

ENVIRONMENTAL PROTECTION AND CLIMATE CHANGE

Climate change not only has profound impacts on the global ecosystem, but also brings significant impacts on the global economy. Carbon dioxide emission has been adopted as an important indicator by the PRC for the evaluation of an enterprise's production and operation performance, which presented new requirements for enterprises to adapt to climate change. The Group has realized the effects of risks and policies associated with climate change on its operations and has taken corresponding proactive measures to capitalize on the opportunities arising therefrom and cope with the challenges.

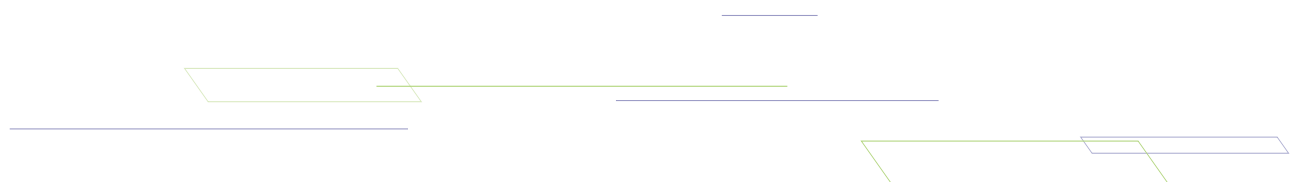
In 2022, the Group actively researched on and discussed the pathways to address climate change and control greenhouse gas emissions, while formulating green and low-carbon development plans. It organised capacity building, technology research and publicity work to fight against climate change and endeavoured to improve its capability in environmental management, with a view to contributing to mitigate global warming.

Climate Risk Governance

To enhance its ability to respond to climate change, the Group has analysed and sorted out major climate-related issues that had and may have an impact on the Company and the action taken to managing climate change. It has also established targets and work plans for reducing emissions. The Company has also taken into account the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) to advance its work on governance, strategy, risk management and targets to address climate change.

Governance



The Board is responsible for coordinating and overseeing the implementation of ESG goals and ESG actions, including climate risk management and "Carbon Peak, Carbon Neutrality" ("Dual Carbon") planning. The ESG Working Team under the Board is responsible for carrying out ESG-related tasks, including climate risk assessment and energy saving and emission reduction initiatives. Besides, the Group also set up a "Carbon Peak, Carbon Neutrality" management organization, with the President of the Company as the person in charge, which is responsible for work related to overall planning and management.



ENVIRONMENTAL, SOCIAL AND GOVERNANCE REPORT

Strategies

The Group realized the long-term and significant impact and risks posed by climate change to the enterprise. By analysing the potential impact of the risks, it identified strategies to deal with risks to avoid negative impact on business operations as far as possible. In addition, the Group prepared “the Dual Carbon Goals Rolling Development Plan” and “the Dual Carbon Action Plan” to actively seize the opportunities from climate change. Please refer to relevant sections in this report for relevant contents.

Type of risk	Risk description	Potential impact	Preventive strategy	
 Physical risks	Acute risk: extreme weather such as typhoons and heavy rainfall	Increase in frequency and severity of extreme weather, such as heavy rainfall, which affects business development progress	Loss of revenue, higher operating costs	Implement emergency plans for natural disasters
	Chronic/long-term risk	Higher temperature in the future, increasing energy consumption	Increase in operating costs such as energy consumption due to the need for more refrigeration equipment as a result of higher temperatures	Implement energy saving and emission reduction measures Research and development for the application of more energy-efficient refrigeration technologies and equipment
 Transition risks	Technology risk	Low-carbon technology transformation leading to change of business scenarios	Stranded assets due to failure to adopt low-carbon technologies timely	Enhance R&D capabilities for low-carbon technology and commence relevant technology cooperation
	Market risk	Customer preference for low-carbon products and solutions based on climate related considerations	Failure to effectively meet consumer demand for green and low-carbon products and solutions	Expand the industrial ecosystem to provide low-carbon products and solutions
	Regulatory compliance risk	Enforcement of stricter climate-related laws and regulations	Increase compliance costs	Form working groups to regularly follow up on legal and regulatory requirements

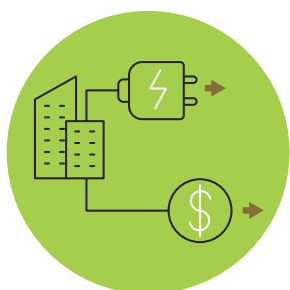
Risk Management

The Audit Committee of the Board is responsible for reviewing the assessment of the relevant risks and delegating authority to management to develop and implement the relevant systems. At the same time, climate change risks were included in the overall risk assessment and management system of the Company and internal control process related to the environmental, social and governance was newly added to further strengthen the Company's risk management of ESG.

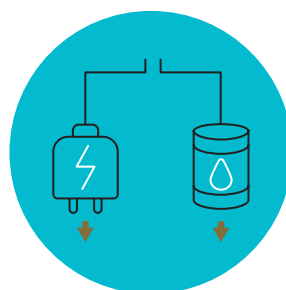
Metrics and Targets

The Group actively responds to the national strategy of "Dual Carbon" while persistently implementing the development philosophy of innovation, coordination, green, openness and sharing. It has formulated green and low-carbon plans and related implementation programs and continuously increased its R&D investment in emerging energy-saving technologies and new businesses, thereby creating a green ecosystem and making China Comservice more eco-friendly.

Targets during the period of Dual Carbon Goals Rolling Development Plan



The growth rate of total energy consumption does not exceed that of business revenue



Electricity and fuel consumption per revenue of RMB10,000 remains on a reasonable decline

	2022	2021*	Change
Energy consumption per revenue of RMB10,000 (kg of standard coal)	11.29	12.70	-11.1%
Electricity consumption per revenue of RMB10,000 (kWh)	20.56	23.69	-13.2%
Fuel consumption per revenue of RMB10,000 (L)	7.26	8.12	-11.9%

* During the reporting period, the Company systematically sorted out the calculation methodology adopted by the Greenhouse Gas Protocol for the disclosed data and made corresponding adjustments to the data for 2021 to increase data comparability, so the data for 2021 is slightly different from those disclosed in the 2021 report.

Our actions

Action 1

The Group has set up a "Carbon Peak, Carbon Neutrality" management organization, with the President as the main person in charge and the Company's management working together to form the leading group. This three-tier working structure aims to promote the Group's green and low-carbon development.

Leading Group

Directing the deployment of green development work and studying and making decisions on important issues in respect of "Dual Carbon"



Office of the Leading Group

Implementing the specific work and organizing the day-to-day work of the Group for the "Dual Carbon"



Subsidiaries at all levels

Implementing the Group's "Dual Carbon" plans and objectives, promoting and undertaking "Dual Carbon" projects



ENVIRONMENTAL, SOCIAL AND GOVERNANCE REPORT

During the year, “Dual Carbon” management organization planned and conducted a three-week “Dual Carbon” Empowerment Training Month under three themes: new infrastructure and new energy, contract energy management and consulting training, and platform services and eco-cooperation, and a total of over 1,500 participants joined the training online.

The Group summarized the main capabilities of subsidiaries at all levels in terms of “Dual Carbon” and formed a list of “Dual Carbon” services in 12 major categories and six areas in total.

中国通服双碳赋能月

创新引领 科技共享

新基建及新能源篇
7月12日上午09:00

时间	内容	发言人
09:00-09:15	领导讲话	梁世平
09:15-09:35	绿色5G基站产品及解决方案	湖南康普
09:35-09:55	绿色5G基站一体化服务能力	中时讯
09:55-10:15	老旧机房节能降碳解决方案	中通服节
10:15-10:35	新型绿色低碳数据中心一体化服务能力	中通服设计
10:35-10:55	光伏新能源解决方案	中通服绿建
10:55-11:15	光伏发电一体化解决方案	浙江工程
11:15-11:35	中国通服2022年“双碳”赋能光伏新能源解决方案	安徽电力行业中心
11:35-11:55	风力发电项目承接解决方案	中融建

中国通服双碳赋能月

创新引领 科技共享

平台服务及生态合作篇
7月26日上午09:00

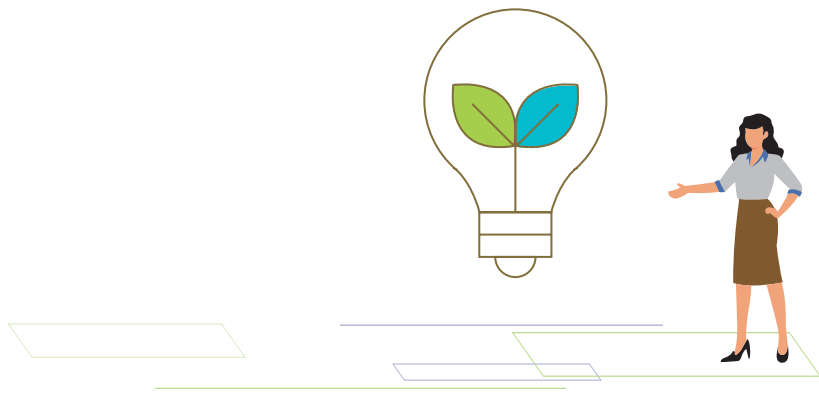
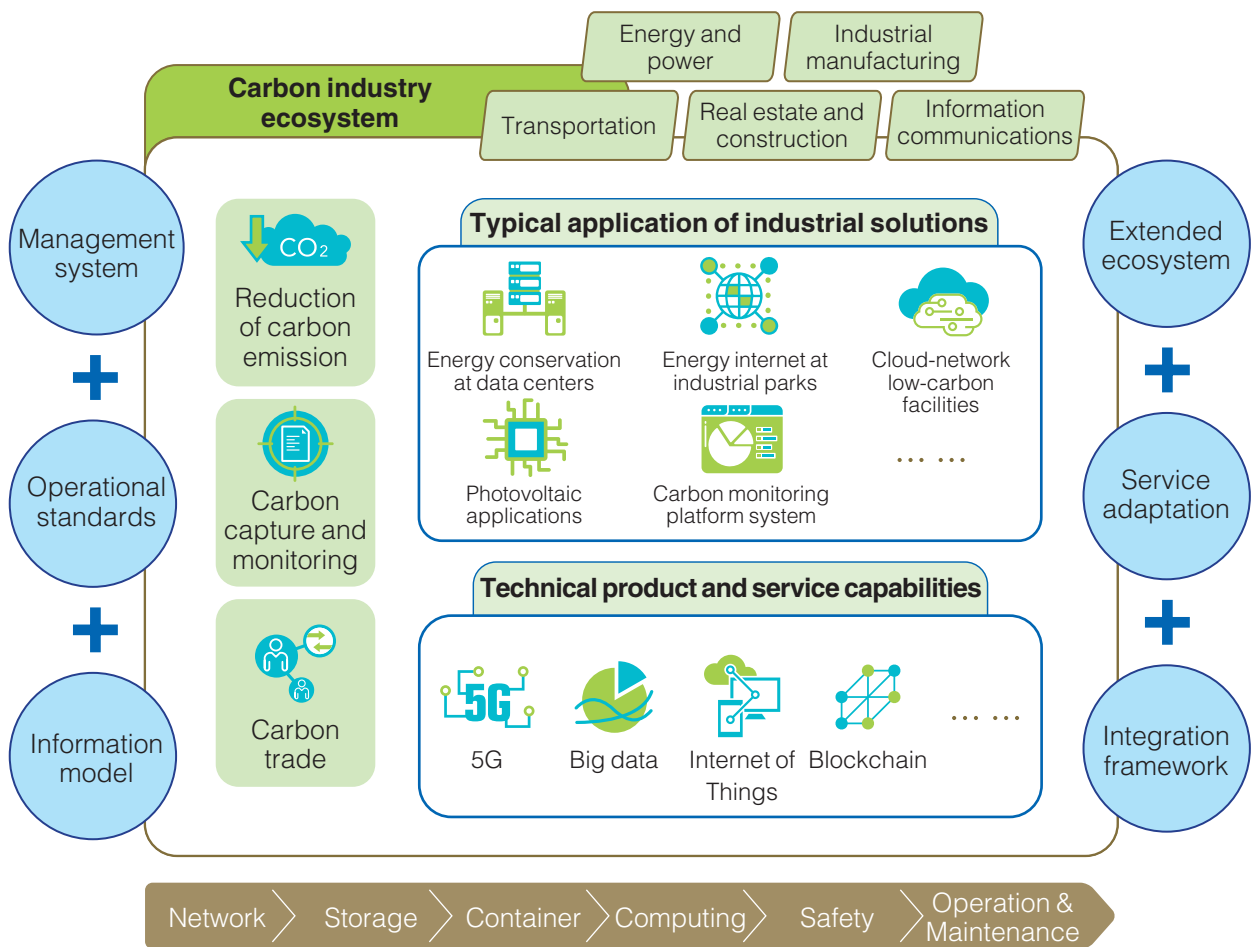
时间	内容	发言单位
09:00-09:20	生态合作-能源数字化	中能融合智慧科技有限公司
09:20-09:40	生态合作-绿电	国网绿色能源有限公司
09:40-09:55	绿电交易探索	公诚设备
09:55-10:10	碳足迹	中国通服数智科创
10:10-10:25	智慧节能机房	福建技民
10:25-10:40	园区智慧节能管控管理平台	中通服科信
10:40-10:55	双碳监测管理平台	重庆通建
10:55-11:10	基于平台的多场景节能服务	浙江邮电工程
11:10-11:25	智慧园区下的双碳管理解决方案	中通服四信
11:25-11:40	机场智慧能源	中通服创交
11:40-12:00	领导总结	/

The Second Carbon Neutralization Boao Conference was successfully held and the Group’s subsidiary, China Information Consulting & Designing Institute Co., LTD., was awarded the “Carbon Neutrality Industry Pioneer Award (Information and Communications Industry)”. This award is the most influential award among the China Energy Conservation Association’s carbon neutrality field enterprise awards, reflecting the industry’s high recognition of the Company’s capabilities and achievements in the field of carbon neutrality in the information and communications industry.



Action 2

The Group prepared “the Dual Carbon Goals Rolling Development Plan for 2023–2025” and “the 2023–2025 Dual Carbon Action Plan”, and continuously promoted the “Research on the Peaks of Carbon Emission and Pathways to Carbon Peak”. Leveraging the “Dual Carbon” mission, it improved the organizational system and rules for energy conservation and emission reduction, supported the construction of a binding incentive mechanism for energy conservation and emission reduction, and reduced total energy consumption. Focusing on the areas of energy and power, industrial manufacturing, transportation, real estate and construction, and information and communications as well as three major business sectors which included carbon emissions, carbon management and carbon removal, the Group strived to promote carbon reduction in society.



Use of Technology to Seize Opportunities from Energy Saving and Carbon Reduction

In managing the risks of climate change, the Group has leveraged its unique advantages to increase the application of new technologies such as 5G, big data, cloud computing and the Internet of Things. While promoting upgrade and carbon reduction of energy-intensive industries, it developed a series of energy-saving technologies and products for energy saving and carbon reduction, which allows it to seize the opportunities in climate change.



The First “Zero-Carbon” Green Big Data Center in China

China Telecom (National) Digital Qinghai Green Big Data Center undertaken by Huaxin Consulting Co., Ltd., which is a subsidiary of the Group, in general contracting model, has reached a PUE of less than 1.2 through advanced cooling technologies such as indirect evaporative cooling and liquid cooling. With the construction of its own distributed photovoltaic parking shed for power generation and the development of a green power monitoring platform in collaboration with State Grid, it established China’s first traceable 100% clean energy power supply, as well as China’s first exemplary model of integrated source-grid-load-storage smart green power supply in the data center sector. The data center has been rated as an AAAA low-carbon data center (planning category) and it has passed the ISO certification for data centers. It has also been awarded the “2022 Industrial Transformation and Energy Saving Special Fund” in Qinghai Province, selected as one of the “2022 Corporate Cases for High-Quality Development of Big Data Centers” and “2022 Excellent Case of Green ‘Dual Carbon’ Technology Application in Digital Industry” in China.

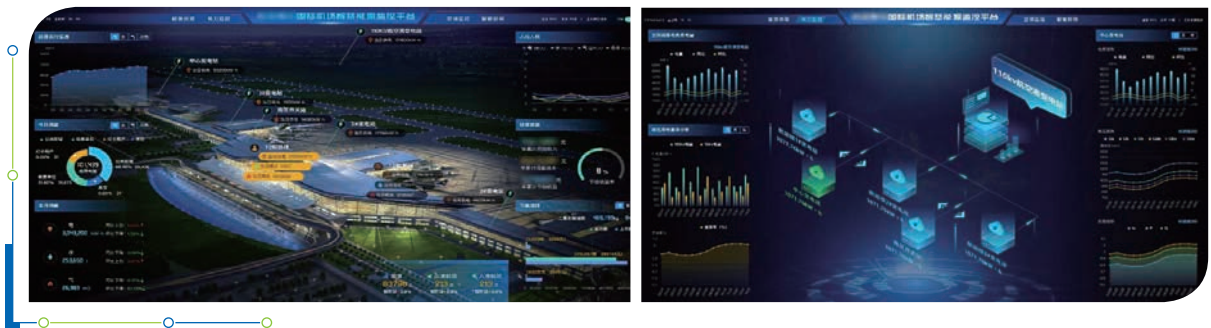
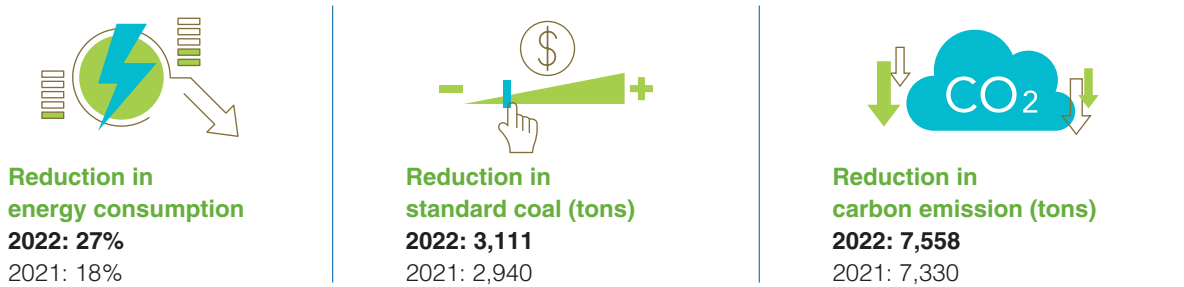


Integrated Energy Management Platform for Smart Airport

China Comservice Transfar Technology Company Ltd., which is a subsidiary of the Group, provides integrated smart energy control services for the green airports. With a focus on energy consumption indicators, the platform achieves panoramic multi-dimensional visual monitoring of the airport energy system and helps airports to make better data-driven decisions. A new integrated energy dispatching system was established to enable “demand-supply interaction”. Based on load forecasts and energy production costs, it dynamically adjusts the composition of production equipment to achieve optimal dispatching of the entire network, further improves the quality of energy consumption and reduces production costs.

An international airport has become the first airport in China to adopt smart energy management. It has achieved significant reductions in average annual energy consumption, average annual energy costs and total carbon emissions, without compromising the comfort of passengers.

Operational outcome of the integrated smart energy management platform at an international airport



Distributed Photovoltaic Power Generation Project of a Factory

China Comservice Construction Co., Ltd., a subsidiary of the Group, has built a photovoltaic parking shed for customers, adopting the mode of “self-generation for self-use and grid-connection of surplus power”. By utilizing Building Integrated Photovoltaic (BIPV) and BIM technology, the distributed photovoltaic power generation steel structure parking shed was constructed using the parking lot in the factory. The total installed capacity of the overall photovoltaic parking shed construction of the factory is about 50MWp, and the annual emission reduction of carbon dioxide is more than 18,000 tons.





Comprehensive Energy-saving Retrofit of Equipment

Guangdong Nanfang Communication Construction Company Ltd., which is a subsidiary of the Group, adopted diversified means for the comprehensive energy-saving retrofit of the micro-modules at access network rooms, the air conditioning system in the machine room and 2/3G sites.

- A total of 17 access network rooms in Guangzhou, Foshan and Shantou have undergone the retrofit of micro-modules using a consortium approach and completed the supply, installation, testing and commissioning of micro-module equipment. The PUE of most of the micro-modules in the access network rooms is reduced to around 1.2–1.4 after the retrofit, saving approximately 1.91 million kWh of electricity for the 17 machine rooms per year.
- With regard to the energy-saving retrofit of the air-conditioning system in the machine room, a comprehensive energy-saving solution was adopted, which included the use of high-efficiency inverter screw units, inverter pumps, inverter cooling towers and EC fan terminal air cabinets. Following the completion of the renovation of the central air-conditioning system of a comprehensive building of a research institute, the customer can precisely adjust the cooling system according to the real-time changes of the cooling load and achieve 50% more energy saving benefits as compared to those before the retrofit. As a result, the customer can save around 2 million kWh of electricity each year.
- The minimalist retrofit of 2/3G sites included the customization of the centralized dispatching plan for remote and near-end server rooms, the consolidation of BBU and integration of baseband boards for target sites, and the switch-off and phase-out of high-energy-consuming equipment such as air-conditioners at relevant sites. The minimalist retrofit of nearly 1,500 sites has been completed, which reduced the overall power consumption by about 53% and cut carbon dioxide emissions by about 22,500 tonnes per year.



Red Line Monitoring System for Ecological Protection



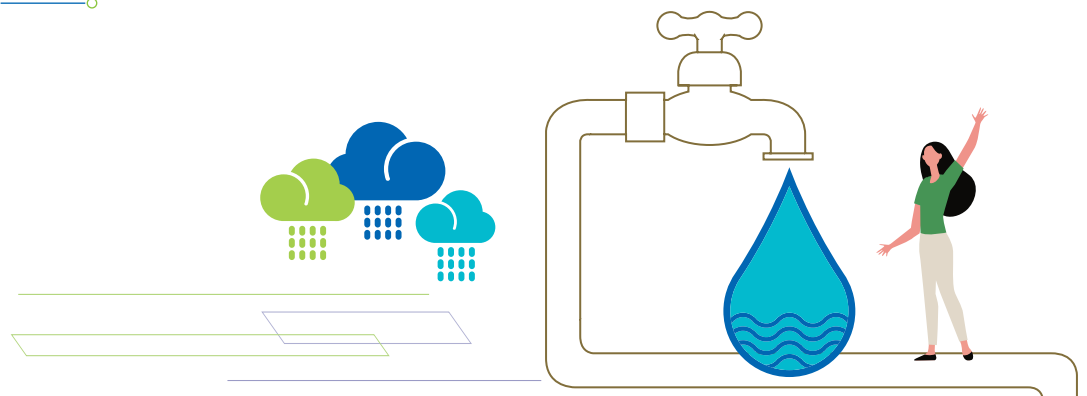
China Comservice Construction Co., Ltd., which is a subsidiary of the Group, undertook the construction project of the red line monitoring and supervision capacity for the ecosystem and ecological protection in Shenzhen City, Guangdong Province. The system covered five major areas of monitoring, which included the monitoring of ecosystem structure, the monitoring of ecological resources status, biodiversity observation, ecosystem function observation and human habitat suitability monitoring. A total of 296 biodiversity observation sites (200 for animals, 11 for insects and 85 for plants) and 20 sites for building the monitoring capability of human habitat suitability (6 for air microorganisms, 6 for pollen, 6 for negative ions and 2 for BVOC) have been established. Relying on “integrated space, sky and ground” drones, video surveillance, ground surveillance and other automated monitoring means, the system achieves round-the-clock and large-scale real-time dynamic monitoring of urban ecology and ecological protection red line.



“Smart Water Conservancy” Products

Based on a unified microservices structure, the Group achieved the integration and unified visualization presentation of diversified applications for the management of “three defense”, river chiefs, water resources and environment, with successful cases all over China.

- **Three Defense Command Center and Protection System for a customer in Guangdong Province**
The center established and achieved the integrated linkage of three defense decision support, three defense video surveillance, three defense consultation and dispatch and three defense mobile application business system. It launched a mobile APP for remote consultation and integrated monitoring of flood and rainfall, weather and video surveillance.
- **Phase I of Smart Water Conservancy Project in a city of Jiangsu Province**
The project included the building of eight major sub-systems, namely the flood and drought prevention information management system, water supply information management system, drainage information management system, South-to-North Water Transfer information management system, water conservancy project information management system, water resources information management system, rural water conservancy information management system and smart water conservancy collaborative office platform, etc. It is also China’s first integrated informatization platform for water conservancy and water affairs.
- **Smart Water Conservancy Construction Project in a city of Fujian Province**
The project included the building of an efficient and comprehensive awareness system, a big data resource center and a unified smart application platform of water conservancy in that city. It assisted the customer in making decisions and reducing flood disasters, eliminating potential flood hazards, safeguarding people’s lives and property, and improving public service efficiency and service capacity.



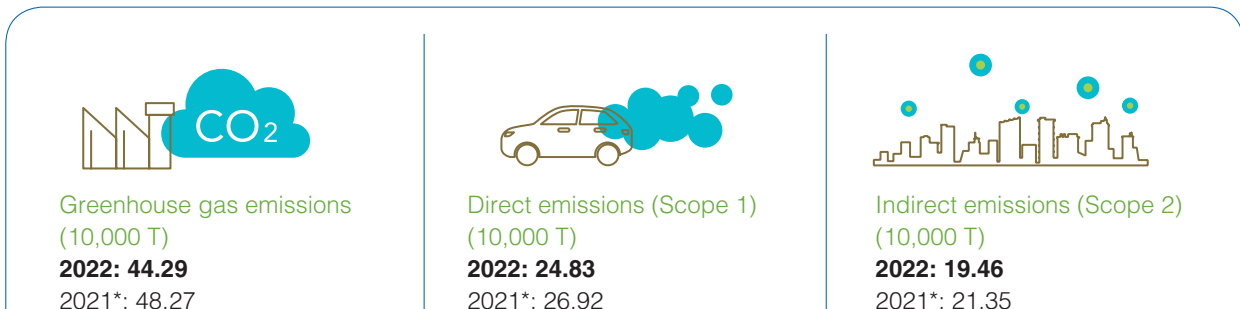
Promote Green Operations

The Group is an informatization communications service provider. In the course of providing services to customers, the Group has always strictly complied with various laws and regulations on environmental protection and emissions, including the Environmental Protection Law of the People’s Republic of China and the Energy Conservation Law of the People’s Republic of China. It has carefully formulated internal management systems for environmental protection and resource use, actively controlled pollutant and greenhouse gas emissions, sewage discharge and the disposal of solid and hazardous waste. The Group has actively responded to the national call to reduce the impact of its operations on the environment.

Energy Consumption

In 2022, the total energy consumption of the Group was approximately 159,000 tons of standard coal, with an energy consumption per revenue of RMB10,000 at 11.29 kg of standard coal (2021*: approximately 170,000 tons of standard coal, with an energy consumption per revenue of RMB10,000 at 12.70 kg of standard coal).

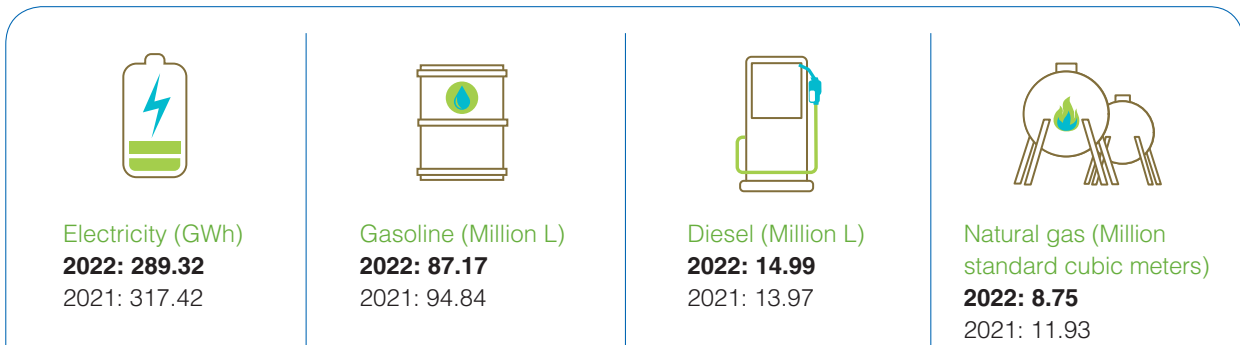
According to the energy report of the Group, the total emission of greenhouse gases generated from energy consumption of the Group in 2022 as accounted pursuant to the Greenhouse Gas Protocol was approximately 442,900 tons (2021*: approximately 482,700 tons).



Notes:

1. Scope 1 direct greenhouse gas emissions include greenhouse gas emissions from the consumption of natural gas, coal, gasoline and diesel.
 2. Scope 2 indirect greenhouse gas emissions include greenhouse gas emissions from the purchase of electricity and heating.
 3. Total greenhouse gas emissions are the sum of Scope 1 direct greenhouse gas emissions and Scope 2 indirect greenhouse gas emissions.
- * During the reporting period, the Company systematically sorted out the calculation methodology adopted by the Greenhouse Gas Protocol for the disclosed data and made corresponding adjustments to the data for 2021 to increase data comparability, so the data for 2021 is slightly different from those disclosed in the 2021 report.

Direct/Indirect Energies by Type



Waste Discharge

The Group strictly follows the Law of the People's Republic of China on the Prevention and Control of Environment Pollution Caused by Solid Wastes and other laws and regulations regarding waste disposal and utilisation, and carries out waste disposal in accordance with regulatory requirements. Some of the provincial companies and professional companies of the Group have engaged property management firms for waste disposal.



Notes:

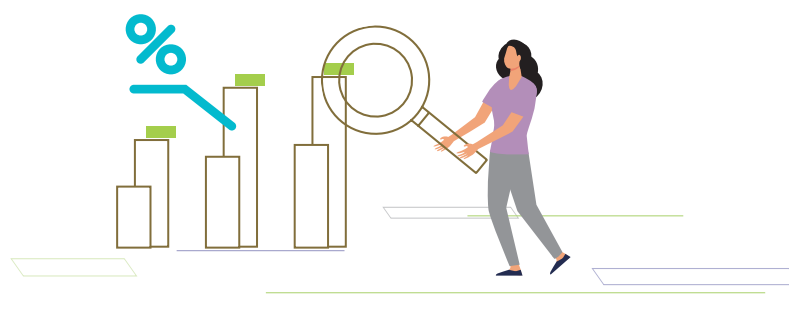
1. The Group is an asset-light enterprise, its solid wastes are mainly daily garbage, and the sewage it discharges is mainly daily sewage.
2. During the reporting period, the Company has made concurrent adjustments to the data for 2021 to enhance data comparability, leading to the slight difference between the data for 2021 and those disclosed in the 2021 annual report.

Resource Utilisation

In terms of the use of packaging materials, the Group operates in the informatization communications service industry, and is mainly engaged in design, construction, supervision, maintenance and other services. Therefore, there is no significant usage of packaging materials in its production and operation process.

As for water consumption, the Group's water supply is provided by the owner or property manager of the office building. The Group attaches great importance to the reasonable and efficient usage of water resources in the normal course of business. It strives to promote and advocate water conservation through public promotion on a daily basis and the installation of water-saving taps, which allows it to further intensify the management of water resource utilisation and reduce unnecessary consumption of water resources. In 2022, the Group's total water consumption was approximately 4.60 million tons (2021²: approximately 5.30 million tons).

In respect of office paper usage, the Group adheres to the principle of economical use and tolerates no waste to strictly control the use of office paper. In addition, the Group actively enhances its online office capabilities, continuously improves its service quality with informatization means, and extensively promotes the use of cloud-based office applications such as paperless conference systems and online conference systems. In 2022, the Group's total office paper consumption was approximately 1,135 tons (2021²: approximately 1,081 tons).



Protecting the Ecological Environment in Project Construction

The Group complies with environmental laws and regulations, contracts and other relevant requirements in its business operations. It reduces construction waste and natural resource consumption, and requires its subsidiaries to understand the environmental characteristic and needs of the regions where they operate, and establish and implement environmental management strategies in line with the requirements. More than 100 professional companies of the Group have obtained the ISO9001 and ISO14001 certifications and among them, Jiangsu Communications Real Estate Management Co., Ltd., a subsidiary of the Group, has obtained ISO50001 energy management system certification. They are committed to managing and reducing their environmental impact in their business activities.

	<p>Land conservation</p>	<p>Strictly abide by national laws and regulations, effectively protect arable land, and orderly implement treatment and restoration work such as site closure, rehabilitation and greening to achieve sustainable use of land resources</p>
	<p>Equipment pollution</p>	<p>Give priority to equipment that is free of noise, electromagnetic radiation and pollutant emissions</p>
	<p>Construction impacts</p>	<p>Avoid mineral deposits, forests, grasslands, wildlife, natural relics, human relics, natural reserves, scenic spots and other areas when conducting field survey for communication lines and avoid changing the neighbouring environment when laying optical fibre cables as far as possible</p>
	<p>Electromagnetic radiation</p>	<p>Actively adopt advanced technical means to refine the layout of base stations and ensure that the electromagnetic radiation indicators meet the national standards; monitor and assess the electromagnetic environment around base stations; strictly control the quality of equipment connecting to the network to exercise strict control at source</p>

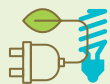
Green Office

The Group constantly improves its organizational system, management system and work process for energy saving and emission reduction through multiple measures, so as to effectively reduce energy consumption. Campaigns like Energy-saving Promotion Week and National Low-carbon Day are actively carried out by the Group to continuously raise the energy-saving and environmental-protection awareness of its staff. Energy conservation slogans are put up in venues such as public areas inside the buildings and conference rooms. In addition, the Group strictly implements the assessment and reward and punishment mechanisms in relation to energy saving and emission reduction performance and sets annual energy-saving and emission-reduction budgetary targets for its provincial companies, which ensure the accomplishment of its annual energy-saving tasks.



Improve online office capabilities

The Group makes full use of cloud conferencing and cloud research to enhance online office efficiency



Strengthen power saving management for lighting

The Group continues to enhance its daily electricity saving measures and adopts energy-saving lamps in all offices, meeting rooms and other premises to reduce the electricity consumption of lighting equipment



Enhance energy consumption management for vehicles and promote green travel

The Group strictly controls the formation and scale of the fleet of business vehicles to reduce its energy consumption, and it has implemented a "one vehicle, one card" refuelling system in an effort to reduce total fuel consumption. With the use of GPS systems for precise positioning, it aims to reduce the energy consumption of vehicles. It also advocates green travel among employees



Eco-friendly Recycling

Several professional companies of the Group collect returned network equipment, inefficient equipment with high-energy consumption and other inefficient assets from telecommunications operators for recycling and disposal via a green auction platform. By introducing the reverse integrated asset disposal model of “dismantling, transportation, storage and sale”, a closed-loop ecological chain of environmentally-friendly asset disposal, starting from the source of scrap materials till the auction and delivery of assets, has been developed, which not only realizes eco-friendly disposal of waste and obsolete products, but also achieves effective utilisation of resources.

The Group will actively establish and improve a long-term mechanism for resource conservation, improve energy efficiency, develop a circular economy and fulfil its corporate environmental responsibility.

China Comservice Supply Chain Management Company Ltd.

China Comservice Supply Chain Management Company Ltd. (“Supply Chain Company”), which is a subsidiary of the Group, owns six subsidiaries including Zhongjie Telecommunications Co., Ltd., Shanghai Tongmao International Supply Chain Management Company Ltd., Zhejiang Zhongtong Communications Co., Ltd., Jiangsu Zhong Bo Communications Co., Ltd., Fujian Zhongtong Communication Logistics Co., Ltd. and Hubei Xintong Communication Ltd. These subsidiaries engaged in the auction business and disposed of cables, batteries, return network equipment, office supplies and engineering materials for a total of RMB860 million in 2022. Since 2009, they have disposed of assets with a total amount of over RMB6 billion.

Based on the nature of the waste and obsolete materials from customers, Supply Chain Company has established a green auction support system, which integrates the recycling, transportation, sorting, storage and disposal of such materials to solve the problems including long asset disposal cycle, various safety hazards and high storage costs for customers. The company has also compiled a whole process integrated plan to meet customers’ needs for the whole process control from asset scrapping to material delivery.

Zhejiang Zhongtong Communications Co., Ltd.

Since 2009, it has engaged in the recycling, storage and disposal of scrap materials for operators and built its own disposal platform for waste and obsolete products. The company has over 1,600 high-quality recycling partners and a business presence in 31 provinces, municipalities and autonomous regions across China. It disposes of communication assets, office supplies and engineering materials for customers including telecommunications operators, such as China Telecom, China Mobile and China Tower. It also offered integrated assets disposal services for asset owners which include asset valuation, qualification examination and online auction services.

Shanghai Tongmao International Supply Chain Management Company Ltd.

The green auction support system of Shanghai Tongmao formed a mature reverse integrated asset disposal model by integrating the recycling, transportation, sorting, storage and disposal of scrap materials. The whole process fully covers from the source of scrap materials after they are generated, all the way to the disposal, delivery and settlement of scrap assets. Currently, the auction platform has nearly 350 recycling enterprises with various qualifications for various types of materials, which can cover the disposal needs of operators for scrap materials. Apart from improving the disposal efficiency of asset units, it can also avoid the environmental risks arising from scrap materials and fulfils the environmental responsibilities of waste-producing units.