



# ZNSHINE PV-TECH CO.,LTD

## 2023 Environmental, Social and Governance Report

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# About the Report

The Report is the 2023 Environmental, Social and Governance Report (hereinafter referred to as the “ESG Report” or “Report”) of ZNSHINE PV-TECH CO.,LTD (hereinafter referred to as the “ZNSHINE” or the “Company”). For internal and external stakeholders of the Company, the Report fully discloses the measures and performance of the Company to implement ESG concept and promote sustainable development of economy, environment and society.

## Access to the Report

To view or download the Report online, please visit the website of ZNSHINE PV-TECH CO.,LTD:  
<https://www.znshinesolar.com/>.

## Contact Information

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## Reporting Standard

The Report was prepared in accordance with the Global Reporting Initiative Standards (GRI Standards) and, made extensive reference to the Corporate Social Responsibility Reporting Guidelines (CASS-CSR 5.0) of Chinese Academy of Social Sciences and other relevant guidelines and requirements.

## Reporting Scope

The Report is an annual report, covering the period from January 1, 2023, to December 31, 2023. In order to enhance the comparability and completeness of the Report, some contents and data may exceed the above period.

The Report takes ZNSHINE PV-TECH CO.,LTD as the main body, covering the three major bases of Changzhou, Suqian, and Dali, namely:

**ZNSHINE PV-TECH CO.,LTD** (hereinafter referred to as the “Jintan Headquarters”). Address: No.1, South Zhenxing Road, Zhixi Town Industry Concentration Zone, Jintan Zone, Changzhou, Jiangsu Province, China.

**Zhengxin Photoelectric Technology (Suqian) Co., Ltd** (hereinafter referred to as the “Suqian Base”). Address: 1589 Guangzhou Road, Economic and Technological Development Zone, Suqian City, Jiangsu Province, China.

**ZNSHINE PV-TECH DALI CO.,LTD** (hereinafter referred to as the “Dali Base”). Address: Shangdeng Industrial Park, Shangdengzhong Area, Dali Economic and Technological Development Zone, Dali City, Dali Bai

## Reporting Principles

The Report was reviewed and approved for release by the Company’s Board of Directors. The Company guarantees that the Report is free from false records, misleading representations, or material omissions, and the Company is responsible for the authenticity, accuracy and completeness of its content.

## Publication

As an independent Environmental, Social and Governance (ESG) report, the Report is released in Chinese and English version and in electronic form.

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# Message from the Director



**Director** Yingchun Wang

ZNSHINE has always taken “Fairness and Trust” as the core value of corporate culture, and obtained the trust of many customers and partners. In the past year, ZNSHINE and all employees went forward hand in hand, with everything considered, stable, and orderly. Having a great atmosphere of its employees with one heart and one mind, the Company achieved a remarkable performance, with smooth overall operation and continuously improved order, basically realizing the annual strategic goals.

The Company values pure heart, self-discipline, righteous morality and upright behavior. We gradually established a sound and compliant corporate governance structure, emphasized business ethics and anti-corruption, and actively communicated with stakeholders to lay a solid foundation for sustainable development. We firmly believed that green and low-carbon was the way to high-quality development of the Company. Through innovation, we shaped a green future together, deeply integrated green concepts into our products and services, and continuously optimized our environmental management, so as to provide more vitality of sustainable energy for the world.

Treat people with sincerity and trust. Internally, we fully protected the legitimate rights and interests of employees, cared for their lives, and created a healthy and safe working environment. Externally, we took customer value as the core, provided efficient and reliable products, offered all-round solutions for the new energy industry, and also carried out public welfare and charitable activities to contribute to the society. We firmly believed that innovation is the soul that makes us different. We maintained close communication with our industry partners, facilitated resource sharing and experience exchange, leading to win-win cooperation. We made significant progress in the field of new energy, not only winning awards for technological innovation, but also being recognized in the marketplace with expanded product offerings.

Standing at a new starting point, ZNSHINE will take advantage of the momentum, anchor the goal, keep leading the development of the photovoltaic industry, promote the popularization and application of renewable energy, make greater contributions to the construction of a clean and green future, and help the sustainable development of economy, society and environment.



# About ZNSHINE

## Company Profile

Founded in 2006, ZNSHINE PV-TECH CO.,LTD is one of the pioneers in the photovoltaic (PV) industry, which is involved in power station development and operation, EPC service, and module manufacturing.

With a 10GW capacity across three production bases in Changzhou City, Suqian City, and Dali City, ZNSHINE currently provides comprehensive solar solutions in over 80 countries through its 30+ global subsidiaries. The Company was listed in The New Third Board (NEEQ) in 2016 as an energy company.

Since 2018, ZNSHINE has emerged as the top Chinese module supplier in India, and has been recognized as a BNEF Global Tier 1 module manufacturer. The Company was successively honored as a Top Performer in the PV Evolution Labs (PVEL)' s PV Module Reliability Scorecard, a world-renowned third-party, and established a long-term strategic partnership with Munich Re from 2019.

In 2023, ZNSHINE was named as Top 100 Global PV Brands List 2022 by PVBL Global PV Brands List Organizing Committee and 2023 Winner of the Most Influential PV Module Company of 2022 by

## Enterprise Culture

### Mission

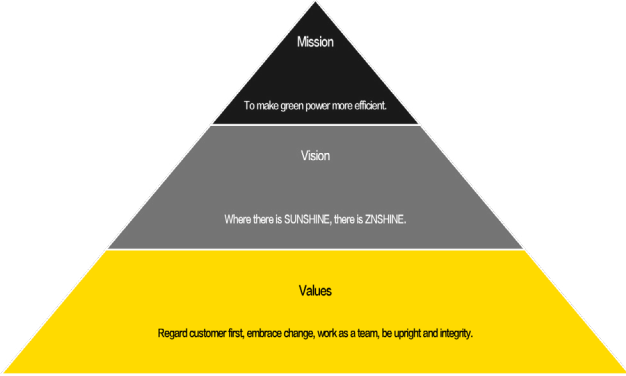
To make green power more efficient.

### Vision

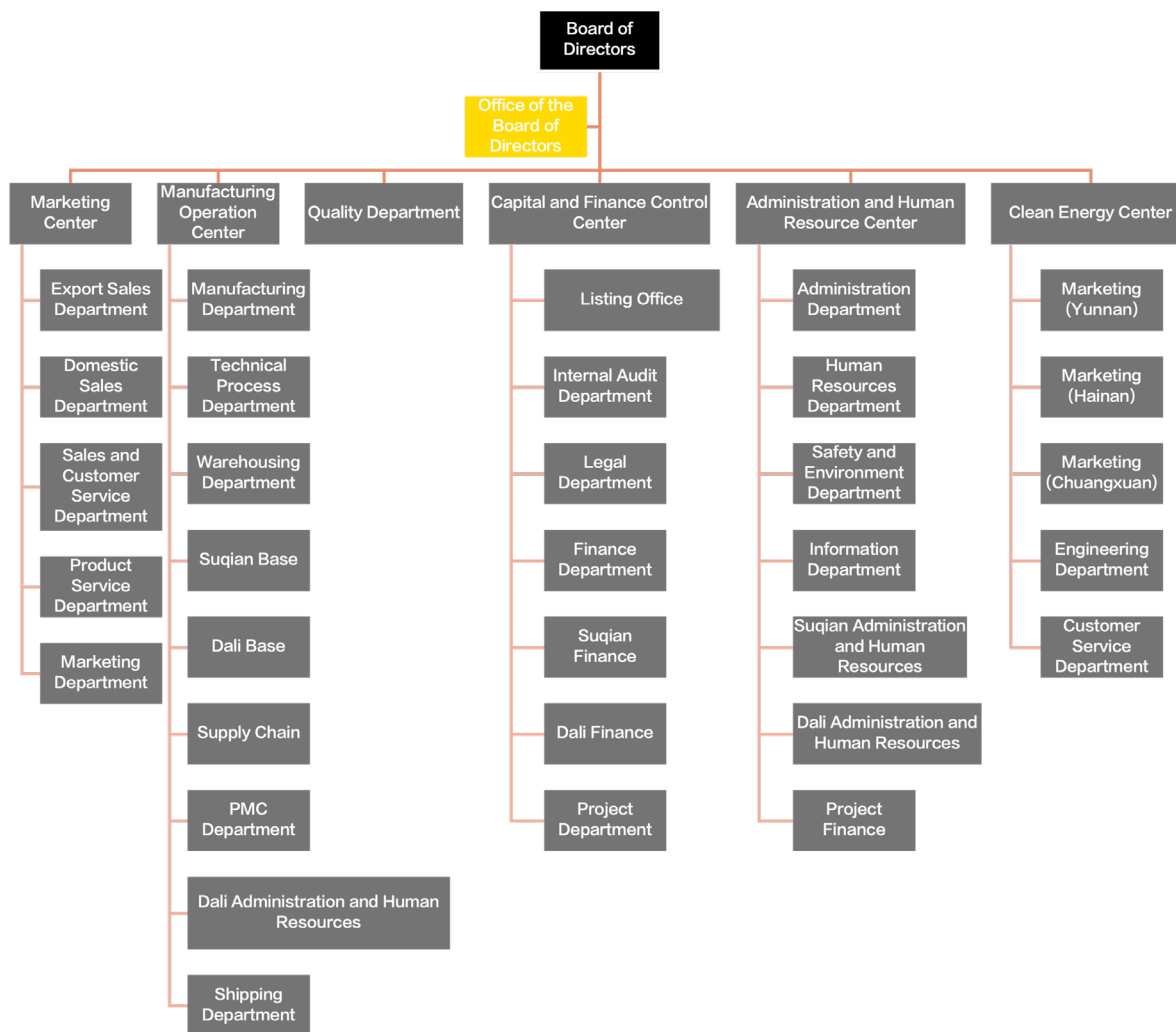
Where there is SUNSHINE, there is ZNSHINE.

### Values

Regard customer first, embrace change, work as a team, be upright and integrity.



# Organizational Structure



The top management of the company consists of the board of directors and the general manager, who are responsible for making the development strategy and major decisions of the company. Next is the management of each department, including marketing, finance, Human resources and technology. The Marketing Department is responsible for market research, brand building and marketing promotion, while the finance department is responsible for the company's financial management and cost control. The Human Resources Department is responsible for recruitment, training and employee relations management, while the Technology department is responsible for the company's technology development and innovation.

There are specific executive teams under the management of each department, such as the market planning, market analysis and sales team of the Marketing Department, and the research and development team, technical support and project management team of the technical department. These teams work deeply in their respective fields and together drive the company's growth.





## Industrial Layout



### Module R&D and Production – 8GW Fully Automated Line

Changzhou Production Base: total capacity of 2GW, mainly produce 166mm series modules 182mm series modules, TOPCon series mainstream modules, lightweight flexible modules and other differentiated modules;

Suqian Production Base: total capacity of 4GW,, adopt the world’s most advanced production equipment and fully automated line; compatible with up to 210mm TOPCon and other N-series modules;

Dali Production Base: total capacity of 2GW, utilize the world’s most advanced production equipment and fully automated line; compatible



### Project Development and Construction – EPC Services

A wholly-owned subsidiary, Shaanxi Qinpu Construction Engineering Co., Ltd. was established in 2016, specializing in PV EPC, mechanical and electrical installation EPC, building decoration, renovation and other construction.



### Residential Energy Storage – PV + BESS

Integrated Energy Intelligent Management – Commercial & Industrial PV Intelligent Storage & Charging Solution

Residential Smart Energy Management – Residential PV + Energy Storage Integrated Solution

Integrity, integrity and perseverance

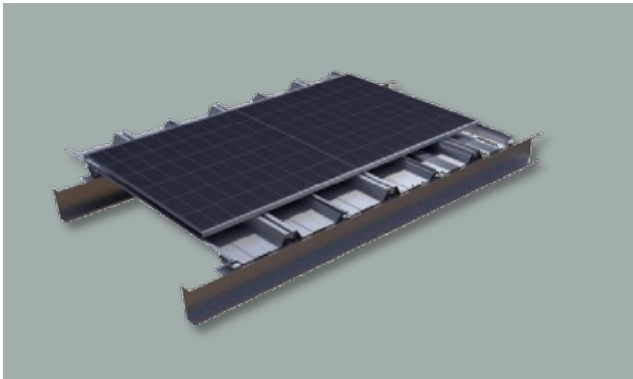
Zhengxin Optoelectronics adheres to customer value as the core and is committed to promoting the development of new energy.

From photovoltaic raw materials, components, energy storage to EPC photovoltaic power station systems, we provide comprehensive solutions for the new energy industry by providing efficient and reliable products.



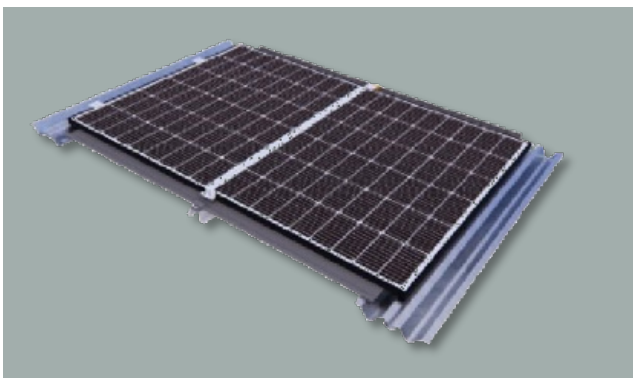
### **Integrated Rooftop System**

The use of standard length guide rail combination and integrated block to quickly and flexibly adapt to complex roof conditions, simplify the BOM content used by the builder, optimize inventory management. The system is simpler, more reliable and faster (up to 30% less installation time).



### **BIPV ZNSHINE High Power Tile System**

The integrated roofing system for photovoltaic buildings designed for new roofs uses color steel shingles with custom medium wave, and color steel shingles with custom quick installation clips can quickly install photovoltaic modules without additional tools, fast and efficient and free of late torque maintenance.

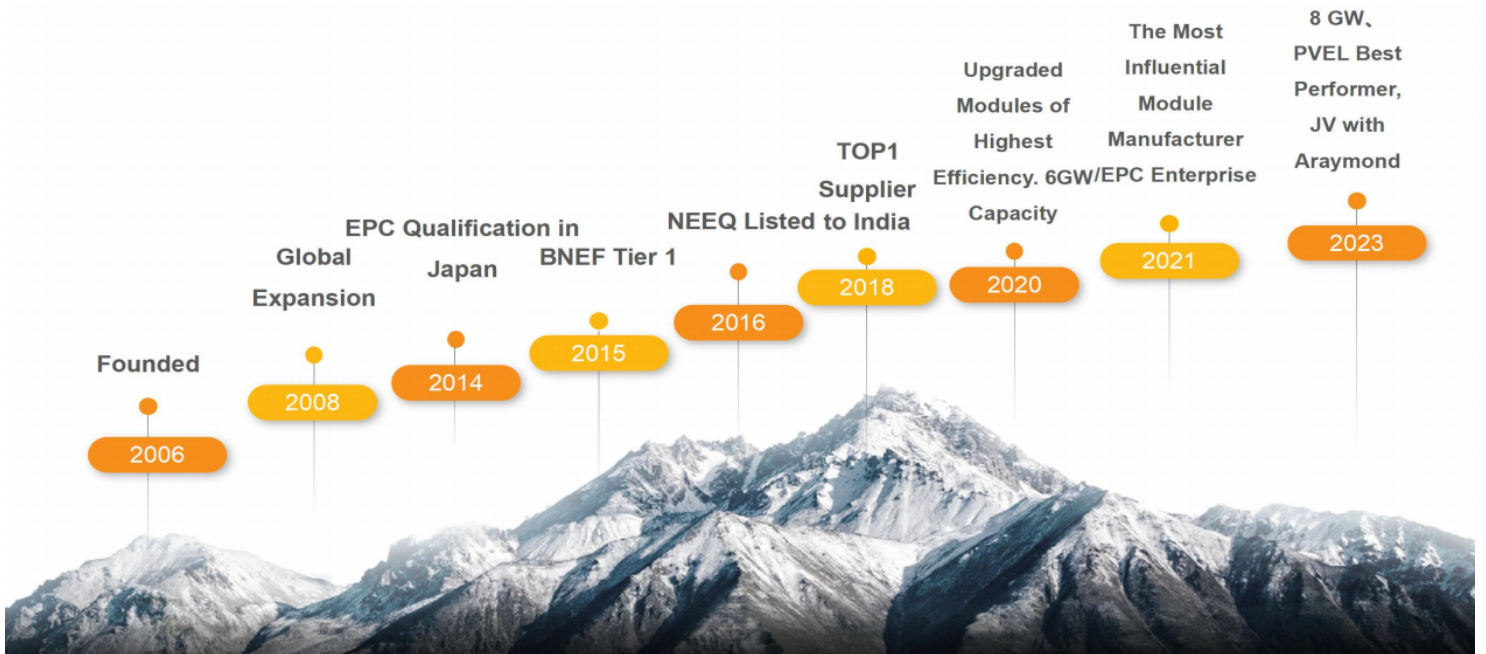


### **BAPV ZNSHINE Waterproof Tile System**

For the photovoltaic roof system of the old roof renovation, the main sink and the lateral auxiliary guide sink are used to establish a complete and continuous roof drainage system on the old roof, and the reinforcement design in the middle of the module enhances the overall load performance of the photovoltaic roof.



# Developmental Milestones



2006 Founded

2008 Global Expansion

2013 BNEF Tier 1

2014 EPC Qualification in Japan

2016 NEEQ Listed

2018 Top 1 Supplier to India

2020 Upgraded Modules of Highest Efficiency. 6GW Capacity

2021 The Most Influenced Module Manufacturer/EPC Enterprise

2023 Steadily Developed with Total Capacity of 8GW. PVEL Module Best Performer.

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# Cultivate the positive mindset to build sustainable

**ESG Management Structure**  
**Stakeholder Communication**  
**Material Issues Management**

Zhengxin Optronics firmly believes that good corporate management is essential for us to achieve sustained value. In order to achieve this goal, we continuously optimize and improve our management level to effectively respond to and reduce the risk of business operations. In addition, we actively engage with various stakeholders to deeply understand their needs and expectations, so as to create long-term value for them.

## ESG Management Structure

ZNSHINE established a three-level ESG management structure namely “ESG Management Committee – ESG Promotion Office – ESG Internal and External Coordination Organization” to improve the management mechanism of ESG matter from the top to the bottom. The Company fully implements its ESG strategy, which includes conducting ESG materiality assessments, managing ESG data, formulating ESG policies, evaluating implementation, and disclosing ESG information.

### ESG Management Committee

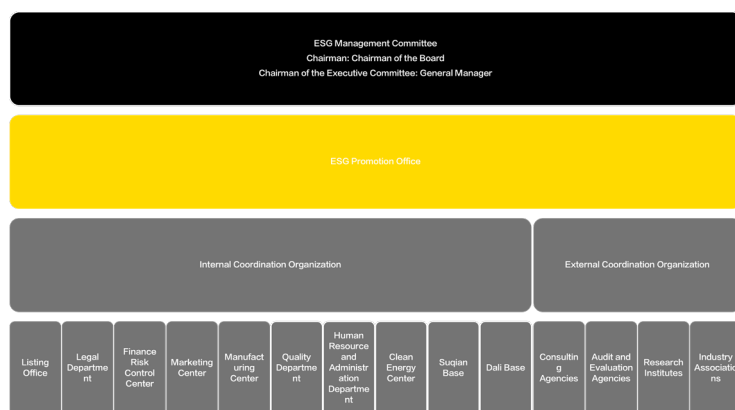
Chaired by the Chairman of the Board of Directors and led by the General Manager as the Chairman of the Executive Committee, the ESG Management Committee is mainly responsible for guiding the Company’s ESG strategic direction (including climate change and carbon emissions, water conservation and other issues), resolving the key issues in ESG implementation, and ensuring strategy implementation and the integration of ESG demands into the Company’s decision-making process. The ESG Committee identifies carbon reduction and climate change response as one of the Company’s ESG priorities, to be reported regularly to the Board of Directors as key issues.

### ESG Promotion Office

The ESG Promotion Office consists of the heads of ESG-related departments and ESG full-time employees to provide professional support and action planning for the Company’s ESG work. The office is required to report regularly to the ESG Management Committee on ESG issues planning, work progress and results, so as to ensure the timely fulfillment of the ESG Management Committee’s responsibility of supervising the various ESG issues.

### ESG Internal and External Coordination Organization

The Internal Coordination Organization consists of the heads and key contact persons of ESG-related departments within the Company, primarily responsible for undertaking ESG projects and maintaining high-frequency interactions with the ESG Promotion Office based on the promotion of its own ESG projects. The External Coordination Organization consists of consulting firms, audit and evaluation agencies, research institutes, industry associations, etc., closely related to the Company, providing external intellectual and data support for the Company’s ESG work.



ESG Management Structure of ZNSHINE

## Stakeholder Communication

The Company attaches great importance to daily communication with stakeholders and establishes diversified communication channels to receive opinions and suggestions from important stakeholders such as government and regulatory authorities, shareholders, employees, customers, partners and the community, etc., endeavoring to respond positively to the expectations and demands of stakeholders, to jointly promote sustainable development.mechanism of ESG matters from the top to the bottom.

Stakeholders	Expectations and demands	Major response approaches
Government and Regulatory authorities	Operate in compliance with the law Implement national policies	Operate in good faith and pay taxes according to the law Respond to national policies and regulations
Shareholders	Optimize corporate governance Earnings Growth	Make scientific decisions Hold shareholders' meetings
Employees	Protect legal rights and interests Value personal development Employee occupational health	Sign labor contracts in compliance with laws Conduct regular employee trainings Strengthen production safety inspections
Customers	Provide high-quality products and services Protect customer rights and privacy	Optimize quality management system Improve after-sales service system
Partners/Suppliers	Ensure fair competition Win-win for industry	Carry out sunshine procurement to eliminate commercial bribery Develop supplier assessment and evaluation mechanism Carry out cooperation and communication
Communities	Serve community development Protect the ecological environment	Participate in community building Strengthen "three wastes" management Enhance environmental information disclosure
Media/NGOs	Disclose information Interact with the media	Disclose information through official websites, media and other channels Establish complete media communication mechanisms

## Material Issues Management

The Company has conducted materiality assessment to collect, analyze and summarize the concerns of stakeholders. BY analyzing domestic and international sustainability-related standards, compares the current status of sustainability disclosure of industry enterprises, in combination with the actual performance of the Company's development, to identify material internal and external issues. The Company forms the ESG issues database, and ranked the importance of material issues, and based on the results of the materiality assessment, a total of 19 ESG issues identified, including 5 governance issues, 6 environmental issues and 8 social issues.

Governance Issues	Environmental Issues	Social Issues
1. Corporate governance 2. Compliance and risk management 3. Business ethics 4. Information security 5. Economic performance	6. Environmental management compliance 7. Energy management and utilization 8. Water management and utilization 9. Pollutant control 10. Response to climate change 11. Green industry chain	12. Scientific and technological innovation 13. Product quality management 14. Customer service management 15. Promotion of industry development 16. Sustainable supply chain 17. Human capital management 18. Occupational health and safety 19. Support for community development

# Keep the fair path to consolidate governance

才和技术为基础，创造最佳产品和服务  
TALENT & TECHNOLOGY, BEST PRODUCTS AND SERVICES



**Regulate Corporate Governance**  
**Compliance and Risk Management**  
**Manage Business Ethics**  
**Assure Information Security**

Zhengxin Optoelectronics takes normative corporate governance, compliance and risk management, compliance with business ethics, and information security as the main axis to build a solid foundation for governance. We are committed to establishing a transparent and accountable management system to ensure business compliance, adhere to business ethics, and protect information security. These initiatives will provide solid support for the long-term growth of the company and ensure that we continue to create value.



## Regulate Corporate Governance

### Governance Structure

ZNSHINE strictly complies with the Company Law of the People's Republic of China, the Securities Law of the People's Republic of China and other relevant laws and regulations, and establishes a set of complete governance rules and regulations including the Articles of Association, Procedural Rules for the General Meeting of Shareholders, the Procedural Rules for the Board of Directors, the Procedural Rules for the Board of Supervisors, the Determination System for External Guarantees, and the Management System for External Investments, etc., to ensure the scientific and standardized management, as well as efficient and stable operation of the Company.

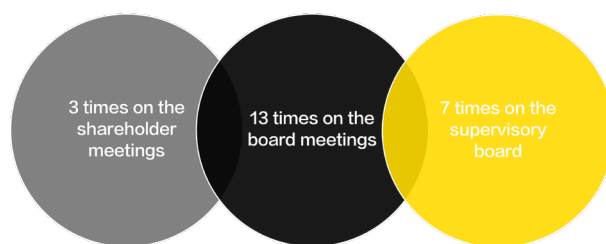
The Company applies the procedural rules of three meetings, i.e. the General Meeting of Shareholders, the Board of Directors and the Board of Supervisors.

The General Meeting of Shareholders is the authority of the Company that decides on the business principles and investment plans in accordance with laws. The Board of Directors and the Board of Supervisors shall report to the General Meeting of Shareholders. Directors, supervisors and senior management shall give explanations and clarifications on shareholders' queries and suggestions at the general meeting.

The Board of Directors consists of seven directors, there are five directors at the end of 2023, including two female director. The Board of Directors sets up the Office of the Board of Directors to deal with the daily affairs of the Board of Directors. The Secretary of the Board of Directors serves as the head of the Office of the Board of Directors, maintains the seals of the Board of Directors and the Office of the Board of Directors, and may designate securities representatives and other relevant personnel for assistance in handling daily affairs. The Board of Supervisors exercises oversight to safeguard the rights and interests of shareholders and investors as well as the interests of the Company from infringement, responsible to the General Meeting of Shareholders. The Board of Supervisors sets up the Office of the Board of Supervisors to handle the daily affairs, and the Chairman of the Board of Supervisors serves as the head of the Office of the Board of Supervisors. During the reporting period, ZNSHINE held 3 General Meetings of Shareholders, 13 Board of Directors' Meetings and 7 Board of Supervisors' Meetings that fully explored and voted on various proposals, so as to ensure stringent and efficient decision-making within the Company.

### Investor Protection

In order to effectively protect the legitimate rights and interests of investors, especially public investors, the Company has formulated the Investor Relations Management System, clarifying the purpose and basic principles of the investor relations management, the work objects, contents and methods, the setup of the management department and its main responsibilities, and the specific implementation measures, continuously improving the professionalism of the investor relations management. Meanwhile, the Company has formulated the Information Disclosure Management System, strictly following the requirements of relevant laws, regulations and the Company's systems, aiming to enhance the transparency and integrity of the Company, ensure that the investors of the Company have equal access to the relevant information of the Company, so as to effectively protect the legitimate rights and interests of the Company, its shareholders, creditors and other stakeholders. The Board of Directors of the Company is responsible for information disclosure matters, including reception of visitors, answering inquiries, contacting shareholders, providing publicly disclosed information of the Company for investors, and contacting the news media to publish the disclosed information. During the reporting period, ZNSHINE successfully completed the preparation and disclosure of 2 periodic reports and 81 interim reports.



Major decisions in 2023

## Compliance and Risk Management

For the sake of strengthening the internal supervision in the Company and preventing enterprise risks, ZNSHINE continuously improves the operational safeguard mechanism and supporting system for compliance management, and formulates the Control Procedures for Identification of Laws, Regulations and Other Requirements and Evaluation of Compliance, and the Control Procedures for Risks and Opportunities, promoting the orderly development of compliance management and risk prevention work.

For compliance management, the Human Resources and Administration Department, as the main responsibility department, obtains laws, regulations and other requirements applicable to the Company from the governmental departments, stakeholders, statutory publications, news media and websites, etc., and incorporates them into the Company's laws and regulations identification list after confirmation by the management representative. The Company annually tracks and amends the list, organizes relevant departments and personnel to evaluate compliance, fills out the Compliance Evaluation Form for Laws, Regulations and Other Requirements, prepares the Compliance Evaluation Report, and analyzes the reasons for non-compliance and takes necessary improvement measures. For risk control, the Company sets up a risk and opportunity evaluation team, carries out risk identification and assessment once a year. Responsible departments shall screen and identify the workshops, production processes and personnel with possible risks, the company adopts risk assessment rules based on risk severity and frequency of occurrence, and sets up risk levels, respectively implementing risk acceptance, risk reduction, risk avoidance and other countermeasures for different levels of risks.

## Manage Business Ethics

ZNSHINE strictly abides by the Criminal Law of the People's Republic of China, the Law Against Unfair Competition of the People's Republic of China, the Anti-Money Laundering Law of the People's Republic of China, the Anti-Monopoly Law of the People's Republic of China and other laws and regulations, and thereby formulates the Anti-bribery System, to strengthen the system oversight, promote the anti-corruption system and ensure the commitment to the anti-bribery system. The Company strictly follows the rules of fair competition, consciously resists negative corruption phenomena such as seeking profit without justice, dishonesty, deception and fraud, and establishes favorable image of the enterprise.

The Company signs the Anti-Bribery Commitment with employees of key departments, and strictly prohibits employees accepting kickbacks, gifts and private benefits in various kinds from any suppliers, partners and contractors. It is not allowed to take advantage of the work for personal interests, or participate in entertainment activities arranged by any supplier, partner or contractor. It is not permitted to arrange or introduce friends and relatives to contract works or supply materials, finished products, semi-finished products and equipment within the project scope such as cooperating parties.

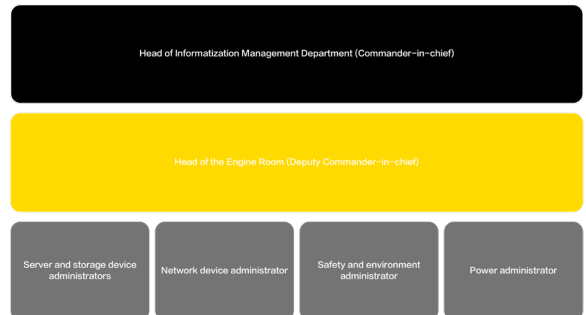
The Company further signs the Supplier Anti-Bribery/Anti-Corruption Agreement with its suppliers, strictly prohibiting suppliers from negotiating privately with the Company's employees on work-related issues to seek self-interest in non-normal competition against the Company's interests or to reach tacit agreements to harm the Company's interests. It is forbidden for suppliers to offer spiritual or material gifts to the Company's employees, such as kickbacks, banquets, entertainment, property, employment, shopping discounts and so on. In case of suppliers' violation of the agreement during the period of cooperation, the Company shall immediately terminate the business relationships with the supplier.

The Company encourages employees and partners to report corruption, publicizes the contact information of the Anti-Bribery Team, maintains strict confidentiality in the acceptance and investigation of complaints, and protects the name, department, company name and other information of the complainant. In the investigation and verification, no whistle-blowing materials and whistle-blowers shall be exposed. No identification shall be conducted on anonymous letters and materials, and no whistle-blowing materials shall be freely lent to the public. During the reporting period, the Company's Jintan Headquarters conducted a total of 2 hours of anti-corruption training for 20 person-times, covering key departments such as the Purchasing Department and the Human Resources Center; the Suqian Base conducted a total of 7 hours of anti-corruption training for 41 person-times; and the Dali Base conducted a total of 2 hours of anti-corruption training for 22 person-times.

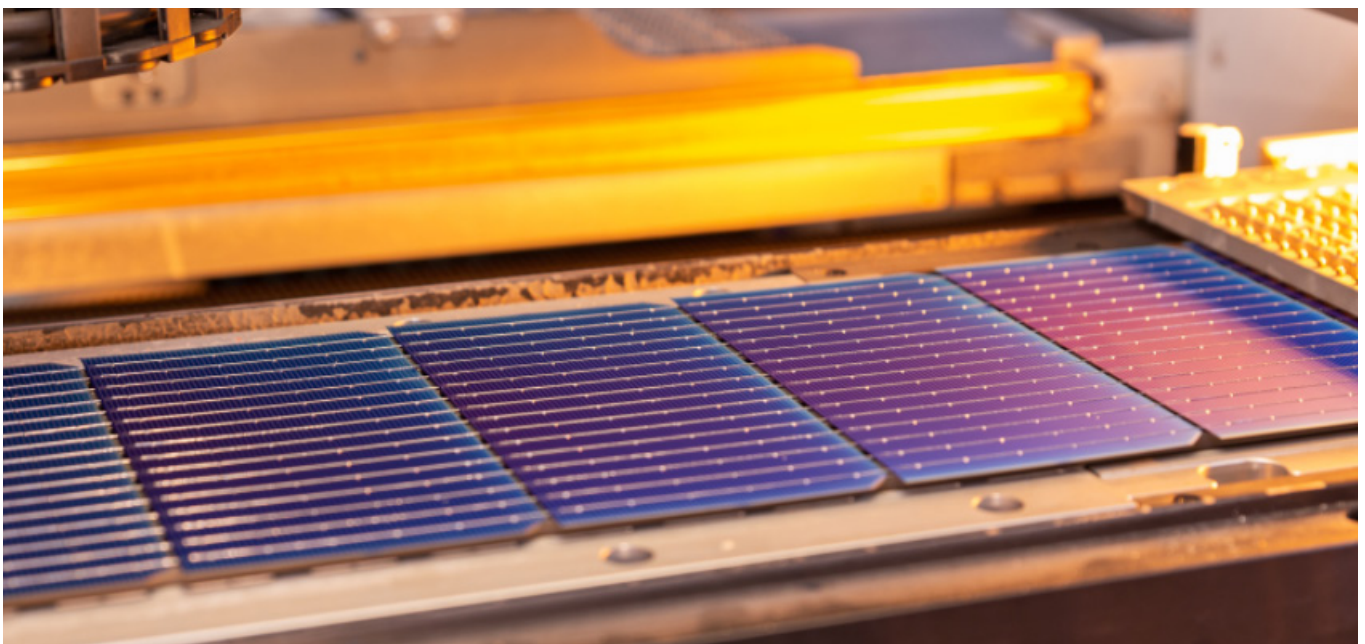
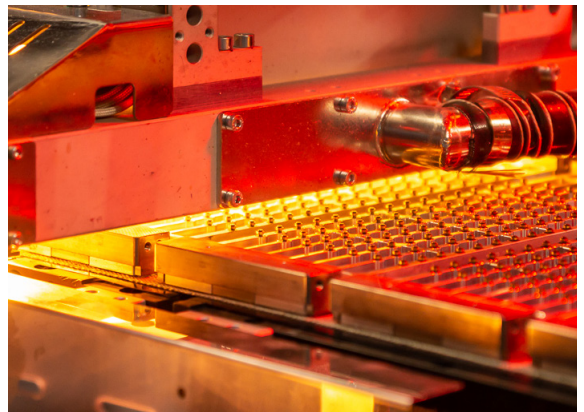
Types of risk	Risk description	Impact	Response measures
Environmental risk	Natural disasters and climate change	May cause disruption to operations and raw material supply	Optimize product transportation; The daily management pays attention to the comprehensive treatment of the surrounding environment.
Legal and regulatory risk	Policies and laws and regulations	Increased compliance costs	Regularly monitor emerging laws and regulations, and require continuous monitoring of related risks.
PV industry risk	Market and technological changes	Technological updates may lead to a decrease in project value	Adhere to customer orientation, strengthen independent innovation, and produce green and low-carbon products.
Safety production risks	Security management	Accident hazards	Strengthen safety production management and strictly implement hidden danger investigation and treatment.
Product quality risk	Quality control	Decreased customer satisfaction	Establish a comprehensive quality management system and deliver reliable products.

## Assure Information Security

ZNSHINE continuously concerns about information security in the operation process, and formulates a series of systems such as the Information Security Management System, the Informatization Resource Management System, the Informatization Emergency Plan, etc., to constantly improve the system of information security and privacy protection, as well as protect the Company's assets and business security. The Company controls access to the application system, carries out necessary management of system user registration, authority change and authority cancellation, only granting users the minimum access necessary for business activities. Domain controllers are installed with antivirus software and firewalls, while no authorized personnel are allowed to store, process or transmit sensitive information on them. Data backup system is established, that ERP, MES, and CRM database servers are backed up once a week. Real-time backup of data is carried out after massive updates data after massive updates. In addition, the Company builds an informatization emergency response working group led by the Informatization Management Department. in case of damage to the network and information system caused by natural disasters, power failures, network damages, equipment failures, and man-made damages, the Company investigates the causes of system failures in according to the debugging process, classifies the failure emergencies into four levels, and adopts different treatment measures for different degrees of failure causes.



Information Security Emergency Response  
Work Group of ZNSHINE





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# Hold the firm belief to promote green development



**Integrated Environmental Management**  
**Low Carbon Operations**  
**Green Industry Chain Empowerment**

Zhengxin Optoelectronics firmly believes in the concept of green development, actively promotes the integrated environmental management, and adopts a series of measures to achieve the effective use and recycling of resources to minimize the impact on the environment. We not only practice low-carbon operations, actively explore innovative ways of energy conservation and emission reduction, but also commit to empowering the green industry chain, supporting and promoting the development of the entire industry in a more environmentally friendly and sustainable direction, and contributing to the development of the green economy.

# Integrated Environmental

## Environmental Management System

ZNSHINE insists on the path of green development, strictly complies with the Environmental Protection Law of the People’s Republic of China and relevant laws and regulations of overseas operation places, formulates the Environmental Guideline of “comply with the environmental laws and regulations, continuously improve the environment, reduce the pollution emission and reasonably utilize the energy”, and prepares the management system such as the Control Procedure for Identification and Evaluation of Environmental Factors and Control Procedure for Emergency Preparedness and Response, to continuously improve the environmental management system. Based on ISO 14001 Environmental Management System, the Company carries out the upgrade of environmental management system certification, as the Jintan Headquarters and Suqian Base of ZNSHINE have obtained the ISO 14001:2015 Environmental Management System Certification.



ISO 14001:2015 Certification

## Clarify Functions and Responsibilities

The Company designates the Human Resources and Administration Department as the responsible management department for environmental protection, in charge of organizing representatives of departments to carry out identification and assessment of environmental factors and conducting regular supervision and inspection of environmental control.

## Evaluate Environmental Risks and Factors

The Company conducts identification and control of environmental factors, registers environmental impact factors, recognizes the origin, area and impact on the environment of environmental factors, main modules and concentration of pollutants, and current treatment methods. In addition, the Company identifies applicable laws, evaluates the compliance of pollutant emissions, chemical use, resource and energy consumption in production and operation with the requirements of laws and regulations, and conducts regular reviews of environmental factors and amendments to environmental factors.

## Assess Environmental Performance

The Company carries out measurement, analysis and evaluation control of environmental performance, tests waste gas, waste water and noise generated in operation of the Company annually on a regular basis, and commissions qualified third-party testing organizations to issue testing reports.

During the reporting period, ZNSHINE continued to improve environmental management that the Jintan Headquarters invested 236,500 RMB in environmental protection with 560 people participating in environmental protection training; the Suqian Base invested 266,900 RMB in environmental protection with 452 people participating in environmental protection training; and the Dali Base invested 15,300 RMB in environmental protection with 346 people participating in environmental protection training. No environmental pollution accidents occurred at the Jintan Headquarters and two bases during the reporting period.

## Environmental Emergency Management

Along with the normalized environmental risk control, ZNSHINE implements proper environmental emergency management. The Company prepares the Procedure for Emergency Preparedness and Response Control, and appoints the Human Resources and Administration Department as the responsible department, responsible for formulating the organizational structure of emergency command and rescue, clarifying the relevant responsible personnel, identifying the possible environmental accidents, as well as the training and drills of the emergency response plan.

The Company prepares annual emergency response plans for environmental pollution accidents, establishes an emergency rescue leading group, equips with emergency rescue equipment and devices, regularly carries out training on environmental emergency response within the Company, effectively manages and controls possible hidden dangers, enhances the ability to respond to and dispose of environmental emergencies, to avoid and minimize the losses and hazards caused by environmental emergencies to the environment.

The Jintan Headquarters of the Company carried out an environmental protection drill on May 10, 2023 according to the theme of the 2023 Emergency Response Plan for Environmental Emergencies Drill Program, with the participation of the internal emergency rescue organization and workshop employees, and recorded the process of the drill, summarizing the deficiencies, experiences and effects achieved in the drill.



Environmental Protection Drill at Jintan Headquarters

The Suqian Base prepared the Response Drill Plan for Environmental Emergencies and carried out a hazardous waste (HWO6 waste xylene) leakage drill on March 16, 2023, with full participation, set up rescue team, alert team, medical team, communication team and material protection team, used firefighting sand containment and carried out a series of disposals such as embankment, plugging, pumping, etc., to achieve effective treatment of the leaked waste xylene and further improve the employees' ability to respond to environmental emergencies.



## Low Carbon Operations

### Response to Climate Change

ZNSHINE has consistently integrated the principles of green and low-carbon sustainable development into its corporate strategy, actively addressing global climate change and contributing to environmental protection and social progress. Consequently, the company has established sustainable development policies and is progressively establishing and refining its comprehensive sustainable development system to ensure the seamless integration of sustainability principles with daily operations, committed to the inventory and control of greenhouse gas emissions, energy and resource conservation, slowing down the process of global warming, and maintaining the sustainable development of the global ecological environment. The Company promises to comply with environmental laws and regulations, and strives to develop environmentally friendly, resource-saving products that minimize the impact on humans and the environment throughout the entire life cycle of product development, production, storage, logistics, distribution, and use. For new products, the Company records and measures possible environmental impacts and energy efficiency in advance to reduce environmental pollution and improve the efficiency of the environmental management system. At the same time, the Company raises the environmental awareness of employees via regular communication and education. Following the requirements of ISO 14064-1:2018, the Company identified the greenhouse gas (GHG) emissions of the Jintan Headquarters, Suqian Base and Dali Base in 2023 and prepared the Greenhouse Gas Inventory Report, with the Category 1 emission types including stationary combustion, mobile combustion, process emissions and fugitive emissions, and the Category 2 emission types including purchased electricity.

It is noted from the report that Category 2 indirect GHG emissions from energy are the largest GHG emissions of ZNSHINE, consequently the Company shall take the following measures to mitigate the Category 2 GHG emissions:

- (1) Promote energy-saving activities to reduce the use of electricity (e.g., utilize more variable frequency air compressors, adjust production operation modes, etc.);
- (2) Strengthen equipment repair and maintenance, reduce abnormal operation of equipment, improve equipment operation efficiency, and reduce energy loss (e.g., maintain equipment on a regular basis, strengthen compressed air leakage checks, and maintain equipment as scheduled and in time, etc.);
- (3) Adopt energy-saving equipment to reduce energy use (e.g., use LED lighting, frequency conversion equipment, equipment above the second level of energy efficiency, etc.);
- (4) Establish the energy saving management system of equipment and facilities, such as cut off water and electricity of equipment and facilities during long time line stoppage, reasonably switch on the lighting for the better lighting, control by zone, sound and light in part areas and conduct the workshop operation at 25±5°C.

Greenhouse Gas Emissions of ZNSHINE in 2023

2023	Category 1 Direct Emissions (tCO <sub>2</sub> eq)	Category 2 Indirect Emissions from Purchased Energy (tCO <sub>2</sub> eq)	Total Greenhouse Gas Emissions (tCO <sub>2</sub> eq)	Greenhouse Gas Emissions from 10,000 RMB Revenue (tCO <sub>2</sub> eq per 10,000 RMB)
Jintan Headquarters	194.64	9764.49	9959.13	0.0278
Suqian Base	391.68	11737.12	12128.80	0.0338
Dali Base	126.58	3956.78	4083.36	0.0114

## Energy Management and Utilization

ZNSHINE has set environmental targets and aims to reduce water resources, water consumption, and greenhouse gas emissions by 2% from the 2023 benchmark by 2028. To achieve this, the company, grounded in the ISO14001 environmental management system, has established a robust internal environmental management framework. The company strictly complies with the Energy Conservation Law of the People's Republic of China, the Energy Conservation Regulations of Jiangsu Province and other relevant regulations on energy management, formulates the Energy Management System and strengthens the establishment of energy management system. During the reporting period, the Suqian Base was certified with ISO 50001:2018 Energy Management System.



Energy Management System Certification of the Suqian Base

### Energy Management Organizational Structure

The energy management of ZNSHINE adopts the three-level management system of the Company, branch factories, and workshops. The Company sets up energy management leading group and its part-time management organization operation center, with the General Manager as the leader, the heads of relevant departments and main workshops as the members, and the operation center responsible for daily affairs. The branch factories, relevant departments and offices set up energy management team, with the head of the workshop as the team leader. The workshop sets up energy managers to form a company-wide energy management network.

### Energy Use Management

Electricity management system: The Equipment Department is responsible for ensuring the normal supply of electricity for the whole company. The Operation Center makes reasonable scheduling of the Company's production, ensures standardized production of major electricity-consuming equipment as far as possible, improves the load factor, and reduces the unit electricity consumption. The use of 500W and above incandescent lamps is strictly prohibited in the operation area of the branch factories, which gradually switches to high-efficiency energy-saving lamps. The Company strictly controls the issuance and private use of electric heaters, and encourages the power consumption units to put forward new proposals for power saving.

Fuel management system: The Operation Center prepares the fuel supply plan according to the Company's production plan and submits it to the Equipment Department for the purchase of refined oil. The warehouse carries out unified storage and custody of the refined oil, weighing, bookkeeping and checking of the purchased fuel. Each unit shall hold the material requisition form for the use, and the warehouse management personnel shall check the varieties, quantities, and strictly measure the fuel in time for distribution.

Energy saving promotion management: In order to boost the enthusiasm of employees to save energy, promote the further development of energy-saving work, eliminate the leakage and drip of energy, and use resources safely and reasonably, it is stipulated that units shall strictly prohibit the use of living stoves, private connections and connections without permits, as well as eliminate long-lasting lamps, and implement other energy-saving methods.

### Energy Management for New, Renovated and Expanded Projects

Prior to the project establishment, the Operation Center conducts research on the energy consumption of major energy-consuming equipment and the level of energy consumption per unit of product based on the information about advanced processes in the same industry domestically and internationally, and prepares the Research Report on the Energy Consumption of Processes and Equipment for New, Renovated and Expanded Projects. The Company prefers equipment with low energy consumption, reasonably allocates energy-consuming equipment and facilities, and fills in the Main Energy-Consuming Equipment Ledger and Economic Operation Record Sheet. The Human Resources and Administration Center is responsible for communicating with the project design unit, selecting the process plan, designing the process flow, to optimize the energy-using system of the whole production process.

### Energy Measurement Management

The Company designates the Human Resources and Administration Department as the responsible management department for environmental protection, in charge of organizing representatives of departments to carry out identification and assessment of environmental factors and conducting regular supervision and inspection of environmental control.

## Energy Efficiency Programs

The original string welder used by the Company suffered from low productivity, high energy consumption and unsatisfactory string welding effect, affecting the quality of the products. The Jintan Headquarters replaced with Autowell AM050E multi-master grid PV string welder, improving the working efficiency, reducing the time spent on the string welding section of a single batch of products, and lowering the electricity required per unit of product. Annually, it could improve the product output value of about 3.2 million RMB, reduce electricity consumption of about 1.6 million kWh, and save electricity cost of about 1.8 million RMB, totaling 5 million RMB.



Autowell AM050E Multi-master grid PV String Welder

The Sujian Base replaced and updated the string welding equipment, from the previous XN S4000 to XN S5000. With the high productivity of XN S5000 String Welding Equipment, it is not only the production capacity and finished product rate of the workshop gets improved, the breakage rate is reduced, the labor cost is lowered, but also the power consumption of one production line gets reduced by 15kWh with S5000 compared to S4000, and the power saving of one production line per day reaches up to 2,160kWh.



XN S5000 String Welding Equipment

As a high energy-consuming equipment, the Process Department of the Dali base conducted continuous validation and test on the laminating machine to reduce the consumption, and changed the laminating process of the equipment, changing the laminating time from 690 seconds to 630 seconds without affecting the quality of the products, saving 60 seconds of the laminating time to save about 7kWh/unit in terms of energy consumption. The factory had 8 laminators in total, and achieved the effect of saving 56kWh per hour under full production.

## Water Resources Management and Utilization

ZNSHINE strictly complies with the Water Law of the People's Republic of China and other laws and regulations, attaches importance to the saving, efficient and sustainable utilization of water resources in production and operation, and formulates the Management Measures for Water Conservation, clearly defining the duties of the main responsible departments.

The Human Resources and Administration Department is responsible for the daily management and supervision of the Company's water consumption, timely stopping and correcting the phenomenon of wasting tap water; responsible for the maintenance and management of water consumption equipment and pipelines to ensure the completeness of water consumption facilities.

The Finance Department is responsible for monthly statistical summaries and real-time monitoring of water consumption, providing timely feedback on any anomalies in water consumption, with the Human Resources and Administration Department to supervise corrective actions.

The departments are responsible for educating employees on water conservation and implementing the use of water at rated and scheduled volumes.



Filtration and Purification Equipment –  
Shallow Medium Filter

The Company actively promotes the practice of sustainable water resource management, carries out water planning and water conservation, insists on source optimization, and reduces the waste of water resources. Each workshop and unit in the whole company conducts regular inspection and maintenance of its own water pipes and faucets to eliminate the phenomenon of bubbling, running, dripping and leaking, and informs the pipeline maintenance class of the Equipment Department to repair for any damage and leakage in areas beyond its ownership. Avoid the phenomenon of long running water, and stop the water when people leave.

Moreover, the Company actively explores new technologies for water conservation. After circulating of a small amount of cooling water in the cooling tower, due to the high impurities in the water, the use of cooling tower facilities is affected, and thus the cooling water is replaced and discharged frequently. By installing cooling water purification and recycling devices in cooling towers, the impurities, sediment and harmful substances in the circulating water could be effectively removed and the water quality could be stabilized to meet the requirements for recycling of cooling devices, so as to increase the recycling frequency and efficiency of the cooling water, and to reduce the frequency of wastewater replacement and discharge. The cooling water consumption was reduced by about 5,000 tons since June 2023, when the program was put into operation.

Water Use of ZNSHINE in 2023

2023	Total Water Consumption (t)	Water Consumption for 10,000 RMB of Revenue (tons per 10,000 RMB)
Jintan Headquarters	116794	0.3255
Suqian Base	51729	0.1442
Dali Base	2906	0.0081

## Pollutant Emission Control

ZNSHINE strictly complies with relevant laws and regulations such as the Air Pollution Prevention and Control Law of the People’s Republic of China, the Water Pollution Prevention and Control Law of the People’s Republic of China, and the Solid Waste Pollution Prevention and Control Law of the People’s Republic of China, etc., and formulates the management documents such as the Management Measures for the Emission and Monitoring of the Three Wastes, the Waste Management Measures, and the Hazardous Waste Management System, etc., specifying the management requirements for various types of emissions.

### Waste Water, Waste Gas Management

The waste gas of ZNSHINE in the production process mainly arises from non-methane hydrocarbons and particulate matter generated from the welding process and lamination process. Each base of the Company carries out full control over the process of generation, treatment and emission of waste gases, in strict accordance with the requirements of the emission permit, and regularly commissions qualified third parties to test the exhaust outlets in accordance with the requirements of the EIA and the self-monitoring programs. The factory buildings are equipped with ventilation fans, while the production equipment involving non-methane hydrocarbons is equipped with air-collecting cover fans and other pumping equipment, and the “activated carbon adsorption and desorption + CO catalytic combustion” device is adopted for the treatment of the waste gases. The drainage of each base adopts the system of “rainwater and sewage separated, clean water and sewage separated”, with rainwater discharged locally through the rainwater network and domestic wastewater discharged into the sewage network of the park through septic tanks upon reaching the standard, and then processed by the sewage treatment plant of the industrial park. The Company regularly engages qualified third-party companies to test the wastewater discharge outlets to ensure compliance with the standards.

### Waste Management

The Company collects waste by classification, sets up waste collection points with clear markings, and regularly transports waste to the storage warehouse. Waste storage points shall be clearly marked to indicate the category of waste, measures shall be implemented to prevent the outflow of sewage, and fire-fighting equipment shall be placed within 20 meters of the waste yard. Inspection shall be strengthened during rainy seasons, typhoons, etc., and the frequency of waste removal shall be increased.

The Human Resources and Administration Department is responsible for commissioning the treatment of waste, auditing the qualifications of waste treatment units and signing treatment agreements, and filling in the Hazardous Waste Transfer Sheet for the treatment of hazardous waste. Recyclable waste is recovered by waste recycling companies or recycled internally.

Waste Production of ZNSHINE in 2023

2023	Total Waste Production (t)	Hazardous Waste Production (t)	General Waste Production (t)
Jintan Headquarters	187.62	1.22	186.40
Suqian Base	129.71	1.63	128.08
Dali Base	2.57	1.17	

### Electrically Heated Laminators to Reduce Waste Thermal Oil Generation

Fully automatic laminators based on oil heating use thermal oil as the energy transfer medium and electric heating tubes as the primary heat source. In the process of energy transfer, numerous parts constantly emit heat, and it is possible to pollute the environment once the heat-conducting oil needs to be replaced. ZNSHINE phased out the oil-heated laminating machine and adopted the electric-heated laminating machine, reducing the generation of waste thermal oil by 1.5 tons per year.



### Chemicals Management

ZNSHINE strictly implements the Safety Management Regulations of Hazardous Chemicals and other relevant laws and regulations, strengthens the safety management of hazardous chemicals, and formulates the Management Measures of Chemicals, the Chemical Warehouse Management System, and other management system documents, to ensure the safety of the employees' occupational health and safety, avoid and minimize the occurrence of environmental pollution incidents.

**Chemical procurement:** It is required for suppliers to provide information such as the Safety Production License, the Safety Technical Instructions, etc. Purchasing personnel shall be professionally trained to ensure that the chemical labels are complete and consistent with the products in the package.

**Chemical transportation, loading and unloading:** It shall be transported by qualified transportation units with the Road Transportation Operation License and Hazardous Chemical Vehicle License required. Transportation vehicles shall be equipped with the necessary emergency handling devices and personal protective equipment in accordance with the safety technical instructions. Loading and unloading operations shall be carried out under the on-site command of management personnel.

**Chemical storage:** Storage buildings and places for chemicals shall meet fire and explosion-proof requirements. It is necessary to test the incoming chemicals, including whether the packaging is damaged and whether the products hold certificates of conformity. Chemical storekeepers shall participate in professional training to understand the performance, characteristics, storage methods and accident handling skills of chemicals, and store them in isolation in accordance with the storage requirements, without being exposed to heat, strong light, high stacking or heavy pressure, and with obvious markings to facilitate the management of receiving and issuance.

**Chemical usage:** Apply in accordance with the amount used on the day, and do not exceed the amount. The equipment and storage containers of hazardous chemicals shall be strictly inspected to ensure the completeness. The used empty barrels shall be collected and stored in the designated place in the warehouse, to be recycled and disposed by suppliers arranged by the Warehousing Department, as well as properly logged in/out of the warehouse. The storage place shall be relatively closed, rain-proof, and ground impermeable to prevent the spread of pollution.





Alarm for Combustible Gases in Hazardous Chemicals Warehouse



MSDS Documentation Posted in the Chemical Warehouse



Explosion-proof Cabinet for Flux



Explosion-proof Cabinet for Xylene

## Green Industry Chain Empowerment

ZNSHINE is committed to integrating the green concept into the whole life cycle of its products. While providing customers with efficient and stable products, ZNSHINE minimizes or eliminates the environmental impacts of the products in all aspects of the life cycle, such as research and development, warehousing and logistics, use and recycling.

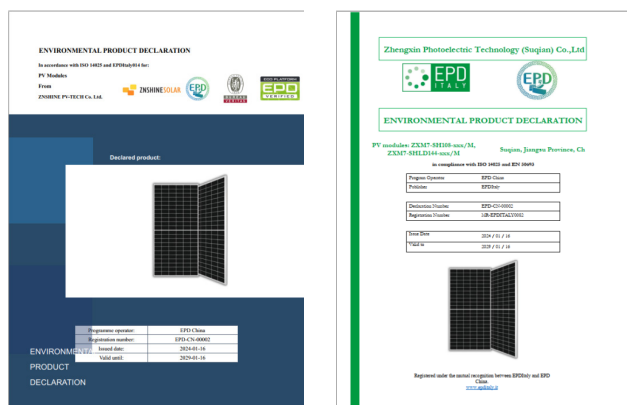
### Green Product Research and Development

Aluminum alloys are used conventionally as a key module in the frames of solar PV modules. However, with the rapid development of the photovoltaic industry, the high energy consumption and carbon emissions of aluminum alloys are gradually revealed. In response to the challenge, ZNSHINE actively invests in research and development, and introduces newer polyurethane composite framing products, providing new sustainable power for the solar photovoltaic industry.





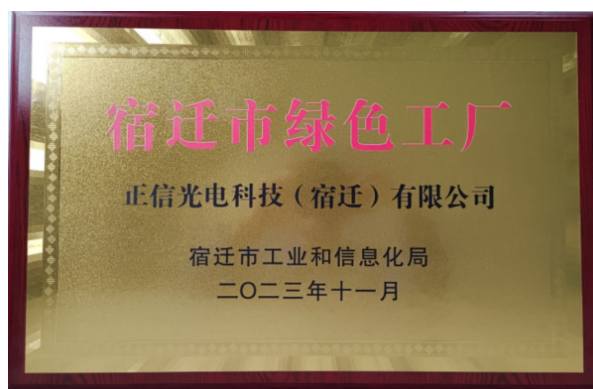
Furthermore, the PV modules produced by the Suqian Base of ZNSHINE have been issued with the EPD Environmental Product Declaration Verification Certificate and the EPD Italy Certification.



### Green Factory

ZNSHINE always sticks to the Energy Guideline of “scientific and law-abiding, energy saving and environmental protection, creating benefits; clean production, continuous improvement and pursuing excellence”, and seeks for energy re-cycling and efficiency gains through “energy saving, cost reduction and consumption reduction” to improve the competitiveness of the Company and pursue the sustainable development. The Jintan Headquarters was certified as the Green Factory of Jiangsu Province in 2019.

The Suqian Base was certified as the Green Factory of Suqian City in 2023 after the procedures of enterprise declaration, county and district recommendation, formal review, expert evaluation, credit review and on-site review.



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# Show trust and sincerity to improve society



**Create a New Chapter in Science and Technology**

**Pursue Quality and Ingenuity**

**Build a Responsible Supply Chain**

**Bring Employees Together**

**Focus on Health Security**

Zhengxin Optoelectronics adheres to the sincere heart to build a better society. We write new chapters in science and technology, promote innovation, and provide opportunities for social development; Abide by quality ingenuity, meet customer needs, win trust; Establish a responsible supply chain to promote sustainable development; Focus on employee development and well-being, strengthen safety management; Actively support community development, assume social responsibility, and promote prosperity and progress. We work together with the community to build a better future.

# Create a New Chapter in Science and Technology

## Excellence in Innovation

Since its foundation, ZNSHINE has accumulated profound manufacturing experience, specializing in research, manufacturing and sales of photovoltaic modules, as well as providing comprehensive EPC power plant services and integrated solutions for the renewable energy sector. ZNSHINE insists on innovation-driven, carries out research and development projects based on its main business, and actively promotes product innovation, technological revolution and production efficiency improvement, aiming to improve product performance, innovate product categories and enhance product competitiveness. Currently, the Company has established the R&D center and CNAS-certified laboratory in accordance with the national standards, and owns over 100 technology patents, including the graphene-coated echnology patents.

During the reporting period, the Company had 192 R&D personnel, over 20 R&D projects, and invested 134 million RMB in R&D expenses.

ZNSHINE constantly pursues scientific research and innovation, promotes cooperation with companies and universities, and not only focuses on the products, but also improves the user experience. ZNSHINE and Shanghai Jiao Tong University jointly established a new research and development center, dedicated to improving the conversion rate of battery cells and developing a new generation of photoelectric conversion technology. Through cooperation with international R&D laboratories, the Company is committed to improving module efficiency to global leading levels. In addition, the Company collaborates with globally recognized companies and maintenance service providers, continuously explores, experiments and improves to adapt to market changes and customer needs for sustainable development.

### ZNSHINE Module Products and Application Development: A Rectangular Cell Single Glass Module Project

Compared with the traditional square silicon wafers, the silicon material is well utilized in the rectangular cell module at the wafer end, reducing the cost; at the module end and the terminal, it provides higher string power value, thus enhancing the customer value; and it improves the loading rate in the packaging and transportation, increasing the transportation efficiency and saving the transportation cost.

### ZNSHINE Module Products and Application Development: A Lightweight Reinforced Module Project

It adopts high-efficiency crystalline silicon solar cell technology and self-developed polymer composite materials, achieving new crystalline silicon photovoltaic modules with lightweight, thin-film and flexible features. It weighs only 30% of traditional PV modules and reduces the thickness to less than 2mm. It has excellent durability and rupture resistance, stable power output and steady power generation efficiency, with the ability to resist PID attenuation, salt spray corrosion, ammonia corrosion, sand and dust erosion, and hail impact. It could be applied not only in distributed power station scenarios such as industrial and commercial color steel tile roofs, flat roofs and residential tile houses, but also in featured scenarios such as featured landscape lights, convenient mobile power, robots and outdoor activities.

Highlights of ZNSHINE's R&D Activities in 2023

No.	Project Theme
1	Research and Development of HJT Solar Modules
2	Research and Development of High-Quality, Long-Lifespan HJT Double-sided, Double-Glass Modules
3	Technology Development of Graphene Modules
4	ZNSHINE Lightweight Reinforced Module-based Product and Application Development
5	ZNSHINE Rectangular Cell Single Glass Module Product and Application Development
6	Research and development of key technologies for new efficient BIPV photovoltaic tiles
7	Research on the Application of Building Block Roof Architecture in BIPV

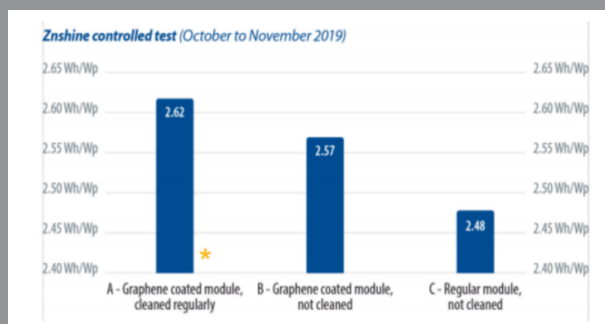
## ZNSHINE Graphene Self-Cleaning Technology

Driven by innovation, ZNSHINE has the graphene self-cleaning technology. Graphene is the world's thinnest, lightest, most flexible, strongest, and most conductive nanomaterial. The technology is capable to reduce operation and maintenance costs and increase power generation capacity. Tests have shown that graphene has hydrophilic, self-cleaning and photocatalyst properties: great benefits for solar modules.

**More Power Generation:** With the superior optical properties of graphene, the addition of graphene coating layers could increase the light absorption by about 2.3%.

**Self-Cleaning Technology:** With the super hydrophilic nature of graphene, dust on the surface of the modules could be cleaned by natural raindrops.

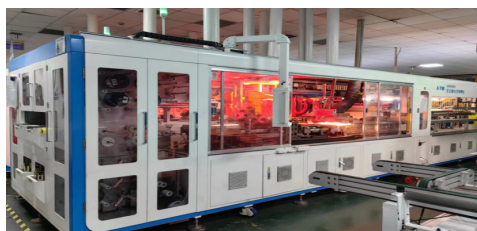
**Low Micro-Crack Risk:** Stabilized carbon atoms and lattice structure make graphene strong and tough.



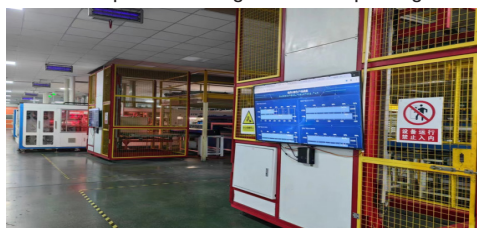
As shown in the PV Magazine Module Benchmark Test, the graphene-coated modules from ZNSHINE perform better power generation benefits, with a maximum power generation increase of 5.64% and an average power generation increase of more than 2%.

## Intelligent Manufacturing

ZNSHINE Intelligent Manufacturing Project adopts smart and precise data analysis, automated production and digitalized processes, and builds fully-automated production workshops centered on new-generation technologies of high intelligence, high quality and high efficiency, as well as warehousing, environmental protection, and related supporting facilities, to create energy-saving and high-efficiency high-tech PV intelligent factories, enabling large-scale production of ZNSHINE self-developed P-type PERC modules and N-type TOPCon modules, covering a wide range of products with single-glass and double-glass, multiple versions, and different sizes.



Jintan Headquarters Intelligent Workshop String Welder



Jintan Headquarters Production Monitoring Screen



Suqian Base Typesetting Robot



Dali Base Data Monitoring Screen

In 2023, the Production and Manufacturing Center of ZNSHINE upgraded the intelligent equipment and software of its workshop in collaboration with the IT Department.

### Intelligent Equipment Upgrade

(1) String welding machine: The domestic first-class high-speed string welding machine is introduced, equipped with the domestic leading intelligent AI system. It automatically carries out qualified inspection on semi-finished products after the completion of manufacturing process, increasing the inspection efficiency by 10%, reducing the defective rate by 3%, and increasing the production capacity by 20% at the same time.

(2) Scribing machine: High-speed non-destructive cutting integrated with high-speed CCD camera, conducts good and bad material determination and sorting at the same time of battery cell cutting, to ensure the qualification rate of raw materials.

(3) Layout machine: The battery strings finished welding are detected by vision, and laid out by intelligent robots according to the original edited layout.

(4) Stacked welding machine: It can modify the parameters within the authority limits. The operating system is capable of recording and analyzing production data. Real-time operating conditions are displayed on the touch screen, allowing access to production records and fault alarm records.

### Software Upgrade

(1) IOT (Internet of Things for Devices): With the upgrading of intelligent equipment, the IT department takes the lead in the construction of the Internet of Things for intelligent equipment, including the network construction of equipment, centralized data collection, data analysis and so on.

(2) WMS: Develop and upgrade WMS for auxiliary materials and finished products, responsible for raw material receiving, IQC and inventory management. Adopt PDA+4G+1D code for batch management.

(3) MES system: The MES system function was upgraded and optimized during the period, and the APP for cell phones was launched, with data push service.



### Intellectual Property Protection

ZNSHINE attaches great importance to the protection of intellectual property rights and strictly abides by the Patent Law of the People’s Republic of China and other regulations and policies. During the reporting period, the Company obtained 12 new authorized patents, including 3 invention patents and 9 utility patents, and the total number of authorized patents reached 157.

New Patents Authorized for ZNSHINE in 2023

No.	Title	Type
1	Photovoltaic Module Transportation Rack	Invention
2	A Photovoltaic Module Transportation Device	Invention
3	Aluminum Frame for Solar Photovoltaic Modules	Invention
4	A Roadway Photovoltaic Barrier	Utility
5	A Double-sided Double-glass Photovoltaic Module	Utility
6	A Photovoltaic Module for Roads	Utility
7	A Rotatable and Cleanable Photovoltaic Module	Utility
8	A Moisture-Barrier Solar Module	Utility
9	A Double-glazed Photovoltaic Module Built-in Tooling Lamination System	Utility
10	A Metal Tile for Roofing Photovoltaic System	Utility
11	High strength frame of solar cell module	Utility
12	A type of photovoltaic module pressing block	Utility



# Pursue Quality and Ingenuity

## Product Quality Management

ZNSHINE takes product quality as the first priority, insists on the principle of “quality first, winning by quality”, and takes “integrity-based, customer-oriented, striving for perfection, pursuing excellence” as the Company’s quality guideline. The Company passed ISO 9001:2015 and a number of international product certifications, such as TUV, CSA, BIS, KS, MCS, CQC, CEC, etc., providing reliable assurance for product exports. The Company owns a product performance testing center, in line with ISO/IEC 17025 standards, recognized by the CNAS laboratory, and also has the qualification of TUV Süd TMP witnessing laboratory. The tests cover multiple photoelectric performance tests in IEC, UL and related national standards, providing scientific and accurate data for the Company to continuously improve the product quality.

The overall quality target set by ZNSHINE is “First pass yield of finished products  $\geq 99.5\%$ ”. During the reporting period, the passing rate of products of the Company’s Jintan Headquarters was 99.6%, with Suqian Base of 99.52% and Dali Base of 99.84%.

### Systems and Policies Building

The Company formulates the ZNSHINE Management Manual, specifying the requirements for products and services, the design and development of products and services, the process of external provision, the control, measurement, analysis, evaluation and improvement of products and services, etc. The Company also constantly improves the Inspection and Test Control Procedures, the Non-conforming Products Control Procedures, the Marking and Traceability Control Procedures. The Company formulates the ZNSHINE Management Manual, specifying the requirements for products and services, the design and development of products and services, the process of external provision, the control, measurement, analysis, evaluation and improvement of products and services, etc. The Company also constantly improves the Inspection and Test Control Procedures, the Non-conforming Products Control Procedures, the Marking and Traceability Control Procedures. The Company is dedicated to the development of the ZNSHINE Management Manual, designed to meet the needs of the customers. The Company also continuously improves the Inspection and Test Control Procedures, Nonconforming Product Control Procedures, Marking and Traceability Control Procedures, etc., and the pursuit of product quality is always consistent. The Company establishes ISO 9001 Quality Management System, attaches importance to consistent synchronization of process construction, carries out process reconstruction, manufacturing process evaluation, upgrades PV module system, and assures the qualification rate of factories.



Jintan Headquarters, Suqian Base and Dali Base of ZNSHINE passed ISO 9001 Quality Management System Certification

### Incoming Material Quality Inspection

The Company carries out comprehensive inspection and evaluation of incoming materials, with a total of 158 inspection and testing items, including battery efficiency, EL test, glass transmittance, glass hydrophilic angle, EVA cross-linking degree, junction box temperature test, tin-plated copper tape tin layer test, etc. The Company is equipped with complete inspection capability and standardized work process. The ECCB platform clarifies the import process of new materials, new processes, new suppliers and the responsibilities of relevant departments in the process of project modification, establishes positive communication with suppliers and improves the constraint system to ensure that each batch of raw materials complies with the quality requirements of the Company’s standards.

### Process Quality Control

The Company focuses on standardizing employee operations and preventive systems to detect and correct process quality fluctuations in time; assesses the match of materials and processes in the pre-production phase to ensure process stability and enhance process capability, and establishes OCAP processes for fast handling of anomalies to ensure module yields. Each product is required to pass three EL tests: pre-lamination EL, post-lamination EL, and final inspection EL, thus minimizing defective products as well as reducing overall production costs.



### IV Testing for Performance Tests

The production lines in manufacturing factories are equipped with advanced PV module power testers. The testers utilize the most advanced AAA+ grade light source and are compatible with the test functions of PERC/HJT/TOPCon modules on the market, with sophisticated power conditioning system and freely adjustable light pulse settings. The iad test method enables accurate and convenient testing of the most important data for each module, such as maximum power, operating current, fill factor, etc., in a short time.

### Information and Data Systems Development

The Company establishes the QIMS Quality Information System, DCMS Documentation Management System, etc., recording the product information, material information, personnel information and equipment information during the production process in the MES system, achieving process monitoring and product traceability. The establishment of the quality big data system, realizes the change of management mode from inspection to assurance, makes the unseen problems visible, the “quality valves” in place, and achieves the integration of IT digitization and intellectualization.

Self-developed electronic management system (EMS) : module production workshop is equipped with 16 quality control points, each production quality control point is equipped with accurate data recording and monitoring equipment.

Product traceability control: Each module has a unique bar code, which can be traced all the way back to the silicon ingot upstream of vertical integration production. Product data retention for at least 10 years.

### Regular Testing for Long-Term Assurance

The Company emphasizes on reliability management and conducts random sampling reliability tests on bulk raw materials and products at various bases, such as UV, LID, PID, TC, DH and other tests. Through the improvement of raw material and product performance as well as quality assurance upgrading, strengthening reliability failure analysis, the Company standardizes the methods of reliability monitoring and improves the overall reliability level.

ZNSHINE testing center is equipped with international advanced testing equipment, and the laboratory is certified by CNAS as the state-level laboratory, reaching a certain level in terms of hardware facilities, software conditions and testing capabilities, with first-class testing equipment in the industry, so as to carry out rigorous testing of the modules and ensure the reliability and stability of the products.

### Quality Culture Creation

Quality management tools training: In 2023, the Company carried out engineer training programs by means of knowledge lectures, case sharing, on-site Q&A, etc., covering quality concepts and principles, quality management system, quality core management tools, quality standards and control plans, etc., and conducted over 25 trainings, with a total of 300 participants, and 26 qualified engineers, helping employees deeply understand the tools and methods of quality analysis.

Learning on production line: The Company organizes and carries out production line learning for quality engineers and training personnel, including SOP process and quality standards of PV module production, etc., helping the engineers to master the production process and the key points of product control, and improving the practical operation and analysis ability of the quality engineers.



Quality Production Line Learning

### On-site assessment and verification of important process positions:

The Company carries out weekly on-site assessment and verification of important process positions, and clarifies the theoretical knowledge and practical operation ability of the employees through on-site random sampling and questioning. In 2023, the Company conducted on-site assessment for more than 120 times in total.

**Production Team Leader Training:** The Company carries out the skill training for team leaders, including 10 training sessions on quality management, focusing on quality thinking, quality management system and quality control methods for team leaders.

### Quality Month Activities in 2023

In order to enhance the quality awareness of employees and create a team with common quality culture and high quality, ZNSHINE held the Quality Month activity with the theme of quality in 2023. The activity involved eight projects, including skill competitions and talent cultivation, production line management (safety, 6S, process management), quality improvement and rationalization suggestions (cost and operation categories mainly), and QC improvement activities.

Completed 8 professional skills training for materials

Completed 14 professional skills training courseware

Conducted skill competitions such as string welder tape changing, reworking of laminated layers, and EL inspection

Awarded 17 golden ideas/rationalization suggestions



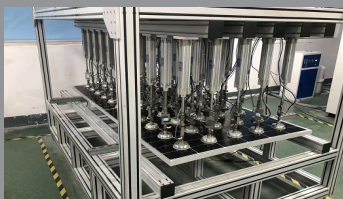
Jintan Headquarters Audit Team Project,



Suqian Base Training for Skills



String Welder Tape Changing Skills Competition



Improvement Activities – Adding Dynamic Load and Vibration Testing Programs

## Customer Service Management

ZNSHINE is customer-oriented, improves product quality and service level, creates industry-leading quality assurance concepts and reputation from providing products to providing services, to create value for customers and grow together with customers. The Company attaches great importance to communication with customers, using a variety of ways and means to identify customer needs or complaints, and providing customers with multi-level, multi-channel, all-weather services in the pre-sale, sale and after-sale phases.

### Customer Information Protection

The Company establishes the Customer Property Management Policy, requiring confidentiality control of customers' intellectual property and personal information, such as patented technologies, management methods, trade secrets, or personal information. No external leakage is allowed without the customer's permission.

### After-sales Service

The Company is committed to protect the rights and interests of consumers, develops after-sales service management measures and processes, covering providing technical support for customer safety and debugging as well as technical guidance on the use of products, ensures the supply of spare parts, takes charge of maintenance services, handles customer calls and visits, answers inquiries, collects customer opinions on product quality and improves timely under the circumstances.

### Satisfaction Survey

The Company regularly conducts customer visits and inquiries about the status of product usage. In order to obtain customer feedback on products and services, the Company performs customer satisfaction surveys regularly and forms analysis reports. The survey covers the product quality, service (contract fulfillment, customer complaint handling, etc.), and the timeliness and reliability of goods delivery. During the reporting period, the Company's Jintan Headquarters achieved a customer satisfaction score of 94.26, with the Suqian Base scoring 94.26 and the Dali Base scoring 98.

### Complaint Handling

With the goal of “reducing customer complaints year by year and striving for zero complaints”, the Company fully identifies and analyzes customer complaints, closes customer concerns in a timely manner through effective tracking and management, avoids repetition of customer complaints, and takes actions to improve the product and service quality so as to achieve customer satisfaction. During the reporting period, the complaint resolution rate of the Company was 100%.

In response to customer concerns, the Quality Department shall determine containment actions in time, with countermeasures including segregation of non-conforming products, segregation of suspicious products in stock, re-inspection, focused monitoring of similar products on-line, and notification of relevant customers to prevent customers from suffering losses. For bulk non-conforming products, the Company shall immediately assign employees to the customer to isolate the non-conforming products and carry out sorting, and assist the customer in handling the products.

### Empowerment for the Industry

As a global leading PV smart energy solution provider, ZNSHINE is committed to promoting the transformation and upgrading of China’s energy industry, promoting the high-quality development of the PV industry, and fulfilling its green mission and corporate responsibility with responsibility and practical work. The Company actively participates in industry exhibitions and forums, maintains close information channels with industry associations, develops new technologies and products with institutions, strengthens cooperation and exchanges with industry partners, participates in the research and formulation of industry standards, so as to enhance the influence, and promotes the development and prosperity of the industry.

### Participation in Standards Development

In terms of products and technologies, the Company participated in the formulation of the national standard “Inspection Specification for Plateau Photovoltaic Power Generation Equipment (GBT 42006-2022)”, which was formally implemented in May 2023, to establish the standards for the inspection categorization of plateau photovoltaic power generation equipment, environmental condition requirements for inspection, and the content and methods of inspection.

### Participation in Industry Networking

The Company adheres to the concept of openness and sharing, and promotes its products and technologies in domestic and international forums and exhibitions, laying a solid foundation for the Company to further broaden its market and expand its sales.

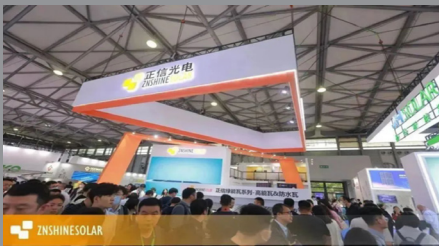
After-sales and Installation Service Process

No.	Process	Description
1	Installation, Service Acceptance	Supply in time to ensure the matching and sufficiency of accessories at the installation site, and if necessary, ensure that after-sales engineers arrive at the installation site to carry out relevant service work.
2	Resource Assurance	
3	Technical Guidance for Installation and Service	Supervise site operators to carry out installation, testing, maintenance and repair work in accordance with the requirements in the Installation Manual.
4	Customer Feedback Collection	Collect customers' opinions on installation, service and utilization by phone interviews, etc. to ensure customers' satisfaction.
5	Customer Profile Establishment	Establish detailed customer profile for follow-up service work.

### ZNSHINE New Products Shine at International Solar Photovoltaic and Intelligent Energy (Shanghai) Exhibition

On May 24, 2023, SNEC 16th (2023) International Solar Photovoltaic and Intelligent Energy (Shanghai) Exhibition was held in Shanghai. As a “barometer” and wind vane of the global PV industry, nearly 500,000 people registered to attend the exhibition, with new technologies and new products released intensively.

ZNSHINE displayed its new energy industry chain integrated solutions such as modules, photovoltaic storage and inversion, industrial and commercial roof power stations, BIPV concept green energy tiles, etc., including new modules, such as PVB color glass modules, flexible modules, polyurethane composite low-carbon modules, black frame modules, photovoltaic storage and inversion integrated installation solutions, high-energy tiles and waterproofing tiles systems for new and old rooftops.



### ZNSHINE Products at Intersolar Europe, the German Solar Photovoltaic Exhibition

On June 14, 2023, Intersolar Europe opened in Munich, Germany. As the world’s largest and most influential new energy exhibition, it attracted close to 1,700 solar product and service providers worldwide to participate in the exhibition. ZNSHINE presented its newly developed modules – TOPCon series, lightweight reinforced modules, colorful PVB modules, BIPV concept green tiles (high-energy tiles + waterproof tiles) series, SRS roofing integrated mounting system, and energy storage series at the exhibition.



### At PV Solar Expo Brazil in 2023, ZNSHINE

discussed the future of green energy in South America with its peers, presented its diversified range of P-type and N-type modules, and specially exhibited ultra-low carbon modules to meet the innovative needs of the Brazilian energy market as well as to provide more choices for green energy solutions.



### ASEAN Sustainable Energy Week (ASEW) 2023

ZNSHINE was invited to participate in ASEAN Sustainable Energy Week (ASEW) 2023 to showcase its industry-leading photovoltaic building integrated solutions. ASEW, the most comprehensive energy and environment exhibition in the ASEAN region, with the theme of “Promoting Clean Energy Transition and Achieving Carbon Neutrality”, attracted numerous industry players to discuss the road to green energy in the future.





## Build a Responsible Supply Chain

ZNSHINE establishes complete and strict supplier management system, selects more than three major qualified suppliers for the main raw materials to ensure the long-term stability of the supply chain, and annually implements the assessment and evaluation of the suppliers, eliminates the unqualified suppliers, establishes stable cooperation with the qualified suppliers, and continuously improves the suppliers' resources and competitiveness of the suppliers.

In 2023, the Company revised the Supplier Development and Management Procedures to further clarify department responsibilities, sample evaluation, and batch validation, and to standardize the process of supplier development, selection, evaluation, and approval of qualified suppliers and their management.

### Supplier Survey

The Company establishes the potential supplier database and confirms the qualification of potential suppliers through detailed questionnaires and site visits to verify supplier information when necessary.

### New Material Approval

For new materials provided by suppliers, it is necessary to perform sample evaluation, batch testing and reliability verification and approval, etc. New suppliers are also required to pass on-site audits and become qualified suppliers before executing batch purchases.

### Supplier Assessment

Systems audit of the supplier needs to be completed during the on-site audit and evaluation of the supplier. Supplier are required to propose corrective actions for non-conformities.

#### Key Items for Supplier Assessment

- (1) Quality management system and quality assurance capability
- (2) Supply guarantee capacity
- (3) Product performance and reliability
- (4) Corporate social responsibility, business ethics and EHS management
- (5) New product development capability
- (6) Cost advantage
- (7) Technical support and sales service

### Qualified Supplier Approval

Based on suppliers' qualification certificates, sample evaluation reports, material quantity test reports, material reliability reports, suppliers' on-site assessment forms, product recognition letters, etc., the Company conducts qualified supplier approval, directory registration and regular updates. In July 2023, the Company formed the Qualified Supplier Directory for Batteries and Qualified Supplier Directory for Auxiliary Materials after assessments.

### Qualified Supplier Management

The Company regularly assesses and analyzes the performance of suppliers in terms of quality, cost, delivery and service, and carries out annual on-site assessment of qualified suppliers with more than 10 incoming shipments, while the performance assessment grades are classified into five grades ranging from A to E.

Grades		Scores	Actions
A	Excellent	≥90	Ease the frequency of incoming inspection requirements and/or reward better commercial terms
B	Good	80~89	Maintain the status quo and encourage better performance
C	Average	70~79	Increase sampling frequency (if necessary) to encourage better performance
D	To be improved	60~69	Submit corrective and preventive action reports; increase sampling frequency (if necessary)
E	Unqualified	<60	Re-evaluation of qualification if no measures for effective improvement



## Bring Employees Together

### Supplier Disqualification and Re-evaluation

Supplier may be removed from the qualified supplier list in the following cases:

- (1) Get less than 60 scores in the comprehensive quarterly assessment, with no significant improvement after guidance;
- (2) Major accidents occurred;
- (3) The supplier is proved to have fraudulent behavior, violation of business ethics;
- (4) The supplier is unable to continue to fulfill the business terms, or unable to reach technical standards and quality agreements;
- (5) The rectification results do not meet the Company's requirements, and no effective improvement is made over a long period of time (3 months).

### Supplier Development

ZNSHINE implements supplier development programs to enhance suppliers' capabilities through mechanisms such as senior-level visits and communications, regular information exchanges, and expert training, with the goal of better quality and delivery, and lower-cost products and services, in order to achieve competitive advantages and optimal added value for both the Company and its suppliers. At the same time, the Company develops local suppliers, shortens transportation distances, reduces transportation energy consumption, and lowers purchasing costs, so as to realize win-win social and economic benefits.

### Employment Management

ZNSHINE strictly implements the labor employment policies of the country and the location, and formulates the Child Labor Rescue Control Procedure, the Forced Labor Prohibition Control Procedure, the Anti-Discrimination Control Procedure, and the Management Provisions for Female Workers' Labor Protection, etc., which stipulates no use of child labor and underage labor, prohibits forced labor, upholds the dignity of the employees, and eliminates discrimination such as gender, ethnicity, age, etc., so as to effectively safeguard the lawful rights and interests of the employees.

The Company follows the principles of lawfulness, fairness, equality and voluntariness in signing written labor contracts with its employees, performs, modifies, discharges and terminates labor contracts in accordance with the law, pays social insurance in full and on time throughout the year, and continuously enriches the welfare system to improve the sense of identity and belonging of employees.

Employment Performance of ZNSHINE in 2023				
Indicator in 2023	Unit	Jintan Headquarters	Suqian Base	Dali Base
Total Number of Employees	people	686		
Percentage of Male Employees	%	61		
Percentage of Female Employees	%	39		
Proportion of Employees Aged 30 and below	%	12		
Proportion of Employees Aged 30 to 50	%	71		
Proportion of Employees Aged 50 and above	%	17		

## Compensation and Benefits

ZNSHINE regards its employees as valuable resources, formulates a reasonable remuneration system, follows the principle of work-based distribution and equal pay for equal work, pays its employees in full and on time, and establishes an incentive mechanism in accordance with the principle of synchronized enhancement of the company's business performance and employees' income. In addition to paying social insurance in accordance with the law, the Company also purchases employer's liability insurance for special position operators to further provide protection for employees. The Company distributes holiday gifts on major traditional festivals; pays attention to the physical health of employees, provides employees with health insurance and regular medical checkups; establishes the system of helping employees in difficulty, and provides financial assistance to employees in difficulty. In 2023, the labor union of the Company's Jintan Headquarters distributed gifts valued at 578,200 RMB to its employees, while the total amount of employee welfare distribution of the Suqian Base reached 222,900 RMB, and that of the Dali Base 119,200 RMB; the total amount of subsidies for poor employees of the Company's Jintan Headquarters, Suqian Base and Dali Base reached 15,000 RMB.



Subsidies for Poor Employees



Employee Team Building Activity



Free Meals in Jintan Headquarters  
Employee Cafeteria



Free Shuttle Bus for the Jintan  
Headquarters



Suqian Base Employee Cafeteria



Dali Base Employee Cafeteria

## Democratic Communication

ZNSHINE establishes and improves the labor union organization in accordance with the law, supports the employees to join the labor union, encourages the employees to participate in democratic management in multiple ways, and actively responds to the opinions of the employees. The Company formulates the Employee Relationship Management System to provide employees with multiple feedback methods such as communication channels with senior management, employee opinion windows, employee satisfaction surveys and complaint channels.

During the reporting period, the employee satisfaction rate of the Company's Jintan Headquarters, Suqian Base and Dali Base exceeded 85%, with the handling rate of employee opinions of 100%.

### ZNSHINE Semi-Annual Employee Satisfaction Survey

The Company conducted surveys on employee satisfaction in the first half of the year in terms of the company's management, remuneration and benefits, work content and safety, environment and logistics, etc. By collecting, organizing and analyzing the opinions of the employees, the Company professionally diagnosed the deficiencies in organization and work management, absorbed the rationalized suggestions, further improved the management and service work, to create a good corporate culture and work atmosphere.



Employee Representative



Employee Communication of the Suqian Base

## Training and Development

The Company establishes the concept of “people-oriented”, respects knowledge and talents, provides employees with training, promotion, transfer and other career development opportunities, carries out all-round, multi-level, systematic education and training, continuously improves the team’s working ability and willingness to work, helping employees to enhance their professional skills and qualities.

Continuously expand training channels, contents and forms, and classify training contents into four categories, namely academic training, induction training, professional training and management training, in the form of open courses, internal training and training programs.

Implement personalized employee learning and development plans, formulate the Training Management System and Qualified Position Training Process, and specify the corresponding assessment levels for positions, training courses and schedules, assessment methods and assessment standards.

Introduce talents and management trainee training, establish evaluation and elimination system. The Company cooperates with ZNSHINE Academy to carry out online training, creating a learning team atmosphere and a learning organization, and establishing a replicable talent ladder and a quality team to support the Company’s business development.

During the reporting period, a total of 743 person-times at the Company’s Jintan Headquarters participated in training a, with a total training time of 10,679 hours; a total of 882 person-times at the Suqian Base, with a total training time of 6,103 hours; and a total of 974 person-times at the Dali Base, with a total training time of 55,518 hours.



Work Safety Knowledge Training at the Dali Base



On-site Practical Training at the Dali Base

## Focus on Health Security

### Safety Production Management

ZNSHINE strictly implements the Safety Production Policy of “Safety First, Prevention Main and Comprehensive Treatment”, conscientiously implements the Safety Production Responsibility System, standardizes the management of Safety Production Targets, and continuously improves the Safety Production Management System. In 2023, the Jintan Headquarters and Suqian Base of the Company obtained the certification of enterprise three-level safety production standardization.



Safety Production Standardization  
Certificate for the Suqian Base

### Annual Management Objectives Setting

In 2023, the Company formulated annual EHS management objectives, requiring the enhancement of EHS comprehensive security capabilities on the basis of the past, further improvement of production safety, enhancement of employee safety awareness and skills, significant reduction in injury severity rate, doubling the sense of safety, health and happiness of employees at work, and the Company’s comprehensive participation in safety and production, with efforts to provide a solid security guarantee.

### Indicators of Safety Production Management in 2023

0 target for fire and explosion accidents;  
0 target for accidents with serious injuries and above;  
0 target for mechanical injury accidents;  
100% target for employees’ three-level safety education and training rate;  
100% target for the certification rate and inspection rate of special equipment, and 100% target for the certification rate of special operators;  
100% target for testing and maintenance of safety facilities;  
≥95% target for the investigation and punishment rate of “three violations”;  
100% target for the completion rate of hidden safety problems management;  
No major chemical leakage accidents and environmental pollution accidents;  
Continuous and in-depth operation of safety production standardization.

### Responsibilities Clarification and Systems Improvement

The Company clarifies the management responsibilities of the Safety Committee members, designates the General Manager as the first responsible person for safety production, and signs safety production target responsibility letters at each level; establishes the safety supervision and management department, and allocates safety management personnel; sorts out the operation of the EHS management procedures, management systems, processes and forms, and formulates the Safety Production Target Management System, the Safety Production Responsibility Management System, and the Safety Production Position Management Measures etc., and timely revises and optimizes operation processes and management nodes to continuously improve work efficiency.



### Security Risk Identification and Prevention Enhancement

Based on the risk evaluation guidelines, the Company regularly conducts risk evaluations of operational activities, equipment and facilities, materials and substances, operators, operational processes, operational environments and operational conditions; establishes risk lists based on the risk evaluation results and formulates corresponding control measures, improves safety operation procedures and hazard notification; and manages hidden dangers identified by risk evaluations within a specified period of time. In addition, the Company regularly identifies risks related to procurement and eliminates unqualified suppliers in time.

### On-site Safety Management

#### Improve production facilities and process safety:

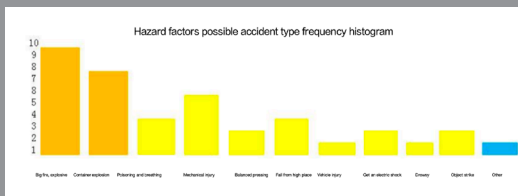
The Company formulates operating instructions and trains operators to master process safety information (chemical hazards, process and equipment information, etc.), so as to ensure the safe and reliable operation of production equipment and facilities; carries out risk analysis of the process, and prepares on-site emergency response plans; and conducts daily and regular inspection and maintenance management.

**Emphasize product safety:** The Company clearly stipulates the obligation to publicize product performance, characteristics and knowledge of safe use to customers, requires obtaining MSDS of hazardous chemicals from suppliers, and strictly abides by customer safety regulations and wears appropriate safety protection equipment when visiting customer sites.

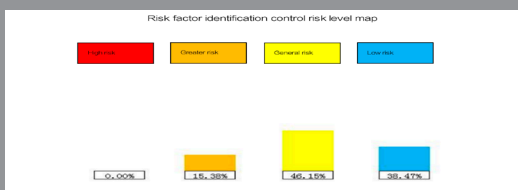
**Strengthen operational safety:** The Company implements the operational permit management for hazardous operations such as fire operations, entry into restricted spaces, temporary use of electricity, and work at height, and strictly carries out the approval procedures. The work permits include the identification of dangerous and harmful factors and safety measures. The work site is equipped with appropriate safety protection equipment and fire-fighting facilities and equipment. It strictly implements the contractor management system, manages the pre-qualification and selection of contractors, the preparation before the commencement of work, the supervision of the operation process and the evaluation of performance, and signs the Safety Agreement with the contractors.

### Suqian Base Establishes Dual Prevention Mechanism Files for Safety Risk Grading, Pitfalls Detection and Management

In 2023, the Suqian Base identified the places, processes and parts of the Company with significant risk factors in the production process and formulated relevant safety management software accounts. It adopted the Hazardous (Harmful) Factors Examination and Recognition Checklist to examine the places, processes and parts of the identified hazardous factors, adopted the Safety Risk Rating and Control Checklist for registration, and applied the analytical methods such as JHA and SCL for risk identification of the hazardous factors, and ultimately classified the risks into “red, orange, yellow, and blue” according to the risk identification results, informed publicly through the Safety Risk Notification Card.



Hazard Factors Potential Accident Type Frequency Bar



Corporate Risk Factor Identification and Control Risk Level

### Accident Response Improvement

According to the annual emergency drill plan, the Company arranges at least one desktop drill, functional drill and full-scale drill respectively annually to strengthen employees' awareness of emergency response and improve the response speed and combat capability of the emergency response team.



Fire Emergency Drill at the Jintan Headquarters



Fire Emergency Drill at the Dali Base



### Reinforcement of Inspection and Rectification

The Company organizes and implements the safety production potential hazard investigation and management in accordance with the way of "coordinated leadership, clear responsibilities, self-correction and self-correction, supplemented by supervision from the senior level, full mobilization, awarding the best and punishing the worst". It conducts focused safety inspections. Regular inspections and checks are organized for the areas under the Company's control, key places, key parts, key processes, key time periods, major facilities and equipment, holidays, and winter and summer accident-prone seasons. For hidden safety hazards found during the inspection process, the responsible departments shall make rectification within a specified period of time.

### Safety Production Culture Building

The Company organizes employees to participate in safety technology exchanges, watch safety production exhibitions, and posts safety production posters, slogans and safety signs for extensive publicity and education. From the conceptual culture, institutional culture and behavioral culture, the Company improves the employees' independent awareness of safety protection and risk pre-control ability, working together to create a safe working environment. The Safety Education and Training Management System was set up to stipulate the requirements for education and training of management personnel, operational personnel, and other personnel, as well as daily safety education, raising the safety awareness, technical knowledge of safety, and safe operation skills of employees. The three-level education system is implemented to provide safety education to employees according to the work characteristics of the department.



Safety Production Publicity Bulletin Board of the Jintan Headquarters



Safety Publicity Bulletin Board for Employee Stage Activity at the Jintan



Safety Operation Regulations Posts for Production Workshops of the Dali Base



Safety Warning Signs for Production Workshops of the Dali Base

## Occupational Health Management

ZNSHINE cares about the physical and mental health of employees, complies with the occupational health and safety regulations, conducts health checks for its full employees, striving to provide a safe and comfortable working environment for employees. The Company strengthens the daily education and training of employees on occupational health, continuously improves the awareness of employees on occupational health and safety, implements safety protection measures for various positions involved in occupational hazards, and adopts daily and regular testing to ensure the occupational health under control. During the reporting period, the number of occupational contraindications and occupational diseases was 0 in the Company's Jintan Headquarters, Suqian Base and Dali Base, and the Jintan Headquarters and Suqian Base passed the certification of Occupational Health and Safety Management System.



### Certification of Occupational Health and Safety Management System Building Improvement

The Company formulates systems such as the Responsibility System for Prevention and Control of Occupational Disease Hazards, the System for Workers' Occupational Health Surveillance and File Management, and the System for Disposal and Reporting of Occupational Disease Hazardous Accidents, etc.; and establishes the Occupational Hygiene Operating Procedures for positions involving noise and toxic and hazardous substances.

### Indicators of Occupational Health Management in 2023

0 target for occupational disease hazard accidents (poisoning, occupational disease);  
100% target for passing rate of testing indicators of occupational disease hazards program.

## Occupational Hazards and Prevention of Occupational Diseases

The Company conducts pre-employment, in-employment and off-employment occupational health checks, establishes employee health electronic files, statistically analyzes the effectiveness of the Company's occupational disease control, proposes improvement and preventive measures, and prevents occupationally contraindicated personnel from engaging in occupationally contraindicated work.

The Company performs regular on-site testing and online declaration of occupational hygiene. It improves the engineering control of on-site occupational hygiene, conducts regular testing of occupational disease hazards in the workplace, and sets up informative signs at the monitoring points to inform the test results.

The Company formulates the Labor Protective Equipment Management System, establishes standards for the distribution of labor protective equipment for different positions according to the working environment and nature of different positions in the production line, and strengthens the inspection and assessment of the wearing of labor protective equipment.

### On-site Occupational Health Testing at the Dali Base during Occupational Health Awareness Week

The Dali Base takes occupational health as the top priority of its safety, deploys occupational health and safety management personnel, and actively carries out occupational health publicity activities. In 2023, during the Occupational Health Awareness Week, it invited the third party to carry out on-site testing of occupational health, and sampled a total of 32 spots on-site, so as to achieve the occupational hazards with no corners, and to take measures to improve the rectification of any hazards.



Individual Testing for Insulation Test Positions



Chemical Detection of String Welder Fixed Spots



Occupational Disease Hazard Notification Card for the Suqian Base



Occupational Hazard Bulletin Board of the Dali Base

### Occupational Health Training

The Company regularly organizes relevant employees to carry out occupational health and safety knowledge training as planned. New employees are required to undergo occupational skills training and occupational hygiene training before induction, and are only permitted to work specific jobs after passing the training. The existing employees in the Company shall be trained on occupational skills and occupational hygiene once a year. During the reporting period, 730 person-times were covered by occupational health and safety training at the Company's Jintan Headquarters, with 907 person-times at the Suqian Base and 539 person-times at the Dali Base.

### Emergency Drill for Occupational Disease Hazards at the Suqian Base

In March 2023, the Suqian Base held an emergency response drill for occupational disease hazard accidents, setting the occupational disease hazard accident scenarios as chemical splash into eyes/skin contact, high temperature scald/high temperature heatstroke, and infrared radiation irradiation to the eyes and skin, so as to improve the ability to respond to and deal with sudden occupational disease hazard accidents and to organize emergency response and rescue timely, orderly, scientifically, and efficiently to minimize personnel casualties and property losses.





## Support Community Development

ZNSHINE continues to fulfill its social responsibility and devote itself to public welfare works. In 2023, internally, ZNSHINE widely mobilized its employees and set up a charity fund for employees, striving to form the spirit of mutual help, mutual love and poverty alleviation to create a good corporate atmosphere of “when one person is in trouble, all of us shall help him out”; externally, it actively broadened its public welfare channels and gathered social resources and local residents to contribute to the local education work, with total public welfare investment of ZNSHINE reaching 300,000 RMB.

### Donate Funds for Education, Community Love, with Infinite Responsibility, to Boost the Future

It takes ten years to grow trees, but a hundred to rear people. ZNSHINE regards the revitalization of talents as the key and foundation stone of rural revitalization, dedicates itself to education, carries out sponsorship activities, inspires students with love, and joins hands with social resources to guard the future and hope of the nation.

On September 8, 2023, Zhixi Junior High School held the activity of ZNSHINE Education Fund and Love for Hometown – Township Sages Help Education, and the education fund named by ZNSHINE was officially launched. At the launching ceremony, Changzhou Da Ai Jinsha Education Development Foundation read out the decision to set up the name of the ZNSHINE Education Fund, and signed a tripartite agreement on donations and scholarships with Zhixi Town Government and ZNSHINE.



Starting from 2023, ZNSHINE would donate 300,000 RMB annually to Zhixi Town in the form of donation and scholarship activities for a period of ten years, with full contribution of 3 million RMB to the education fund, mainly used for the Love Scholarship Award, Outstanding Scholarship Award, Outstanding Teacher Award, Outstanding Team Award, as well as sponsorship of social welfare and education charity aid in the field of education. At the event, 13 outstanding elementary school students, 12 outstanding secondary school students and 5 outstanding teacher teams of Zhixi Town in 2023 were awarded with cash prizes. On the day of the event, the launching ceremony of the Love School Bus was also held for the primary and secondary schools in Zhixi Town, funded by the Love Fund, to provide school bus transportation services for the students.



” The Company keeps the ‘root’ sentiment, always grateful to the hometown and giving back to the society in the steady forward development path. This is our responsibility.”

Chairman, ZNSHINE **Guifen Wang**

“With limited material help, the Company carries forward the spirit of unlimited love, takes people as its focus, cares for livelihoods, supports education, and helps the poor and needy. ZNSHINE is honored to provide material support for the education construction of Zhixi Town. “

Director Chairman, ZNSHINE **Yingchun Wang**

# Outlook

Climate change is a common challenge facing all humanity in terms of sustainable development. With the rapid development of clean energy, the dependence on traditional fossil energy could be effectively reduced, making remarkable contributions to the mitigation of global warming. From this perspective, the PV industry would play a significant role in promoting the green, low-carbon transformation and development of economy and society, as well as achieving the goals of carbon peak and carbon neutrality.

As a globally recognized manufacturer of photovoltaic modules, ZNSHINE has accumulated over 35 years of manufacturing experience, specializing in the R&D, manufacturing, and sales of photovoltaic modules, as well as providing comprehensive EPC power station services. ZNSHINE aims to deliver integrated solutions for the renewable energy sector. Our mission is to have ZNSHINE wherever there is sunshine, and make solar power the most economical clean energy in the world.

2024 is a critical year for ZNSHINE to continue our momentum and move forward towards higher goals.

In the new year, we will keep focusing on the international and domestic markets, taking market expansion as the first priority, acquiring customers as the necessity, improving quality as the prerequisite, strengthening management as the guarantee, and a customer-first approach as our core value, to firmly contribute to the development of clean energy.

In the new year, we will keep in mind the importance of corporate responsibility and green mission, hold a positive and pragmatic attitude, continue to pursue scientific research and innovation, adapt to market changes and customer needs through continuous exploration, experimentation and refinement, striving to realize the harmonization of enterprise development with society and the environment. We will work together with the employees to promote the common growth of the employees and ZNSHINE, with the attitude of love and diligence, the mind of helping each other, and the footsteps of being down-to-earth.

In the future, we will keep moving forward with stakeholders and empower more places to share the brightness of ZNSHINE in the sunshine, to lay down a green and efficient energy path for future generations towards a bright and sustainable outlook.

# Appendix

## Key Performance

2023 ESG Indicators	Unit	Jintan	Suqian Base	Dali Base
<b>Governance</b>				
Total Assets	100 million RMB	42.58		
Return on Net Assets	%	10.34		
Operating Income	100 million RMB	35.88		
Net Profit	100 million RMB	0.92		
Total Tax Payment	10,000 RMB	6988		
Number of Board Members	people	7		
Number of Female Board Members	people	2		
Number of Directors' Meetings for the Year	times	13		
Number of Supervisory Board Meetings for the Year	times	7		
Number of Shareholders' Meetings for the Year	times	3		
Number of Corruption Prosecution Cases Completed in the Reporting Period	case	0	0	0
Total Hours of Anti-corruption Training	hour	2	7	2
Person-times Covered by Anti-corruption Training	person-times	20	41	22

2023 ESG Indicators	Unit	Jintan	Suqian Base	Dali Base
<b>Environment</b>				
Investment in Environmental Protection	10,000 RMB	23.65	26.69	1.53
Number of Environmental Emergency Drills	times	1	1	0
Number of Employees Covered by Environmental Protection Training	person-times	560	452	346
Number of Environmental Pollution Accidents	times	0	0	0
Total Energy Consumption	tons of standard coal	2400.78	2605.759	879.97
Petrol Consumption	liters	37025.34	7747.33	12488.87
Diesel Composition	liters	27274.28	55600	11476.53
Natural Gas Consumption	cubic meter	0	0	0
LPG Consumption	tons	0.2575	0	0
Total Electricity Consumption	MWh	17051.295	20580.607	6938.066
Purchased Electricity	MWh	17121.675	20580.607	6938.066
Self-generated Electricity from In-plant Clean Energy	MWh	9311.297	0	0
Energy Consumption per 10,000 RMB Revenue	tons of standard coal / 10,000 RMB	0.0067	0.0073	0.0025
Total Water Consumption	tons	116794	51729	2906
Water Reuse Volume	tons	5000	0	0
Water Consumption per 10,000 RMB Revenue	tons / 10,000 RMB	0.3255	0.1442	0.0081
Emission of Tin and its Compounds	tons	0.0175	2.494	0.04944
Total Wastewater Discharge	tons	9450	5880	0.677328
Chemical Oxygen Demand (COD) Discharge	tons	3.78	0.423	2324.8
Ammonia Nitrogen Discharge	tons	0.28	0.115	0.82



2023 ESG Indicators	Unit	Jintan	Suqian Base	Dali Base
<b>Environment</b>				
Total Nitrogen Discharge	tons	0	0.14	0.095
Total Phosphorus Discharge	tons	0.028	0.014	0.13
Total Waste Generation	tons	187.6191	129.7132	0.015
Hazardous Waste Generation	tons	1.2191	1.6312	2.57
General Waste Generation	tons	186.4	128.082	1.17
Waste Recycling Volume	tons	0	0	2.4
Total Greenhouse Gas Emissions	tCO <sub>2</sub> e	9959.13	12128.80	4083.36
Greenhouse Gas Emissions (Category I)	tCO <sub>2</sub> e	194.64	391.68	126.58
Greenhouse Gas Emissions (Category II)	tCO <sub>2</sub> e	9764.49	11737.12	3956.78
Greenhouse Gas Emissions per 10,000 RMB Revenue	tCO <sub>2</sub> e / 10,000 RMB	0.0278	0.0338	0.0114

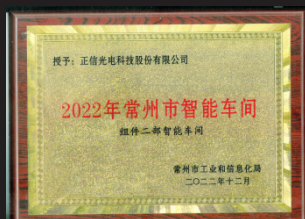
2023 ESG Indicators	Unit	Jintan	Suqian Base	Dali Base
<b>Social</b>				
Investment in Product R&D	10,000 million RMB	1.34		
Total Number of R&D Personnel	people	192		
Accumulated Number of Authorized Patents	number	157		
Newly Authorized Patents in the Reporting Period	number	12		
Product Qualification Rate	%	99.6	99.52	99.84
Number of Complaints	number	10	4	0
Complaint Resolution Rate	%	100	100	100
Customer Satisfaction Score	point	94.26	94.26	98
Number of Participation in Formulating Industry Standards in the Reporting Period	number	1		
Total Number of Suppliers	number	131		
Number of Suppliers in North China	number	3		
Number of Suppliers in East China	number	109		
Number of Suppliers in South China	number	5		
Number of Suppliers in Central China	number	7		
Number of Suppliers in Northwest China	number	4		
Number of Suppliers in Southwest China	number	3		
Total Number of Employees	people	686		
Proportion of Male Employees	%	61		
Proportion of Female Employees	%	39		

2023 ESG Indicators	Unit	Jintan	Suqian Base	Dali Base
<b>Social</b>				
Proportion of Employees Aged 30 and below	%	12		
Proportion of Employees Aged 30 to 50	%	71		
Proportion of employees Aged 50 and above	%	17		
Proportion of Employees with Master's Degree or Above	%	2		
Proportion of Employees with Bachelor's Degree	%	19		
Proportion of Employees with Bachelor's Degree or Below	%	79		
Proportion of Employees from Ethnic Minorities	%	3		
Proportion of Employees with Disabilities	%	0		
Total Number of Management Employees	people	35		
Proportion of Female Employees in Management	%	40		
Employee Turnover Rate	%	9.38		
Male Turnover Rate	%	5.82		
Female Turnover Rate	%	3.56		
Turnover Rate of Employees Aged Under 30	%	2.34		
Turnover Rate of Employees Aged 30 to 50	%	6.11		
Turnover Rate of Employees Aged 50 and above	%	0.93		

2023 ESG Indicators	Unit	Jintan	Suqian Base	Dali Base
<b>Social</b>				
Employee Satisfaction	point	97.10	87.00	85.85
Number of Employee Opinions Collected/Implemented	number	3	3	3
Employee Opinion Handling Rate	%	100	100	100
Total Number of Employee Training Attendance	person-times	743	882	974
Total Hours of Employee Training	hour	10679	6103	55518
Male Employee Training Coverage Rate	%	99.5	100	100
Female Employee Training Coverage Rate	%	98.2	100	100
Average Duration of Training for Male Employees	hour	14.5	7.2	57
Average Duration of Training for Female Employee	hour	14.5	6.5	57
Investment in Safety Production	10,000 RMB	12.63	7.95	34.234
Number of Safety Emergency Drills	number	1	1	1
Number of Safety Production Accidents	number	1	2	0
Rectification Rate of Hidden Safety Dangers	%	100	100	100
Number of Recordable Workplace Injuries	people	1	2	0
Number of Working Days Lost Due to Workplace Injuries	days	7	30	0
Number of Occupational Contraindications	people	0	0	0
Occupational Contraindications Transfer Rate	%	0	0	0
Number of Occupational Diseases	people	0	0	0
Occupational Health and Safety Training Coverage	person-times	730	907	539
Total Hours of OHS Training	hour	92	66	40
Investment in Public Welfare	10,000 RMB	30		



## Enterprise Honors



**Changzhou Intelligent Workshop**  
Changzhou Municipal Bureau of Industry and Information



**Award for first step over 5 billion RMB in sales**  
CPC Changzhou Jintan District Committee;  
Changzhou Jintan District People's Government



**2023 PVEL PV Module Reliability Scorecard Top Performer**  
PV Evolution Labs



**PVBL Top 100 Solar PV Brands in the World**  
Photovoltaic Brand Lab (PVBL)



**2023 PV Module High-quality Enterprise**  
Solar PV & Energy Storage World Expo



**2023 GF60 Green Finance Award for Best Innovation Practice**  
GF60



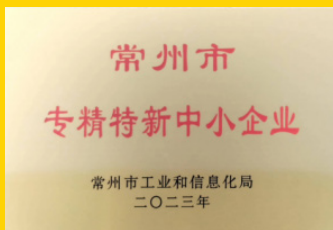
**2023 Most Influential Photovoltaic Module Company**  
Photon Cup Committee



**2023 Most Influential Photovoltaic EPC Company**  
Photon Cup Committee



**2023 Four Star in Changzhou**  
CPC Changzhou Municipal Committee; Changzhou Municipal People's Government



**2023 Changzhou Specialized, Special and New Small and Medium Enterprise**  
Changzhou Bureau of Industry and Information Technology



**2023 Jiangsu Province Specialized, Special and New Small and Medium Enterprise**  
Industry and Information Technology Department of Jiangsu



**2023 High-tech Enterprise**  
Jiangsu Provincial Department of Science and Technology; Jiangsu Provincial Department of Finance; Jiangsu Provincial Tax Service, State Taxation Administration

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## Comments and Feedback

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Dear readers,

Thank you for reading the 2023 Environmental, Social and Governance (ESG) Report of ZNSHINE PV-TECH CO.,LTD. In order to continuously improve our ESG management and reporting preparation, please share your comments and suggestions by filling in the feedback form and send them back to us by post or email. We sincerely appreciate your valuable suggestions!

ZNSHINE PV-TECH CO.,LTD  
May, 2024

1.Which of the following stakeholders do you belong to?

Government/Regulatory Agency   
Shareholders  Employees  Consumers  
 Partner/Supplier  Public Community   
Media/NGOs  Others \_\_\_\_\_

2.What is your opinion about the Report as a whole?

Very good  Good  Normal  Poor   
Very Poor

3.Your comments on the layout design of the Report are:

Very good  Good  Normal  Poor   
Very Poor

4.Your comments on the ESG disclosure quality of the Report are:

Very good  Good  Normal  Poor   
Very Poor

5.Your comments on the content and structure of the Report are:

Very good  Good  Normal  Poor   
Very Poor

6.What information would you like to know more about?

\_\_\_\_\_  
\_\_\_\_\_

7.Your opinions and suggestions on the EGS report and ESG Management work of the Company:

\_\_\_\_\_  
\_\_\_\_\_

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