



中国铝业股份有限公司  
ALUMINUM CORPORATION OF CHINA LIMITED



# 2022

Social Responsibility and Environmental  
Social and Governance Report

Stock Code: 2600 (Hong Kong Exchanges and Clearing Limited) 601600 (Shanghai Stock Exchange)

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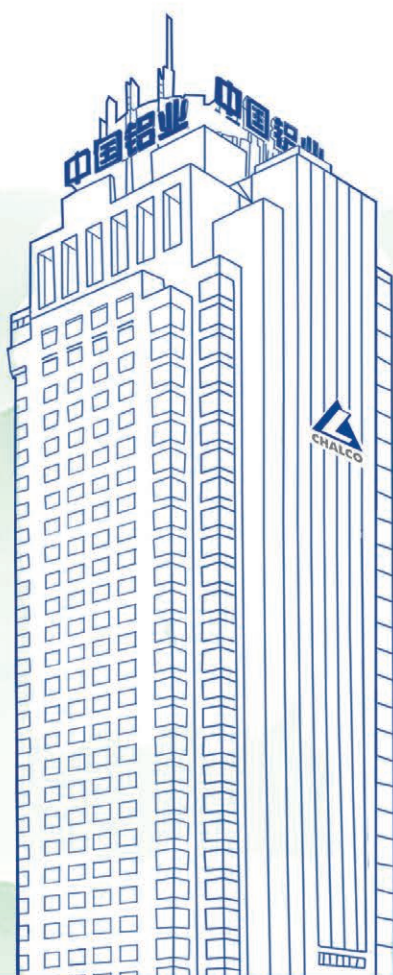


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# Statement from the Chairman



**Time flies, and we are about to usher in a new year.** In 2022, Chalco focused on the priority of high-quality development and firmly positioned itself to take the initiative in a changing environment, thus achieving steady improvement in quality and reasonable growth in quantity.

—**Enhance value creation and committed to making ourselves a first-class enterprise.** We have firmly adhered to the strategic goal of building a world-class aluminum industry, carried out in-depth benchmarking against industry's best in all aspects, and strived to maintain stable business growth. As a result, the overall development has continued to improve, along with a significantly enhanced level of quality and efficiency. We have achieved and exceeded our goal ahead of schedule and have maintained a profit level of tens of billions for two consecutive years, which has made positive contributions to stabilizing the economy and steadying the growth.

—**Focus on key responsibilities and businesses, and speed up green development.** Adhering to the policy of industrial optimization and upgrading, we have created a new paradigm of high-quality “3x5” industrial development and continuously developed new value-creating fields and paths. We have made major progress in the extraction of valuable metal elements, the comprehensive utilization of red mud, the disposal methods of the “three wastes” from electrolytic aluminum, aluminum recycling, and clean energy industry planning, resulting in a number of energy-saving and carbon-reducing landmark scientific research achievements and giving full play to the modelling and leading roles in the industry.

—**Deepen reforms and innovations, and enhance governance capabilities.** The company has stuck to the problem-oriented concept, focused on reform and tackling key problems, followed institutionalized, process-based, and list-based governance practices, implemented classified authorization and differentiated control approaches, and implemented tenure contracts at the managerial level. We also expanded the scope of the reform of professional managers, strengthened incentives and constraints, and strictly implemented the system of demotion of last-ranking persons and termination of employment of incompetent persons, resulting in continuous optimization of operations, further improving the modern enterprise system with Chinese characteristics, and successfully concluding the three-year action of state-owned enterprise reform.

—**Persevere in fulfilling our responsibilities and achieve mutual and shared benefits.** The company has fully integrated ESG concepts into its development strategy and daily operations and truly fulfilled its commitment to the mission of “paying back to the shareholders, helping the employees succeed, benefiting the customers, contributing to society, and cherishing the environment”, which has been widely recognized by all walks of life. We have been included in the “ESG Pioneer 50 Index of Central Enterprises” and have been awarded the A-level evaluation of information disclosure by the Shanghai Stock Exchange for four consecutive years.

In a boat race, those who row the hardest will win. Chalco will continue to deliver a better performance to promote the synergistic improvement of the economy, society, environment, and employees and to move forward to a world-class enterprise with the good image of “responsibility, integrity, openness, and excellence”.

Chairman of the Board, Chalco: Liu Jianping  
March 21, 2023



# Statement from the President



In 2022, Chalco made stability its top priority, and sought progress while maintaining stability, comprehensively improving its value creation capabilities, accelerating high-quality development, and maintaining a positive development momentum.

—**We have strived to improve our business performance**, carried out in-depth benchmarking against the industry's best on all aspects, and comprehensively implemented the management of "three modernizations and one improvement" and "five standards and one control". The value creation capability has been continuously enhanced, economic and technical indicators have shown continuous improvement, and the quality and efficiency of development have been steadily on the rise.

—**We have committed to green and low-carbon development**. We have driven industrial upgrading with energy transformation, focusing on building a clean production system, and made major breakthroughs in the planning and development of clean energy and green industries. The annual reduction of carbon emissions was more than 1.6 million tons, the proportion of clean energy consumption reached 45%, and a number of enterprises obtained carbon footprint certificates for their products.

—**We insisted on self-reliance and self-improvement in science and technology**. The company have rebuilt the innovation system with a focus on science and technology, and aim to accelerate the development of digital intelligence. A number of "stranglehold problems", such as energy-saving and carbon-reduction technologies, deep utilization of resources, and research and development of high-end materials, have been overcome one after another, leading the technological progress of the industry and increasing the core competitiveness.

—**We have deepened management reform**, perfected the modern enterprise system with Chinese characteristics, improved the market-oriented operation mechanism, promoted professional integration, implemented differentiated management, and put in place a classified delegation and decentralized control system, constantly stimulating the vitality of the enterprise as well as achieving continuous improvement in corporate governance and professional control.

—**We continued to build a beautiful China**, firmly established the concept of "Lucid waters and lush mountains are invaluable assets", strengthened the protection of the ecological environment, encouraged enterprises to achieve ultra-clean emissions, realized a 100% mine reclamation rate, and always maintained the leading position in environmental protection. Six companies and eight mines were awarded as national green factories and green mines, respectively.

—**We insisted on fulfilling our social responsibilities, strengthen enterprise-local cooperation**. We have strived to be an excellent corporate citizen by strengthening the cooperation between enterprises and local governments and sharing the fruits of development. Last year, we donated 29.91 million yuan to aid Qinghai and Tibet, earthquake relief, and other accidental activities. We also helped small and medium-sized enterprises with difficulties and reduced rents by 13.06 million yuan.

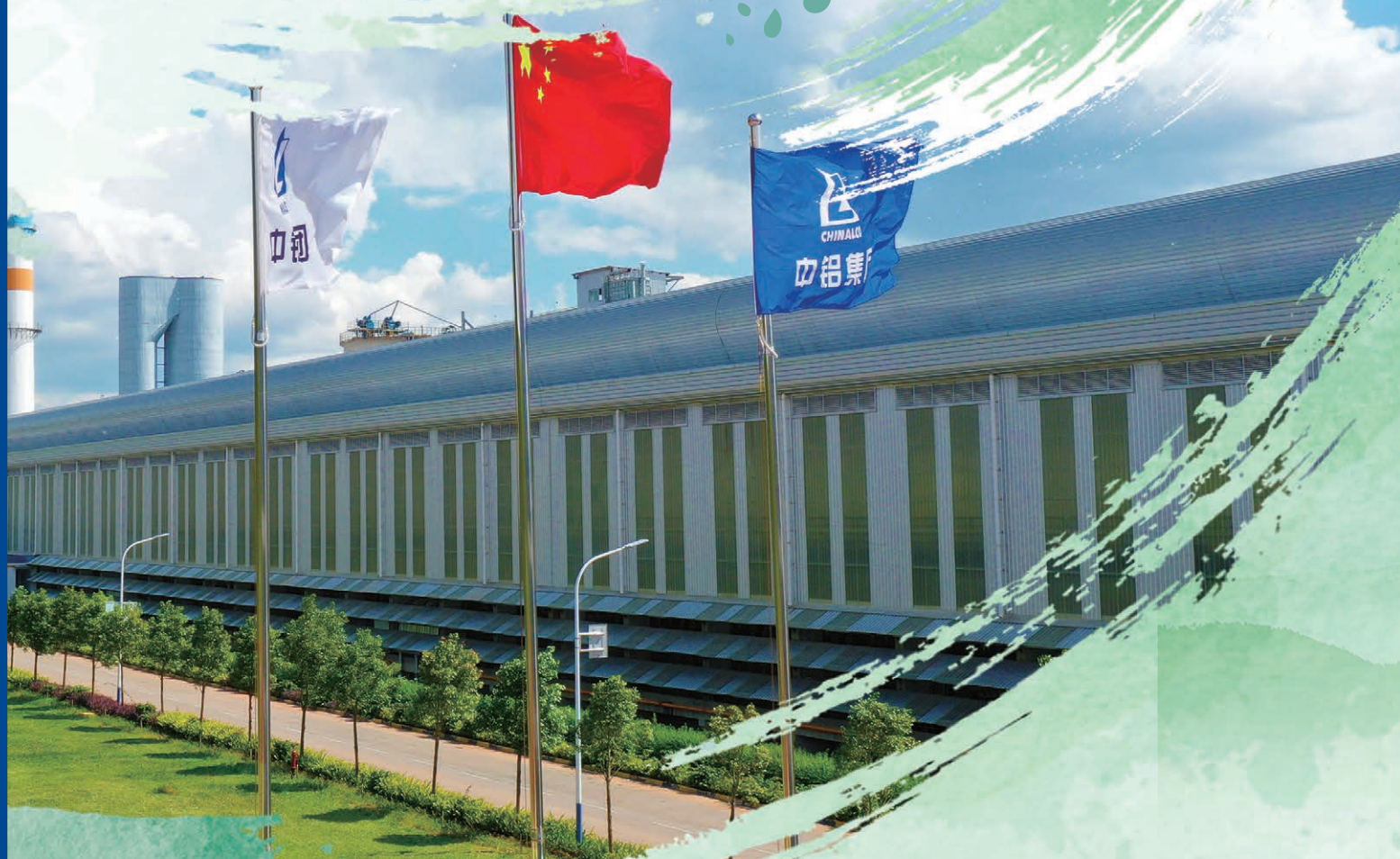
2023 is a critical year for achieving the goal of the "14th Five-Year Plan". Aluminum Corporation of China will continue to benchmark against world-class enterprises, focus on improving core competitiveness, and push forward high-quality development so as to give back to society, shareholders, employees, and investors with better performance.

President: Zhu Runzhou  
March 21, 2023



## About this report

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# About this report



This report covers the environmental, social, and governance (ESG) performance of the Aluminum Corporation of China Limited (hereinafter referred to as “Chalco”, the “Company” or “we”, “us”, “our”, or “ourselves”) and its branches and subsidiaries (collectively referred to as the “Group”), as well as communications and responses to the needs of our stakeholders. This report has been reviewed and approved by the Board, which is fully responsible for the our sustainable development work.

## 1.1 Reporting period

This report covers the period from the 1st January 2022 to the 31st December 2022 (the “reporting period” or the “year”), unless otherwise specified.

## 1.2 Reporting scope

This report covers The Group, focusing on the environmental, social, and governance performance and related policies and management. Because Yunnan Aluminum Co., Ltd. and Pingguo Aluminum Co., Ltd. is consolidated to the scope of the Company’s financial report, the report scope of the ESG report included these two company unless there are special explanations.

## 1.3 Reporting cycle

Chalco’s Corporate Social Responsibility Report and Environmental, Social, and Governance Report are published annually. This is our 15th report.

## 1.4 Reporting guidelines

This report was prepared according to the Environmental, Social and Governance Reporting Guide (the “ESG Guide”) contained in Appendix 27 of the Rules Governing the Listing of Securities on the Hong Kong Exchanges and Clearing Limited (HKEX) and the Guidelines No. 1 for the Self-regulation of Listed Companies on the Shanghai Stock Exchange – Standardized Operation, and the Guidelines on Listed Companies’ Environmental Information Disclosure of the Shanghai Stock Exchange, and with reference to the Sustainability Standards 2022 issued by the Global Reporting Initiative (GRI), the International Organization for Standardization (ISO)’s Guidance on Social Responsibility (ISO26000:2010), the national standard GB/T36000 Guidance on Social Responsibility and the Guidelines to the State-owned Enterprises Directly under the Central Government issued by State-owned Assets Supervision and Administration Commission (SASAC). The materiality assessment results according to the reporting principles in the above-mentioned guidelines and standards also serve as the basis for identifying information to be disclosed. This report is available in both Chinese and English. Should there be any discrepancy between the Chinese version and the English version, the Chinese version shall prevail.

## 1.5 Reporting principles

**Materiality:** In accordance with the requirements of the Environmental, Social and Governance Reporting Guide issued by the Hong Kong Exchanges and Clearing Limited (HKEX), we have carried out stakeholder engagement and materiality assessment, and clarified the report content and scope based on the results of materiality assessment. For details, please refer to “Stakeholder communication and response” and “Materiality identification and assessment” in this report.

**Balance:** This report unbiasedly discloses both the positive and negative information to showcase the environmental, social and governance performance of the Company during the reporting period.

**Quantitative:** This report refers to applicable quantitative standards and practices, adopts quantitative methods to disclose applicable key performance indicators (KPIs), and elaborates relevant quantitative standards, methodologies, assumptions and/or calculation tools, and the source of the conversion factors used (if applicable) where appropriate.

**Consistency:** Unless otherwise specified, there are no major changes to the disclosure scope of this report from previous reports, and methodologies used are consistent with those in the prior year.

## 1.6 Reporting data specification

The data quoted in this report is final statistics and in Renminbi (“RMB”) unless otherwise specified. If there are any discrepancies between the financial disclosures in this report and the Company’s Annual Report, the figures in the Annual Report shall prevail.



# About this report (continued)



## 1.7 Reporting specification

In this report, the following terms shall have the following meanings unless otherwise specified:

"China"	refers to The People's Republic of China
"SASAC"	refers to the State-owned Assets Supervision and Administration Commission
"NDRC"	refers to the National Development and Reform Commission
"The 14th Five-Year Plan"	refers to the Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the People's Republic of China
"30.60"	refers to the statement made by General Secretary Xi Jinping at the General Debate of the 75th session of the UN General Assembly that "China will scale up its Intended Nationally Determined Contributions (INDCs) by adopting more vigorous policies and measures and aim to have CO2 emissions peak before 2030 and achieve carbon neutrality before 2060", which is "Carbon peaking and carbon neutrality"
"Chalco", the "Company", "we", "us", or "our"	refers to Aluminum Corporation of China Limited
The "Group"	refers to Aluminum Corporation of China Limited and its branches and subsidiaries
"Chinalco"	refers to Aluminum Corporation of China
"Chalco Trading Group"	refers to China Aluminum International Trading Group Co., Ltd
"Chalco Logistics"	refers to China Aluminum Logistics Group Corporation Co., Ltd.
"Chalco Materials"	refers to Chalco Materials Co., Ltd.
"Three Platforms"	refers to Chalco Trading Group, Chalco Logistics, Chalco Materials
"Zunyi Aluminum"	refers to Zunyi Aluminum Co., Ltd.
"Baotou Aluminum"	refers to Baotou Aluminum Co., Ltd.
"Guangxi Branch"	refers to Guangxi Branch of Chalco
"Zhongzhou Aluminum"	refers to Zhongzhou Aluminum Co., Ltd.
"Ningxia Energy"	refers to Chalco Ningxia Energy Group Co., Ltd.
"Zhengzhou Research Institute"	refers to Chalco Zhengzhou Nonferrous Metal Research Institute Co., Ltd.
"Chalco Shandong"	refers to Chalco Shandong Co., Ltd.
"Shanxi New Material"	refers to Chalco Shanxi New Material Co., Ltd.'
"Chalco Mining"	refers to Chalco Mining Co., Ltd.
"Qinghai Branch"	refers to the Qinghai Branch of Chalco
"Guizhou Branch"	refers to the Guizhou Branch of Chalco
"Fushun Aluminum"	refers to Fushun Aluminum Co., Ltd
"Lanzhou Aluminum"	refers to Lanzhou Aluminum Co., Ltd
"Chalco Guinea"	refers to Chalco Guinea Company S.A
"Guangxi Huasheng"	refers to Guangxi Huasheng New Material Co., Ltd



"Guizhou Huajin Aluminum"	refers to Guizhou Huajin Aluminum Co., Ltd
"Shanxi Zhongrun"	refers to Shanxi Chalco Huarun Co., Ltd
"Xinghua Technology"	refers to Shanxi Jiaokou Xinghua Technology of Aluminum Corporation of China Co., Ltd
"Shanxi Huaxing"	refers to Shanxi Huaxing Aluminum Co., Ltd
"Chalco New Materials"	refers to Chalco New Materials Co., Ltd
"Chalco (Shanghai) Carbon"	refers to Chalco (Shanghai) Carbon Co., Ltd.
"Wangwa Coal Industry"	refers to Ningxia Wangwa Coal Industry Co., Ltd.
"Yinxing Coal Industry"	refers to Ningxia Yinxing Coal Industry Co., Ltd.
"Gansu Hualu Aluminum Industry"	refers to Gansu Hualu Aluminum Industry Co., Ltd.
"Yunnan Aluminum"	refers to Yunnan Aluminum Co., Ltd.
"Yunnan Haixin Aluminum"	refers to Yunnan Haixin Co., Ltd.
"Yunnan Runxin Aluminum"	refers to Yunnan Runxin Co., Ltd.
"Yunnan Wenshan Aluminum"	refers to Yunnan Wenshan Co., Ltd.
"Yunnan Yongxin Aluminum"	refers to Yunnan Yongxin Co., Ltd.
"Yunnan Aluminum Yangzonghai Smelter Branch"	refers to Yunnan Aluminum Yangzonghai Smelter Branch

## 1.8 Access to the report

Electronic copies are available as follows:

The Stock Exchange of Hong Kong:

<https://www.hkex.com.hk>

The Shanghai Stock Exchange:

<https://www.sse.com.cn>

Chalco Website:

<https://www.chalco.com.cn>

## 1.9 Response to the report

The Group values suggestions or opinions from various stakeholders for continuous improvements. If you have any comments on this report, please contact us:

Phone no.: 8610-8229 8322

Fax no: 8610-8229 8158

Email: [ir@chalco.com.cn](mailto:ir@chalco.com.cn)

A feedback questionnaire is attached on page 88 of this report, and you are welcome to fill in and send it to the email address above.

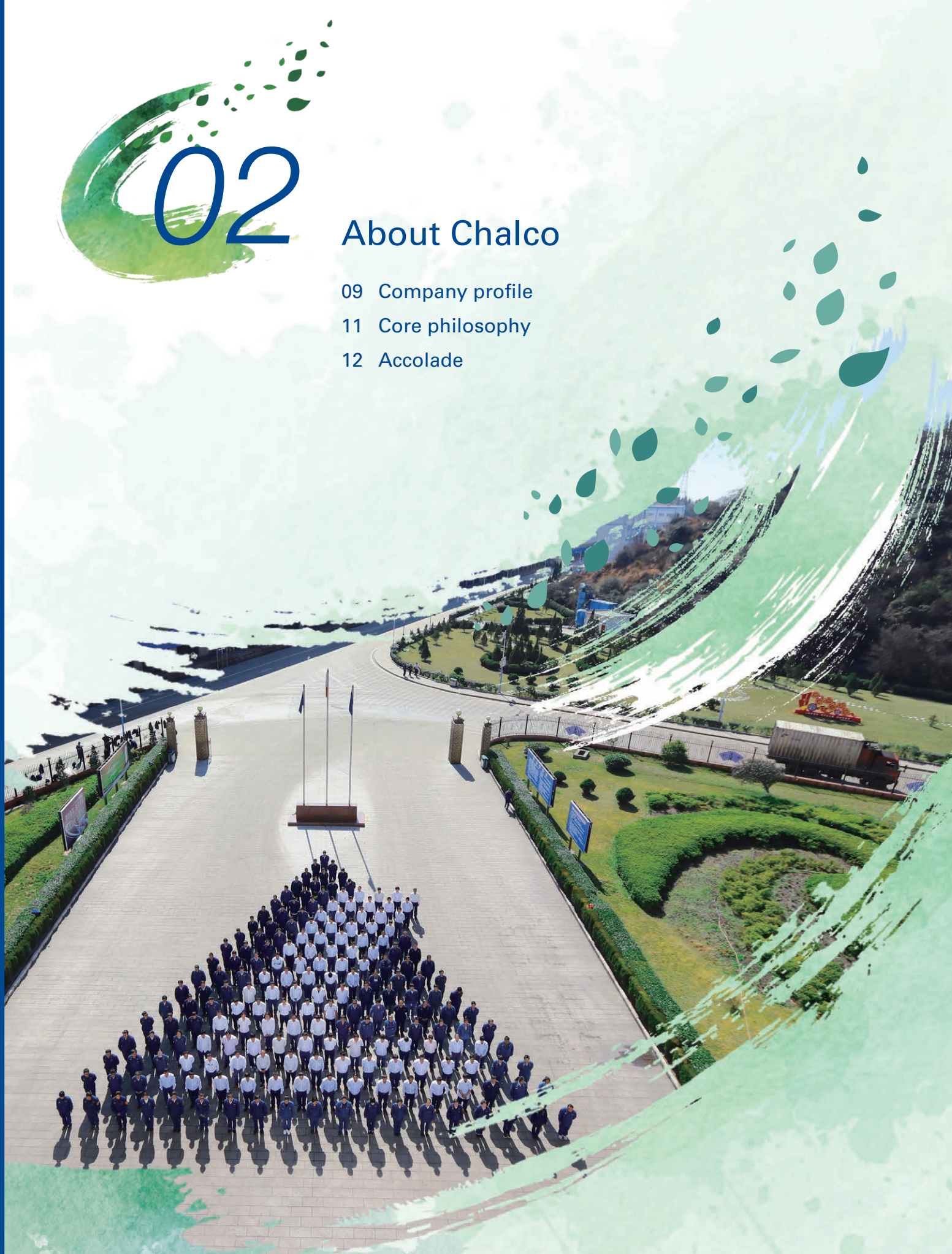
# 02

## About Chalco

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# About Chalco



## 2.1 Company profile

Chalco is controlled by Aluminum Corporation of China. Chalco is a leading company in China's aluminum industry, the world's largest supplier of alumina, fine alumina, high-purity aluminum, and aluminum anodes. Chalco has been listed in the Stock Exchange of Hong Kong (stock code: 2600) and the Shanghai Stock Exchange (stock code: 601600). A-shares are included in the MSCI China A Onshore Index and H-shares are included in the Hang Seng China Enterprises Index and the Hang Seng Corporate Sustainability Index Series. As of the end of 2022, Chalco had a total of 30 subordinate enterprises.

### 2.1.1 Basic information

Company name:	Aluminum Corporation of China Limited
President:	Liu Jianping
Date of foundation:	September 10, 2001
Registered address:	No. 62, Xizhimen North Street, Haidian District, Beijing
Total capital stock:	17161591551
Controlling shareholder:	Aluminum Corporation of China
Company website:	<a href="http://www.chalco.com.cn">www.chalco.com.cn</a>
Actual controller:	State-owned Assets Supervision and Administration Commission of the State Council
Email:	<a href="mailto:ir@chalco.com.cn">ir@chalco.com.cn</a>



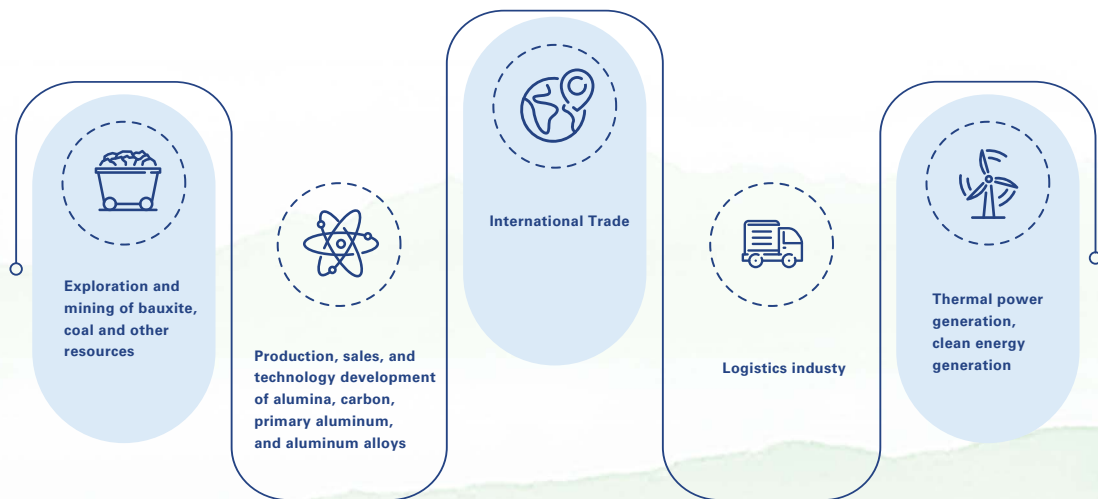
## About Chalco (continued)



### 2.1.2 Operating business segment

The Group is a large enterprise whose businesses include exploration and mining of bauxite and coal, the production, sales, and R&D of alumina, carbon, primary aluminum and aluminum alloy products, to international trade, logistics, and power generation from both fossil fuels and clean energy.

Chalco is also a national enterprise technology center and has independently developed an array of representative technological achievements in the field of bauxite, alumina, fine alumina, and electrolytic aluminum. The Company plays a leading role in developing and revising national and industry standards, guiding industry standards and technological advances.



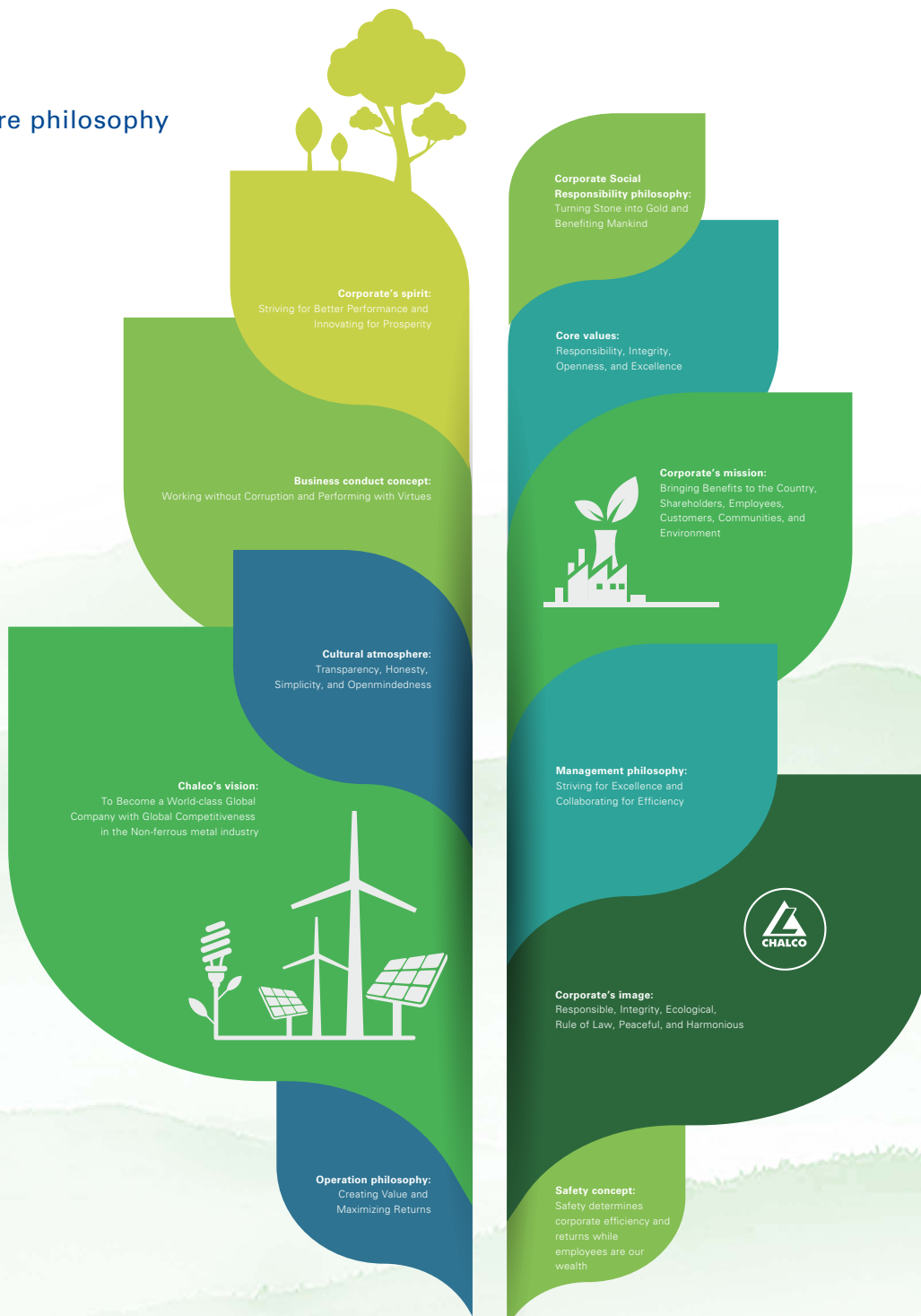
### 2.1.3 Market presence

In recent years, Chalco has continuously strived to comprehensively deepen reform and innovation and to promote transformation and upgrading. Chalco has made breakthroughs in layout optimization, remarkably improved comprehensive strength, and enhanced market competitiveness. The position and role of Chinalco as a core strategic unit of the Group has been more prominent as it has maintained the highest credit rating across the global non-ferrous metal industry for many years.





## 2.2 Core philosophy



## About Chalco (continued)



### 2.3 Accolade

2022



Ranked 5th in the "State-owned Enterprises ESG • Pioneer 50 Index", 3rd in the "State-owned Enterprises ESG • Governance Pioneer 50 Index", 4th in the "State-owned Enterprises ESG • Social Value Pioneer 50 Index", and 8th in the "State-owned Enterprises ESG • Risk Management Pioneer 50 Index" in 2022.

2022



Chalco Guinea was granted the 2022 Excellent Overseas Security Practice Award, and the project of "Building a Project to Promote the Development of A Region, Contributing to Guinea's Economic Recovery" was awarded as an excellent case in the "Promoting Global Development" section of the 2022 (the fifth) International Image Building Cases of Chinese Enterprises and other accolades.

2022



Won the National Intellectual Property Advantage Enterprise awarded by the China National Intellectual Property Administration.

2022



Won the first "ESG Golden Bull Award • Pioneer Enterprise", and the "Excellent ESG Practice Case of Listed Companies".

2022



S&P Global Ratings upgraded the company's credit rating from "BBB-" to "BBB".



03

## Board statement





## Board statement



The Board of Chalco believes that establishing and improving the environmental, social and governance (ESG) management system can continuously drive the sustainable development of the Company. The Board of Directors is the decision-making body for sustainable development, takes full responsibility for the Company's sustainable development strategies, and on this basis, takes the overall planning of the company's ESG management.

Various special committees under the Board are responsible for overseeing and managing their respective ESG work. Among them, the Committee for Development Planning is responsible for formulating corporate development plans in line with ESG concepts; the Committee for Occupational Health, Safety and Environment is responsible for the general management of various matters related to workers' health and safety and the environment during the Company's operations; the Audit Committee is responsible for supervising, managing and auditing ESG risks. In addition, in accordance with the requirements of the Implementation Rules of Aluminum Corporation of China Limited for Work on Social Responsibilities, the Company has also established a social responsibility working committee to be responsible for promoting the specific ESG work and implementing various ESG management tasks and indicators. Every year, the Board obtains and reviews the ESG work progress report from these special committees, discusses over relevant matters, and guides the ESG work guidelines. Meanwhile, each committee also reports to the Board from time to time on important ESG matters to ensure that the Board is informed of the progress of relevant issues. The Company cooperates with external third-party professional agencies to provide 1-2 ESG centralized trainings to the Board every year, and irregularly organizes relevant organizations to provide special trainings to the Board and assist the Board understanding the latest trends in the ESG field and excellent ESG practices.

Chalco has integrated ESG risk into its risk management system. Under the guidance of the Audit Committee, all operating departments and subordinate production enterprises of Chalco identify and prevent significant ESG risks in the daily operation and production process, mainly including environmental risks, safety risks, operational risks and other risks. The Audit Committee regularly reviews such risks and reports the risk management to the Board on a regular basis.

Chalco continues to set environmental and social goals in connection with its business operations. The Board reviews and discusses the establishment and completion of these goals, and clarifies that the Company will continue to strive to achieve the carbon dioxide peaking by 2025 and carbon the dioxide reduction of 40% by 2035. For relevant details, please refer to chapters 6-8 of this report.

Chalco has developed effective strategies to maintain a balance between the Company's environmental and social impact and the achievement of its business objectives to promote sustainable development. The Company has developed ESG strategy, and the Board has reviewed and evaluated its ESG strategy on a regular basis to review and ensure alignment with the Company's development strategy. The Board also evaluates the importance of ESG issues on a regular basis. The evaluation process and results are detailed in the "Responsibility communication" section of this report and have been reviewed by the Board.

This report has disclosed the above ESG-related issues in detail and has been reviewed and approved by the Board on March 21, 2023.



# 04

## Social responsibility and ESG management

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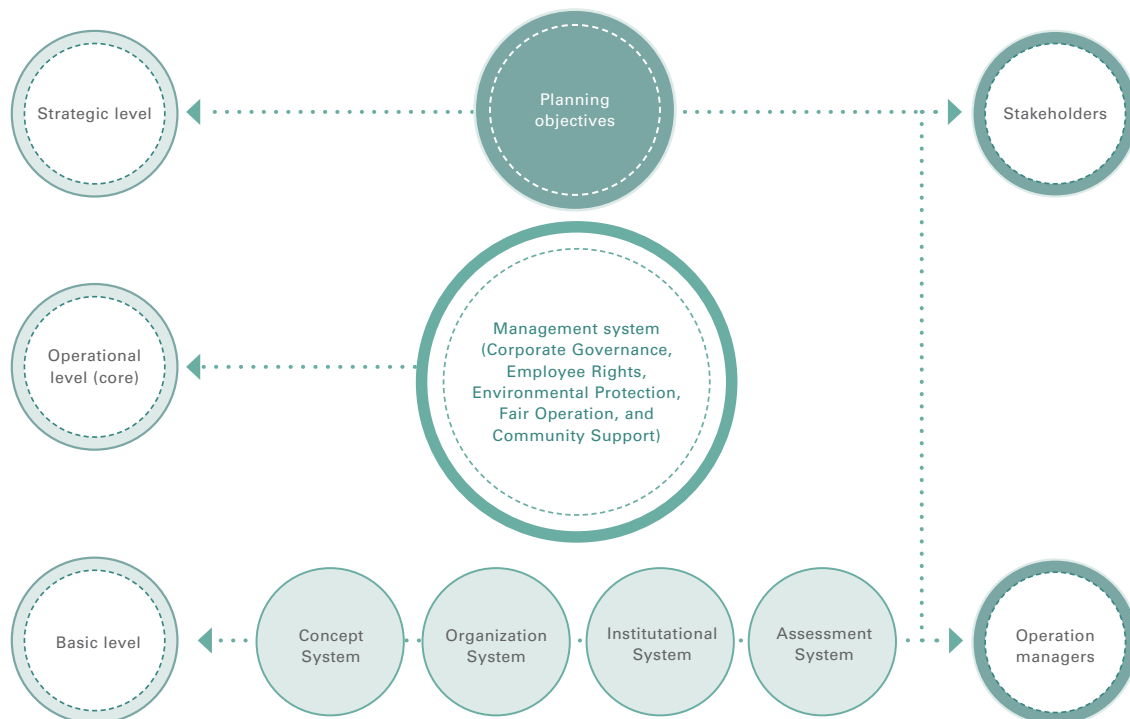
# Social responsibility and ESG management



The Group's social responsibility governance aims to achieve a high quality of sustainable development, and believes that a sound sustainability strategy can effectively contribute to the realization of long-term strategies and objectives, and seize opportunities and respond to risks brought about by sustainable development. To this end, Chalco actively integrates social responsibility into the day-to-day management system and assumes responsibility for various stakeholders including employees, customers, society, and the environment.

## 4.1 Social responsibility management system

Chalco fulfills its social responsibility based on the core concept of "turning stones into gold and benefiting the people", aims at the mission of repaying shareholders, helping employees succeed, benefiting customers and the society and cherishing the environment, effectively integrates social responsibility management into its business management system (CBS) to achieve full coverage of its major business units, establishes the Social Responsibility Management Module of Aluminum Corporation of China Limited to form systematic conceptual system, organization system, institutional system, appraisal and system management system, and clarifies five major areas of duty performance: corporate governance, employees' rights and interests, environmental protection, fair operation and community support. Meanwhile, the Company has defined the scope of responsibility and responsible subjects for the five major areas, as well as the responsible indicators and negative list of each department and subordinate enterprise. Among them, the negative list contains a total of 80 prohibited items.



## 4.2 ESG management system

In accordance with the requirements of the “Implementation Rules of Aluminum Corporation of China Limited” for Work on Social Responsibilities, Chalco has established a complete social responsibility management system that covers sustainable development and ESG management:



## Social responsibility and ESG management (continued)



### 4.3 Responsibility communication

#### 4.3.1 Stakeholder communication and response

Chalco actively listens and responds to the expectations of different stakeholders. We have established various communication and participation mechanisms based on actual businesses and operational features, aiming to fully respond to the expectations and requirements of stakeholders, thereby assisting the Company in prioritizing its sustainable development efforts and jointly defining the key directions for future sustainable development.

Stakeholder	Means of communication	Expectations and requirements
Major shareholders	Shareholders' meetings, company announcements, field visits	Safeguarding shareholders' rights and interests, improving corporate governance, enhancing business performance, and operating in compliance with the law, and conducting profit distribution
Government and regulators	Periodical information reports and submissions, regular sessions with regulatory agencies, participation in conferences/seminars	Operating in compliance with laws and regulations, paying taxes, driving the development of local economy, promoting local employment, safeguarding occupational health and safety of employees, as well as safe corporate production and operation
Employees	Congress of workers and staff, suggestion box, symposium	Occupational health, compensation and benefits, career development, humanistic care
Customers	Business communication, customer feedback	Improving quality assurance system, providing high-quality products and services
Peer companies	Participating in industry forums, exchange visits, learning exchanges	Jointly promoting the sustainable development of the industry
Potential investors and financial institutions	Information disclosure, investor presentations, roadshows, analyst briefing sessions	Timely disclosing relevant information and improving business performance
Suppliers	Tendering and purchasing, seminars and forums, access and evaluation, field visits	Personnel health and safety, fair and transparent supplier management
Communities	Participating in public benefit activities, and involving stakeholders	Improving community environment, supporting community public service, rural revitalization



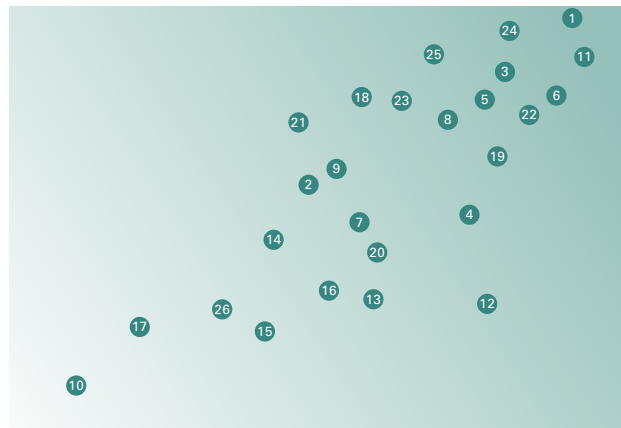
#### 4.3.2 Materiality Issues Identification and assessment

In 2022, Chalco analyzed the internal and external background of sustainable development based on its operation situation and development plan, taking into account such factors as industry focus, ESG related policies and standards, key concerns of capital market. Based on the background analysis, the Company identified a total of 26 materiality issues in the environmental and social aspects. Compared with 2021, we have adjusted the topics of “land resources utilization and mine site rehabilitation” and “leading the industry, promoting industry development” to “mineral resources management and mine site rehabilitation” and “enhancing industry influence and leadership, and promoting industry development”.

In order to have an in-depth and well-rounded understanding of the feedback from internal and external stakeholders on the materiality of the Company’s ESG issues, Chalco conducted a survey on the materiality of different environmental and social issues among various stakeholders by sending questionnaires and collecting their opinions on the Company’s sustainable development work. The Company analyzed these feedbacks in a fair and balanced way and formed a materiality matrix for Chalco’s materiality issues (as shown to the right).

Such survey served as a supplement to the daily communication channels and provided assistance and guidance in evaluating the materiality of the Company’s ESG issues. We will discuss these issues and the specific content separately in respective sections of this report.

Importance to stakeholders



Importance to Sustainable Development of Aluminum Corporation of China

- |   |   |
|---|---|
| 1. Pollutant Discharge Management (including the generation, emission and management of waste gas, waste water and solid waste) | 14. Fair Competition  |
| 2. Ecology and Biodiversity Protection  | 15. Supply Chain Management   |
| 3. Energy Management  | 16. Influence and Leadership to the Industry and Industry Development |
| 4. Water Resources Management   | 17. Community Involvement and Contribution                            |
| 5. Renewable Energy Application   | 18. Product Quality Control   |
| 6. Carbon Emission Management   | 19. Innovative R&D  |
| 7. Climate Change-Related Risks and Opportunities   | 20. Intellectual Property Protection                                  |
| 8. Prevention and Treatment of Environmental Emergency affairs  | 21. Customer Privacy Protection                                       |
| 9. Mineral Resources Management and Mine Reclamation  | 22. Sustainable Growth of Profits                                     |
| 10. Use of Packaging Material   | 23. Enterprise Governance   |
| 11. Employee Health and Safety  | 24. Enterprise Internal Anti-corruption and Integrity Promotion       |
| 12. Employee Benefits and Welfare   | 25. Transparency of Financial and Non-financial Information           |
| 13. Employee Development and Training   | 26. Communication with Stakeholders                                   |



# Social responsibility and ESG management (continued)



## 4.4 Responsibility manifestation

### 4.4.1 Support for the United Nations' Sustainable Development Goals

Chalco is well aware of that the economic, environmental and social challenges facing all mankind cannot be underestimated and that sustainable development is an imperative trend. We have integrated the sustainable development concept into our daily operation strategy to respond to China's and the world's demand for sustainable development, and have been pushing for the realization 'of the UN' sustainable development goals. The table below lists the Company's key practices in relation to the 17 SDGs:

The UN's sustainable development goals	Our actions	The UN's sustainable development goals	Our actions
 <p><b>1 NO POVERTY</b></p>	Conducting targeted poverty alleviation, and helping solve the education, medical care and employment problems of children from poor families.	 <p><b>6 CLEAN WATER AND SANITATION</b></p>	Optimizing water consumption structure, strengthening daily water saving management, and ensuring water resources safety.
 <p><b>2 ZERO HUNGER</b></p>	Participating in rural revitalization, helping rural areas to implement agricultural transformation, improving the local agricultural environment by restoring and improving the soil environment, enhancing water acquisition efficiency and other methods, and pushing forward the process of agricultural modernization.	 <p><b>7 AFFORDABLE AND CLEAN ENERGY</b></p>	Adjusting energy utilization structure, vigorously developing renewable energy industries such as photovoltaic power and wind power generation, and increasing the proportion of clean energy; assisting residents near the operation sites to construct equipment for clean power generation, thus providing more people the access to clean energy.
 <p><b>3 GOOD HEALTH AND WELL-BEING</b></p>	Implementing employee activities, including culture, sports and life activities, to help employees balance work and life; improving the intrinsic safety level and strengthening production safety by means of digital and intelligentized transformation.	 <p><b>8 DECENT WORK AND ECONOMIC GROWTH</b></p>	Firmly safeguarding employees' rights and interests, creating a good working environment, setting up attractive employee development programs, implementing equity-based incentives, and promoting the continuous improvement of employment quality.
 <p><b>4 QUALITY EDUCATION</b></p>	Launching education aid activities and donating sports, school and living supplies and other projects, to provide a better learning and growing environment for children and teenagers and help them grow sturdily.	 <p><b>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</b></p>	Accelerating scientific researches, speeding up the transformation and application of research results, and leading the industry, so as to provide strong support for achieving high-quality development.
 <p><b>5 GENDER EQUALITY</b></p>	Adhering to the employment policy of gender equality and ensuring that all employees enjoy all rights and interests as well as fair and just treatment according to the law.	 <p><b>10 REDUCED INEQUALITIES</b></p>	Guaranteeing equal rights and benefits for employees of different nationalities, races and cultural backgrounds.

<sup>1</sup> The United Nations adopted the Transforming Our World: The 2030 Agenda for Sustainable Development in 2015 and set out 17 Sustainable Development Goals (SDGs), aiming to eradicate poverty, combat inequality and injustice, and address climate change globally from 2015 to 2030.

The UN's sustainable development goals

Our actions



Actively participating in community development, being enthusiastic about public welfare undertakings, and continuously carrying out the aid programs for Qinghai and Tibet and charitable donations; promoting the application and development of clean energy, and helping accelerate the construction of sustainable cities and communities where we operate.



Continuously implementing the research, development and industrial promotion of energy-saving technologies and harmless disposal of waste, accelerating the layout of clean energy industry, and intensifying the implementation of the concept of responsible mining.



Optimizing corporate energy utilization structure, expanding the usage of clean energy, actively carrying out activities to save energy, reduce consumption, and mitigate climate change, and helping the country achieve the "30.60" goal.



Using water circulation system to achieve "zero discharge" of production wastewater and reduce water pollution.

The UN's sustainable development goals

Our actions



Adopting responsible site selection methods, developing scientific mining processes, conducting mine site rehabilitation, actively creating and building green mines, and implementing organized storage and comprehensive utilization of waste.



Optimizing corporate governance capabilities, improving compliance management, internal control systems and legal systems, strengthening the construction of clean honest administration, and promoting modernization of corporate governance.



Enabling win-win relationships, establishing efficient communication platforms, and building a stable and sustainable supply chain.



# 05

## System construction and enhancement of governance capacity

- 23 Governance system
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- 29 Integrity building
- 31 Scientific and technological innovation



# System construction and enhancement of governance capacity



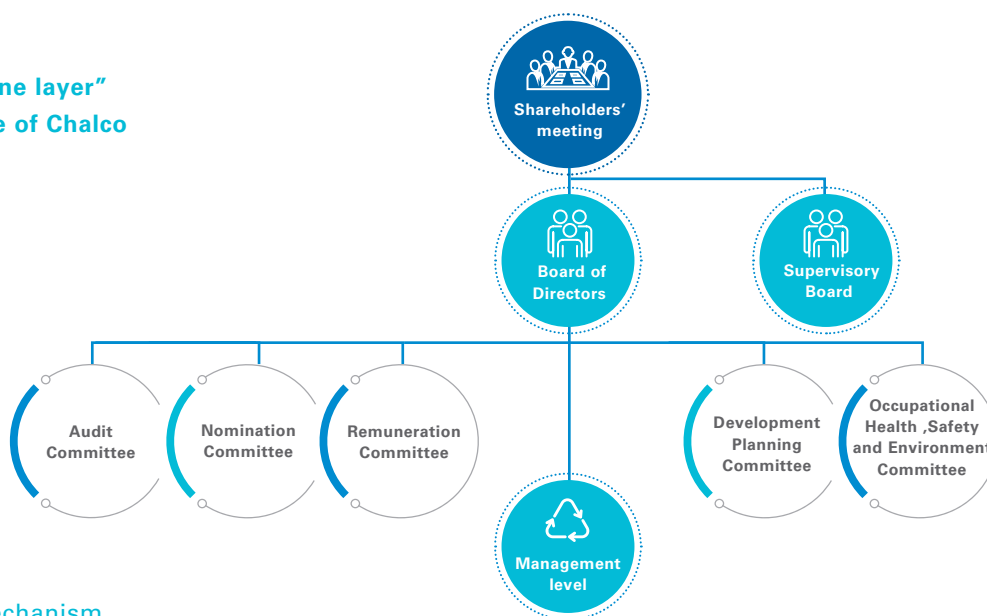
Chalco adheres to the goal of “building a world-class aluminum company with global competitiveness”, conscientiously implements the national policies, complies with the regulation rules on listings, improves the corporate governance structure that enables each to perform its functions and responsibilities and secures coordinated operation and effective balance, and promotes the Company’s comprehensive reform of in all aspects. We focus on professional asset operation center and profit center in terms of responsibility orientation, strengthen the professional, market-oriented, standardized, internationalized, digitalized and informationized operation management, and have achieved remarkable results in improving the modern corporate system with Chinese characteristics, promoting the optimization and adjustment of layout structure, and enhancing corporate vitality and efficiency.

## 5.1 Governance system

### 5.1.1 Governance framework

Chalco continues to promote the optimization of the governance system and improve the governance structure of “three meetings and one layer” consisting of shareholders’ meetings, board meetings, supervisory board meetings and the management level, continuously deepens the management of “three meetings”, improves the governance system of the Company and enterprises to which it has contributed capital, and promotes the clarification of rights and responsibilities and the standardization of operations. We will lead Chalco to achieve sustainable and high-quality development and reward the society and shareholders with good performance.

### “Three boards and one layer” governance structure of Chalco



### 5.1.2 Governance mechanism

#### Shareholders’ meeting

Shareholders’ meeting is the highest authority of the Company, and the powers and functions exercised by it according to the law include the following: deciding on the Company’s business principles and investment plans, examining and approving the plans for the Company’s profit distribution and losses recovery, amending the Articles of Association, the rules of procedure of shareholders’ meeting, the rules of procedure of the Board, the rules of procedure of the Supervisory Board and other issues. In 2022, Chalco held three shareholders’ meetings, one A-share shareholders’ meeting and one H-share shareholders’ meeting, invited shareholders including institutional investors to attend these meetings, and considered and passed a total of 26 proposals.

#### Board of Directors

The Board is the decision-making body for the Company’s operations and is responsible to the shareholders’ meeting. The functions and powers exercised by the Board in accordance with the law include but are not limited to the following: implementing the resolutions of the shareholders’ meeting; deciding on the Company’s development strategy, business plan and investment plan; formulating the Company’s annual financial budget plan and accounting plan; developing the plans for the Company’s profit distribution and losses recovery; making the plans to increase or reduce the Company’s registered capital; developing the Company’s basic management system and supervising the implementation of the system; deciding on the Company’s risk management, compliance and internal control policies; formulating the Company’s internal control and compliance management and other related systems, and developing equity-based incentive plans and other issues.

## System construction and enhancement of governance capacity (continued)



As of the end of the reporting period, the Board has nine directors, and they are Mr. Liu Jianping, Chairman of the Board; Mr. Zhu Runzhou, Mr. Ou Xiaowu and Mr. Jiang Tao, who are executive directors; Mr. Zhang Jilong and Mr. Chen Pengjun, who are non-executive directors; and Mr. Qiu Guanzhou, Mr. Yu Jinsong and Ms. Chen Yuanxiu, who are independent non-executive directors. During this reporting period, Chalco held 14 board meetings and considered and passed 60 proposals.

Under the Board, there are the Audit Committee, the Re-election Nomination Committee, the Compensation Committee, the Committee for Development Planning, and the Committee for Occupational Health, Safety, and Environment, among which, the Audit Committee, the Re-election Nomination Committee, the Compensation Committee, and the Committee for Development Planning are dominated by outside directors, and the Audit Committee, the Re-election Nomination Committee and the Compensation Committee are all chaired by independent directors.

The Board Office is the daily service organ of the Board, responsible for the daily affairs of the Board and providing decision support for the various decisions by the Board. Every month, the Board Office prepares "Directors' Newsletters" that contain market information on the industry involved, the Company's production and operation conditions, and the progress of key projects for the reference of the Company's directors. The Company has established an advance communication mechanism for the Board's proposals, reports to the Company's outside directors on key matters in a timely manner at irregular intervals to solicit and listen to their opinions and suggestions on the Board's proposals, organizes outside directors to conduct researches on subordinate enterprises to enable them to be informed of the relevant information of the industry and the Company in a timely manner. In 2022, the Company organized outside directors to conduct work research on Yunnan Aluminum Limited, aiming to strengthen the support for the Company's outside directors in performing their duties.

### Supervisory Board

The Supervisory Board is the supervisory body of the Company and is responsible to the shareholders' meeting. The Supervisory Board exercises its functions and powers according to law, including inspecting the Company's financial and risk management and the implementation of internal controls, supervising and evaluating as well as putting forward comments and suggestions on the duty performance of the Board, management, and their members. During the year, the Company established an advanced communication mechanism, aiming to communicate with supervisors on important proposals and ask for their opinions and suggestions in advance. As of the end of the reporting period, the Supervisory Board has five supervisors, and they are Mr. Ye Guohua (Chairman of the Supervisory Board), and supervisors Ms. Shan Shulan, Ms. Lin Ni, Mr. Yue Xuguang and Ms. Xu Shuxiang. During the reporting period, the Company held eight supervisory board meetings to carefully consider the Company's periodic financial reports, the implementation of internal control and other relevant important matters, and reviewed and approved a total of 18 proposals.

### Management level

The management level is mainly responsible for presiding over the Company's production and operation management, organizing and implementing the resolutions of the Board, the Company's development strategy, annual business plan, investment plan and financial budget plan, and formulating, organizing and implementing performance appraisal and compensation incentives. The Board reviews the functions assigned to the management personnel and their work performance to ensure the company operate efficiently and the interests to shareholders. The Company's management level reports to the Board or the Supervisory Board on the signing and performance of important contracts, the use of funds and the profit and loss conditions. As of the end of the reporting period, the Company's major senior executives include the president Mr. Zhu Runzhou, the vice presidents Mr. Wu Maosen and Mr. Jiang Tao, and the chief financial officer and secretary to the Board Mr. Ge Xiaolei.



Held **14**

Board meeting

Passed **60** proposals

Held **8**

Supervisory board meetings

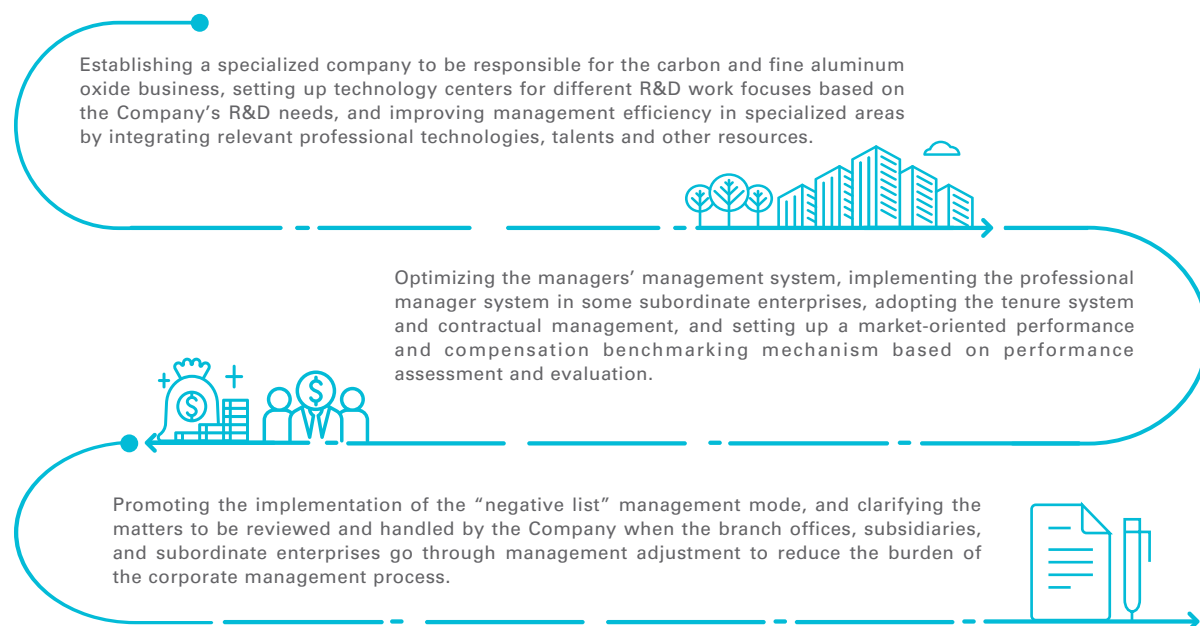
Passed **18** proposals



### 5.1.3 Governance system optimization

Chalco always insists on leading the healthy development of the Company by reform, and continues to promote the optimization of the governance system and enhance the system construction. This year, the Company revised and improved a number of system management measures, and established an online system management platform to realize the tabularized system, process-oriented form and process informationization, further improving the efficiency of system management. Meanwhile, the Company guided and urged its subordinate enterprises to complete the revision of rules and regulations and the rectification of work problems to promote the high-quality development of the Company.

In this year, Chalco advanced the implementation of the centralized management mode, enhanced the principle of “arranging special persons to be responsible for special tasks”, and continuously improved the corporate governance efficiency through internal professional integration. This year, the Company mainly implemented the following measures to optimize the management system:



Formulating and implementing the “Administrative Measures of Aluminum Corporation of China Limited on Managing the Authorization of the Board of Directors”, with the aim to establish a dynamic adjustment mechanism for the delegation of authority from the Board to the management level and truly realize centralized, consistent, hierarchical, and effective management, thus stimulating the management's vitality, optimizing the decision-making cycle, and enhancing the decision-making efficiency.



#### Perfecting the supervision system and improving the effectiveness of strengthened governance supervision

This year, the Company actively improved the supervisory work system, formulated and issued the “Administrative Measures of Aluminum Corporation of China Limited on Supervisory Work”, clarified the categories and processes of supervisory tasks, standardized the change process for major modifications to various tasks, and refined the reward and punishment standards of supervisory tasks. The Company sorted out the task lists of the group, subordinate enterprises and itself and incorporated them all into the supervision management, adopted a mechanism of regular reminders and notifications to supervise the implementation of these tasks, and established a supervision management system to implement the integrated online operation of various tasks, thus realizing the full traceability of supervision tasks and enhancing the supervision efficiency.

## System construction and enhancement of governance capacity (continued)



### 5.2 Legitimate operation

Legitimate operation is the cornerstone of an enterprise's steady development. The Company continues to deepen the construction of the legal compliance system, steps up efforts in compliance supervision, improves the compliance management system and internal control system, and continues to implement the law system and the internal control system.

#### 5.2.1 Deepening the construction of legal system

Chalco continues to strengthen legal construction, reinforce management and operations in accordance with the law, and enhance the awareness of legal compliance among employees. The Company has established a leading group for legal construction and compliance management with the chairman as the leader and the president as the deputy leader. The leading group is responsible for organizing and implementing regular surveys of domestic and international legal compliance risks and paying attention to legal updates and regulatory dynamics. The Company also employs third-party legal advisors to assist in instructing the daily legal compliance work and strengthening the management of domestic and overseas legal compliance.



### Implementing compliance management system

During the year, the Company consistently carried out the construction of the legal compliance system, and helped and promoted subordinate enterprises to conduct compliance system construction while implementing the Company's compliance management practice. Based on the reform plan for the legal control system, the Company promoted Baotou Aluminum establish and improve its legal department, and included newly-established enterprises such as Chalco New Materials and Chalco (Shanghai) Carbon into the service scope of the Legal Center, thus achieving full coverage of its subordinate enterprises in terms of legal control.

### Strengthening the construction of compliance system

The Company puts emphasis on constructing the management system of rules and regulations, formulates work plans for "establishing, modifying and abolishing" rules and regulations on an annual basis, and continuously revises and perfects the Company's system to ensure the applicability of the system. During the year, the Company carried out special work on legal compliance and compiled a series of documents for the compliance system, including lists for identification of legal compliance risks in key areas, job responsibilities lists, legal compliance risk prevention manual and other documents, and refined the compliance management requirements, aiming to promote the legal compliance of production and operations in all aspects. In addition, the Company formulated and issued the "Operation Plan of the Property and Commercial Law Center", integrated the legal resources of the Three Platforms to establish the Property and Commercial Law Center, and appointed a general counsel to coordinate the legal work of the Three Platforms and strengthen the legal compliance of the business trade links.

### Stepping up the efforts in compliance management

The Company continues to step up its efforts in legal compliance supervision, reports on the handling progress of non-compliance events on a regular basis, and urges relevant departments, branches, subsidiaries, and subordinate enterprises to intensify their efforts to handle the events. The Company also conducts event sourcing and analysis regularly, promotes the responsibility investigation mechanism, supervises relevant departments to implement rectifications, and keeps abreast of the relevant rectification conditions.

In addition, the Company continuously improves its overseas legal compliance management. The Company employs professional legal advisors to guide Chalco Guinea to strengthen the management of legal compliance risks and guide its daily compliance work. The Company also engages lawyers at overseas operating sites to keep abreast of changes in local laws, so as to ensure timely response and compliance with overseas compliance requirements.

### Creating a culture of rule of law

The Company continues to carry out publicity and education concerning the law. This year, we have adopted newspapers, third-party social networking platforms, case studies, and other means to train the Company and enterprises at all levels on the Civil Code and other contents to create a culture of legal compliance. The company conducted legal compliance training for its senior managers and the key managers of its subordinate subsidiaries and branches, and organized subordinate enterprises to test the leading cadres' knowledge of the rule of law and legal compliance. The test content covers the Civil Code, the Constitution, the Law on Environmental Protection, the Law on Production Safety, the Supervision Law and other industrial laws, and a total of 290 people participated and passed the test.

### 5.2.2 Improving internal control management process

Chalco attaches importance to internal control management and consistently improves its internal control management system and management mechanism. During the year, the Company sorted out and revised the internal control system of each business area based on the business conditions, improved the construction of the internal control system, and prepared the "Internal Control Manual (Revised 2022)". The Company constantly urges its subordinate enterprises to improve their internal control management, promotes the docking among the internal control management processes of the Company and its subordinate enterprises, and keeps pressing for the implementation of the "big internal control" system featuring "standard specifications, complete coverage, upper-to-lower docking, and collaborative promotion". The Company's Internal Audit Department is responsible for internal control evaluation. Every year the department conducts independent assessments of the effectiveness of the design and operation of the subordinate enterprises' internal control systems, analyzes the existing problems and puts forward suggestions for management improvement. In this year, the Company organized all enterprises to carry out semi-annual and annual internal control self-assessment, completed independent evaluation of internal control of more than ten enterprises, achieved the goal of full coverage of independent evaluation of internal control from 2020 to 2022, and cooperated with a third-party agency to complete internal control audit.

The Company sticks to the mechanism of close-loop rectification of internal control defects and has established such mechanisms as confirmation of time limit for defects rectification, regular notification of rectification progress and confirmation of defects rectification cancellation, aiming to emphasize the normalization and effectiveness of rectification. For defects that fail to be rectified completely, the Company arranges, urges, and inspects rectifications again to ensure such defects are effectively corrected.



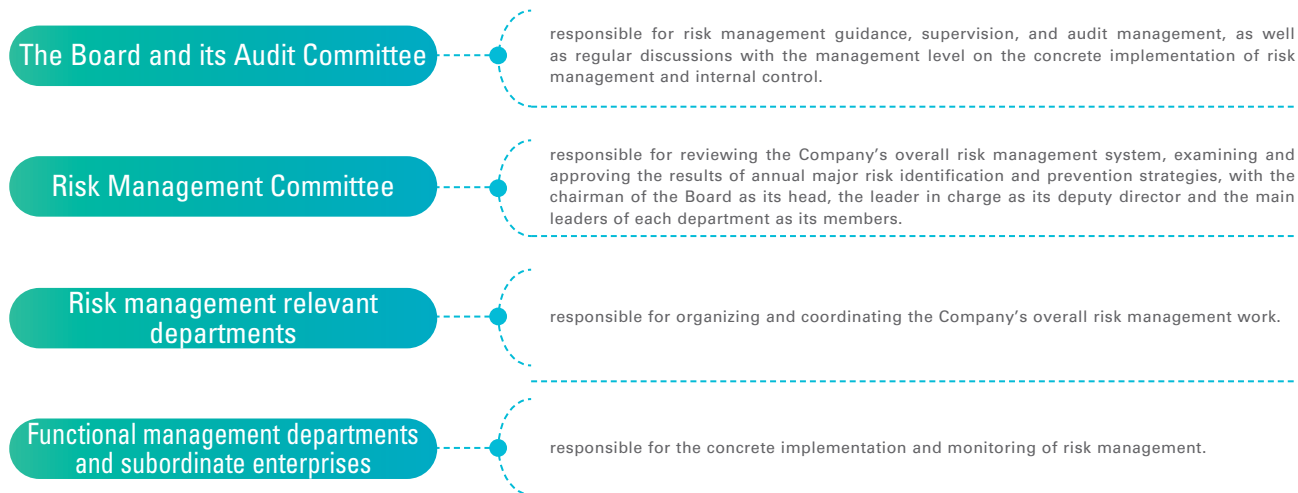
## System construction and enhancement of governance capacity (continued)



### 5.3 Risk management

Chalco continues to improve its risk prevention and control level, strengthens the management of operational risks including ESG risks, continuously strengthen the risk assessment, implements risk management measures, and emphasizes risk management to safeguard the realization of business objectives. We continue to improve the risk assessment process, dynamic control process and risk early warning process, forming a relatively complete risk management system.

#### ● Chalco's risk identification and management system



#### Chalco's risk identification and management work flow

Regarding the material risks identified, the Company organizes and develops special prevention and control measures, which are approved by the Risk Management Committee and submitted to the Audit Committee of the company's management level and board of directors for consideration.

01

The Company's management level, supervisory departments and operating departments identifies annual material risks respectively.

02

03

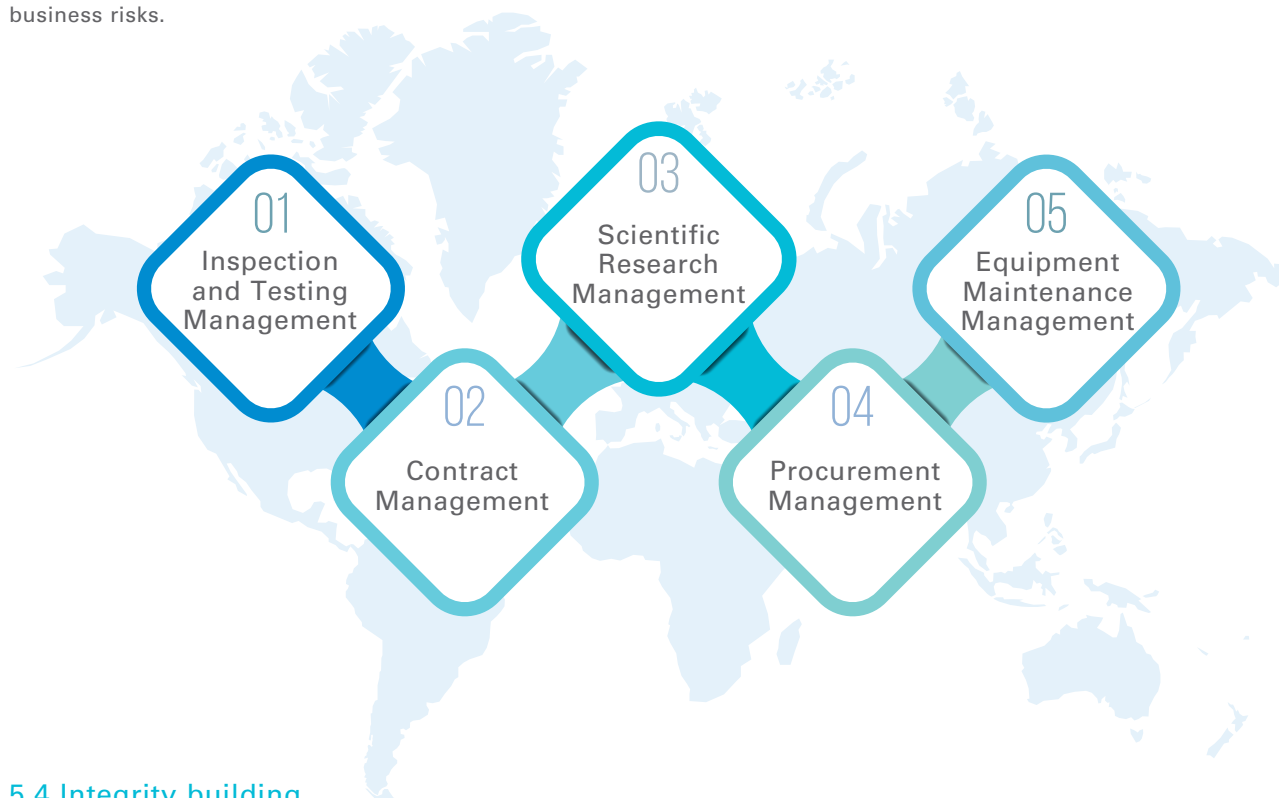
Relevant entities organizes the supervision of material risk prevention and control, and report material risks on time.

04

Relevant entities organize the implementation of major risk prevention and control measures, dynamically monitor the implementation, and timely report to the management.

In 2022, the Company identified a total of 10 material risks, including ESG-related environmental risks and risks relating to “carbon peaking and carbon neutrality” and energy use structure. The Company’s organizations at all levels developed and implemented 52 measures to address them based on the risk identification results.

During the year, the Company strengthened the risk identification work, and the management level, business departments and supervisory departments participated in the risk identification work at the same time, achieving accurate identification. The Company improved its supervision and early warning for market risks, financial business and derivative trading related risks, investment risks, and international operation risks. The company attaches importance to the feedback of risk prevention and control information, strengthens the risk prevention and control and correction work, and puts forward a total of 31 management suggestions to the management level of the company; The company continued to strengthen the risk management of special businesses, developed the internal control risk lists for five business areas: inspection and testing management, contract management, scientific research management, procurement management, and equipment maintenance management, realizing precise prevention and control of business risks.



## 5.4 Integrity building

Chalco attaches great importance to improve Party conduct and uphold integrity, thoroughly implements the system of accountability for constructing an honest administration, and continuously improves the related work from various aspects, such as clear management responsibilities, enhanced system construction, implementation of supervision and inspection, emphasis on risk prevention and control, and enhanced learning and education. The Company insists on systematically addressing both symptoms and root causes, focusing on key areas and key links to maintain a deterrent power at all times so that people “dare not to corrupt”. The Company has also developed the “Compilation of ‘Can-not-corrupt’ System” to move forward the pass of anti-corruption, with a focus on key businesses such as bidding and procurement, trade, and sales.

At the same time, the Company actively carries out special supervision and inspection of the system implementation, supervises the formulation of rules and regulations, improves workflow specifications, strengthens the binding force and execution of the “can-not-corrupt” system, effectively blocks management loopholes, prevents and dissolves risks. During the year, no bribery, extortion, fraud, money laundering and other violations that have a significant impact on the Company, as well as concluded corruption litigation cases regarding corrupt practices had happened.

# System construction and enhancement of governance capacity (continued)



## 5.4.1 Implementing anti-corruption system

Chalco strictly abides by the Anti-Money Laundering Law of the People's Republic of China, the Chinese Communist Party Standards on Integrity and Self Restraint, the Interim Provisions on Prohibition of Commercial Bribery, and other relevant laws and regulations, has formulated a series of systems and policies such as the "Rules of Procedure of the Discipline Inspection Committee", urged all branches, subsidiaries and relevant departments of subordinate enterprises to do a good job in investigating and handling cases, and continuously promoted the construction of a clean and honest administration and the anti-corruption work. The Company requires directors and employees to strictly observe the "List of Liability Exemptions Based on Due Diligence" and "Legal Compliance and the Rules for Implementation of Integrity in Leadership", keeps a close eye on key supervision points and discipline enforcement, and emphasizes the remediation of key areas.

The Company insists on implementing the collective decision-making mechanism, the credit management system and the accountability system of professional integrity, and strengthens the construction of anti-corruption system. Meanwhile, the Company has established a "big Supervision"<sup>2</sup> system, set up an oversight committee, closely integrated the integrity building with production and operations, carried out prevention and control of major integrity risks, and implemented continuous risk control in all aspects of business operation. The Company continues to improve its anti-corruption management system from the following aspects:

### Improving the anti-corruption system

This year, the Company developed the "Compilation of 'Can-not-corrupt' System" and integrated 393 systems of 9 categories, including corporate governance and compliance management, with reference to national laws and regulations, and requested all departments and enterprises at all levels to study them. The Company requires its subordinate enterprises to "establish, modify and abolish" their systems based on the system compilation and their actual situations, and to check the leaks and fill the vacancies in daily management and strengthen the construction of the anti-corruption management system.

### Strengthening prevention and control of integrity risks

The Company emphasizes the prevention and control of integrity risks, has built an integrity risk prevention and control system for the Three Platforms, and sorted out the major integrity risk points of the Three Platforms. This year, the Company organized the Three Platforms to conduct integrity risk combing and found 15 major integrity risk points. Meanwhile, the Company conducted special inspections of the Three Platforms and intensified the anti-corruption supervision in the areas of material procurement, marketing, trade, logistics, transportation and other aspects. With regard to the potential problems found, the Company issued discipline inspection proposals to relevant departments and enterprises, urged them to conduct rectifications in a timely manner, and performed inspections on the rectification results.

### Attaching great importance to the supervision of suppliers

The Company pays high attention to the anti-corruption work for suppliers and continuously improves its capacity of anti-corruption audits for suppliers. At the access stage, the Company compares suppliers with the list of blocked transactions in the "Enterprises Run by Cadres' Relatives (Chalco DJZ [2018] No. 167)", thereby excluding enterprises run by relatives of cadres. When concluding contracts with suppliers, the Company and its subordinate enterprises strictly follow the Notice on the Release of the "Compilation of Commonly-used Model Contracts (First Edition)", include the "Integrity Contract" as an inseparable part of business contracts, and specify the supervision and reporting channels of both companies in the contracts to enhance the anti-corruption supervision between partners, and bind the staff of both parties to practice professional integrity and comply with rules and regulations, thus safeguarding the legitimate rights and interests of both parties.

During the year, the Company revised the supplier management measures and specified that in case of any form of bribery in the core links of supplier access and assessment, the concerned supplier will be immediately disqualified, the result will be timely published on the supplier network, and such supplier will be banned from access for five years.

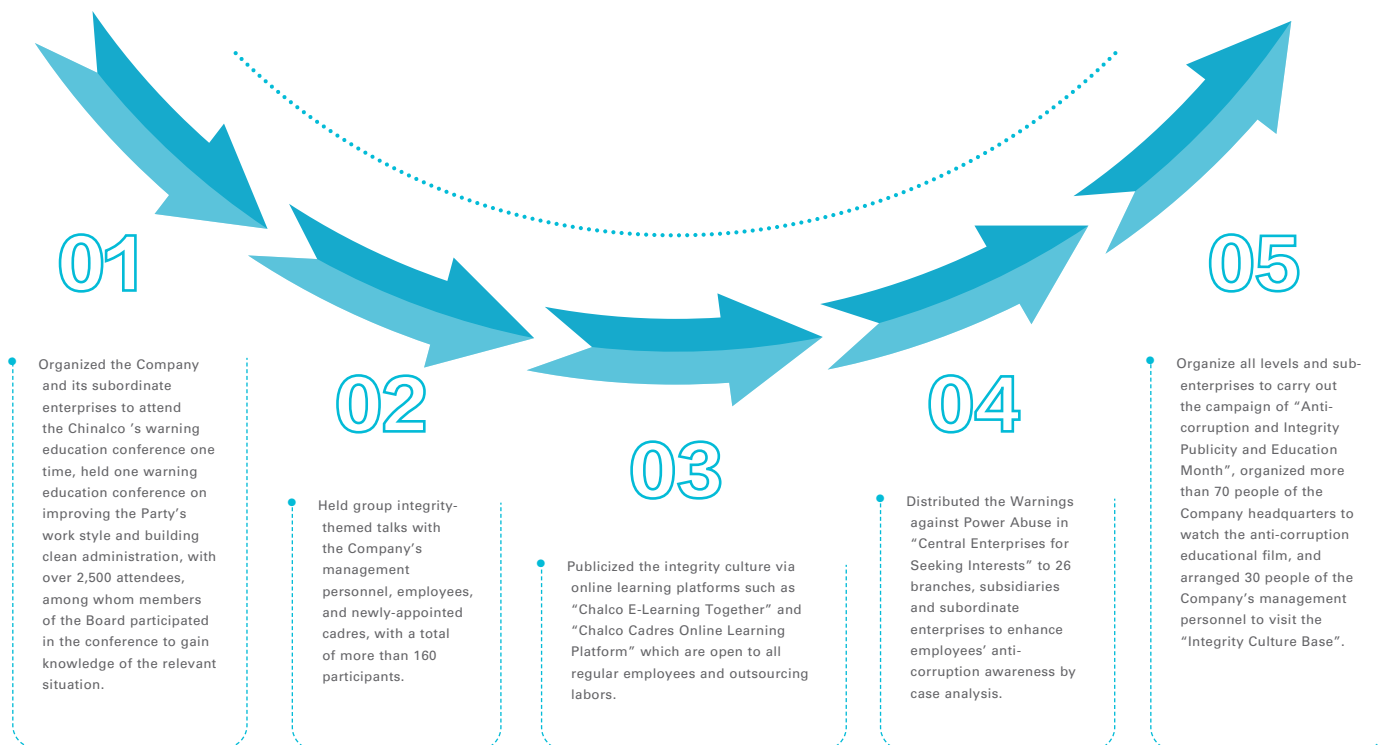


<sup>2</sup> Deeply integrating inner-party supervision with corporate management supervision, giving full play to the two advantages of party building work and corporate governance, forming a complementary relationship among various regulatory forces, focusing on the weak links in corporate development, studying problem rectification ideas, establishing a vertical supervision chain based on the lines of business and a horizontal integration of supervision departments, as well as an interactively nested all-round three-dimensional supervision system complementary relationship among various regulatory forces, focusing on the weak links in corporate development, studying problem rectification ideas, establishing a vertical supervision chain based on the lines of business and a horizontal integration of supervision departments, as well as an interactively nested all-round three-dimensional supervision system



### 5.4.2 Strengthening the publicity of anti-corruption consciousness

Chalco has continued to promote the publicity of anti-corruption and clean administration, cooperated with relevant departments to carry out training on anti-corruption and clean administration and honesty education in discipline inspection, law, compliance, auditing and other aspects, and continuously improved the anti-corruption awareness of the Board and employees at all levels. During the year, the Company mainly organized and implemented the following activities:



In addition, the Company has clearly stated in the "Regulations of Aluminum Corporation of China Limited on Anti-Fraud Work" that it has established a standing body for the anti-fraud work to fully mobilize the masses to report, and has set up reporting channels for letters and visits, such as telephone, e-mail, mailbox and other channels. The Company adopts process management for the handling of reports, has established written procedures and systems which has specified the receiving, retaining, and handling processes of allegations and the real-name or anonymous reports from employees or external third parties, and has maintained written records for inspection by management, the Audit Committee, the Supervisory Board and the Board of Directors. The Company also attaches particular importance to the protection of whistleblower. It is clearly stipulated in the "Anti-fraud Working Regulations" that anti-fraud work must be carried out by dedicated personnel and the information reported and whistleblowers must be kept strictly confidential in order to protect the privacy of whistleblowers and enable them to exercise their legitimate rights and interests.

### 5.5 Scientific and technological innovation

Chalco always adheres to the idea of "strengthening the leading role businesses play in making technological innovation and comprehensively improving innovation capabilities of enterprises" proposed in the national "14th Five-Year Plan", and regards scientific and technological self-reliance and self-improvement as its core strategic support. The Company actively improves the management framework and system of science and technology, perfects the incentive mechanism for innovations, and continuously enhances its capability in independent scientific and technological innovations. The Company also continues to increase investment in scientific research and conducts overall planning for scientific research directions, to promote the settlement of key technical problems in important areas and drive high-quality corporate development with scientific innovations. In 2022, 451 patents were accepted and 356 patents were authorized. As of the end of the reporting period, the Company had a total of 2,296 valid authorized patents. During the year, the Company invested RMB6.666 billion in R&D.

Total of **2,296**  
valid authorized patents

Invested **6.666** billion  
in R&D



# System construction and enhancement of governance capacity (continued)



## 5.5.1 Perfecting R&D framework

### Improving the innovation management framework

To continuously enhance the level of scientific and technological innovation, Chalco is constantly improving the management framework of scientific and technological R&D and expanding the scope of scientific research covered by the framework. During the year, the Company focused on improving the functions of technology centers in various fields, optimized and integrated internal resources, and assisted these technology centers in improving the efficiency of transforming scientific research results into applications by organizing assessment and evaluation of technology centers, optimizing the formulation of R&D schemes, and clarifying task lists. In addition, the Company continued to expand the scale of technology centers based on scientific research needs, and a total of four new technology centers were established in 2022, basically realizing that the scientific and technological R&D covers all business needs of the Company.

### Establishing R&D incentive system

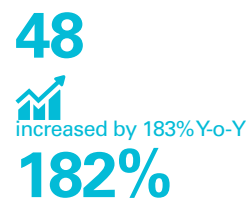
The Company has implemented the science and technology management systems such as the “Administrative Measures of Aluminum Corporation of China Limited on Scientific and Technological Work (Trial)” and the “Administrative Measures of Aluminum Corporation of China Limited on Scientific and Technological Projects”, and established an “open competition mechanism to select the best candidates”. This year, the Company released the incentive system for scientific and technological R&D projects and the responsibility letter for scientific research projects, and implemented direct rewards and performance bonus incentives for project teams to stimulate scientific researchers’ motivation to make innovations. For key technological R&D projects, the Company signed duty agreements with relevant personnel, which have specified indicators required for completion of projects and project completion time evaluation to enhance the R&D efficiency.

To further enhance the efficiency and quality of innovation, the Company has launched a fund program to support scientific and technological development and implemented incentive models such as performance bonuses, project dividends, and equity co-investments. In 2022, the Company formulated the “Administrative Measures of Aluminum Corporation of China Limited on Scientific and Technological Work (Trial)”, formulated and implemented 19 incentive policies concerning scientific and technological innovation, provided stock ownership based incentives to 67 engineers, and granted a total of 6,885,700 shares.

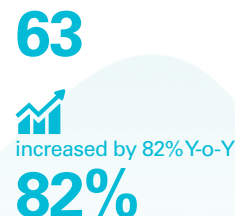
### Enhancing the efficiency of scientific and technological R&D

During the year, in order to improve the R&D efficiency and quality of scientific research institutions at all levels, the Company discussed and rectified 16 issues, including administration authority, R&D boundary and operation guarantee, with R&D institutions such as Zhengzhou Research Institute, Chalco Green Metal Research Institute and technology centers in professional fields. The Company improved the R&D efficiency of scientific researchers by defining the administration authority of scientific research institutions, optimizing the management process of scientific research projects and other measures, in order to reducing the management burden of scientific research institutions. In 2022, Zhengzhou Research Institute obtained 2 new national-level projects, 3 national scientific research tasks, 48 invention patents, with a year-on-year increase of 182%, and 63 patent licenses, with a year-on-year increase of 82%.

#### Invention patents



#### Patent licenses



## 5.5.2 Conducting overall planning for R&D directions

Chalco actively promotes the distribution of scientific and technological R&D projects and pushes forward the progress of major special projects of intelligent science and technology. The Company has developed a science and technology development plan and a scientific and technological innovation program for the 14th Five-Year Plan period, defined 12 key scientific and technological researches, and launched 27 scientific and technological research projects.

This year, the Company organized the “Science and Technology Month” special campaign, held a promotion conference for scientific and technological innovation results, and released and promoted 11 mature scientific and technological achievements. The Company also pushed forward the progress of 65 company-level key scientific and technological R&D projects in a coordinated and all-round way, drafted and released 15 national standards, industry standards and group standards, and obtained 356 patent licenses.



Case:

### Laying emphasis on the revision of standards, leading the development of the industry

Zhengzhou Research Institute attaches great importance to the construction of a standardization system to assist the industry in developing in a standardized way. This year, Zhengzhou Research Institute actively promoted the transformation of research results into international standards, and applied for international standard projects in the field of raw materials for aluminum (monohydrallite and cryolite). Meanwhile, the Company actively undertook international standard projects, issued and implemented 2 national standards, and obtained 62 authorized patents, including 48 invention patents. As of the end of the reporting period, Zhengzhou Research Institute has presided over the formulation of 3 international standards and developed a total of 154 national standards and 162 industry standards for designated-size businesses.

### Promoting the construction of digital intelligent factories

Centering on the strategy of high-quality development, the Company has developed an overall guideline for the construction of digital intelligence, and formulated the Chalco “12348+N” digital intelligence action plan based on a thorough investigation of the current digital intelligence conditions of the Company and its subordinate enterprises, that is, one data standard, two systems, three sets of norms, four unified platforms, eight batches of intelligent factory promotion plans, and N special research on science and technology, safety and intelligence, aiming to provide new impetus for high-quality corporate development through digital technology. The Company has also formulated the “Administrative Measures of Aluminum Corporation of China Limited on Digital Projects”, the “Specifications of Aluminum Corporation of China Limited on Non-tendering Operations of Digital Intelligence Projects”, and other management measures to regulate the management and construction of digital intelligence projects. The Company became the first to complete the preparation of the first set of specifications for the construction of smart factories in the non-ferrous industry, providing standards and guidelines for the promotion and construction of its smart factories and effectively enhancing the standardization and effectiveness of smart factory planning and construction.



## 12348+N

Action Plan

### Strengthening technology-based green construction

Chalco has put into practice the concept of green and high-quality development, and actively pushed forward the research, development and application of low-carbon and environmental protection technologies, and is devoted to reducing the impact of its operations on the environment through technology. The Company has adopted low-energy consumption equipment for mining, product production, transportation and other links, vigorously promoted the application of clean technologies in the energy supply link for production, and implemented digital means to improve management efficiency, so as to reduce the energy consumption and carbon emissions during operations. Meanwhile, the Company continues to strengthen the application of technologies for air pollutants, wastewater and wastes, aiming to reduce waste discharge and build a green enterprise. The Company also continues to step up efforts in the research and development of the comprehensive utilization of wastes such as red mud and aluminum ash, and has carried out technical practices to improve the efficiency of waste disposal and help the development of circular economy.

During the year, the Company made significant progress in smart factories, energy conservation, carbon content reduction, disposal of hazardous waste, comprehensive utilization of resources and other aspects. For details of the relevant scientific research progress and achievement transformation, please refer to chapters 6-8 of this report.





06

## Strengthening Safety Operations & Intelligently Empowering Essential Safety

36 Refinement of Management System

39 Digitization of Management System





## Strengthening Safety Operations & Intelligently Empowering Essential Safety



### Safety Production Targets

Chalco upholds the concept of “all risks can be controlled and all accidents can be prevented”, insists on safety development, keeps implementing the policy of safety first, prevention first and comprehensive management and prevents and solves major safety risks from the source. The Company continued to improve its health and safety management system and utilizes intelligent technology to enhance the level of safety production management and protect the health of employees and production safety.

Chalco strictly complies with the Law of the People’s Republic of China on Work Safety, the Law of the People’s Republic of China on Prevention and Control of Occupational Diseases, the Law of the People’s Republic of China on Safety in Mines and other relevant laws and regulations. It also has established a sound production safety management system by law. The Company proceeded to formulate and implement rules and regulations such as “Rules of Work of the Occupational Health, Safety and Environment Committee of Aluminum Corporation of China Limited”, “Responsibility System for Occupational Health, Safety and Environmental Protection of the Headquarters of Aluminum Corporation of China Limited”, “Regulations for Supervision of Occupational Health, Safety and Environmental Protection of Aluminum Corporation of China Limited”, “Regulations for Investigation and Treatment of Equipment Accidents of Aluminum Corporation of China Limited” and other regulations to provide a sound system for occupational health and safety management.

Completion of safety targets in 2022: The Group completed its safety targets well, achieving the target of zero larger and above production safety accidents, including that of contractors, and reducing the rate of work-related fatalities by 71% for the year. At the same time, the Company actively promoted the construction of standardized production safety teams. As of the end of the reporting period, the standardized production safety teams reached 94%, which greatly improved the safety level of the primary teams.

During the year, all the subsidiaries of the Company has obtained ISO 45001 health and safety certification and OHSAS 18001 occupational health and safety certification.

In 2023, the Company will pursue a consistently high standard of safety production with the following targets:

The Company’s larger and above safety accident

**0 case**

The Company’s production safety workplace accident

**0 case**

Enterprise full safety certification rate

**100%**

Rate of signing the production safety responsibility letter for all employees of the enterprise

**100%**

# Strengthening Safety Operations & Intelligently Empowering Essential Safety (continued)



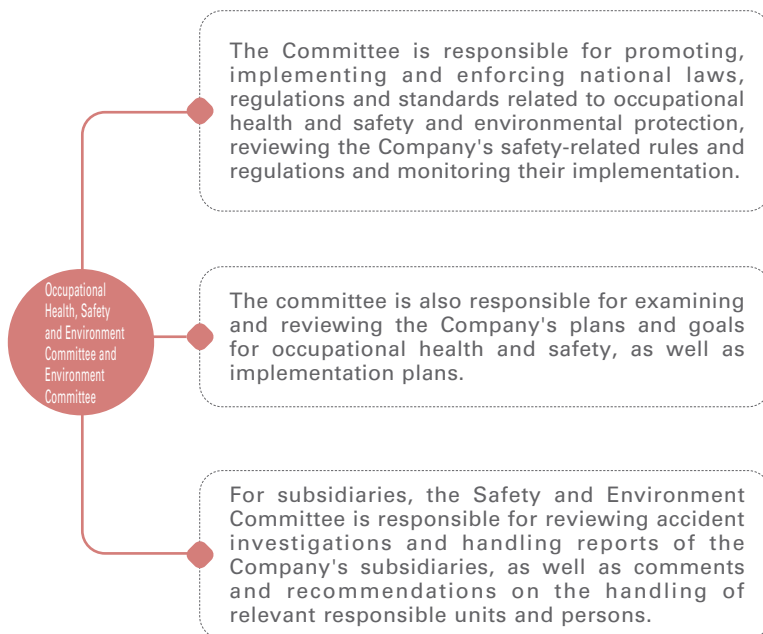
## 6.1 Refinement of Management System

Chalco is devoted to building a refined standardized system of safe production. This year, the Company continued to promote the construction of standardized occupational health and safety production system, formulated special actions to tackle important and difficult issues of safety management, improved the list of “single position and double responsibilities” for safety production, carried out the three-year action plan for special rectification of safety production to fulfill the responsibility of safety management effectively.

### 6.1.1 Safety Production Management System

Chalco has built a sound production management system based on the safety risk management process. The Company strictly monitored the implementation of safety in all aspects of production and regularly investigated production and environmental safety issues and related risks through the Occupational Health, Safety and Environment Committee (hereinafter referred to as “Safety and Environment Committee”).

The Company also continuously improved its production safety inspection system and strengthened its safety supervision. In 2022, the Company issued the “Guideline for the Preparation of the Enterprise’s Full Production Safety Responsibility List” to guide enterprises to revise and improve the production safety responsibility list for all employees. The guide emphasizes the need for enterprises to clarify the personnel responsible for each post, the scope of responsibility and assessment criteria, and to establish an assessment mechanism to promote the implementation of the “three managements and three musts” safety requirements and the effective implementation of the “single position, double responsibilities” requirement. This year, the Company also strengthened production safety inspections for branches, subsidiaries and subordinate enterprises. On the basis of CAHS standardized management system audits, the Company added daily special inspections and would assist subordinate enterprises to rectify any problems if found.



During the year, in order to meet the relevant national requirements, the Company has established relevant complaint and reporting channels for hidden health and safety hazards of employees. The Company formulated and issued the “Notice on the Establishment of Safety Hazard Reporting Incentive Mechanism”, set up the Company’s reporting telephone, reporting email and reporting WeChat to receive reports from employees on major accident hazards and illegal and unlawful acts, and required enterprises to synchronize the establishment of a safety hazard reporting incentive mechanism to receive employee reports. The initiative further ensured production safety while expanding the channels for the company to discover safety problems and enhance the efficiency of safety management improvement.

### 6.1.2 Production Management Measures

Chalco actively improved and implemented comprehensive and diversified safety management measures and formulated management measures including “Regulations on Enhanced Safety Supervision and Management of Aluminum Corporation of China Limited”, “Regulations on Occupational Health, Safety and Environmental Protection Supervision of Aluminum Corporation of China”, “Comprehensive Emergency Response Plan for Emergencies of Aluminum Corporation of China Limited” and other management measures to systematically standardize enterprise safety production management. At the same time, the Company continues to promote the standardization of contractor safety management to improve production safety in all aspects.

<sup>3</sup> “Single position, double responsibilities”: The leaders at all levels are responsible for the production safety along with their business duties.

<sup>4</sup> “Three managements and three musts”: The management of industry must have safety in control; the management of business must have safety in control; the management of production and operation must have safety in control.



## Production Site Safety Management

Chalco placed great emphasis on production site safety management and has formulated and implemented such management measures as “Management Regulations on Prevention of Major Disasters in Mines of Aluminum Corporation of China Limited”, “Management Regulations on Reporting of Safety Information in Coal Mines of Aluminum Corporation of China Limited”, “Supervision and Management Regulations on Major Dangerous Sources in Energy Enterprises of Aluminum Corporation of China Limited” and “Management Regulations on the Going Down of Mines and Leading Shifts by Coal Mine Managers of Aluminum Corporation of China Limited” and other policies to ensure the safety of production and operation. In 2022, the Company issued the “Guide to the Preparation of the Safety Production Responsibility List for All Staff of the Enterprise”, which defined the management responsibilities for every employee and further refined the safety control system.

During the year, the Company strengthened production safety management measures in several aspects:

- **Revising Mine Safety Management Measures** – In response to the hidden dangers concerning mine safety, the “Mine Safety Risk Grading and Control Management Measures” were revised to expand the scope of system management to all types of mines.
- **Promoting Standardized Enterprise Site Management** – The Company developed and issued the “Standardized Work Specification for Safety Site Management”, which guided and standardized the safety management of enterprise production sites.
- **Strengthening Operational Standardization** – The Company developed and improved safety production procedures, maintenance procedures and job operation standard cards (pocket cards).
- **Standardizing Job Risk Identification** – It compiled “Risk Identification Manual for Electrolytic Aluminum Enterprises” and distributed it to all electrolytic aluminum enterprises to unify the norms, standards and targeted measures for risk identification in electrolytic aluminum enterprises to effectively prevent relevant accidents.

This year, the Company conducted a comprehensive inspection and rectification of safety hazards and problems in construction (structures), deep well casting, environmental protection facilities, hazardous chemicals and gas, mines and tailing ponds, and conducted an examination of seven aspects including control of important hazard sources, management of toxic and hazardous gases, management of flammable and explosive hazardous chemicals and management of contractors to exclude relevant safety hazards.



### Case

#### Wangwa Coal Industry continued to improve the level of prevention and control of major disasters in mines

In response to the national mine safety requirements, Wangwa Coal Industry, a subsidiary of Ningxia Energy, has cooperated with several universities and research institutions to conduct research on soft rock support, water damage management and comprehensive fire prevention technology in coal mining hollow areas and other aspects. Based on the research results, it has optimized the way of roadway support, carried out hydrophobic pressure reduction on the water-bearing layer of the working face roof and installed automatic alarm and fire extinguishing devices, explosion-proof water shed and automatic dust spray and other facilities, to comprehensively prevent sudden water, fire and explosion accidents, fire, explosion and other accidents.

# Strengthening Safety Operations & Intelligently Empowering Essential Safety (continued)



## Contractor Safety Management

Chalco has always placed contractor safety management in an important position in the Group's production safety management system, formulated and implemented the "Regulations on the Management of Business Outsourcing in the Production Field of Aluminum Corporation of China Limited", "Notice of Aluminum Corporation of China Limited on Increasing the Safety Rigid Constraint Provisions of Business Outsourcing Contracts" and other contractor safety management systems, and clearly required all branches, subsidiaries and subordinate enterprises to strictly implement national laws and regulations and the company's regulations on contractor safety management. The company's laws and regulations as well as the company's relevant regulations on contractor safety management and safety control. In order to further standardize contractor safety management, this year, the company has comprehensively sorted out the contractor safety management process and completed the "Contractor Business Safety Management Process List", "Contractor Business Safety Management Process Flow Chart" and "Contractor Business Safety Management Procedure Table" to clarify the important process nodes, responsible units, responsible persons, safety management duties, work standards, control measures and effect verification methods for contractor business control. Meanwhile, based on the implementation of the "three unifications"<sup>5</sup> requirements, the Company selected four pilot enterprises by industry this year to carry out contractor safety information management, incorporating the whole process of contractor safety management into the Company's information system for standardized management.



### Chalco Mining contractor safety management system construction

Chalco Mining incorporates contractors into the enterprise safety management system for unified management and formulates "Chalco Mining Contractor Management Guide" and distributes it to contractors for study and implementation. This year, Chalco Mining has arranged special personnel to supervise contractors to carry out Contractor safety management standardization system(CAHS-CS)management system construction, safety training and assessment, and organized a third party to carry out standardized class meeting to pass the acceptance activities. 16 contractor teams have all met the acceptance standards. Chalco Mining also carried out targeted safety training and communication with contractors in combination with specific construction content and operating environment. Meanwhile, the company has provided free training to contractors every year with an experiential safety training base. This year, the enterprises organized and carried out experience training for contractors' personnel up to 1,595 times.

## Safety Awareness Training

Chalco actively carries out safety training, safety risk prevention work training, safety knowledge quiz and other activities and establishes a targeted and graded training system according to the needs of job positions to continuously improve employees' safety skills and awareness and promote the construction of corporate safety culture. During this year, the main training activities we carried out included:

- **Specialized Graded Question Bank:** In 2022, the Company organized enterprises to compile and complete a common question bank of about 57,000 questions for production safety managers and primary employees, further refining the safety training assessment system for personnel at all levels of the Company and enterprises;
- **Safety Production Lecture Hall:** The Company organized responsible persons of enterprises and safety production managers to conduct safety lectures, recorded a total of 31 videos of safety education-related courses and created the Company's safety production video teaching library;
- **Overseas Safety Risk Prevention Training Course :** Overseas safety risk prevention training course: The Company organized and completed safety risk prevention training for a total of 52 overseas Chinese employees through the "Chalco E-learning" network learning platform. All of them passed the safety training examination.

<sup>5</sup> According to the requirements of "unified requirements, unified standards and unified training", the contractors' employees were managed like internal employees.

## Safety Management Performance

During the year, a total of one work-related accident occurred within the Company, which was handled in strict accordance with the “Management Measures for Prior Accountability and Accident Investigation and Treatment of Safety Production of Aluminum Corporation of China Limited” (Chalco General [2019] No. 564).

Statistics on work-related injuries and deaths in recent three years:

	2020	2021	2022
Number of work-related fatality (person)	2	3	1
Work-related death rate(%)	0.003	0.005	0.001
Lost work days due to work injuries (day)	12,000	18,000	6,000

The work-related fatalities occurred this year were caused by improper operation and facility safety management. After the accidents, the company carried out on-site emergency disposal at the first time, so that the accidents were properly resolved. Also, the accident investigation team was assigned to investigate and deal with the causes of the accidents. In addition, an accident warning and education conference was held to conduct a review of the situation, and management measures were revised and improved from the technical and management levels, similar risks were investigated and safety training was strengthened to avoid the recurrence of similar incidents.

## 6.2 Digitization of Management System

Chalco actively promotes “science and technology for safety”, gradually replaces old equipment and technology with automation, intelligent and informatization technology and equipment update and iteration, progressively completes the unattended system transformation of high-risk and tough circumstance positions and strives to enhance essential safety<sup>6</sup> to effectively prevent all kinds of production safety accidents from the beginning. We tried our best to protect employees’ life and health.

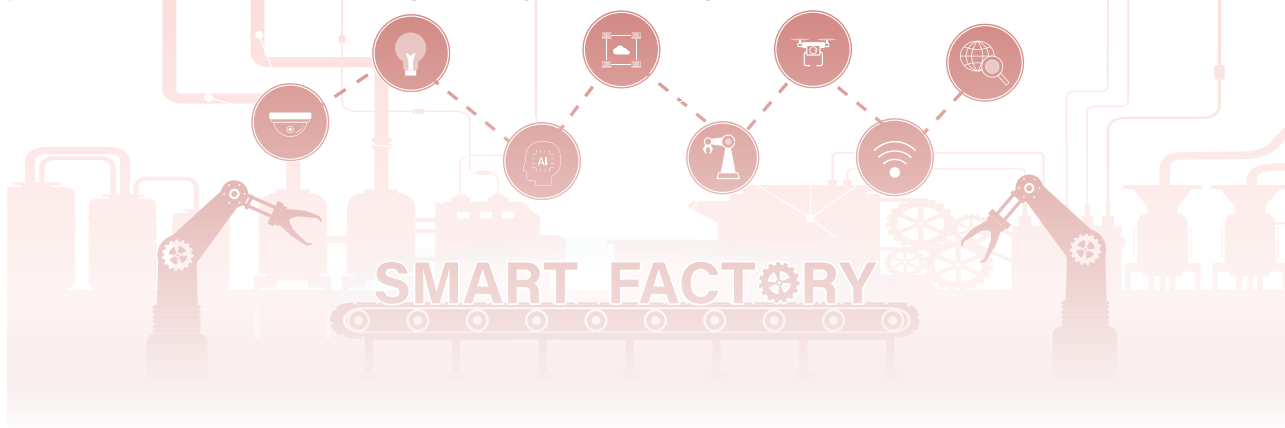
### 6.2.1 Orderly Promotion of Smart Factory Construction

In 2022, in accordance with the enterprise’s digital smart factory construction plan, Chalco has carried out digitalization and informatization to improve safety production in the factory. We upgraded existing equipment and added safety protection systems to effectively reduce safety risks in operations and improve essential safety through intelligent identification of personnel action traces, automatic safety tips and other functions.

At the same time, we installed additional cameras in the factory and equipped them with an online detection system to detect the sources of danger in real time and monitor the safety of the operating environment to better prevent the generation of safety accidents.

### 6.2.2 Informatization Boosts the Essential Safety of Mines

Chalco comprehensively launches the construction of mine safety informatization and intelligence and initially builds an informatization safety management platform that supports the enterprise’s risk grading and control and the double prevention mechanism of hidden danger investigation and management.



<sup>6</sup> Essential safety: It refers to the function of ensuring the safety of production equipment or production system itself by design and other methods, so that no accident will be caused even in the case of misoperation or malfunction.



# Strengthening Safety Operations & Intelligently Empowering Essential Safety (continued)



## Progresses of smart factory project pilots

This year, Chalco has focused on building three smart factory pilot demonstration enterprises, namely Guangxi Huasheng, Yunnan Wenshan Aluminum and Baotou Aluminum, to achieve obvious improvement and optimization of labor productivity and process indexes of the three enterprises.



Figure: Yunnan Aluminum factory digital screen、smart factory production robot arm



## Guangxi Huasheng adopted an unattended watch system for stacking and reclaiming steps

In order to solve the problems of labor intensity and job operation safety, Guangxi Huasheng adopted 3D modeling, environment perception, intelligent equipment control, AI and other technologies to automate the unloading, stacking and reclaiming steps to build an unattended system of stacker-reclaimer. The system ensured comprehensive safety monitoring of personnel in the area and realized the goal of 100% safety of stacking and reclaiming.

We steadily promotes the mechanization and remote operation of underground mining in bauxite mines, seeking to replace manual operations with machines in high-risk positions to protect employees' lives and health. In 2022, we took the following measures to enhance the management of hidden hazards in mines:

- Set up downhole video monitoring systems in all underground mines of the company, achieving full coverage of video without dead angle in staffed underground workplaces.
- Yinxing Coal completed the upgrade of the comprehensive automation platform, realizing unattended watch in dangerous areas such as the main drive belt, ventilator, pressurized air and nitrogen production, power monitoring system and underground central water pump room.
- Ningxia Energy actively promoted the intelligent construction of mines. The installation of the intelligent working surface in Wangwa No. 2 Mine was completed and successfully realized back mining. All coal mines utilized intelligent video identification and other technologies to monitor and analyze the changes of personnel entering and leaving the mine, the number of people and the state of coal mine production operations in real time and 24/7, while all underground coal bin coal feeders were already remotely controlled.
- Shanxi New Material utilized Unmanned Aerial Vehicles (UAVs) to replace personnel to inspect dangerous areas in open-pit mines and tailing ponds.



## Scientific and Technological Innovation & Pursuit of Low Carbon Transformation

- 43 Consolidating “Carbon Peaking and Carbon Neutrality” Management
- 43 Promoting the “Carbon Peaking and Carbon Neutrality” Strategy
- 44 Identifying Climate Change Impacts
- 45 Implementing the “Carbon Peaking and Carbon Neutrality” Task



# Scientific and Technological Innovation & Pursuit of Low Carbon Transformation



Chalco actively responds to the national call of “30.60” and conducts green and low-carbon transformation by accelerating energy-saving and carbon-reducing transformation, promoting clean energy substitution and efficiently managing carbon assets to boost the implementation of “carbon peaking and carbon neutrality” goals. The company continuously pursues green and high-quality development, assists society in addressing climate change actively and strove to achieve carbon neutrality.

## Energy and Greenhouse Gas Emissions Performance and Targets<sup>7</sup>

This year, the Company reviewed the progress of its targets for greenhouse gas emissions and energy consumptions in the context of its operations and set new goals as follows:

Indicators		Base Year	2022 Targets (same statistical criteria as 2021)	2022 Targets Review (same statistical criteria as 2021)	2023 Targets (new statistical criteria)
Greenhouse Gases	Alumina Sector - CO <sub>2</sub> equivalent emissions per unit product (ton of alumina)	2021	To reduce emissions by 1.28% compared to 2021.	Targets achieved, with a 4.90% emission reductions compared to 2021.	To reduce emissions by 2% compared to 2022.
	Electrolytic Aluminium Sector - CO <sub>2</sub> equivalent emissions per unit product (ton of electrolytic aluminum)	2021	To reduce emissions by 0.10% compared to 2021.	Targets achieved, with a 5.98% emission reductions compared to 2021.	Below 8 metric tons in terms of molten synthesis AC power consumption.
	Total greenhouse gas emissions	2021	To reduce emissions by 700,000 tons of CO <sub>2</sub> equivalent for the same production volume.	Targets achieved, considering the carbon emission intensity per unit of the Company's main products, the annual carbon reduction was more than 1,600,000 tons.	Strive to achieve the carbon peaking by 2025 and 40% of carbon emission reductions by 2035.
Energy	Total coal consumption	2021	To reduce consumptions by 2.80% compared to 2021	Because a large increase in major products production in 2022 compared to 2021, the coal consumption increased.	-
	Integrated energy consumption of standard coal (in metric ton) per ten thousand Yuan of output value in 2023 (under the 2020 annual price).	-	No more than 1.878	1.862	Less than 1.870
	Averaged electricity consumption of aluminium molten synthesis AC power consumption (excluding desulfurization power consumption)	2021	Not to exceed 13,650 kWh in 2022; not to exceed 13,450 kWh in 2023; not to exceed 13,300 kWh in 2025	2022 target achieved.	To hold the original target.

<sup>7</sup> During the year, due to the acquisition of enterprise equity, such as Yunnan Aluminum Limited., the scope of the consolidated company in the financial statement has changed. In order to reflect the comparability of the targets, the statistical criteria of the “2022 Targets” and “2022 Targets Review” columns are the same as that of 2021, excluding the newly consolidated enterprises in this year; the statistical criteria of the “2023 Targets” column covers the Group, including the newly consolidated enterprises in this year.

<sup>8</sup> In order to show the relationship between production and energy consumption more properly, the company adjusted the standard coal consumption goal from total coal consumption to tons of standard coal per ten thousand Yuan.



## 7.1 Consolidating “Carbon Peaking and Carbon Neutrality” Management

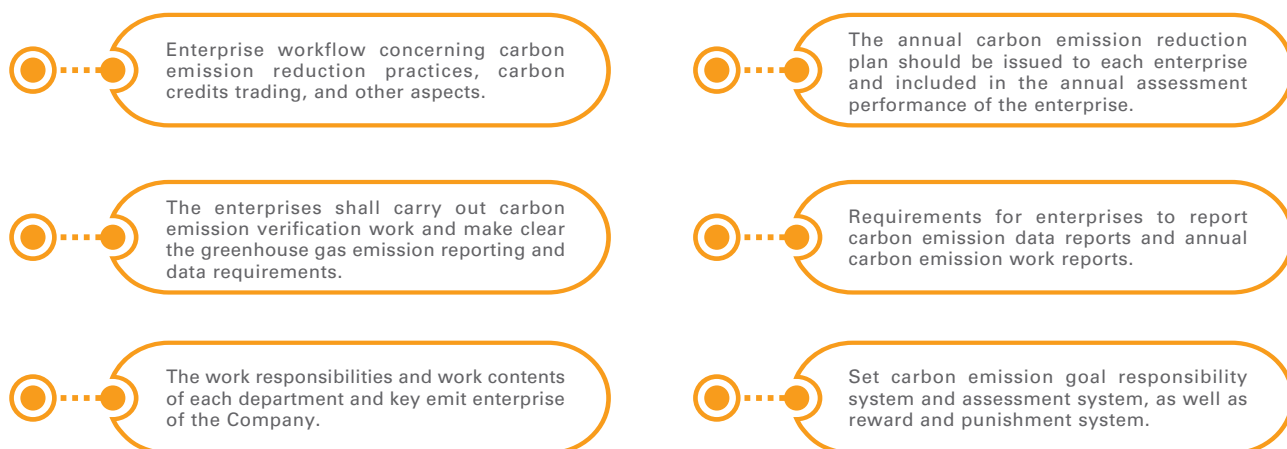
The Board of Chalco values the management of climate change and “carbon peaking and carbon neutrality”, and integrated the management of climate change and “Carbon Peaking and Carbon Neutrality” into the management of all managing processes of the Company. The Company set up a leading group for “carbon peaking and carbon neutrality” work, which is responsible for the implementation of the daily work of “carbon peaking and carbon neutrality”. Each functional department is responsible for energy saving and carbon reduction according to the division of work and departmental responsibilities. The Company set up a carbon asset management team, issued the “Carbon Asset Centralized Control Plan” and carried out carbon reduction related management system construction, technology and equipment improvement, energy saving awareness and other measures to reduce energy consumption and carbon emissions generated by the production processes of the enterprise.

The company established a reporting mechanism for “Carbon Peaking and Carbon Neutrality” works, led by the company’s General Department, in cooperation with relevant departments, to regularly report to the Board and management on the latest trends in low-carbon development and the progress of low-carbon management work. During this year, the Company conducted special studies and produced research reports on low-carbon transformation topics such as green and low-carbon transformation of alumina and electrolytic aluminum, regulation of the orderly development of regional electrolytic aluminum and acceleration of the construction of recycled aluminum industry, according to which the Company formulated relevant policies and implementation measures. The Company also established a sound mechanism for the implementation of “carbon peaking and carbon neutrality” work. After the management level reviewed and approved the work plan for low-carbon development, the business department identified the key tasks for low-carbon development and split the tasks, then assigned them to each enterprise according to the requirements and carried out regular supervision to ensure that the enterprises properly implemented the relevant work plan.

## 7.2 Promoting the “Carbon Peaking and Carbon Neutrality” Strategy

In 2022, the Company focused on the concept of green and low-carbon. Based on the National “14th Five-Year Plan” and the clean energy development plan, the company continued to promote the construction of green and low-carbon industrial chain, the improvement to carbon asset management capacity, the R&D and application of low-carbon technology and the optimization of energy structure, adhering to the goal of “Strive to achieve the carbon peaking by 2025 and 40% of carbon emission reductions by 2035”.

This year, the Company officially released the “Carbon Emission Management Measures of Aluminum Corporation of China Limited” (hereinafter referred to as “Carbon Emission Management Measures”). The Carbon Emission Management Measures clarified the following contents:



# Scientific and Technological Innovation & Pursuit of Low Carbon Transformation (continued)



## 7.3 Identifying Climate Change Impacts

Aluminum Corporation of China understood that climate change will affect the corporate value chain and thus the implementation of the company's strategy to development. The Company have included climate change and energy usage risks into the risk identification process, and identified "carbon peaking and carbon neutrality" and energy usage structure as one of the major risks for this year. Please refer to the "Risk Management" section of this report for the risk identification process. During the year, the company identified risks and opportunities related to climate change based on the national macro environment, industry characteristics and the company's development plan and actively took corresponding measures in the production, operation and supply chain.

Risks and Potential Impact		Response Strategy
Risks and opportunities		
Policies and Legal	<ul style="list-style-type: none"> <li>China has launched national carbon trading markets. With the tightening of carbon emission control requirements year by year, which may have an impact on the Company's operation efficiency.</li> <li>International carbon-related trade barriers continue to rise, such as the EU Carbon Border Adjustment Mechanism (CBAM). Not only does it affect the import and export trade of the Company's products, it also affects the cross-border transactions of the Company's downstream enterprises, which in turn has an impact on the Company's efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>Closely follow up the progress of international, national, industry and industrial policies, combine them with the development of the company, accelerate the transformation of the enterprise, and resolutely carry out the green low-carbon development.</li> <li>Continuously carry out carbon trading management work, build a sound carbon asset management system, reasonably allocate and utilize carbon quotas, and complete compliance requirements.</li> </ul>
Technology	<ul style="list-style-type: none"> <li>With the promotion of China's "30.60" goal, national policies and regulations related to carbon emissions continue to tighten. The Company's energy structure is dominated by coal, natural gas and other fossil fuels, with large carbon emissions. If the Company can quickly complete the replacement of clean technology, it will improve the Company's production efficiency in the long term, reduce the Company's costs due to the use of fossil energy, which also boosts China's achievement of the "carbon peaking and carbon neutrality" goal. Accordingly, it may lead to corresponding compliance costs and expenses arising from technology replacement in the short and medium term.</li> </ul>	<ul style="list-style-type: none"> <li>Continuously improve the management of energy conservation and emission reduction, accelerate the R&amp;D and application of low-carbon and zero-carbon technologies in mining, smelting, production, and other parts of operation.</li> <li>Carry out in-depth research on clean energy industry, actively carry out optimization of energy structure, mainly focus on clean energy to optimize energy use structure, and accelerate energy structure adjustment of subordinate enterprises.</li> </ul>
Market	<ul style="list-style-type: none"> <li>Based on the characteristics of the industry, downstream enterprises in the value chain gradually pay attention to the low-carbon attributes of their products and services and therefore raise the low-carbon requirements for the Company's main products. In order to meet the market changes, the Company may face the risk of failure in the process of low-carbon transformation of products. However, the change of market demand also opens up a brand-new market for the Company and guides the green and high-quality development of the Company.</li> </ul>	<ul style="list-style-type: none"> <li>Has gradually carried out green aluminum brand building work to enhance the company's influence and low-carbon characteristics in the value chain.</li> <li>Vigorously develop the technology R&amp;D and production line construction of low-carbon aluminum, zero-carbon aluminum, recycled aluminum and other new material green aluminum products, accelerate the commercialization process of green aluminum products and expand the market share of green products.</li> </ul>
Reputation	<ul style="list-style-type: none"> <li>Stakeholders are increasingly sensitive to the company's performance related to green and low-carbon development and addressing climate change. If the company's performance fails to meet their expectations, it may affect the company's reputation and image, which in turn may affect the company's market performance.</li> </ul>	
Physical risks		
Acute Risks	The increased frequency of natural disaster events such as hurricanes and floods caused by climate change may result in water and power outages and damage to production facilities, which may lead to disruptions in production operations, and will in turn lead to suspension of water and power supply, destruction of production and operation equipment, and employee safety risk, resulting in the Company's failure to operate normally and financial losses. At the same time, acute risks will affect logistics and transportation, affecting the timeliness and safety of the company's suppliers and product transportation, resulting in potential economic losses.	<ul style="list-style-type: none"> <li>Incorporate this type of risk into daily operational management and establish early warning systems and emergency response plans for extreme weather and other natural disasters.</li> <li>Replace equipment to enhance its ability to resist natural disasters.</li> <li>Develop supply chain safety and security plans and measures to respond to unexpected natural disasters and guarantee the transportation needs for all enterprises.</li> </ul>
Chronic Risks	Chronic risks such as sea level rise, changes in water distribution and increased hot weather caused by climate change may affect business operations, such as relocation of operation sites, increased demand for refrigerating equipment and shortened equipment life, which may increase the Company's operating expenses.	

## 7.4 Implementing the “Carbon Peaking and Carbon Neutrality” Task

### 7.4.1 Accelerating Technology R&D and Application

During the year, under the policy guidance of the all Company’s subordinate enterprises of the Group continued to expand the research and application of energy-saving and low-carbon technologies in the process of mining, production, energy supply and transportation to reduce energy consumption and improve energy efficiency. In addition, the “new energy-saving technology of aluminum electrolytic cell with stable flow insulation” developed by the company this year won the first prize in the selection of typical cases of carbon neutral action by SASAC in 2022. The deformed aluminum and aluminum alloy round ingots, electrician’s round aluminum rods, aluminum ingots for remelting, aluminum and aluminum alloy welding materials and cast aluminum alloy products produced by some enterprise have obtained the product carbon footprint certificate issued by the China Quality Certification Center (CQC).

#### Mining

- Switching to low energy consumption equipment – Guangxi Branch reduced fuel consumption by 642 liters/day by replacing four old fuel oil hydraulic rock crushers with electric ones.



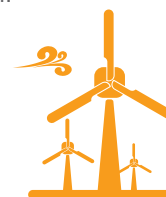
#### Production

- Application of low power consumption technology in electrolysis tank – Qinghai Branch conducted the R&D of graphitization cathode combined with phosphor pig iron new technology test tank and reduced the aluminum liquid AC power consumption got a 515kWh/t decreases in 180KA electrolysis tank, and reduced the aluminum liquid AC power consumption from got a 364kWh/t decreases in 200KA series electrolysis tank.
- Waste heat application – Several enterprises have achieved roaster flue gas waste heat utilization transformation, making full use of roaster flue gas waste heat to heat low temperature media and efficiently recovering and utilizing the heat carried by the flue gas. At the same time, the process transformation can recover water vapor and alumina dust in the flue gas, reducing steam consumption by about 0.1 tons per ton of alumina.
- Production process optimization – Chalco Zhongzhou adopted the Bayer production system for alumina production. With the increase in product output, the electricity consumption decreased by about 6 million kWh year-on-year, achieving a year-on-year decrease of 4.89 kg of standard coal in comprehensive energy consumption per ton of product.
- Automated production process transformation – Guangxi Branch realized precise control of filler addition by changing the ball mill filler work from manual operation to automatic machine addition, reducing the increase of electricity consumption caused by excessive filler and achieving annual electricity saving of about 1.2 million kWh.
- Reduction of carbon emission of working vehicles in the field – Yunnan Haixin Aluminum built an LNG gasification station in the production field and adopted more energy-saving and environment-friendly natural gas vehicles as working vehicles in the field, which can reduce energy consumption by about 20%-30% per year compared with fuel vehicles.



#### Production Energy Supply

- With high back pressure heat supply, increasing the unit’s heat supply capacity by about 1.7 million m<sup>3</sup> and reducing coal consumption for power supply by about 13g/kWh.
- Improving power supply efficiency – Baotou Aluminum Power Plant unit implemented turbine through-flow transformation, increasing turbine through-flow area, improving unit operating efficiency, and reducing coal consumption of power supply by about 15g/kWh.
- Reducing electricity consumption – Yunnan Haixin Aluminum carried out the R&D and application of new node equipment and fully decommissioned the air pressure station power saving system, saving about 13% of electricity consumption.





## Scientific and Technological Innovation & Pursuit of Low Carbon Transformation (continued)

### Product Transportation

- The company takes into account the loading and unloading conditions, transportation methods, transportation distance and other factors to optimize the shipment methods, improve the transportation efficiency and reduce the emissions generated by transportation means. For detailed information, please refer to Chapter 10.3 "Empowering partners" in this report.



### Case

#### Yunnan Runxin Aluminum's all-procedures carbon reduction in production

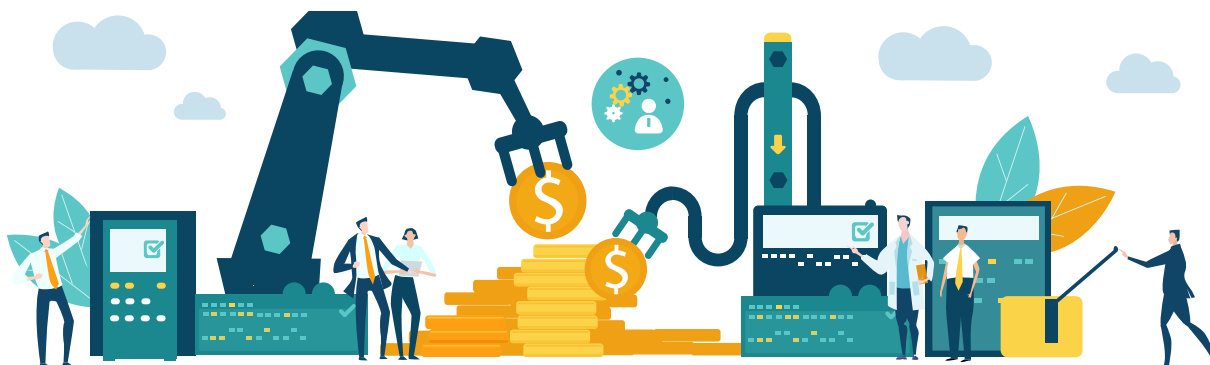
In this year, in order to accelerate energy saving and emission reduction in production, Yunnan Runxin Aluminum reduced the annual comprehensive AC power consumption by 452kwh/t compared with 2021, by introducing "FHEST technology" of low power consumption overhaul tank, adopting gas instead of coke particles for roasting, optimizing the shape and size of carbon anode. The goal of 13,450kwh/t of step electricity price in 2023 was achieved ahead of schedule.

#### Digital Technology Supporting Low Carbon Technology R&D

The Company also adopted digitization to improve R&D efficiency and quality. In recent years, Zhengzhou Institute has carried out research on thermal optimization and energy-saving technology of falling film evaporator for the problems of substandard evaporator water volume, substandard steam-to-water ratio and insufficient steam volume in domestic alumina enterprises. Based on a large amount of research data, the Institute utilized digital simulation technology to adjust and test the relevant research parameters and develop data analysis tools that can reflect the effectiveness of the application. After several data simulation experiments and analyses, the Institute finally proposed the optimization measures with the highest carbon reduction benefits and applied the technology to a subsidiary company in 2021, reducing vapor by approximately 0.034 t/t and saving 8.4 tons of low-pressure steam per hour, which was equivalent to reducing carbon emissions by approximately 3.14 tons per hour. As of the end of this report period, the technology has enabled the enterprise to reduce carbon emissions by approximately 13,500 tons.

#### Carbon Capture Technology R&D

During the year, Aluminum Corporation of China continued to carry out R&D work on CO<sub>2</sub> capture technology and researched and developed a new type of complex CO<sub>2</sub> capture agent, which was tested and its capturing effect was above the average level of market products.



#### 7.4.2 Adjustment of Energy Use Structure

In order to accelerate the enterprise's green transformation, combined with the current situation of the Company's high energy consumption structure, the Company clear to develop wind energy and photovoltaic energy to optimize the energy use structure. In this year, the Company has formulated and issued a number of notices, such as "Notice on the Work Related to the Acquisition of Renewable Energy Resources", "Notice on the Acceleration of the Acquisition of Wind and Solar Energy Resources" and "Notice on the Uniform Research and Deployment of Distributed Clean Energy Power Generation Projects" to guide the enterprises to accelerate the adjustment of energy structure.

During the year, the Company has carried out the construction of Ningdong 250MW photovoltaic composite power generation project and promoted the development of clean energy cooperation projects and distributed photovoltaic projects in multiple locations. By the end of the reporting period, the Company's installed wind power generation capacity reached 1,605 MW; installed solar power generation capacity reached 463 MW, increased by 117% from 2021. In 2022, the percentage of green electricity (including wind power electricity, solar power electricity and hydropower electricity) used to electrolytic aluminum production reached to 45% of total electricity consumption, where hydropower electricity took 29%, wind power and solar power electricity took 16% respectively. The clean energy use ratio of the subsidiaries of the Company has increased to different degrees, among which the clean energy use ratio of Yunnan Aluminum was 88.6%, the clean energy use ratio of Qinghai Branch was 80.4% and the clean energy use ratio of Lanzhou Aluminum was about 67.4%.



#### Photovoltaic power generation direct current connected to the production link of electrolytic aluminum

In this year, Yunnan Aluminum, together with professional R&D institutions, carried out research to address the unstable efficiency of photovoltaic power generation and unstable power supply. It successfully developed and put into operation the distributed photovoltaic direct current supply technology, which connects photovoltaic power generation directly to the production process. In 2022, the total direct use of photovoltaic power generation in the production process of Yunnan Aluminum Yangzonghai Smelter Branch was about 24.73 million degrees, achieving coal savings of 7,600 tons and reducing CO<sub>2</sub> emissions by about 24,700 tons.



Figure – Yunnan Aluminum roof photovoltaic power generators

## Scientific and Technological Innovation & Pursuit of Low Carbon Transformation (continued)



### 7.4.3 Improvement of Carbon Asset Management

During the year, the Company established a carbon asset management team in accordance with the relevant compliance requirements of the national carbon market to improve the management of carbon trading process. The Company's carbon asset management team was responsible for coordinating the Group's carbon trading work, guiding the subordinate enterprises to complete the clearance of carbon emission quotas, and ensuring that the enterprises completed the compliance tasks accordingly. At the same time, the management team actively conducted research on carbon emission trading policies and rules and proposed the plan of industry carbon trading to promote the low-carbon and green development of the aluminum industry. Furthermore, the Company coordinated and planned the carbon emission quotas of each enterprise, made efficient use of carbon quotas through reasonable internal deployment and formed management measures to prioritize trading with strategic partners to avoid wasting quotas.

The Company also actively carried out the application of green financial tools to bring new resources to the green transformation of the enterprise. During the year, the Company issued carbon neutral bonds and transformation progress bonds totaling 1.5 billion RMB, all of which would be used for the construction of the Company's green wind power projects.

### 7.4.4 Carrying out the Construction of Green Aluminum Industry

In order to facilitate the high-quality development of the company, actively respond to the call of the national "carbon peaking and carbon neutrality" strategy and further enhance the influence of the company in the non-ferrous industry, the company carried out the construction of low-carbon aluminum brand this year. Combined with the current development situation of the company, we carried out the construction of green aluminum production lines in subordinate enterprises. The initial results were observed. In this year, the Company has significantly improved the output of recycled aluminum through technical research and enterprise production line construction and achieved a one time increases year-on-year in the amount of aluminum scrap consumed. Taking into account the operation and development plan, the Company researched and compiled the implementation plan of the Company's recycled aluminum business to gradually improve the company's aluminum scrap consumption and promote the development of the recycled aluminum business.



#### Case

#### Yunnan Haixin Aluminum carried out the construction of hydropower and aluminum integration project

In this year, Yunnan Haixin Aluminum built the low-carbon production factory equipped with hydroelectric power generation on the basis of the abundant hydroelectric power in the operation area. At the same time, the Company further enhanced the environmental attributes of its products by equipping facilities for air pollution treatment, sewage treatment and waste treatment.



Yunnan Haixin Aluminum construction of hydropower and aluminum integration project



#### Case

#### Guizhou Branch completed a recycled aluminum model line

During the year, the Company completed a 50,000-ton/year recycled aluminum demonstration line at its Guizhou Branch. Through technological research on grading treatment, melting and alloying process control, the Company reduced the comprehensive loss of recycled aluminum, improved product quality and will provide examples in recycled aluminum production solutions for other production enterprises.



### Key greenhouse gas and energy consumption performance<sup>8</sup>

Performance indicator	Unit	2020	2021	2022
<b>Basic information</b>				
Operating income	RMB10,000	18,599,057.70	26,974,823.18	29,098,794.20
Alumina production	10,000 ton	1,453	1,623	1,764
Electrolytic aluminum production	10,000 ton	369	386	688
<b>GHG emissions<sup>9</sup></b>				
Scope 1				
CO <sub>2</sub> equivalent emission of alumina sector	10,000 ton	2,412.86	2,245.60	2,351.78
CO <sub>2</sub> equivalent emission of electrolytic aluminum sector	10,000 ton	2,120.03	2,240.68	3,337.00
The amount of total <sup>11</sup> CO <sub>2</sub> emission (in CO <sub>2</sub> equivalent)	10,000 ton	6,101.23	5,720.66	6,920.00
Scope 2				
CO <sub>2</sub> equivalent emission of alumina sector	10,000 ton	197.96	277.37	209.22
CO <sub>2</sub> equivalent emission of electrolytic aluminum sector	10,000 ton	2,570.20	2,650.37	4,527.00
The amount of total <sup>12</sup> CO <sub>2</sub> emission (in CO <sub>2</sub> equivalent)	10,000 ton	2,802.77	2,959.45	4,844.00
Total greenhouse gas emissions				
CO <sub>2</sub> equivalent emission of alumina sector	10,000t	2,610.79	2,522.97	2,561.00
CO <sub>2</sub> equivalent emission per ton in alumina sector	t/ton of alumina production	1.8	1.55	1.45
CO <sub>2</sub> equivalent emission of electrolytic aluminum sector	10,000t	4,690.23	4,891.05	7,864.00
CO <sub>2</sub> equivalent emission per ton in electrolytic aluminum sector	t/ton of electrolytic aluminum production	12.71	12.67	11.43
The amount of total <sup>13</sup> CO <sub>2</sub> emission (in CO <sub>2</sub> equivalent)	10,000t	8,904	8,680.11	11,764.00
The amount of CO <sub>2</sub> emission (in CO <sub>2</sub> equivalent) per RMB10,000 of operating income	t/RMB 10,000	4.79	3.22	4.04
<b>Comprehensive energy consumption</b>	10,000 tce	2,058.04	2,540.74	2,823.00
Comprehensive energy consumption per RMB10,000 of operating income	Tce/RMB 10,000	1.11	0.94	0.97
The amount of purchased electricity	100 million kWh	400.39	409.23	807.64
Total coal consumption	10,000t	1,551.96	1,543.15	2,945.00

<sup>9</sup> During the year, due to the acquisition of enterprise equity, such as Yunnan Aluminum Limited., the scope of the consolidated company in the report has changed, the statistical criteria covers the Group, including newly acquired enterprises.

<sup>10</sup> The emission data is calculated by using the average emission factor of each type of energy after the Group has aggregated the energy consumption data of each branch and subsidiary.

<sup>11</sup> Including emissions from the alumina sector, electrolytic aluminum sector and other business sectors.

<sup>12</sup> Including emissions from the alumina sector, electrolytic aluminum sector and other business sectors.

<sup>13</sup> Including emissions from the alumina sector, electrolytic aluminum sector and other business sectors.



## Focusing on the Environment & Adhering to Green Development

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## Focusing on the Environment & Adhering to Green Development



Chalco firmly held the awareness of the development with “green water and mountain are treasures”, constantly improved the environmental management system, strengthened internal precise management and strictly controlled environmental risks. The Company continued to increase investment in environmental protection, accelerate green transformation, adhere to the development of mineral resources and ecological restoration, actively fulfill its enterprise social responsibilities and guard the beautiful green home. In 2022, the company invested about 2.151 billion yuan in taking actions to environmental protections.

Chalco strictly abided by the *Environmental Protection Law of the People's Republic of China*, *Law of the People's Republic of China on the Promotion of Cleaner Production*, *Law of the People's Republic of China on Prevention and Control of Water Pollution*, *Law of the People's Republic of China on Prevention and Control of Atmospheric Pollution*, *Law of the People's Republic of China on Prevention and Control of Environmental Pollution by Solid Waste*, and other national and operation location environmental protection laws and regulations. It actively studied environmental protection policies, continuously improved its environmental management system, strengthened supervision and management of ecological environment to promote environmental protection governance.

### Environmental Performance Goals<sup>14</sup>

For this year, the Company reviewed the progress of its targets for water resources, air pollutants, waste and mine reclamation in the context of its own operations and set new goals as follows:

Indicators		Base Year	2022 Targets (same statistical criteria as 2021)	2022 Target Review (same statistical criteria as 2021)	2023 Targets (new statistical criteria)
Air Pollutant	SO <sub>2</sub> Emission	2020	To decrease by 2% in 2022, 3% in 2023 and 5% in 2025.	Targets achieved, with a 4% decrease in 2022 compared to 2020.	To hold the original target.
	NO <sub>x</sub> Emission	2020	To decrease by 2% in 2022, 3% in 2023 and 5% in 2025.	Targets achieved, with a 9% decrease in 2022 compared to 2020.	
	Soot Emission	2020	To decrease by 2% in 2022, 3% in 2023 and 5% in 2025.	Targets achieved, with a 23% decrease in 2022 compared to 2020.	

Indicators	2022 Targets (same statistical criteria as 2021)	2022 Target Review (same statistical criteria as 2021)	2023 Targets (new statistical criteria)
Water Resources	Not to discharge any industrial wastewater <sup>15</sup> in 2022.	Targets achieved, Aluminum Corporation of China and its producers have achieved “zero discharge” of production wastewater.	Not to discharge any production wastewater.
Hazardous Waste	To comply with the principle of “eliminating hazardous waste in the same year of production” and to dispose of all hazardous waste generated in previous years within 5 years on this basis.	The disposal rate of hazardous waste reached 100% and the total disposal rate reached 81%.	To hold the original target.
Non-Hazardous Waste	To promote the R&D of red mud comprehensive utilization project and improve its comprehensive utilization rate.	The comprehensive utilization rate of red mud reached 10.7%, more than double that of last year.	Strive to reach 15% comprehensive utilization rate of red mud
Mine Reclamation	100% of recalculation of mine and reclaim 6,200 mu (equal to about 4.13 square kilometers) of land in 2022.	Targets achieved, land reclamation totaled 7,132 mu (equal to about 4.75 square kilometers) and reach 100% recalculation of mine.	To reclaim 5,100 mu (equal to about 3.40 square kilometers) of land and keep 100% of recalculation of mine.

<sup>14</sup> During the year, due to the acquisition of enterprise equity, such as Yunnan Aluminum Limited., the scope of the consolidated company in the financial statement has changed. In order to reflect the comparability of the targets, the statistical criteria of the “2022 Targets” and “2022 Target Review” columns are the same as that of 2021, excluding the newly consolidated enterprises in this year; the statistical criteria of the “2023 Targets” column covers the Group, including the newly consolidated enterprises in this year.

<sup>15</sup> Industrial wastewater refers to production wastewater, excluding mine gushing water.

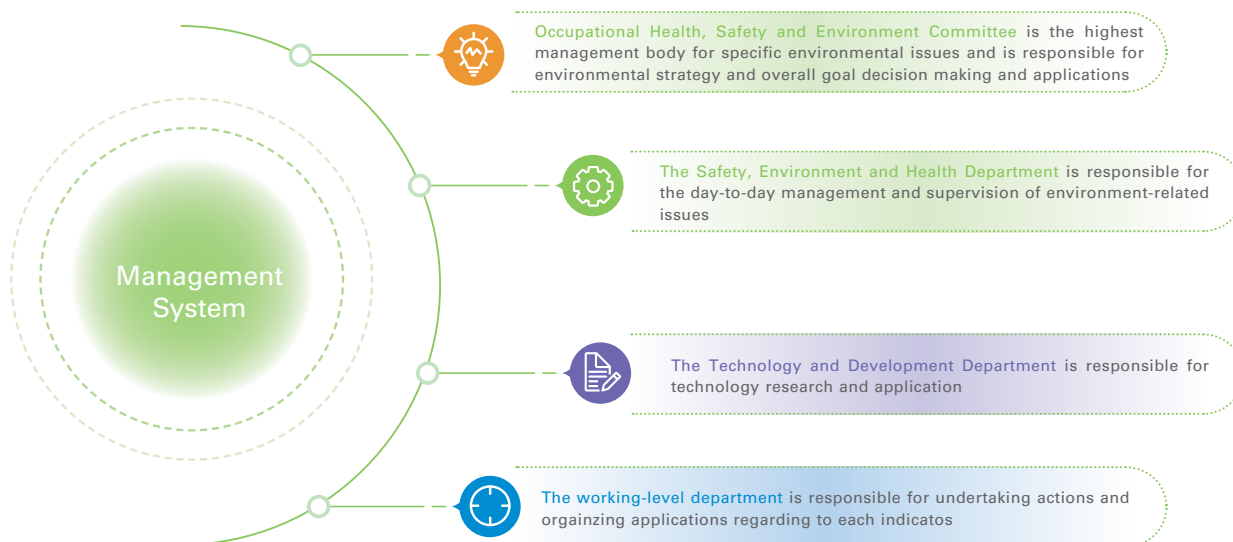


# Focusing on the Environment & Adhering to Green Development (continued)



## 8.1 Environment Management System

Chalco devoted itself to building a long-term mechanism for green environmental protection in the whole value chain. The Company established an environmental management system at different levels and classifications, clarified the Company's annual ecological and environmental protection plan, and assigned the work plan to various departments, branches, subsidiaries and subordinate enterprises according to practical business. Besides, the Company kept standardizing the supervision mechanism of environmental protection work to orderly achieve environmental protection goals.



Chalco continuously implemented internal systems such as "Mandatory Requirements for Ecological and Environmental Control of Aluminum Corporation of China Co., Ltd.," "Work Rules of Occupational Health, Safety and Environment Committee," "Work Regulations for Supervision of Occupational Health, Safety and Environmental Protection" and "Comprehensive Emergency Response Plan of Aluminum Corporation of China Co., Ltd." During the year, the Company issued and implemented the "Management Measures for Ecological Environmental Protection" and "Measures for Responsibility for Ecological Environmental Protection (Trial)," which put forward more requirements on institutional settings and responsibilities, management mechanism construction, pollution prevention and control, and standardized and clarified the handling of production environment-related issues.

During the year, the Company further improved its systems and measures concerning environmental protection inspectors, environmental risk assessment, and emergency management methods, and other aspects, mainly including:

- **Fully promoted the rectification and reform of the central environmental protection inspection:** The completion rate of rectification and reform of the central ecological and environmental protection inspection reached 94%, exceeding the task goal.
- **Carried out special inspection of ecological and environmental protection management:** Environmental protection experts within the company were assigned to carry out on-site inspection and examination of special ecological and environmental protection issues, implementation of ecological and environmental indicators, and operation of online monitoring systems, and other aspects. Problems were found and promptly formulated and followed up to solutions.
- **Regularly sorted out and assessed environmental risks:** A quarterly ecological and environmental risk assessment system was established to regularly sort out various highlighted environmental issues such as environment-related reports and complaints, enterprise self-examination of hidden problems, and enterprise site inspections, and to actively help enterprises promote problem rectification.
- **Deployed to prevent environmental emergencies:** The "Comprehensive Emergency Response Plan of Aluminum Corporation of China Limited" was formulated to regulate the emergency management of environmental emergencies, including emergency event response procedures, emergency work mechanisms, and event handling procedures.

In addition, the Company placed great emphasis on environmental protection knowledge publicity to enhance employees' awareness of environmental protection. This year, the Company invited experts from the government, external scientific research institutions, research centers and other institutions to provide special training on the difficulties of ecological and environmental protection work of the Company, focusing on the rectification of the problems of the central environmental protection inspection, hazardous waste management, emission permit management, and other issues. 426 people attended the training and got good results.

## 8.2 Protecting Natural Ecology

Chalco highly valued the sustainable development, insisted on treasuring nature and promoting green development, and continuously improved its environmental management and natural ecological protection capacity. The Company stressed investment in environmental protection projects, strove to improve the efficiency of using water resources, recycled waste, made every effort to balance the relationship between economic benefits and environmental benefits, strongly supports the development of circular economy, and established a civilized and environmentally friendly corporate image.

### 8.2.1 Reducing Pollution Emissions

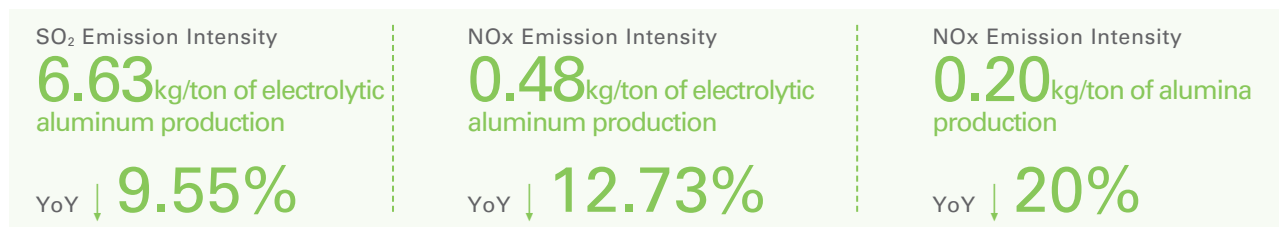
Chalco strictly observed the relevant laws and regulations and local policies of China and the operation location and reduced pollution emissions by continuously improving the environmental management system and applying the latest technology. The Company included the implementation of the rectification and reform of environmental protection inspection into the performance assessment system of all departments and subordinate enterprises of the Company and urged all enterprises to effectively reduce pollutant emissions and reduce the impact to the environment.

#### Prevention and Control of Atmospheric Pollution

The atmospheric pollution generated in the Group's operation was mainly SO<sub>2</sub>, NO<sub>x</sub> and soot. The Company required each enterprise to follow the Company's environmental protection management measures and other internal rules and regulations to implement air pollution prevention and control to continuously promote clean production.

Chalco attached importance to environmental protection in ecologically fragile areas, took the initiative to study solutions suitable for the local environment and formulated environmental management plans in advance. We urged the electrolytic aluminum and carbon enterprises belonging to ecologically fragile areas in the Yellow River Basin, such as Qinghai and Gansu, to formulate a timetable for the environmental improvement and transformation of electrolytic flue gas desulfurization, carbon roasting and calciner dust desulfurization and denitrification, and promote the transformation according to the time schedule. We requested enterprises in Southwest and South China to plan and deploy actions in advance to reduce air pollutant emissions in the autumn and winter in line with the special action plan for comprehensive management of air pollution.

In 2022, Chalco organized its affiliated electrolytic aluminum enterprises to carry out special investigation and treatment of disorganized emission problems of the whole production process, standardize the pollution emission management process of electrolytic aluminum enterprises and comprehensively reduce the emission level of air pollutants from electrolytic aluminum enterprises.



Among them, Shanxi New Material completed the ultra-low emission reform project of flue gas purification and desulfurization for electrolysis II series and the ultra-low emission reform project of clinker firing kiln for NO<sub>x</sub>, which effectively reduced the emission intensity of SO<sub>2</sub> and NO<sub>x</sub> per ton of product.



## Focusing on the Environment & Adhering to Green Development (continued)



### Wastewater Management

Chalco has established industrial wastewater recycling system, and all its affiliated production enterprises have achieved “zero discharge” of industrial wastewater, and 100% of industrial wastewater has been reused for production operations after being treated. To address the sewage of enterprises along the rivers identified in the environmental protection inspection, the Company has carried out special investigation and treatment of wastewater of enterprises along the rivers and continuously strengthened the protection of surface water and groundwater systems in the operation sites.



#### Case

### Yunnan Haixin Aluminum achieving “zero discharge” of sewage

Yunnan Haixin Aluminum has built a production wastewater treatment system with a daily treatment capacity of 250 m<sup>3</sup>. The system adopted technologies including multi-media filtration, ultra-filtration and reverse osmosis to filter the production wastewater to meet the requirements of “Water Quality of Industrial Water for Urban Wastewater Recycling” and recycle it as production water. At the same time, the enterprise is equipped with a household wastewater treatment system, which is used for toilet water in the park and greening of the factory after treatment, realizing “zero discharge” of wastewater.



#### Case

### Wangwa Coal Industry completed the construction of a coal mine impermeable water storage dam

Wangwa Coal Industry and Luowa Township in Ningxia Hui Autonomous Region jointly built an impermeable water storage dam with a capacity of 50,000 m<sup>3</sup> to treat the domestic sewage from the coal mine and reuse it as water for local crop irrigation. After the dam was completed, it effectively solved the local drought problem and improved the recycling rate of water resources. It created more than 2,100 mu (equal to about 1.43 square kilometer) of watered land in the area and promoted agricultural development in Luowa Township.



Impermeable reservoir dams



## Waste Management

Chalco continuously improved waste management to minimize the impact of waste on the environment. We continued to strengthen the management of mineral waste and production waste centering on each production step to reduce waste discharge. The Company strictly implemented the management system of pollutant discharge such as the “Measures for the Management of Hazardous Waste of Aluminum Corporation of China Co., Ltd.” and reinforced the auditing of subordinate enterprises regarding clean production.

- For enterprises that have been included in the list of mandatory “Cleaner production audits”, the Company required them to strictly follow the requirements of national laws and regulations, such as the Interim Measures for Cleaner Production Audits, to examine and diagnose the production and service processes, and propose and implement plans to reduce pollutant emissions.
- For enterprises that are not included in the list of mandatory cleaner production audits, the Company required them to carry out voluntary cleaner production audits comprehensively and strive to maintain the leading cleaner production level in the industry.

## Solid Waste Management

The Company highly valued waste compliance treatment, strictly complied with relevant laws and regulations in treating all kinds of waste, and continuously implemented the “Measures for the Management of Hazardous Waste of Aluminum Corporation of China Co., Ltd.” For hazardous waste such as overhaul slag, aluminum ash and carbon slag, the Company disposed of them harmlessly through harmless treatment production lines, established temporary storage for hazardous waste for safe storage, and entrusted qualified third parties to dispose of them. For general solid wastes such as red mud, fly ash and sulfur paste, we continue to develop comprehensive utilization technology and improve the level of comprehensive use. For details, please refer to Chapter “Contributing to Circular Economy” in this report.

During this year, the company has strengthened measures to prevent pollution of the environment, such as prevention of dispersion, loss and leakage, designed scientific management methods for hazardous waste generation, collection, storage, transportation, utilization and disposal, and standardized the management and maintenance process of related facilities, equipment and sites. After rectification, the disposal rate of hazardous waste from electrolytic aluminum production of the Company reached 81.24% this year, increasing by 5.21% year-on-year.

the disposal rate of hazardous waste from electrolytic aluminum production reached

**81.24%**

increasing by

**5.21** percentageYo-Y

During the year, the main solid waste management measures carried out by the Company’s subsidiaries included:

Baotou Aluminum actively promoted zero stock of hazardous waste, timely disposal of overhaul slag, carbon slag and aluminum ash, and completed the assessment and treatment of contaminated soil.

Qinghai Branch promoted the treatment of slag storage as planned and improved the standardization of waste storage and disposal process.

Gansu Hualu Aluminum Industry rectified shortcomings of hazardous waste storage sites such as electrolyzer overhaul slag storage yard and achieved good results.

## 8.2.2 Efficient Resource Utilization

Chalco engaged in creating a sustainable water supply system and ensured the supply of water resources for production and operation by encouraging the adoption of more water-efficient production methods and enhancing the recycling of water. The Company’s water intake sources were mainly the Yellow River, Yangtze River and their tributaries. And it has not yet encountered any shortage of water resources.

The Group continued to optimize the water use process to reduce new water consumption by adopting measures such as recycling condensate water, replacing new water with medium water, implementing self-circulation of pump machine seal water, recycling and reusing wastewater and initial rainwater, and optimizing the water flow of the desulfurization process to reduce new water consumption. The Company also supported the work of creating a water-saving city and built a water-saving benchmark enterprise. This year, Guangxi Huasheng was rated as the industrial water-saving benchmark enterprise in Guangxi Zhuang Autonomous Region.

Meanwhile, Chalco was devoted to reducing the generation and use of packaging materials in its operations and gradually increasing the use of recyclable packages. We continued to adopt the internal sharing mechanism of packaging optimization benefits to improve the enthusiasm of production and logistics enterprises to promote the use of recyclable packages. The Company kept optimizing alumina packaging by combining loading and unloading conditions, transportation methods and transport distances, focusing on the promotion of circular bags, car bulk, new dry bulk boxes and other packaging on compliant routes and improving shipment methods. In 2022, the Company invested a total of 151.79 tons of new recycling bags.

Invested

**151.79** ton  
of recycling bags

## Focusing on the Environment & Adhering to Green Development (continued)



### 8.2.3 Restoration of Ecological Environment

Chalco actively explored the development of green mines that are compatible with ecological and environmental protection and adhered to the concept of “responsible mining.” The Group strictly complied with the Mineral Resources Law of the People’s Republic of China, the Law of the People’s Republic of China on the Protection of Land Resources and other relevant laws and regulations, ensured the compliance of production activities in the process of site selection and minimized the impact on local communities. The Group included mine reclamation in its annual mine priorities for promotion, formulated a general plan for mine ecological restoration and refined and divided annual reclamation goals for relevant enterprises. The management of the Company followed up and supervised the implementation of the goals. In 2022, the Group reclaimed a total of 7,132 mu (equal to about 4.75 square kilometer) of land, with a reclamation rate of 100%.



#### Case

### Chalco Shandong enterprises greening red mud yard

Chalco Shandong set up a special greening service team, invited experts to guide it and raised the greening coverage of the red mud dam body by covering it with dust nets, filling in the hollow bricks for greening and planting vegetable test plots at the bottom of the dam, planting more than 40,000 seedlings of various types and sowing 12,000 m<sup>2</sup> of grass seeds within two years, with a greening area of more than 60,000 m<sup>2</sup>.



Chalco Shandong red mud yard



#### Case

### Zhongzhou Aluminum mine geological environment treatment

In this year, Zhongzhou Aluminum designed a mine geological environment treatment plan for the mining pits formed by the open-pit mining of Xiaye coal bauxite mine and completed 9,138 m<sup>2</sup> of slope cleaning, 2,718 m<sup>3</sup> of slag cleaning, 26 hectares of site leveling, 5.8 hectares of mixed seed sowing, about 124 hectares of ecological environment improvement, about 5.8 hectares of shrub woodland formation and 24 hectares of arable land restoration in the treatment area. Through the treatment, the Company achieved the restoration of the local landscape and ecological environment while eliminating the hidden danger of geological disasters.



Mine ecological restoration

#### 8.2.4 Advocating Green Operation

The Company actively encouraged and advocated green office and green operation. The main measures included:

- Actively promoting the application of online office systems such as OA and facilitating a paperless office.
- Asking employees to turn off computers, printers, copiers, water dispensers and other electrical equipment after work to achieve the way that lights go out as people leave and to unplug cell phone chargers, and other means.
- Installing radar switches in the announcement area of the Company's headquarters to achieve lights go out as people leave; replacing air conditioning switches to achieve precise temperature control; using advanced permanent magnet synchronous motors instead of the traditional turbo-worm drive method in the drive system of the Company's headquarters freight elevator to improve transmission efficiency by 20% and reduce energy consumption by 40%.
- Timely fixing damaged valves, taps and other equipment and facilities to reduce resource consumption.

### 8.3 Contributing to Circular Economy

Chalco continuously developed solutions for recycling materials, aiming at waste reduction, harmlessness and resourcefulness to reduce waste discharge and enhance production efficiency to help the development of circular economy. During the year, we carried out technological research and development including comprehensive utilization of red mud and resource utilization of secondary aluminum ash and implemented action plans for the development of recycled aluminum.

#### Comprehensive Utilization of Red Mud

In 2022, the Company carried out special management of the comprehensive utilization of red mud and guided Guangxi Branch, Guangxi Huasheng, Yunnan Wenshan Aluminum and other enterprises to promote the development and industrialized application of a number of technologies based on market demand and expand the quality-based utilization of red mud. This year, the Group's comprehensive utilization rate of red mud was 10.7%, more than double that of last year, leading the industry.



#### Guangxi Huasheng strengthened the comprehensive utilization of red mud

Guangxi Huasheng carried out the work of treating red mud as raw material for cement after contacting and testing with relevant enterprises. The Company cooperated with scientific research institutes to develop comprehensive utilization technology of bauxite red mud iron selection, and jointly built a demonstration line for comprehensive utilization of red mud with professional enterprises to comprehensively improve the production level of comprehensive utilization of red mud. In 2022, Guangxi Huasheng's red mud comprehensive utilization volume reached about 603,000 tons.



Research on water control standard of red mud



## Focusing on the Environment & Adhering to Green Development (continued)



### Resourceful Utilization of<sup>16</sup> “Three Wastes”

In 2022, the Company continued to promote the disposal and comprehensive utilization of the “three wastes” of electrolytic aluminum, completed a pilot study on the cooperative disposal of overhaul slag, carbon slag and aluminum ash and initially built a demonstration line for the disposal of overhaul slag and carbon slag to extract and reuse resources from hazardous wastes.



#### Case

### Shanxi New Material secondary aluminum ash collaborative clinker kiln comprehensive utilization practice

Shanxi New Material put the 15,000 tons/year secondary aluminum ash collaborative clinker kiln comprehensive utilization demonstration line into operation, passed the environmental assessment and obtained the hazardous waste operation qualification. The total annual disposal of aluminum ash was about 8,000 tons.



#### Case

### Practice of comprehensive utilization of solid waste resources of Yunnan Runxin Aluminum

Yunnan Runxin Aluminum explored the technical route of the harmless joint disposal process of aluminum electrolysis overhaul slag, carbon slag and aluminum ash and built the first domestic 35,000 ton per year overhaul slag and carbon slag disposal industrial test line. It has cooperated with scientific research institutions to solve the technical problems of harmless treatment of aluminum ash, promoted the development and industrialization of pressurized wet metallurgy technology of aluminum ash and integrated the disposal of aluminum electrolysis waste such as overhaul slag, carbon slag, aluminum ash and fluorine wastewater to achieve “treating a waste with another waste” and efficient utilization of resources. By the end of this reporting period, over 27,000 tons of hazardous waste were disposed.



#### Case

### Yunnan Wenshan Aluminum adopted aluminum ash resource utilization technology

Yunnan Wenshan Aluminum cooperated with universities to carry out research on “comprehensive utilization of aluminum ash by sintering method” and developed the technology of harmless and resourceful disposal of aluminum ash. At the same time, it has developed gas purification device and mixed gas capture device to collect and reuse the hydrogen and ammonia gas generated in the disposal of aluminum ash. By the end of the reporting period, a total of 108,500 tons of aluminum ash were harmlessly disposed, 70,500 tons of alumina were recycled and produced, about 16 million standard cubic meters of hydrogen were supplied as fuel for alumina production and more than 5,000 m<sup>3</sup> of ammonia were produced.

<sup>16</sup> “Three wastes” refers to three kinds of hazardous wastes produced in the process of electrolytic aluminum and alumina production: overhaul slag, carbon slag and aluminum ash.

## Key environmental performance<sup>17</sup>

The environment-related performance data of the Group from 2020 to 2022 are shown in the table below.

Performance indicator	Unit	2020	2021	2022
<b>Basic information</b>				
Operating income	RMB10,000	18,599,057.70	26,974,823.18	29,098,794.20
<b>Emissions</b>				
<b>Air emissions</b>				
The amount of SO <sub>2</sub> emission	10,000t	3.6	3.46	5.56
The amount of NO <sub>x</sub> emission	10,000t	1.05	0.96	1.18
The amount of Soot emission	10,000t	0.42	0.32	0.44
<b>Wastewater discharge<sup>18</sup></b>				
production wastewater	10,000t	0	0	0
mine water inflow	10,000t	76.23	31.14	562.8
The amount of ammonia nitrogen discharged	10,000t	5.6	1.54	1.22

Performance indicator	unit	2020	2021	2022
<b>General industrial solid wastes</b>				
The amount of general industrial solid wastes generated	10,000t	3,780.33	4,147.66	4,698.20
The amount of general industrial solid wastes generated per RMB10,000 of operating income	t/RMB 10,000	2.03	1.54	1.61
The amount of red mud generated	10,000t	2,172.46	2,426.50	2,856.68
The amount of red mud utilized	10,000t	280.58	328.32	577.47
The amount of fly ash generated	10,000t	436.23	425.15	511.83
The amount of fly ash utilized	10,000t	324.61	349.96	399.98
The amount of slag generated	10,000t	130.94	135.74	175.78
The amount of slag utilized	10,000t	105.27	118.27	154.29

<sup>17</sup> During the year, , due to the acquisition of enterprise equity, such as Yunnan Aluminum Limited., the scope of the consolidated company in the report has changed, the statistical criteria covers the Group, including newly acquired enterprises.

<sup>18</sup> In this year, the company refined the statistical caliber of wastewater, divided industrial wastewater into production wastewater and mine water inflow, and count previous data according to the above classification.

## Focusing on the Environment & Adhering to Green Development (continued)



Performance indicator	unit	2020	2021	2022
<b>Resources consumption</b>				
Total amount of hazardous waste	t	112,540	149,505	392,700
The amount of hazardous waste generated per RMB10,000 of operating income	t/RMB10,000	0.0061	0.0055	0.01354
The amount of waste oil (motor oil and mineral oil) generated	t	733	721	1,700
The amount of disposal of waste oil (motor oil and mineral oil)	t	819	629	2,800
The amount of aluminum ash generated	t	22,402	33,047	74,200
The amount of aluminum ash disposal	t	29,181	27,035	69,300
The amount of waste tank lining generated	t	39,958	46,157	212,300
The amount of disposal of waste tank lining	t	37,884	99,855	236,400
The amount of carbon slag generated	t	49,447	59,408	98,700
The amount of carbon slag disposal	t	47,493	68,354	104,700

Performance indicator	Unit	2020	2021	2022
<b>Use of resource</b>				
Total water consumption	100 million t	34.14	32.37	42.96
In which: circulating water consumption	100 million t	33.29	31.36	42.02
Total freshwater consumption	100 million t	0.84	1.02	0.94
Water consumption per RMB10,000 of operating income	t/RMB10,000	183.55	120	147.63
Freshwater consumption per RMB10,000 of operating income	t/RMB10,000	4.52	3.78	3.23
The amount of packaging material used	10,000t	1.33	1.49	2.76
The amount of packaging material used per RMB10,000 of operating income	t/RMB10,000	0.00072	0.00055	0.00095



## Discharge indicators in 2022

Number of discharge outlets		
Waste gas	number	1688
Waste water	number	23

Emission type	Unit	Approved total emissions (under emissions permit)	Total emissions
SO <sub>2</sub>	t	140,141.88	55,588
NO <sub>x</sub>	t	30,532.34	11,825
PM	t	20,033.74	4,439
COD	t	86.2	56.79
Ammonia nitrogen	t	7.31	1.22

## Environmental Penalties in 2022

In 2022, the Group received a total of 4 environmental penalties and paid a total of 1.7095 million RMB in administrative penalties. We have taken timely resolution measures and all of them have been rectified. The penalties mainly included:

1. Guizhou Branch was penalized 735,000 RMB in February 2022 for failing to re-approve environmental impact assessment documents due to the change in the scale of bauxite mine production.
2. Ningxia Energy was penalized a total of 860,000 RMB in May 2022 for the failure of its subordinate enterprises to implement the environmental impact assessment approval and emission permit requirements; failure to take protective measures such as layered operation, layered compaction, covering and sprinkling water for coal gangue sites; and failure to take airtight measures to prevent dust pollution for the open storage of coal gangue, raw coal and coal slurry in coal storage sites.

# 09

## People-Oriented & Harmonious Enterprise

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# People-Oriented & Harmonious Enterprise



Chalco adhered to the concept of “talent is the best resource”, insisted on people-oriented, continuously optimized the employment system and effectively protected the rights and interests of employees. We also provided employees with attractive salaries and promotion channels, a diversified, inclusive, fair and just working atmosphere and strengthened humanistic care for employees to achieve the common growth of employees and enterprises.

Chalco strictly abided by the *Labor Law of the People's Republic of China*, the *Labor Contract Law of the People's Republic of China*, the *Law of the People's Republic of China on the Protection of Minors*, the *Provisions on the Prohibition of Child Labor*, the *Law of the People's Republic of China on Labor-dispute Mediation and Arbitration*, the *Law of the People's Republic of China on the Protection of Rights and Interests of Women*, the *Law of the People's Republic of China on the Protection of Disabled Persons*, and other employment-related laws and regulations. In addition, with reference to the above laws and regulations, it established a sound employment system and norms.

## 9.1 Protection of Employee Rights and Interests

In accordance with relevant laws and regulations, the Company formulated relevant internal systems such as “Measures for the Administration of Labor Contracts of Aluminum Corporation of China Limited” and “Measures for the Performance Management of Enterprises Affiliated to Aluminum Corporation of China Limited” to protect employees’ legitimate rights and interests including employment, recruitment, termination, salary, promotion, anti-discrimination and other aspects via sound rules and regulations.

During the year, the Company studied and formulated the “2022 Work Points of the Labor Union of Aluminum Corporation of China Limited”, which stated clearly that the Labor Union of the Company shall protect the legitimate rights and interests of employees and serve the employees dedicatedly as its basic duties and assist them in safeguarding their rights and interests. The Company duly respected the employees’ rights to information and supervision, and constructed the democratic management mechanism of the Company and its affiliated enterprises via the Employee Representative Meetings (SRM) and put forward employees’ suggestions and demands in the form of collective proposals by employee representatives. In this year, the Company elected the first batch of employee representatives in the first Staff Congress and gathered proposals from employee representatives in energy saving and consumption reduction, green transformation, operation and management, safety and environmental protection, scientific and technological innovation and risk prevention and control.

With regard to the prohibition of child labor and forced labor, the Company formulated strict internal management measures in accordance with laws and regulations. The Company carefully reviewed the identity information of applicants during the recruitment process and conducted identity checks again in the subsequent onboarding process to avoid employing child labor from the beginning. The Company strictly supervised the employment of labor in the course of operation. Once any forced labor was observed, it would be handled in strict accordance with national laws and regulations and internal systems. The Company would promptly correct it and compensate the employees, and the management and the person in charge of HR department would be investigated in serious cases. No child labor or forced labor was involved in the Group during the reporting period.

In addition, the Company established the retirement pension assurance system covering all employees in terms of pension and retirement benefits in accordance with the requirements of national laws and regulations and the local requirements of the places of operation. It followed the procedures of retirement approval, pension withdrawal and socialized management for all employees as per the laws and regulations to protect the retirement life of employees.

# People-Oriented & Harmonious Enterprise (continued)



## 9.1.1 Diversity & Equality

Chalco kept building a healthy workplace with equality and diversity, adhered to the principle of equal employment, and insisted on the employment policies of equal pay, gender equality and ethnic equality.

During this year, the Company formulated the “Management Measures for Open Recruitment of Employees of Aluminum Corporation of China Limited”, which stipulated in detail the approval method of employment plan and the whole process of recruitment audit, and regulated the employment management of the Company in terms of recruitment plan, qualification examination, candidate assessment and candidate public announcement. Besides, it further stated that the recruitment evaluation process should equally treat candidates of different genders, ages and nationalities.

The Company also focused on ensuring the management of equal pay for labor dispatched employees and regular employees. The Company requires enterprises at all levels to pay workers the same monthly labor remuneration, social insurance and other expenses as regular employees in accordance with national laws and regulations and the Company’s requirements, and to include the payment supervision in the annual business assessment of enterprises at all levels.

We also emphasized on protecting the rights and interests of female employees. In this year, we nominated the first female employees committee through discussion at the first general meeting of the company’s labor union to truly protect the rights and interests of female employees.

## 9.2 Regulation of personnel management

### 9.2.1 Employment

Chalco continued to build a better labor management system and HR management structure to improve labor productivity. During the year, the Company formulated and issued management measures such as “Assessment Measures for Deepening the Reform of Three Systems” and “The Company’s 2022-2024 Human Resource Management Benchmarking and Enhancement Work Plan” in accordance with the employment-related laws and regulations of the People’s Republic of China, and put forward management goals and action initiatives in selection and appointment, labor employment and income distribution.

Table: Chalco’s Employment in 2022

Indicators		2022
Total number of current employees as of the end of the reporting period (Person)		67,383
The number of employees by gender (Person)	Male	56,126
	Female	11,257
The number of employees by age group	30 and below	7,867
	30-49	39,936
	50 and above	19,580
The number of employees by employment category (Person)	Senior management	195
	Department heads	1,011
	Other office employees	9,468
	General and technical workers	56,709
The number of employees by region (Person)	Hong Kong, Macao and Taiwan regions	0
	Chinese mainland	67,383



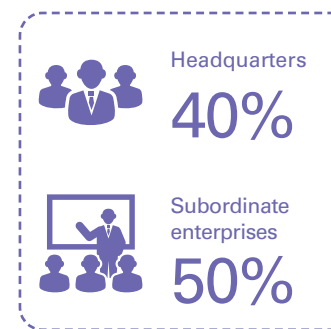
Table: Chalco's turnover and turnover rate<sup>19</sup> in 2022

Indicators		Number of People	Rate <sup>20</sup>
The total number of turnover as of the end of the reporting period		4,312	6.40%
Number and rate of employee turnover by gender	Male	3,049	5.43%
	Female	1,263	11.22%
Number and rate of employee turnover by age group	years old and below	317	4.03%
	30-49 years old	827	2.07%
	50 years old and above	3,168	16.18%
Number and rate of employee turnover by rank	Senior management	14	7.18%
	Department heads	21	2.08%
	Other office employees	347	3.66%
	General and technical workers	3,930	6.93%
Number and rate of employee turnover by region	Hong Kong, Macao and Taiwan regions	0	0%
	Chinese mainland	4,312	6.40%

### 9.2.2 Employee Assessment

During the year, Chalco continued to implement the "Three-Year Action Implementation Plan for Deepening Reform (2020-2022)", regularly checked the work accomplishment of employees at all levels, carried out the comprehensive assessment mechanism based on monthly, quarterly and annual evaluations, and strengthened daily supervision and tightened the process assessment to ensure the achievement of enterprise operation goals. At the same time, the Company introduced the bottom-level reassignment and incompetent withdrawal system based on the assessment results in order to strengthen the management efficiency.

The Company continuously improved the assessment system and incorporated non-financial indicators such as resource and energy security, industrial layout adjustment, green and low-carbon development, scientific and technological innovation, safety and environmental protection into the management performance assessment system and applied the management mode of "one policy for one enterprise, one order for one person" according to the actual situation of the enterprises. In this regard, the non-financial assessment indicators of the leaders of the Company's headquarters weighed about 40%, and the non-financial assessment indicators of the leaders of the subordinate enterprises weighed about 50%.



<sup>19</sup> The range of people from the Group that take into account for calculation turnover rate include voluntary departures, dismissals, retirements and deceased employees.

<sup>20</sup> Turnover rate (per category) = Employees in the specified category leaving employment/Number of employees in the specified category.

## People-Oriented & Harmonious Enterprise (continued)



### 9.3 Boosting Employee Development

Chalco valued the development of its employees, upheld the talent concept of “putting people first, cherishing talents and caring for employees” and effectively provided employees with clear career development routes and diversified training courses to realize the simultaneous growth of employees and the company.

#### 9.3.1 Salary Incentive

Chalco followed a benefit-oriented philosophy and built a performance-based incentive system to emphasize the relationship between salary and benefit. In this year, according to the requirement of “benchmarking all elements by specialty to comprehensively improve the competitiveness of the Company”, it focused on improving the systems such as “Management Measures for Assessment and Evaluation of Senior Management and Remuneration Distribution of Aluminum Corporation of China Limited”, “Management Measures for Business Performance Assessment of Affiliated Enterprises of the Company” and “2022 Annual Wage Linkage Programme” for affiliated companies. These policies further emphasized the linkage of all levels of employee’s pay to performance with costs, profits and non-financial indicators (including resource and energy security, industrial layout adjustment, green and low-carbon development, science and technology innovation, safety and environmental protection and other indicators). Moreover, the Company further increased the job bonus and introduced refined performance management methods to enhance the work rewards of outstanding employees such as scientific and technological personnel and technical backbone.

In 2022, the Company carried out the employee stock ownership plan (ESOP) and its targets ranged from senior management, core management personnel of the Company, leading personnel of entity enterprises, leading personnel of entity enterprises’ factories and mines, leading personnel of entity enterprises’ functional departments, scientific researchers, technical backbone, skilled backbone and sales backbone, covering five types of business including management, production, R&D, skills and marketing, with a total of 1,206 incentive targets and 139 million incentive shares.

#### 9.3.2 Employee Training

Chalco continued to build a comprehensive and diversified employee training system, strengthen talent management, improve employees’ working capacity and realize their professional value, as well as build a team of highly proficient talents. The Company built the “Chalco E-learning” online learning platform, set up an “online + offline” training system and expanded the training reach. In 2022, “Chalco E-learning” undertook 25 training programs of all types, with a total of more than 56,000 trainings. In particular, the Company carried out network training on thematic practical activities including low-carbon and environmental protection, legal compliance and other aspects with a total of more than 11,000 participants.

The Company also continued to enhance the training of management personnel and optimize the structure of the leadership team. During the year, the Company carried out training in professional fields such as electrolytic aluminum and alumina to push forward the extension of management personnel to the foundation so as to carry out leadership team building. During the year, the Company sent a total of four managers to attend the transfer training of higher-level cadres. At the same time, the Company completed the recommendation and selection of outstanding young leaders and made reserve for talents in professional fields. 591 candidates of outstanding young cadres were recommended and formed by professional categories this year, and 15 young cadres were promoted in total.



During this year, the Company continued to promote the construction of scientific and technical and skilled talents, set up a one-on-one contact system between managers and service experts to enhance the professional ability of managers. A total of 47 managers participated in relevant projects. At the same time, the Company strengthened the training of senior skilled personnel and trained 405 highly skilled personnel throughout the year.

In addition, the Company assisted its subordinate enterprises to develop a training system that can provide diversified courses for different types and levels of employees. It mainly included:



#### Case

### “Promoting learning through competition” to strengthen employees’ occupational capacity

In this year, the Labor Union of the Company took “national competition, industry competition and enterprise competition” as the starting point to round out the organization of skill competitions and skill personnel training system, guiding employees to practice in working, work in practice and promote learning through competitions. In 2022, the Group carried out 655 competitions for various types of workers’ skills, and about 30,000 workers participated in skills and job training.



Skill competition



#### Case

### Workshop on international certification attraction and cultivation project for highly skilled personnel

In this year, Baotou Aluminum sent 32 highly skilled talents and technical leaders to the workshops on “Robotics General Skills” and “Intelligent Manufacturing and Industrial PLC Technology” held by Baotou City in cooperation with the enterprise to comprehensively enhance the technical ability of enterprise talents.



Baotou Aluminum carries out staff training



## People-Oriented & Harmonious Enterprise (continued)



Table: Training of Chalco Employees in 2022

		Number of trainees	Percentage (%)	Average hours of training (hour)
Training by level	Senior management	195	100%	115
	Department heads	1,011	100%	65
	Other office employees	8,968	94.70%	54
	General and technical worker	51,704	91.20%	36
Training by gender	Male	51,635	92%	46.3
	Female	10,243	91%	35.2

### 9.4 Focus on Employee Welfare

Chalco established a sound welfare assurance system. On the basis of paying social insurance and provident fund for all employees as per laws and regulations, it also provided enterprise annuity, supplementary medical insurance, death insurance, supplementary medical treatment and group accident insurance and other contents. During the reporting period, Chalco established corporate annuity plans for 55 enterprises. The Company also formulated the “Leave System for Employees at the Headquarters of Aluminum Corporation of China Limited” to ensure that employees can enjoy paid leave, maternity leave and other statutory holidays by law and to implement a flexible leave policy.

In addition, the Company’s Labor Union distributed festival gifts to regular employees and labor-dispatched employees on holidays such as Spring Festival, Dragon Boat Festival and Mid-Autumn Festival, carried out special consolation activities regarding major illnesses and accidents and distributed consolation money and materials to employees and their immediate family members who suffered from major illnesses.

#### Caring for Female Workers

The Company implemented the “Outline for Women’s Development in China (2021-2030)” and further improved the awareness and popularity of laws and regulations on the protection of female workers’ rights and interests by expanding the coverage of legal education. Some subordinate enterprises of the Company signed the “Special Collective Contract for the Protection of Female Workers’ Rights and Interests” to protect the rights and interests of female workers. At the same time, the Company provided female workers with protection and benefits including parental leave and special medical checkups for women and organized female workers to attend special health checkups to ensure their health and safety. The Company also encouraged female workers to actively participate in labor competitions, skill competitions and proposal collection activities, launched the selection of advanced models for female workers, motivated female workers to improve their technical skills and boosted their career development.

In addition, the Company organizes recreational activities such as pastry making and cultural competitions for female workers on March 8th International Women’s Day to enrich their daily life.



Zhengzhou Research Institute organized female workers to make paper quilling flowers



Fushun Aluminum carried out “March 8 Women’s Day” activities



## Giving top priority to quality and making progress together with the industry

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# Giving top priority to quality and making progress together with the industry



Chalco always insists on providing high-quality products and services, and is devoted to building a quality brand of “Good aluminum, find Chalco”, thus promoting product diversification in a faster and better way. The Company strictly abides by laws and regulations, puts emphasis on intellectual property rights, information security and privacy protection, and strives to fully protect the rights and interests of all parties. Meanwhile, we utilize advanced digital and intelligent technologies to build an industry-leading digital supply chain, uphold an open and win-win attitude, actively carry out industrial exchanges and communications, and drive the high-quality development of the industry with actions.

## 10.1 Strengthening quality management

Chalco strictly observes relevant national laws and regulations and continuously improves its quality management system to guarantee the quality of products and services with a sound mechanism. The Company continues to implement the “Quality Management Measures” and controls the quality of intermediate and final products by means of self-inspection, mutual inspection, special inspection and random inspection. During the year, the Company continued to improve its specifications on product quality and introduced 15 corporate standards related to aluminum oxide, electrolytic aluminum and product quality, including methods for analysis of aluminum oxide and detection of S<sub>2</sub> content in sodium aluminate solution, as well as 12 technical management specifications. In 2022, the Company obtained the certification of GB/T19001-2016 quality management system, and its branches and subsidiaries also acquired the following quality-related recognitions:

- Chalco Shandong was awarded the title of Leading Quality Enterprise in the first-session selection in Zibo City.
- 17 subordinate enterprises have reached a maturity level of three stars in terms of the quality management system, and 12 enterprises have reached the four-star level.

In addition, the Company focuses on implementing the appraisal and supervision of product quality, and only products verified as qualified according to the national identification standards are allowed to leave the factory for sale. The Company also entrusts the China National Quality Supervision and Test Center for Light Metal to conduct supervision and random checking of the main products of its subordinate enterprises every year, and in case of any objection about quality, the Company will deal with such objection in strict accordance with the provisions of the “Quality Management Measures”.

### 10.1.1 Pursuing quality products

Chalco has always been sticking to the quality vision of “being a leader in domestic, being first class in the world” and the working policy of quality first, problem orientation, goal orientation, and result orientation to ensure that its product quality reaches the industry-leading level. The Company has made sustained efforts to implement the performance excellence model, and continued to enhance its product quality assurance capacity and promote the building of quality brand by implementing measures such as corporate standard leader system, quality technology research, quality control (QC) team activities, and improvement of quality management system maturity in an orderly manner.

In 2022, the Company implemented the management mode of “‘five standards and one control’<sup>21</sup> for electrolytic aluminum, and ‘three-ations (standardization, ecologization and intelligentization) and one improvement’<sup>22</sup> for aluminum oxide”, with a focus on benchmarking for all elements and a main target of improving the production management level. The Company won a total of 132 awards in the QC accomplishment presentation competitions above the provincial and ministerial levels. The QC team of Chalco Shandong won the Gold Award in the 47th International Convention on Quality Control Circles (ICQCC), and initiated the formulation of a total of 26 new national standards, industry standards and group standards, and completed 1 international standard.



<sup>21</sup> “Five standards and one control”: It refers to the standards for large original fuel, baking start-up, later stage management after start-up, normal production process technology, and production operations and the data-based control of production, which is a scientific, systematic, standardized and refined electrolysis production management mode.

<sup>22</sup> “Three -ations and one enhancement”: It refers to the establishment of an aluminum oxide management mode that enables standardized production, equipment, safety, environmental protection and quality (standardization), realizes energy conservation, low carbon, environmental protection, ultra-clean emission, comprehensive utilization of resources (ecologization), and achieves real-time collection, centralized control, intelligent optimization and unmanned factory (intelligentization).

### Ensuring product safety

Product safety is the basis for ensuring product quality. Chalco has been devoted to providing customers with safe and high-quality products. The Company has formulated corporate standards that are stricter than national standards and industry standards, ensured strict compliance with the corporate standards and the special needs of customers in terms of elemental content of products, and resolutely prohibited the addition of harmful elements such as lead, mercury, arsenic and other elements, to ensure maximum safety in use while meeting customer needs. During the reporting period, no recall of products due to health and safety reasons occurred in the Company.

### Improving product quality

In 2022, the three indicators: metallurgical-grade aluminum oxide, the prebaked anode of the second or higher grade, and the aluminum ingot of AL99.70 or higher, remained at 100%; the rate of metallurgical-grade aluminum oxide, the rate of the first-grade prebaked anode and the percentage of electrolytic cells with aluminum liquid of AL99.85 or higher achieved a year-on-year increase of 5.6%, 4.0%, and 6.1%, respectively, and the quality of primary aluminum liquid hit a new high. In addition, we organized six competitions for the following indicators: the rate of metallurgical-grade aluminum oxide, the rate of primary aluminum liquid of AL99.55 or higher, the rate of the prebaked anode of the first grade or above, the non-scheduled downtime of gold-medal thermal units, the non-scheduled downtime of power plant boilers (units), and the operating cycle of power plant boilers (units), and held production-related labor competitions exchange and sharing sessions, aiming to enhance employees' awareness and promote the methods and techniques for improving product quality through exchanges and mutual learning.



## Removal of impurities in aluminum oxide production

The Company has been actively exploring new technologies for optimizing product quality. In response to the problem that the complex content of impurities in the ore affects the production stability and quality of aluminum oxide, the Company managed to reduce the impurity content of products by integrating the desulfurization and decarburization technologies and applying the achievements obtained in the "desulfurization and decarbonization technology researches" such as humic acid removal and reduction of chloride ion content.

### 10.1.2 Optimizing service quality

The Company adheres to the business philosophy of honesty and service first, sticks to an orderly running, coordinated, and efficient marketing management system, and has formed a sales network covering the whole country and overseas operating sites. The Company has actively conducted pre-sales, in-sales, and after-sales services and strives to provide customers with better services.

The Company has also established an after-sales service feedback processing mechanism, stipulated the customer complaint handling process, response time and other contents in the complaint management measures, and formulated corresponding handling processes for circumstances such as product quality objections or quality events. The Company also attaches importance to the prevention of quality events and has formulated and implemented preventive measures for quality events. The processing accounts for various quality events are in safe keeping, and the records and files of information such as analysis records, handling reports, and results of liability distribution are maintained. In addition, the Company has also applied the unified collection and centralized management of its subordinate enterprises' after-sales information and assigned the relevant issues to the respective special departments for settlement and provision of guiding opinions. In 2022, the Company received 44 product-related customer complaints, and all complaints were solved appropriately.





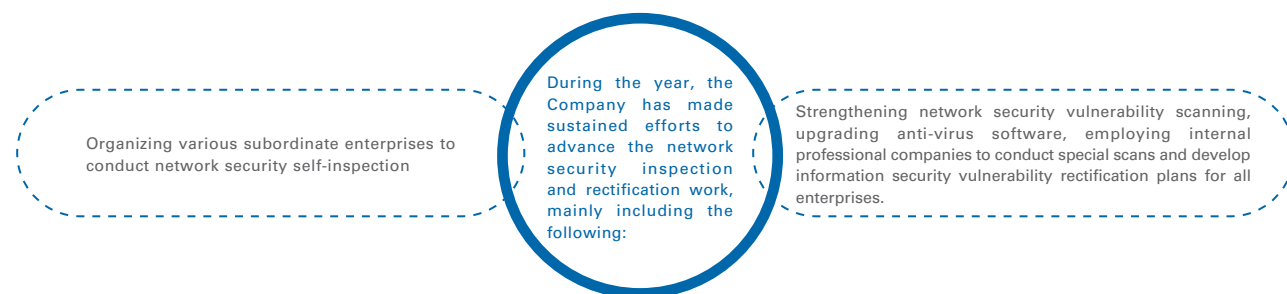
### 10.2 Safeguarding operational rights and interests

#### 10.2.1 Information security and privacy protection

Chalco strictly abides by the Law of the People's Republic of China on Guarding State Secrets, the Interim Provisions on the Protection of Trade Secrets of Central Enterprises, the Personal Information Protection Law of the People's Republic of China and other laws and regulations, and has formulated such rules and regulations as the "Emergency Response Plan for Internet Security Incidents of Aluminum Corporation of China Limited" and the "Measures for Data Management of Aluminum Corporation of China Limited (Trial)", and has properly implemented various measures for protecting corporate information and customer privacy. In 2022, to strengthen information confidentiality management, the Company issued seven confidentiality-related management systems, including the "Administrative Measures of Aluminum Corporation of China Limited for Equipment Involving Confidential Information", the "Responsibility System for Confidentiality Work of Leading Cadres of Aluminum Corporation of China Limited" and the "Regulations of Aluminum Corporation of China Limited on Confidentiality Management of Work Concerning Foreign Affairs or Foreign Nationals". Meanwhile, to advance intelligent construction, the Company issued the "Specifications of Aluminum Corporation of China Limited on Managing Industrial Control Network Security of Intelligent Plants", which serves as a guideline for its subordinate enterprises to construct the safety management, technology, operation, and maintenance and supervision systems of intelligent plants' industrial control network.

##### Information security protection

The Company has been strengthening data and information protection. With regard to information backup management, the Company has introduced the system backup management method – the "Detailed Operation Procedures of Aluminum Corporation of China Limited for Application System Backup". For commonly-used information systems, regular backup is implemented, while for important information, off-site backup is adopted, so that data loss can be avoided. The Company applies strict access control for system user accounts, adopts password policies, and implements strict examination and approval for account applications. The professional management staff is appointed to ensure that accounts are created according to the specified procedures, and regular audits are conducted for the operations of these management staff. The Company also attaches importance to the privacy security of the supplier management system, and has followed the requirements of network security protection level II or III based on the importance degree.



##### Information security training

During the year, we further enhanced the publicity of network security and popularized the network security laws, digital security laws and personal information laws among all employees over the Internet. Meanwhile, we organized training on the cyber security-related laws and regulations for the group's employees to enhance their awareness, and a total of 35,000 employees attended such training, including the Company's management personnel, technical staff and front-line workers.

#### 10.2.2 Protecting intellectual property rights

Chalco has strictly followed the Patent Law of the People's Republic of China, the Advertising Law of the People's Republic of China, and other laws and regulations, improved its measures for intellectual property management, defined the incentive system for intellectual property rights, and protected its own intellectual property rights and respected the same of others at the same time.

During the year, the Company revised the relevant administrative measures and required that for cooperations with overseas parties, the method for the distribution of intellectual property rights and interests among related parties and the obligation of maintaining information confidentiality must be clearly stipulated in contracts. During the cooperation period, the Company kept tracking the intellectual property rights obtained by the partners in projects and has taken remedial measures in a timely manner once a breach of contract is detected, and terminated the cooperation immediately when necessary. The Company has continued to implement the measures for administration of trademarks, conducted daily monitoring of trademark publicity and placement, developed countermeasures for infringement, and authorized its subordinate enterprises to carry out trademark anti-counterfeiting activities to ensure the exclusive right to use trademarks and promote the sustainable development of scientific and technological research and development.

In terms of incentives for intellectual property rights, the Company has issued responsibility letters for key projects, defined the incentives for intellectual property rights and patent applications, and included infringement and technology secret disclosure in the negative list, for the purpose of supporting and protecting scientific and technological innovation.

## 10.3 Empowering Partners

Building a stable and sustainable supply chain is a core link for the company's business development. The Company has established a sound supplier management system and provided an open and efficient cooperation environment for suppliers through digital platforms. While ensuring the stability and efficiency of the Company's supply chain, Chalco has also been working with suppliers to fulfill the social responsibility of green development, create a green supply chain and grow together with suppliers.

### 10.3.1 Supplier management system

During the year, the Company has revised the "Administrative Measures for Suppliers of Aluminum Corporation of China Limited" and the "Procurement Management Measures of Aluminum Corporation of China Limited", and improved the management of suppliers at the access, assessment and evaluation stages in an all-round way.

At the access stage, the Company has inspected the qualification of suppliers, classified suppliers, and refined the assessment criteria in strict accordance with the relevant national requirements, and has verified the various supporting materials provided by suppliers. The Company has examined the qualification of suppliers according to production and processing qualification, manufacturer sales platform qualification, import qualification, agency and distribution qualification and special trade qualification, and required suppliers to provide relevant proof materials. The Company has also investigated for the illegal operations of suppliers and excluded the suppliers who have had the spotty records of serious violations against the relevant regulations on social responsibility in the society or the industry. As of the reporting period, the Company had a total of 3,422 suppliers of raw materials for production, all of which are from the mainland of China.

At the same time, the Company has established a sound daily review and rectification mechanism for suppliers. The suppliers which have a poor performance in social responsibility and have caused certain adverse impact on the society will be downgraded. For those which have caused serious adverse impact, the Company will terminate the transactions with them or require them to make rectifications in a specified time period, and disable them in the Company's enterprise resource planning (ERP) system.

#### Environment and social risk management of supply chain

In terms of supplier risk management, the Company has been implementing the "double reductions and double controls"<sup>23</sup> for business outsourcing to reduce the environmental and social risks of the supply chain. The Company has also exercised strict control over the transportation guarantee for normal operations, paid close attention to the logistics safety guarantee work during the flood season, natural disasters, large events and other special natural and humanistic periods, well coordinated the transportation guarantee work for key lines to Baotou Aluminum, Shanxi Zhongrun, Guangxi Huasheng and other places. developed supply guarantee plans in advance, implemented measures for guaranteeing handling, unloading and other links, so as to satisfy the Company's transportation demand.

#### Supplier exchanges and training

The Company has also actively carried out supplier training and communicated with suppliers to maintain the relationships with them. During the year, the Company has completed the induction training for more than 1,400 suppliers, and held 10 training sessions and more than 20 training assessments. The training covers basic product information maintenance, order maintenance, billing settlement and other contents.



Case

### Coal industry supplier seminar

In August 2022, Chalco held the 2022 Seminar on Key Coal Supplier Markets, which was attended by more than 100 coal companies from domestic and overseas energy industries. The Company invited professionals to conduct special reports on the current situation and development of the coal industry and to advocate coal suppliers to fulfill the social responsibilities.

<sup>23</sup> "Double reductions and double controls": It refers to the reduction of cost of business outsourcing and the number of contractors, and the strict control of unnecessary outsourcing, and non-safety operations

## Giving top priority to quality and making progress together with the industry (continued)



### 10.3.2 Digital management platform

In order to quickly realize digital transformation and intelligent procurement, Chalco Materials has built the online purchasing platform “Lv Yue Yi Cai” to provide the group with “efficient, convenient and value-added” digital purchasing experience and services, thus realizing resource aggregation and reducing comprehensive procurement cost.



#### Online purchasing platform “Lv Yue Yi Cai”

“Lv Yue Yi Cai” is an e-commerce service platform which provides the group’s internal customers and users in the non-ferrous metal industry with commodities required for their production and operations, covering the procurement of standard products and bulk materials. It is equipped with relevant functions such as commodity management, application management, order management, agreement management and settlement management, aiming to provide an integrated and full-process purchasing platform for enterprises.

During the year, the platform has strengthened the mall purchasing mode, standardized the purchasing business of standard goods and low-value goods and visualized the goods through the centralized operation and management mode, which has effectively shortened the individual procurement cycle and improved the procurement efficiency. For the procurement of bulk materials, the platform has developed the “sourcing mode” to realize the transparency of the whole procurement process, so that the procurement process can be controlled and the procurement risk can be reduced.

In addition, the three major operating platforms of Chalco Trading Group, Chalco Logistics and Chalco Materials has implemented information construction respectively from the dimensions of trade management, network freight transportation and bulk procurement business operation. Among them, Chalco Trading Group has conducted the information management construction for the whole process of procurement, sales, payment, settlement, and inventory management of aluminum oxide, electrolytic aluminum and other bulk commodities to ensure to process the procurement data on the same platform, improve procurement efficiency, and avoid operational errors due to platform replacement at the same time.

### 10.3.3 Creating a green supply chain

Chalco has actively fulfilled its social responsibilities and helped suppliers to develop in a green way to build a green supply chain. According to the “Administrative Measures for Suppliers of Aluminum Corporation of China Limited”, Chalco Materials has exercised a strict control over the access of suppliers and included the environmental protection conditions of suppliers into qualification review to ensure that all indicators of the bulk materials acquired by centralized purchasing of the Company meet the environmental protection requirements. The Company has established a special environmental management system for suppliers to strictly supervise suppliers’ energy consumption index, environmental index, production emission and other conditions. Meanwhile, during the annual assessment of suppliers, the Company has awarded extra points to suppliers with green production marks or green certifications, established a single award for green environmental protection in the annual recommendation of excellent suppliers, and given full recognition to enterprises that have made contributions to the environment.



#### Including sulfur content into the quality acceptance criteria for functional coal suppliers

When signing annual framework contracts with coal suppliers, the Company has specified the acceptance criteria for coal quality and prioritized the purchase of coal with a sulfur content of lower than 1% to achieve emission reduction and low carbon to the greatest extent, provided that the production requirements are met.

The Company has also implemented such measures as optimizing the purchase and logistics plans and reducing the carbon emissions during transportation. For more information, please refer to section 8.2 “protecting natural ecology”.



## 10.4 Maintaining market stability

Taking the idea of “benchmarking against first class and striving for excellence” as the starting point, Chalco has actively responded to such unfavorable factors as dual control of energy consumption, regional blackouts, commodity price fluctuations and unstable overseas situation, stabilized resource supply, and maintained market prices, thus ensuring industry stability and maintaining the business order of the industry.

### Stabilizing market prices

The Company has actively maintained market prices and smoothed market wobbles. During the year, the Company conducted in-depth analysis and research on unexpected international events by taking into account the macroeconomic situation and policies as well as the development situation of the aluminum industry, thus improving the accuracy of market research and judgment. The Company has actively conducted strategic hedging of aluminum ingots and made predictions on relevant risks in order to deploy risk prevention and control measures in advance and maintain the stability of market prices. In addition, the Company has formulated scientific sales strategies. During the consumption off-season and the abnormal fluctuations of product prices, the Company has adjusted the sales strategies of various products based on the changes of supply and demand pattern, taken the initiative to change the short-term situation of the market, and joined hands with enterprises of various industries to maintain the market prices of aluminum products.

### Safeguarding the supply of resources

The Company has further strengthened the guarantee of resource supply. In terms of coal supply, the Company has made greater efforts to develop channels and formulated refined measures of “one factory, one plan” based on the domestic and international coal supply and demand situation and the impact of the unstable markets, as well as the needs of different enterprises. The Company has reserved high-quality coal resources to ensure the coal demand of enterprises by optimizing the coal transportation structure, effectively utilizing leased sites and dry coal sheds, and speeding up the operation of coal bases in Inner Mongolia and North Port. Meanwhile, the Company has put focus on promoting the realization of strategic long-term coal supply and made greater efforts to develop direct supply resources channels, introducing 25 direct supply resources for its branches, subsidiaries and subordinate enterprises.

### Coping with overseas risks

In 2022, to cope with the fluctuation of aluminum mineral resources supply due to the unstable situation in Guinea, the Company formulated the “Production Organization Plan under Different Supply Conditions of Imported Ores”, supervised Chalco Trading Group to actively develop overseas trade resources and conduct coordination work to ensure the supply of imported ores. Meanwhile, the Company has formulated targeted solutions taking into account various impacts such as legal risks, enterprise needs and system requirements. In addition, it has also regulated the procurement, logistics and settlement links of the Guinea Boffa project and formulated a series of systems and measures to ensure the normal operation of the Boffa imported ore project under the market-oriented mechanism.







## Shouldering corporate responsibility and fulfilling social responsibility

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# Shouldering corporate responsibility and fulfilling social responsibility



Chalco attaches great importance to corporate social responsibility and has integrated social responsibility management into its development strategies and daily operations. The Company has been insisting on implementing the aid programs for Qinghai and Tibet and public welfare donations, contributing to rural revitalization by supporting local development, and actively guiding young employees to devote themselves to volunteer services to demonstrate a sense of corporate responsibility. The Company has also responded to the “Belt and Road” national initiative, fulfilled the social responsibility of overseas development projects, and shared the fruits of development with the local community.

## 11.1 Promoting rural revitalization

Chalco has always kept in mind its responsibility and mission to promote rural revitalization. In order to make an effective connection between the consolidation of poverty eradication achievements and rural revitalization, the Company guides resources to be effectively used in long-term rural development based on regional characteristic resources and in combination with market demand.

To help the economic construction of the territories where its operating sites locate, the Company has provided strong support for the development of culture, sports, medical and health care, public welfare, and other undertakings in targeted villages and towns in rural revitalization. During the year, the Company provided paired-up assistance for rural revitalization in 11 provinces, 13 counties and county-level cities, 16 townships and 24 villages, appointed a total of 19 stationary clerks, and invested a total of RMB6,078,800 in the donations and rural revitalization projects for the targeted regions for paired-up assistance. In addition, the Company and its subordinate enterprises included the agricultural products from the targeted regions in the employees’ annual festival offerings, and contributed a consumption-based poverty relief effort of RMB3,938,800 throughout the year.



### Case

#### Helping the construction of rural roof photovoltaic power generation

During the year, Ningxia Energy took the initiative to carry out rooftop photovoltaic construction work with 936 farmers. A solar power generation device with a capacity of 3 kW is installed on the roof of each household. After generating enough electricity to meet the needs of farmers, the surplus electricity is sold to Ningxia Power Grid, which promotes the transformation of photovoltaic power generation and creates economic benefits for farmers. As of the end of the reporting period, the project had an annual generating capacity of approximately 3 million kWh.



roof photovoltaic construction



### Case

#### The Party Committee of Zunyi Aluminum went to the targeted regions for paired-up assistance to carry out the activity of caring students

Zunyi Aluminum carried out assistance work in Taoyuan community, and provided consolation funds and study and life gift packs to 14 children from poor families to solve the problem of long-term education guarantee for children from poverty-stricken families. In 2022, Party organizations at all levels of Zunyi Aluminum raised a total of RMB110,000 yuan for charity educational aid fund, and provided a total of RMB18,200 for 14 students in difficulty.



## Shouldering corporate responsibility and fulfilling social responsibility (continued)



### 11.2 Strengthening international cooperation

Chalco Guinea has been adhering to the philosophy of “operating in compliance with laws and contributing to the society”, actively integrating into the local community, respecting local religions and cultures, paying attention to the livelihood and development demands of local people, and promoting local economic development.

- The enterprise actively purchases from local suppliers to promote local economic development. In 2022, the enterprise had 59 local suppliers and service providers and had purchases amount reached to about 32 million USD.
- The enterprise attached great importance to employee localisation. By the end of 2022, the number of employees with Guinean nationality took 78% of the total employees, including 30 of them from the management level.

The company continues to strengthen communication with the community, visit important partners, take local community training, and care for the community. This year:

- The enterprise strengthened the cooperation between external training institutions and undertook local society younger training for 30 mining trunks and 5 welders, which provided the skills for young people in the society and improved competitiveness in daily work.
- The enterprise launched the “Clean Water” project to build wells for communities along the route and donate water tanks to hospitals and villages, aiming to provide clean water to residents.

In January 2022, a serious fire broke out in Coria, Guinea, and the company immediately distributed relief materials to the disaster area to contribute to its reconstruction.





### 11.3 Focusing on public welfare undertakings

Chalco is deeply devoted to public charities and enthusiastically participates in various public welfare undertakings. During the year, the Company actively made contributed a total of RMB19.9 million in the pairing assistance to Qinghai and Tibet. Meanwhile, in face of the earthquake in Luding County, Sichuan, the Company donated a total of RMB4 million. In addition, the company also focuses on supporting social and cultural development. The Company also focuses on supporting social and culture development. During the year, it donated RMB1 million to the Fourth Nationwide Fitness Campaign of the 18th Qinghai Provincial Sports Meeting, and RMB500,000 to the Red Cross Society of Pingguo City, Guangxi Zhuang Autonomous Region.

The Company continues to carry forward the voluntary service spirit of “dedication, friendly affection, mutual assistance and progress”, and has organized youth to participate in the voluntary service activity of “I Do Practical Things for the Masses of People”, and set up a number of voluntary service teams represented by “Chalco Sunshine” service team and “Liupan Starlight” service team. In 2022, the Company’s youth employees participated in various donations and contributed a total of RMB419,000, and three youth volunteers got recognition at the provincial level and above. As of the end of the reporting period, the Company had 253 youth volunteer organizations, 9,914 registered youth volunteers, and provided a total of 121,020.8 hours of volunteer service.

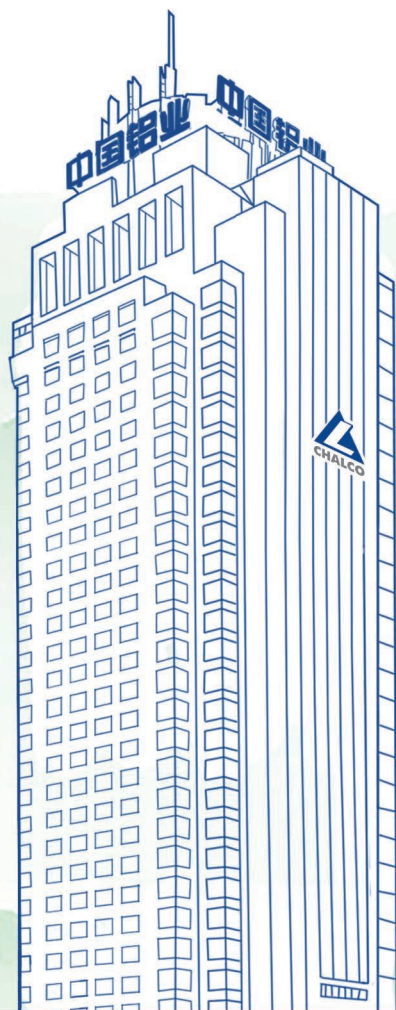


#### Voluntary service activities of Yunnan Yongxin Aluminum

In 2022, Yunnan Yongxin Aluminum held the volunteer activity of “aiding students in remote villages and caring for childless elderly people” and donated more than 200 pieces of books, stationery, candies and other school supplies for poor students. It also organized the volunteer activity themed on “caring for the elderly and inheriting family traditions, I do practical things for the masses of people” and bought cotton socks, cotton hats, tissue paper and other necessities for the lonely aged people in Jianshui County Welfare House, Yunnan.



## Prospects



Looking ahead, Chalco will implement thoroughly the new development concept, construct a new development pattern, shoulder the strategic mission of “being the vanguard, main force, and leader” of China’s aluminum industry. The Company will firmly implement the strategy of development motivated by innovation, keep improve the industrial level and deeply promote the reform in key sectors. The Company will also keep open the development in new area and new sector, building a new momentum and new advanced development, accelerate the construction of competitive world-class aluminum company and strive to write a new chapter of high-quality development.

## Appendix I: Environmental, Social and Governance Reporting Guide Content Index



Issue	Issue Description	Corresponding report chapter
Governance Structure	<p>A statement from the board containing the following elements:</p> <ul style="list-style-type: none"> <li>(i) a disclosure of the board's oversight of ESG issues;</li> <li>(ii) the board's ESG management approach and strategy, including the process used to evaluate, prioritise and manage material ESG-related issues (including risks to the issuer's businesses); and</li> <li>(iii) how the board reviews progress made against ESG-related goals and targets with an explanation of how they relate to the issuer's businesses.</li> </ul>	Board Statement
Reporting Principles	<p>A description of, or an explanation on, the application of the following Reporting Principles in the preparation of the ESG report:</p> <p>Materiality: The ESG report should disclose: (i) the process to identify and the criteria for the selection of material ESG factors; (ii) if a stakeholder engagement is conducted, a description of significant stakeholders identified, and the process and results of the issuer's stakeholder engagement.</p> <p>Quantitative: Information on the standards, methodologies, assumptions and/or calculation tools used, and source of conversion factors used, for the reporting of emissions/energy consumption (where applicable) should be disclosed.</p> <p>Consistency: The issuer should disclose in the ESG report any changes to the methods or KPIs used, or any other relevant factors affecting a meaningful comparison.</p>	About this report
Reporting Boundary	A narrative explaining the reporting boundaries of the ESG report and describing the process used to identify which entities or operations are included in the ESG report. If there is a change in the scope, the issuer should explain the difference and reason for the change.	About this report
A Environmental		
Aspect A1: Emissions		
General Disclosure	<p>Information on:</p> <ul style="list-style-type: none"> <li>(a) the policies; and</li> <li>(b) compliance with relevant laws and regulations that have a significant impact on the issuer</li> </ul>	Scientific and Technological Innovation & Pursuit of Low Carbon Transformation, Focusing on the Environment & Adhering to Green Development
KPI A1.1	The types of emissions and respective emissions data.	Scientific and Technological Innovation & Pursuit of Low Carbon Transformation, Focusing on the Environment & Adhering to Green Development



## Appendix I: Environmental, Social and Governance Reporting Guide Content Index (continued)



Issue	Issue Description	Corresponding report chapter
KPI A1.2	Direct (Scope 1) and energy indirect (Scope 2) greenhouse gas emissions (in tonnes) and, where appropriate, intensity (e.g. per unit of production volume, per facility).	Scientific and Technological Innovation & Pursuit of Low Carbon Transformation – Key greenhouse gas and energy consumption performance
KPI A1.3	Total hazardous waste produced (in tonnes) and, where appropriate, intensity (e.g. per unit of production volume, per facility).	Focusing on the Environment & Adhering to Green Development – Key environmental performance
KPI A1.4	Total non-hazardous waste produced (in tonnes) and, where appropriate, intensity (e.g. per unit of production volume, per facility).	Focusing on the Environment & Adhering to Green Development – Key environmental performance
KPI A1.5	Description of emissions target(s) set and steps taken to achieve them.	Scientific and Technological Innovation & Pursuit of Low Carbon Transformation – Implementing the “Carbon Peaking and Carbon Neutrality” Task, Focusing on the Environment & Adhering to Green Development – Protecting Natural Ecology
KPI A1.6	Description of how hazardous and non-hazardous wastes are handled, and a description of reduction target(s) set and steps taken to achieve them.	Focusing on the Environment & Adhering to Green Development – Protecting Natural Ecology
Aspect A2: Use of Resources		
General Disclosure	Policies on the efficient use of resources, including energy, water and other raw materials.	Focusing on the Environment & Adhering to Green Development
KPI A2.1	Direct and/or indirect energy consumption by type (e.g. electricity, gas or oil) in total (kWh in '000s) and intensity (e.g. per unit of production volume, per facility).	Focusing on the Environment & Adhering to Green Development – Key environmental performance
KPI A2.2	Water consumption in total and intensity (e.g. per unit of production volume, per facility).	Focusing on the Environment & Adhering to Green Development – Key environmental performance
KPI A2.3	Description of energy use efficiency target(s) set and steps taken to achieve them.	Focusing on the Environment & Adhering to Green Development – Protecting Natural Ecology
KPI A2.4	Description of whether there is any issue in sourcing water that is fit for purpose, water efficiency target(s) set and steps taken to achieve them.	Focusing on the Environment & Adhering to Green Development – Protecting Natural Ecology
KPI A2.5	Total packaging material used for finished products (in tonnes) and, if applicable, with reference to per unit produced.	Focusing on the Environment & Adhering to Green Development – Key environmental performance
Aspect A3: The Environment and Natural Resources		
General Disclosure	Policies on minimising the issuer’s significant impacts on the environment and natural resources.	Focusing on the Environment & Adhering to Green Development – Protecting Natural Ecology
KPI A3.1	Description of the significant impacts of activities on the environment and natural resources and the actions taken to manage them.	Focusing on the Environment & Adhering to Green Development – Protecting Natural Ecology
Aspect A4: Climate Change		
General Disclosure	Policies on identification and mitigation of significant climate related issues which have impacted, and those which may impact, the issuer.	Scientific and Technological Innovation & Pursuit of Low Carbon Transformation

Issue	Issue Description	Corresponding report chapter
KPI A4.1	Description of the significant climate-related issues which have impacted, and those which may impact, the issuer, and the actions taken to manage them.	Scientific and Technological Innovation & Pursuit of Low Carbon Transformation
B Social		
Employment and Labour Practices		
Aspect B1: Employment		
General Disclosure	Information on: (a) the policies; and (b) compliance with relevant laws and regulations that have a significant impact on the issuer	People-Oriented & Harmonious Enterprise – Protection of Employee Rights and Interests
KPI B1.1	Total workforce by gender, employment type (for example, full or parttime), age group and geographical region.	People-Oriented & Harmonious Enterprise – Regulation of personnel management
KPI B1.2	Employee turnover rate by gender, age group and geographical region.	People-Oriented & Harmonious Enterprise – Regulation of personnel management
Aspect B2: Health and Safety		
General Disclosure	Information on: (a) the policies; and (b) compliance with relevant laws and regulations that have a significant impact on the issuer relating to providing a safe working environment and protecting employees from occupational hazards.	Strengthening Safety Operations & Intelligently Empowering Essential Safety
KPI B2.1	Number and rate of work-related fatalities occurred in each of the past three years including the reporting year.	Strengthening Safety Operations & Intelligently Empowering Essential Safety – Refinement of Management System
KPI B2.2	Lost days due to work injury.	Strengthening Safety Operations & Intelligently Empowering Essential Safety – Refinement of Management System
KPI B2.3	Description of occupational health and safety measures adopted, and how they are implemented and monitored.	Strengthening Safety Operations & Intelligently Empowering Essential Safety
Aspect B3: Development and Training		
General Disclosure	Policies on improving employees' knowledge and skills for discharging duties at work. Description of training activities.  Note: Training refers to vocational training. It may include internal and external courses paid by the employer.	People-Oriented & Harmonious Enterprise – Boosting Employee Development
KPI B3.1	The percentage of employees trained by gender and employee category (e.g. senior management, middle management).	People-Oriented & Harmonious Enterprise – Boosting Employee Development
KPI B3.2	The average training hours completed per employee by gender and employee category.	People-Oriented & Harmonious Enterprise – Boosting Employee Development

## Appendix I: Environmental, Social and Governance Reporting Guide Content Index (continued)



Issue	Issue Description	Corresponding report chapter
Aspect B4: Labour Standards		
General Disclosures	General Disclosure Information on: (a) the policies; and (b) compliance with relevant laws and regulations that have a significant impact on the issuer relating to preventing child and forced labour.	People-Oriented & Harmonious Enterprise – Protection of Employee Rights and Interests
KPI B4.1	Description of measures to review employment practices to avoid child and forced labour.	People-Oriented & Harmonious Enterprise – Protection of Employee Rights and Interests
KPI B4.2	Description of steps taken to eliminate such practices when discovered.	People-Oriented & Harmonious Enterprise – Protection of Employee Rights and Interests
Operating Practices		
Aspect B5: Supply Chain Management		
General Disclosure	Policies on managing environmental and social risks of the supply chain.	Giving top priority to quality and making progress together with the industry
KPI B5.1	Number of suppliers by geographical region.	Giving top priority to quality and making progress together with the industry – Empowering Partners
KPI B5.2	Description of practices relating to engaging suppliers, number of suppliers where the practices are being implemented, and how they are implemented and monitored.	Giving top priority to quality and making progress together with the industry – Empowering Partners
KPI B5.3	Description of practices used to identify environmental and social risks along the supply chain, and how they are implemented and monitored.	Giving top priority to quality and making progress together with the industry – Empowering Partners
KPI B5.4	Description of practices used to promote environmentally preferable products and services when selecting suppliers, and how they are implemented and monitored.	Giving top priority to quality and making progress together with the industry – Empowering Partners
Aspect B6: Product Responsibility		
General Disclosure	Information on: (a) the policies; and (b) compliance with relevant laws and regulations that have a significant impact on the issuer relating to health and safety, advertising, labelling and privacy matters relating to products and services provided and methods of redress.	Giving top priority to quality and making progress together with the industry – Strengthening quality management
KPI B6.1	Percentage of total products sold or shipped subject to recalls for safety and health reasons.	Giving top priority to quality and making progress together with the industry – Strengthening quality management
KPI B6.2	Number of products and service related complaints received and how they are dealt with.	Giving top priority to quality and making progress together with the industry – Safeguarding operational rights and interests



Issue	Issue Description	Corresponding report chapter
KPI B6.3	Description of practices relating to observing and protecting intellectual property rights.	Giving top priority to quality and making progress together with the industry – Strengthening quality management
KPI B6.4	Description of quality assurance process and recall procedures.	Giving top priority to quality and making progress together with the industry – Strengthening quality management
KPI B6.5	Description of consumer data protection and privacy policies, and how they are implemented and monitored.	Giving top priority to quality and making progress together with the industry – Safeguarding operational rights and interests
Aspect B7: Anticorruption		
General Disclosure	Information on: (a) the policies; and (b) compliance with relevant laws and regulations that have a significant impact on the issuer relating to bribery, extortion, fraud and money laundering.	System construction and enhancement of governance capacity – Integrity building
KPI B7.1	Number of concluded legal cases regarding corrupt practices brought against the issuer or its employees during the reporting period and the outcomes of the cases.	System construction and enhancement of governance capacity – Integrity building
KPI B7.2	Description of preventive measures and whistle-blowing procedures, and how they are implemented and monitored.	System construction and enhancement of governance capacity – Integrity building
KPI B7.3	Description of anti-corruption training provided to directors and staff.	System construction and enhancement of governance capacity – Integrity building
Community		
Aspect B8: Community Investment		
General Disclosure	Policies on community engagement to understand the needs of the communities where the issuer operates and to ensure its activities take into consideration the communities' interests.	Shouldering corporate responsibility and fulfilling social responsibility
KPI B8.1	Focus areas of contribution (e.g. education, environmental concerns, labour needs, health, culture, sport).	Shouldering corporate responsibility and fulfilling social responsibility
KPI B8.2	Resources contributed (e.g. money or time) to the focus area.	Shouldering corporate responsibility and fulfilling social responsibility

## Appendix II: Global Reporting Initiative (GRI) Sustainability Reporting Standards Content Index



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2.3 Accolade	
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7.2 Promoting the "Carbon Peaking and Carbon Neutrality" Strategy	201-2; 305-5
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Report framework	Number of GRI Standard
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9.1 Protection of Employee Rights and Interests	2-27; 2-30; 201-3; 401-2
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9.3 Boosting Employee Development	2-19; 201-3; 404-1; 404-2
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10.2 Safeguarding operational rights and interests	
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10.4 Maintaining market stability	
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11.1 Promoting rural revitalization	203-1; 413-1
11.2 Strengthening international cooperation	203-1; 413-1
11.3 Focusing on public welfare undertakings	



## Appendix III: Questionnaire for Feedback



Dear reader:

Hello! Thank you very much for taking time to read the Report. In order to continuously improve the preparation of the report and promote the Company's work in ESG, we especially hope to listen to your opinions and suggestions, please let us know!

1. What is your identity regarding to Chalco (e.g. investor, employee, etc.)?  
☐Government ☐Employee ☐Business Partner ☐Environmental Organization ☐Media  
☐Community ☐Others (Please specify)
2. Your overall assessment to the Report is:  
☐Very Good ☐Good ☐Fair ☐Poor ☐Very Poor
3. How do you think of the structure of the Report?  
☐Very Reasonable ☐Good Reasonable ☐Fair General ☐Poor ☐Very Poor
4. How do you think of the design of the Report?  
☐Very Good ☐Good ☐Fair ☐Poor ☐Very Poor
5. How do you think of the readability of the Report?  
☐Very Good ☐Good ☐Fair ☐Poor ☐Very Poor
6. How do you think of the quality of the ESG information in the Report?
7. Which disclosed issues do you pay attention to in the Report? (please choose 3 issues at most)  
☐Pollutant Discharge Management (including the generation, emission and management of waste gas, waste water and solid waste) ☐Ecology and Biodiversity Protection  
☐Energy Management ☐Water Resources Management ☐Renewable Energy Application  
☐Carbon Emission Management ☐Climate Change-Related Risks and Opportunities  
☐Prevention and Treatment of Environmental Emergency affairs  
☐Mineral Resources Management and Mine Reclamation ☐Use of Packaging Material  
☐Employee Health and Safety ☐Employee Benefits and Welfare  
☐Employee Development and Training ☐Fair Competition ☐Supply Chain Management  
☐Influence and Leadership to the Industry and Industry Development  
☐Community Involvement and Contribution ☐Product Quality Control  
☐Innovative R&D ☐Intellectual Property Protection ☐Customer Privacy Protection  
☐Sustainable Growth of Profits ☐Enterprise Governance  
☐Enterprise Internal Anti-corruption and Integrity Promotion  
☐Transparency of Financial and Non-financial Information  
☐Communication with Stakeholders ☐others



8. What are your opinions on or suggestions to the ESG Report and our performance?

You can mail the above feedback form to the following address:

Address: No. 62, Xizhimen North Street, Haidian District, Beijing, People's Republic of China

Tel: 8610-8229 8322

Fax: 8610-8229 8158

Email: [ir@chalco.com.cn](mailto:ir@chalco.com.cn)

Website: [www.chalco.com.cn](http://www.chalco.com.cn)

**Thank you very much for your understanding on and support of our work!**

Aluminum Corporation of China Limited



Address: No. 62 North Xizhimen Street, Haidian District, Beijing, the People's Republic of China

Zip code: 100082

Tel: 86-10-8229 8322

Web: [www.chalco.com.cn](http://www.chalco.com.cn)

Fax: 86-10-8229 8158