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Golden Concord Holdings Limited

Environmental, Social and Governance Report in 2021

ENVIRONMENTAL, SOCIAL AND GOVERNANCE REPORT IN 2021

GOLDEN CONCORD HOLDINGS LIMITED

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About This Report

Overview

Since its first *Social Responsibility Report* in 2013, Golden Concord Holdings Limited had released the report on an annual basis until it was renamed the Sustainability Report in 2019. This year, GCL Group released the first *Environmental, Society and Governance Report* (hereinafter referred to as the ESG Report). This report will provide a systemic overview of our philosophy, work, and highlights in 2021 regarding Environmental, Social, and Governance (ESG). We hope this report will help all stakeholders understand each other better and find common ground on sustainable development.

Scope of the Report Period

This report covers the period from January 1, 2021 to December 31, 2021 ("reporting period"), and partially covers previous years.

Basis of Preparation

This report mainly refers to the GRI Standards issued by the Global Reporting Initiative (hereinafter referred to as "GRI Standards"), the Stock Exchange of Hong Kong Limited (hereinafter referred to as "HKEX") Listing Rules Appendix 27 Guidelines on Environmental, Social and Governance Reporting, as well as the United Nations Sustainable Development Goals (SDGs), etc.

Scope and Boundary of the Report

The scope of entities in this report is Golden Concord Holdings Limited and its subsidiaries. For readers' convenience, Golden Concord Holdings Limited is hereinafter referred to as the "GCL Group", "the Group" or "we", abbreviations of the subsidiaries in the report are listed in the appendix. The environmental indicators cover four listed subsidiaries, namely, GCL TECH, GCL S.I, GCL New Energy, and GCL-ET. Certain data are available only to some subsidiaries due to the product categories and production processes involved.

Indicator Selection

This report selects indicators that are relevant to key issues' performance disclosure and based on their quantification, materiality, balance, and consistency as well. We will continue to adjust and optimize the disclosure indicators in our future reports.

Information Sources

The qualitative and quantitative information used in this report is from GCL Group's public information, internal documents and relevant statistical data. Unless otherwise specified all currencies involved in this report are denominated in CNY.

Access to This Report

This report is published online and can be downloaded on the GCL Group's official website (gcl-power.com).

Confirmation and Approval

After confirmation by management, this Report was approved by the Board on October 31, 2022

Contact Us:

If you have any questions, suggestions, or comments about our ESG management and this report, please contact us by following means:

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Chairman's Statement

The pursuit of green energy has become an important gene of GCL since 1990 when it was founded. In the past 32 years, GCL Group has taken ESG early as the source of green and low-carbon competitiveness in the context of green and low-carbon development coming to be the mainstream.

According to the first chapter of the *GCL Constitution*, our mission is to "focus on green development and improve the human living environment continuously". Recently, people's life is affected significantly by repeated outbreaks of COVID-19, extreme climate change and intensified geopolitical conflicts. Sustainable development becomes increasingly urgent. The new energy industry is under unprecedented pressure and challenge, and also faced with unprecedented development opportunity. 2021 was the first year of carbon neutrality for China, and it was the 32nd anniversary of GCL Group.

The year of 2021, GCL Group may be described with the following key words: "rebirth", "change", "strength", "reform", "struggle" and "new ecology". We have overcome the difficulties, including intensification of market competition, price rise of bulk raw materials, restriction of business and power supply, epidemic and floods. The three granular silicon bases are established in Leshan, Baotou and Xuzhou. Our FBR granular silicon helps the Chinese PV industry decrease the price, and carbon is reduced by 85% throughout the industrial chain. GCL now becomes stronger, healthier and livelier.

By the end of 2021, GCL Group had supplied 370 billion kilowatt hours of green power, equivalent to 150 million tonnes of standard coal saved, 380 million tonnes of carbon dioxide reduced or 186,500km^2 of trees planted.

GCL Group is designing an ecological model of mobile power exchange and building a closed loop of industrial ecology based on ESG. According to the new mode of multi-energy complementary zero-carbon power port, the power exchange station is upgraded to a super power port, which covers full scene application of all exchange, storage, charging, inspection, light and hydrogen in one, provides service of energy supply, micro-grid energy storage and high-end experience, and helps improve the ESG value throughout the industrial chain of mobile energy.

The time of evaluating enterprises only by operating performance and financial data has gone. ESG is crucial to sustainable development for enterprises.

The strategy of GCL Group focuses not only on corporate development, but also on sustainable social development. We are grateful to our customers and partners for their great support, 40,000 employees for their great contribution, and investors, government and all walks of life for their trust and help in the past 32 years.

As it turns out, today when our fate a company is closely linked to the society, we should take sustainable social development as our own responsibility actively respond to changes, strive for cooperation, unite as one and make continued innovation, and should work for building a community with a shared future for mankind and achieving sustainable global development.

Secretary of Party Committee,

Vice Chairman and President of GCL Group

Zhu Yufeng

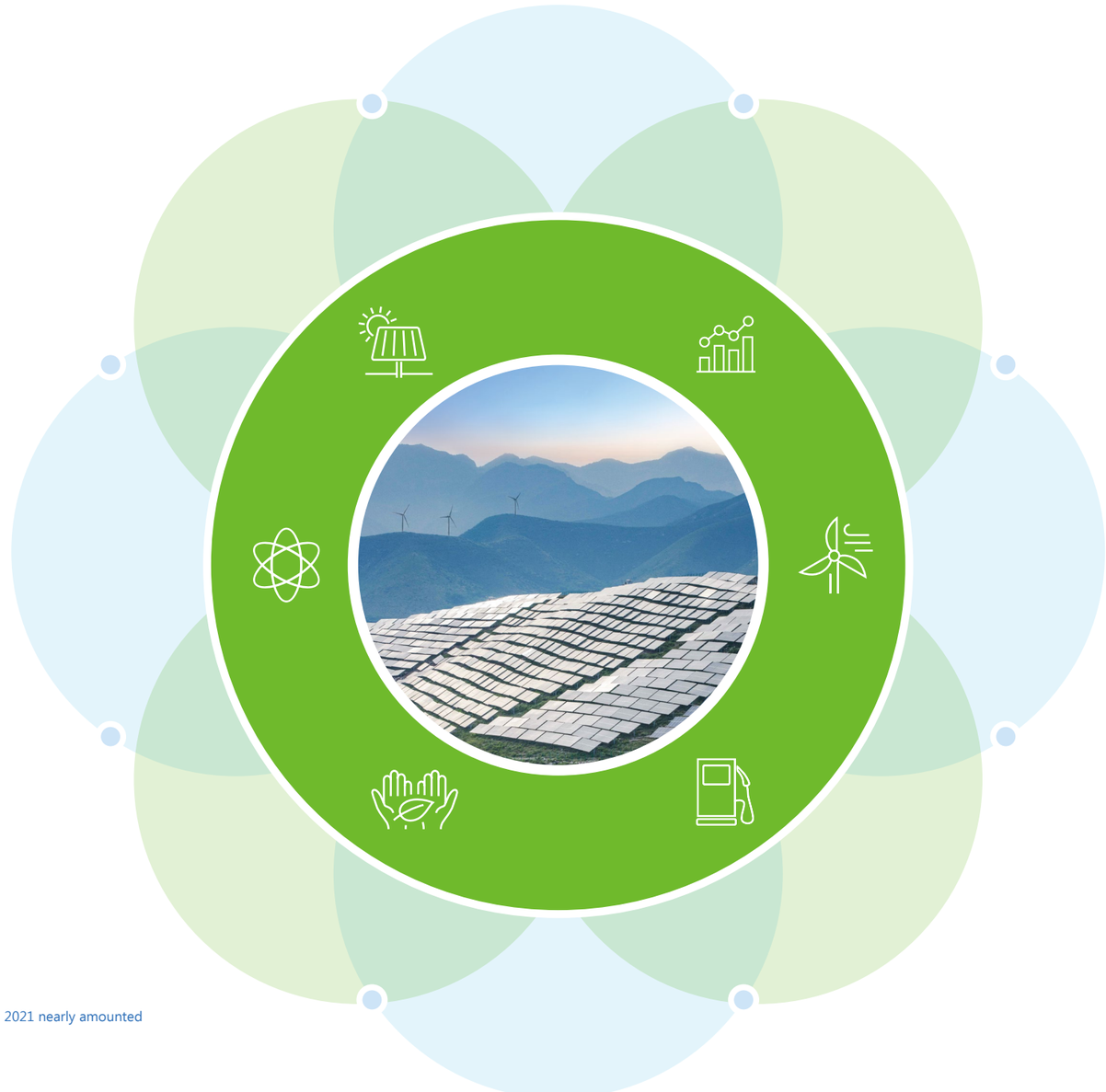
GCL Overview

Group Profile

GCL Group is a world-leading innovation-based enterprise committed to the advancement and development of green, low-carbon and zero-carbon technology. GCL Group has formed a comprehensive business portfolio, including the integration of wind power, PV power, energy storage, hydrogen energy, the optimization of source-grid-load-storage network, a systematic promotion of new energy, clean energy, mobile energy ecology and a coordinated development of related industries covering silicon materials, lithium materials, carbon materials, and integrated circuit core materials. The Group is determined to propel the new and clean energy innovations and technology onwards, blueprinting for a "Technical GCL", "Digital GCL" and "Green GCL" under the background of the national strategies of "Carbon Peak" and "Carbon Neutrality".

By the end of 2021, the assets of GCL Group had reached around 200 billion CNY, and its annual operating revenue in 2021 had nearly amounted 130 billion CNY. The assets are mainly distributed in all parts of China, throughout Africa, the Middle East, North America, Southeast Asia, Europe and other regions. The Group has a number of A-share and H-share listed companies, such as GCL TECH (03800. HK), GCL S.I. (002506. SZ), GCL New Energy (00451. HK), and GCL Energy Technology (002015. SZ). It has more than 3,000 researchers for energy technology R&D. For many consecutive years, GCL Group has been ranked at the forefront of the global top 500 new energy enterprises, the top 500 Chinese enterprises and the top 500 private enterprises in China. Besides, GCL is of the chairman unit of the Global Solar Energy Council, the chairman unit of the Asian Photovoltaic Industry Association, and the vice chairman unit of the China Electricity Council.

Ever since its setup 32 years ago, GCL Group has been taking technology as its driving force and taking the path of digitalized and green development. GCL has advanced in the development of silicon materials, carbon materials, lithium materials, etc. via technology advancement in the industrial chain. GCL has also developed a series of subversive and cutting-edge technology for carbon-neutral industry, including but not limited to granular silicon, perovskite, semiconductor materials, cathode materials. GCL Group has established the best industrial chain of photovoltaic (PV) integration boasting the most intellectual property rights. Overseas monopoly has been broken by our GCL-method polysilicon technology. Furthermore, we have developed a new generation of PV silicon-based materials, i.e. FBR granular silicon, which minimizes global carbon footprint of silicon-based materials, helps decarbonize the PV industrial chain in depth, and leads PV power to be green and affordable. At the same time, in cooperation with the National Integrated Circuit Industry Investment Fund, GCL has undertaken the National Major Science and Technology 02 Special Project. It is among the few domestic enterprises that have the import substitution "China chips" of electronic-grade polysilicon for integrated circuits, 12-inch silicon wafers, and large wafers.



As for energy supply and consumption, GCL sticks to resources and "Green Energy + Big Data" to promote the energy supply and consumption revolution. In response to the "Belt and Road" initiative, GCL makes efforts to build a global integrated industry chain for natural gas, undertakes natural gas development, ammonia production and liquefaction, etc. in Ethiopia, connects natural gas exploration, international spot trade and end users, and maintains national and regional energy security.

GCL promotes the integrated energy service system of power source, grid, load and storage, explores the zero carbon energy ecosystem of wind, light, storage and hydrogen, and makes green energy popular. Meanwhile, GCL reshapes the mobile digital energy ecology driven by technology, digital convergence, and by putting all information flow, technology flow, capital flow, talent flow, material flow and process flow in one based on green energy in order to speed up mobility electrification and achieve low-carbon transportation.

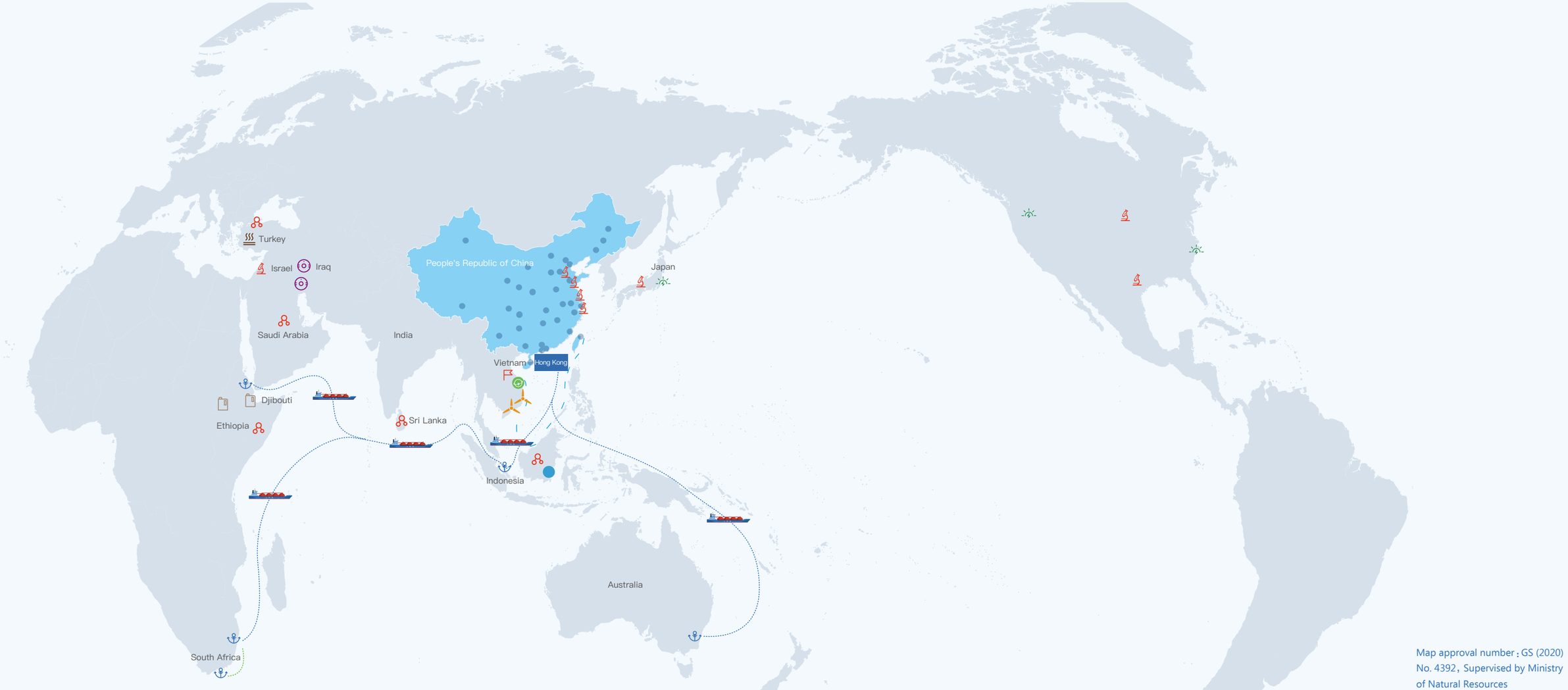
The assets of GCL Group had reached almost

200 billion CNY

The annual operating revenue in 2021 nearly amounted

130 billion CNY

Business Distribution



Map approval number : GS (2020) No. 4392, Supervised by Ministry of Natural Resources

Carrying forward the national "Belt and Road" initiative, GCL Group is promoting and contributing with its competitive advantages to the green energy development worldwide. Our green energy business covers North America, Europe, Asia, Oceania, the Middle East and other regions; and we are the largest private investor in new energy under the Belt and Road Initiative. We have set up R&D centers and technology incubators in Japan, Israel, the United States, and in Shanghai, Nanjing, Xuzhou and Suzhou in China and extended our business branches to Vietnam, Indonesia, Sri Lanka, Saudi Arabia and Turkey. The launch of the oil and gas projects in Ethiopia and Djibouti, by far the largest in East Africa, signals GCL's ever-increasing investment in clean energy.

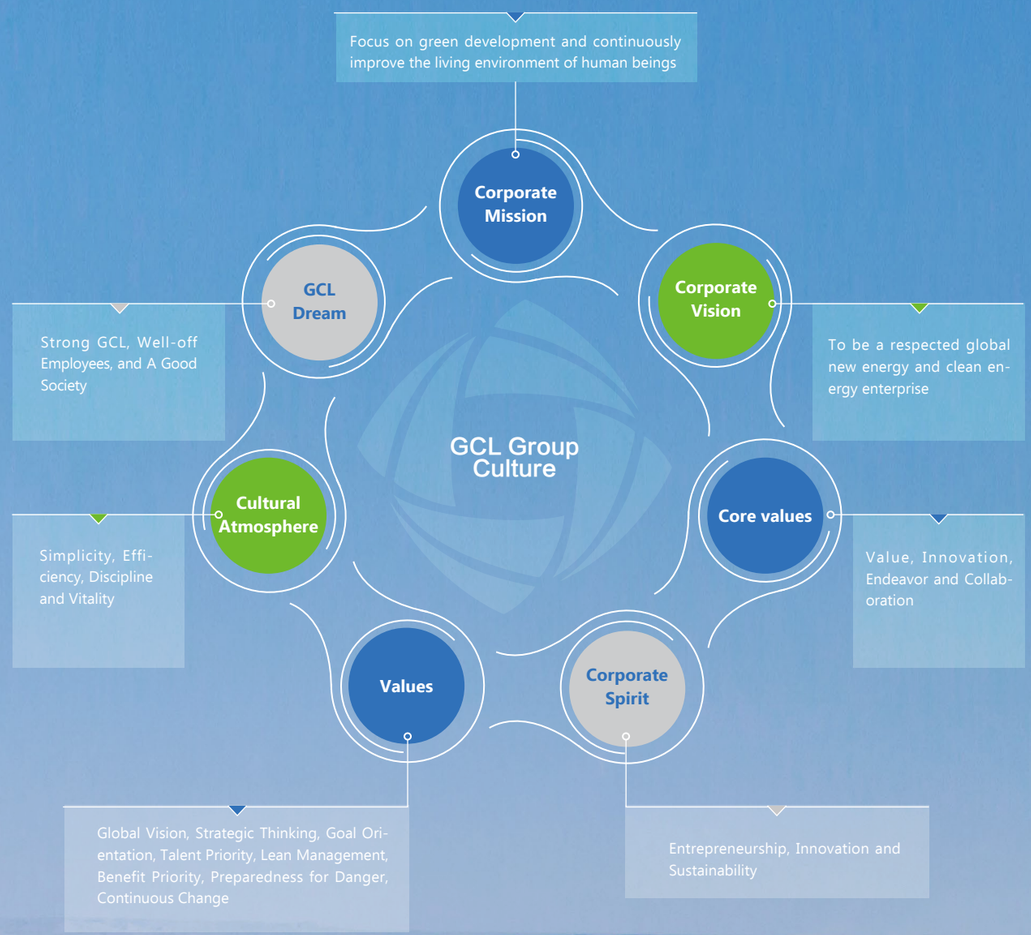
Overseas Power Projects | Geothermal | Hydropower | Gas Turbine | Wind Power | Solar Energy

Oil and Gas | Overseas Manufacturing Projects | Affiliated Branches | Port | LNG Transport Ship

Technology R&D Centers, Incubators China: Shanghai, Suzhou, Nanjing, Xuzhou USA: St. Louis, Houston Japan, Israel

Group Culture

Corporate culture is our soul. GCL Group attaches great importance to construction of our corporate culture, improves the corporate culture system, builds the GCL culture matrix, and enhances the corporate cohesion. We have always upheld the concept of "bringing green energy into life", based on the energy industry, we constantly innovate and change, promote green, low-carbon and circular development, and actively create a better life. Staying market-oriented, customer-centered, technology-driven, talent-oriented, industry-guided, and capital-based, GCL is determined to turn its role from "a clean energy producer" to a "clean energy multi-service provider", aiming to "become a globally-recognized new energy and clean energy enterprise" and promote the GCL dream of "Strong GCL, Well-off Employees, and Good Reputation" .



2021 was the thirtieth anniversary of GCL. We included the national strategy of peak carbon dioxide emissions and carbon neutrality ("Double Carbon") in our corporate culture, improved the corporate culture management network, designated corporate culture managers from department to department and issued the *Guiding Opinions on the Construction of Corporate Culture of GCL Group (2021-2023)*; we prepared and promoted the *Training Handout on Corporate Culture Construction of GCL Group* within the Group; we joined the China Association for the Promotion of Corporate Culture, whose journal Chinese Corporate Culture introduced the practice of GCL corporate culture construction.

During the reporting period, GCL Group received the following honors and awards: "the Model of New Era Enterprise Culture Practice and Innovation 2021", "the Most Beautiful Brand" and "Outstanding Achievement Award for New Era Enterprise Culture Practice and Innovation" all from China Culture Management Association; and the first prize of "Industrial Enterprise Culture Construction and Innovation Achievement 2021" from the *China Industrial Daily*.

Brand Impacts

In the past 30 years, the brand of "GCL" had won first place in the Chinese new energy industry and had been listed in the world top 500 new energy enterprises for many years. During the reporting period, GCL Group received a number of industrial awards for our technological products and innovations. In the future, GCL Group will continue to be rooted in green energy, focus on green development and technological innovation, and enhance the brand image of Technical GCL, Digital GCL and Green GCL.

The GCL Logo is inspired by a rotating windmill, suggesting GCL's mission of constantly converting natural energy into green energy in a non-stop spiral upward.

The color combination of blue and green symbolizes the sky and the earth, innovation and harmony. It implies that GCL takes technological innovation as the driving force, committed to green development to better the living environment for human beings.

The overall shape is round on the outside and square on the inside, indicating that externally, GCL is full of flexibility and resilience, keeping pace with the times, and externally, GCL sticks to its tenet and principles.

The white lines between the triangular arc-shaped leaves are dynamically rotating, representing GCL's vigor and vitality.

Brand Interpretation

An Industry Leader

GCL Group won the first place of Top 500 in the Green Energy Industry both in the list of 2021 Top 500 Chinese Enterprises and Top 500 Private Enterprises in China

The first place of Top 500 in the Green Energy Industry

GCL Group was ranked fourth place in the world in the list of 2021 Top 500 Global New Energy Enterprises by the Hydrogen Energy Industry Development Forum as the only Chinese enterprise among the top five

The fourth place in the world in the list of 2021 Top 500 Global New Energy Enterprises by the Hydrogen Energy Industry Development Forum as the only Chinese enterprise among the top five

GCL Group was ranked No. 2 in the Top 20 Global Photovoltaic Enterprises (Comprehensive Category) at the "Brand Power - China Carbon Neutrality Forum 2021 & 2021 Global Top 20 Photovoltaic and China Top 20 Energy Storage Rankings"

No. 2 in the Top 20 Global Photovoltaic Enterprises (Comprehensive Category)

Honors and Awards

"National High-tech Enterprise"

GCL Group successfully passed the public scrutiny during the publicity and was again listed as a "National High-tech Enterprise", according to The Notice on Publicizing the List of the Second Batch of High-tech Enterprises Identified and Filed in Jiangsu Province in 2021, issued by the National Leading Group Office for the Identification and Management of High-tech Enterprises.

"Best Hong Kong Stock Exchange Company"

GCL TECH won "Best Hong Kong Stock Exchange Company" award at the "5th Golden Hong Kong Stock Award Awards Ceremony"

"Talent Cultivation Award"
"Scientific and Technological Achievement Award"
"Industry Contribution Award"
"PV Utilization Award"

GCL University, Jiangsu Zhongneng, GCL TECH and GCL Energy Engineering won the "Talent Cultivation Award", "Scientific and Technological Achievement Award", "Industry Contribution Award" and "PV Utilization Award" at the Asian Photovoltaic Industry Association (APVIA) Awards Ceremony, respectively.

"China IC Unicorn"

Xinhua Semi won "China IC Unicorn" at the 4th China IC Unicorn Award Ceremony for its innovation and breakthrough in the field of electronic grade silicon materials and excellent product quality

"Outstanding Contribution Award"

Xinhua Semi won the Outstanding Contribution Award at the China Electronic Materials Industry Technology Development Conference co-sponsored by the China Electronic Materials Association and the Fifth Research Institute of the Ministry of Industry and Information Technology

"2021 Top 10 Best Charging and Battery Swap Company Award"

GCL-ET's subordinate mobile energy brand, GCL Electric Port, made its debut at the 3rd Guangzhou International New Energy Vehicle Industry Ecological Chain Exhibition and won the Top 10 Best Charging and Battery Swap Company Award in 2021

"2021 Industrial Ecological Innovation Digital Enterprise Award"

GCL-ET won the "2021 Industry Ecology Innovation Digital Enterprise" award for its rapid breakthrough and excellent performance in mobile energy at the 2021 15th Annual China Automotive Conference.

"2021 Green Power Heavy Truck Intelligent Charging and Battery Swap Brand of the Year"

GCL-ET won the "2021 Green Power Heavy Truck Intelligent Charging and Battery Swap Brand of the Year" award at the 2021 5th China New Energy Logistics Vehicle Green City Distribution Conference and the 1st China New Energy Heavy Truck Industry Ecology Conference

Memorabilia in 2021

2021 was the first year for Double Carbon, and also an important milestone of GCL Group in implementing the Phoenix Nirvana program. In this year, we put forward the plan for Technical GCL, Digital GCL and Green GCL. With technology and capital, GCL Group improved the industrial sector of green energy, made a great breakthrough in PV, hydrogen energy and mobile power, and received favorable recognition on a national or international basis. Also, GCL Group made outstanding achievements in internal management and external cooperation as a model in new energy.

2021

1~3 月

On January 6th

GCL TECH won the award of Best Hong Kong Stock Connect Company at the Fifth Annual Award Ceremony for Golden Hong Kong Stock held in Shenzhen. The event was co-sponsored by zhitongcaijing.com and 0033.com, both the leading Hong Kong and US stock information platforms.

On February 3rd

GCL TECH announced that the annual capacity of Jiangsu Zhongneng Polysilicon Technology Development Co., Ltd. for granular silicon had increased from 6,000tonnes to 10,000 tonnes.

On March 5th

the Proposal on Helping Enterprises with Big Data and Artificial Intelligence and Accelerating the Improvement of Intelligent Manufacturing in Jiangsu Province (Proposal No. 0495) submitted by Zhu Gongshan, Chairman of GCL Group, was recognized as a good one by the members of the Jiangsu Provincial Committee of the CPPCC at the third meeting of the Twelfth Provincial CPPCC.

On March 31st

the High Quality Development Forum for Zero Carbon-Driven Green Transport and the Kickoff for GCL-ET Mobile Energy Strategic Transformation and CICC-GCL Carbon Neutralization Fund directed by China Electricity Council and hosted by both GCL Group and CICC Capital were held in Beijing, where GCL Group released the "G Action" mobile energy strategic program.

4 月

On April 20th

a delegation led by Shi Taifeng, Secretary of the Party Committee and Director of the Standing Committee of the People's Congress of the Inner Mongolia Autonomous Region paid a visit to GCL Group, accompanied by Lou Qinjian, Secretary of the Party Committee and Director of the Standing Committee of the People's Congress of Jiangsu Province. Chairman Zhu Gongshan introduced the performance of GCL black technology projects of Double Carbon, e.g. granular silicon and perovskite, to the visitors.

On April 29th

the China Electricity Council (CEC) held the seventh congress of its members in Beijing Wuzhou Hotel. At the meeting, the 7th Council was formed by voting. GCL Group was re-elected as vice director, and Zhu Yufeng, Vice Chairman and President of GCL Group, was elected as vice chairman.

5 月

On May 10th

GCL Group ranked second among top 20 global PV enterprises and GCL Energy Engineering ranked tenth among top twenty China PV power plant EPC enterprises at the Brand Strengthening China -- China Carbon Neutralization Summit Forum 2021 and the Announcement of Top 20 Global PV Enterprises and Top 20 Chinese Energy Storage Enterprises 2021.

On May 19th

GCL Group Yan'an Spiritual Research Association was founded and the theme forum of Learning the Party's 100-Year History and Promoting Yan'an Spirits was held at GCL Energy Center. It is the first Yan'an Spiritual Research Association sponsored by a private enterprise in China.

On May 26th

GCL S.I. was rated for five consecutive years as the world Top Performer as a module manufacturer by PVEL, an independent third-party PV laboratory, for the excellent reliability and power generation performance of its PV modules.

6 月

On June 5th

Jiangsu Zhongneng received the first Product Carbon Footprint Certificate issued by the China Quality Certification Center in China for granular silicon, indicating that the carbon footprint for producing per kilogram of granular silicon was low to 20.74kg CO2 equivalent, compared to the world's lowest 57.559 kg CO2 equivalent per functional unit previously achieved by Wacker.

On June 28th

Zhu Gongshan, Chairman of GCL Group was invited to the 2021 International Energy Change Dialogue co-hosted by the National Energy Administration, the People's Government of Jiangsu Province and the International Renewable Energy Agency with the theme of Energy Change for Carbon Neutrality. He discussed the path to Double Carbon with the participants at the High-end Dialogue.

On June 29th

the 100th Anniversary of the Communist Party of China was celebrated at GCL Energy Center and 83 parallel sessions. Zhu Gongshan, the Chairman of GCL Group, attended the meeting and made an address online. Zhu Yufeng, the leader of the Group's Party Committee, led a thousand Party members present at the event to repeat the oath to the Party flag and watch the short video of *My Oath*.

7 月

On July 12th

•Guiyang International Forum for Ecological Civilization 2021 was opened in Guiyang with the theme of low-carbon transformation for green development - building a community of man and nature. Li Zhanshu, member of the Standing Committee of the Political Bureau of the CPC Central Committee and chairman of the Standing Committee of the National People's Congress, delivered an important keynote speech at the conference. At the closing of the Forum on July 13th, Zhu Gongshan, Chairman of the Global Green Energy Council and Chairman of GCL Group, gave a speech as the only entrepreneur representative.

On the afternoon of July 20th

Sun Yongchun, leader of the Fifth Steering Group of the Central Committee for Party History Learning and Education, led a team to GCL Energy Center to investigate our performance in this regard. Zhu Yufeng, Secretary of the Party Committee and President of GCL Group was present. GCL Group was favorably approved by the steering group for the great achievements made by our Party Committee in leading the staffs to follow the Party firmly and focusing on red guidance and green development.

On July 29th

the Hydrogen Energy Industry Development Forum and GCL Hydrogen Energy Strategy Kickoff were held by GCL New Energy in Beijing, announcing that it would access the hydrogen energy industry in order to accelerate the achievement of Double Carbon.

8 月

On August 6th

GCL Huidong Rudong LNG Terminal Project, Jiangsu Province was approved by Jiangsu Provincial Development and Reform Commission. The project is located in Yangkou Port Area, Rudong County, Jiangsu Province. It is the nearest coastal port to Shanghai among China's 100,000-ton ports and also the most convenient area for river and sea intermodal transportation.

On August 23rd

the Second Congress and the Plenary Meeting of the First Committee of GCL Group Party Committee were held in GCL Energy Center. Zhu Yufeng, Zhang Yaobang, An Lingyi and Chen Fei were elected as members of the first Party Committee: Zhu Yufeng was elected as the Secretary of the Party Committee and Zhang Yaobang as the Deputy Secretary of the Party Committee.

On August 28th

the launching conference of common prosperity was held within GCL Group, which released the *Action Program for Common Prosperity for* Strivers and included the GCL Dream in the China Dream in order to improve all GCL employees' welfare.

9 月

On September 24th

the *Computer Software Copyright Registration Certificate* was issued by the National Copyright Administration for the GCL Power Switching-over Software V1.0 developed by GCL-ET. This is the first software copyright obtained by GCL-ET since it started mobile energy business.

On September 25th

•the list of Top 500 Chinese Enterprises and Top 500 Chinese Private Enterprises 2021 was released. In 2021, GCL Group was one of the enterprises with revenues of 100 Billion CNY, ranking No.1 among Top 500 Chinese Enterprises in the green energy industry, No. 222 among Top 500 Chinese Enterprises, No. 97 among Top 500 Chinese Manufacturing Enterprises, No. 31 among Top 100 Leading Enterprises in the Strategic Emerging Industry, No. 72 in terms of Top 100 Chinese Transnational Corporations and Trans-nationality Index, No. 78 among top Chinese 500 private enterprises and No. 41 among top Chinese 500 private enterprises in the manufacturing industry.

On September 28th

the 15 GW project of the 60 GW high-efficiency PV module manufacturing base of GCL S.I., Phase I was successfully put into operation in Hefei.

10 月

On October 16th

the program of "Hand in Hand, Heart to Heart" submitted by GCL Group was included in 90 outstanding cases of social responsibility of power enterprises in 2021 published by the China Electricity Council, where GCL Group was the only private enterprise as an excellent social charity case. "Hand in Hand, Heart to Heart" is designed by GCL-ET and launched every year. It has been held four times.

On October 28th

•a number of celebrations were held in honor of GCL Day within the Group. On the morning, Zhu Yufeng, Secretary of the Party Committee, Vice Chairman and President of the Group, issued an order of "GCL Starting with One Heart for Double Carbon"; Zhu Gongshan, Chairman of the Board of Directors, extended his best wishes to all staffs; One hundred representatives from the headquarters and the organizations working at GCL Energy Center made an oath, and hang the best-wish cards on the pioneering tree at GCL Energy Center.

At the end of October

Jiangsu Zhongneng received the GCL Carbon Footprint Certificate for Granular Silicon Products issued by the French National Environment and Energy Control Agency (ADEME), according to which our carbon footprint for each functional unit (1kg) of granular silicon was 37.000 kg CO2 equivalent. It means that China's granular silicon has out-performed the global solar energy industry significantly in the big data of carbon emission.

11 月

On November 1st

GCL TECH resumed trading on the Hong Kong Stock Exchange at an opening price of HK$3.4 per share; the maximum price was up to HK$3.62 per share, up 82.83%, and the maximum market value exceeded HK$90 billion.

On November 8th

Zhu Gongshan, Chairman of GCL Group, proposed a new strategic concept of "Technical GCL, Digital GCL and Green GCL".

On November 24th

the fifth council meeting of the Fourth Asian Photovoltaic Industry Association was held, where Zhu Gongshan, Chairman of Global Green Energy Council and Chairman of GCL Group, was re-elected as chairman of the fifth council and made an inaugural speech.

On November 5th

the State Power Investment Group and GCL Group reached a comprehensive strategic cooperation framework agreement in Beijing in order to promote construction of a new power system with new energy as the mainstay, accelerate achievement of carbon neutrality, and set a new benchmark for a zero carbon era.

12 月

On December 17th

•the Labor Union of GCL-ET sent the donations from the "Hand in Hand, Heart to Heart" program to Zongmai Township Central School, Luhuo County, Ganzi Prefecture, Sichuan Province on behalf of the staffs.

On December 22nd

•GCL Power Group completed the settlement of carbon emission quota in the first performance cycle of the national carbon emission trading market. Through energy conservation and emission reduction, all enterprises of the Power Group achieved a total surplus of about 1.67 million tonnes, equal to 80 million CNY currently at 48 CNY / tonne, which represents a new profit growth point.

On December 26th

Chairman Zhu Gongshan proposed a systematic management concept and a list of key reform items of ten improvements and two accelerations in response to the current business management problems that cry out for reform.

GCL's contribution to sustainable development

In response to the initiatives of the United Nations Sustainable Development Goals (SDGs), GCL Group takes sustainable development actions, integrates sustainable development into the value chain and corporate strategy, and enhances the international influence of the GCL brand.

United Nations Sustainable Development Goals	Corresponding Chapter	Our Actions
1 NO POVERTY	Social Harmony– –Charity	Integrating internal and external resources, combining industrial revitalization of rural areas with green development by conducting PV rural revitalization pilots and village-enterprise twinning, and creating values to consolidate the national poverty alleviation achievements and revitalize the rural economy.
2 ZERO HUNGER	Social Harmony– –Charity	GCL Group organized donations and disaster reliefs in reply to the social needs.
3 GOOD HEALTH AND WELL-BEING	Talent Development–Employee health and safety Social Harmony– –Charity	Attaching great importance to work safety and occupational health, improving working conditions, and establishing an occupational health and safety management system. Organizing visits and constructions related to the community.
4 QUALITY EDUCATION	Talent Development–Employee Development Social Harmony– –Charity	Providing education opportunities and platforms for employees and advocating lifelong learning. Carrying out donations and voluntary services to improve the learning and living environment of poor students.
5 GENDER EQUALITY	Talent Development–Employment	Providing equal pay for equal work and eliminating gender discrimination
6 CLEAN WATER AND SANITATION	Environmental protection–Green Operation Environmental protection–Environmental Management	Reconstructing domestic water pipelines, ensuring clean water supply and eliminating water resource waste. Promoting water-saving appliances and rainwater recovery devices, and ensuring that the office environment and sanitation facilities are clean and tidy.
7 AFFORDABLE AND CLEAN ENERGY	Environmental protection–Green Industries Environmental protection–Green Operation	Ensuring that PV power is affordable by making a technical progress route of polycrystalline silicon, long crystal, silicon chip, battery, module, system integration and PV power station, and relying on technical innovation, management innovation, regional layout and green card system. Transforming us from a cleaner energy producer to a comprehensive clean energy service provider, and holding various types of power generation installations e.g. environment-friendly power generation with coal, gas, PV, wind, biomass and garbage, with clean energy installations taking the lead in the industry. Using renewable energy to reduce carbon emissions in operations.
8 DECENT WORK AND ECONOMIC GROWTH	Talent Development–Employee Care	Providing employees with competitive salaries and benefits, and encouraging employees to create value at work.
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Technological Innovation–Excellent Products	Increasing investment in technological R&D, improving the innovative R&D capacity, and achieving continuous technological progress and accelerated product upgrading.
10 REDUCED INEQUALITIES	Talent Development–Employee profile	Building a diversified, inclusive and equal working environment to ensure equal opportunities.
11 SUSTAINABLE CITIES AND COMMUNITIES	Environmental protection–Environmental Management Social Harmony–Voluntary Services	Design buildings based on the standard of "sponge city", and creating "green building" demonstration premises. Focusing on green development and social charity, and carrying out voluntary activities all around.
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Environmental protection–Environmental Management Technological Innovation–Excellent Products Technological Innovation–Supply Chain Management	Integrating Environmental protectiveness into all aspects of operations. Attaching importance to product quality and implementing the quality control system throughout the process. Building a responsible supply chain
13 CLIMATE ACTION	Environmental protection–Green Industries	Having access to renewable energy power generation, hydrogen energy and zero carbon industrial parks, and making great contributions in response to global climate change and carbon neutrality. Launching green products represented by granular silicon and perovskite.
14 LIFE BELOW WATER	Environmental protection–Green Operation Environmental protection–Environmental Management Social Harmony–Voluntary Services	Organizing a number of environmental protection and charity activities, e.g. beautiful park, garbage removal from river banks, water environment protection for courses, etc. Controlling discharge of wastewater. All subsidiaries involved in wastewater discharge are equipped with advanced drainage systems and industrial wastewater treatment systems.
15 LIFE ON LAND	Environmental protection–Environmental Management Social Harmony–Voluntary Services	Comprehensive environmental management to reduce the impact on environment and biology in operations. Carrying out environmental protection activities, e.g. Arbor Day and ecological governance.
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	Good Governance–Business Ethics Technological Innovation–Supply Chain Management	Optimizing the corporate governance system, improving anti-fraud management, and achieving better corporate governance. Strengthening ESG management along the supply chain and achieving sustainable procurement with suppliers.
17 PARTNERSHIPS FOR THE GOALS	Technological Innovation–Win–win Cooperation	Exerting the positive value and brand influence of GCL Group, sharing the leading technical experience, carrying out industrial co-construction, and promoting common development in the industry.

01

Good Governance

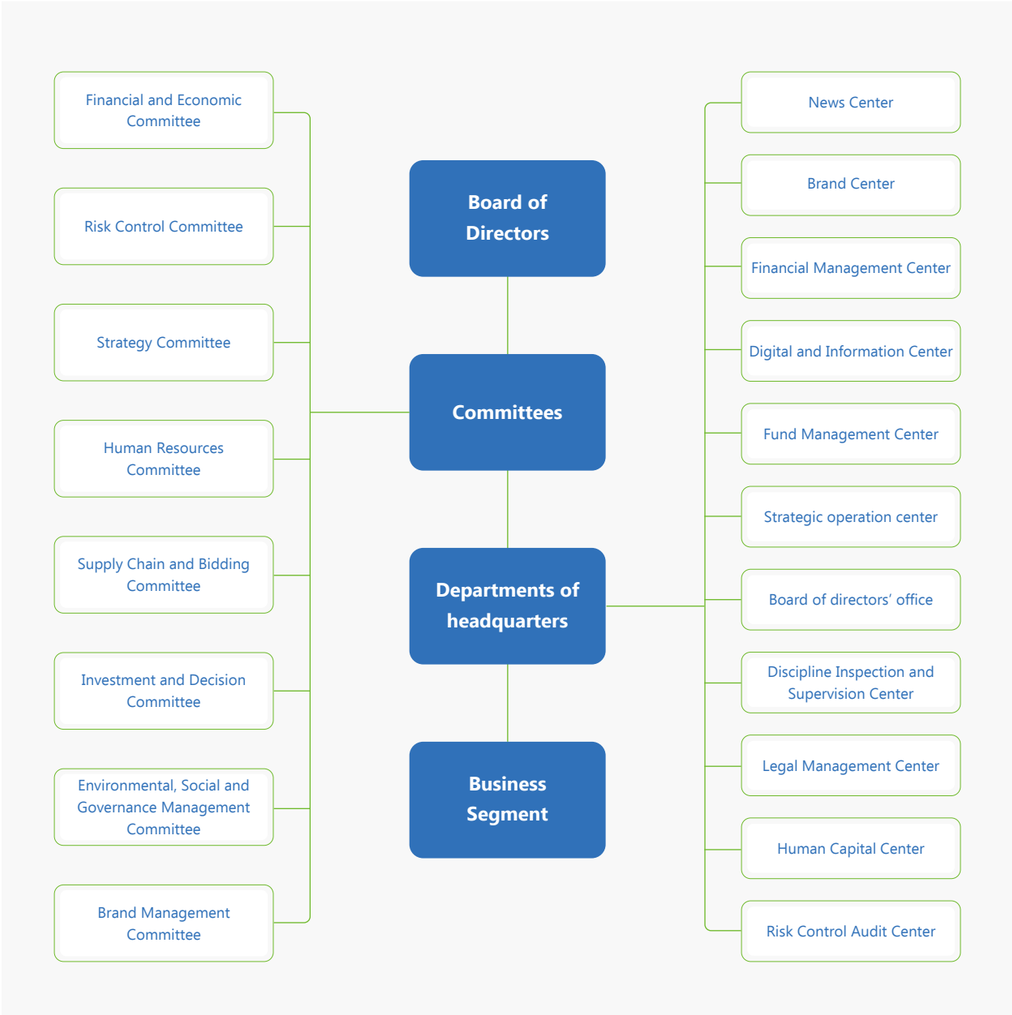
GCL Group values a high level of corporate governance with a sound three-tier ESG management structure and a proven management system to improve the Group's risk management and business ethics. We integrate ESG into our corporate strategy as a pledge to a high-quality sustainable development path.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Governance Structure

GCL Group believes that our sustainable and healthy development starts with compliance. Our sound long-term development comes from complying with national laws & regulations and regulatory requirements, integrating compliance throughout our governance structure and policy formulation, and committing to a high level of corporate governance continuously.

With the Board of Directors as the highest decision-making body, our well-established corporate management structure has seven committees under the Board to oversee the Group's overall development, thereby constantly improving the Group's management framework and decision-making.



Governance Structure of GCL Group

Risk Management

GCL Group believes that the long-term development of an enterprise relies on comprehensive risk management. Our robust development builds on continuously improving our risk control management system, standards, and work guidelines, and establishing a risk prevention and control management system that supports the Group's global business ambitions.

Risk Management Mechanism

GCL Group identifies risk management responsibilities and scans major risks across the Group regularly in accordance with the Group's *Comprehensive Risk Management Guidelines* and through our self-developed closed-loop risk management model. After quantifying and assessing the risks of each indicator in the Group and each business segment, we develop corresponding strategies for functional departments to track and eliminate risks. Meanwhile, the Group and each business segment are warned and urged constantly to avoid risks in a timely manner.

Closed Loop of Risk Management

The Group works to improve the design and application of quantitative risk indicators in risk management, making them useful in practice instead of only on paper. During this reporting period, the Group has revised six management systems and guidelines, including internal control, risk, audit, engineering, etc., further improving the Group's risk management system and expanding the scope of risk control. At the same time, new quantitative indicators for assessing financing quality risks, credit abnormality risks, and capital market regulatory matters have also been incorporated into the system. In total, 46 risks for the Group have been identified, and four series of notices for risk management and control have been issued to expose management loopholes and compliance risks found in internal control and auditing. All the above demonstrates our continuous efforts to strengthen internal risk control.

GCL Group, guided by the strategic vision of "carbon neutrality", has put high on the agenda the impact of climate change on our operations. We will conduct climate change risk identification and analysis in the future, and proceed to integrate climate change risk management into the risk management system.

Internal Control

GCL Group has formulated the *Principles and Systems of Internal Control Management*. Guided by this document, we have improved the comprehensiveness and effectiveness of internal control continuously. For example, to strengthen our risk management and compliance, GCL Group has regularly conducted internal audits to analyze the Group's management and propose possible improvements in terms of organizational structure, performance management principles, and effectiveness of personnel. In 2021, we carried out a Group-wide, segment-specific, large-scale, and full-scope audit project and achieved outstanding results in internal control.

Achievement of GCL Group's internal control in 2021

5 audit projects had been implemented, including identification of inefficient assets, company access management and paid-up registered capital; audit of the application of SAP human resources module; adjustment of assessment criteria for management by objectives in construction projects; and inspection of important document archiving

5 projects

lost due to corruption and malpractices had been identified

69.94 million CNY

recovered

135.09 million CNY

24,305,000 CNY had been recovered by the annual risk control line as audits got the losses back and saved investment

243.05 million CNY

investment saved

3,802 million CNY

12 targeted single-company reports had been issued throughout the year

12 reports

14 mini-investigation reports had been submitted throughout the year

14 reports

Business Ethics

GCL Group abides by business ethics, complies with all relevant laws and regulations and upholds the governance principle of honesty and trustworthiness. We strive to create a "clean GCL" by preventing insider trading and building a culture of integrity in accordance with the *Measures for the Administration of Inspectors and the Guidelines for Supervision of Bidding*.

Anti-corruption

GCL Group, with a zero-tolerance policy toward corruption in place, has established a Disciplinary Inspection and Supervision Center. We have formulated the Anti-Corruption Regulations and have established a sound Group-wide standardized system of "clean GCL" and an integrity assessment and accountability mechanism. As a result, the cooperation and coordination among all functional departments of the Group have been strengthened, and job embezzlement, bribery, and other fraudulent acts have been cracked down on and deterred continuously. Meanwhile, we are implementing a series of anti-corruption initiatives to build a healthy ecology of the Group's anti-corruption system and eliminate corruption.

Within the Group, we have made unrelenting efforts to purify our internal management environment by combating corrupt practices and strengthening risk control and supervision of employees' proper fulfillment of their job duties. We have investigated and handled anti-corruption cases, made regular disciplinary inspections and supervisions, and monitored work style and effectiveness, asset disposal, investigation, etc.

As for our external cooperation, GCL Group has continued to learn from enterprises affiliated with prestigious associations such as the Enterprise Anti-Fraud Alliance and Trust and Integrity Enterprise Alliance to comprehensively improve our employees' awareness of integrity, work style, and effectiveness.

GCL Group's Anti-corruption Initiatives

GCL Group is committed to promoting the Group's anti-corruption management through integrity culture training activities to achieve a clean and upright corporate environment. We have incorporated an anti-corruption training module into the staff training system, and have conducted lectures and training on the construction of an integrity culture for many companies of the Group. In 2021, in order to create a benign ecology for the Group's anti-corruption system, we used Group's multimedia channels to cover every staff of the Group and produced six anti-corruption warning videos and released them on platforms, such as our WeChat Official account, official website, internal Lanxin official account, and in-person lectures. GCL S.I., GCL TECH and other subsidiaries of the Group have carried out integrity and legal education activities through various channels online and offline. In total, more than ten lectures on the construction of integrity culture have been held.

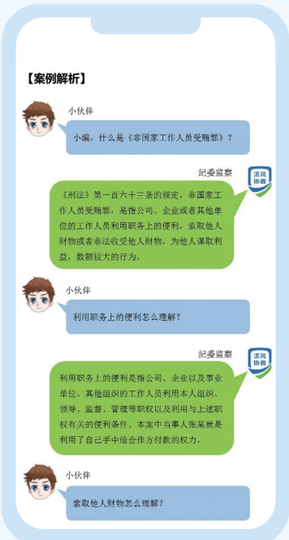
in 2021

Produced anti-corruption warning videos

6 copies

Anti-corruption Campaign via the "Clean GCL" WeChat Official Account

GCL Group has set up a "Clean GCL" WeChat official account to regularly send anti-corruption-themed materials to all the management and staff of the Group. Via this account, we have published a variety of anti-corruption-themed case analyses, articles, tips, warnings, and videos in a vivid and diversified way, and especially have delivered more campaigns during typical holidays and festivals. We aim to help all employees of the GCL Group raise their awareness of anti-corruption bit by bit and create a clean atmosphere within the Group.



Case analysis: "Learning law from the case".

Push notification: "Please check and receive your instructions on integrity for the Spring Festival".

Whistleblower Protection

GCL Group encourages internal and external personnel to exercise timely and effective supervision of the Group's ethical practices. We have set up a number of complaint and reporting channels, such as online channels on the "Clean GCL" WeChat official account, hotline, and e-mai, and opened an "Integrity Online" on our official website for the convenience of our employees and partners to report acts that are inconsistent with our business ethics.

Email: jubao@gcl-power.com

Hotline: 0512-68538110

Website: http://jubao.gcl-power.com/onlinereporting-web/index.do

The Group places great emphasis on the protection of whistleblowers and has formulated the *Confidentiality Management Standards* and the *Whistleblower Protection System* to prevent them from retaliation and unfair treatment due to information disclosure in the process of real-name reporting or anonymous reporting. For the reporting confirmed true, we protect and reward whistleblowers in accordance with the *Measures for Rewards for Reporting*, so as to encourage relevant parties to jointly participate in the Group's integrity building.

- The Group places a high priority on the confidentiality of reporting, and has a strict management and control system and process for the acceptance and investigation of reporting. The personal information of the whistleblower and all the reporting information provided by him or her are kept strictly confidential to prevent disclosure or loss.
- Any form of retaliation against the whistleblower is strictly prohibited, and if any, will be punished according to national laws and regulations and company rules and regulations, and will be transferred to judicial organs if it is in violation of national laws and regulations.
- The Group's Supervision Department gives out rewards to whistleblowers through an exclusive channel to ensure that the privacy of their information is effectively protected.

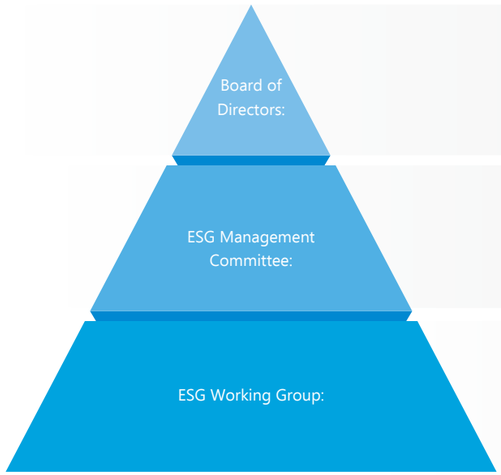
GCL Group's Whistleblower Protection

ESG Governance

GCL Group incorporates ESG governance into its corporate management strategy and ensures the fulfillment of its sustainable development responsibilities through the establishment of a comprehensive ESG management strategy, a clear management structure, and a regular management mechanism for ESG matters.

ESG Governance Structure

We firmly believe that the creation of long-term value depends on the sustainable development of the Group. As the industry continues to develop, GCL Group actively takes up its social responsibility and integrates ESG management and sustainable development concepts into its daily operations and production. In order to improve the level of ESG management and ensure the stable and efficient implementation of ESG-related matters, during this reporting period, we have increased the involvement of the board of directors and the management in the Group's ESG work by establishing a three-tier ESG management structure, while at the same time strengthening our top-level design, thus continuously improving our management and capabilities in the ESG field.



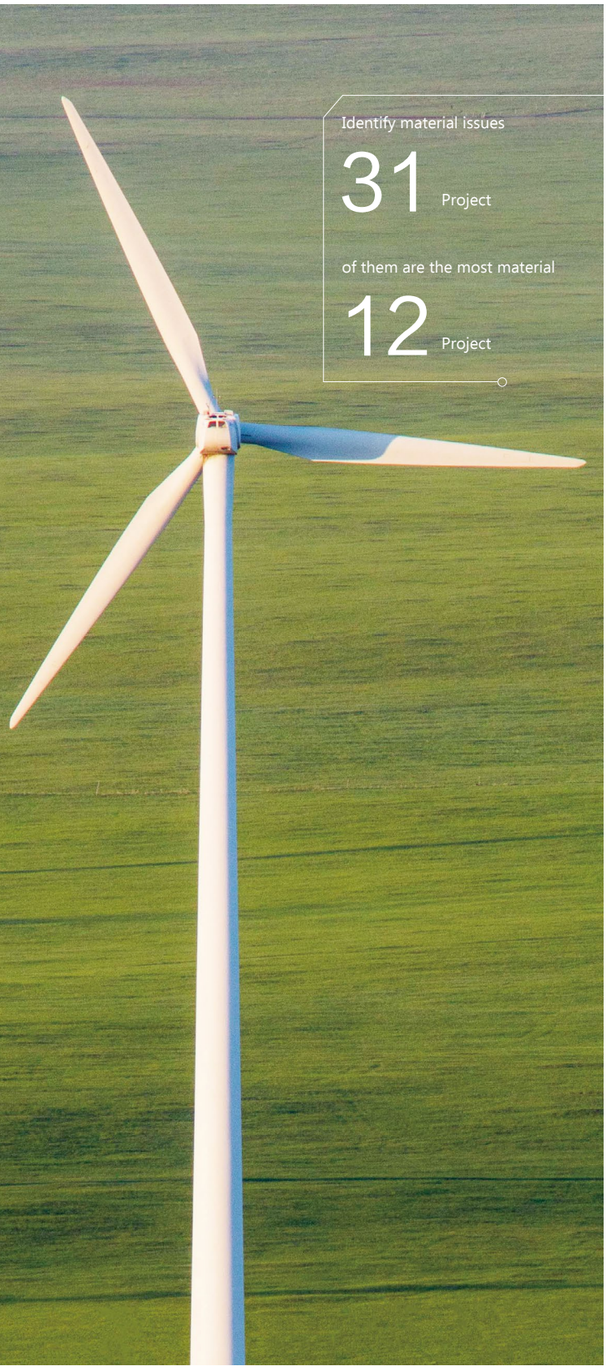
GCL Group's ESG governance structure

- The Board assumes final responsibility for the ESG strategy and performance.
- The ESG Management Committee regularly identifies ESG risks and opportunities of the Group and formulates sustainable development strategies and management policies based on business conditions.
- Setting ESG policies and action plans that meet the Group's sustainable development strategy and objectives
- Managing the risks and matters related to ESG in the daily operations of all departments and sectors.
- Cooperating with all l departments and sectors to jointly promote the implementation of ESG related matters.
- Collecting, collating and preparing the public disclosure of the Group's performance on ESG-related issues.

Stakeholder Engagement

GCL Group listens carefully to the voices of stakeholders. On this basis, We further improve the corporate environment, society and governance. In 2021, we identified eight categories of stakeholders: local governments, regulators, shareholders / investors, suppliers, customers / consumers, local communities, media, industry organization associations, and employees. The concern issues and communication methods of various stakeholders are as follows:

Stakeholders	Local government and regulatory authorities	Shareholders/ Investors	Suppliers	Clients / Consumer	Local Communities	Media	Association of industry organizations	Employees
Stakeholders Concerns	◆ Establishing an effective governance structure ◆ Anti-Corruption ◆ Risk Management ◆ Environmental management system ◆ Exhaust emission management ◆ Waste water management ◆ Waste management ◆ Management of energy consumption ◆ Water resources management ◆ Material management	◆ Technology and innovation ◆ Risk management ◆ Improving product quality and safety ◆ Addressing climate change ◆ Clean energy technology development ◆ Environmental management system	◆ Product traceability management ◆ Supply chain management ◆ Responsible procurement ◆ Conflicting minerals	◆ Improving product quality and safety ◆ Improving product traceability management ◆ Technology and innovation ◆ Client relations ◆ Responsible Marketing ◆ Consumer privacy and data security	◆ Education and training ◆ Bio-diversity protection ◆ Charitable donations ◆ Environmental protection activities	◆ Improving product quality and safety ◆ Charity donations ◆ Environmental protection activities ◆ Protecting intellectual property rights ◆ Addressing climate change ◆ Clean energy technology development	◆ Technology and innovation ◆ Protecting intellectual property rights	◆ Workplace safety and employee health ◆ Employment ◆ Employee rights and interests protection ◆ Improving employee satisfaction ◆ Increasing remuneration and benefits ◆ Employee development and training
Communication Channels	◆ On-site visit ◆ Meetings ◆ Phone	◆ Investor's meetings ◆ Online industrial peak meetings ◆ Performance announcement ◆ Press release / announcement ◆ On-site visit	◆ Supplier communication meeting	◆ On-site visit ◆ Meetings ◆ Client appreciation and communication Meetings ◆ Questionnaire inquiry ◆ Customer complaint management	◆ On-site visit ◆ Meetings ◆ Press release / public report	◆ Press release / announcement ◆ Meetings ◆ Exposition ◆ Luncheon ◆ Appreciation banquet ◆ Management interview invitation	◆ On-site visit ◆ Meetings ◆ Supplier meeting ◆ Industry exhibitions	◆ Grassroots symposium ◆ Employee congress ◆ Employee opinion box ◆ Telephone, email, WeChat Official Account and other online channels ◆ On-site interview



ESG Materiality Analysis

We have developed a matrix of GCL Group's materiality issues for 2021 to better respond to stakeholders' demands and be consistent with the Group's strategic development direction and industry trends. Based on domestic and international industry benchmarking, policy analysis, stakeholder interviews, and questionnaire survey results, the matrix identifies 31 materiality issues, 12 of which are highly important. Please be noted that the issues and our responses to the expectations of stakeholders will be disclosed in detail in the subsequent chapters.

Initial identification of material issues

We made it through media analysis, peer benchmarking, and policy research.

Stakeholder interviews

Interviews were conducted to get to know the concerns of internal and external stakeholders.

Questionnaire survey

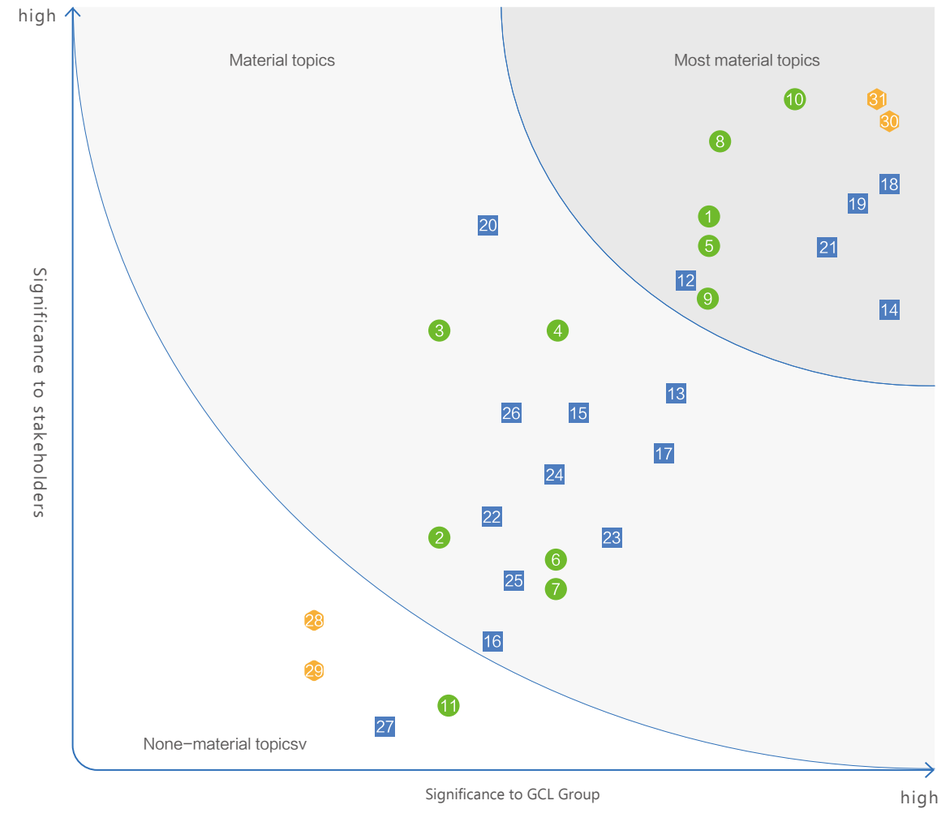
Surveys were conducted on internal and external stakeholders of GCL Group to inform the Group of materiality issues

Adjustment and confirmation of the ranking of material issues

A matrix of material issues for 2021 was developed after ranking the issues in terms of their impact on both the Group's strategic operation and development and our stakeholders.

Analysis Process of Materiality

GCL Group 2021 ESG Materiality Issues Matrix



List of GCL Group 2021 ESG Materiality[1]

Environmental issues

1. **Environmental management system**
2. Exhaust emission management
3. Waste water management
4. Waste management
5. **Management of energy consumption**
6. Water resource management
7. Materials management
8. **Addressing climate change**
9. **Bio-diversity protection**
10. **Clean energy technology development**
11. Environmental protection activities

Social issues

12. Improving product quality and safety
13. Improving product traceability management
14. Technology and innovation
15. Client relations
16. Responsible Marketing
17. Consumer privacy and data security
18. Workplace safety and employee health
19. Employment
20. Employee rights and interests protection
21. Improving employee satisfaction
22. Increasing Remuneration and Benefits
23. Education and training
24. Supply chain management
25. Responsible Procurement
26. Employee development and training
27. Charity donations

Governance issues

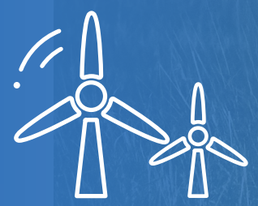
28. Establishing an effective governance structure
29. Anti-Corruption
30. **Risk Management**
31. **Protecting intellectual property rights**

[1] Topics in bold are of most material

02

Environmental Protection

GCL Group always believes that green development is the foundation of an enterprise, regarding "Green GCL" as an important lever for sustainable development of the enterprise. We pursue the mission of environmental protection from four dimensions of diversified green industry layout, standardized green operation, sophisticated environmental management and strict emissions management. While providing clean inclusive green energy for the social production and promoting transformation and upgrading of the country's energy structure, we continuously reduce the effects of our operating activities on the environment, committed to becoming a model enterprise for sustainable development.

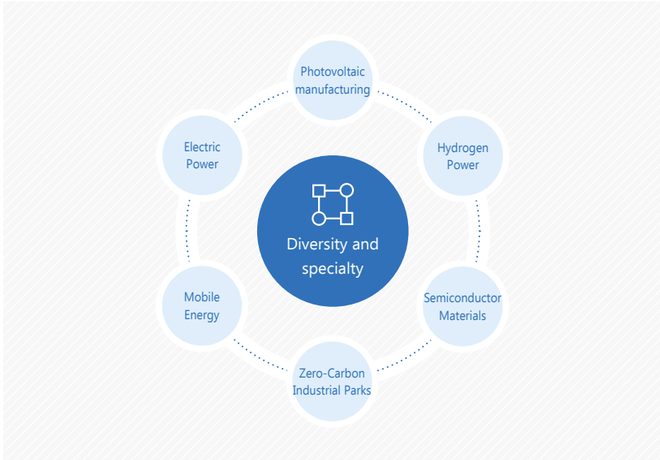


Green Industry

With the advent of the new era of the Internet of Everything (IoE), new technologies, new models and new norms are emerging from industries to consumption. GCL Group has a deep insight into the development trend of the industry, focusing on industrial upgrading. By integrating low-carbon, technological and digital development and actively laying out green industries, we inject renewed impetus into "carbon neutrality" with unflagging vitality.

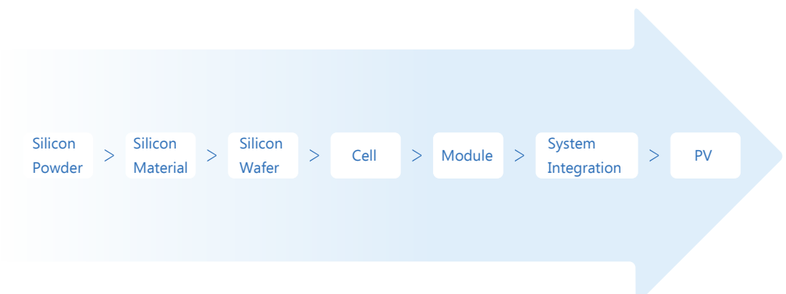
Industrial Cluster

GCL Group takes "technology-driven, digital empowerment, green development" as the main policy. is the Group focuses on the research and manufacture of silicon, lithium, carbon and other high-tech materials, and on green energy production and services. GCL has deployed to build its six-pillar industrial clusters, including: photovoltaic, electric power, semiconductor materials, hydrogen energy, mobile energy, and zero-carbon industrial parks, blueprinting for a "Technical GCL", "Digital GCL" and "Green GCL".



Photovoltaic manufacturing

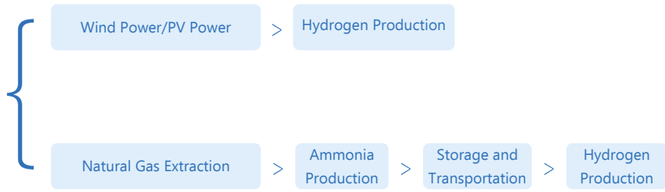
GCL has formed by far the most integrated PV industry chains with the most intellectual property rights in the world. Relying on its continuous innovations and core-technology breakthroughs, GCL has made the transformation and upgrading from traditional manufacturing to intelligent manufacturing, utilized its production capacities and significantly improved the economy and efficiency of its photovoltaic systems. GCL has not only ended China's PV industry dilemma of "two ends abroad", but is now playing an important role in promoting the use and the large-scale applications of solar energy in the world.



GCL targets at making PV-generated electricity affordable and inclusive for the public by its constant technology innovations in polysilicon, silicon wafers, cells, modules, system integration and photovoltaic power plants, continuous improvement of its management, regional layout and green energy certification systems.

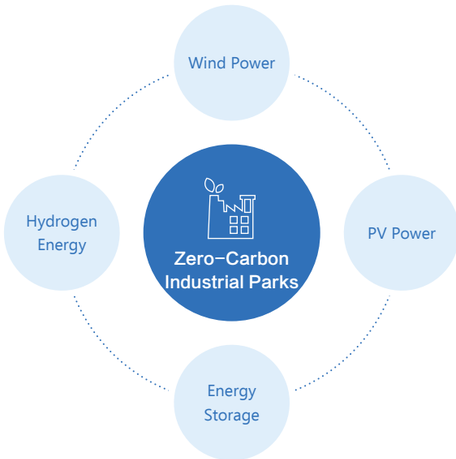
Hydrogen Power

GCL implements the "Blue and Green Run Parallel" hydrogen energy strategy which is composed of blue hydrogen and green hydrogen. Based on its technological advantages and absorption capacity in the fields of electric power, oil and gas, silicon materials, etc., as well as advantages of upstream resources, GCL Group has connected all links throughout the industrial chain to become a professional hydrogen energy service provider integrating investment, development, technology, equipment and service.



Zero-Carbon Industrial Parks

GCL Group is to build up green energy consumption utilities such as "zero-carbon industrial park", "zero-carbon smart city" and "mobile energy operation", by fully developing the grand "wind, PV, energy storage and hydrogen" energy bases in deserts, Gobi, etc. GCL is determined to diversify its investment in the "Belt and Road" initiative, in smart manufacturing parks, in smart cities and in mobile energy to seek path for a dearer carbon and greener future development.

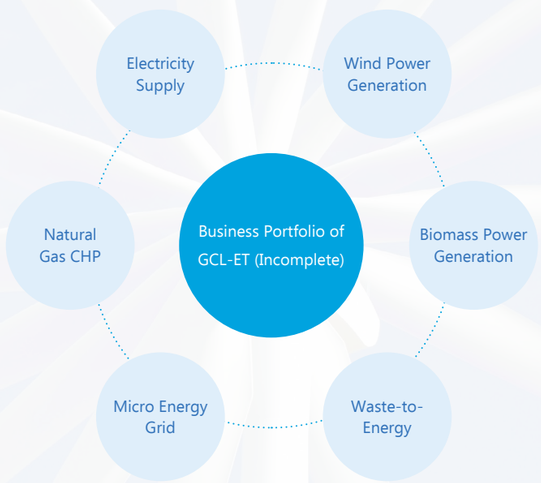


Electric Power

GCL Group is an experimenter as one of China's mixed-ownership power companies. It entered the field multi-owned by investment entities and has set a number of industry examples in terms of operational efficiency. In line with the global trend of energy transformation, GCL strives for the paradigm shift of power business from traditional energy to distributed and mobile energy, and for its own transition from a clean energy producer to a clean-energy comprehensive service provider. GCL has the capacity for installing various types of power generators, including environmentally friendly thermal power, gas, photovoltaic, wind power, biomass and waste power generation. The proportion of clean energy installed capacity tops the industry.

Electricity Generation → Distribution → Electricity Supply → Energy Storage → Energy Networking

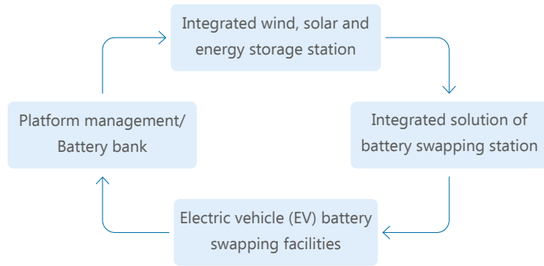
GCL-ET, centers on green energy production, operation and comprehensive energy services. Anchoring at clean energy power generation and cogeneration, GCL-ET has deployed energy storage, energy efficiency management, power distribution and supply, and is trying to forge an integrated "source-grid-supply-use-cloud" system and become a leading energy service provider of data ecology.



GCL-EI, a subsidiary of GCL Group, has a business scope that covers the power generation involving efficient and environmentally friendly thermal power, pumped storage and hydropower (with installed capacity of 10GW under operation, management and construction), and vigorously develops the business of power distribution and sales and carbon asset management, making it an industry-leading non-public power holding enterprise and green energy solution provider.

Mobile Energy

GCL-ET, is a leading mobile energy service provider in China. Now GCL-ET is accelerating its transformation into a technology-based comprehensive energy service provider, committed to establishing a new integrated energy information system with electricity as its core. GCL-ET is contributing to the progress of China's energy consumption, supply, technology innovation and system reform, to a closer international cooperation. By driving the innovation and reform in the energy field, GCL-ET is advancing the development of the mobile energy industry. We have also made important progress has been made in the research and development of intelligent mobile energy products, the development of digital management platforms, and the declaration of intellectual property rights such as patents.



Semiconductor Materials

GCL has made full use of its advantages in the R&D and manufacturing of silicon materials and put into shape its integrated circuit material industry. Up to now, Xinhua Semi, a subsidiary of GCL Group,has become the world's third largest producer of semiconductor silicon materials, and GCL Semi, a subsidiary of GCL Group, has become a leading enterprise in the field of semiconductor silicon materials in China.

In its R&D centers in China and in the USA, GCL has started its R&D of polysilicon and large silicon wafers for integrated circuits. Manufacturing bases are built and supporting industries are deployed. Currently, the production capacity of electronic-grade high-purity polysilicon is 5,000 tonnes per year, and the planned production capacity of large semiconductor wafers is supposed to reach 600,000 pieces per month. Not only can GCL self-produce electronic-grade polysilicon in large quantities, its product index is on par with the standards of world-class manufacturers. This exemplifies GCL's tech-driven contribution to the high-quality development of China's integrated circuit industry.

Electronic-Grade Polysilicon

Semiconductor large silicon wafers

By the end of the reporting period, GCL Group had made outstanding contributions to emission reduction in power generation and photovoltaic materials through its leading advantages in the field of renewable energy and continuous efforts in various business sectors. The data are as follows:

Category	Power generation (100 million kWh)	Equivalent to the saving of standard coal (10,000 tonnes)	Reduce carbon dioxide emissions (10,000 tonnes)	Equivalent to planting trees (10,000 mu)
PV Power Generation	428.44	2,056.51	5,125.86	3,655.76
Wind Power Generation	58.52	200.14	524.36	373.97
Natural Gas CHP	761.64	1,136.04	3,564.47	2,542.17
Waste-to-Energy	38.90	133.04	348.56	248.59
Biomass Power Generation	59.45	293.11	767.95	547.72
Polysilicon	2,337.35	11,219.26	27,964.01	20,244.54
Total	3,684.30	15,092.10	38,295.21	27,612.75

Green Product

GCL Group is committed to enabling green products with scientific and technological innovation. We incisively observe the global green and low-carbon development trend, closely follow the national "double carbon strategy", and rely on our diversified industrial advantages to launch a variety of green products. While continuously promoting the healthy development of the energy industry, GCL Group helps achieve the carbon neutrality goal from multiple perspectives.

Granular Silicon Products

GCL Technology is a subsidiary of GCL Group leading the Chinese polysilicon industry. In 2009, we launched the first large-scale technology transformation project of Siemens-method cooling hydrogenation in China. It pioneered a new round of technological revolution in the upstream photovoltaic (PV) materials then. After that, we explored the technical route of manufacturing granular silicon with the silane fluidized bed method (FBR). In 2019, we achieved a breakthrough and started commercial mass production of a new generation of silicon-based materials with exclusive technology - FBR granular silicon. At present, the unit comprehensive power consumption of our granular silicon is 14.8kWh/kg, and the unit comprehensive steam consumption is 15.3kg/kg, which enjoys great advantages of cost and carbon emission.

Granular silicon represents the state-of-the-art product of silicon materials right now, and it will become an important technological leap for PV materials. As a new generation of products in the PV silicon materials, granular silicon boasts a better potential for cost reduction than traditional Siemens-method silicon rods in cost, quality and application. It is critical to reducing the cost of the PV industry per kilowatt hour and achieving carbon neutrality by promoting it all over the world.

In May 2021, GCL TECH obtained the *Product Carbon Footprint Certificate* issued by China Quality Certification Center (CQC) for its granular silicon products. At the end of October 2021, it received the *GCL Granular Silicon Product Carbon Footprint Certificate* issued by the French Environment and Energy Control Agency, proving that its carbon footprint value of every kilogram of granular silicon produced is only 37 kilograms of CO_2 equivalent. This broke the world's previous lowest record of 57.56 kilograms of CO_2 equivalent per functional unit, and is also the first "carbon footprint certificate" of domestic granular silicon products issued by a foreign authority. This recognition has shown that our excellent performance in carbon emission from granular silicon production has an absolute advantage in the global solar energy industry.

Total power consumption per kilogram of granular silicon production

14.8 kWh/kg

Total steam consumption per kilogram of granular silicon production

15.3 kg/kg

Granular silicon

Reduction in resource and energy use

Granular silicon requires less intensive investment and lower power consumption and labor cost. The FBR technology for granular silicon has a shorter process, fewer post-processing procedures and a smaller footprint. It has led to a 30% decrease in investment intensity, 30% decrease in project personnel headcount, 30% decrease in water consumption and 42% decrease in hydrogen consumption. According to the standardized conditions for the photovoltaic manufacturing industry in 2020, the total power consumption per kilogram of granular silicon production with FBR is about 2/3 less than that with the traditional Siemens process, saving 70% electricity in production.

Vigorous reduction in carbon emission

Carbon emission in granular silicon production reduces by 65% to 70%. Every 10,000 tonnes of granular silicon production will reduce carbon emissions by about 448,000 tonnes, which is equivalent to planting 2.186 million trees every year and saving 166,400 tonnes of standard coal. With the implementation of carbon trading and carbon border tax in the future, the low-carbon attribute of granular silicon will reduce the carbon tax of enterprises, reduce the burden of enterprises and promote sustainable development.

Two major advantages of granular silicon in environmental protection

产品碳足迹证书

证书编号：PCI-2021-CL-0009

中国质量认证中心根据相关核查程序发布本证书，对如下内容的真实性和有效性予以证明：

产品名称/型号：颗粒硅

委托人名称/地址：江苏中能硅业科技发展有限公司 徐州经济技术开发区杨山路66号

生产者名称/地址：江苏中能硅业科技发展有限公司 徐州经济技术开发区杨山路66号

生产企业名称/地址：江苏中能硅业科技发展有限公司 徐州经济技术开发区杨山路66号

数据时间边界：2020年1月1日-2020年12月31日

功能单位：每千克颗粒硅

每功能单位产品碳足迹数值：**20.74** 千克二氧化碳当量

核查所依据的标准及规则：ISO14067及PAS2050相关规则

系统边界：摇篮到大门

产品各阶段碳排放比例：

20.74 kg CO2 CQC

92.36%

7.64%

原材料获取　产品生产

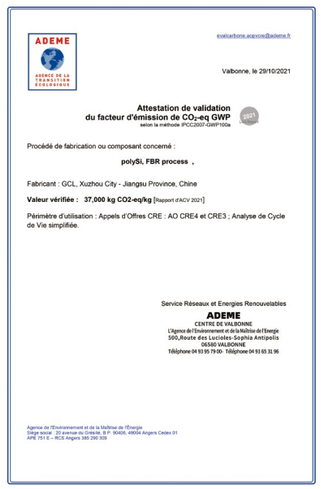
发证日期：2021年06月29日　有效期至：2023年06月29日

主任：

中国质量认证中心

http://www.cqc.com.cn　中国·北京　海淀环西路188号102　100070　电话：+86 10 83886666

Product Carbon Footprint Certificate issued by CQC for our granular silicon products



ADEME

AGENCE DE LA TRANSITION ÉCOLOGIQUE

evaluacbone.acpvcne@ademe.fr

Valbonne, le 29/10/2021

Attestation de validation du facteur d'émission de CO_2-eq GWP

selon la méthode IPCC2007-GWP100a

2021

Procédé de fabrication ou composant concerné :

polySi, FBR process ,

Fabricant : GCL, Xuzhou City - Jiangsu Province, Chine

Valeur vérifiée : 37,000 kg CO2-eq/kg [Rapport d'ACV 2021]

Périmètre d'utilisation : Appels d'Offres CRE : AO CRE4 et CRE3 ; Analyse de Cycle de Vie simplifiée.

Service Réseaux et Energies Renouvelables

ADEME

CENTRE DE VALBONNE

L'Agence de l'Environnement et de la Maîtrise de l'Energie

500,Route des Lucioles-Sophia Antipolis

06560 VALBONNE

Téléphone 04 93 95 79 00- Téléphone 04 93 65 31 96

Agence de l'Environnement et de la Maîtrise de l'Energie

Siège social : 20 avenue du Grésillé, B.P. 90406, 49004 Angers Cedex 01

APE 7515 Z - RCS Angers 385 290 309

GCL Granular Silicon Product Carbon Footprint Certificate

Swapping products and solutions

GCL-ET, has long-gained experience in green energy operations and a comprehensive business layout of energy services, as well as the core competitive advantages rapidly established in the development and iteration of battery charging and swapping technologies. GCL-ET takes "technology driving low-carbon life" as its mission, green power as the source and transportation capacity as the foremost thing, and builds a business mode driven by mobile digital energy operation platform and intelligent battery electric vehicles through digital aggregation and financial empowerment. With vehicle as the energy carrier, battery as the core resource, and energy hub as the infrastructure. GCL-ET builds an ecological closed loop of green power, hub and station, vehicle, battery and energy storage, jointly develops new energy vehicles in customized operation areas, integrates transportation capacity resources, provides commercial operation of BEV energy supplement service, battery life cycle management, battery charging and swapping station and hub and mobile digital energy platform. It strives to provide convenient, economical and green integrated solutions for electric travel. GCL-ET has developed products suitable for various scenarios centering on solutions for EV operation, swapping product development, operation and management and financial services, deepening the integrated development of green energy and automobile industries.

Solution for BEV operation scenarios

Heavy truck – scatter-to-centralization solution: Focus on the transportation of bulk materials, and make use of the scatter-to-centralization solution to greatly improve the efficiency of green logistics

Heavy truck – trunk logistics solution: Develop long battery life and brand-new electric heavy trucks to create a new ecology of efficient trunk green logistics.

Heavy truck – freight platform solution: Link freight platform, deploy battery swapping network, and promote large-scale application of battery-swapped heavy trucks.

Logistics vehicle solution: Respond to the call of green urban distribution policy, and take economic development belt as the scenario to realize full electrification.

Solution for passenger cars - taxis and online hailed cars: Focus on cities with resource advantages, rely on the platform resources, obtain help from local resources, and make use of the"mode of business expansion to new cities" for large-scale development.

Development of battery swapping products

- Battery-swap station
- battery package
- customized development of vehicle models
- ladder energy storage
- super home energy hub

Operation management and financial services

- Digital operation cloud platform
- vehicle asset management
- financial cloud support

GCL Energy Hub

Photovoltaic systems and solutions

Relying on its comprehensive advantages in the supply chain of the photovoltaic (PV) industry, GCL Group has deepened and expanded the development of photovoltaic modules and photovoltaic power stations. According to different design requirements and various scenarios, we provide customers with systematic solutions covering design, product and later service, to meet the needs of photovoltaic power generation in different regions, for different types and on different scales. GCL Group provides system integration packages based on differentiated ultra-efficient components through technological innovation and application innovation, ensures the continuous and stable operation of photovoltaic power stations for more than 25 years with quality and high efficiency, and continuously provides clean, safe, efficient green inclusive energy for the society.

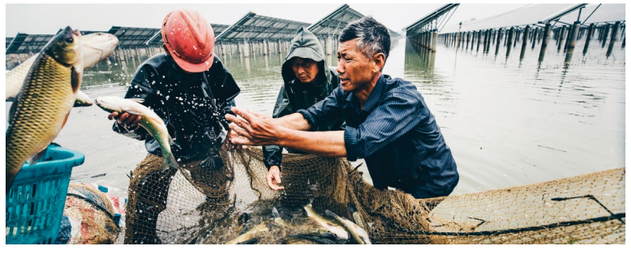
The power station development business of GCL New Energy has now covered all indicator types of PV projects including the "pioneer project", PV-assisted rural revitalization project, distributed and ordinary power stations. By the end of the reporting period, the power generation of GCL New Energy self-maintained photovoltaic power stations had totaled 3.87 billion KWH. Through green operation, GCL New Energy had saved about 1.54 million tonnes of standard coal, reduced the emission of about 3.86 million tonnes of carbon dioxide, about 116,000 tonnes of sulfur dioxide and about 58,000 tonnes of nitrogen oxide, which was equivalent to 192,613.33 hectares of afforestation.

192,613.33

hectares of afforestation

Fishing-PV complementary green photovoltaic project

Taking advantage of the tidal flat and fish pond construction, GCL New Energy sets photovoltaic modules above the water surface of the fish pond to achieve dual use of space: the lower layer is for aquaculture, and the upper layer is for photovoltaic power generation, which greatly improves the economic value of the land per unit area. The characteristic fishing-PV complementary photovoltaic project can provide new energy without increasing the environmental pressure and add new tourist attractions to the local area, which has obvious social and environmental benefits.



In terms of photovoltaic module manufacturing, by the end of the reporting period, GCL System Integration Technology Co., Ltd. (GCL S.I.) had sold 2.3GW of modules throughout the year. The photovoltaic power stations built with its modules each year saves 910,000 tonnes of standard coal, reduces emission of 2.75 million tonnes of carbon dioxide, 83,000 tonnes of sulfur dioxide and 42,000 tonnes of nitrogen oxide, which is equivalent to 192,000 hectares of afforestation.

Green Operation

GCL Group actively fulfills its corporate social responsibility and is committed to continuously reducing the impact of its operations on the environment. Adhering to the development concept of "bringing green energy into life", we implement the development strategy of "Green GCL", integrating low-carbon and sustainable development into various links including product development and manufacturing, project management, project operation, daily office and corporate activities.

Green office

GCL Group and its subordinate business sectors proactively integrate the new concept of low-carbon office in daily work and the construction of corporate culture. We instill into employees the consciousness of energy saving and environmental protection, promote green office plans, and advocate all employees to practice low-carbon lifestyle, striving to create a sustainable green corporate atmosphere.

Recycle

Reuse

Reduce

Replace

GCL Group "4R" principle

Paperless office

- All application procedures shall be initiated and approved online to minimize the use of paper
- If printing of documents is required during daily operation, printing permission shall be set and black-and-white and double-side printing shall be used, so as to reduce the consumption of ink cartridges and paper.

Air-conditioning and lighting control

- Except for peak commute hours, only half of the lights in basement shall be switched on to reduce unnecessary consumption
- Curtains shall be half drawn during summer to block out sunlight and reduce the use of air conditioning
- Implement time-sharing zoning lighting management through management measures such as lighting zoning control, voice control switch in the staircase complex building area, and installation of timing switch devices
- Property management staff shall conduct daily inspection as scheduled and turn off lights in office area to avoid unnecessary lighting
- Air-conditioners shall be turned off in advance before leaving to maintain room temperature at normal level

Water saving in office

- Promoting the use of water-saving appliances
- Reconstructing domestic water pipeline network to prevent water dripping and leakage

GCL Group and its subordinate business sector green office initiatives

Improving the greening rate of office area

- The site area of the GCL Group Energy Center is 85,000 square meters with a GFA of 174,000 square meters and a green area of 75,000 square meters. The greening rate reaches 88.23%.
- A green wall of around 120 square meters is set on the first floor of the second phase of office building of GCL Group and more than 400 pots of green plants are planted in the office area.

Reduction of disposables

- Encouraging employees to bring their own water cups, and encouraging visitors to use the company porcelain cups.
- Using hand towels or hand dryers instead of kitchen paper
- No disposable flatware is used
- Reusing with plastic bags, cartons, paper bags, and filled containers
- Using a rechargeable battery
- Printing business cards using renewable paper

Advocating green commuting

- Advocating employees to travel green, use public transportation, and avoid non-essential business trips.
- GCL New Energy builds its own photovoltaic parking shed in the operating power station, and adopts the operation mode of low-voltage grid connection of "spontaneous self-use, surplus power is connected to the Internet" to promote employees to commute by using electric vehicles

Waste classification and recycle

- Contacting community to organize seminar on waste classification and broadcasting knowledge of waste classification on screens in restaurants and lobbies to promote waste classification
- Classifying waste into hazardous waste, kitchen waste, recyclable waste and other waste in strict compliance with standards and all wastes shall be disposed within the same day
- Responsible for recyclable wastes (such as paper shells, cartons, etc.) generated by employees in daily work

Our continuous efforts in green office have resulted in a number of certifications. During the reporting period, GCL TECH received the *Green Organization Certification Certificate* issued by the Hong Kong Environmental Campaign Committee.

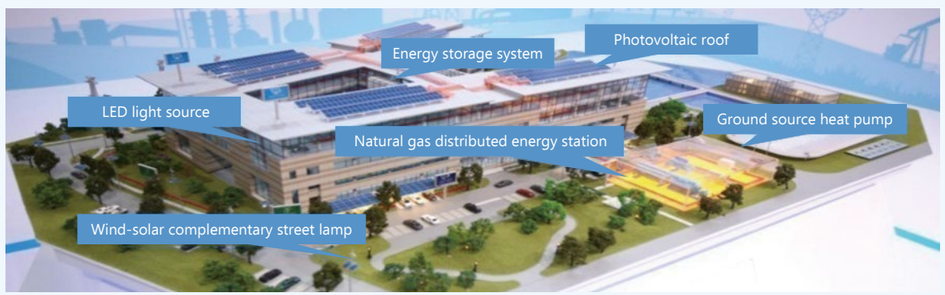
Green Organization Certification Certificate for GCL TECH

Green Factory

GCL Group is fully aware that tackling climate change and achieving sustainable development is the social responsibility that an enterprise should fulfill. Relying on our unique advantages in energy and digitalization, we continuously build low-carbon factories with technology, and strive to improve the construction of green and low-carbon factories, while bringing a zero-carbon future into reality.

GCL New Energy: Construction of zero-carbon industrial parks

In 2021, under the overall planning and leadership of GCL Group, GCL New Energy started the preliminary work of zero carbon industrial parks in Zhundong, Baotou, Ordos, Wuhai, Yinchuan and other places. With the goal of "zero-carbon energy consumption", these parks will provide 100% green electricity for several large-scale production and manufacturing bases planned by the Group in southwest and northwest China. Featuring the integration of "source, network, load, storage, hydrogen, bigness, intelligence, materials, migrability and cloud", these parks contribute to the building of a zero-carbon green circular economy integrating development, construction, operation, and energy management services.



GCL Power: "Garden-style Power Plant" built by Xinjiang Guoxin Coal Power Energy Co., Ltd.

In 2021, Xinjiang Guoxin Coal Power Energy Co., Ltd. achieved 8.04 billion of electricity generation with over 6,000 hours of utilization of the units. Among them, Unit 1 was under continuous safe operation for 315 days, and no abnormal events with environmental parameters occurred throughout the year. The Group optimized the start-up procedure parameters of the units by such means as putting into operation the deaerator heating in advance and using bypass to increase the heat load of the boiler, so as to meet the operation parameters of environmental protection facilities as soon as possible. It also controlled the operation time of denitration facilities to significantly reduce the emissions generated by the plant, thereby contributing to the construction of a green power plant. At the same time, the Group actively responded to the call of the state and the government. In 2021, it newly planted 700 crown-of-thorns and 2,400 elm trees. As of now, the Group's green area has reached 7.8 hectares, and the Gobi-based power plant is gradually turning into a "garden-style power plant".

GCL-ET: Investment and construction of the distributed energy project for China-Malaysia Qinzhou Industrial Park

In January 2021, the distributed energy project for China-Malaysia Qinzhou Industrial Park invested by GCL-ET was fully completed and put into operation, where two 75 MW gas-steam combined cycle units were officially put into operation. The project provides comprehensive energy services such as heat, electricity and cooling for the China-Malaysia Qinzhou Industrial Park. With the advantages of safety, high efficiency, energy saving, environmental protection and low carbon, it can effectively reduce the energy cost of enterprises in the park, playing an important role in driving the development of green industries in the China-Malaysia Qinzhou Industrial Park.

GCL S.I.: Construction of a Gigafactory project in Hefei

GCL S.I. (Hefei) Phase I 15GW component project covers an area of 55.47 hectares with the total construction area of about 530,000 square meters. The huge factory and workshop areas required more sophistication in logistics planning. Through the reasonable setting of gate-keeping functions and truck routes, GCL S.I. (Hefei) ensured the smooth flow of trucks in the factory, reduced unnecessary waiting time and extended the transportation distance, greatly improving the turnover efficiency of logistics vehicles in the factory. As of now, the North District of the factory has achieved an average daily throughput of 230 vehicle-times, with a peak throughput of 330 vehicle-times.

In addition to the planning of the transportation of goods in the factory, GCL S.I. (Hefei) made great efforts in the planning of internal logistics of the factory. The logistics handling in the plant is electric powered, which reduces the operating cost by more than 50% compared with the traditional fuel trucks. Through the rational planning of logistics routes, the cargo handling distance is reduced by more than 30%. Through the introduction of WMS and MES systems, the accuracy of one-time handling is greatly improved, and the turnover of materials and finished products is reduced, so is the repeated handling. Through a series of technical measures, GCL S.I. (Hefei) has greatly improved efficiency while reducing the carbon emissions produced by the plant operation.

Environmental Protection

GCL Group is committed to being a pioneer in energy conservation and environmental protection. During the reporting period, we carried out various forms of green culture construction activities. Through regular environmental protection training and assessment, we continuously improved employees' awareness of environmental protection and ensured that employees abide by and practice their responsibilities for green production. At the same time, we actively promoted the popularization of environmental protection knowledge by holding various forms of public-spirited environmental protection activities, and created an all-hands-on-deck environmentally friendly environment with unique GCL characteristics. During the reporting period, we carried out a number of environmental protection training programs, covering environmental pollution, basic legal knowledge popularization on environmental protection, environmental risk factor identification, etc. The training totaled 9,251 hours, with 17,345 person-times participating and a coverage rate of 100%.[2]

During the reporting period, the training totaled

9,251 hours

The training totaled

17,345 hours

The training coverage rate has reached

100 %

Grassroots enterprises carry out a number of environmental protection training programs

Xinjiang GCL provides basic training on environmental protection knowledge for all new employees (including regular employees, dispatched labor and outsourced construction personnel), which mainly covers environmental protection laws and regulations, corporate environmental management plan, environmental emergency response, etc. In January 2021, Xinjiang GCL's Environmental Protection Management Department carried out a special training program on environmental protection knowledge entitled "Beautiful Xinjiang, I am an Actor". In April 2021, in conjunction with the production and construction section Xinjiang GCL's Environmental Protection Management Department organized the training entitled "Special Environmental Protection Education on Promoting the Capacity Building for Environmental Emergencies with Case Studies" with 531 participants. In June 2021, in conjunction with the production and construction section Xinjiang GCL's Environmental Protection Management Department organized the training of "Environmental Protection Laws and Regulations", in which a total of 1,002 employees participated.

Funing GCL's environmental protection training is carried out according to their own annual training plan. The training mainly covers prevention and control of air pollution, noise pollution, water pollution, solid waste pollution and other topics of environmental protection management. Through case studies, the training has improved employees' consciousness of environmental laws and regulations. Training on the operation of environmental protection and treatment facilities has enhanced the operating ability of relevant employees, thereby ensuring the stable operation of the facilities.

[2] The data concerning the duration, cumulative number of trainees and coverage rate of the environmental protection training cover the four listed companies under GCL Group: GCL TECH, GCL-ET, GCL New Energy and GCL S.I.

GCL Group: Carrying out various forms of environmental protection activities

On the occasion of the "June 5" 2021 World Environment Day, more than 40 employees of Jiangsu Zhongneng walked into Xuzhou Jinlong Lake Park to carry out the theme activity of "Harmonious Coexistence between Man and Nature". At the activity site, the leaders of Jiangsu Zhongneng shared with the employees the origin and history of the "June 5" World Environment Day, and actively interacted with them on related environmental issues.

In 2021, Rudong GCL Environmental Thermoelectric Co., Ltd., a subsidiary of GCL-ET, carried out the themed activity of "Cherish Water and Care for Water". By issuing water-saving and water-protecting proposals, environment-friendly shopping bags and other materials, it publicized the knowledge of water conservation and protection, introduced tips to save water, and appealed to employees to save water. This water-saving publicity activity enhanced the awareness of water saving among employees and helped to translate the concept of water saving into habitual thinking and daily behavior.

Xinjiang GCL held the launching ceremony of the June 5 World Environment Day under the theme of "Harmonious Coexistence between Man and Nature". Middle and senior leaders of Xinjiang GCL and leaders of the Environmental Protection Bureau of Zhundong Economic Development Zone attended the launching ceremony together to help build a better environment. Taking the World Environment Day as an opportunity, Xinjiang GCL organized a one-week environmental publicity campaign to create an enabling atmosphere for all employees to pay attention to environmental safety and take part in environmental action, so that the GCL management philosophy of "safety is the root, economic performance is the foundation and environment is priority" was fulfilled with practical actions. At the same time, all employees were required to learn the *Code of Conduct for Environmental Protection*, promote green production and green way of life, and reduce resource consumption and pollutant emissions.

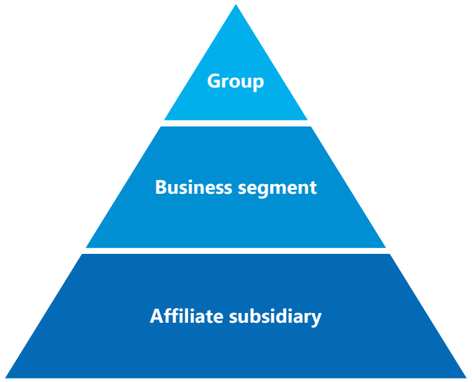
Environmental Management

GCL Group and its various subsidiaries strictly abide by national and local laws and regulations on environmental protection including the *Civil Code of the People's Republic of China*, the *Environmental Protection Law of the People's Republic of China*, the *Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution*, the *Environmental Impact Assessment Law of the People's Republic of China*, the *Law of The People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste* and so on. Combined with technology innovation and practice, we increase funding for environmental protection and actively promote environmental management from the aspects of system construction, emergency management, energy conservation and consumption reduction, resource utilization and emission reduction.

System Construction

The Group has set up a three-level (group-sector-enterprise) environmental management system, issued policy documents in combination with the practical situation of different industrial sectors, and developed a series of regulations such as the Environmental Protection Regulation. The environment and safety department has been set up at every enterprise in each business sector to supervise and guide the enterprise's daily operations involving environmental aspects. By the end of the reporting period, 23 subsidiaries of GCL Group had passed ISO 14001 environmental management system certification, forming a sound environmental management system.

GCL Group integrates environmental factors identification and environmental monitoring into the whole process of project design, construction and operation. We strictly implement the "Three Simultaneities" *Regulation on EHS of Projects* in the construction, reconstruction and expansion projects, submit the environmental monitoring data and the environmental impact assessment report in time to the local government departments, so as to improve the environmental management performance.



GCL Group's three-level environmental management system

Energy Management

The Group has established a unified, orderly and efficient energy management system, which can effectively support the implementation of low-carbon production and energy saving goals, strengthen energy management, and make the best use of limited energy. We actively promote the work of energy saving and consumption reduction, and take measures from three aspects of promoting energy saving transformation, strengthening energy management and optimizing energy structure to continuously reduce our carbon emissions.

Promotion of energy-saving changes

- Traditional lighting is replaced with LED energy-saving lighting, for which energy efficient products are selected;
- Production processes are improved to increase efficiency and reduce energy consumption;
- Energy-saving technical change is carried out on some production equipment to reduce power consumption;
- Traditional street lights are replaced with solar or wind lamps in some areas.

Better energy management

- Policies such as the *Energy Conservation Management Post Responsibility System* were introduced to strengthen energy management;
- Energy consumption data is collected online by digital means to form reports, compare and analyze energy consumption, and deal with possible problems in time;
- An energy use management system is established with set energy saving targets.

Energy mix optimization

- The technical improvement of waste heat recovery devices is actively carried out;
- Technical changes are optimized in water supply, power supply and heating systems;
- The proportion of renewable energy used is increased.

Capitalizing on the unique technical advantages in photovoltaic power generation and self-built distributed photovoltaic projects, we constantly improve the utilization ratio of renewable energy. When designing and planning for the energy center of the headquarters, we reserved spaces for facilities such as rooftop solar power system, lake solar power system and wind power generation for street lighting. Through the above projects, our green electricity usage ratio has been continuously improved and the cost of purchased electricity and our carbon emission in the daily operation have been reduced.

GCL Group's rooftop PV project

GCL S.I. maximizes the utilization of roof resources to collect solar energy, including the roof of workshops and warehouses of about 200,000 square meters. It has designed and installed a 24 MW distributed photovoltaic power station for daily use in the production of the base; moreover, solar collectors are installed on the roof of the general-purpose building and the dormitory for on-duty workers for the energy use in the accommodation and living of employees. After the completion of the project, the annual power generation will be about 22.23 million KWH, saving 7,410 tonnes of standard coal and reducing 19,414.2 tonnes of carbon dioxide emissions.

Jiangsu Zhongneng has built a rooftop distributed photovoltaic power generation system with a capacity of 1.1MW on the roof of the energy pavilion, eastern cafeteria and activity center. The renewable energy power generated is used for power consumption in the daily operation of the company. The daily average power generation of the project is not less than 2,901.98 KWH.

GCL-ET : Constructing wind-solar complementary street lamps and developing green lighting mode

In 2021, two wind-solar complementary street lamps were put into use in the gasification station area of Zhaoqing Gas Turbine LNG under GCL-ET. Renewable solar and wind energy were used to generate electricity, which avoided the laying of a large number of electrical devices and high electricity costs, eliminated the emission of pollutants and saved electric energy.

At the same time, we actively explored potential low-carbon technologies and carried out a number of energy-saving technical renovation projects to effectively improve energy efficiency.

GCL TECH: A series of energy-saving technical improvement projects

Production line renovation with water process in the reduction furnace chassis

In order to further reduce the steam consumption in rod-shaped silicon production, GCL TECH increased 0.2mpa steam by-production through continuous transformation of the water process in the reduction furnace chassis, and at the same time reformed the steam supply process to increase 0.2mpa steam consumption to match the above technical transformation project, thereby truly making full use of everything and further reducing the steam consumption per unit of production.

Production line renovation with cleaning machine

By adjusting the high flow and long overflow of the cleaning machine to overflow with material plus water spray, Suzhou GCL reduced the high-power heating of the fast heating tank. The temperature of the cleaning machine was reduced by 5% to reduce the internal high-power heating. With the change of overflow mode and tank function, the power and water consumption of a single machine decreased significantly by about 598 KWH and 5.83 tonnes on average, respectively.

During the reporting period, GCL Group's energy consumption and greenhouse gas emissions at the operational level are as follows:

In 2021

Coal	3,516,763.22 Tonne
Natural gas	2,279,480,927.60 Cubic meter
Diesel	2,591.54 Tonnes
Purchased electricity	2,232,220.52 MWh
Steam	1,177,405.00 Tonnes
Direct energy consumption	5,547,509.72 Tonnes of standard coal
Indirect energy consumption	425,754.18 Tonnes of standard coal
Comprehensive energy consumption [3]	5,973,263.90 Tonnes of standard coal
Direct energy consumption density	1.44 Tonnes of standard coal/ Per 10,000 CNY of revenue
Indirect energy consumption density	0.11 Tonnes of standard coal/ Per 10,000 CNY of revenue
Comprehensive energy consumption density	1.55 Tonnes of standard coal/ Per 10,000 CNY of revenue
Scope I greenhouse gas emissions	10,415,601.22 Tonnes of CO_2e
Scope 2 greenhouse gas emissions	365,017.46 Tonnes of CO_2e
Total greenhouse gas emissions (Scope I + Scope II)	10,780,618.68 Tonnes of CO_2e
Comprehensive greenhouse gas emissions density	2.80 Tonnes of CO_2e /Per 10,000 CNY of revenue

[3] The comprehensive energy consumption was calculated with reference to the *GB/T2589-2020 General Rules for Calculation of the Comprehensive Energy Consumption (the National Standards of the People's Republic of China)*, including:

1) GCL-ET : coal, natural gas, diesel and purchased electricity;
2) GCL New Energy: diesel and purchased electricity;
3) GCLS.I.: natural gas and purchased electricity;
4) GCL TECH: coal, natural gas, diesel, purchased electricity and steam.

Resource Use

GCL Group earnestly strengthens the utilization and management of resources and is committed to maximizing the value of limited resources. During the reporting period, we carried out a number of process improvement projects, strengthened technical transformation, and upgraded traditional equipment to effectively improve the efficiency of resource use.

Water resources management

We strengthen water resources management in strict compliance with the *Water Law of the People's Republic of China* and other relevant laws and regulations. During the reporting period, a number of water-saving technical renovation projects were carried out continuously to prevent dripping and leakage in daily operation, so as to achieve the dual benefits of resource saving and reducing the operating cost of the enterprise. During the reporting period, several subsidiaries of the Group were awarded the title of "water-saving enterprise".

GCL S.I.: Building a demonstration factory of "green architecture"

When planning the factory, GCL S.I. (Hefei) referred to the standard of "sponge city". A large number of concave green spaces were set up to collect rainwater for site greening irrigation and road washing. The annual utilization of rainwater is about 29,458 cubic meters. The ground parking space is equipped with pervious pavement, with a total pavement area of 10,916.45 square meters. Water-saving appliances are adopted in daily operation with efficiency not lower than Level 1. More than 90% of the green areas in the factory are sprinkled by micro-sprinkler irrigation to further improve the water-saving effect.

GCL-ET: Creating a "Water-saving Unit"

In 2021, Xuzhou Renewable, a subsidiary of GCL-ET, analyzed water balance across the factory. It vigorously managed the dripping and leakage defects in all water use links, improved the integrated recycling of wastewater such as concentrated water from ultrafiltration and from nanofiltration, and ultimately won the title of "water-saving advanced unit" issued by the Xuzhou Office of the Leading Group for Building a National Water-Saving City.

In 2021

Total circulating water consumption

188,947,886.40 tonnes

Total comprehensive water consumption

39,259,959.72 tonnes

Intensity of water consumption

10.18 tonnes /Per 10,000 CNY of revenue

Materials management

GCL Group attaches great importance to the economical use and management of materials in production, and strictly manages all kinds of materials and packaging materials involved in the production process of each business sector. GCL TECH will collect and verify the Raw and Auxiliary Material Safety Data Sheets (SDS) involved in relevant production, and utilize the material in production after full verification by experiments.

GCL TECH: Subsidiaries carry out technological transformation of process flow for material saving

Jiangsu Zhongneng adopts the silane process for its high-purity crystalline silicon replacement and upgrading project which has the characteristics of short production process, low energy consumption and continuous production. Comparing to rod-shaped silicon, the overall production cost of granular silicon has decreased by approximately 30%, hydrogen consumption during production process has decreased by 40%, labour cost has decreased by 65%, and the power consumption of the whole process has decreased by 70%. In addition, The quality of granular silicon products produced by this project has reached electronic-grade standards. The technical process has shown satisfactory performance in environmental protection and we have independent intellectual property rights thereof. With such process, we have achieved a breakthrough in closed cycle of material and the localization of core technologies and equipment, filling the gap of silane gas technology in China.

Through technical transformation, Xuzhou Photovoltaic collects and dedusts the tail gas of the monocrystal furnace and removes oxygen, hydrocarbons, carbon monoxide and other impurities from the tail gas to obtain pure argon gas, which can be used as the raw material for the production process of Czochralski monocrystal pulling. With the technical transformation, recycling of argon gas can be realized and the volume of production materials can be greatly reduced, thereby reducing the production cost of products. It is estimated that 20 million CNY can be saved every year.

In 2021, Funing GCL completed the transformation of automatic dispensers used in the viscose process. With the technical transformation, 558,144 CNY worth of glue materials and 13,824 CNY worth of paper cups can be saved every year. In addition to saving materials, the weight of hazardous waste (empty plastic drums) generated reduced by 1.97 tonnes.

Compliance with Emission Regulations

In strict compliance with the *Air Pollution Prevention and Control Law of the People's Republic of China*, *Water Pollution Prevention and Control Law of the People's Republic of China*, *Law of the People's Republic of China on Prevention and Control of Environmental Pollution by Solid Waste*, *Integrated Emission Standard of Air Pollutants* and other laws and regulations, we classify and mange exhaust gas, wastewater and solid waste generated during the daily operation in accordance with the standards and requirements of the Company. Our discharge of exhaust gas and wastewater meets or exceeds national standards, and solid waste is handed over to qualified third-party institutions according to their categories for disposal as required.

Waste water management

GCL Group strictly implements wastewater discharge management in compliance. All subsidiaries involved in wastewater discharge are equipped with wastewater treatment facilities and production wastewater pretreatment facilities, and carry out daily maintenance and repair of environmental protection facilities, so as to ensure that wastewater treatment facilities meet production and environmental protection requirements and pollutant discharge standards.

GCL TECH: Wastewater system upgrade

During the reporting period, Suzhou GCL expanded the capacity of its wastewater system and upgraded its treatment capacity from 3,600 tonnes/day to 6,000 tonnes/day, which fully met its demand for capacity improvement and ensured that wastewater was effectively treated and discharged to the standard. The main renovation projects are as follows:

- High-concentration wastewater treatment unit was reformed to improve the treatment capacity;
- Outdated water pumps were replaced with high-efficiency pumps to stabilize wastewater transport capacity;
- Two high-efficiency diaphragm filter presses were installed to improve sludge disposal capacity;
- The mud-water separation module and submersible flow propeller were added to improve the pretreatment effect of the hydrolysis and acidification tanks;
- Two micro-sand rapid sedimentation systems and one air flotation treatment device were installed to improve wastewater treatment capacity;
- The exhaust gas system of wastewater station was improved with fiberglass reinforced cover added to the adjustment tank, sludge tank, aerobic tank and accident tank to improve the environment of the site.

Renovation of iron-carbon tank

Pouring silty

Cleaning settling tank I

Renovation of settling tank II

Renovation of hydrolysis tank

During the reporting period, GCL Group's wastewater discharge data are as follows: In 2021

Total wastewater discharge	Waste water discharge density
6,701,683.34 Tonnes	1.74 Tonnes /Per 10,000 CNY of revenue

Exhaust Gas Emission Management

Our exhaust gas pollutants mainly come from nitrogen oxides, sulfur dioxide and dust particles produced in the production process. We have formulated system documents such as the *Procedures for Controlling Production Exhaust Emissions* and other internal companies to supervise and manage waste gas emissions. We recycle tail gas through exhaust gas absorption device, remove workshop dust by dust removal and purification devices such as dust removal bags, and collect the ammonia and hydrogen sulfide gas discharged from the sewage station by the application of "sprayed, ionized and activated carbon" adsorption device and discharge after purification treatment. In addition, we engage qualified third parties to monitor our exhaust gas emission on a regular basis. Some of our subsidiaries have maintained environmental liability insurance.

GCL TECH: Technical transformation of the exhaust system of the production line at a subsidiary

During the reporting period, Suzhou GCL invested 1.18 million CNY to upgrade its exhaust system of wafer cutting system, degumming system and cleaning equipment of production lines in its workshop and install VOCs (Volatile Organic Compounds) and dust treatment systems. The treatment processes include spray tower, UV (Ultraviolet Rays) photolysis catalysis, activated carbon filtration and adsorption box (column activated carbon) and activated carbon fiber sheet adsorption box, which ensure that the exhaust gas emission of the workshops meet the standard.

During the reporting period, GCL Group's exhaust emission data are as follows: In 2021

Nitrogen oxides	Sulfur oxide / sulfur dioxide	Dust
2,599.37 Tonnes	387.03 Tonnes	105.21 Tonnes

Waste Discharge Management

According to the situation of each affiliated company, GCL Group categorizes, collects and disposes solid waste in the *Management and Control Procedures for Waste and Hazardous Waste and the Management Regulation for Three Wastes* and other extensive regulations. Besides, GCL Group adheres to the waste management principle of volume reduction and recycling, solid wastes are disposed properly based on the categories.

For general solid waste, we have built storage yards in accordance with the requirements of "anti-leaching, anti-seepage and anti-scattering" and engaged qualified third parties for the recycling and reuse of recyclable general solid waste. We have implemented four-level duplicated form management system and sludge transfer confirmation system. For hazardous waste, we have set up temporary storage sites and engaged qualified third parties for centralized disposal. We adopt five-level duplicated form management system for the transfer of hazardous waste to achieve the traceability of transfer of hazardous waste.

GCL TECH: Highlights of waste reduction

- During the reporting period, Ningxia GCL recycled waste oil with vacuum pump and newly installed oil mist purifier treatment system. An acid mist washing tower equipment was also installed to reduce acid washing exhaust gas emission.
- GCL High Tech Nano Materials (Xuzhou) Co., Ltd. ("Xuzhou High-tech") invested 8.95 million CNY for the purchase of environmental protection facilities such as tail gas treatment devices, sewage treatment facilities and bag filter and maintenance of wastewater pool, which facilitated the reuse and recycling of "three wastes" with significant environmental and economic benefits. Xuzhou High-tech was able to make social and economic contributions while deriving environmental benefits.
- Jiangsu Zhongneng repaired the rooftop of the hazardous waste warehouse and newly installed hazardous exhaust gas treatment facilities.

High-tech invested in procurement of environmental protection facilities

8.95 million CNY

During the reporting period, GCL Group's solid waste discharge situation is as follows:

In 2021

Hazardous waste	Hazardous waste discharge density
55,488.61 Tonnes	0.01 Tonnes /Per 10,000 CNY of revenue

Non-hazardous waste	Non-hazardous waste discharge density	Recyclable waste
2,222,596.07 Tonnes	0.58 Tonnes /Per 10,000 CNY of revenue	714,413.35 Tonnes

Emergency Response

GCL Group strictly complies with the national and local management systems such as the *Environmental Emergency Management Measures and the National Environmental Emergency Plan*. All business segments have formulated system documents such as the *EHS Accident Management Regulation*, *Provision of Emergency Management* and *Contingency Plan for Environmental Pollution Incident*. Environmental emergency management has been carried out from multiple perspectives, including emergency management of environmental emergencies, risk assessment, emergency plan filing, emergency training, emergency drill, emergency rescue team building, and emergency equipment and material reserves, to continuously improve the ability to respond to environmental emergencies.

GCL-ET: Carrying out emergency drills for hazardous waste leakage

In 2021, Lianyungang Xinneng, a subsidiary of GCL-ET, carried out special emergency drills for hazardous waste leakage. In the context of waste oil leakage emergencies, emergency plans were launched, and simulated actual practice was implemented. Through targeted drills employees' mastery of emergency disposal steps for hazardous waste leakage improved, and the impact of accidents was reduced.

GCL New Energy: Regular flood control emergency drills

GCL New Energy carries out emergency drills for flood control regularly. Under its unified arrangement, the Central China Regional Company's Jiangling GCL power station and Anfu GCL power station, Henan Regional Company's Yongcheng Xinneng power station, Southwest Regional Company's Yuxi Zhongtai power station and other operating power stations actively implement the emergency response work for heavy rain weather, timely inspect and discharge logged water everywhere, and take various effective measures to ensure the safe and stable operation of power plant equipment.

03

Technological Innovation

The innovation and development of science and technology is constantly promoting the economic and societal change and progress, and digital technology is profoundly affecting the production and life style of human society with unprecedented explosive power. Upholding the concept of "technological innovation to promote sustainable enterprise development", GCL Group has etched technological innovation into its DNA, adhering to customers as the center and technology as the drive of enterprise development. Together with industry partners, we take the path of digital empowerment, committed to becoming a technology innovation-oriented enterprise and enhancing the corporate image of "Technological GCL" and "Digital GCL".

Excellent Products

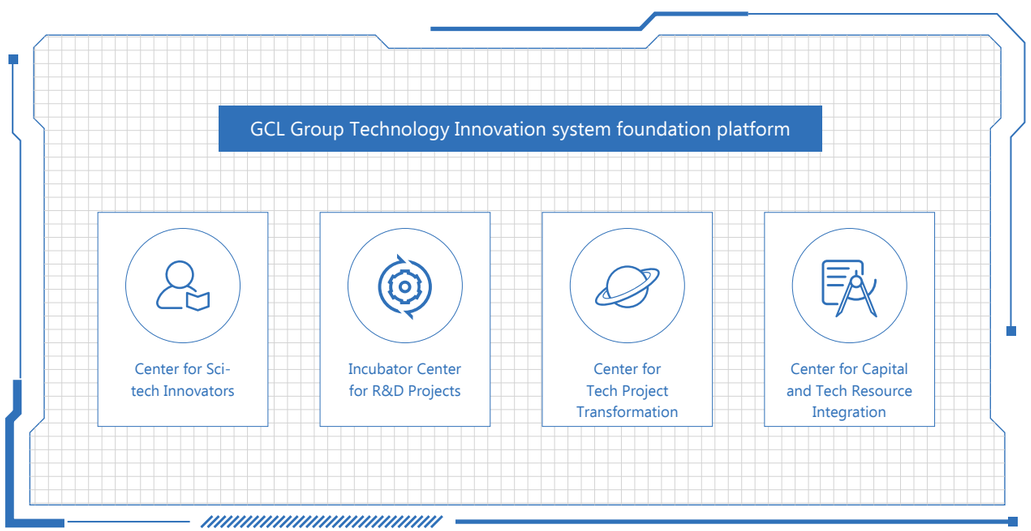
Committed to innovation while forging ahead, GCL Group adheres to the basic innovation policy of "innovation as the soul, customers as the orientation and resources as the guarantee". GCL Group continuously increases its R&D investment to build a platform for technological innovation and research, deepens the construction of R&D talent echelon, and continuously improves its technological R&D capability. While focusing on innovation, we persistently improve the quality and customer service system, provide customers with quality products and services, and constantly improve customer satisfaction.

Technological Innovation

GCL Group firmly believes that technological innovation is the fundamental driving force of its sustainable development. In order to strengthen the Group's technology management, promote the development of its industries, and enhance its core competitiveness and sustainable development ability, we have formulated internal systems such as the Technology Management System and the Management Measures of Technological Projects according to the relevant national regulations on technology management. At the same time, through the system construction, we improve the Group's technology management system, clarify the functions of various departments, and promote the institutionalized and systematic management of the Group's technologies including the planning, projects, achievements, technical standards, talents, capacity building, incentives, and assessment and evaluation and so on.

Technology innovation management

To consolidate the systematic enterprise innovation, research and application system, GCL Group coordinates the overall technological innovation work. . A global innovative R&D system has been formed with the GCL Central Research Institute as the innovation carrier, eight domestic R&D branches as the pillar, and international R&D centers located in the United States and Japan and other countries as the international R&D resource-pooling platform. The Group is committed to building the foundation platform for its technology innovation system, establishing a broader technology innovation mechanism and platform, and making technological innovation a common practice in the enterprise.



Technological talent management

The first-class research team is the guarantee of continuous innovation of GCL Group and the key to our competitive advantage. We have set up world-class R&D centers and incubators in many countries and regions, and established a scientific research team made up of more than 3,000 experts from home and abroad with strong innovation ability, as well as academician and postdoctoral workstations, helping the Group make solid breakthroughs in terms of key equipment, advanced production technology, and frontier technology reserve. In order to promote the construction of "Technological GCL", we make scientific research plans based on our own development strategy and market trends, hire experts in the field and top experts in the industry, and constantly enrich the R&D talent pool.

Jiangsu Provincial (Xinhua) Engineering Technology Research Center for High Purity Silicon in Integrated Circuits

During the reporting period, Xinhua Semi was approved to build the Jiangsu Provincial (Xinhua) Engineering Technology Research Center for High Purity Silicon in Integrated Circuits. It is committed to building a domestic first-class semiconductor materials research and development base with high international standards. To this end, it has cultivated a batch of technical personnel with rich experience in semiconductor materials, given full play to its technological leading role, and constantly enhanced the domestic level of semiconductor materials research and manufacturing, thereby driving the rapid development of the integrated circuit industry.

Xinhua Semi Engineering Technology Research Center is well versed in the continuous research and development of electronic-grade polysilicon equipment, raw materials, peripheral applications and other related fields, focusing on the basic theoretical research and application technology development in electronic-grade polysilicon and related technology fields. It constantly improves the existing electronic-grade polysilicon production technology to make the products' quantitative indicators such as resistivity and impurity concentration, stability, crystal structure and other hidden indicators reach the international first-class level.

In order to continuously stimulate the enthusiasm and creativity of researchers and enhance the technological competitiveness of GCL Group, we set up a scientific research fund and reward teams and individuals who make outstanding contributions to technological innovation and achieve various technological outcomes. According to the relevant laws and regulations of the state, we have formulated the Technological Achievements Incentive Management Measures to further standardize the management of incentives by clarifying the rewarding methods, selection standards, application procedures, rewarding workflow, among others, so as to ensure the fairness and impartiality of the selection and that the technological achievements rewarded are well deserved. In addition, we have two kinds of technological incentives: annual evaluation-based awards and immediate awards. Adhering to the principle of combining spiritual encouragement and material reward, we issue certificates of honor and bonuses to the winning teams and individuals for their technological achievements.

Annual evaluation–based awards

Awards are issued once a year based on centralized evaluation, mainly including:

- Science and Technology Innovation Award
- Excellent Intellectual Property Award
- Technical Progress Award
- Outstanding Science and Technology Talent Award

Immediate awards

Awards are issued for technological achievements created in real time, mainly including two categories:

- Intellectual property awards
- Government project filing awards

R&D achievements

GCL Group sticks to the road of innovation by committing itself to production process and technology innovation, and has built a number of projects included in the National Key R&D Program. During the reporting period, Xinhua Semi won the "2021 Jiangsu Provincial Science and Technology Award".

2021 Jiangsu Provincial Science and Technology Award

GSL Optoelectronics: Key materials and macro preparation technology for a new generation of perovskite solar cells

In cooperation with the current domestic top research institutes related to cast monocrystalline and enterprises related to crystal growth and battery components, the project has its members including Zhejiang University, Tsinghua University, Shanghai Jiao Tong University, Institute of Microelectronics of Chinese Academy of Sciences, Wuxi Product Quality Supervision and Inspection Institute and other well-known research institutions, as well as famous domestic PV enterprises and equipment manufacturers across the industry chain such as GCL Group, CSI Solar, Trina Solar, Sunport, and S.C. In accordance with the route of theoretical research - key technologies - development of advanced equipment - establishment of demonstration line, the project mainly studies the impurity transport and defect mechanism of cast monocrystalline, and on that basis, combines thermal field simulation to develop high-quality cast monocrystalline silicon wafer. It is also intended to design advanced cell structure according to the characteristics of cast monocrystalline, so that the efficiency exceeds 25%, to develop advanced contact passivation equipment and establish demonstration line, and on that basis, to formulate four group standards for testing and performance evaluation of crystalline silicon materials, batteries and equipment.

At present, we constantly optimize the thermal field and process for the growth of high-efficiency cast monocrystalline silicon materials and provide high-quality cast monocrystalline experimental silicon wafers in line with the relevant requirements to Tsinghua University, Trina Solar, CSI Solar and other research units. At the same time, feedback is given regarding the experimental results and improvement suggestions are put forward at the professional level. We have successfully achieved the following results: The boron emitter saturation current density is lower than 20 fA/cm^2, and the actual density is 9.8fA/cm^2; The carrier saturation current density of SiOx/Poly-Si passivated contact structure is lower than 10 fA/cm^2, and it actually reaches 6.8fA/cm^2; Moreover, combined with GCL high-quality polycrystalline silicon wafer, using efficient boron emitter preparation technology and passivation contact technology matched with advanced metallized low shading and high contact performance technology, we have prepared the solar cell certified by the third party of Germany ISFH with conversion efficiency of 24.71%.

As of now, the project has published four papers at home and abroad and applied for eight invention patents. We have carried out research on the cast monocrystalline silicon material and battery standard sub-system and formed eight standards and reports including the *Research Report on Cast Monocrystalline Silicon Materials and Battery Standard Sub-system*, draft group standard for comment the Electric Parameters Testing Method for Crystalline Silicon Double-sided Battery, draft Special Report on the Research of Electric Parameters Testing Technology for Crystalline Silicon Double-Sided Battery, draft group standard for comment Technical Specifications for Cast Monocrystalline Silicon Material Testing and Performance Evaluation, the *Report on Cast Monocrystalline Cells and Component Reliability Evaluation and Analysis*, and draft group standard for comment *Specifications for Evaluation of Key Technologies of Low-pressure Chemical Vapor Deposition Equipment (LPCVD) with High Yield and High Uniformity.*

GCL TECH: Research on key technologies of high-efficiency and low-cost crystalline silicon solar cells

Xuzhou Photovoltaic is committed to the research and development of high-efficiency and low-cost crystalline silicon solar cells based on its own experience and expertise in cooperation with domestic top cast monocrystalline-related research institutes and enterprises related to crystal growth and battery module.

Xuzhou Photovoltaic has conducted in-depth research on the impurity transport and defect mechanism of cast monocrystalline, and on this basis, combined with thermal field simulation, developed high-quality cast monocrystalline experimental silicon wafers that meet relevant requirements to advance the research and development. Xuzhou Photovoltaic in collaboration with scientific research units has carried out key technology research and development and made breakthroughs according to the characteristics of cast monocrystalline. By combining GCL high-quality polysilicon wafers, adopting efficient boron emitter preparation technology and passivation contact technology matched with advanced metallized low shading and high contact performance technology, the solar cell with conversion efficiency of 24.71% was successfully prepared after continuous debugging, which was certified by the third party of German ISFH. At the same time, Xuzhou Photovoltaic developed contact passivation equipment and established a demonstration line. Based on the actual operation of the demonstration line, it has formed four group standards regarding the crystal silicon material, battery and equipment related testing and performance evaluation technology, enabling the future production of efficient and low-cost crystal silicon solar cells.

By the end of the reporting period, the project has published four papers at home and abroad and applied for 8 invention patents, carried out research on the sub-system of standards for cast monocrystalline silicon materials and batteries, and formed eight standards and reports, including draft group standards for comment.

By the end of the reporting period

the project has published four papers domestically and abroad

4 papers

Applied for invention patent

8 papers

Formed eight standards and reports, including draft group standards for comment

8 papers

GCL TECH: Leading the new development of the industry with in-depth engagement in silicon products

As a leader in the domestic polysilicon industry, GCL TECH has developed silane fluidized bed reactor (FBR) granular silicon technology, and after making a breakthrough in 2019 started to commercialize and mass produce a new generation of silicon-based material with exclusive technology -- silane FBR granular silicon. Granular silicon represents the most advanced technological product of the existing silicon materials. It also exemplifies the "Technological GCL" and will become an important technological transition process for PV materials.

During the reporting period, GCL TECH carried out special improvement work for granular silicon, rod-shaped silicon and silicon wafer products, and made significant progress to achieve the purpose of cost reduction and efficiency increase.

"Silicon core batching process optimization" project	"Monocrystalline thermal field upgrade" project	"Large-size slicer renovation" project
Under the premise of ensuring the physical and chemical indicators of silicon core, the original 30-100mm block material was replaced with 1-3mm scrap material as the verification ingredient, thereby upgrading the silicon material formula to further reduce production cost and improve production efficiency.	Reinforcement and expansion was carried out on monocrystalline thermal field currently in use to increase the feeding amount and daily yield.	After transformation, the dicing performance has reached the industry benchmark level. With 20GW capacity, the investment amount of 900 million CNY can be saved. During the reporting period, the 10GW large-size project reached target production.

Intellectual property protection

In order to ensure the continuous advancement of innovation, GCL Group has long regarded it as an important responsibility to respect for intellectual property rights (IPR) and protect its own IPR from infringement. GCL Group adheres to zero tolerance for infringements of IPR and severely cracks down on any criminal acts violating IPR. We strictly follow the *Patent Law of the People's Republic of China, the Copyright Law of the People's Republic of China, the Trademark Law of the People's Republic of China*, the *Anti-unfair Competition Law of the People's Republic of China*, among other relevant laws and regulations and normative documents of the places where we operate. We have built an intellectual property risk management system, and developed the *Intellectual Property Management Standards, Intellectual Property Filing Management Process*, among other internal systems. Through the establishment of the systems, the Group and its subsidiaries have standardized the management of intellectual property rights and patents, established the maintenance and protection mechanism of intangible assets such as patents and trademarks, and actively safeguarded the core interests of the Group in terms of patent rights, trademark rights, copyrights and trade secrets.

During the reporting period, we actively responded to the Outline for Building a Strong Country with Intellectual Property Rights (2021-2035) issued by the CPC Central Committee and The State Council by formulating and issuing the *GCL Group Strategic Action Plan on Intellectual Property for the "14th Five-Year Period"*. In order to enhance the Group's level of IPR creation, utilization, protection and management, we improved the intellectual property management system, optimized intellectual property resource configuration and IPR talent team construction, and set up the Leading Group for Comprehensively Promoting the Strategic Plan on Intellectual Property, which is entirely responsible for implementing tasks related to IPR. We are committed to building a national IPR demonstration and competitive enterprise.

During the reporting period, GCL Group was granted 331 patents, trademarks, copyrights and other intellectual property rights, including 329 patents where there were 32 inventions. By the end of the reporting period, the Group had been granted more than 3,000 patents, including more than 700 invention patents, 100 software copyrights, presided over or participated in the revision of over 100 international and national technical standards, and published 500 papers in core journals.

At the same time, we pay attention to improving the awareness and ability of intellectual property protection among employees at all levels of the Group. We extensively carry out intellectual property publicity, popularization and training, and adopt diversified forms of publicity and dissemination to create an enabling IPR culture and atmosphere within the Group.

During the reporting period

Number of Trademarks, copyrights and other intellectual property rights GCL Group was granted

331

Number of Patents the Group was granted

3,000 +

IPR training

The importance of intellectual property and other intangible assets is increasing. In order to further improve employees' awareness and ability of intellectual property protection, we actively carry out intellectual property sharing and training activities, so that employees understand how to make intellectual property and other intangible assets support the development of the enterprise through strategic layout, orderly planning and scientific operation. At the 2021 Technological and Digital Conference of GCL Group, we invited external intellectual property experts to share with us the experience in intellectual property protection. The audience including executives and middle managers at the conference site and all online viewers reached more than 3,000 person-times.

In the face of intellectual property infringement, we resolutely safeguard our own rights and interests and arm ourselves with legal weapons. During the reporting period, we found low-quality counterfeit GCL components and counterfeit registered trademarks in a poverty-stricken county in a northwestern province. We successfully obtained relevant clues and materials by going to the site for many times to collect evidence and file materials to report the case. In the end, the public security organ issued a notice of acceptance and filing of the "crime of counterfeiting registered trademarks".

Digital Empowerment

In keeping with the development of the times and based on its positioning and business development, GCL Group has formulated the "Digital GCL" strategy to promote informed management, digital production and intelligent decision-making. GCL Group adheres to the IT application strategy. Through digital factories, intelligent production, production system standardization, quality analysis management system, infrastructure management system and other information projects, we have improved production efficiency and quality, promoted refined management, and used data analysis to assist decision-making, so as to serve our operating goals.

During the reporting period, we were actively engaged in the digital empowerment of the enterprise operation and risk management. Through the big data and modeling, we made holistic analysis of the internal and external environment, implemented internal business performance and external analysis of competitors and market. We opened up a data sharing channel to provide early warning analysis and future prediction for the Group's management, so as to elevate the competitiveness of the enterprise. In addition, based on the business development of various industries, we distributed the application of different IT application platforms, formed a dual-core platform, and realized the Group's master data unity at the core of personnel, financial and physical risk management and control. Our continuous layout of a unified digital and information platform and architecture laid a solid foundation for the "Digital GCL" strategy.

GCL Group continuously explores intelligent manufacturing and digital factories to build efficient, energy-saving, green, environmentally friendly, comfortable and people-oriented factories through information integration, human-computer interaction and digital technology. During the reporting period, the "large-size semiconductor silicon wafer dicing and grinding workshop" of GCL Semi was listed in the 2021 List of Intelligent Manufacturing Demonstration Workshops in Jiangsu Province.

Intelligent manufacturing and digital factory

GCL TECH

In 2021, GCL TECH, continued to deepen digital transformation. Through the reform of "three modularizations and one digitalization", including strategic objectives modularization, business values modularization, process systems modularization, and operation conditions digitalization, an efficient and smart operation system was established to help GCL TECH achieve excellent operation.

GCL TECH is committed to building a digital factory. Through industry 4.0 advanced technologies such as AR Hawk-Eye system, thermal imaging inspection system and UAV system, GCL TECH continues to promote the intelligent level of its production and management.

AR Hawk-Eye system

Safety and environmental protection control is ensured through AR real-world application.

Thermal imaging inspection system

The external operation is guided to handle outliers and ensure site safety.

UAV system

Emergency scenarios are displayed on the dispatch screen, realizing on-site emergency command.

In Xuzhou base, an automatic, intelligent and intensive central control system has formed for granular silicon production. Through the cloud big data platform and intelligent analysis and application of whole-chain massive data, one can have a full view of the granular silicon production and R&D bases in Xuzhou, Leshan and Baotou. With a series of remote digital intelligent control technologies co-developed by many domestic cutting-edge enterprises in science and technology, such as robot inspection, system early warning, hawk-eye identification and remote dispatching, the production process at granular silicon bases has been established on the precise and intelligent digital cloud, which improves the production and construction efficiency and reduces the production safety risk.

GCL Optoelectronics

GCL Optoelectronics applies intelligent and digital technology in production lines. Intelligent interconnection has been achieved among the equipment in the factory, which enables equipment energy consumption detection, condition monitoring, remote operation and maintenance and other operations simultaneously, so that GCL Optoelectronics can collect and analyze equipment parameter data anytime and anywhere in the production process. The application of a large number of robots to pick up and put components reduces the contact between products and the outside world, greatly reducing the instability caused by manual operation and improving product stability and pass-yield. In addition, each product is assigned a QR code and uploaded to the system. The system can track the location and status of each product in the factory and ensure product traceability after delivery.

Coating robot

Xinhua Semi

In 2021, the "electronic-grade polysilicon intelligent manufacturing workshop" of Xinhua Semi was listed in the "2021 List of Intelligent Manufacturing Demonstration Workshops to be Awarded in Jiangsu Province" jointly issued by Jiangsu Provincial Economic and Information Commission and Jiangsu Provincial Department of Finance. Using intelligent production equipment, which combines robot technology, robot vision, big data and artificial intelligence algorithm design, Xinhua Semi's electronic-grade polysilicon intelligent manufacturing workshop has realized the automation of silicon rod harvesting process, unification of equipment damage assessment standards, and clarification of equipment cleaning standards. With the effective control of the pollution of impurities introduced in CVD link during the artificial process and due to equipment defect, the content of impurities reduces and the product quality of electronic-grade polysilicon improves greatly.

During the reporting period, the electronic-grade polysilicon preparation technology of Xinhua Semi was recognized by China Electronic Materials Industry Association to reach the international advanced level.

GCL S.I.: Building core competitiveness with "data and digital intelligence"

GCL S.I. highly focuses on digital transformation. Applying diversified IT-based management systems, it has taken the lead in introducing big data intelligent platform in the photovoltaic industry, and is committed to building core competitiveness by relying on "data and digital intelligence".

GCL S.I. has introduced multiple IT-based systems, covering the whole process from R&D design, production and manufacturing to sales management, thus to realize whole-process information support, whole-process data recording and tracing, and integrated control of equipment running and process parameters configuration. These systems improve data timeliness, accuracy and traceability, while saving human cost effectively.

GCL S.I.'s big data intelligent platform is the first intelligent platform for photovoltaic module manufacturing in the industry. Its functional modules cover production processes such as materials, procurement, inventory, planning, and process control, playing a supporting role in finance, human resources and other relevant functional departments. Through the big data intelligent platform, the closed-loop support of the whole production process including pre-production prediction, in-production monitoring and post-production analysis is realized, which completely changes the traditional production mode. In the production and manufacturing stage, relying on the Aliyun big data and intelligent manufacturing system on the big data intelligent platform, a series of intelligent production processes - such as the Automated Guided Vehicle (AGV) automatic scheduling of feeding, automatic transmission of component ID, automatic welding, automatic framing, automatic division - are realized through industrial big data, smart brain and custom-developed factory automation system.

After the application of the whole-process management by IT-based systems and the big data intelligent platform, the production proportion of components that meet the needs of customers has increased significantly. With the emphasis and continuous investment of GCL S.I. on intelligent manufacturing, the newly built component factories and workshops of GCL S.I. have become highly automated and intelligent. During the reporting period, GCL S.I. (Hefei) Gigafactory was successfully put into production.

GCL S.I. (Hefei) Gigafactory

AGV automatic scheduling of feeding

Industrial robot

GCL New Energy: One-stop comprehensive smart energy operation and maintenance

GCL New Energy has actively participated in the national "Photovoltaic Pioneer Plan". Grasping the new development opportunities in the transformation and upgrading, it has adopted the regional smart operation mode, pushing the smart operation and maintenance business into the fast lane with continuous technological progress and its own attributes of specialization.

Different from the traditional management and operation of photovoltaic power stations, GCL New Energy has built a photovoltaic "cloud" platform with complete intellectual property layout, which serves as an intelligent management system of stock assets. In the core business terminal of operation and maintenance, the specialized platform of "GCL Smart Maintenance" is built based on the foundation framework of equipment coding and acquisition protocol standardization, which integrates 17 business subsystems and corresponding functional modules, such as centralized control, dispatching, production and analysis.

Meanwhile, based on the application of intelligent hardware and software technologies such as timely cleaning by intelligent robots, inspection by drones, hot spot detection and IV curve scanning, the three-level management system architecture of "photovoltaic power station - regional center - management center" initiated by GCL New Energy is connected and nested. Three systems are built including intelligent hardware at the photovoltaic power station side, real-time dynamic management of production at the regional center side, and operating big data analysis at the headquarters side, thus a customized and digitalized new mode of smart power station operation and maintenance is created featuring "centralized monitoring, regional maintenance, unattended or less attended operation, intelligent and specialized operation and maintenance" to continuously optimize comprehensive ability in operating and maintaining photovoltaic power stations, leading the industry innovation in the operation and maintenance mode with technological innovation.

证书

CREDENTIAL

苏州协鑫新能源运营科技有限公司：

经组委会专家组认定，贵公司兆点“碳中和下基于 AI 的光伏电站运营后市场研究”获得本届“SNEC 十大亮点评选”：

兆瓦级翡翠奖

特颁此证，以致贺忱并资纪念。

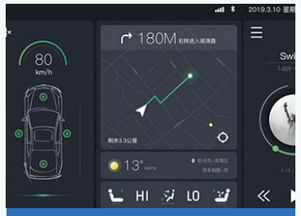
The research results of photovoltaic power station operation and maintenance technology recognized by industry awards

GCL New Energy's intelligent cleaning robot helping smart operation and maintenance

GCL-ET: GCL Energy Hub - Integrated digital operations cloud platform

Based on the strategic transformation from energy production to comprehensive energy services, GCL-ET has established a digital energy research institute, responsible for its digital transition, digital platform planning and implementation, distributed smart energy system, data business scenarios and derivatives, hash rate development, IT application-based management software and hardware management, etc.

Together with a number of upstream and downstream enterprises in the industrial chain, such as car companies, battery manufacturers and travel platforms, GCL-ET has created a mobile energy brand covering the whole industrial chain -"GCL Energy Hub". It has independently developed the first integrated digital operations cloud platform in the field of battery swapping, formed an intelligent Internet of vehicles with "GCL Energy Hub" as the center, and integrated vehicle flow, cargo flow, energy flow, human flow, capital flow and information flow into one operation system. Using digital technology to improve the service capacity of the mobile energy business, it has built an integrated interconnected ecosystem of mobile energy vehicle, station and battery industries. At present, the monthly user stickiness of the digital operations cloud platform exceeds 97%, higher than the industry level.



Intelligent dispatching

- The background intelligent algorithm matches the optimal charging and swapping scheme and driving routes;
- Users can reach the service through apps, mini-programs, self-service terminals, vehicle-mounted service terminals and other channels.

Maximum battery life

- Intelligent management of battery use process is implemented based on big data algorithm to improve the use value and utilization rate of batteries.

Higher energy efficiency

- With energy utilization as the core, an integrated energy data intelligence platform of "charging, swapping, storage and sale" is established to achieve efficient energy utilization.

Main Functions of the Digital Operations Cloud Platform

During the reporting period, GCL-ET was awarded the "2021 Industrial Ecological Innovation Digital Enterprise Award" by the 15th China Automobile Annual Conference.

Training on digitalization

In order to deepen the "Digital GCL" strategy and enable the digital transformation of the Group, we actively carry out various training programs on digitalization. In addition to specialized training for personnel in digital and information lines, we offer "GCL Drive", "GCL Sea of Knowledge" and "GCL Future" series training for all employees. Multiple rounds of digital management training are carried out to promote the cultivation of digital talents. At the same time, we encourage all subsidiaries to carry out digitalization-related training according to their own business and project needs, so as to broaden the specialized knowledge reserve of employees and contribute to the digital transformation of enterprises.

GCL S.I.: The manufacturing team carries out joint training on digital transformation

During the reporting period, GCL S.I. invited external experts to give special training on "Enterprise Actual Practice of Digital Transformation", where they communicated and exchanged on leadership system and operation mechanism, digital conception and application at photovoltaic manufacturing plants, etc., to fill the theoretical gap in this field. After the training, the employees of GCL S.I. put what they had learned into practice and set up a digital promotion committee to interpret the brand gene of "Digital GCL" with practical actions and promote the digital transformation of the enterprise.

CL TECH: Photovoltaic Lecture Hall – Building digital growth curve and reshaping enterprise value creation mode

During the reporting period, GCL TECH invited external experts to give special training of "Building Digital Growth Curve and Reshaping Enterprise Value Creation Mode". More than 230 middle and senior executives, information, R&D and smart manufacturing-related personnel from GCL TECH Management Center and 14 subordinate enterprises participated in the training on-site or via video. This training enabled relevant personnel to deeply understand the great significance of digitalization in the development of enterprises and understand how to realize the digital transformation of enterprises: to truly transform data into value and promote business expansion, productivity improvement and value-added business, the core is data intelligence. Deriving dividend from data can bring new value growth points for enterprises and help enterprises realize transformation and upgrading.

Quality Control

We firmly believe that the overall improvement of quality management plays a key role in promoting the long-term development of the Group. GCL Group always attaches importance to product quality management by strictly abiding by the relevant quality and safety-related laws and regulations and industry standards such as the Law of the People's Republic of China on Product Quality, the Standardization Law of the People's Republic of China, and the Regulations of the People's Republic of China on Production Licenses of Industrial Products. We continuously improve the quality management system, establish a quality management framework, and set quality management requirements, while at the same time requiring our subsidiaries to establish corresponding internal quality management systems according to their own business characteristics and needs.

GCL-ET, has continuously improved its engineering project management system by formulating rules and regulations such as the Engineering Project Management Standards and the Engineering Quality Management Standards to address possible risk points in various aspects of engineering construction, and adding a series of new rules and regulations such as the Guidelines for Construction Management of Technological Innovation Projects, the Engineering Project Management Fees Management Standards and the Technical Experts Management Standards during this reporting period. As a result, GCL-ET has integrated quality management into the whole process of project management, including project approval, budgeting, bidding, construction, supervision, and acceptance. It has also set up reasonable project job positions, clarified job duties and responsibilities, promoted efficient communication, and coordinated management in project operation. GCL TECH has formulated and implemented a series of internal standards, including the Corporate Standard System, the Standards Development Rules, the Silane Gas Standard, and the Solar Grade Polysilicon, to strengthen whole-process product quality control ranging from material release to production, and continuously improve its product quality and performance, while actively responding to the "Digital GCL" strategy by applying digital technology into the quality management system, enabling it to become the second line of defense for the whole-process quality control system.

Source control

- High standard for supplier access
- Whether suppliers can produce high-quality products in accordance with national and industry standards is considered an important factor in granting access.
- Suppliers are required to provide and update the relevant certificates of their product qualifications.

Process control

- High requirements for production quality
- Review feasibility studies on product quality requirements, and technical features continuously to ensure that the final products meet or exceed market and customer expectations.
- High requirements for raw material used
- Important raw and auxiliary materials are on trial and approved before putting them into production.

Quality analysis & management system

- Production data are collected in a systematic and automatic way and reasonable calculation models are built, from which the relevant data that are used to analyze production safety and unstable quality are fed back to production management to ensure production safety and product quality level.

GCL TECH's Whole-process Quality Control

Excellence starts from lean management and the pursuit of high quality. We enhance employees' awareness of product quality assurance by carrying out various product quality-related training activities. During this reporting period, GCL Semi has raised its quality management awareness, promoted total quality management, and implemented a quality management system through its quality month activities.

Additionally, we set up a special recall team to collect products that meet the recall conditions in the product information reports and deal with the subsequent processing of recalled products. During this reporting period, there has been no incident of recall due to safety and health reasons among the products sold or delivered by the GCL Group.

As of the end of this reporting period, subsidiaries of the GCL Group, including Xinhua Semi, GCL TECH, GCL-ET, GCL S.I., and GCL Semi, all obtained ISO 9001 quality management system certification. GCL Semi, after being awarded ISO 9001:2015 quality management system certification, successfully earned IATF 16949:2016 certification of quality management standard in the automobile industry, which fully proves that the quality of the company's silicon wafer manufacturing and products, verified by internationally renowned accredited agencies, has the potential to extend to the auto field. In addition, Xinhua Semi is the first domestic electronic-grade polysilicon manufacturing company to receive the IATF 16949 quality management certificate.

Quality Service

GCL Group, with its focus on customers' needs, is committed to providing customers with quality product services. Our global layout and rich technical experience allow us to be able to flexibly meet customers' needs and empower them with high efficiency and good quality. Meanwhile, we constantly improve our services through a perfect service system, customer complaint handling process, and regular satisfaction surveys, and tailor our efforts to meet customers' demands.

Customer Communication

We attach great importance to customer experience and satisfaction by establishing a multi-channel customer service mechanism and continuously improving the customer complaint mechanism. As a result, we are able to implement professional and standardized management, and respond to customers' demands as fast as possible.

GCL New Energy provides customers with efficient, timely, and accurate solutions by setting up customer service hotlines, online customer service, e-mail, and other communication channels and equipping a professional customer service team with both technical expertise and communication and coordination abilities to respond to customers' needs in a timely manner.

GCL TECH, with an aim of providing excellent after-sales service and improving customer service experience, has set up a comprehensive customer complaint and feedback handling process, including key links such as after-sales phone-answering, customer opinion recording, and internal flow of customer feedback, to ensure smooth complaint channels, timely acceptance and appropriate handling of complaints and feedback as possible as can be. For the complaints confirmed by the investigation, we take targeted corrective and preventive measures first, and then submit the results of complaint handling to the annual meeting for review and make a trend analysis.

Customer complaints reception → Classification and preliminary processing → Dealing with customer complaints in corresponding departments → Tracking the processing situation → Analyzing and summarizing customer complaints regularly

Customer Complaint and Processing Procedure of GCL TECH

In addition, we regularly conduct satisfaction surveys on our customers to gain a deeper understanding of customers' needs and suggestions and continuously improve our customer services. GCL TECH has made multi-dimensional customer satisfaction surveys that include yield rate, delivery rate, price competitiveness, and service. When the results come in, we would identify its weakness and at the same time analyze the items with low scores and put forward clear corrective measures accordingly in an effort to maintain and improve customer satisfaction. During this reporting period, GCL TECH has set up a dedicated team to make improvements for products of high customer concern. Thanks to their efforts, the improved products not only met customer requirements, but also won favorable comments from them.

Privacy Protection

GCL Group pays high attention to data security and customer information protection and strictly abides by the relevant policies and regulations such as the Civil Code of the People's Republic of China, the Personal Information Protection Law of the People's Republic of China, and the Cybersecurity Law of the People's Republic of China. Guided by these laws and regulations, we continuously improve our information and data security management system in accordance with our business realities by setting up a multi-dimensional information security protection mechanism to fully protect data and privacy security. Within the company, we have formulated and continuously optimized our internal systems such as the Information Security Management Standards, the Information System Backup and Recovery Management Regulations, the Cyber System Management Standards, and the E-mail System Management Standards to regulate the management and operation of system security, storage and backup, disaster recovery mechanism, cyber security, and information security. In order to enhance employees' awareness of information security, we have made information security training mandatory for new employees and have continuously exposed employees to information security protection-related knowledge and importance in their daily work, so as to minimize the information security risks from internal personnel and guarantee the security of customers' data and privacy in all aspects.

Access management	▪ Distinguish and desensitize the core fields of documents, use tools to distinguish confidential information, and set access rights. ▪ Require customer information to be kept strictly confidential, and the SAP system is for internal access only.
Early warning mechanism	▪ Identify potential information security risks through threat intelligence situation awareness, log analysis, and other initiatives, and promptly report and take measures to prevent information security incidents from occurring.
Emergency response	▪ Establish an information security emergency response committee to handle information security emergencies. ▪ Immediately disconnect the network and use backup files and the recovery system to safeguard business operations in the event of an information security incident.

Information Security Management

The information security management system of GCL Group has received the ISO 27001 information security management system certification. During this reporting period, no major information security and customer privacy disclosure incidents occurred in the Group.

Responsible Marketing

All marketing and promotional activities carried out in any form by the GCL Group have strictly complied with relevant laws and regulations and industry norms such as the Advertisement Law of the People's Republic of China and the Law of the People's Republic of China on the Protection of Consumer Rights and Interests. Within the Group, we have formulated marketing, advertising, and sales-related regulations such as the Internal News Publicity Management Standards, the Press Release and External News Publicity Management Measures, and the Standards for the Management of Press Spokespersons to regulate the Group's marketing and promotion's activities and clarify the process of reviewing marketing and publicity materials and the penalty mechanism for violations. The review and supervision mechanism has helped ensure that all marketing contents and forms are compliant and appropriate, so as to prevent any content from being exaggerated or false. During this reporting period, we have not been punished by the regulatory authority due to violation of relevant laws and regulations in marketing.

Supply Chain Management

GCL Group is aware of the importance of good supply chain management to quality service and enterprise development. While standardizing the basic management process of suppliers, we continue to improve ESG management of the supply chain, strengthen mutual trust, work closely and develop together with suppliers through training and communication, and create a transparent, quality and safe sustainable procurement environment.

Supply Chain Management

We have released the Supply Chain Management Regulations, the Supplier Management Methods, and the Procurement Management Regulations applicable to GCL Group and its subsidiaries, clarified the orientation and responsibilities of supply chain management departments, supplier management processes and operating methods, and specified the process of supplier access, hierarchical management, inspection and investigation, reporting and recording. In order to improve management efficiency, we implement the "one warehouse, one platform, one entrance" system and control suppliers in terms of access, inspection, evaluation, performance, acceptance and elimination in order to promote systematic and smart supplier management.

Acceptance of suppliers

Suppliers shall file an application and the accepted suppliers will be included in the list of qualified suppliers of GCL Group.

Pre-qualification

Candidate suppliers shall submit relevant information.

The supplier management team of the Group shall review candidates' registration, business operations and commercial credit, etc.

The accepted candidates will be included in the list of qualified suppliers, waiting for the sector supplier administrator's approval.

Inspection of suppliers

Inspectors shall prepare an inspection plan in advance and communicate with candidate suppliers to ensure inspection will be effective.

On-site inspection: candidate suppliers' operations, financial status, human resources, environmental management and qualification documents will be checked.

Off-site inspection: candidates will be surveyed by telephone, on Internet or by collecting information accordingly.

A report shall be prepared according to the inspection results.

Approval

Approval shall be started for those passing the inspection and the approved suppliers shall be deemed qualified.

Supplier access process

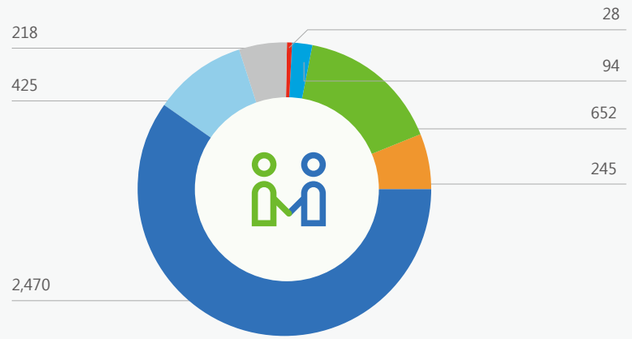
We evaluate suppliers' performance monthly, quarterly, semi-annually and annually on quality, cost, delivery and service. Suppliers are divided into Class I, Class II, Class III and Class IV, and put under hierarchical management. Suppliers scoring more than 70 are deemed as qualified; Class IV will be removed from our list of qualified suppliers; Class III are subject to improvements, which will be followed up.

Number of suppliers by region

By the end of the reporting period, GCL Group had 4,132 suppliers in total. They are divided by region as follows:[4]

Number of Suppliers of GCL Group

4,132



Northeastern China | Northern China | Northwestern China | Eastern China | Central China | Southern China | Foreign regions and China Hong Kong, Macao and Taiwan regions

Also, we make efforts to improve our supply chain management by providing related training to our procurement personnel, clarifying the key issues in the supply chain, bidding and procurement to ensure good implementation of the supply chain management regulations, and reduce supply chain risks.

[4] Northeastern China: Liaoning, Jilin, Heilongjiang
Northern China : Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia
Northwest China: Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang
Southwestern China: Tibet, Sichuan, Chongqing, Guizhou, Yunnan
Eastern China : Shanghai, Jiangsu, Zhejiang, Jiangxi, Anhui, Fujian, Shandong
Central China: Henan, Hubei, Hunan
Southern China : Guangdong, Guangxi, Hainan
Foreign regions and China Hong Kong, Macao and Taiwan regions: Foreign regions and Hong Kong, Special Administrative Region, Macao Special Administrative Region and Taiwan Province

GCL-ET: Training on supply chain, bidding and procurement

GCL-ET, always provides training for suppliers. In March 2021, a training session on supply chain, bidding and procurement was held by GCL-ET by focusing on how the life cycle management is conducted through professional procurement. The session analyzed the impact of domestic and foreign economic situations and the price fluctuation of bulk raw materials on supply chain procurement as well as the major issues of supply chain, bidding and procurement. All the procurement staffs and technicians participating in the session passed an examination and qualified for their respective jobs.

Communication with Suppliers

GCL Group looks forward to growing together with our suppliers and would like to maintain stable and friendly cooperation in a long term. Also, we provide communication and sharing channels for suppliers who support and cooperate with us hoping to achieve win-win with them and enable both of us to be industry leaders.

We take an initiative to exchange with suppliers on performance, supplier evaluation and improvement, high-quality training, and in-depth cooperation through daily communications, supplier training and supplier conferences, etc. We are ready to listen to suppliers and address their difficulties and requirements of partners in order to create a harmonious, mutually-benefiting and win-win supply chain management system.

Innovative cooperation with suppliers

For procurement by Suzhou GCL, core components are imported and then assembled by suppliers in China. In the process of assembly, Suzhou GCL helps suppliers improve their capacity, ensures the products reach the performance standard of imported components through trials and commissioning, and makes the unit purchase price lower than the unit price of the imports. While helping suppliers to generate revenues, we try to reduce the procurement expenditure.

Fighting COVID-19 with suppliers

COVID-19 has caused short supply and rising price of imported quartz sand; due to shutdown and frequently restricted operation of the single crystal crucible industry, the supply of single crystal crucibles fell short of demand. In this case, Xuzhou GCL applies for partial advance payment to lock up the capacity of major supplier of single crystal crucibles, which helps them overcome the difficulties and ensures stable crucible supply and normal operation.

Responsible Procurement

Building a sustainable supply chain is one of the important tasks for GCL Group to fulfill social responsibilities and achieve long-term benefits. For sustainable procurement, GCL Group integrates our social responsibilities into all aspects of supply chain management, requires suppliers to abide by the code of conduct in business operations, contract performance and after-sales service, and maintain a more responsible, growing and sustainable supply chain system together with suppliers.

Audit of Supplier ESG

In order to guarantee the quality of suppliers' products and improve the management of the Group's responsible procurement, we include suppliers' performance concerning business ethics, occupational health and safety, environmental management and quality in the supplier access, audit and rating system according to the Supplier Management Methods. In the stage of supplier access, we require suppliers to provide safety, quality and environmental certificates before listing them as qualified suppliers. Meanwhile, we subject suppliers' performance of occupational health and safety, business ethics, and environmental management to our inspections and examinations as an important indicator in order to create a responsible supply chain. For suppliers with ESG risks found in inspections, we require them to make corrections, which will be followed up. We will terminate cooperation with those suppliers with significant risks.

Environment, Health and Safety Management

- Abiding by the local laws and regulations on environment, health and safety.
- Providing employees with a healthy, safe, environmentally-friendly and comfortable workplace.

Business Ethics and Compliance

- Both corruption and bribery are absolutely prohibited.
- Complying with all applicable laws and regulations on fair competition and anti-monopoly.
- Complying with all applicable local data privacy laws.

Employees' rights and interests

- Supporting and respecting employees' rights and interests, including by prohibiting forced labor and child labor in any form, respecting employees' rights to participate in an independent trade union, of collective bargaining and their freedom of association
- Providing an equal working environment without harassment nor discrimination.

Scope of Supplier ESG Auditing

Clean Supply Chain

GCL Group makes efforts to maintain a clean, fair, just and open business environment and prohibit any corruption, monopoly and other unfair competitions. We conduct bidding and procurement strictly in compliance with national and local laws and regulations; we have formulated the Management Methods for Bidding and Negotiation, and the Anti-fraud and Tip-off Management Standard in order to build an open and transparent bidding system. Both bribery and corruption in any form are prohibited. We invite bids for procurement according to law. By improving the penalties against unlawful practices, we include anti-bribery provisions in contracts, clarify the responsibilities and obligations of both parties, and urge suppliers to act in accordance with laws and regulations. Suppliers who commit frauds and violations in the process of bidding and cooperation will be removed permanently from the list of qualified suppliers.

Construction of Clean Supply Chain

Signing an Integrity Agreement

- Purchasers shall sign an integrity agreement.
- Suppliers shall sign the Supplier's Commitment to Anti-bribery and Anti-fraud and the Non-disclosure Agreement.

Improving Tip-off Channels

- Providing the tip-off platform, telephone number, email address and WeChat ID on GCL Group's supplier portal.

Green Supply Chain

We promote and lead green construction of the supply chain and help the Group achieve sustainable development. We give priority to green products and greenly manufactured products, establish a guiding mechanism for low-carbon products, formulate reasonable rules, and urge suppliers to increase their early research, development and investment in low-carbon new process, technology, equipment and materials. We give priority to suppliers with good environmental performance, improve their performance in environmental management and low-carbon operation, and build a green supply chain together with them.

Management of Conflicting Minerals

GCL Group prohibits mining, trading, processing and exporting mineral resources in the areas affected by conflicts or with high risks, respects the rights and interests of workers in the mining area, and attaches importance to possible environmental and social impacts. We have established conflict-free mineral policies, management systems and management processes. We promise not to purchase minerals from the areas affected by conflicts or with high risks. We insist on responsible procurement of minerals.

Win-win Cooperation

GCL Group adheres to common development of the industry, gives full play to our positive value and brand influence, participates in industry exchange and standard formulation, and would like to share our leading technology and experience. We make efforts to bridge cooperation inside and outside the industry, open up the industrial link, carry out industrial co-construction, and achieve win-win.

Industry Standard Formulation

GCL Group participates in formulation of industrial standards. During the reporting period, we hosted or participated in the formulation or revision of 11 international, national and industrial standards, including layout of standards for key black technology projects and low-carbon green manufacturing.

Participating in Formulation of Industrial Standards

Semiconductor

We participated in the revision of Chinese national standard: the Test Method for Low Temperature FT-IR Analysis of Single Crystal Silicon for III-V Impurities.

Green Production

We participated in the preparation or revision of group standards, e.g. the General Rules for Evaluation of Green Enterprises and the Standard for Star Rating Evaluation of Green Enterprises.

Preparation of Silicon Materials

We hosted the preparation or revision of Chinese national standards, e.g. Granular Polysilicon Produced by Fluidized Bed Method.

Mobile Energy

We participated in the preparation or revision of industrial and local standards, e.g. the Interchangeability of Onboard Power Exchange System for Pure Electric Commercial Vehicles, and the Technical Specifications for Construction of Power Exchange Station Shared by Medium and Heavy Duty Electric Trucks and Power Exchange Vehicles

Industrial Communication and Cooperation

By adhering to open cooperation and win-win, we are ready to share our R&D achievements within the industry and share our experience of frontier technology based on the practice of technology application. GCL Group maintains long-term cooperation with a number of universities at home and abroad. We have signed a talent training agreement with Northwestern Polytechnical University and the Engineering School of Queen Mary University of London respectively. The first batch included 100 students from the latter majoring in material science and polymer materials, etc.

We participated in the "Solar Energy Cup" sharing meeting and the 14th Distributed Distributor Forum, SEMICON China 2021, Brand Power - China Carbon Neutralization Summit Forum 2021 and the ranking release conference of top 20 global PV companies and top 20 Chinese energy storage companies 2021. Chairman Zhu Gongshan and Vice Chairman Zhu Yufeng of GCL Group, delivered keynote speeches related to Double Carbon, which received close attention from inside and outside the industry.

GCL Group's Cooperation and Communication Meeting with Banks

On November 25th, the representatives of 27 non-commercial banks, commercial banks and other financial institutions attended the GCL Group's cooperation and exchange meeting.

A signing ceremony for strategic cooperation agreements was held at the meeting by focusing on Double Carbon. Suzhou Branches of Industrial and Commercial Bank of China, Bank of China, Bank of Jiangsu and China Merchants Bank signed a strategic cooperation agreement respectively with GCL Group.

Zhu Gongshan delivered a thank-you speech on behalf of GCL Group. GCL Group focuses on energy research and innovation, enriches the people and serves the country through industry, works with financial institutions for win-win, and enjoys the solid strategic partnership with them. At the critical moment of GCL's transformation and upgrading, it is the financial institutions that help GCL to adjust the structure, reduce the risks and stabilize the liabilities, which demonstrates the strength of the strategic cooperation between both sides.

04

Talent Development

GCL Group believes that talents are the foundation of development. We consider both organizational development and personal development. We establish a multi-dimensional talent development channel, create an inclusive, equal, open and harmonious working environment, give full play to employees, and maximize the personal value of employees while achieving corporate growth.

Employee Profile

During the reporting period, we revised, improved and released the human resources systems, and built a sound employee management system in order to attract high-level talents. In 2021, GCL Group was honored "Jiangsu Outstanding Employer 2021" due to our excellent employee management.

GCL Group was honored "Jiangsu Outstanding Employer 2021".

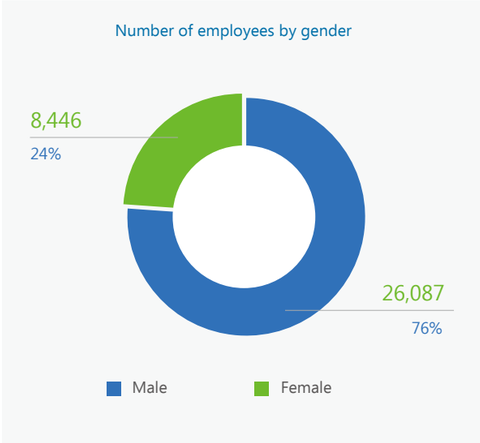
Employment

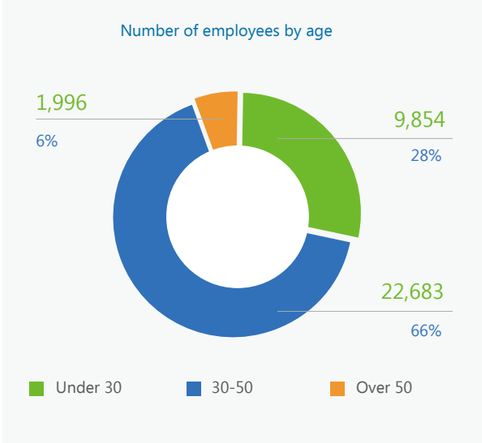
In order to support strategic transformation and improve the construction of talent supply chain, GCL Group reviews our demand for talent reserves, conducts human capital audits, and optimizes our talent structure with help of campus recruitment and job fair according to the Recruitment Management Standard and the Internal Recommendation Management Standard. During the reporting period, there were more than 18,000 new employees in GCL Group.

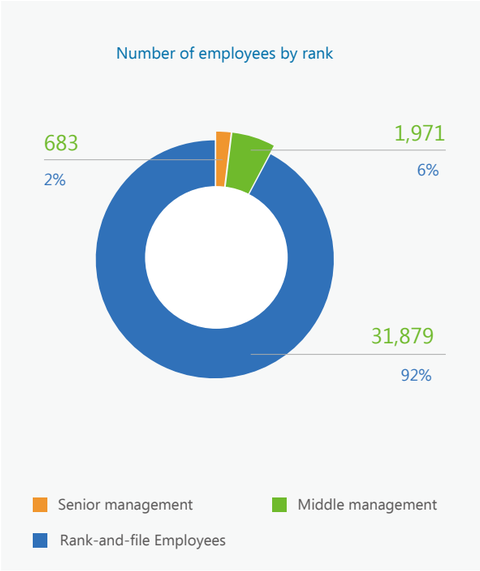
GCL Group Campus Recruitment

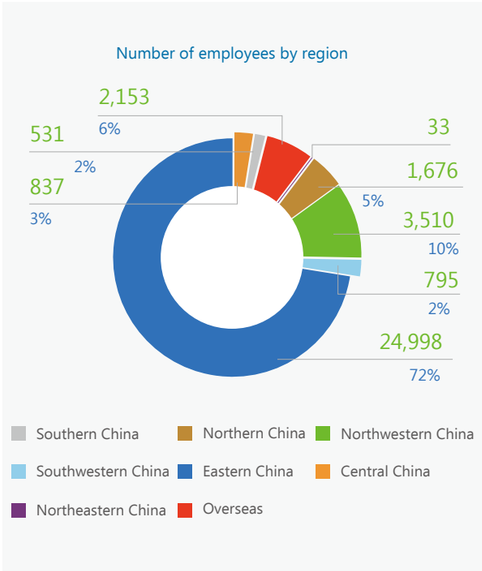
For campus recruitment, three seminars were held by GCL Group in Shanghai, Hefei and Chengdu, where we received 10,000 resumes from domestic and foreign universities and 300 excellent graduates with a master or doctoral degree were successfully recruited.

As of December 3, 2021, the Group has a total of 34,533 employees[5], including 2,153 overseas employees and 863 ethnic minority employees. The division of employees by gender, age, rank and region is as follows:

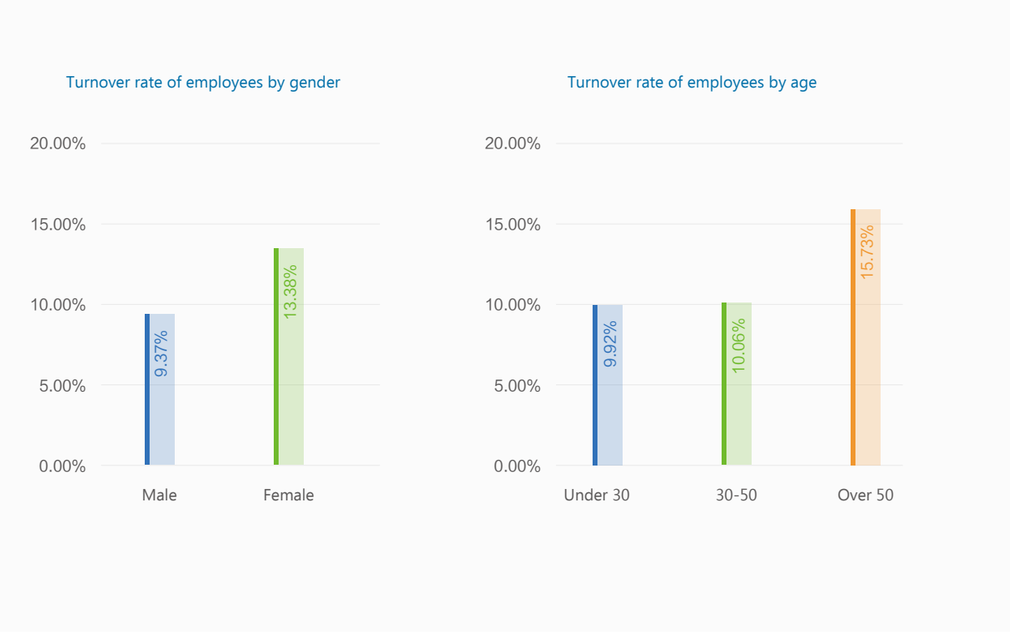


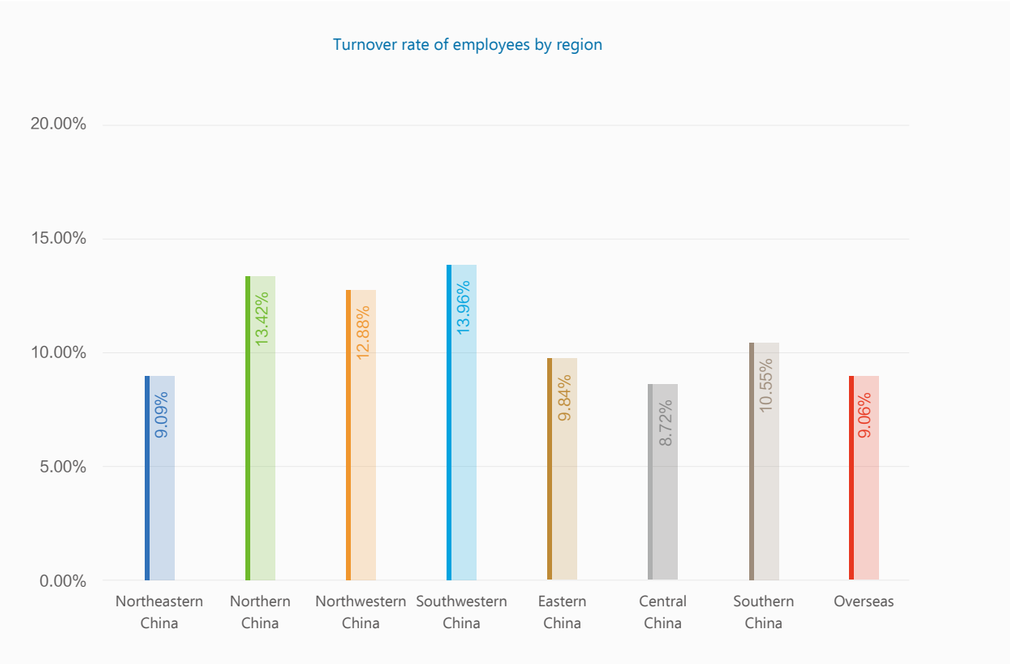






[5]The number of employees includes the headquarters of the Group and its subsidiaries.





Employees' Rights and Interests

GCL Group abides by the Declaration of the ILO on Fundamental Principles and Rights at Work, the Labor Law of the People's Republic of China, and the Labor Contract Law of the People's Republic of China, etc. Meanwhile, we formulate and implement a series of policies and rules, prohibit any use of child labor and forced labor, employ workers according to law, prohibit any discrimination based on gender, age, religion or marriage, create an equal, inclusive and open workplace, provide a solid guarantee for talents, and safeguard the rights and interests of employees all round. During the reporting period, 100% employees signed a labor contract and were covered by social insurance.

During the reporting period, rate of employees signing labor contracts and covered by social insurance

100 %

Employee Development

GCL Group attaches importance to employee development, and ensures employees have a clear career development path by improving talent training and evaluation, in order to help employees improve themselves, achieve their value, and work together for sustainable development.

Career Development

We digitalize talent portrait through a comprehensive evaluation mechanism and clear career planning, connect talent evaluation, development, performance management and salary management, present talent characteristics in key positions, and help employees to achieve long-term development.

Number of Planned and organized review meetings:

20+

In order to standardize jobs and positions within the Group, we establish a hierarchical structure of human resources, adjust the existing job and position system, so as to open up the development channels of professionals, technicians, R&D workers and other employees and expand their career development space. Meanwhile, we set up qualification standards for professionals, technicians, R&D workers and other posts, accredit their qualifications. During the reporting period, we developed and assessed 52 job standards in 10 functional lines, planned and organized 20 review meetings, and completed the post value evaluation of 587 senior employees in order to help them understand their own competitiveness and achieve sustainable improvement.

The partnership system is practiced in this Group. It originates from the manager system dating back to April 2020. We hope to help employees realize that they work not for the enterprise, but for themselves and help them have the run-a-business awareness. Based on the virtual equity system, we'll translate the regional center into a profit center, and link value creation to employees' income, so that more pay can be provided for more work.

Furthermore, an equity incentive system is in place among some subsidiaries of GCL Group, where shares may be granted to eligible employees, in order to help them have a sense of ownership and self-improvement.

GCL New Energy: employee share incentive plan

As part of the long-term incentive plan for employees, 2021 saw GCL New Energy granting employees no more than 650 million shares, accounting for 2.95% of the total share capital, in four installments, 25% for each year. During the reporting period, 370 million shares of employee option were granted to employees according to their annual performance evaluation, which not only encourages employees to combine their careers with the corporate development strategy, but also helps achieve win-win between employees and the Company.

Employee Training

By employing a sharing, improving and collaborative talent development model, GCL Group establishes a scientific and perfect employee training system to help employees improve themselves at work. We have established GCL University in order to promote comprehensive talent development, resource integration and coordination within the Group. Based on our industrial human resources, branches are founded at GCL Photovoltaic, GCL-ET, GCL New Energy and GCL S.I. in order to strengthen the cultivation of professionals and craftsmen all around. We'll promote the formation of a talent training mechanism covering businesses, industries and the headquarters through the integration of talent empowerment and knowledge management. The talent development mechanism of GCL Group is recognized both inside and outside the industry. We won the talent empowerment award of Asian Photovoltaic Industry Association 2021.

Talent Empowerment Award of Asian Photovoltaic Industry Association 2021

Driven by technology, GCL Group promotes the digital inheritance of knowledge. We have developed 100 courses, 300 programs, proposals and teaching cases, and 4 standard documents, e.g. online course development guide. During the reporting period, we carried out a number of talent training and digital training projects to meet employees' career development and improve their professional abilities.

Digital Training

To promote digital talent training, we have carried out a number of digital management training sessions for 600 employees.

Talent Training Network

The training network of GCL University covers the headquarters, industrial branches and regional branches in order to promote talent training all around within the Group.

Talent Training Project

We have conducted 50 talent training projects for echelon talents, functional experts, business backbones and freshmen orientation, which provided 800 talents for the Group.

Talent Training Highlights of GCL Group in 2021

Training Sessions

A talent racing platform was established within GCL Group to help young people develop themselves. During the reporting period, we launched the first innovation competition of "GCL Skills and Technology" covering seven sectors, and regional cultural coaching and empowerment in Xuzhou, Xinjiang and Ningxia to provide training opportunities for grass-roots managers and employees.

Employee Innovation Competition of "GCL Skills and Technology"

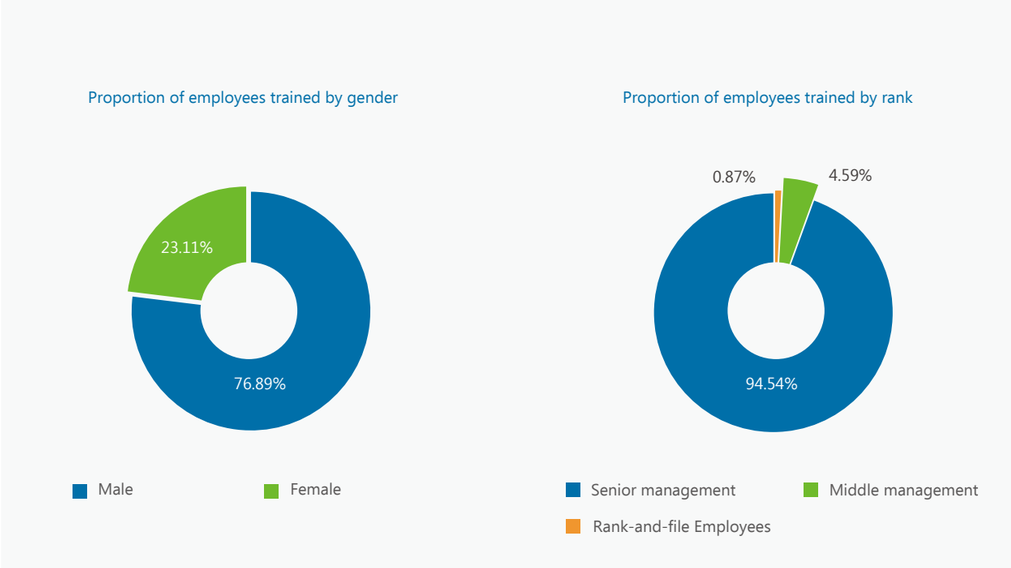
Regional Cultural Coaching

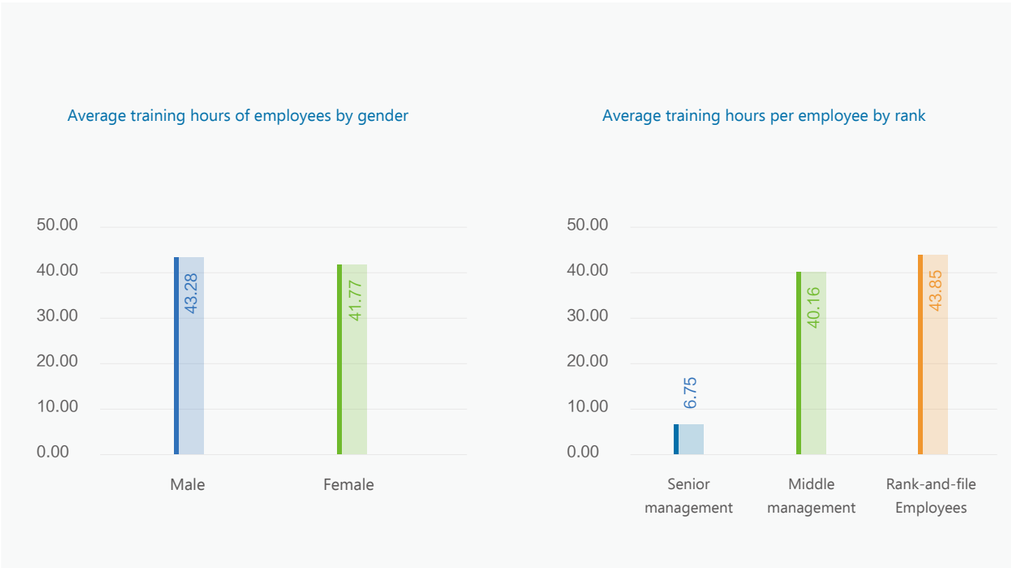
Chairman's Lecture

GCL Star College Student Training Camp

CL Group Employee Training 2021

During the reporting period, the training for employees of the Group totaled 1,481,757 hours, 45.74 hours per capita. The training by gender and position is as follows:





Employee Care

GCL Group always cares for, respects, values communication with and listens to employees, and provides aids for those in need. We provide them with competitive salaries to support their development together with us.

compensation and Benefits

We abide by the Social Insurance Law of the People's Republic of China, the Regulations of the People's Republic of China on Minimum Wage, the Guideline for Remuneration Packages, the Welfare Management Standard, the Measures for Performance Appraisal of Employees and Cadres of the Headquarters, and the Management Standard for Employee Attendance, Leave and Business Trip. We promise to provide employees with competitive pays and benefits. Meanwhile, we conduct external market research and analysis to provide a basis for compensation reform within the Group. The headquarters of the Group refer to large-size group enterprises in terms of scale, sector, region and other dimensions. Therefore, we have produced compensation standards for GCL Group, PV material industry groups, chemical enterprises and long crystal chip enterprises. We are now planning to increase new compensation standards for technology lines. During the reporting period, we completed the formulation and release of five major salary systems and the salary coefficients for 25 cities in 11 provinces. Also, we considered market competitiveness while improving the effectiveness of salary payment in order to attract more talents.

Furthermore, we understood the personal needs of employees, and introduced more employee welfare policies. While ensuring their legal benefits, we provided additional benefits to care for employees all around.

Subsidies and allowances

- Communication allowance
- Meals allowance
- Transportation allowance
- Meal allowance
- Extreme weather allowance
- Marriage and maternity allowance
- Bereavement allowance
- Remote area allowance
- Holiday benefits

Non-cash benefits

- Supplemental commercial insurance
- Employers'liability insurance
- Entry physical examination / annual routine physical examination

Female preferential treatment

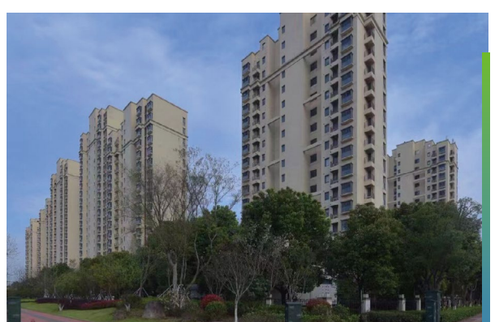
- Baby care room
- Breastfeeding leave, maternity leave and male worker paternity leave, etc
- No-pay leaves and preferential shifts for female staff in pregnancy

Diverse benefits

- Ethnic minority eateries
- Holidays for ethnic minority festivals
- Talent apartments

GCL Group diversified additional benefits

Baby Care Room



Talent Apartments

Meanwhile, GCL Group cares for the employees in need and has set up a special fund under GCL Sunshine Charity Foundation to help employees and their families who are trapped by illness and disaster.

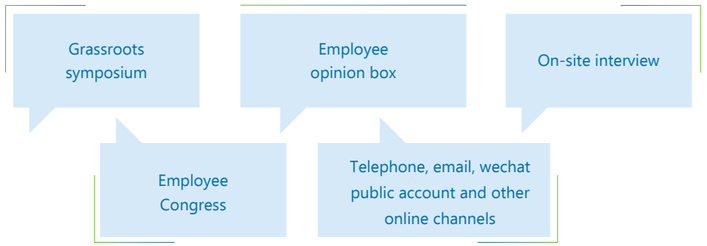
GCL Donation of One Day's Salary

Initiated by GCL Sunshine Charity Foundation, the functional centers, holding companies, subsidiaries, representative offices and overseas agents of GCL Group launched the Donation of One Day's Salary during March 2-11 in which the International Volunteer Day and Lei Feng Day fall. All employees donated their money to the "Care for Employee" fund of GCL Group.

In the past five years, the fund has helped 26 employees and their families who were trapped by serious illness and disaster, which received favorable comment from all walks of life.

Employee communication

Listening to employees is one of the important ways to maintain corporate operation. We encourage them to let us know their needs. For that purpose, we make efforts to facilitate communication between both of us for their opinions and suggestions through different channels, and provide solutions quickly in order to improve their sense of belonging and shorten the gap between employees and management.



GCL Group diversified employee communication channels

Employee Activities

During the reporting period, we organized a number of cultural activities to enrich employees' after-work life and promote communication among them, in the form of birthday party, fun sports meet, outing and excursion, etc.

Basketball Match

Birthday Party

Fun Sports Meeting

Employee Health and Safety

We attach great importance to occupational health and safety. The Environment, Health and Safety (EHS) Office employs the first-line working method, conducts penetrating inspection, formulates and implements plans for monthly inspection of safety, health and environment practice, and analyzes the findings in order to improve the occupational health and safety management. While strengthening the construction of occupational health facilities, the businesses of the Group make efforts to improve employees' occupational health awareness and create a healthy and safe workplace for employees. A number of subsidiaries have passed the ISO 45001 Occupational Health and Safety Management System Certification.

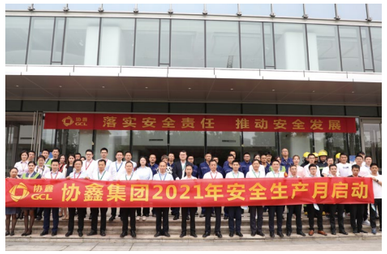
Work Safety

With safety first, prevention first and treatment first, GCL Group makes efforts to publicize and implement the Work Safety Law of the People's Republic of China, improves the comprehensive responsibility system of work safety, enhances safety management of work teams, and implements the concept of "safety first, benefit first and environment first" to the grass roots.

In order to strengthen the safety, health and environmental management, the EHS Office has optimized the management method and prepared the rules for evaluation of safety, health and environment performance, including 307 items covering 21 elements. During the reporting period, the EHS Office formed a team of safety management experts to evaluate GCL-ET for a month on safety, health and environment, covering 8 enterprises and 1 project under construction. The team communicated with the management, and put forward opinions and requirements for the existing problems, which helped GCL-ET improve their safety, health and environment management. The EHS Office analyzed the problems found in the evaluation at the safety, health and environment meeting, requiring all subsidiaries to make self-inspections and self-improvements in order to improve safety management within the Group.

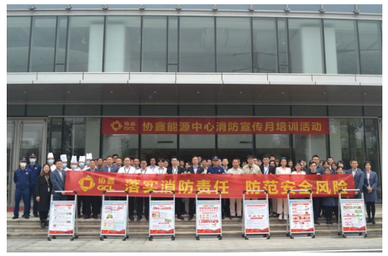
According to Chinese laws and regulations on work safety, we have formulated the Safety, Health and Environment Incident Management System and the Plan for Safety, Health and Environment Emergencies based on the safety risks within the Group. Also, we have defined the responsibilities of the headquarters, industrial sectors and enterprises, established the response process against emergencies, and formulated provisions for treatment, reporting, coordination, disclosure, investigation and settlement of emergencies. GCL Group has established a spokesman system to release our emergency response to the public.

We strengthen work safety supervision and consolidate safety foundation by setting up work safety objectives, improving management structure, making inspections and organizing theme activities. All subsidiaries have taken a series of measures to ensure work safety.



Production Safety Activity Month

Safety emergency drills



Fire Awareness Month

Production safety knowledge competition

First aid training

Hazard self-inspection

GCL-ET

In 2021, GCL-ET continued to strengthen safety management. With help of the quarterly and annual performance assessment system, it conducted 100 work safety inspections covering clean energy, mobile energy and comprehensive energy, and detected 1,400 potential hazards.

There was no personal injury nor major equipment accident occurring in the year. By the end of 2021, GCL-ET had achieved work safety for 5,571 consecutive days.

GCL New Energy

In 2021, GCL New Energy organized spring inspection, work safety month and autumn inspection and other EHS activities as planned with one policy for one point. The EHS Office organized a summer work safety inspection, where three teams inspected 10 PV power stations in 4 regions in order to eliminate hidden hazards, control safety risks and improve management effectiveness.

There were no common equipment accidents nor minor personal injuries or above occurring within GCL New Energy throughout the year. By the end of 2021, it had achieved work safety for 3,191 consecutive days.

GCL TECH

The EHS guideline of GCL TECH is "People oriented, safe development; safety first, prevention first; comprehensive treatment, comprehensive coverage; fine management, continuous improvement; active, early and effective". EHS always comers first.

Through work safety standardization and the dual prevention mechanism, risk prevention exercises and construction are carried out in order to create a safe working environment for employees.

GCL S.I.

GCL S.I. has formulated the Comprehensive Emergency Plan for Major Events, the Emergency Plan for Fire and Explosions and the Emergency Plan for Environmental Pollution. It strengthens rehearsal of the plans, provides training, organizes safety month activities, makes fire, safety and food hygiene inspections, and communicates safety knowledge to employees.

In addition, GCL S.I. attaches importance to improving work safety, establishes a perfect work safety management mechanism, and maximizes the safety of employees.

By December 31st, 2021, no work fatalities had occurred within GCL Group in the past three years; GCL TECH, Suzhou Lantian and Beibu Gas Turbine had passed the ISO 45001: 2018 Occupational Health and Safety Management System Certification; GCL Group was honored "Jiangsu Healthy Enterprise".

Occupational Health

In order to manage and improve occupational disease prevention and control, and ensure employees' health and safety at work, GCL Group abides by national laws and regulations on occupational health, e.g. the Work Safety Law of the People's Republic of China, the Law of the People's Republic of China on Prevention and Control of Occupational Diseases, the Regulations on Industrial Injury Insurance, and the Regulations on Labor Protection in the Workplace Using Toxic Substances. Meanwhile, we have formulated the Occupational Health Management Standard, and take measures to eliminate hidden hazards of occupational diseases. We create a safe and healthy workplace for employees and improve their occupational health awareness by providing facilities, e.g. health rooms and psychological consultation rooms, and health training and organizing activities. During the reporting period, 100% of GCL employees were covered by physical examination, and the count of occupational disease cases was 0.

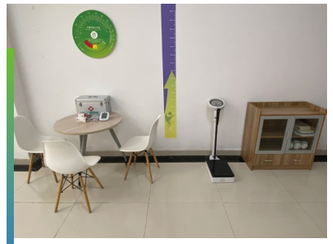
During the reporting period, Coverage of employee's physical examination

100 %

The number of occupational disease cases was

0

Health trails



Health Hut

Psychological counseling rooms

Blood pressure glucometers

Infirmary

GCL TECH: A publicity week for the Law of the People's Republic of China on Prevention and Control of Occupational Diseases

In order to prevent, control and eliminate occupational disease hazards, protect employees' health and promote work safety, Xuzhou Photovoltaic attaches great importance to occupational health. April saw a publicity week for the Law of the People's Republic of China on Prevention and Control of Occupational Diseases, which was launched through broadcasting, noticeboards, multi-media and WeChat. Employees were required to enhance their awareness of protection and master protection skills to form an atmosphere where everyone pays close attention to occupational health and strives to be a health expert.

GCL TECH: Taking measures to ensure occupational health and safety

According to the Law of the People's Republic of China on Prevention and Control of Occupational Diseases, Jiangsu Zhongneng provided physical examinations for those exposed to occupational hazards including 800 persons before work and 1500 during work. Also, the company monitored occupational disease hazards frequently in 215 places.

In 2021, this company launched a series of training sessions on prevention and control of occupational disease and COVID-19, invited essay contributions in the name of "Occupational Health - Listen to Me". Meanwhile, the company organized inspections on occupational health, eliminated potential occupational health hazards at work, and guaranteed employees' occupational health and safety.

In order to prevent sudden death, Jiangsu Zhongneng provided 5 AEDs, and a number of training sessions on using the equipment.

05

Social harmony

With a high sense of social responsibility, GCL Group never forgets the mission. While improving economic benefits, we focus on green development and social charity, and conduct charitable donations and voluntary services to enhance the corporate credibility and create a good image as a responsible enterprise.

Charity

We never forget our social responsibility as a large enterprise. We always participate in rural revitalization, disaster relief and education support, and contribute to make the community prosperous.

Rural Revitalization

By "Bringing Green Energy into Life", 2021 saw the Group integrating the internal and external resources, combining industrial revitalization with green development by piloting rural revitalization with PV and aiding villages, and contributing to national poverty alleviation and rural economy booming.

Pilot Rural Revitalization with PV

GCL Group started the pilot poverty alleviation with PV in 2014. It aims at the areas with good lighting resources. By developing local solar energy resources, this project helps the local poverty-stricken people to maintain and increase their income, so as to alleviate poverty by industry, ecological development and clean energy. While developing PV power stations for poverty alleviation, GCL New Energy, has established a long-term mechanism of poverty alleviation to help develop the local economy.

Pairing up to Build New Villages

In 2021, GCL Group and its subsidiaries were paired with villages to lead local economic development and support national rural revitalization.

During the reporting period, Leshan GCL was twinned with Hongjun Village, Zhugen Town, Wutongqiao District, Leshan City and entered into the Village-Enterprise Twinning and Development Agreement with the secretary of the Party Committee of the village at the signing ceremony for village-enterprise twinning to build new villages.

Henan GCL twinned with Wangzhuang Village, Luohe City, Henan Province and launched "Three Links, Three Helps and Three Improves".[6] The company dispatched employees to visit the local lonely elderly while relieving the local employment pressure.

Disaster Assistance

In response to floods and COVID-19, GCL Group and its subsidiaries met social needs immediately by organizing disaster reliefs and contributing to the resumption of business operations. In this way, the Group did very well in fulfilling our social responsibilities as a great enterprise.

GCL Group: Fighting against floods in Henan

In response to the sudden floods in Henan 2021, GCL Group established a disaster relief WeChat group immediately to receive information from all channels, and organized donations and disaster aids for several times to meet the local people's demand.

On July 28th, Jiangsu Suzhou Industrial Park Charity Federation launched the "Aid Henan" campaign through Tencent Charity. By the end of the reporting period, 200,000 CNY had been donated; meanwhile, GCL Sunshine Foundation had purchased materials worth 200,000 CNY, e.g. drainage pumps, disinfectants and soaps, which were delivered to Xinxiang, Henan Province on the 29th and 30th respectively.

On July 30th, Chairman and President of GCL Group donated 200,000 HK$ in his name to the disaster area in Henan; Xinxin Semiconductor Technology Co., Ltd., GCL Sunshine Charity Foundation and other institutions under GCL Group also made donations.

[6] Three Links, Three Helps and Three Improves: the Party branches of the Headquarters, companies and villages are linked together; leaders help companies, Party Committee secretaries of companies help work teams, and Party members help households; the party branches of the Headquarters, companies and villages improve their operations together.

GCL S.I.: Donation of Anti-COVID-19 Materials

On August 1st, 2021, Jurong GCL donated mineral water, protective masks, instant noodles, rice porridge and other goods to the traffic police and nucleic acid detection workers in Guozhuang Town, Jurong City in honor of them on the front line against COVID-19.

Education Aids

GCL Group is always concerned about education. We try our best to improve the education and living environment for poor students through donations and voluntary services, to promote development of both cultural construction and regional education. In October 2021, "Hand in Hand, Heart to Heart", the education charity brand under GCL Group was included in the outstanding cases of social responsibility of power businesses in 2021 by the China Electricity Council, which received favorable recognition from all walks of life.

"Hand in Hand, Heart to Heart"

GCL TECH's voluntary service: "Learning from Lei Feng and Passing on New Spirits"

On March 5th, 2021, Jiangsu Zhongneng dispatched its volunteers to Dahuangshan Experimental Primary School and organized a voluntary service activity "Learning from Lei Feng; Passing on New Spirits", together with the local Youth League, in order to help the local education and improve employees' sense of social responsibility and participation.

Volunteers gave away stationery boxes, notebooks, bags and other supplies to the student representatives, and rice, milk and other goods to 2 poverty-stricken students.

GCL S.I..: Children's Day Donation

On June 1st, 2021, Wei Guangjun, Vice President of GCL Energy Engineering Co. Ltd. (GCL-SE), attended the celebration of Children's Day at the Central Primary School of Xiniujiao Town. GCL-SE donated stationery and food worth 7000 CNY to the Central Primary School and the primary schools in Bailu Village and Lianmin Village. The Secretary of the Party Committee of Xiniujiao Town sang high praise for GCL Group undertaking the social responsibility.

Volunteer Work

While promoting charity, GCL Group is deeply involved in community construction and ecological protection. With employees, charities and other stakeholders, we organize voluntary services and achieve the unity of corporate value and social value.

Community Building

With our gratitude to communities, we make efforts to enhance communication with the community and organize activities closely related to the community in order to share our achievements with the community.

GCL TECH: Cool Summer

On August 6th, 2021, Chairman of Trade Union and Deputy Secretary of the Party Committee of Suzhou GCL paid a visit to the Police Station, the Urban Management and Administrative Law Enforcement, and the Traffic Police at the Technology City of High-Tech Zone, together with drinks and materials worth 5,000 CNY.

Ecological Protection

The Group strictly complies with the rules of low carbon, emission reduction and energy conservation, and pay close attention to green development. We follow the trend of the era, and launch environmental campaigns, such as Arbor Day, ecological governance, and garbage clearing, to build a better ecological environment.

Arbor Day celebrated by subsidiaries of GCL Group in 2021

GCL Energy Technology Co., Ltd （GCL ET）

GCL-ET launched an Arbor Day event in the name of "Planting Green, Flying Dream", in which employees participated by planting trees around the premises.

GCL Technology Holdings Limited（GCL TECH）

GCL TECH organized environmental volunteers from the front lines to plant young trees and create great forests around the premises.

GCL System Integration Technology Co. Ltd （GCL SI）

On Arbor Day 2021, GCL S.I. organized employees to beautify the premises, harden the bare earth, plant trees and grass in the green area and increase green vegetation in order to create a resilient sustainable community.

GCL Group: Subsidiaries Protected the Ecology of the River

On April 22nd, 2021, Ningxia GCL, together with Zhongwei Volunteer Federation and other organizations, launched an ecological protection activity in the Yellow River basin of Zhongwei City in order to protect the ecology of the Yellow River basin by patrolling the river, banning fishing and cleaning the banks.

In 2021, GCL-ET -- Suzhou Lantian Company joined the "River Chief Alliance" in Suzhou Industrial Park to patrol and protect the Wusong River, contributing to the protection of water environment and the construction of an ecological river-lake network.

GCL TECH: Clearing Garbage Within and Around the Premises

On June 4th, 2021, Ningxia GCL had garbage cleared around the premises according to the local conditions, hoping to help employees understand the harmonious coexistence between man and nature, and encourage employees to green the premises.

Corporate Party Building

As an industrial leader of new energy, clean energy and integrated circuit semiconductor, GCL Group advocates red guidance and green development and we have made great achievements in Double Carbon. In the exhibition of the "History of the Communist Party of China in Jiangsu" held in November 2021, we received the favorable comment from the audience, and a thank-you letter from the Publicity Department of and the Party History Office of the Jiangsu Provincial Committee of CPC.

In addition, GCL Group, as the only key private enterprise, stood out from 1,213 power enterprises nationwide to be selected as "the enterprise with party building brand impact in the national power industry in 2021" by the China Electricity Council.

Party Building Activities

In 2021, the 100th anniversary of the Party, GCL Group had a celebration based on the tradition of revolution by organizing employees to study the history of the Party, which received guidance from the Central Steering Group for Education of Party history. We made efforts to promote the integration of Party building and green development within the Group, which represented our determination of making contributions to the Party, the Country and the Group.

GCL Group: The Party Committee launched the campaign to study the Party history

In order to implement the instructions of the Party Central Committee and encourage all Party members and employees to study the Party history, the Party Committee of GCL Group invited Zhou Jianping, former deputy director of the Party History Working Office of the Suzhou Municipal Party Committee to give a speech named *"Learning the Party's History and Starting a New Journey of Building Socialist Modernization"*.

Mr. Zhou interpreted the history of the Party from learning history to make sense, uphold morality and put it into practice, seeking truth from facts, and abiding by the discipline. We shall benefit from our learning the Party history in honor of the 100th anniversary.

GCL Group: Celebrating the 100th Anniversary of the Communist Party of China

On June 29th, 2021, GCL Group celebrated the 100th anniversary of the Communist Party of China at Suzhou Energy Center and 83 parallel sessions. The celebration included Chairman's address, reviewing the oath of joining the Party, declaiming the verse "Follow the Party Forever", and a short video "Red Guidance & Green Development", which successfully enhanced the belief of Party members, which gave full play to the grass-root Party organization as a battle fortress..

The advanced teams/groups and outstanding Communist Party members were awarded at the conference, including 20 demonstration positions, 17 advanced grass-roots organizations, 100 outstanding Communist Party members, and 17 outstanding Party affairs workers.

At the conference, prizes were awarded to 20 demonstration positions, 17 advanced grass-roots organizations, 100 outstanding Communist Party members and 17 outstanding Party affairs workers.

The Fifth Steering Group of the CPC Central Committee for Party History Education visited GCL Group for guidance

On July 20th, 2021, Sun Yongchun, leader of the Fifth Steering Group of the Central Committee for Party History Education, led a team to GCL Energy Center to guide the development of Party history learning and education. They were informed of the development of GCL Group's Party building and the highlights of the year, affirmed the work of GCL Group, and expected GCL Group to make greater progress for high-quality development.

On December 21st, Li Qidou, the leader of the Third Guidance Group for Party History Learning and Education of the State Administration of Taxation, led a team to the GCL Party Building Exhibition Hall for inspection. Fei Zhong, member of the Group's Party Committee and director of the Party Masses Department, reported the performance of GCL Group in learning the Party history and the phased achievements, and was highly praised by the visitors.

Under the leadership of the Party Committee, GCL Group will continue the education of the Party history to achieve high-quality development.

GCL Group Yan'an Spiritual Research Association established

Supported by China Yan'an Spiritual Research Association, GCL Group Yan'an Spiritual Research Association was founded on May 19th, 2021 by the Party Committee of GCL Group. It is the first one initiated by a private enterprise in China. Meanwhile, we held a picture exhibition of "The Yan'an Spirit Shining Forever" and a theme forum of "Learning 100-Year Party History and Promoting Yan'an Spirit". Through expert analysis and high-end dialogue, we furthered our understanding of the Yan'an spirit, which encouraged us to insist on studying the Party history within the Group.

Appendix

GRI Standard

Indicators number	Description	Chapters
General Disclosures		
Organizational profile		
102-1	Name of the organization	About This Report Preface-Overview
102-2	Activities, brands, products, and services	Preface-Overview
102-3	Location of headquarters	Preface-Overview
102-4	Location of operations	Preface-Overview
102-5	Ownership and legal form	Preface-Overview
102-6	Markets served	Preface-Overview
102-7	Scale of the organization	Preface-Overview
102-8	Information on employees and other workers	Talent Development-Employee Care
102-9	Supply chain	Technological Innovation-Supply Chain Management
102-10	Significant changes to the organization and its supply chain	Technological Innovation-Supply Chain Management
102-11	Precautionary Principle or approach	Good Governance-Risk Management
102-12	External initiatives	Good Governance-ESG Governance
102-13	Membership of associations	Good Governance-ESG Governance
Strategy		
102-14	Statement from senior decision-maker	Message from President
Ethics and integrity		
102-16	Values, principles, standards, and norms of behavior	Preface-Overview
Governance		
102-18	Governance structure	Good Governance -ESG Governance
Stakeholder engagement		
102-40	List of stakeholder groups	Good Governance -ESG Governance
102-41	Collective bargaining agreements	Talent Development-Employee Care
102-42	Identifying and selecting stakeholders	Good Governance -ESG Governance
102-43	Approach to stakeholder engagement	Good Governance -ESG Governance
102-44	Key topics and concerns raised	Good Governance -ESG Governance
Reporting practice		
102-45	Entities included in the consolidated financial statements	About This Report
102-46	Defining report content and topic Boundaries	About This Report
102-47	List of material topics	Good Governance -ESG Governance
102-48	Restatements of information	About This Report
102-49	Changes in reporting	About This Report
102-50	Reporting period	About This Report
102-51	Date of most recent report	About This Report
102-52	Reporting cycle	About This Report
102-53	Contact point for questions regarding the report	About This Report
102-54	Claims of reporting in accordance with the GRI Standards	About This Report
102-55	GRI content index	Appendix- GRI Standard
Topic disclosures		
Anti-corruption		
205-2	Communication and training about anti-corruption policies and	Good Governance-Anti-corruption
205-3	Confirmed incidents of corruption and actions taken	Good Governance-Anti-corruption
Materials		
301-2	Recycled input materials used	Environmental protection-Environmental Management
301-3	Reclaimed products and their packaging materials	Environmental protection-Environmental Management
Energy		
302-1	Energy consumption within the organization	Environmental protection-Compliance with Emission Regulations
302-2	Energy consumption outside of the organization	Environmental protection-Compliance with Emission Regulations
302-3	Energy intensity	Environmental protection-Compliance with Emission Regulations
302-4	Reduction of energy consumption	Environmental protection-Compliance with Emission Regulations
302-5	Reductions in energy requirements of products and services	Environmental protection-Compliance Emissions
Water and Effluents		
303-1	Water withdrawal by source	Environmental protection-Environmental Management
303-2	Water sources significantly affected by withdrawal of water	Environmental protection-Environmental Management
303-3	Water recycled and reused	Environmental protection-Environmental Management
Emissions		
305-1	Direct (Scope 1) GHG emissions	Environmental protection-Compliance with Emission Regulations
305-2	Energy indirect (Scope 2) GHG emissions	Environmental protection-Compliance with Emission Regulations
305-3	Other indirect (Scope 3) GHG emissions	Environmental protection-Compliance with Emission Regulations

Indicators number	Description	Chapters
305-4	GHG emissions intensity	Environmental protection-Compliance with Emission Regulations
305-5	Reduction of GHG emissions	Environmental protection-Compliance with Emission Regulations
305-6	Emissions of ozone-depleting substances (ODS)	Environmental protection-Compliance with Emission Regulations
305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	Environmental protection-Compliance with Emission Regulations
Effluents and Waste		
306-1	Water discharge by quality and destination	Environmental protection-Compliance with Emission Regulations
306-2	Waste by type and disposal method	Environmental protection-Compliance with Emission Regulations
306-3	Significant spills	Environmental protection-Compliance with Emission Regulations
306-4	Transport of hazardous waste	Environmental protection-Compliance with Emission Regulations
306-5	Water bodies affected by water discharges and/or runoff	Environmental protection-Compliance with Emission Regulations
Environmental Compliance		
307-1	Non-compliance with environmental laws and regulations	Environmental protection-Compliance with Emission Regulations
Supplier Environmental Assessment		
308-1	New suppliers that were screened using environmental criteria	Technological Innovation-Supply Chain Management
308-2	Negative environmental impacts in the supply chain and actions	Technological Innovation-Supply Chain Management
Employment		
401-1	New employee hires and employee turnover	Talent Development-Employees' Rights and Interests
401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	Talent Development-Employee Care
Occupational Health and Safety		
403-1	Workers representation in formal joint management–worker health and safety committees	Talent Development-Employee Care
403-2	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	Talent Development--Employee Care
403-3	Workers with high incidence or high risk of diseases related to their occupation	Talent Development--Employee Care
403-4	Health and safety topics covered in formal agreements with trade unions	Talent Development--Employee Care
Training and Education		
404-1	Average hours of training per year per employee	Talent Development-Employee Development
404-2	Programs for upgrading employee skills and transition assistance programs	Talent Development-Employee Development
404-3	Percentage of employees receiving regular performance and career development reviews	Talent Development-Employee Development

Indicators number	Description	Chapters
Diversity and Equal Opportunity		
405-1	Diversity of governance bodies and employees	Talent Development-Employee Profile
Non-discrimination		
406-1	Incidents of discrimination and corrective actions taken	Talent Development-Employee Profile
Freedom of Association and Collective Bargaining		
407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	Technological Innovation-Supply Chain Management
Child Labor		
408-1	Operations and suppliers at significant risk for incidents of child labor	Talent Development-Employee Profile
Forced or Compulsory Labor		
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	Talent Development-Employee Profile
Human Rights Assessment		
412-2	Employee training on human rights policies or procedures	Talent Development-Employee Profile
Local Communities		
413-1	Operations with local community engagement, impact assessments, and development programs	Social Harmony- -Charity
413-2	Operations with significant actual and potential negative impacts on local communities	Social Harmony-Voluntary Services
Supplier Social Assessment		
414-1	New suppliers that were screened using social criteria 8	Technological Innovation-Supply Chain Management
414-2	Negative social impacts in the supply chain and actions taken	Technological Innovation-Supply Chain Management
Public Policy		
415-1	Political contributions	Technological Innovation-Win-win Cooperation
Customer Health and Safety		
416-1	Assessment of the health and safety impacts of product and service categories	Technological Innovation-Excellent Products
416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	Technological Innovation-Excellent Products
Marketing and Labeling		
417-1	Requirements for product and service information and labeling	Technological Innovation-Excellent Products
417-2	Incidents of non-compliance concerning product and service information and labeling	Technological Innovation-Excellent Products
417-3	Incidents of non-compliance concerning marketing communications	Technological Innovation-Excellent Products
Customer Privacy		
418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	Technological Innovation-Excellent Products

United Nations Sustainable Development Goals

Sustainable Development Goals	Description	Chapters
1 NO POVERTY	End poverty in all its forms everywhere	Social Harmony- -Charity
2 ZERO HUNGER	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	Social Harmony- -Charity
3 GOOD HEALTH AND WELL-BEING	Ensure healthy lives and promote well-being for all at all ages	Talent Development-Employee health and safety Social Harmony- -Charity
4 QUALITY EDUCATION	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Talent Development-Employee Development Social Harmony- -Charity
5 GENDER EQUALITY	Achieve gender equality and empower all women and girls	Talent Development-Employee Employment
6 CLEAN WATER AND SANITATION	Ensure availability and sustainable management of water and sanitation for all	Environmental protection-Green Operation Environmental protection-Environmental Management
7 AFFORDABLE AND CLEAN ENERGY	Ensure access to affordable, reliable, sustainable and modern energy for all	Environmental protection-Green Industries Environmental protection-Green Operation
8 DECENT WORK AND ECONOMIC GROWTH	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Talent Development-Employee Care
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Technological Innovation-Excellent Products

Sustainable Development Goals	Description	Chapters
10 REDUCED INEQUALITIES	Reduce inequality within and among countries	Talent Development-Employee Profile
11 SUSTAINABLE CITIES AND COMMUNITIES	Make cities and human settlements inclusive, safe, resilient and sustainable	Environmental protection-Environmental Management Social Harmony-Voluntary Services
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Ensure sustainable consumption and production patterns	Environmental protection-Environmental Management Technological Innovation-Excellent Products Technological Innovation-Supply Chain Management
13 CLIMATE ACTION	Take urgent action to combat climate change and its impacts	Environmental protection-Green Industries
14 LIFE BELOW WATER	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	Environmental protection-Green Operation Environmental protection-Environmental Management Social Harmony-Voluntary Services
15 LIFE ON LAND	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss	Environmental protection-Environmental Management Social Harmony-Voluntary Services
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	Good Governance-Business Ethics Technological Innovation-Supply Chain Management
17 PARTNERSHIPS FOR THE GOALS	Strengthen the means of implementation and revitalize the global partnership for sustainable development	Technological Innovation-Win-win Cooperation

Company Name involved in This Report

Full name	Abbreviation
Golden Concord Holdings Limited	GCL Group
GCL Technology Holdings Limited[7]	GCL TECH
GCL System Integration Technology Co. Ltd	GCL S.I.
GCL New Energy Holdings Limited	GCL New Energy
GCL Energy Technology Co., Ltd	GCL-ET
Xuzhou Xinjin Semiconductor Material Technology Co., Ltd.	GCLSemi
Jiangsu Xinhua Semiconductor Material Technology Co., Ltd.	Xinhua Semi
GCL Energy Technology Investment Group	GCL-EI
GCL Technology (Suzhou) Energy Limited	GCL-Tech (Suzhou)
Jiangsu Zhongneng Polysilicon Technology Development Co., Ltd.	Jiangsu Zhongneng
Leshan GCL New Energy Technology Co., Ltd	Leshan GCL
Xinjiang GCL New Energy Technology Co., Ltd	Xinjiang GCL
Suzhou GCL Photovoltaic Technology Co., Ltd	Suzhou GCL
Henan GCL Photovoltaic Technology Co., Ltd.	Henan GCL
Jurong GCL Photovoltaic Technology Co., Ltd	Jurong GCL
Jiangsu GCL Silicon Material Technology Development Co., Ltd	Xuzhou Photovoltaic
Ningxia GCL Monocrystalline Silicon Technology Development Co., Ltd	Ningxia GCL
GCL High Tech Nano Materials (Xuzhou) Co., Ltd.	Xuzhou High Tech

[7] Formerly known as GCL-Poly Energy Holdings Limited