiber trunk in China, was the first in China to complete on existing network a test of the WDM transmission system for ultra-long distance at 400GB/S, and achieved passive relay transmission for a distance over 1,900 kilometers. It also built a premium OTN network for government and enterprise customers with nationwide coverage.

5G Coverage in All Newly-built Subways

In December 2022, the Shanghai company completed the construction of the full network coverage of Metro Line 14 and Line 18 in just over 20 days, using the 5G network in two frequency bands for the first time, expanding 5G capacity and providing users with a smooth network experience.

Accelerate Direct Fiber Connection for "the west to compute data for the east"

The provincial branches in Guizhou, Guangxi and Guangdong jointly accelerated the development of direct fiber connection between the Guizhou node (national computing hub) and the Guangdong-Hong Kong-Macao nodes. New G.654E fiber was used in all connections to meet the needs of low-latency, high capacity and high reliability of cloud-network connection for hubs in the "West computing data for the east" project to support the high-quality development of the digital economy.

Enable 5G VoNR UHD Video Calls in City

Based on the full coverage of 5G signals, the Shenzhen Branch took the lead in realizing full VoNR coverage, becoming one of the first 5G VoNR (Ultra-high definition video call) cities of China Telecom. UHD video calls based on CT's 5G VoNR technology features successful connection within seconds, ultra high definition with no frozen frames, and no need to download and install software.

Enable Ubiquitous Computing Power

China Telecom implemented the national project of "West computing data for the east", continued to optimize the "2(2)+4+31+X+O" layout of ubiquitous computing infrastructure, and built a four-tier intelligent computing system, adding 1.7EFLOPS of computing power to the eSurfing Cloud, with the total computing power reaching 3.8EFLOPS, an increase of 81% over the previous year.

Actively engaging in deploying computing infrastructure, China Telecom built eSurfing Cloud 4.0, the new generation of cloud foundation that supports large-scale application and multi-region availability, in regional central nodes including those for the Beijing-Tianjin-Hebei region, the Yangtze River Delta, the Guangdong-Hong Kong-Macao region, and the Chengdu-Chongqing region, so as to provide users with high-availability cloud services. "One pool for one city" nodes were built in 241 cities to provide customers with better data localization and ultra-low latency distributed cloud services. Capacity building was strengthened in industry-specific clouds and customer's private clouds, creating secure and trusted cloud foundation for the digital transformation of various industries. More than 800 data centers, 3,000 edge DCs and 48,000 comprehensive access offices were built nationwide in an integrated data center layout featuring "center + edge". In 2022, 50,000 new racks were added in data centers, with the total number reaching 540,000, maintaining a leading position in the industry.

Build across the country

More than **800** data centers **3000** + edge DCs

More than **48,000** comprehensive access offices

An integrated data center layout featuring "center + edge"

New data center racks in 2022 **50,000** racks

Reaching **540,000** racks

Maintaining industry leadership by scale

Lingang Information Park - Build New Highland of Global Network Hub

The Lingang Information Park project is an important one for China Telecom to develop national new information infrastructure and implement the "West computing data for the east" project. It is also an important node to support Shanghai to become a global digital highland. The Park relies on China Telecom's capabilities in integrated clouds and networks, as well as AI, big data, IoT and other technologies, to build a smart campus of digitalized, intelligent management and a green, low-carbon, intelligent and open information park with high quality.
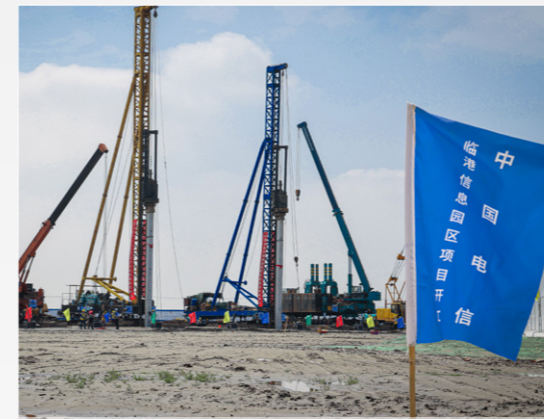
Anhui's First Ultra-large Intelligent Computing Center - China Telecom Anhui Intelligent Computing Center - Officially Launched in Hefei

With a total investment of RMB 10 billion, the Anhui Intelligent Computing Center built by China Telecom has 16,000 high-density racks, with computing power reaching 2.2EFLOPS after completion. This Center is not only one of the four core cloud computing bases of eSurfing Cloud, but will also become one of the most influential ultra-large data centers in East China, helping to double the overall computing power in Anhui Province.

Build the eSurfing Connected Video Network

China Telecom took active measures in building the "fifth network" – the eSurfing Connected Video Network - based on the underlying integrated cloud and network resources covering the whole country. With capabilities such as video access, storage and AI-based intelligent analysis, this network satisfies basic needs of various customers in daily video checking, video convergence and unified supervision, and also provides face recognition, mask-on recognition, drowning prevention monitoring and other services to meet customer needs for personalized intelligent management.

Promote the Development of Services based on eSurfing Connected Video Network

The Zhejiang Branch developed Transparent Kitchen, Open Factory and other "sunshine series" of applications, promoted cultural auditoriums, garbage classification and other "rural community" applications, and developed a total of more than 10 provincial-level standardized applications of the eSurfing Connected Video Network. In 2022, it grew 450,000 new users.

Total number of provincial-level standardized applications of the eSurfing Connected Video Network

More than **10**

New users in 2022

450,000

Empower Digital Development

Adhering to the people-centered development philosophy, China Telecom increased the supply of high-quality, efficient digital products and services, and worked to meet customers' new demands for a better digital life, constantly improving people's sense of gain, happiness and security. It integrated clouds, AI, security and platforms in a comprehensive manner, and provided customized integration of clouds, networks, edges, terminals and security at greater depth, accelerating industrial digitalization.

Empower the Digital Economy

China Telecom provided active support to digital economy development with focuses on agriculture, industry, finance, education, healthcare, transportation, energy and other key areas. It accelerated the integration of digital information technologies and applications, and worked to create a number of new growth engines driven by integrated clouds, AI, security and platforms to bolster industrial digital transformation and upgrading at a faster pace.

In 2022, China Telecom developed an additional 3,200 customized 5G networks, or an increase over 150% year-on-year, adding the total number of such projects above 4,800, with more than 16,000 projects of industry-specific 5G application. Based on the customized NICES1.0 product system running on 5G, with the custom-made network operation platform and 5G capability matrix at the core, it prioritized new products and services such as network enhancement, end-to-end security, 5G terminals and application on demand, and built better NICES PRO product system for new applications, services and capabilities.

Build 5G-based, Fully Connected Smart Factory

Fully leveraging the industrial Internet, big data, intelligent simulation and other technologies, the Hubei Branch worked with Midea Group to build 5G-based, fully connected smart factory, achieving 52% increase in productivity, 25% reduction in delivery time, 64% reduction in quality defects, and 11% increase in customer satisfaction. Such smart factory manifested the latest achievements in industrial digital transformation, and was shortlisted in the 8th batch of global "lighthouse factories" list by the World Economic Forum in 2022.

Empower Smart Textile Factory

Drawing upon its technical strength, the Jinjiang Branch helped Fujian Yongu Group build 5G + textile smart campus. In 2022, 5G private networks were set up in the campus for intelligent renovation to achieve smart supervision of textile machines in workshops, automatic passing through heald shafts, closed-loop control of temperature and humidity between factories, and intelligent management of production energy efficiency, raising product pass rate by 97% while reducing overall operating cost by 15%.

Let the Rice "Talk"

China Telecom gave full play to the Xinghe AI enabling platform, the Tianshu 5G-based drone platform, eSurfing Cloud and other capabilities to promote standardized rice production at Taihe Farm in Nanjing, Jiangsu Province. With the help of AI, accurate analytics was performed at various stages of rice growth, and real-time irrigation and drainage was enabled so that every need of the rice in its growth could be "understood". As a result, the Taihe Farm increased organic rice yield per mu by 40%, lowering planting cost by nearly 50%, and raising income per mu by 50%.

Create Smart Agriculture Scenarios

The Yunnan Branch continued to promote the development of Gigabit broadband and 5G network in rural areas. It adopted cloud computing, big data, IoT and other information technologies to empower agricultural production through customized private networks and 5G wireless high-speed networks, creating multiple smart agricultural scenarios integrating production, operation management and services. Functions including real-time monitoring data, transaction data, planting guidance, agricultural product management and intelligent equipment management were provided as effective support to agricultural and rural modernization.

5G-based Interactive Online Teaching for Balanced Development of Quality Education

The Shandong Branch and the People's Government of Zibo jointly built an interactive online teaching system that connects live broadcast signals in the classroom to the interactive platform for presentation through audio/video terminals. Such platform broke geographical restrictions and turned traditional offline classroom into a smart one, without any blurred frames, latency or frozen images, effectively promoting balanced education development between urban and rural areas.

5G Private Network for New Applications of Smart Education

Relying on the "5G+ smart education" application pilot of the Ministry of Education and the Ministry of Industry and Information Technology, the Shaanxi Branch and Xi'an Jiaotong University developed the first customized 5G private networking plan on integrating wired, wireless, IoT and 5G communication, etc. for technological innovation of 5G-enabled teaching, examination, evaluation and management and for the demonstration pilots of smart education. New application scenarios of three-dimensional, full-scenario and intelligent education were developed, and resources from multi-parties including governments, enterprises, universities, research institutes and users were integrated, with a view to establish an industry chain to accelerate the transformation of scientific and technological achievements driven by the integration of education and 5G.

Build "5G + Integrated Platform for Emergency Medical Services"

China Telecom built a "5G+ integrated platform for emergency medical services" based on its technological advantages. The platform used 5G technologies to send patient information and vital signs in real time, so that "information would arrive before the patient checks in". Video footages in the ambulance could be transmitted synchronously in real time for remote instruction and consultation, realizing "hospital check-in immediately upon boarding on the vehicle" thus greatly shortening the response time in rescue. At present, the platform has connected the emergency and critical care center with six specialized disciplines, namely chest pain, stroke, trauma, poisoning, newborn, and high-risk pregnant and lying-in women, achieving whole process management from patient call, treatment, hospital admission to patient discharge.

Empower Digital Government

Focusing on the overall objective and requirements of modernized national governance, China Telecom integrates existing achievements in ICT adoption across the country, and extensively shares and gathers data and information from the government, society, and the general public, to build a social governance platform encompassing "intelligent supervision, smart service, intelligent decision-making support, public participation and targeted governance" for improved regional governance capabilities. The social governance platform covers over 240 cities in 31 provinces, at all levels from provinces, cities, counties, townships, streets to rural communities, helping build Safe China and the rule of law.

Big Data and AI-based Intelligent Analytics for Modernization of Social Governance

The Quanzhou Branch joined hands with Nan'an Municipal CPC Committee and Political and Legal Committee to build the city's social governance platform. With focuses on addressing challenges in grassroots-level social governance such as multi-agency administration, repetitive construction, insufficient inter-agency coordination and interaction, and weak synergy in governance, efforts were made to explore operation under the modes of "Party building + granulized management", "online + offline governance" and "manual labor + technology support". The principle of "political leadership in all work, autonomy to settle disputes, rule of law for social order, moral ethics for wider acceptance, and intelligent governance to drive innovation" was also followed in building a granularity-based new system for grass-roots social governance in Nan'an.

Data Product Supermarket for Hainan Free Trade Port

China Telecom actively cooperated with the People's Government of Hainan Province to build a data supermarket. Relying on its self-developed data trading platform, it provided open public data resources while integrating social data resources in the process of data product development and production, supply and demand alignment, circulation and trading. Now there're more than 100 billion pieces of government data, more than 1 billion pieces of social data, and more than 800 data products made accessible in the supermarket to support the development of the free trade port.

Empower Digital Culture

With an accurate understanding of the national strategy of digitalized cultural development in China, China Telecom worked to improve its capabilities in digitalized cultural service. It drew upon technical capabilities accumulated in AI, blockchain and virtual reality, etc., to increase product supply and technology support, keep producing high-quality digitalized cultural content, and explore new models and business forms of cultural consumption.

5G+MEC+VR to Experience the Xia Capital Culture

With 5G+MEC, cloud, XR and other digital technologies, China Telecom transformed the Museum of Erliou Site of the Capital City of the Xia Dynasty in Luoyang into the first 5G+MEC-based smart museum of historical site in China. By digital means of immersive digital projection, 3D digital theater supported by manually built landscape, interactive wall with radar projection, 5G+4K UHD immersive VR and other digital technologies, visitors would travel "through" time and space to participate in the processes of the discovery, identification, exploration and restoration of cultural relics.

"Tour in Gansu with Your Mobile Phone" Platform Built for Comprehensive Cultural and Tourism Services

Located on the golden section of the Silk Road, the Gansu Province boasts a large number of valuable historical relics including grottoes, temples, Great Wall passes, pavilions, towers, monuments and ruins of ancient cities. Giving full play to its own advantages, China Telecom helped Gansu Provincial Cultural and Tourism Department build the "Tour in Gansu with Your Mobile Phone" platform for comprehensive cultural and tourism services. Positioning itself basically as "best tour guide, intimate butler, cultural mentor and versatile shopping guide", the platform uses such emerging technologies as big data, cloud computing and XR to provide tourists with integrated services of catering, accommodation, travel, shopping and entertainment, allowing conveniences for the travelers while promoting tourism development in Gansu Province.

China's First Concert by the Sea over the Cloud for Novel Experience in Digital Entertainment

On the evening of July 25, 2022, China's first live broadcast by the sea over the cloud – "Hello 5G· Starting Young Again - China Telecom 5G Concert over the Cloud by Shui Mu Nian Hua" was held in New City Bay in Zhoushan, Zhejiang Province. Relying on China Telecom's resource advantages in cloud-network convergence, combined with advanced 5G technologies, Guomai Culture brought a grand feast to the eye and the ear for audiences to enjoy digitalized entertainment that integrates technology and performance. The concert was jointly broadcast by the official video account of Shui Mu Nian Hua, Mango TV, Tianyi UHD, NetEase, Sina, Sohu and China Telecom APP podcast, BestPay and other new media, with more than 10 million times of viewing and reaching out to over 100 million people.

Support to the Digital Society

In line with new trends of integrating digital technologies into social interactions and daily life, China Telecom launched digital services and applications for various scenarios to create a better digital life for all.

Relying on its cloud-network convergence, China Telecom upgraded the digital home portfolio to meet customers' ever-upgrading needs for a better life, benefiting thousands of households and businesses. Focusing on network connection, home security and convenient life, it provided users with high-speed Gigabit connection, full coverage and scenario-based Wi-Fi networking solutions in every corner of the house to address low network speed, poor coverage, difficult networking and other challenges. It developed the Tianyi HD Digital Entertainment Center for large-screen viewing experience for quality video, online education and gaming, etc. It upgraded the whole-house smart products and cloud storage products, and launched various smart home products and customized solutions centering around home security, elderly care, home appliance control, digital assets and other scenarios.

Relying on its smart community platform, China Telecom provided street administrators, communities, property owners and residents with such ICT applications as video playback, access control, property fee payment, smart Party building and convenience services, which not only empowered grassroots governments in digital governance but also met people's needs for digitalization. At present, China Telecom has served more than 64,000 streets and communities.

Breakthroughs Achieved in Development Scale of Household Business

Registered users of CT Housekeeper, the unified access to China Telecom Digital Home, exceeded 130 million households, the whole-house Wi-Fi had an accumulated user of over 100 million, the number of Tianyi HD users reached 140 million, and the number of connected terminals for intelligent home exceeded 300 million. The picture below is a photo of China Telecom employee with the 100 millionth registered user of CT Housekeeper on April 27, 2022.

Build Smart Community Bases

The Jiangsu Branch actively engaged in developing smart communities in the province, with the establishment of three smart community bases in Zhenjiang, Nanjing and Suzhou as effective ties between local governments, property owners and households, providing strong support to the development and operation of smart communities within the province. In 2022, 9,000 communities in the province signed cooperation agreements, of which 3,697 were new, standard smart communities, meeting the ever-increasing needs of the government, society, residents and other groups for digitalization.

Total number of whole-house WIFI users exceeds
100 million

The number of Tianyi HD users reached
140 million

The number of connected terminals for intelligent home exceeded
300 million

Empower Digital Ecological Conservation

China Telecom stayed firm to the high-quality development path that prioritizes ecological conservation, and green and low-carbon development, supporting comprehensive green transformation of the economy and society by digitalization.

Digital Intelligence for Green Qinling Mountains

Drawing upon its advantages in clouds, networks, digitalization, industry, security and terminals, the Shaanxi Branch worked with Qinling Ecological Environment Protection Administration to build smart mountain management system. The system relies on intelligent network, UAVs, night vision cameras and other IoT equipment to monitor key areas with back-checks enabled for all processes, visualized views throughout the target areas, and controllability in all respects, creating a "security shield" for the daily protection management, flood prevention and emergency management of the Qinling mountains.

"Smart Sky" to Protect the Yangtze River

The Nantong Branch worked with Nantong Municipal Bureau of Agriculture and Rural Affairs in building the ICT-based "Smart Sky" system for intelligent identification of ship information, accurate detection of ship behavior, rapid alert push, automatic photo taking and automatic upload to the intelligent application platform. With the help of ICT technologies, a monitoring "umbrella" was created to cover more than 600 square kilometers of areas along the Yangtze River with digital and manual surveillance, helping achieve fishing control from the source through multi-party governance and long-term supervision.

Ensure Secure and Smooth Communication

China Telecom worked to consolidate the security foundation for high-quality development by firmly safeguarding network and information security, guaranteeing emergency communications, and preventing and defusing major risks through multiple measures.

Maintain Network and Information Security

China Telecom followed strictly relevant laws and administrative regulations on network and information security to improve its working mechanism, striving to build a security-oriented enterprise.

Forum on Ecosystem Cooperation for Network and Information Security

On December 30, 2022, China Telecom Digital Technology Ecosystem Conference – Forum on Ecosystem Cooperation for Network and Information Security was held online. The forum aimed at in-depth exchange and discussion with stakeholders in the industrial chain on hot topics such as network and information security industry, product and service capabilities, etc., and further strengthening multi-party collaboration, in order to jointly create favorable security environment for high-quality development of the network and information security industry. Meanwhile, the *eSurfing Cloud Security White Paper* was released, comprehensively elaborating on the security development vision of China Telecom's eSurfing Cloud.

China Telecom built a security operation system of "VCERT (Virtual Computer Emergency Response Team) + two-level SOC (Security Operation Center)", creating a two-level (headquarters - provincial branches) audit and control system for information and content release. Continuous efforts were made to improve the integrated security capability system comprising of clouds, networks, edges and terminals, with 194 nodes of security capability pools, 150 key cities covered across the country, and the anti-DDoS capability reaching 9.7T, continuing to be among top security providers in China. Integrated security data center and situation-aware system were built across the whole network, and the security middle-desk capability took its initial shape, significantly improving the capabilities of security incident detection, analysis and disposal.

China Telecom launched the Cloud DAM · Counter-DDoS product for government and enterprise customers, covering more than 10 industries including government, finance, education, energy, transportation, logistics and commerce; the Security Brain product for tens of thousands of customers in education, government, finance, healthcare and other industries; the Tianyi Trouble-free service for individuals that blocks unsolicited calls, marketing calls and calls from a custom-defined directory; the Security Keeper service for households with a focus on online security protection for home broadband.

China Telecom was active in implementing the *Data Security Law of the People's Republic of China*, the *Law on Personal Information Protection of the People's Republic of China* and other laws and regulations, and improved the *Measures of China Telecom for Managing the Protection of Users' Personal Information* to protect the security and rights of users when processing personal information. It made further moves to address APPs infringing upon users' rights and interests, as well as active exploration in the ability of scenario-specific personal information protection. It established catalogs of important and core corporate data, and improved the ability to discover risks independently, with the proportion of self-identified data security risks reaching 99.9%. It carried out actions on personal information protection and developed related product functions, doing an effective job in the protection of users' personal information.

Launch of Privacy Sentinel

Based on mobile fingerprint database and automated detection technology, China Telecom Privacy Sentinel takes a deep dive into APP-based privacy risks in mobile phones, produces visualized reports on personal privacy assessment, and provides risk disposal services such as excessive authorization alert, helping users accurately prevent, identify and deal with APP-based privacy risks.

Guarantee Emergency Communication

China Telecom stayed committed to its mission of ensuring secure and undisrupted communication against earthquakes, typhoons, floods and other natural disasters to guarantee communication during major events: communication support to disaster relief after a 6.8 magnitude earthquake in Luding, and after floods and typhoons in Zhejiang, Fujian, Liaoning, Guangdong, Guangxi, Gansu and other provinces. It focused on key areas, coordinated efforts both network-wide and from online and offline, to successfully guarantee communication for 11 major events, including the Beijing Winter Olympics and the 20th CPC National Congress. In 2022, more than 800,000 times of personnel, 270,000 times of vehicles and 100,000 times of sets of communication equipment were dispatched for emergency communication guarantee.

Emergency communication personnel dispatched More than **800,000** times

Emergency communication vehicles dispatched cumulatively More than **270,000** times

Sets of communication equipment for emergency communication dispatched More than **100,000** times

Make Every Effort to Ensure Smooth Network during the Winter Olympics

During the 2022 Winter Olympic Games, the Beijing Branch set up 10 professional groups who were on duty 7x24 for communication guarantee, and a team of 114 experts on communication technology and operation to do all they could in network guarantee for the grand ice and snow event. During the Games, communication guarantee services were provided to more than 200 critical locations, with support personnel sent for a total of 13,000 times, support vehicles for more than 2,000 times, and emergency communication vehicles for 20 times.


Critical Communication Guaranteed in Disaster-hit Areas

At 12:52 am on September 5, 2022, a magnitude 6.8 earthquake hit Luding County, Ganzi Prefecture, Sichuan Province, causing communication disruption in Luding County and Shimian County of Ya'an City. After the earthquake, the Sichuan Branch put human life above everything else and stood up to its responsibility as a central SOE. It called out contingency plans immediately and established emergency communication headquarters. Leveraging its advantages in satellite communications, airborne base stations and other ICT means, it sent multiple emergency rescue teams to the disaster-hit areas for comprehensive communication guarantee, which was critical to the work in disaster relief.

Successful Communication Guarantee for the Launch of the Wentian Lab Module

On July 24, 2022, the Long March 5B carrier rocket taking onboard the Wentian lab module successfully took off from the Wenchang Space Launch Site in Hainan province. As an important communication support to the Wenchang Satellite Launch Center, the Hainan Branch made a special contingency plan to send backbone teams to open fast-response emergency station in the key observation area, and deploy emergency communication vehicles for wireless signal coverage to ensure smooth mobile communication during the rocket launch.
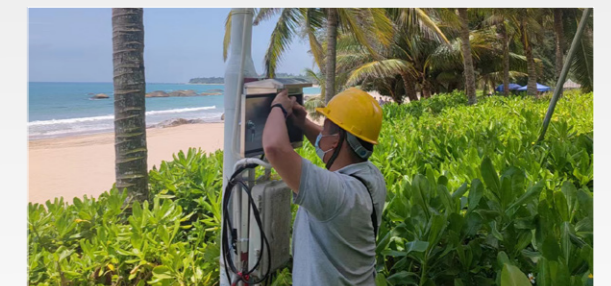
STIMULATE THE VITALITY OF DIGITAL IN-NOVATION

Adhering to innovation-driven development, China Telecom takes technology self-reliance as the strategic support to corporate development, and continues to improve technology innovation system around customers' digital needs. It strengthens technology research cooperation, works to protect intellectual property rights, advocates green and low-carbon development, actively addresses climate change and promotes low-carbon operation in order to enable green development and constantly stimulate the vitality of digital innovation.

Strengthen Technology Innovation

Attaching great importance to the critical role of technology innovation in promoting high-quality development of the economy, society and itself, China Telecom focuses on four R&D directions - frontier research, cloud-network convergence, network and information security, and digital platform. Systematical approaches have been adopted to facilitate technological innovation from the aspects of deepening institutional innovation, strengthening the development of scientific and technological talents, enhancing researches in core technologies, and promoting scientific research cooperation.

Improve Technology Innovation System

China Telecom continued to improve its technological innovation system, with a complete design of R&D system comprising of basic RESEARCH (R), applied technology DEVELOPMENT (D) and OPERATION development (O). It established an innovation system featuring extensive synergy from the industry, universities and research institutes, and kept enhancing the ability of independent innovation. In 2022, it was awarded "Enterprises with outstanding contribution to scientific and technological innovation" by SASAC. In the R field, key topics and innovative exploration projects were designed, focusing on basic research and cutting-edge technologies. In the field of D, an internal R&D chain was built, with the chain leader integrating efforts in the upstream and downstream, to make breakthroughs in core technologies in key fields. In the field of O, the transformation process of research results was optimized, with more operation teams and developers starting new responsibilities, to promote the application of research results at larger scale. The investment structure for R&D management was optimized, and incentive mechanism for scientific research improved. Top-notch talents were introduced, and a candidate pool of chief experts established, with 15 chief experts hired or renewed to lead major research projects. The chief technical expert system was set up, and special honors and awards for scientific and technological innovation diversified to commend individuals and teams for major innovation achievements. Technology innovation teams were organized in a systematic manner to create favorable atmosphere for technological innovation and build good image in advocating technological innovation. Under the leadership of China Telecom Science and Technology Association, 45 sub-associations were already established. The second China Telecom Science and Technology Festival was successfully held and China Telecom was selected as Outstanding Organization in Activities on National Science and Technology Education Day.

The Second China Telecom Science and Technology Festival Successfully Held

On October 26, 2022, the second China Telecom Science and Technology Festival was launched under the theme of "National Strength in Cyberspace Powered by Science and Technology". During the event, outstanding breakthroughs made by China Telecom in core technologies were demonstrated, together with achievements in collaborative innovation in recent years. Teams and young talents with outstanding contributions to or achievements in innovation were also commended.

Breakthroughs Achieved in Core Technologies

China Telecom strengthened scientific and technological innovation as its strategic support, continuously improving influence in the industry. As the first batch of technology sources, it accelerated the development of source base for original cloud computing technologies, and achieved breakthroughs in core technologies for eSurfing Cloud including in cloud operating system, elastic computing, cloud storage, distributed database, and CDN. TeleCloud OS4.0 went beyond open source restrictions, and "Xirang" - computing power distribution network platform for eSurfing Cloud 4.0 - was selected as "Top Ten Super Projects by Central SOEs in 2022". It built and provisioned the world's largest quantum-based metropolitan area network "Hefei Quantum-based MAN"; it had a self-research list with 84 results, over 1,500 small and micro research results achieved by staff, revenue from intelligent video cloud, eSurfing Housekeeper, CDN and other applications reaching RMB 1 billion, revenue from 7 applications including eSurfing Cloud Desktop and Cloud Dam reaching RMB 500 million, and revenue from 6 application including Website Security Experts, eSurfing Security Brain reaching RMB 100 million. Seven achievements, including the intelligent operation system for network co-construction and sharing, were shortlisted into the SASAC *Catalog of Recommended Scientific and Technological Innovation Achievements by Central SOEs* (2022 edition).

"Xirang" - Computing Power Distribution Network Platform for eSurfing Cloud 4.0 - Released

"Xirang" - computing power distribution network platform for eSurfing Cloud 4.0 – launched by China Telecom enabled intelligent and orderly scheduling of complex computing power resources, thus opening up the information "artery" connecting data and computing power between the eastern and western regions. Each computing demand across the entire network was sent on a real-time basis via high-speed transmission networks, with computing power up to 3.1 EFLOPS.

Breakthroughs by China Telecom in Science and Technology Awards, Patents and International Standardization

Patents for 5G technology for the first time	Machine vision codec	All-fiber backbone network achievements
Silver Award, China Patent Award	Second Prize, National Standard Innovation Contribution	2022 World's Leading Internet Science and Technology Achievements

In 2022, China Telecom's applications for domestic invention patents and PCT patents were 1.4 times and 2 times respectively more as compared with the same period last year. At present, 55 people from China Telecom are holding important positions in the International Standardization Organization, and 4 serving as vice chair of ITU-T working groups, one of the organizations with largest number of such posts in China.

Establishment of World Broadband Association (WBBA) Led by China Telecom

With unremitting efforts, the World Broadband Association (WBBA) was formally established, with a view to build international cooperation and exchange platform for cloud-network technology innovation and enhance international influence.

Development of 18 R17 Technical Standards Led by China Telecom in 3GPP RAN

In June 2022, at the 96th meeting of 3GPP RAN (Wireless Network), the 3GPP R17 standard was announced to be frozen, marking the official completion of the second evolved version of 5G standards. During the R17 standard research and development cycle that lasted 2 years and 3 months, China Telecom took the lead in the formulation of 18 technical standards in 3GPP RAN such as super uplink enhancement, network coverage improvement, evolution of co-construction and sharing, networking of non-public networks and system interference cancellation, and submitted more than 1,000 technical proposals, ranking among top global operators by relevant contribution.

Strengthen Cooperation in Scientific Research

China Telecom intensified cooperation with the industry, universities and research institutes by strengthening the integration of innovation resources in upstream and downstream, and carrying out joint research with well-known universities such as Tsinghua University, scientific research institutes such as Chinese Academy of Sciences, and industrial chain partners such as Huawei to promote researches with application and bolster the application of major research achievements in quantum, cloud-network, security and AI, among others. In 2022, it worked with partners to undertake national projects and made a series of theoretical and prototype breakthroughs in cutting-edge technologies such as privacy computing, data authentication, intelligent computing framework, and 6G-based integrated sensing and communication.

Protect Intellectual Property Rights

China Telecom continued to establish and improve intellectual property management system, strengthen the protection of intellectual property rights, issue operational guidelines related to IPR management throughout product life cycles, and conduct training and advocacy on IPR protection and use related to pictures, fonts, and video/audio materials involved in business operation and management. In 2022, focusing on 13 R&D chains, it enhanced invention patent applications in key areas such as cloud, security, 5G and cloud-network operation to increase patent protection for core technologies and products in key fields. It also strengthened overseas patent plans and applications to enhance international influence and competitiveness, thus building moats for IPR protection.

China Telecom-Tsinghua University Joint Research Center for Next-Generation Internet Technology Unveiled

On March 8, 2022, the unveiling ceremony of the Joint Research Center between Tsinghua University and China Telecom Group for Next-generation Internet Technologies was held at Tsinghua University. Relying on the Center, the two parties will further draw upon their respective advantages in scientific research, technology, talent and industry in extensive cooperation to seek long-term development, mutual benefit and win-win results.

First Intellectual Property Summit Forum Held by China Telecom

On April 26, 2022, the World Intellectual Property Day, China Telecom held the first Intellectual Property Summit Forum, together with "National Intellectual Property Advocacy Week" and other activities to enhance public IPR awareness.
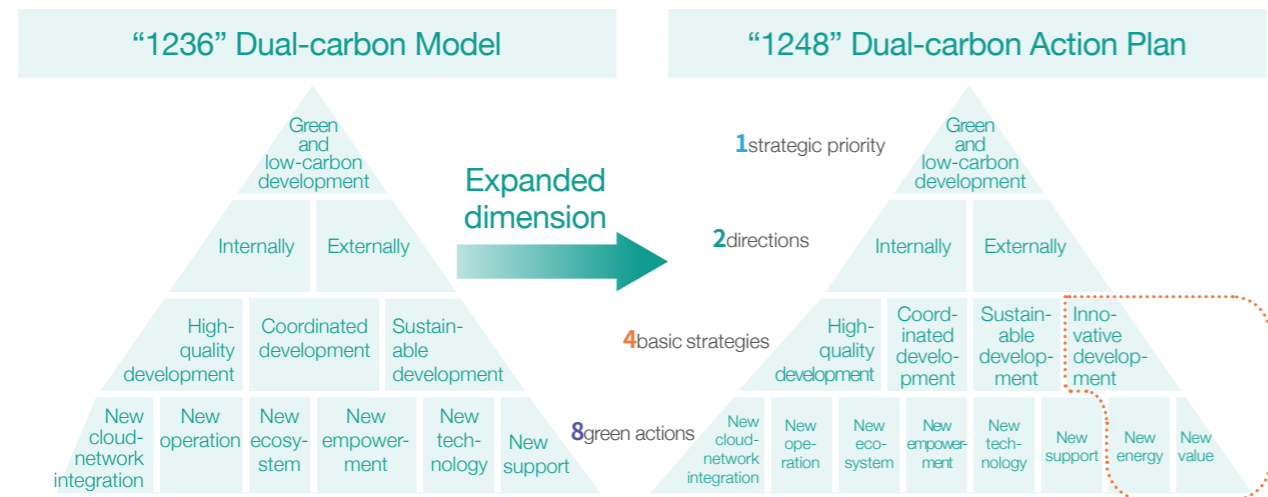
Advocate Green and Low-carbon Development

China Telecom has actively responded to the national strategic goal of carbon peaking and neutrality and to the green and low-carbon requirements of the industry. It accelerated the improvement in both energy efficiency and managerial capability, and speeded up the transformation in both energy structure and product empowerment, making significant breakthroughs in green and low-carbon development.

Combat Climate Change

Closely focusing on the national goal of carbon peaking and neutrality as well as corporate strategy, China Telecom vigorously promoted factor upgrading and integrated innovation. Prioritizing innovation and development, it further expanded and upgraded the "1236" dual-carbon model to the "1248" dual-carbon action plan, and identified eight major green actions with key measures, comprehensively promoting its green and low-carbon transformation.

"1236" Dual-carbon Model	"1248" Dual-carbon Action Plan

"1236" Dual-carbon Model

- Green and low-carbon development
- Internally / Externally
- High-quality development / Coordinated development / Sustainable development
- New cloud-network integration / New operation / New ecosystem / New empowerment / New technology / New support

Expanded dimension →

"1248" Dual-carbon Action Plan

- **1** strategic priority — Green and low-carbon development
- **2** directions — Internally / Externally
- **4** basic strategies — High-quality development / Coordinated development / Sustainable development / Innovative development
- **8** green actions — New cloud-network integration / New operation / New ecosystem / New empowerment / New technology / New support / New energy / New value

Guided by the "1248" dual-carbon action plan, China Telecom took green and low-carbon development as an important part of the strategy of cloudification and digital transformation, built new type of green information infrastructure based on cloud-network convergence to enable green capabilities across different clouds, networks, edges and terminals, and strengthened organic green mechanisms to nurture new momentum and advantages for the green development of the cloud and the network.

China Telecom formulated the *China Telecom Carbon Peaking Action Plan* and the *2022 China Telecom Requirements on the Work in Carbon Peaking and Neutrality and Assessment Methods*, which clearly defined the management structure and responsibilities of various departments in dealing with climate change, and proposed China Telecom's goals, action plans and specific measures to address climate change and achieve carbon peaking and neutrality.

Governance Hierarchy	Responsible Body	Organization and Main Responsibilities
Decision-making level	"Carbon Peaking and Neutrality" Steering Group	Build carbon neutrality management system to promote the implementation of green and low-carbon strategies, lead the work in green development, and study important matters in the management of "carbon peaking and neutrality" for decision-making.
Management level	Dedicated team for green development	Focus on green and low-carbon transformation, formulate key tasks and promote the implementation of green development, and ensure that requirements of energy conservation and emission reduction are put in place across all production and operation activities including network planning, procurement, construction, operation and office work.
Execution level	Departments of subordinate units responsible for energy conservation and emission reduction and related business units	Follow up on climate change-related risks and opportunities in real time, summarize practical experience, and propose recommendations to the management and decision-making levels.

In 2022, China Telecom achieved good results in energy conservation and carbon reduction. Through co-construction and sharing, renovation of old computer rooms, phasing-out of old equipment, AI-based energy conservation and other measures, greenhouse gas emissions was reduced by more than 13 million tons annually, comprehensive energy consumption per unit of information traffic decreased by 21.5% year-on-year, and greenhouse gas emissions per unit of information traffic decreased by 20.6% year-on-year. In 2023, China Telecom will continue to promote double-digit decline in greenhouse gas emissions per unit of information traffic, and reduce greenhouse gas emissions by no less than 27 million tons through co-construction and sharing as well as various energy-saving measures during the 14th Five-Year Plan period.

White Paper on China Telecom's Action on Carbon Peaking Released by China Telecom Research Institute

Adhering to green and low-carbon development as an important part of the strategy of cloudification and digital transformation during the 14th Five-Year Plan period, China Telecom strengthened technological innovation and management upgrading internally for continuous reduction of carbon emission intensity and accelerated green transformation of development patterns, while optimizing product supply and service quality externally to give full play to the enabling role of digital technologies, nurture green way of production and life, and fully implement the "1248" action plan. Based on its own strength and condition, it empowered the society and contributed to carbon peaking and neutrality.

The White Paper divides China Telecom's action on carbon peaking into four categories

01 The first is to build green clouds and networks with green operation

Giving full play to its advantages in cloud-network convergence, China Telecom promotes the "West computing data for the East" project, and bolsters the development of new, green, low-carbon information infrastructure based on cloud-network convergence featuring well-designed layout, moderately aggressive advancement, advanced architecture and leading energy efficiency. Guided by "dual-carbon" management and new business development & innovation, China Telecom fosters deep integration of digital technologies and energy saving and carbon reduction technologies, and accelerates energy structure adjustment and transformation, demonstrating commitment to its green responsibility.

02 The second is to enhance industrial value and create green ecosystem

China Telecom actively engages in leading and developing green, new ecosystem in the upstream and downstream of the industrial chain to promote a green and low-carbon ecosystem with renewable energy and green supply chain as the core. Leveraging its guiding role in the industrial chain and supply chain, it extends carbon emission management to production processes in the upstream, constantly optimizes green procurement management and green logistics management, and builds smart supply chains, which constantly improve the environmental performance of the supply chain and industry chain.

03 The third is to optimize product system for strengthened green empowerment

China Telecom will leverage its advantages as a technology-driven enterprise, and take the new-generation technologies such as cloud computing, big data, IoT, AI and blockchain as the core to design solutions to intelligent production and services and use digital technologies to empower green production management for enterprises, greener and better life for the people, and green development for the society. By 2025, China Telecom will initially form a green and low-carbon ICT product system to cover the whole digital chain, setting a benchmark for "low-carbon + digital" application.

04 The fourth focuses on green technologies for green transformation

China Telecom will continue to increase investment in new, green technologies for effective and comprehensive scientific and technological support to carbon peaking and neutrality. It will focus on strengthening efforts to make technology breakthroughs in building low-carbon networks, with innovation in design and breakthroughs in core technologies. AI, big data, edge network and blockchain technology will be applied at greater depth to network development and operation, and bottlenecks in the application of 5G, industrial Internet and other technologies in energy-intensive areas will be addressed so as to build green, low-carbon and innovative technology system.

Looking ahead, China Telecom will work together with ecosystem partners, in transparent actions and through open cooperation, to promote the sharing and efficient use of resources for carbon peaking and neutrality, and build new, green ecosystem that echoes China's "dual carbon" goal, thus boosting China's socio-economic transformation toward green, low-carbon development and contributing strength from the telecom sector to mankind's fight against climate change.

Promote Low-carbon Operation

Under the guidance of the national goal of carbon peaking and neutrality, China Telecom actively promotes low-carbon operation and takes diverse measures to increase energy conservation and carbon reduction through the development of green clouds and networks, green office, green procurement, recycling and optimization of energy structure.

Green Clouds and Networks

China Telecom continued to build new, green data centers. In Qinghai province, it set up the country's first "zero-carbon data center", taking comprehensive consideration from location selection, PUE design, energy-saving technology application and green energy utilization. It introduced green elements, adopted both residential and HVDC power supply, and deployed free cooling and indirect evaporation-based cooling depending on where natural cold sources came from. Moreover, by applying AI-driven intelligent operation and other advanced technologies, it achieved a PUE below 1.2, thus being selected as Successful Cases of High-quality Big Data Center Development by China Association of Communications Enterprises, as well as Outstanding Cases of Green Technology for Carbon Peaking and Neutrality for the Digital Industry by China Communications Industry Association.

China's First Zero-carbon Data Center Launched by China Telecom

On July 14, 2022, the Summit Forum on Deep Integration of Digital Economy and Clean Energy & the Launch Ceremony of China Telecom (National) Green Big Data Center for Digital Qinghai was held in Qinghai province. At the meeting, the "China Telecom · Zero Carbon Qinghai" campaign was announced, and the initiative of establishing an industrial alliance for the integration of digital economy and clean energy was proposed, with a view to facilitate the implementation of the "West computing data for the East" project and set a model of carbon peaking and neutrality for Qinghai in order to build green, low-carbon, circular system for economic development.
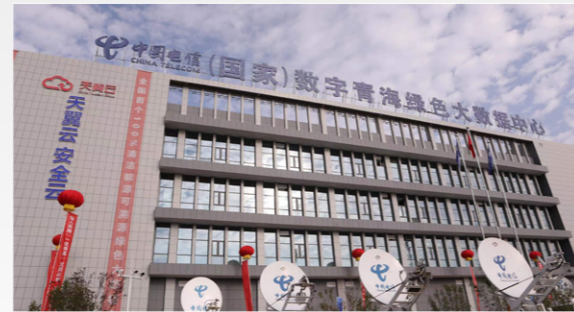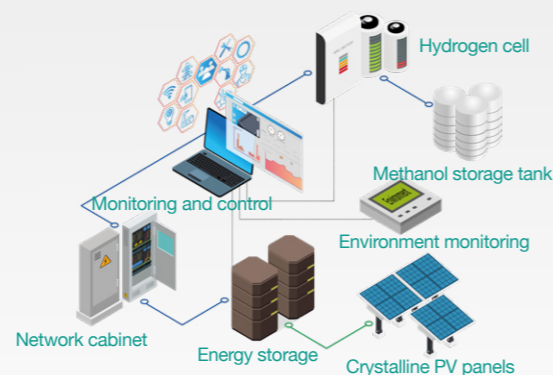
China Telecom continues to promote the application of advanced energy-saving technologies in data centers. Take Beijing Yizhuang Cloud Computing Hub as an example. Through the application of indirect evaporation, CO_2-based cooling and waste heat recovery technologies, comprehensive energy-saving renovation was performed within the building, reducing PUE from 1.4 to 1.3 with a significant drop in overall energy consumption of the cooling system. To overcome problems such as single means to energy saving and high O&M costs in traditional computer rooms, AI, big data, IoT and other new technologies were introduced, and intelligent energy saving system for computer rooms, designed for different energy consumption scenarios, was independently developed for nationwide adoption, achieving an energy saving rate over 15% for cooling.

China Telecom continues to promote base station energy efficiency, and independently developed intelligent energy saving system for 4/5G base stations based on big data and AI. As a result, the AI-based real-time decision-making brain and control network were created for energy efficiency across the whole network with in-depth perception, realizing secure, automatic and accurate energy saving to the maximum for cost reduction and higher efficiency of 4/5G base stations. In 2022, the intelligent BS energy-saving system covered 31 provinces, with 5G energy-saving of not less than 16%, annualized power saving of 600 million kWh, and direct reduction of CO_2 emissions exceeding 300,000 tons every year.

Build China's First Solar-Hydrogen-Storage System for Power Supply

On December 9, 2022, China's first zero-emission communication base station with pollution-free power supply was completed in Butterfly Island, Fangchenggang City, Guangxi Zhuang Autonomous Region, through an integrated solar-hydrogen-storage system. This base station is one of the pilot projects for universal telecom service, which takes into account the characteristics of island resources and coverage requirements. By combining resources with technical advantages, the project not only addressed the difficulties in building new power utility across the sea with high subsequent maintenance costs, but also protected the environment of the island more effectively, providing new ideas on communication and power services on islands and in other similar areas.

Hydrogen cell
Methanol storage tank
Monitoring and control
Environment monitoring
Network cabinet
Energy storage
Crystalline PV panels

Innovative Approach to Energy Consumption with Automatic 5G Activation-Deactivation Pilot

Together with ZTE, the Hunan Branch completed the deployment of 100 5G AAU stations in Zhangjiajie with automatic activation and deactivation as an innovative energy-saving approach, possible of saving power consumption to less than 5W in the state of deactivation during no-call period. With obvious tidal effect of traffic in Zhangjiajie scenic spot, which is closed at night, it was estimated that the automatic activation-deactivation technology alone would help reduce CO_2 emissions by nearly 300 tons per year for Zhangjiajie.

China Telecom has deepened the co-construction and sharing with China Unicom in a comprehensive manner by reducing duplication of 4/5G base stations through greatly improved utilization of legacy base stations, protecting natural environment and landscape, saving the consumption of land, energy and raw materials, and continuing the co-construction and sharing of poles, ducting, fiber cables and other infrastructure to greater extent.

In 2022, the two parties activated more than **300,000** new 5G base stations, adding the number of activated shared 5G base stations to over **1 MILLION** in total.

Shared more than **440,000** 4G base stations, adding the total number of activated shared 4G base stations to over **1.1 MILLION**.

Provided more than **13,500** kilometers of shared poles and more than **800** kilometers of ducting.

Under 4/5G co-construction and sharing, more than RMB **270** billion was saved for the two companies in network development investment, over RMB **30** billion was saved in annualized operating costs, and over **17.5** billion KWH of electricity was saved annually.

China's First Co-constructed and Shared 5G Base Station Launched for Low Bands

China Telecom joined hands with China Unicom in launching China's first low-band 5G base station under the mode of co-construction and sharing in Lianzhang Village, Qingyuan City, Guangdong Province. The project involved 800MHz and 900MHz low-frequency refarming to overcome technical difficulties of deploying LTE, NR and NB-IOT networks within the same 10MHz spectrum on low bands.

Work with China Unicom in Building Inter-carrier 5G Operation and Scheduling System

Together with China Unicom and leveraging blockchain as the underlying technology, China Telecom created secure, trusted, efficient and intelligent blockchain-based scheduling platform, by fully utilizing each other's capabilities in cloud, big data and existing systems through unified deployment and chain formation across different clouds, so that both parties could enjoy, on their co-constructed and shared 4/5G networks, visualized data under management and efficient scheduling of operational resources.

To address government and public concerns of, among others, farmland protection, equipment pollution, construction impact and electromagnetic radiation in communication engineering projects, China Telecom formulated the "Measures of China Telecom for the Management of Electromagnetic Environment Protection Regarding Communication Base Stations (Trial)", established better electromagnetic radiation management system and risk prevention mechanism, and actively implemented environmental protection measures such as environmental assessment. All these laid a solid foundation for environmental protection to ensure compliance with regulatory requirements, which was complemented by well-established approaches to public communication.

Active Electromagnetic Environment Monitoring and Education Campaigns
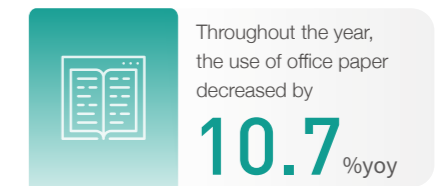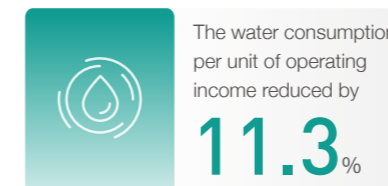
China Telecom implemented environment monitoring through the country on 5G electromagnetic radiation against all metrics, with a view to ensure electromagnetic radiation compliance with the national standard *Electromagnetic Environment Control Thresholds* (GB8702-2014) in in residential buildings, schools, hospitals, offices and other places, through continuous improvement of the electromagnetic environment. At the same time, it actively engaged itself in education campaigns related to electromagnetic environment, together with information disclosure, strengthened community communications and advocacy on new media, and accepted public supervision.

Green Office

China Telecom advocates water conservation, and posts water-saving tips at water facilities and appliances. We take continuous efforts to strengthen the management of water resource usage, carry out sewage discharge treatment, promote the recycling of production water, and actively use reclaimed water to replace tap water on the premise of satisfying water needs. We promote and popularize water-saving appliances, and regularly inspect and repair all links of the water supply system to prevent continuous water running, water dripping and leaks. Compared with the previous year, the water consumption per unit of operating income reduced by 11.3%. We have set a goal of total water consumption for 2023, which is no more than the average of water consumption in 2017—2019.

China Telecom advocates paper saving and takes technical and institutional measures to reduce its use. We advocate for double-sided printing of documents and reduce color printing. We have accelerated the digital transformation of the procurement supply chain, vigorously promoted e-procurement and e-order applications for paperless operation in the whole supply chain process. We continue to promote electronic management of accounting files, electronic VAT invoices, electronic reimbursement filing and paperless operation of electronic invoices, and advance the direct online connection between the tax authority and the enterprise for tax declaration to reduce the use of paper documents. During the year, the use of office paper decreased by 10.7% year on year.

The water consumption per unit of operating income reduced by

11.3%

Throughout the year, the use of office paper decreased by

10.7%yoy

Green Procurement

China Telecom insists on giving priority to resource-saving and environment-friendly products, and promotes suppliers to jointly respond to climate change. The Company is active in building a green supply chain by incorporating green and low-carbon factors into the supplier evaluation system, carrying out a whole life-cycle cost management of the supply chain, increasing the deployment and application of energy-saving and low-carbon products, applying green procurement indicators to the procurement process, and including environmental impact factors in the marking of a procurement project, to propel suppliers to raise their awareness and ability of environmental protection. For products that may have environmental risks during the production process, environmental assessment standards such as ISO 14000 environmental management system certification, government environmental assessment reports, and the "Green Factory" list of the Ministry of Industry and Information Technology have been included in the procurement project rating. Whether production waste meets the green treatment and discharge standards, environmental assessment reports, environmental monitoring reports, green packaging, green processes, etc. have been mandatory inspection items for supplier evaluation. In 2022, the *China Telecom Procurement Supply Chain Green Packaging Evaluation Specification* (Trial) was released, advocating for suppliers to use green packaging and gradually promoting the comprehensive application of green packaging as a commitment standard by suppliers.

Recycling

The Company strengthens the recovery, disposal and utilization of waste materials, to save materials as much as possible and reduce environmental pollution. In 2022, the *Management Measures for the Recycling and Disposal of Waste and Idle Materials* was revised, which further clarifies the compliance requirements for waste materials disposal for environmental protection. We abide by the principles of recycling and disposal of waste materials, divide responsibilities and management, and require qualifications for recyclers. We standardized the disposal forms and procedures, specified the approval authority and process of disposal decisions, efficiently cleaned up hazardous and harmless wastes and organized experience exchange, to effectively prevent disposal risks.

- We implement effective management of hazardous waste annual planning to ensure timely and accurate reporting to the ecological and environmental authorities regarding the types, quantities, flows, storage, and disposal of hazardous waste.

- For hazardous waste like batteries, recycling businesses directly collect them from the designated hazardous waste discharge points, and promptly handle transfer manifests to ensure "one vehicle, one manifest", enhancing disposal efficiency and reducing risks associated with hazardous waste transportation and storage.

- The Company stringently requires the formulation and filing of preventive measures and emergency plans for accidents, to rigorously guard against the occurrence of unforeseen incidents.

In 2023, the Company will continue to strengthen specialized management of waste, adhere to the principle of "recycling whenever possible." Furthermore, we will establish and enhance a systemic framework for the recovery and disposal of waste, obsolete, and idle materials. This includes advancing processes like public auctions for the disposal of waste cables, used batteries, and other items, in line with environmental compliance. These efforts aim to enhance disposal benefits. In the meantime, we will build a module for the disposal of waste and idle materials, connecting various stages such as fixed asset management, material usage, scrapping, recovery, and disposal. This approach aims to achieve a closed-loop management for the disposal of waste and idle materials.

Optimize Energy Structure

China Telecom continues to enhance the efficient and clean utilization of energy while accelerating the transformation and optimization of its energy structure. In 2022, the Company expanded the scale of distributed energy construction in data center parks, communication equipment rooms, and base stations. We promoted the pilot application of self-developed new technologies such as safe lithium batteries and hydrogen energy storage, aiming to maximize energy utilization efficiency. In the meantime, we actively participated in market-based transactions for renewable energy, achieving a breakthrough in cross-provincial trading of "certificate and electricity integration" for green power. The proportion of green power consumption doubled year on year.

Empower Green Development

China Telecom accelerated the transformation of its business development into a green and low-carbon direction. The Company launched products like cloud computers, cloud phones, smart and energy-efficient applications, and green IoT services, promoting green consumption. The Company created products and services such as green IDCs, green cloud hosts, and smart cities, while expediting the promotion and application of energy-saving and carbon-reduction technologies, to foster a green and low-carbon lifestyle in the realm of information and communications.

Green Carbon Reduction Behavior Credit System

In order to encourage everyone to participate in green and low-carbon actions, China Telecom has introduced a Green Carbon Reduction Behavior Credit System. Users who engage in activities such as public transportation, online package subscriptions, online payments, etc., will earn virtual "green energy", which can be exchanged for rural agricultural products, green data packages, and more.
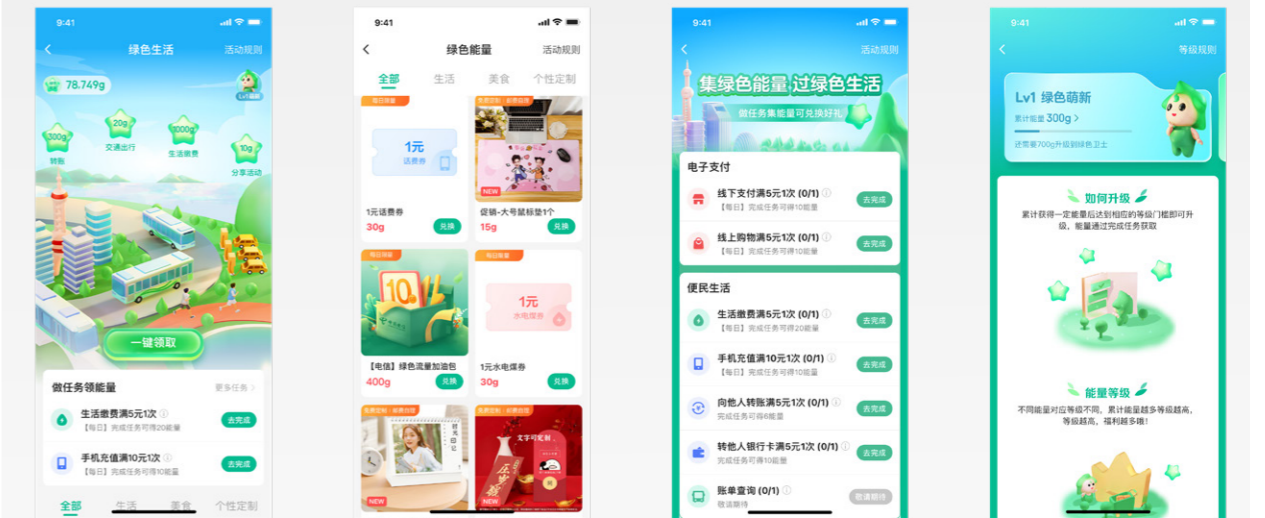
China Telecom empowers green economic and social development by consistently advancing digital technological innovation, and providing customers with novel digital solutions for energy conservation, carbon reduction, pollution prevention, and ecosystem protection.

Assist Jiangxi Jinghao Salt Chemical in Energy Conservation and Carbon Reduction

The Company leveraged its technological advantages to assist Jiangxi Jinghao Salt Chemical Co., Ltd. in establishing a smart factory, which has significantly propelled Jinghao Salt Chemical's transition from a traditional enterprise with high energy consumption and labor intensity to a new enterprise characterized by green, low-carbon, and intelligent operations. With the support of the "One Cloud, One Network, One Platform + Eight Smart Applications" framework, Jinghao Salt Chemical achieved a 15% reduction in maintenance costs, a decrease in coal consumption by 20,905 tons per year, a reduction in steam consumption by 28,500 tons per year, and a decrease in liquid nitrogen consumption by 271 tons per year. This initiative generated an annual direct economic benefit of approximately RMB 13.86 million. The project received multiple honors from the Ministry of Industry and Information Technology and the Jiangxi Province government.

China Post's Postal Mail Processing Center's Rooftop Photovoltaic Power Generation Xiamen Pilot Project Completed and Connected to the Grid for Operation

Fully utilizing its resource advantages, Hunan Planning & Designing Institute of Posts & Telecommunications Co., Ltd. created a photovoltaic power generation system by taking photovoltaic power generation as the starting point, and harnessing the rooftop space of the idle factory buildings at the China Post Xiamen Company's Postal Processing Center, to change the energy usage pattern, increase the self-generation and self-consumption of green energy, reduce the use proportion of traditional energy, and advance the sustainable development of China Post in the context of a green and ecological approach.

CONSOLIDATE THE FOUNDATION OF DIGITAL TRANSFORMATION

China Telecom is committed to comprehensively deepening reform, igniting internal growth momentum, consistently reinforcing compliance management, enhancing risk prevention capabilities, caring for and supporting employees, and encouraging their growth, to continuously consolidate the foundation of digital transformation.

In-depth Reform in All Respects

With the core focus on meeting customers' digital demands, China Telecom comprehensively deepens institutional and mechanism reforms. The Company continues to refine market-oriented operation mechanisms, enhance core capabilities, and effectively stimulate corporate vitality.

The Company actively implemented the three-year action plan for state-owned enterprise reform, and reinforced the overall design, coordination, implementation, and supervision of the reform. In 2022, we achieved an "A-level" rating in the assessment of key tasks for the three-year action plan for central SOE reforms, of which three institutional reforms were rated as Level 1 (Class A). By the end of the year, all reform measures were successfully completed, achieving a successful conclusion, and yielding positive results in promoting the Company's reform and development.

Established and improved the work mechanism to enhance the comprehensiveness, systematic nature, and synergy of reform. Formulated targeted reform measures through research, and established a management cycle of "designing solutions - tracking progress - evaluating effects" to enhance the quality of reform implementation plans and the level of progress.

Fully implemented the modern enterprise system with Chinese characteristics, with ongoing deepened reforms in areas such as government and enterprise services, cloud, cybersecurity, technological innovation, ecological development, and specialized companies. The three major institutional reforms continued to make progress, focusing on concrete and substantial actions. Market-oriented operational mechanisms, including term-based management and contractual arrangements, have been further implemented.

Actively promoted reform through various means, creating an unprecedented atmosphere of reform and innovation. This was achieved by organizing reform lectures, establishing a reform-themed section on the Company's website, and promoting through platforms like WeChat official account. These efforts aimed to effectively tell reform stories, share reform experiences, and disseminate reform models.

The Company accelerated the implementation of reform measures in important areas and key segments. We continued to deepen the reform of government-enterprise services, bolstered the development of industrial research institutes, and enabled the comprehensive operation of provincial and municipal cloud middle platforms. Specialized company reforms made rapid progress, the big data and AI center functioned as a corporate entity, the eSurfing Cloud company achieved diversified equity, and the cloud, security, and IoT companies were listed as "scientific and technological innovation" demonstration enterprises. We strengthened the service arrangement of integration of "space and earth" services, and optimized the management system of the Satellite Research Institute. In order to adapt to the requirements as a service-oriented, technology- and security-focused enterprise, we optimized our product operation and safety production management systems.

Rated "A-level" in the 2021 Annual Assessment of the Three-year Action Plan for State-owned Enterprise Reform

Since the implementation of the three-year action plan for state-owned enterprise reform, the Company has consistently used reform to drive development and innovation to facilitate transformation, thereby promoting high-quality development. By the end of 2022, all 94 key measures of the Company's three-year action plan for state-owned enterprise reform have been completed, surpassing the primary objectives of the reform initiative ahead of schedule. The Company was honored by SASAC with the title of "Enterprises with Outstanding Contributions to Technological Innovation" for the 2019-2021 term. In 2021, the Company received awards for technological innovation achievements, SASAC's special projects, and an "A-level" result in the assessment of the three-year action plan for state-owned enterprise reform. Additionally, the Company was recognized as an "A-grade" enterprise in terms of operational performance for the 2021 term and the 2019-2021 term by SASAC, and earned the distinction of an "Outstanding Performance Enterprise", showcasing an inspiring track record of accomplishments.

The internet finance company has completed two rounds of capital injection, and attracted external capital of over RMB **2** billion, aiming to establish an operation platform on industrial digitalization for central SOEs based on BestPay.

China Comservice introduced State Grid Information & Telecommunication (SGIT) as a strategic shareholder, to further enhance strategic cooperation between the two sides in information-based and intelligent development of the power industry.

As "dual-100" companies, the internet finance company and China Comservice were rated as "**Outstanding**" in the special project assessment by SASAC for 2022.

The Digital Intelligence Technology Company and the eSurfing Cloud Company were awarded as "**Model Enterprises**" for "Demonstration Enterprises of Technological Innovation Reform" in the annual assessment, while the Security Company was recognized as "**Outstanding**".

China Telecom continued to promote the building of the modern enterprise system with Chinese characteristics. We have always adhered to the principle of "two consistents" to integrate the leadership of the Party into various aspects of corporate governance, fully leverage the political advantages as an SOE in Party building, and promote the modern enterprise system with Chinese characteristics towards higher maturity. On one hand, we comprehensively completed the formulation and revision of the list of major operational and management items to be discussed and studied by the Party groups/committees of the Group Company and its important branches and subsidiary companies, and strengthening the leadership of the Party in corporate governance. On the other hand, we enhanced the building of the board of directors by focusing on improving relevant systems, fulfilling the functions and powers of the board of directors, enhancing the corporate governance system and capacity, and ensuring compliant and efficient operations, to establish a corporate governance mechanism characterized by statutory powers and responsibilities, transparency of powers and responsibilities, coordinated operations, and effective checks and balances. Meanwhile, we reinforced supervision and management, improved operational oversight, and extended the "three majors and one large" (major matters, appointment and dismissal of major cadres, arrangement of major projects, and use of large amounts of funds) decision-making and operational oversight system to cover companies at the third level and above.

We continuously strengthened our subsidiary companies' efforts to improve corporate governance systems, enhance market-oriented operating mechanisms, and increase authorization and delegation of power to boost operational and developmental vitality, and convert institutional advantages into effective governance. The corporate governance structures of our subsidiary companies have been further optimized. Based on the characteristics of their businesses and development stages, we have established rational board governance models and continuously refined board composition. In 2022, 17 subsidiary companies introduced specialized committees within their boards, and 10 adjusted the number of board seats. Throughout the year, a total of 91 director appointments and dismissals were made across all levels of subsidiary companies. The corporate governance practices of our subsidiary companies have become more standardized. We consistently enhanced the company bylaws-based systems, reinforced support for board members in fulfilling their duties, and ensured proper protection of managerial authority. In 2022, various levels of subsidiary companies formulated over 300 normative documents related to corporate governance. Through initiatives such as proactively providing operational information to external directors, establishing regular communication mechanisms, and periodically reporting significant work matters to external directors, we have ensured robust support for board members' responsibilities and improved the standardized management of pre-meeting, during-meeting, and post-meeting procedures, thereby enhancing the quality of board decisions. Subsidiary companies at all levels have comprehensively established systems whereby the board authorizes the management team and the management team reports to the board. This has stimulated the operational vigor of the management team and improved the operational efficiency of the company.

Promote Supply Chain Management

The procurement and supply chain of China Telecom are centered around digitalization, intensification, specialization, collaboration, and ecosystem development. Taking the opportunity to build a world-class enterprise in an all-round way, we have continuously enhanced our procurement supply chain management system.

We were dedicated to advancing the building of a digitalized intelligent supply chain. With business process transformation as the driving force, we developed the CTSC 1.0 platform for supply chain operations management, to achieve a supply chain that is perceptible, visible, and controllable, and ensure stable and efficient supply chain operations.

We successfully enhanced the resilience and security of our supply chain, striking a balance between development and safety. We improved risk warning and response mechanisms, increased the degree of self-controllability of critical information infrastructure, and continuously bolstered cloud, network, edge and terminal security capabilities, to ensure reliable supply for key projects and major undertakings in 2022.

We rigorously implemented whole-process compliance control in our supply chain. In 2022, we introduced and revised seven basic regulations, including the China Telecom Supply Chain System Management Measures, to improve regulations related to bidding, framework execution, supplier management, and asset disposal. We also published a list for identifying compliance risks and established a closed-loop management mechanism for addressing compliance issues through the "Three Letters and One Meeting" approach, which further solidified the foundation of our compliance management. We have implemented in-process reminders for risks such as unauthorized procurement (should have undergone a bidding process but were not subjected to it) and procurement beyond authorized levels, strengthened the management of objections in procurement projects, and automated the selection of expert reviewers, to enhance the effectiveness of compliance control.

We consistently enhanced our supply chain's value creation capabilities by increasing the intensity of centralized procurement efforts. In 2022, the Group's comprehensive centralized procurement rate increased by 8.1%. To support business development and expand market share in industrial digitalization, we collaborated with partners to explore diverse supply models. We also backed technological innovation and in-house research by providing comprehensive supply chain services for autonomous technological innovation across demand, research and development, production, and implementation stages. This accelerated the deployment and promotion of independent innovation achievements within the Company.

We earnestly strengthened the supply chain ecosystem and supplier management, expanding supply chain management to the upstream and downstream of the industrial chain. Relying on the Tianyi Supply Chain Ecosystem Development Forum, we enhanced communication among member companies, and promoted their multi-dimensional cooperation in terms of market, business, technology, production capacity, and commerce for integrated development and win-win cooperation. Based on the six dimensions of "supply security, core capabilities, collaborative scale, performance in contract fulfillment, green and low-carbon initiatives, and ecological relationships", we meticulously selected 20 strategic suppliers and 64 excellent suppliers from hundreds of Group procurement suppliers. With these selections as our guidance and influence, we contributed to the Company's strategic development, value creation, risk prevention and control, and resource assurance.

Tianyi Supply Chain Ecosystem Development Forum Established

China Telecom launched the Tianyi Supply Chain Ecosystem Development Forum together with 36 well-known businesses in the industry, and released the *2022 Procurement Supply Chain Development Report for Telecommunications Industry*.

We vigorously promoted the development of a green supply chain by enhancing green procurement efforts. We achieved a 10% year-on-year reduction in energy consumption for the procurement of 5G base stations and servers. We intensified the verification of green and low-carbon aspects in evaluation and testing, and increased the weight of green and low-carbon indicators in bidding and procurement processes. We also enhanced comprehensive online management for the disposal of waste and old materials, and advanced the application of green packaging for collectively purchased materials, to facilitate green circulation and sustainable development of the supply chain.

Enhance Compliance Management

China Telecom has always adhered to lawful and honest operations, and complied with national laws and regulations, regulatory requirements, industry norms, as well as the Company's articles of association, relevant rules and regulations. We comprehensively strengthened compliance management, improved risk prevention capabilities, and organically integrated compliance management, safety production, Party conduct and integrity construction, anti-corruption, financial and audit supervision with corporate operation and reform, to ensure high-quality development of the Company. We fully carried out risk identification and assessment work, strengthened risk tracking and control, and maintained a stable and controllable development trend throughout the year, with no major risk events occurred.

We promoted the Company to operate in accordance with the law and regulations, constantly enhancing compliance management capabilities and levels. We strived to embody the concept of "compliance for everyone, in everything, at all times", and carried out the "Year of Strengthened Compliance Management" initiative. We continuously refined the compliance management system, reinforced organizational leadership, enhanced institutional development, improved operational mechanisms, leveraged the functions of the "three lines of defense", strengthened team building, and fostered a culture of compliance. Meanwhile, we focused on key areas of compliance management, centering on the cloudification and digital transformation strategy. We persistently enhanced compliance management in fields such as cyber and information security, anti-monopoly measures, overseas operations, and drove the integration of compliance management into business operations, providing businesses with a "safety belt" and "protective gear", to ensure the sustainable and healthy development of the Company.

We seriously implemented the *Work Safety Law of the People's Republic of China* and other relevant laws and regulations on work safety. In 2022, we formulated internal systems such as the *China Telecom Implementation Opinions on Work Safety Standardization* (trial) and the *China Telecom Methods for Reporting Rewards in the Field of Work Safety* (trial). We further strengthened the organizational and management system for work safety, enhanced centralized and unified leadership, and established a dual-director system for the work safety committee. We refined and improved the responsibility system for work safety, and summarized the overall principles of "Safety must be managed in all aspects of business development, production and operations, and asset management" and "Those who employ are responsible for safety, those who construct are responsible for safety, those who use are responsible for safety, those who operate are responsible for safety, and those who outsource are responsible for safety." We established a building safety management accountability system with building chiefs, and delegated work safety responsibilities at different levels, in different professions, and in different regions. We enhanced the dual-prevention mechanism of graded control of safety risks and investigation and rectification of hidden dangers, and carried out large-scale investigations and rectifications of safety risks and hidden dangers, to comprehensively prevent and resolve major risks, and ensure the safety of employees and property.

Publicity and Education

Carried out safety production knowledge publicity, education, training, and emergency drills to continuously enhance employees' safety awareness and improve their emergency response capabilities.

Supervision and Inspection

Conducted large-scale investigation and rectification of safety hazards, 100-day special rectification campaigns, special actions to prevent and mitigate significant safety risks, and special actions to inspect and rectify fire safety hazards in high-rise buildings and key premises. Established a risk and hazard record, and promptly implemented closed-loop corrections for identified hazards.

Strengthened the management of cooperating units involved in engineering construction and comprehensive maintenance operations, and rigorously enforced supervisory responsibilities, to contain the occurrence of major accidents, and ensure safety and stability.

Digital Empowerment

Initiated the pilot construction of the "Fire Safety Cloud Platform", leveraging digital empowerment to enhance the networking capabilities of communication equipment rooms for technical defense.

Standardization

Initiated pilot projects for the standardization of work safety practices, laying a solid foundation for basic safety production management.

We are unwavering in our commitment to advancing the construction of Party conduct and integrity, as well as anti-corruption efforts. We diligently enforced laws and regulations related to anti-corruption, such as the *Supervision Law of the People's Republic of China* and established and improved five major mechanisms: education and prevention, institutional supervision, punishment and accountability, error tolerance and rectification, as well as inspection and oversight to rigorously prevent issues like bribery, extortion, fraud, and money laundering. In 2022, we continued the building of the "Clean China Telecom" public account on new media platforms, to foster a positive atmosphere. We conducted a "Clean China Telecom" micro-video collection and promotion campaign, to advance Party conduct and integrity building. We provided integrity education and discipline education for management and staff. We sustained efforts to consolidate and deepen the outcomes of central and internal inspection and rectification, guiding and supervising secondary companies to achieve comprehensive inspections, and advancing specialized rectification within the Company. We established postal reporting mailboxes and hotlines to accept reports, accusations against relevant individuals, appeals regarding related handling, as well as criticism, opinions, and suggestions concerning the building of a culture of integrity and anti-corruption work. Strictly adhering to the *Rules for Handling Reports and Accusations by Disciplinary Inspection and Supervision Organs*, we handled reports and accusations in accordance with regulations, ensured confidentiality, and effectively protected the rights of whistleblowers.

We have effectively strengthened financial and audit supervision. We continuously enhanced the internal control system, and revised internal control processes in a timely manner based on changes in internal and external environments and Company management requirements. We refined the internal control system to align with the Company's governance structure, and enhance the effectiveness of internal control construction. Leveraging the big data financial risk prevention and control system, we constructed a financial risk prevention and control system through building and optimizing financial risk control models, conducting multi-dimensional analysis through cross-scanning and intelligent use of big data. We continued to advance financial digitized operations, using digital means to improve management capabilities. We diligently implemented the new requirements for internal audit work from the CPC Central Committee and the State Council. With the goals of "risk prevention, implementation assurance, development promotion, and value enhancement," we fully utilized the function of audit as an "economic check-up" to aid the Company in operating in compliance with laws and regulations, and contribute to high-quality development. In 2022, we conducted 246,000 audit projects, proposed 3,468 management suggestions, and contributed to the improvement of 4,035 system items.

Enhance Internal Audit System Building	Strengthen Audit Supervision and Rectification	Promote Digital Transformation of Audit	Improve Accountability System
• Established and improved a sound internal audit leadership system, strengthened unified control of enterprise audit work, and enhanced collaboration with professional departments and internal supervision forces, to improve supervision efficiency.	• Continuously strengthened audit supervision of the effectiveness of internal control, compliance, and risk management systems. • Strengthened inspections of key units and areas while ensuring full coverage of the audit for three years. • Strengthened the rectification of audit findings and specified the responsibility for rectification, to promote substantive rectification of key issues, and transform the results of audit rectification into governance effectiveness.	• Actively utilized new technologies such as AI and big data to gradually develop a normalized risk monitoring capability, and promote the improvement and efficiency of audit work.	• Refined the accountability system for illegal business operations and investments, and carried out accountability and verification of common issues in accordance with the law and regulations, to enhance the compliance and bottom-line awareness of management personnel at all levels.

Care about Employees

China Telecom protects the rights and interests of employees in accordance with the law, pays attention to the establishment of harmonious labor relations, supports trade unions to perform their functions, encourages employees to participate in management, helps employees improve their capabilities, and strives to grow together with employees.

Protect Rights and Interests of Employees

China Telecom protects the labor rights, democratic rights, and spiritual and cultural rights of employees in accordance with the law, and strengthens labor employment management for lawful and standardized employment. Adhering to the principles of equality, voluntariness, and consensus through consultation, it signs written labor contracts with employees in accordance with laws and regulations related to labor employment and employee rights protection, such as the *Civil Code of the People's Republic of China*, the *Labor Contract Law of the People's Republic of China*, and the *Trade Union Law of the People's Republic of China*, and by implementing documents such as the *Notice on Issuing the 'China Telecom Group Labor Contract (Model)'*. The labor contracts provide detailed regulations on the dissolution of those contracts and are enforced in accordance with laws and regulations, to safeguard employees' basic rights, and fulfill the obligations of both parties.

The Company respects employees' labor, values their health, and timely and fully pays salaries to employees, as well as social insurance. A paid leave system for employees has been implemented, and working hours and vacations are clearly clarified to safeguard employees' legitimate rights and interests.

The Company continues to improve the business operation mode and job classification related to labor dispatch by clarifying the employment forms of various posts, regulating the dispatch agreements signed with labor dispatch units, inspecting if the dispatch units and dispatched workers have signed labor contracts, and urging them to do so, as well as paying salaries and social insurance on time.

CT recruits talents from all over the society. Complying with the *Employment Promotion Law of the People's Republic of China*, and taking the principles of fairness, openness, and impartiality, it publishes recruitment information through company websites, official accounts, social recruitment websites, and other channels, and provides multi-channel and diversified recruitment methods to attract various types of outstanding talents. In recruitment, it provides equal employment opportunities, ensures that workers are not discriminated against based on ethnicity, race, gender, age, region, marital status, physical condition, etc., and provides job positions suitable for individuals with disabilities. The Company adheres to equal pay for equal work, offers promotion opportunity to employees, unblocks the career development path, and deals with the individual information of employees according to law, protecting their privacy and ensuring information security.

China Telecom pays attention to employee occupational health management. Abiding by occupational safety and health related laws and regulations such as the *Occupational Disease Prevention Law of the People's Republic of China*, it established and improved internal systems for occupational health and labor protection such as the *Interim Measures for Labor Protection of Female Employees of China Telecom Group*, and carried out Employee Assistance Program (EAP) to ensure the occupational safety and physical and mental health of employees.

As China Telecom strictly implements the relevant requirements of the *Regulations on Prohibition of Child Labor*, child labor is prohibited and forced labor is prevented in the Company. The recruitment management methods have defined the age requirements of candidates, to avoid the use of child labor. There was no event related to child labor or forced labor in the Company in 2022.

Joint Negotiation of the Collective Contract

In order to further establish harmonious and stable labor relations in the company, safeguard the legitimate rights and interests of employees, and better promote the development of the company, the Shaanxi Branch revised the Collective Contract, Collective Negotiation Agreement on Wages, and Special Contract for the Protection of the Rights and Interests of Female Employees signed by the Shaanxi Branch at the third session of the Workers' Congress in accordance with the latest revised laws and regulations, in order to standardize the form of contracts and protect the legitimate rights and interests of employees.

Care about Employees' Life

China Telecom continues to strengthen communication with employees, understand their demands, increase care for them, and strives to improve their sense of happiness, acquisition and security.

More close communication with employees

- Organized trade unions at all levels to continue to give play to the role of full-time and part-time trade union cadres, team leaders, and employee representatives, adhere to a normalized understanding of employees' thoughts and difficulties, reflect their opinions and suggestions, and build a harmonious labor relationship.

- Organized a questionnaire survey on employees' happiness and motivation, the answers of which were summarized and analyzed for a report on the ideological status of employees in various provinces, which was reported to the management, and promoted the resolution of employees' urgent and difficult problems.

Better working environment for employeesxa

- Widely carried out activities on construction of "Beautiful Branch" and "Beautiful Courtyard", to continuously improve the working and living environment of grassroots employees.

- Organized a selection activity for demonstration benchmark units in building the "small facilities in four types" (small canteens, small bathrooms, small toilets and small activity rooms), in which 100 benchmark units for county-level branches and grassroots frontline units were selected, to promote good practices and experiences at the grassroots level.

Enhance the physical and mental health of employees

- Opened a psychological service hotline for operating employees, regularly summarized their psychological status, organized online lectures on employee psychological empowerment in response to hot issues of concern to employees, and effectively provided psychological counseling and comfort to employees.

- Enhanced care for female employees, strengthened labor protection, and improved the environment and facilities of the mother and baby room.

- Organized cultural and sports activities such as photography, singing, dance, folk art, badminton, and table tennis to help employees balance work and life, and enhance their sense of happiness.

More efforts on assistance and solicitude

- Learned about the situation of employees suffering from disasters such as earthquake, flood and rainstorm as quickly as possible, and guided and comforted front-line employees engaging in disaster relief, emergency repair and customer service.

- Cared for overseas employees and their families, regularly contacted the families of employees dispatched abroad to understand their situations and help them solve practical difficulties, and sent full solicitude to them during holidays such as the Spring Festival, Dragon Boat Festival, Mid-autumn Festival, and National Day. Regularly registered the situation of employees' children studying abroad by unblocking channels through the internet, whereby a total of 1,577 children studying abroad have been provided with remote medical consultation platform services.

Enhance Employee Cohesion through Commendation

On May 8, 2022, which happened to be Mother's Day, the Jincheng Branch invited family members of outstanding employees to attend the "Annual Commendation Conference", at which those family members received flowers and gifts from the Jincheng Branch to thank them for their understanding of the employees' work and their support for the company's development.

Diversified Recreational and Sports Activities

From June 28th to July 13th, 2022, the Yanbian Branch held the 4th "Tianyi Cup" Basketball Tournament, aiming to improve the physical fitness of company employees, enrich their leisure activities, and enhance collective cohesion.

Successful Conclusion of "Family Fitness Month"

In July 2022, China Telecom Europe held a month-long "Family Fitness Month" event in collaboration with a local fitness chain in the UK. It encompassed activities such as experiencing gym equipment and participating in online and offline fitness classes. Over a hundred employees and their family members from five different countries took part.

This event was conducted with the concept of "Happy Work, Healthy Life" to provide a platform for employees to relax mentally and physically, and enhance their overall well-being. This platform also facilitated improved communication and interaction among employees, fostering joyful moments of engagement.

"This year's activities have been incredibly innovative. While ensuring safety during the pandemic, we engaged in fitness routines together and shared our exercise experiences with colleagues. Through this, we've become more acquainted with one another. I truly resonate with China Telecom Europe's emphasis on a culture of caring for its employees. By involving employees' family members in these activities, it not only increased our interaction time, but allowed families to create unforgettable memories together."

— Pang Yong, Department of Strategic Development and Legal Affairs of China Telecom Europe

Organize Activities to Celebrate "International Women's Day"

On March 8, 2022, the Administrative Labor Union of the Jiangsu Branch organized a flower arranging and nail art event for female employees with the theme "Displaying Elegance and Charm, Celebrating International Women's Day" to commemorate International Women's Day.

Help Employees Grow

China Telecom has continuously advanced the construction of its cadre and talent teams, enhanced employee training, promoted the spirit of model workers, encouraged employee participation in management, and consistently improved the capabilities and value of the employee workforce.

China Telecom has earnestly advanced the construction of a high-quality cadre team, and established a clear personnel orientation focusing on doing practical work. In selecting cadre members to complement the leadership team, serving high-quality development of the Company is a core principle. The Company has continuously optimized the leadership team's age and professional structure, and intensified efforts in cultivating and selecting outstanding young cadres and technology-oriented cadres, to create a reserve pool for technology-oriented cadres. The Company also strengthened education on the ideals and beliefs of cadres, motivating them to take on responsibilities and initiatives. This lays the foundation for the comprehensive implementation of the cloudification and digital transformation strategy, accelerating the building of a world-class enterprise, and driving the high-quality development of the Company.

The Company has continued to strengthen employee training, kept pace with the trends of digital economy development, and promoted the comprehensive implementation of the cloudification and digital transformation strategy. Throughout the year, we conducted 27 sessions of the "Cloudification and Digital Transformation Grand Lectures" series and 4 sessions of the "Path of Transformation" series, with over 2 million participants in total. To further empower the cloud professional team system, an integrated approach was used involving "eSurfing Cloud Empowerment Zone Learning + Key Topics Learning + eSurfing Cloud Certification + Faculty Development + Labor Competition + Training Base", covering nearly 70,000 cloud professionals. We conducted large-scale talent development through hierarchical and tiered approaches. Focusing on "real-world experience + certification", we cultivated three engineering teams in industry digitalization, research and development, and cloud network. For front-line employees, we organized skill certification exams covering 40 different disciplines, involving nearly 370,000 participants, driving the transformation of skilled workers to outstanding engineers.

Learning participants over

2 million people

Skill certification exams covered

40 disciplines

Covered nearly

370,000 people

Explore a Training System for New Employees to Help Them Grow Quickly

Building on the foundation of its operations, the Fujian Branch developed and continuously upgraded a training system for new employees, which has evolved to become a standardized and structured training and management process. Its primary goal is to empower new employees to swiftly acquire the competence required for their roles, facilitating optimal alignment between individuals and their job positions.

1. Systematic pre-job training for precise management of new employees' growth: The establishment of cross-departmental project teams, in conjunction with the characteristics of new employees and business requirements, has led to the creation of an integrated training system that emphasizes standardized management and structured teaching. This system includes the development of individual comprehensive training records for new employees, enabling comprehensive, scientific, and systematic control over their training and development, to ensure that new employees receive the necessary guidance and support for their rapid growth.

2. Comprehensive course design to establish a strong foundation in cloud-network technology: After years of continuous improvement and optimization, the current training system encompasses a range of high-quality courses in various domains, including big data, network security, 5G, machine learning, and cloud technology. While consistently refining the courses, they also continuously update the course content across various categories to align with the latest trends and developments.

3. Using multiple assessment methods for effective evaluation, and mutually beneficial interaction between instructors and learners: Employ methods such as learning assessments, two-way evaluations, and regular discussions, to assess the effectiveness of the learning process, and identify and address areas of weakness, so as to continually improve the quality of the courses and enhance the overall effectiveness of the training system.

Foster a Good Learning Atmosphere with "Chunyu" Classroom

To continuously foster a learning-oriented organization and create a positive team learning atmosphere, the Chongqing Branch established the "Chunyu" (Spring Rain) Classroom in 2022, aiming to enhance employees' comprehensive abilities. The "Chunyu" Classroom conducts teaching activities once a month, where employees may voluntarily enroll as instructors and choose their teaching topics without limitations. By having employees take the stage as teachers, this initiative provides a platform for employees to showcase their expertise, fostering an environment of organization-wide and continuous learning.

"Years of Growth" Speech Contest Organized

On September 23, 2022, the Shanxi Branch organized the "Years of Growth" Speech Contest, marking the beginning of the thematic promotional event "Two Decades of Achievement, Celebrating the Twenty-Year Milestone". More than 170 employees actively participated in the event. Contestants shared moving stories of their struggles, intertwining the company's development journey with their personal growth experiences. Their heartfelt narratives vividly exemplified the spirit of entrepreneurship, innovation, and creation, showcasing the journey and accomplishments of China Telecomers in the ever-changing times.

"Walking the Youthful Path of Digital Intelligence" Themed Event Organized

On August 9, 2022, the Youth League Committee of the Tianjin Branch organized a themed event titled "Walking the Youthful Path of Digital Intelligence" at the Beijing-Tianjin-Hebei Big Data Intelligent Computing Center. Young employee representatives had the opportunity to visit a simulated sandbox, explore the "Development Road" gallery, observe drone footage of the project area, get insights into the overall project construction and operation, and witness the IDC data center in action. Through this educational and enjoyable experience, they gained an understanding of the impressive computing capabilities of the intelligent computing center.

Promote the Spirit of Model Workers, Labor Spirit, and Craftsmanship

Awarded **15** national honors in 2022

Awarded **117** provincial and ministerial honors in 2022

"National May Day Labor Certificate" Awarded

On April 28, 2022, the celebration of International Labor Day and the commendation conference took place in Chengdu, Sichuan Province. During the event, the Sichuan Branch was honored with the "National May Day Labor Certificate", making it the sole company in the communication industry in Sichuan Province to receive this prestigious recognition.

China Telecom encourages employee participation in company management. In 2022, the Company revised and improved the working system of the Workers' Congress, formulated a plan for the transition of the Congress, and organized elections for the second term of workers' representatives. The Company continued the practice of collecting proposals from worker representatives, receiving over a hundred proposals covering areas such as cloud-network convergence, technological innovation, green development, cyber security, product and customer service, corporate management, employee team-building, and staff well-being. Since the inaugural Workers' Congress in 2017, mechanisms for democratic management, participation, and oversight have been deepened. Employees' rights to information, participation, expression, and supervision have been effectively safeguarded, and their involvement in the democratic management of the Company has reached new heights.

SHARE DIGITAL INTELLIGENCE ACHIEVE-MENTS

China Telecom is actively engaged in rural revitalization efforts and enthusiastically participates in philanthropic activities. We are committed to enhancing service awareness, protecting customer rights, improving customer experiences, fostering international cooperation, and promoting global connectivity.


Serve Rural Revitalization

China Telecom is dedicated to effectively connecting the solid achievements of poverty alleviation with the ongoing rural revitalization efforts, and continues to leverage the role of digital information infrastructure in empowering economic and social development, to bridge the digital divide, enhance digital inclusiveness, and enable different segments of the population to share the benefits of digital development.

In 2022, as a year of deepening the effective connection between consolidating the achievements of poverty alleviation and promoting rural revitalization, we maintained our efforts in poverty alleviation, and made full use of our corporate advantages to steadily and systematically advance targeted assistance and industry support initiatives.

Meeting between NRRA and China Telecom

On February 24, 2022, a meeting was held between the National Rural Revitalization Administration (NRRA) and China Telecom Group to discuss the effective connection between consolidating the achievements of poverty alleviation and promoting rural revitalization. Liu Huanxin, a member of the Party Group of the Ministry of Agriculture and Rural Affairs and Head of NRRA, and Ke Ruiwen, Secretary of the Party Leadership Group and Chairman of China Telecom Group, attended the meeting and gave speeches. Chairman Ke said that the Company would fully implement the decisions and arrangements made by the Party Central Committee, continue to focus on targeted assistance efforts and ensure consistent investment of resources in terms of funds, talents, and projects. He also emphasized the ongoing enhancement of network coverage in rural areas and provision of favorable communication services. The Company would focus on digital rural development, and establish digital rural demonstration points in areas related to agricultural production, rural life, and village governance, to empower agricultural and rural modernization.
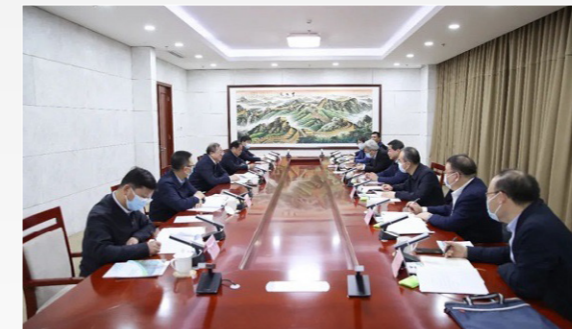
Leaders of China Telecommunications Co., Ltd. conducted supervision, inspection, and research with a comprehensive coverage in the 4 designated counties and 2 paired-assistance counties (referred to as "4+2" assistance counties). This effort resulted in the introduction of RMB 18.99 million of gratuitous assistance funds and the training of 53,441 cadres and talents in the "4+2" assistance counties. We also actively engaged in consumption assistance, and supported the development and growth of over 1,400 assistance points and characteristic industries in the "4+2" assistance counties and companies at various levels, to effectively consolidate and expand the achievements of poverty alleviation and contribute to the comprehensive revitalization of rural areas.

Investigation on Rural Revitalization

From August 22 to 25, 2022, Deputy Secretary of the Party Leadership Group and President of China Telecom Group Mr. Shao Guanglu led a team to Liangshan in Sichuan Province to investigate rural revitalization efforts. During the visit, they delved into the China Telecom-sponsored projects in Muli County and Yanyuan County, both designated to China Telecom for assistance. The delegation also extended their regards to frontline employees and engaged in discussions with local Party committees and governments to collaboratively explore and advance the effective connection between consolidating the achievements of poverty alleviation and promoting rural revitalization.

"Yiqi Zhifu"

In 2022, BestPay actively responded to the "Spring Dawn Special Action" and continued to strengthen the brand of "Taste of Hometown" farmer assistance activities by offering various regional hometown specialties and local cuisine, and creating a culinary identity for different areas. As an example, in Zhangye City, BestPay collaborated with the China Foundation for Rural Development, Zhangye Municipal Government, and Zhangye Nongtou to organize the "Taste of Hometown | Chinese Farmers' Harvest Festival" themed rural revitalization activity. This initiative resulted in over 100,000 orders for agricultural products, effectively boosting local industry income and promoting local brands. The "Yiqi Zhifu" (becoming rich with BestPay and through smart means) plan has provided effective assistance for rural revitalization and income enhancement for the local population, and was selected as a demonstration project for new information consumption by the Ministry of Industry and Information Technology in 2022.

China Telecom promotes digital rural building as a crucial measure in deepening industry support and targeted assistance, and strives to create a model for "Five Revitalizations" in rural areas with digital empowerment. The Company continues to deeply integrate modern information technologies with various aspects of agriculture and rural areas, leverages the digital rural platform to offer capabilities such as cloud viewing, cloud broadcasting, and AI applications to governments and residents of townships and villages, as well as provides digital applications for smart Party building, village and governmental affairs, and convenient services to address the "last mile" of information technology in grassroots governance, drive new progress in rural revitalization and advance modernization in agriculture and rural areas.

Connect the Arteries of Industrial Chain of Xinjiang Fruits

Agriculture is a crucial economic pillar in Shufu County, with the fruit and forestry industry serving as a representative of its distinctive agriculture. Following the industrial assistance approach of "expanding scale, enhancing value, promoting integration," China Telecom focused on the development of the fruit and forestry industry in Shufu County, and worked on connecting the entire process of Xinjiang fruits, including planting, processing, storage, transportation, sales, branding, and services, aiming to expand the agricultural industrial chain and value chain, foster the growth of smart agriculture, build a strong brand, produce high-quality products, tap into larger markets, and support the local Kashgar Jiang Guo Guo Agricultural Technology Co., Ltd. to become a key leading enterprise in the agricultural industrialization of the autonomous region. In 2022, their sales exceeded RMB 220 million, contributing to a better life for the people of Shufu County through improved livelihoods and agricultural development.

Assist the Development of Local Specialty Industries

The Guangxi Branch undertook extensive assistance efforts in Dikou Village, and devised measures under the "One Village, One Plan" approach for precise assistance. Taking into account the village's resources and strengths, it actively explored various aspects such as cultivation and processing, brand image building, collective economic development, industrial integration development, innovative marketing strategies, and digital applications, and developed a mature industrial chain covering cultivation, processing, brand registration, and sales through methods like land integration and labor absorption. It has contributed to the growth of Dikou Village, with the value of industries such as selenium-rich rice and selenium-rich Chinese yam cultivation exceeding RMB 12 million, effectively promoted local industry upgrading and increased residents' income.

Distinctive Rice and Shrimp Cultivation Empowers Collective Economy

Leveraging the unique advantages of soil, landforms, and landscapes in Henggang Village, Xiangdong District, Pingxiang City, the Jiangxi Branch collaborated with the local cooperative to establish a distinctive rice and shrimp cultivation assistance base. Following a "Company + Cooperative + Farmers" assistance model, the base was established by reclaiming and leasing 350 acres of long-idle winter paddy fields. This approach not only reduces abandoned land but also provides stable employment opportunities for surrounding farmers, poverty-stricken households, and monitored households, further enhancing the sense of achievement, happiness, and security among local residents.

Engagement in Charitable Undertakings

China Telecom is enthusiastic in participating in social welfare undertakings, and has implemented the "Welfare Donations Law of the People's Republic of China" and other laws and regulations, as well as "Measures for the Management of China Telecom Group's External Donations". Following the principles of "being voluntary, non-remunerated, clear rights and responsibilities, acting within the limit of resources, being honest and trustworthy", and taking into consideration the needs of beneficiaries and social development, the Company proactively helps the disadvantaged groups and supports the development of the science, education, culture, physical and health courses through various forms of charitable and relief donations. The Company also encourages employees to embrace volunteerism, and fully embody the service concept of the "Love with Tianyi" volunteer service brand to actively participate in voluntary service activities.

Civilized Traffic Volunteer Service

At the end of July 2022, the Jilin Branch actively integrated the "Love with Tianyi" service concept into the province-wide volunteer service activities and conducted a 7-day campaign for civilized traffic volunteer service. Volunteers donned red vests and held small red flags as they worked in cooperation with traffic police to advise individuals on crossing traffic lines, running red lights, and not wearing helmets while riding electric bikes. These volunteers became a beautiful and prominent sight in the crowd.

Work with HINICHIJOU to Convey Warmth and Care

In October 2022, the Shanghai Branch collaborated with the philanthropic influencer brand "HINICHIJOU" to launch the "China Telecom Small Hands and Big Hands towards a 'Beautiful Home'" campaign in three of their stores in Xindong, Caoxi, and Chuanbei. Revolving around the theme of "Spreading Philanthropic Love and Conveying Warmth and Positive Energy," the camapign included a themed art exhibition showcasing the "Beautiful Home" works of autistic children, a flash mob live stream event featuring children's choir performances, the "Bear Claw Relay for Good" initiative, and family portrait sessions centered around the theme of a "Beautiful home". Additionally, a philanthropic donation area was set up where visitors could contribute a little warmth while enjoying the exhibition, live stream, and singing performances. This initiative aimed to bring warmth to remote rural children and children with special needs.

Donate Emergency Rescue Drones

In the context of China Telecom's designated assistance to Yanyuan County, Liangshan Yi Autonomous Prefecture, Sichuan Province, and under the coordination of the Sichuan Branch, the Jiangsu Branch partnered with SF Express to donate 2 sets of M30T specialized drones to Yanyuan County. These drones will be utilized for regular inspections related to forest fire prevention, flood control, disaster relief, and emergency response in the county, to ensure the safety of people's lives and property and strongly promote rural revitalization in the region.

China Telecom continues to advance the construction and operation of "CT Love Stations", giving play to the role of the small station as a broad platform in providing warm and caring services to special social groups, contributing to enhancing information accessibility and security, and consistently elevating the level of public welfare care. The "CT Love Stations" initiative has been upgraded in terms of both service content and extension by introducing a "Tuesday with China Telecom" public welfare service day, establishing an integrated care model that combines "online public welfare live streaming + offline station services", regularly providing rest places and supplies to outdoor workers, as well as organizing lectures to help the elderly use smart applications, collaborative anti-fraud campaigns by the police and the Company, and themed care events such as "Cool Summer", "Warm Winter", and "Respect for the Elderly on Double Ninth Day". The innovation and outreach capabilities of the "CT Love Stations" services have been enhanced. By the end of 2022, over 10,000 "CT Love Stations" had been established, covering densely populated regions including residential communities. A total of 43,000 lectures on topics like digital product use were conducted, benefiting approximately 6 million people. In 2022, 96 "CT Love Stations" were awarded the title of "Most Beautiful Labor Union Service Station for Outdoor Workers" by the All-China Federation of Trade Unions, with the largest number of recognized stations in the enterprise category.

Organized **43,000** lectures and training on digital product use

People benefiting from the care services reached

6 million

"Tuesday with China Telecom" Extends Care to Outdoor Workers

In August 2022, the Xiamen Branch conducted a series of activities to show care for outdoor workers at eight major business outlets. Collaborating with food delivery companies, they set up "Love Tea Stalls" at the Jiangtou and Binbei business outlets, providing take-away deliverymen with a cool place to rest, convenient charging facilities, and refreshing drinks to beat the heat. They also encouraged deliverymen to download the National Anti-Fraud App, to enhance their awareness of fraud prevention and their ability to guard against scams.

CT Warmth Brought by "CT Love Stations"

The Hengshui Branch established "CT Love Stations" at 32 business outlets across 13 administrative districts and counties. Starting from a focus on caring for outdoor workers and the elderly, these stations have been equipped with dedicated facilities to provide warm services such as heating, hot water, and resting areas for outdoor workers, and organize activities for the elderly to experience and learn about the use of smart products, helping them bridge the digital divide and enjoy the convenience of the information age.

Anti-fraud Public Welfare Live Streaming

In 2022, the "CT Love Stations" launched nationwide public welfare live streaming, inviting professionals such as police officers, firefighters, doctors, and consumer rights experts to spread knowledge and skills related to anti-fraud measures, fire safety, consumer rights protection, and health and wellness. The sessions provided an opportunity for online Q&A and clarification. During the year, more than 300 live streaming were conducted.

On September 17, 2022, anti-fraud police officers in the capital city conducted live steaming to illustrate the tactics used in online dating and romance scams, aiming to promote anti-fraud prevention techniques in a clear and straightforward manner.

Serve Customers Attentively

Adhering to the concept of "customers first with attentive service", China Telecom has strengthened its service awareness, protected customers' rights and interests according to law, and improved customers' experience, to create a trustworthy image in an all-round way.

Protect Customers' Rights and Interests

China Telecom diligently implements laws and regulations such as the *Civil Code of the People's Republic of China*, the *Law of the People's Republic of China on the Protection of Consumer Rights and Interests*, and the *Advertisement Law of the People's Republic of China*, and has refined internal regulations related to brand promotion such as the "China Telecom Brand Promotion Management Measures". The Company provides products and services in accordance with the law, regulates tariff management, continually optimizes business registration forms displayed to customers, enhances digital management capabilities, improves integrated approval processes for sales and tariffs, and responds promptly to market and customer demands. Additionally, the Company has strengthened compliance management in advertising and publicity by standardizing promotional language, and prohibiting false advertising, exaggeration, and misleading comparisons to uphold the Company's positive brand image.

China Telecom has taken substantial measures to comprehensively address telecom fraud, harassing calls, and spam messages. In 2022, through continuous enhancement of technical defense capabilities, strengthened control over key communication resources, optimization of complaint handling processes, and other measures, the Company intercepted 3.176 billion harassing calls and blocked 2.85 billion spam messages. The "Tianyi Anti-harassment" service, which allows individual users to set up call blocking for harassing calls, was promoted and reached a user scale of 270 million. By continuously improving technical defense capabilities, intensifying monitoring and response to key businesses, the Company shut down and intercepted 499 million suspicious text messages related to fraud cases throughout the year, including 189 million from overseas sources. We also blocked 5.9821 million suspicious domain names and deactivated 19,400 suspicious numbers. Integrated online and offline anti-fraud campaigns were conducted, reaching a cumulative audience of 24 million people. In 2022, we had the lowest volume of phone numbers related to fraud cases in the industry, and reports of harassing calls and spam messages remained consistently low within the industry.

The Zhangzhou Branch Applies Digital Capabilities in Anti-fraud

The Zhangzhou Branch fully leveraged its powerful cloud resources and big data technology to establish the "Zhangzhou Anti-fraud Big Data Platform". Through multidimensional data modeling, automated processing workflows, differentiated shutdown and recovery mechanisms, and other digital methods, it enhances the effectiveness of anti-fraud measures, fortifies the "fraud prevention wall" for communication information, and safeguards the financial interests of the general public.

Multidimensional data modeling for full coverage
Constructed a three-tier model matrix of "pre-event prevention, during-event monitoring, post-event disposal" for full lifecycle coverage of registered numbers and effectively addressing four major challenges: risk identification for new SIM card registrations, monitoring of abnormal flow for existing inactive SIM cards, control over terminals associated with fraud-related activities during registration, and identification of anomalous call behaviors.

Automated processing workflows for higher efficiency
Shifted away from the inefficient manual assessment and shutdown approach by implementing an automated functionality within the data model. Once fraudulent risk numbers are identified, an automatic shutdown notice message will be sent, significantly enhancing the timeliness and efficiency of the shutdown process.

Differentiated shutdown and recovery mechanisms for better services
Categorized and labeled numbers involved in legal cases, fraud, and protective shutdowns, and developed distinct disposal plans based on risk levels, empowering front-line personnel with a systematic approach to efficiently handle recovery requests and protect customers' rights and interests.

Building upon this foundation, the Zhangzhou Branch furthered its collaboration with the police, weaving a robust security prevention network. It actively explored big data-based comprehensive analysis and judgement capabilities, and provided fraud leads related to three types of devices, which assisted the city's anti-fraud center in enhancing their targeted crackdown abilities, and effectively curbed the rampant occurrence of telecom network fraud and illegal activities. As of December 31, 2022, its alert and dissuasion efforts had covered a total of 86,742 individuals.

Customer Testimonials
"In recent years, your company has taken the initiative to shoulder social responsibility by actively collaborating with public security agencies to combat and prevent telecom network fraud and illegal activities. The establishment of the 'Zhangzhou Anti-fraud Big Data Platform' showcases your utilization of big data and AI technology for analysis and provision of leads. This robust support greatly aids efforts in combating and managing new types of illegal activities within telecom networks, safeguarding the financial interests of the general public."
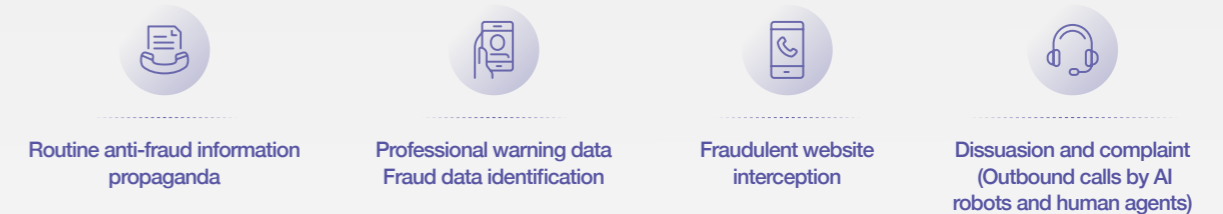—— Chen Jiezhong, Director of Zhangzhou Anti-fraud Center

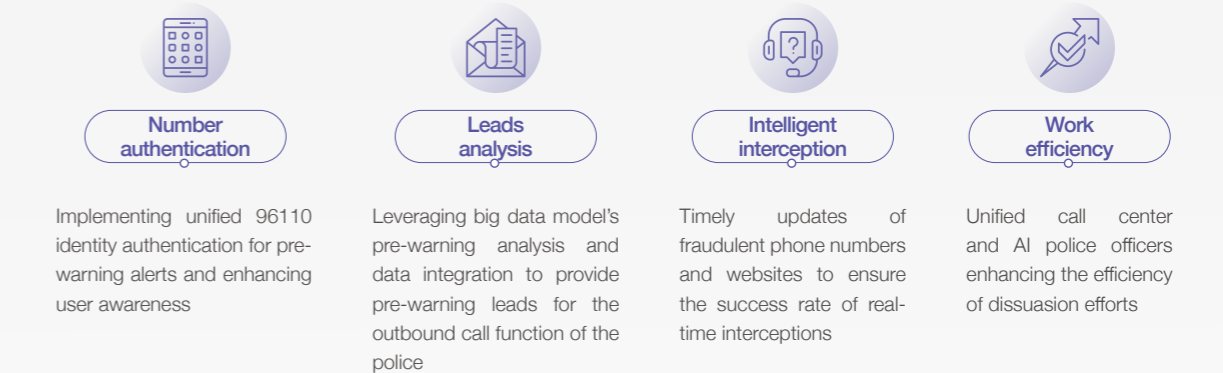### "96110 Anti-fraud" Services

The "96110 Anti-fraud" service offers pre-warning and interception of fraud-related calls and messages, including intelligent daily propaganda, flash message alerts, interception of fraudulent websites, analysis of warning leads for fraudulent messages, and cloud outbound calls for anti-fraud dissuasion through 96110. With over 8,000 fraudulent website recognition models deployed, this integrated platform has already provided services to 73 regions in 19 provinces.

Business Scenarios

Based on 96110

| Routine anti-fraud information propaganda | Professional warning data Fraud data identification | Fraudulent website interception | Dissuasion and complaint (Outbound calls by AI robots and human agents) |

Pain Points Addressed

Number authentication	Leads analysis	Intelligent interception	Work efficiency
Implementing unified 96110 identity authentication for pre-warning alerts and enhancing user awareness	Leveraging big data model's pre-warning analysis and data integration to provide pre-warning leads for the outbound call function of the police	Timely updates of fraudulent phone numbers and websites to ensure the success rate of real-time interceptions	Unified call center and AI police officers enhancing the efficiency of dissuasion efforts

Improve Customer Experience

China Telecom remains committed to customer orientation, and has further advanced customer-centric mechanisms and process reforms. In 2022, we continued the "Enhanced Satisfactory Service Action", addressing deficiencies in mobile and broadband services. Through a green channel mechanism, we focused on hotspot area improvement, digital quality improvement, and transparent consumption and proactive services. We introduced six service initiatives under the theme of "Better and More Tailored Services" to address user concerns and key rights, explore the approach of taking the initiative to solve problems for customers, and transform service provision from reactive to proactive. We launched the 10009 government-enterprise client hotline, supported the rapid growth of emerging businesses, and strengthened the capabilities of the 10000 consolidated operation, online business services, and cross-provincial services, solidifying our leading position in customer service. In 2022, we maintained an industry-leading comprehensive satisfaction rate, with the lowest user complaint rate and mobile number portability complaint rate in the industry.

Ensure High Quality Network Experience

Based on AI-powered intelligent troubleshooting capabilities, the Digital Life Company supported a special quality improvement initiative by the Hunan Branch. This initiative targeted 10,000 users with quality issues in Changsha, and the completion rate for eliminating quality issues reached 95%, effectively resolving customer concerns about network usage and enhancing their overall network experience.

Assist "Buy in Hubei"

As one of the designated official platforms for distributing consumer vouchers during the "Buy in Hubei" campaign in 2022, Best-Pay prioritized technical support for the event. We diligently carried out the task, achieving a peak access rate of 5.5 million accesses per minute on the open platform. This robust performance ensured a smooth and seamless experience on the platform during the flash sale activities.

During the campaign, the BestPay platform distributed a total of 4.46 million consumer vouchers, directly boosting retail, dining, and other consumer spending to surpass RMB 300 million.

Digitalization of China Telecom App

In 2022, the China Telecom app underwent a brand upgrade, introducing AI-powered digital voice interactions and offering user-friendly services tailored for the elderly. The app also achieved seamless online capabilities for cross-province service handling, enabling users to assist their parents back home in handling broadband and other services. It received "APP Security Certification" from the China Cybersecurity Review Technology and Certification Center (CCRC), ensuring network and information security. Utilizing innovative P-RAN technology, the "Tianyi Connect" feature facilitated connections between users, allowing for the sharing, access, and relaying of data traffic.


Bridge Digital Divide

China Telecom has undertaken the universal service task in the telecommunications sector for seven consecutive years. From laying cables to establishing base stations, we have continuously improved network coverage in remote and border areas, bridging the "digital divide" between regions. In 2022, we continued the implementation of the seventh batch of universal service, completing nearly 4,000 4G base stations to provide high-speed information and communication services to approximately 3,800 remote administrative villages and an area of nearly 1,600 square kilometers in border regions in the country.

The 7th Phase of Universal Service Construction Completed

The Tibet Branch remains steadfast in its original mission, actively engaging in universal service efforts. Since 2016, overcoming challenges from geography and climate, it has achieved communication coverage in 3,204 administrative villages and 108 border points, demonstrating their commitment to developing and enriching border areas. In 2022, the Tibet Branch completed the construction of 146 base stations in the seventh phase and initiated the eighth phase of universal service construction, contributing to the long-term stability and high-quality economic development of Tibet through information technology.
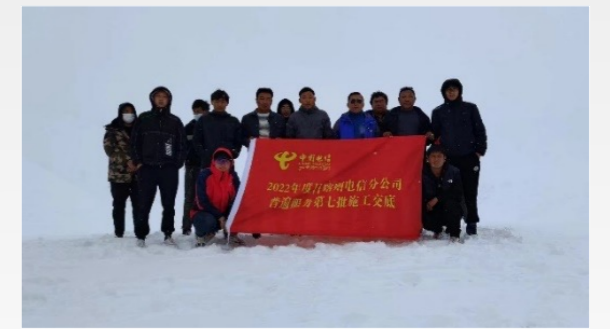
China Telecom actively promotes the traditional virtues of filial piety and respect for the elderly, effectively fulfills the responsibility of a central SOE, practices social responsibility, and helps the silver haired generation cross the "digital divide". In 2022, we continued to improve and promote the elder-friendly adaptation of telecommunications services, combined traditional services with intelligent innovation, online services with offline channels, and focused on high-frequency issues related to the daily lives of the elderly. We exerted efforts on providing more convenient, caring, and high-quality ICT services and exclusive services for the elderly, to effectively help them solve the difficulty in using intelligent technology and facilitate their use of intelligent products and services. In 2022, the 10000 hotline provided about 22.9 million warm hearted services for the elderly by directly directing them to the special service by human agents, and over 95000 remote counter video service transactions.

Elderly-friendly 5G Smartphone Developed

The Terminal Company developed an elderly-friendly 5G smartphone, which is China Telecom's first self-developed 5G smartphone product with fully independent intellectual property rights tailored for the elderly. Designed with concepts of applicability, user-friendliness, functionality, durability, practicality, and thriftiness, this smartphone includes core caring features specifically customized for older users. These features encompass larger fonts, icons, and volume, strong integration with children's phones, pre-installed elderly-friendly applications, and more. This phone ensures comprehensive care for the elderly, assisting them in swiftly integrating into the world of digital living.

Service to Elderly University on the Double Ninth Festival

On October 3, 2022, the Taizhou Branch organized volunteers from the "CT Love Station" to visit the Sunset Red Elderly University and conducted a "Double Ninth Festival Smartphone Public Welfare Workshop and Care Event". Focusing on the challenges that the elderly face while using smartphones, the event provided targeted guidance and assistance in smartphone usage.

Work Together for Global Prosperity

China Telecom is committed to enhancing international cooperation in the ICT field, promoting digital infrastructure construction and interconnection around the world, and effectively improving the quality and development of digital infrastructure in countries along the "Belt and Road". The Company is active in international network communication, fulfilling social responsibilities, and participating in local public welfare activities, to contribute to the building of a community with a shared future for mankind.

## Global Cloud Network Deployment

As of the end of 2022, China Telecom has established 50 branches in 41 countries/regions worldwide, offering international value-added network services and interconnection services to global clients.

The Company actively expanded its global network resources. Throughout the year, we increased 12% in overseas transmission backbone relay bandwidth, added 4.8T of transmission backbone relay capacity along the "Belt and Road" initiative direction, and established 13 new transmission nodes. The global ranking of CTGNET has improved rapidly. We also advanced the construction of overseas cloud resource capabilities, accelerated the global deployment of submarine cable resources, and established a globally interconnected intelligent cloud network resource system.

Sha Tin-Lok Ma Chau Optical Cable Completed

On June 23, 2022, China Telecom Global successfully completed the transboundary optical cable project from Sha Tin to Lok Ma Chau, Hong Kong and officially passed the acceptance test. Following the operation of the China Telecom Western Corridor Optical Cable and the Hong Kong-Zhuhai-Macao Bridge Transboundary Optical Cable, this marks the third transboundary ultra-low latency optical cable constructed by a Chinese operator to be successfully delivered in Hong Kong.
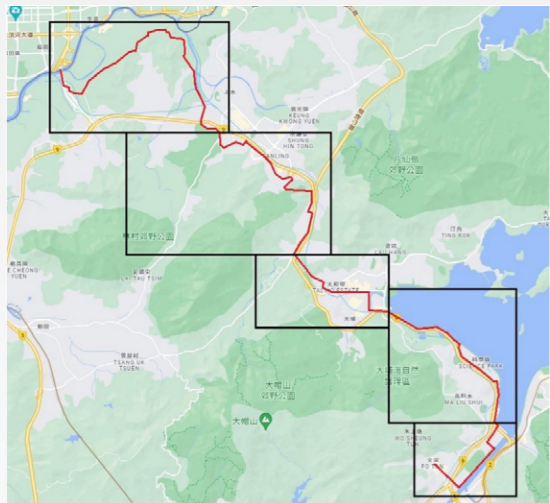
Promote Construction of eSurfing Cloud International Station

In 2022, as the operational foundation for eSurfing Cloud's international expansion, China Telecom eSurfing Cloud International Station took over the management of five public cloud pools of eSurfing Cloud and invested in constructing 10 CDN overseas nodes. The international cloud network platform's 30 high-speed nodes connected 90 public clouds, while 106 SD-WAN nodes covered 43 cities globally.

Support Community Development

Fully embracing the responsibility as a Chinese enterprise, China Telecom has maintained a long-term focus on local community development, actively engaged with and integrated into local communities, expressed care and concern through practical actions, and provided assistance within its capabilities, to constantly transmit positive energy to society.

China Telecom is committed to localizing talent recruitment in overseas branches, to drive local economic development. In Macau, the Company introduced a "Smart Technology Talent Training Program", aiming at opening doors to a "new city and new technology" career path for local youth. This program focuses on nurturing local communication and new technology professionals. In South Africa, the Company actively responded to the requirements of the Black Economic Empowerment Act, and provided training and employment services for black professionals and youth. Through professional institutions, the Company offers a one-year career development training course for local unemployed black individuals, enhancing their vocational skills and employability.

Care for Healthy Growth of Youth Facing Learning Difficulties

In early October 2022, China Telecom Global demonstrated its responsible commitment within the Hong Kong Chinese enterprise community. Collaborating with the Hong Kong Employment Development Service, they organized a volunteer team to create cupcakes with disadvantaged youth. This activity aimed to boost the confidence and communication skills of these youth facing learning difficulties, helping them establish a platform for social interaction and better integration into and adaptation to society.

Package and Distribute Food with Stakeholders

In May 2022, China Telecom Americas organized a volunteer team to participate in the "Pack and Box" event hosted by the North Texas Food Bank (NTFB). The food for this event was donated through a network of 262 partner organizations. Together with local volunteers, China Telecom Americas' volunteers packed and delivered easily storable food items such as bread, compressed biscuits, and canned goods to unemployed individuals and homeless populations in 13 towns around North Texas. Through five hours of collaborative effort, over 7,000 boxes of food were sent to impoverished families in nearby towns that day. These supplies of kindness would help some local underprivileged families temporarily overcome food shortages.

AFTERWORD

About Us

China Telecommunications Corporation Limited is an ultra-large communications operator in China. It has ranked as a Fortune Global 500 company for many years in a row. It specializes in integrated information services including mobile telecom, internet access & application, landline, satellite communications, and ICT integration with total assets of RMB 1.0466 trillion and 400,000 employees.

China Telecommunications Corporation Limited is owned by the central government and funded by the state. The State-owned Assets Supervision and Administration Commission of the State Council (SASAC) fulfills the responsibility as an investor on behalf of the State and dispatched personnel to set up a Supervision Committee at the Group Company. The Group has set up Board of Directors as required by the SASAC, which is the top decision-making body and under which there are the Nomination Committee, the Auditing and Risk Management Committee, and the Remuneration and Appraisal Committee.

China Telecommunications Corporation Limited has operating organizations in 31 provinces (autonomous regions and municipalities directly under the central government), Hong Kong, Macau, and Americas, Europe and Asia. The Group controls 4 listed companies including China Telecom Corporation Limited, China Communications Services Corporation Limited, New Guomai Digital Culture Corporation Limited, and Beijing Global Safety Technology Corporation Limited.
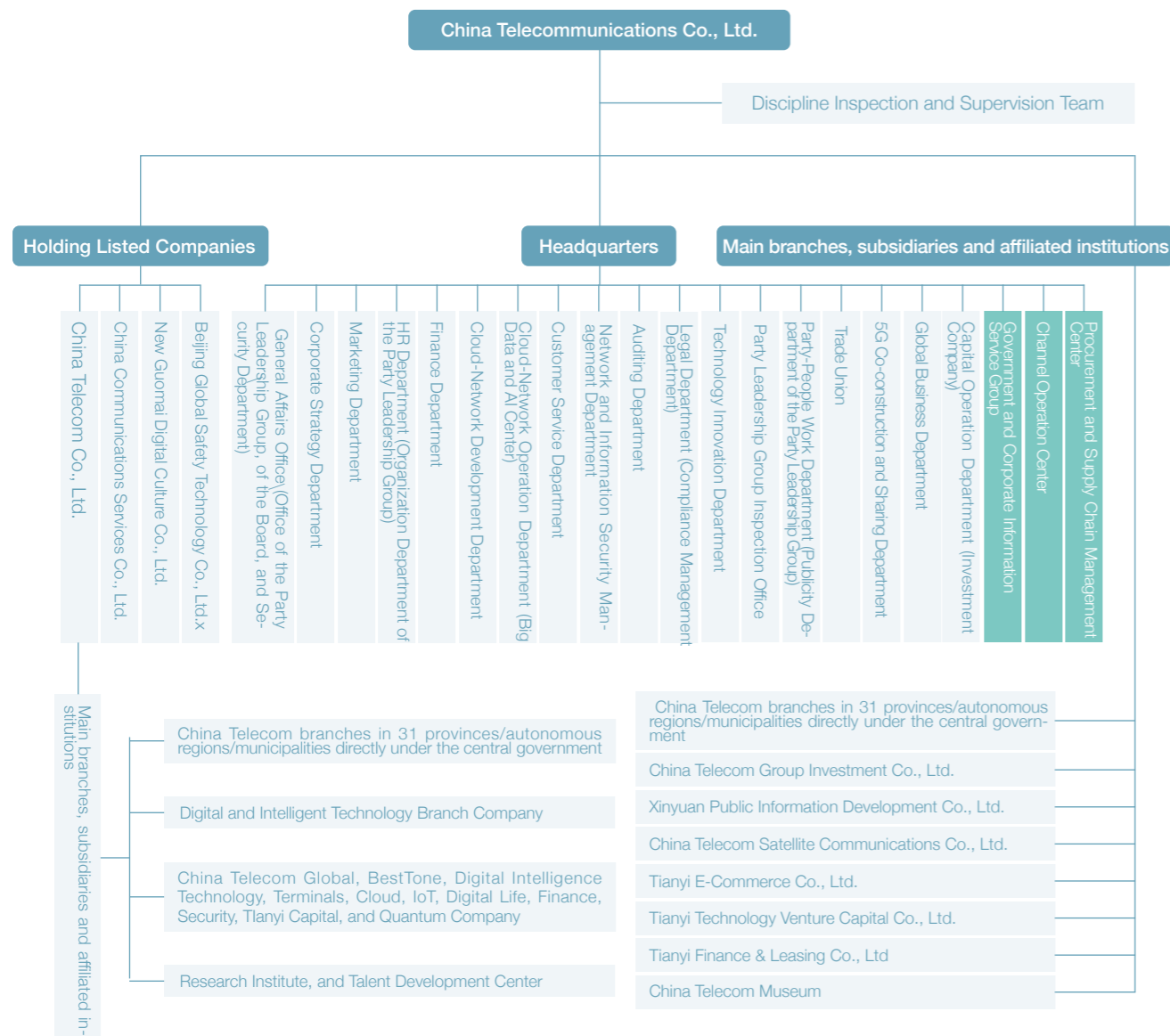
Key Performance Table

Essential Responsibility	2020	2021	2022
Call drop rate of mobile communication (%)	0.05	0.03	0.03
Call completing rate of mobile communication network (%)	99.07	99.14	99.24
4G international roaming countries and regions	220	228	228
5G base station (*10,000)	38.4	69.0	100.0
Cities covered by 5G network	337	337	343
Call completing rate for landline phones (%)	93.05	92.55	91.72
Packet loss rate of backbone network of broadband Internet ChinaNet (%)	0.060	0.030	0.015
Broadband coverage rate in administrative villages in 21 southern provinces/autonomous regions/municipalities directly under the central government (%)	97.0	97.6	98.8
Internet backbone interconnection bandwidth (Gbps)	12,305	17,315	32,720
International interconnection bandwidth (Gbps)	9,985	10,792	13,859
Emergency communication staff dispatched (person-time)	146,397	676,075	840,242
Number of rural channel outlets (*10,000)	13.1	12.6	12.0
R&D input as a percentage of income (%) [1]	3.35	3.38	3.41
Number of new patents licensed	957	1,100	1,135
Total tax paid (*100 million yuan)	67.6	122.6	110.5
Number of people employed (*10,000 people)	1.9	2.0	2.2

Responsibility to Shareholders	2020	2021	2022
Total assets (*100 million yuan)	9,078	9,898	10,466
Main business income (*100 million yuan)	4,762	5,092	5,483
Ranking in Fortune Global 500	158	126	131
Total profit (*100 million yuan)	275.1	302.1	339.4
Asset-liability ratio (%)	44.9	43.0	44.6
Value-maintained and value-added rate of state-owned assets (%)	104.8	103.9	104.6

Responsibility to Customers	2020	2021	2022
Number of mobile subscribers (million)	351.0	372.4	391.2
Among which: 5G subscribers (million)	86.5	187.8	268.0
Number of users of landline phones (million)	112.6	111.4	109.7
Number of wired broadband users (million)	187.2	200.7	214.0
Among which: FTTH/O users (million)	177.5	190.4	203.7
Number of IPTV users (million)	133.6	137.9	144.6

Responsibility to Employees	2020	2021	2022
Percentage of employees joining trade unions (%)	100	100	100
Number of grassroots trade union organizations	2,429	2,731	2,892
Ratio of male to female employees (male : female)	2.2:1.0	2.2:1.0	2.2:1.0
Percentage of ethnic minority employees (%)	5.5	5.6	5.7
Percentage of female managers (%)	19.9	20.3	20.3
Coverage of health and safety training (%)	98	98	98
Work-related injury and death (person)	1	0	0
Per capita training time (hour/person)	22.60	43.16	31.65

Responsibility to Employees	2020	2021	2022
Employee turnover rate (%)	3.4	3.5	3.5
Funding for care (*10,000 yuan)	28,149	34,453	39,936

Environmental Responsibility	2020	2021	2022
Consumption of electric energy during operation (hundred million kWh)	249.4	280.9	287.2
Consumption of gasoline (10,000 tons)	11.7	12.0	8.9
Consumption of diesel (10,000 tons)	2.9	2.9	2.5
Consumption of natural gas (10,000 cubic meters)	1,990	2,213	1,761
Consumption of purchased heat (million kilojoule)	1,462,360	1,554,071	1,325,539
Energy consumption per unit of information flow (kgce/TB)	4.2	3.7	2.9
Power consumption per carrier frequency at base station (kWh/carrier frequency)	1,255	1,391	1,429
Percentage of green procurement (%)	97.0	98.0	98.5
Disposed waste (ton)	90,258	76,962	68,836
Income from waste disposal (100 million yuan)	12.70	7.87	7.35
Staff per capita learning time in online college (hour)	50.20	40.73	57.15

Public Welfare Responsibility	2020	2021	2022
Total social (external) donation (10,000 yuan)	29,164	24,158	23,110
Number of volunteer activities (person-time)	140,000	137,400	201,080
Number of CT Love Stations	—	6,089	10,259

Main Honors

Award to	Honor	Awarded by
China Telecommuni-cationsCo., Ltd.	The highest ranking of "Good" in the evaluation of designated assistance by central units in 2022	National Rural Revitalization Administration
	Class A for 2021 Business Performance Evaluation of the Central SOE Executives	SASAC
	Enterprise with Outstanding Performance in the Term of 2019-2021	SASAC
	Outstanding Contribution Enterprise in Scientific and Technological Innovation in the Term of 2019-2021	SASAC
	2022 ATD Excellence in Practice Award for Performance Improvement Practice Project for Precision Marketing Teams Based on Big Data	Association for Talent Development (US)
China Telecom Co., Ltd.	2021 A-Level Organization for Tax Credit	State Taxation Administration
	The 23rd China Patent Award Silver Award	China National Intellectual Property Administration
	World-leading scientific and technological achievement of the World Internet Conference	World Internet Conference
	First Prize of the China Standards Innovation and Contribution Award	Bloomberg Businessweek/Chinese Edition
	First Prize of Science and Technology Progress Award of the Chinese Institute of Electronics Science and Technology Award	Chinese Institute of Electronics

Award to	Honor	Awarded by
China Communications Services Co., Ltd.	Ranked the 4th in the "100 Most Competitive Software & IT Service Enterprises 2022"	China Information Technology Industry Federation
	The Best TMT Company	The 7th "Zhitong Finance Listed Company Awards" co-organized by Zhitong Finance and Tonghuashun Finance
	Gets ranking on the "2022 FORTUNE China 500" (the 102nd)	FORTUNE China and Forbes
	Gets ranking on the "2022 Forbes Global 2000" (the 1,649th)	Forbes
	"Most Honored Company", ranked the first under the telecommunications sector in the Overall (Small & Midcap) category, including "Best CEO", "Best CFO", "Best IR Professional", "Best IR Program" and "Best ESG"	"2022 Asia Executive Team Rankings" by Institutional Investor
	"Asia's Best CEO", "Asia's Best CFO" and "Best Investor Relations Company"	The 12th Asian Excellence Award 2022 organized by Corporate Governance Asia
	"Gold Award", the "Best Technological Innovation Project Award" and the "Best Investor Relations Team"	"The Asset ESG Corporate Awards 2022"
	"Gold Award" – Traditional Annual Report, "Gold Award" – Cover Photo/Design, "Gold Award" – Printing & Production	International ARC Awards
	"Platinum"award and ranked the 33rd in the top 100 winners of the Annual Report Competition	LACP Vision Awards
	One of the 40 Chinese companies on the "2022 FORTUNE China ESG Influence List"	Fortune
	Selected as a constituent of Hang Seng Corporate Sustainability Benchmark Index	Hang Seng Indexes Company Limited

Outlook

In 2023, China Telecom will carry out the following tasks in fulfilling its social responsibilities:

Promote responsibility management: Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era and with a deep understanding of "the great responsibilities of the country", we steadfastly serve the overall development of the Party and the nation, dutifully fulfill our responsibilities as a central SOE, actively promote high-quality development, and maintain a customer-centered approach. We will comprehensively and deeply implement the strategy of cloudification and digital transformation, and focus on core topics like constructing digital information infrastructure, empowering digital China, bridging the digital divide, and pursuing green development, to ensure economic, social, and environmental sustainability, and accelerate the establishment of a world-class enterprise.

Accelerate the construction of digital information infrastructure: In accordance with the requirement to build comprehensive intelligent digital information infrastructure characterized by "high-speed ubiquity, integrated sky and earth, convergence of cloud and network, intelligent and agile, green and low-carbon, secure and controllable", we are rapidly advancing the construction of foundational infrastructure such as 5G/6G, AI, cloud, payment systems, quantum technologies, and more. We will actively participate in initiatives like the East-to-West computing resource transfer project by creating an industry-leading high-speed interconnected network for data centers. We will expedite the deployment and orchestration of computing resources and the establishment of scheduling platforms for efficient synergy between computing power and network capabilities, to provide more comprehensive and intelligent information services to accelerate the digital transformation of the economy and society. We will continuously intensify our focus on technological innovation, and strengthen our role as a leader in enterprise technological innovation. We will balance development and security, enhance the self-controllability of critical information infrastructure while consistently enhancing end-to-end security capabilities of cloud network, ensuring smooth network security.

Empower the digital transformation of the economy and society: Adhering to the people-centered development ideology, we will actively serve the building of the digital economy, digital society, and digital government, build digital platforms based on cloud-network convergence technology and establish application middle office tailored to vertical industries, to provide comprehensive solutions to drive the digital transformation of various industries. We will strengthen our presence in the digital lifestyle sector, offering individuals, families, and communities more intelligent digital solutions and products. Our goal is to provide the people with a better digital life experience.

Build a harmonious and better Society: We will actively adapt to new industry regulatory requirements, strictly adhere to relevant laws and regulations, and promote healthy, standardized, and orderly industry development. We will steadfastly uphold the concept of green development, take multiple measures to create a green cloud-network and promote eco-friendly operations. We will enhance our service capabilities, and focus on addressing the pressing needs of our customers. We will dedicate efforts to rural revitalization, leverage our digital capabilities to support and consolidate poverty alleviation achievements, and contribute to rural revitalization. We will refine our talent development system, promote the spirit of model workers and craftsmanship, care for and safeguard employees' rights, and foster a work environment that stimulates employee enthusiasm and vitality. We will actively support the development of science, education, culture, and healthcare, and actively participate in the "Belt and Road" initiative. We will also fulfill our social responsibilities overseas, contributing to the economic and social development of relevant countries and regions.

Rating Report

Rating Report of China Telecom CSR Report 2022

Commissioned by China Telecommunications Co., Ltd., the Chinese Expert Committee on CSR Report Rating selected experts to form a rating team and give a rating to "China Telecom CSR Report 2022" (hereafter referred to as "the Report").

I. Basis of Rating

The rating work is based on the "Guidelines for Preparation of CSR Reports in China (CASS-CSR 4.0)" of Chinese Academy of Social Sciences and the "Rating Standard of CSR Reports in China (2020)"of the Chinese Expert Committee on CSR Report Rating.

II. Process of Rating

1. The rating team reviewed the CSR Report Process Information Confirmation Letter and related evidentiary materials submitted by the Report preparation team;

2. The rating team evaluated the compilation process and contents of the Report, and drafted a rating report; and

3. The vice chairman of the Chinese Expert Committee on CSR Report Rating and the leader and expert of the rating team reviewed and signed the rating report.

III. Conclusion of Rating

Procedural Performance (★★★★★)

The Group's Corporate Strategy Department has set up a report preparation team to take charge of the specific preparation work, and the Chairman and the President of the Company are responsible for controlling the overall direction and the final review of the Report. The Company positions the Report as an important tool to improve performance transparency, better social responsibility management, develop corporate culture, enhance communication with stakeholders, and spread the image of the Company as a responsible enterprise with clearly defined value proposition. It identified substantive topics according to relevant national macro policies, benchmarking analysis with the industry, corporate development strategy, stakeholder surveys, etc. It built a social responsibility indicator system based on the corporate framework for responsibility performance. It drove the subordinate companies - China Telecom Corporation Limited and China Communications Services Corporation Limited - to independently produce and publish their ESG reports to generate a multi-level report system. The Department planned to release the Report on the official website in electronic and printed versions in both English and Chinese as well as other forms such as a long figure version, demonstrating outstanding procedural performance.

Substantive Performance (★★★★★)

The Report systematically discloses key topics in the telecom industry in detail, such as ensuring communications quality, innovation in products and services, dealing with customer complaints, protecting customer information, safeguarding emergency communications, creating healthy online environment, closing the digital gap, co-construction and sharing of base stations, development and application of environmental protection technologies, and managing electromagnetic radiation, demonstrating outstanding substantive performance.

Completeness (★★★★☆)

The Report systematically discloses 88.03% of the key indicators of the telecom industry from such aspects as "Build a Digital Development Engine", "Stimulate the Vitality of Digital Innovation", "Consolidate the Foundation of Digital Transformation" and "Share Digital Intelligence Achievements", and is leading in completeness.

Balance(★★★★☆)

The Report discloses negative data and information including "call drop rate of mobile communication", "packet loss on ChinaNet backbone", "work-related injury and death", "employee turnover rate", "proportion of self-identified data security risks", and "child labor and forced labor", with an outstanding balance performance.

Comparability(★★★★☆)

The report reveals comparative data for 52 key indicators, including "cities covered by 5G network", "main business income", "number of mobile subscribers", "coverage of health and safety training (%)", "consumption of electric energy during operation", "Number of volunteer activities (person-time)", "greenhouse gas emissions in operation", for three consecutive years, and discloses horizontal comparable indicators such as "the 131st in Fortune Global 500", "the 102nd in Fortune China 500", " the 1,649th Forbes Global 2000", "eSurfing Cloud ranks among top public cloud IAAS, the first in private cloud service market in China, and the first in hybrid cloud in China", and "in the second half of 2022, eSurfing Cloud leapt to top three public cloud IAAS+PAAS in China by market share". In conclusion, it is excellent in comparability.

Readability(★★★★★)

Themed with "Unleashing the Infinite Power of Digitalization", the Report systematically presents the responsibility performance concept and practices of the Company to the stakeholders and the results in 4 chapters, showing the deep understanding of China Telecom on corporate social responsibility. The cover design adopts the hand-drawn illustration style, and integrates "5G", "AI" and "base station" signs to highlight the industry characteristics, which improves the recognition of the Report. Chapter pages use illustrations and images that match the theme of the chapter, starting with highly general sentences to outline the content. The simple and fresh design style with multiple flow chart designs, the properly matched pictures, and rich and detailed cases and performance data, make it excellent in readability.

Originality (★★★★★)

The Report includes two responsibility features of "Party Building to Lead the New Journey" and "Home-grown Cloud Built on Synergy to Lead the Future with Smart Intelligence", which focus on the actions of the Company in study and practice of the guiding principles of the 20th CPC National Congress, and in cloud-network convergence, and show the main honors of the Company, demonstrating the responsibility of a central SOE. Continuously participating in report rating not only enhances the awareness and height of corporate social responsibility management, but also enhances the standardization and credibility of corporate social responsibility work. Presenting the effectiveness of corporate accountability through stakeholder testimony strengthens the dissemination and credibility of the report, and suggests excellent originality.

Overall Rating (★★★★★)

Taking into account the seven indicators above, the 2022 China Telecom CSR Report is rated as an outstanding CSR report as it is excellent in procedural and substantive performance, comparability, readability, and originality, and leading in completeness and balance performance.

China Telecom CSR Report won five-star rating for the 12th year in a row

IV. Suggestions for Improvement

1. Increase disclosures of core industrial indicators to further improve the completeness of the report.

2. Increase the detailed disclosure of the deficiencies in the performance of responsibilities, to improve the balance of the report.

Vice Chairman of Chinese Expert Committee on CSR Report Rating

Leader of the Rating Team

Expert of the Rating Team

Issuing date: August 2, 2023   Scan here to check corporate rating

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Reader Feedback Form

Dear Readers,

Thank you for taking time to read China Telecom CSR Report 2022.

If you have any advice or suggestions on this report or on China Telecom's CSR performance, you are welcome to fill in the following form and send it to us by post, fax or email. For contact information, please refer to the Report Specification on the first page.

Thank you very much for your attention and support to China Telecom!

Corporate Strategy Department, China Telecom

April 2023

1. Do you think this report can inform you of China Telecom's performance in social responsibilities?

A. Excellent B. Good C. Not bad D. Bad E. Not informed

2. How do you evaluate China Telecom's actions in moving toward a new development stage?

A. Excellent B. Good C. Not bad D. Bad E. Very bad

3. How do you evaluate China Telecom's achievements in fulfilling social responsibilities in 2022?

A. Excellent B. Good C. Not bad D. Bad E. Very bad

4. In your opinion, which areas should China Telecom improve in this report? (Multiple Choices)

A. Framework and logic B. Substance and integrity C. Language expression D. Report design E. Others _____

5. Please leave your other advice or suggestions:

Please let us know more about you if convenient:

Name: Occupation:

Contact: Employer:

China Telecommunications Corporation Limited

Address: No. 31 Financial Street, Xicheng District, Beijing
Zip Code: 100033
Website: http://www.chinatelecom.com.cn