TAIWAN GLASS IND. CORP.

2022
ESG Report

2022

Taiwan Glass Industry Corporation

ESG Report

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About the report

Taiwan Glass Industry Corporation has always been committed to supporting the growth of the glass industry with innovation and new product development while recognizing its corporate social responsibilities as a global citizen since it was founded in 1964. We have been preparing Corporate Social Responsibility Reports since 2013, and the "2022 ESG Report" was TGI's 10th issue. We renamed the report "ESG Report" in 2021 for conformity with international trends and government regulations, and now publish the report in both a Chinese and English version. Through this report, we hope to convey to the general public and other stakeholders TGI's respect for duties as a social citizen and its resolve to pursuing sustainable growth and sharing the outcome of sustainable management practices. This report is divided into six main themes, including: "Ongoing Communication", "Integrity Governance", "Products & Services", "Green Management", "Safe Workplace", and "Social Care". It discloses TGI's efforts and performance outcomes with respect to sustainability indicators such as the economy, the environment, public interest, employee care and growth, and product responsibilities in 2022. Relevant data was gathered to provide explanation in detail.

TGI has created an "ESG" section on its website to provide the general public and stakeholders with better understanding and more communication channels about the measures adopted by TGI. In this section, visitors are able to download this report and receive regular updates on sustainable development goals, strategies, and outcomes. An online stakeholder questionnaire has also been created to serve as a communication channel with stakeholders.

This report will refer to Taiwan Glass (TGI) Industry Corporation using abbreviations such as "TGI, the Company, and we"; other key terminology and acronyms used throughout the report will be explained in footnotes on the respective page.

Scope of report and basis of calculation

This report covers TGI's sustainability performance between January 1 and December 31, 2022. Some of the contents also trace back or extend to periods before and after 2022, whereas future strategies, goals, and plans are partially explained in the report.

Content and performance data of this report mainly cover TGI's Taiwan operations, including the Headquarters and manufacturing sites (namely Taoyuan Factory, Hsinchu Factory, Taichung Factory, Lukang Factory, Lukang Flat Glass Factory, and Changpin Factory). Indicators that pertain to other areas will be explained separately in the report. All data disclosed in the report is presented using globally recognized indicators. Any use of estimate will be explained in the respective chapters. The financial data has been audited and confirmed by Ernst & Young, and is presented in NTD. There is no significant change in the scope or boundary of report compared to the "2021 ESG Report."

Preparation principles and guidelines

TGI has prepared the "2022 ESG Report" in line with international standards, using "GRI Standards 2021" published by the Global Reporting Initiative (GRI) on October 5, 2021. Analytical models were adopted to identify and prioritize sustainability topics that were of concern to stakeholders, and to analyze the sustainability topics, strategies, goals, and measures to disclose in this report. The Company was then able to observe relevant guidelines for the preparation of report.

The following guidelines and initiatives were taken into consideration:

- "GRI Standards" issued by the Global Reporting Initiative (GRI)
- United Nations Sustainable Development Goals (SDGs)
- Earth Charter, Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises
- AA 1000 SEC Stakeholder Engagement Standards (version 2015)
- International Standard on Assurance Engagements - ISAE 3000
- The UN Global Compact
- ISO 26000 Social Responsibility Guidance Standard
- "Taiwan Stock Exchange Corporation Rules Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies"
- Task Force on Climate-related Financial Disclosures (TCFD)
- Sustainability Accounting Standards Board (SASB)

Report preparation process

For the preparation of this report, TGI has assembled an "ESG Task Force" to plan, communicate, coordinate, consolidate data, and edit the report content. The Administration Department is responsible for assembling the task force; task force members are consisted of representatives from factories and relevant departments.

All data and statistics of the report were gathered by employees of various departments and handed over to the task force for draft preparation. Members of the task force then reviewed and amended the details that pertained to their areas of responsibility. Once the chosen indicators have been validated by an independent third party, the finalized content was presented to the Chairman for review according to administrative procedures before publication.

The Company has engaged Ernst & Young, an independent and credible accounting firm, to provide limited assurance on our 2022 ESG Report according to Statement of Assurance Principles No. 3000 - "Audit and Review of Non-historical Financial Information." Outcomes of the assurance review have been fully communicated with the governance body. Please refer to the Independent Assurance Report, presented as an appendix of this report, for more details on the scope and conclusion of CPA's assurance.

01 STEP — Report preparation
The "ESG Task Force" plans, consolidates, and compiles data to be presented in the annual report

02 STEP — Quality management
Task force members and department heads review and amend the preliminary draft

03 STEP — Third-party review
Ernst & Young (EY) was engaged to provide limited assurance on the report

04 STEP — Presentation of information
The ESG Committee examined information of the report

Reporting period and cycle

TGI publishes "ESG Report" on a yearly basis

Current issue: published July 2023

Previous issue: published in July 2022

Contact information

Through this report, we hope to provide the general public and stakeholders with a better understanding of TGI's sustainable development efforts. Please contact us if you have any queries or recommendations regarding the "2022 ESG Report."

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Taiwan Glass Chinese Official Website

Click hereOfficial website of Taiwan Glass or scan QR Code

Message from the Chairman

Greetings to all our directors and shareholders:

In 2022, the continued military conflict between Russia and Ukraine, along with pandemic prevention measures, resulted in an unbalanced global supply chain and a sharp increase in the prices of energy and raw materials, leading to inflation problems. In 2023, the lower risk of COVID-19 severity contributed to a gradual return to normal life. However, as the Federal Reserve and other global central banks raise their interest rates actively to curb inflation, the global monetary policies have been tightened, further resulting in high depreciations of other currencies except for US dollars. Higher interest rate will dampen consumer spending, adding risks and challenges to the economic outlook of 2023.

Recently, the Ministry of Commerce of China announced its launch of a trade barrier investigation on Taiwan's trade restrictions against China. If the investigation confirms these restrictions, they may have an impact on Taiwan's exports and imports. It is recommended that the government respond to this by proposing a plan that includes providing electricity and land concessions, granting subsidies for talent cultivation, and reducing or exempting taxes such as profit-seeking enterprise income tax, business tax, and commodity tax.

Regarding the overall performance of Taiwan Glass in 2022, the demand for raw materials in the first half of the year contributed to a certain amount of profit. However, declining demand, inflation, and exchange losses throughout the year had a negative impact on the overall performance. The group's consolidated revenue for 2022 was NT$43.9 billion, but unfortunately, the company experienced a net loss after tax of NT$820 million. The following report provides a breakdown of the performance of each product.

In terms of flat glass, the growth of Taiwan market has slowed down, and related investment, construction and business exchanges have decreased compared to pre-pandemic levels. However, with COVID-19 border restrictions being lifted and related measures gradually opening up, it is expected that domestic demand, consumption, and industry expectations will improve. Taiwan Glass aims to strengthen its innovation and R&D capabilities, optimize the productivity and efficiency of its production lines and equipment, and utilize industry-university resources and foreign technical cooperation. Currently, double-silver Low-E glass has become the mainstream of the market. We are continuously developing new coating colors for tempered double-silver glass and expanding the types of coatings to meet market demand. As for eco-friendly and energy-saving glass, we are committed to researching and developing triple-silver Low-E glass to meet the higher energy-saving standards of exterior walls.

In 2022, China's dynamic zero-COVID policy had a significant impact on all industries, including a significant reduction in new construction projects. However, in 2023, the authorities have lifted restrictions on the real estate industry and are now providing more support to consumers and real estate developers. This is expected to boost domestic demand and help the economy recover. With post-pandemic business opportunities on the horizon, there is hope for a rebound in China's economy.

In fiberglass business, Taiwan Glass is dedicated to reducing costs and speeding up research & development to increase our product value. As for electronic-grade fiberglass fabric, we have successfully developed and supplied the ultra-thin fiberglass fabric #1010 in response to the market needs in the future. Also, we have successfully developed low-dielectric (Low DK, coefficient: 4.58/10GHz) fiberglass fabric for high-speed, high-frequency transmission and remote business, which has been certified and continuously adopted by international terminal manufacturers. For FRP, the new kiln in cooperation with Owens Corning of the United States has improved production capacity and increased efficiency, coupled with advanced fiberglass formulation and production technology to supply clients with more comprehensive, high-performance and eco-friendly products. We will re-evaluate the expansion of production lines once the fiberglass market recovers.

As for container, tableware, kitchenware glass and our private brand, we experienced a slight decrease in overseas shipments due to clients' inventory and high freight rates. To maintain profitability, we strategically increased unit prices and focused on increasing tenders in the domestic market.

In terms of Shihlien Chemical Industrial Jiangsu Co., Ltd. (SCJ, 43.99% of its shareholding held by Taiwan Glass)in 2022, the tight supply-demand balance in the market led to record-high prices of soda ash and ammonium chloride in the middle of the year, which had a positive impact on SCJ's annual operating performance. As a result, Shihlien China Holding Co., Ltd. reported a consolidated operating income of US$610 million and a net profit of US$105 million. The industry is expected to continue its boom and maintain its prosperity and profitability.

In terms of ESG, Taiwan Glass has implemented energy-saving resource management to save energy and water. Throughout the year, we have saved nearly 5.2 million kWh of electricity and reduced indirect greenhouse gas emissions by 5% by improving the energy efficiency of various equipment and processes, installing rooftop solar panels and windmill motors, and replacing inefficient lamps. Our fiberglass factory in Taoyuan was recognized as an "Excellent Manufacturer of Energy Conservation and Carbon Reduction" by the Bureau of Industry under the Ministry of Economic Affairs. Taiwan Glass is committed to examining the impacts and influences of our products' value chain on the environment and society and working with supply chain partners to move towards sustainability.

At the beginning of 2023, the Climate Change Response Act was passed, which includes a net-zero emissions target by 2050 and the implementation of a carbon pricing system expected in 2024. Taiwan Glass recognizes that achieving net zero and reducing carbon emissions are essential for enterprises to achieve sustainable development. Carbon inventory and disclosure are also key priorities for our decarbonization efforts in the future. We expect the government to establish carbon inventory standards, guidance, certification standards, and management mechanisms that align with international standards, and provide tax credits and incentives for environmental protection investments, such as carbon reduction in manufacturing processes, pollution prevention, and green facilities. These incentives can encourage companies to voluntarily reduce emissions and guide enterprises towards active low-carbon transformation, ultimately achieving the goal of net zero by 2050.

We would like to express our gratitude to all our stockholders for their long-term support, as well as to our directors, management team, and employees for their dedicated efforts. In the face of ever-changing circumstances, Taiwan Glass will continue to innovate in research and development, keeping pace with the times, and prioritize talent cultivation as we strive for steady growth and ESG development.

Chairman of
Taiwan Glass
Industry Corporation

2022 Performance Highlights

Sustainability performance and honors

Selected as a constituent of TIP Taiwan ESG Index

TGI was once again selected as a constituent of TIP Taiwan ESG Index, which is an affirmation for TGI's ESG practice

Taiwan Top 100 Sustainable Enterprises Award

TGI received "Taiwan Top 100 Sustainable Enterprises Award" during the 2022 Taiwan Corporate Sustainability Awards (TCSA)

TCSA Corporate Sustainability Report Award - Silver

TGI won TCSA's Corporate Sustainability Report Award - Silver in the "Conventional Manufacturing" category for 8 consecutive years

TCSA Growth through Innovation Leader Award

TGI won "Single Category Performance - Growth through Innovation Leader" during the 2022 TCSA

TCSA Circular Economy Leadership Award

TGI won "Single Category Performance - Circular Economy Leadership Award" during the 2022 TCSA

Won Excellent Firm for the Reduction of Industrial Greenhouse Gases for two consecutive years

Taoyuan Factory was awarded "Excellent Firm for the Reduction of Industrial Greenhouse Gases" by Industrial Development Bureau, Ministry of Economic Affairs, for two consecutive years (2022 and 2021)

Excellent Contributor to Air Pollution Prevention

In support of the local environmental protection policy, Taoyuan Factory made significant progress in the reduction of air pollutants by replacing heavy oil-based boilers with natural gas-based boilers, and for which it was named "Taoyuan City Excellent Contributor to Air Pollution Prevention" by Taoyuan City Department of Environmental Protection in 2022

Passed Green Factory Label

Taoyuan Factory passed review for Green Factory Label in 2022 and was awarded certificate by the Industrial Development Bureau, Ministry of Economic Affairs

Resource Cycling Foundation Label - "Non-plastic Waste Container"

Hsinchu Factory has been designated by the Environmental Protection Administration, Executive Yuan, as a mandatory waste recycler in 2022, and was awarded the Resource Cycling Foundation Label for "Non-plastic Waste Container"

Certificate of Green Recycled Product

Hsinchu Factory was awarded "Certificate of Green Recycled Product" by the Ministry of Economic Affairs in 2022; the certificate covered a total of 1,012 glass containers

Excellent Performer in Over-quota Employment of Persons with Disabilities for three consecutive years

Lukang Factory was once again named "Excellent Performer in Over-quota Employment of Persons with Disabilities" by the Ministry of Labor in 2022

Outstanding Employee with Disability

An employee with disability at Lukang Factory was awarded "Changhua County 2022 Outstanding Employee with Disability" for having demonstrated initiative and extraordinary capabilities

Sustainability highlights

Sustainable management

- The sum of environmental protection spending in 2022 neared NT$270 million
- Total GHG emission in 2022 was 7.5% lower than 2021

Social inclusion

- Since 2000, TGI Cultural and Educational Foundation has rewarded a total of 2,813 college students with a total of NT$32.25 million in scholarships
- TGI made NT$2.3 million in social donations in 2022
- TGI's entry-level employees were paid 155% of the local minimum salary on average
- 82% of new recruits that were trained under the <Counselor system for new recruits> in 2022 remained in duty as of December 31, 2022
- 2TGI advocates the idea that "Blood Donation Saves Lives" and managed to donate 35 bags of blood across all factories in 2022

Supply chain and environment

- 100% of flat glass products had passed CE (Europe), ANSI (USA), and CNS (Taiwan) standards
- 100% of fiber glass products had complied with RoHS and REACH requirements
- 100% of glass container products had complied with Sanitation Standard for Food Utensils, Containers and Packages in Taiwan and the FSSC 22000 standards
- 51% of glass container products were recycled and reused on average; ongoing improvements are being made
- By improving the energy efficiency of production equipment and procedures, such as solar panels, fans motors, and lighting, the Company was able to save power consumption by nearly 3.7 million kWh for the year across all factories

01

Sustainability Communication

1.1 TGI's sustainable management practice

1.2 Stakeholder communication and identification of material issues

Sustainability Management Performance of 2022

Selected as a constituent of TIP Taiwan ESG Index

TGI was once again selected as a constituent of TIP Taiwan ESG Index, which is an affirmation of our ESG practices

Top 100 Sustainable Enterprises Award

TGI received "Taiwan Top 100 Sustainable Enterprises Award" during the 2022 TCSA

Silver Award

TGI won Corporate Sustainability Report Award - Silver in the [Conventional Manufacturing] category for 8 consecutive years

8 main categories

TGI has identified 8 categories of stakeholder, including shareholders/investors/financial institutions, employees, corporate customers, suppliers, contractors, outsourcing agencies, dealers, and government agencies/authorities

12 issues

In 2022, TGI directed attention to 12 major sustainability issues and devised effective management solutions for each issue

1.1

TGI's sustainable management practice

Being the leader of the glass industry, TGI embraces sustainable development as its core vision and addresses environmental, social, and governance (ESG) issues when planning business strategies. While striving to grow the glass business, we remain mindful of stakeholders' interests and find ways to cater to society's wellbeing and mitigate environmental impact.

TGI operates with four core values in mind: business integrity, environmental sustainability, social care, and friendly workplace. These values have been deeply incorporated into our goals "to provide top-quality products and comprehensive service at reasonable prices to customers' satisfaction, while at the same time delivering returns to shareholders, caring for employees, and giving back to society, all the while providing the foundation for TGI's sustainability practices."

All of our directors have adhered to their duties as prudent managers and supervised the Company in fulfillment of its corporate social responsibilities. In addition to managing progress, the directors also contribute toward improving our efforts and practices in every aspect. The board of directors fulfills sustainable management obligations and corporate social responsibilities primarily through the following actions:

- Outline the Company's CSR mission and vision; establish corporate sustainability policy, system, or management policy.
- Incorporate sustainability into the Company's operating activities and growth, and devise feasible ESG action plans.
- Ensure timely and accurate disclosure of sustainability-related information.

The four main approaches to ESG management

Enforcement of business integrity

Business integrity is TGI's core value and makes up a significant part of its commitment and responsibility to shareholders, employees, and stakeholders. The board of directors and the management not only adhere strictly to rules concerning business integrity, recusal from conflicts of interests, and anti-corruption, but also work together to enforce total risk management.

Enhancement of environmental sustainability

Taiwan Glass (TGI) complies with environmental protection regulations, and is committed to reducing the impact of its production processes on the environment. The Company also plans to have a waste recycling procedure to properly handle the waste generated during production to avoid environmental pollution and reduce wasted resources. Meanwhile, we continue to improve our work environment and focus on green energy issues for energy conservation and carbon reduction, and innovate green products to achieve our goal of sustainable management.

As a social citizen, TGI cares for and gives back to society by participating in charity events and engaging locals in ways that facilitate community development. By granting scholarships to employees' and dealers' children, we aim to grow alongside our stakeholders.

Care for the society

TGI values the harmony of its employment relations and devotes significant attention to employees' treatment, welfare, workplace safety, wellbeing, physical and mental health, rights, gender equality, and skill and career development. By implementing a broad diversity of communication channels with employees and the union, TGI aims to create a culture of mutual benefit between the management and labor.

Friendly workplace

TGI's strategic roadmap for UN SDGs

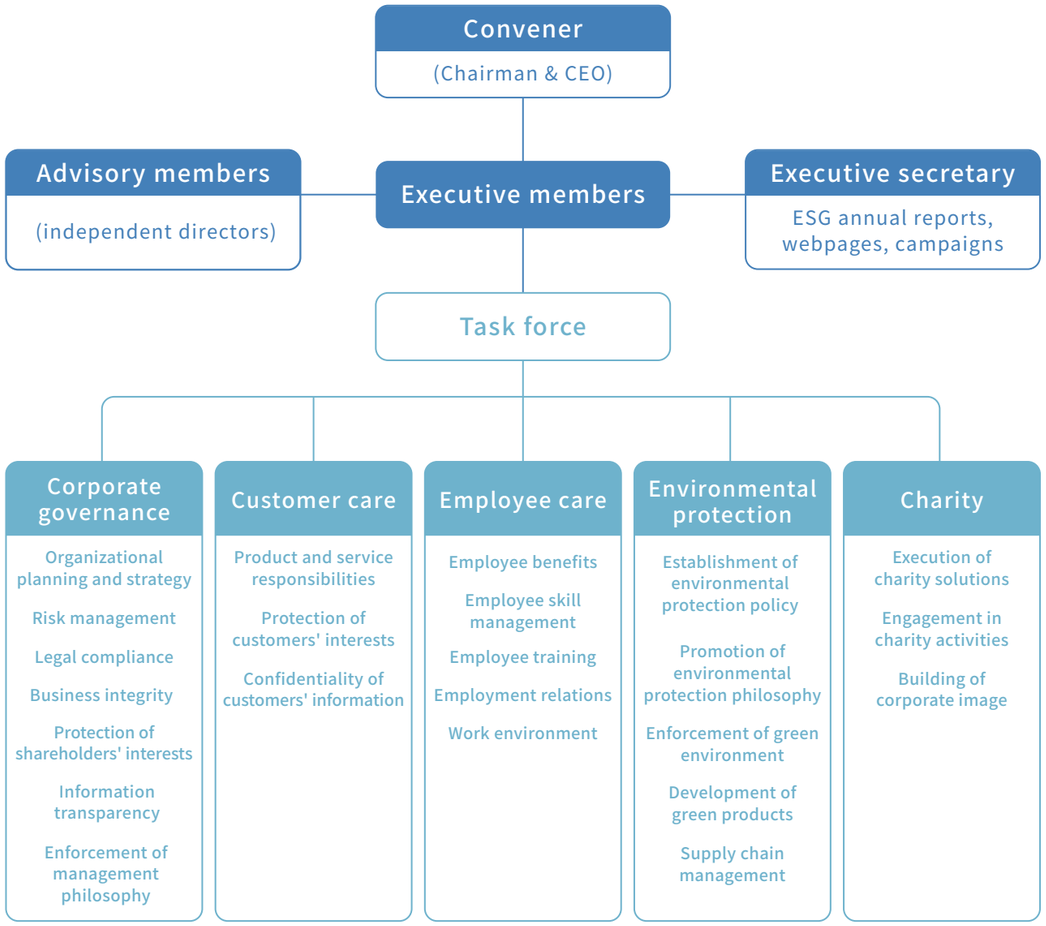
SDGs	TGI's actions
SDG1 No poverty	Since 2000, TGI Cultural and Educational Foundation has rewarded a total of 2,813 college students and paid NT$32.25 million in scholarship
SDG3 Good health and well-being	Established TGI Human Rights Policy - Healthy and Safe Workplace The implementation rate of the Four Major Programs for Occupational Safety is 100% Enforced training for new and existing employees
SDG4 Quality education	TGI Cultural and Educational Foundation places great emphasis on technological education, helping young adults expand vision toward potential technologies while advocating healthy exercise habits In addition to implementing a robust training system, TGI continues to support the Ministry of Labor in the execution of the "On-job Training and Advancement Program"
SDG5 Gender equality	TGI values gender equality; its male-to-female basic compensation ratio is 1:0.95, indicating a difference smaller than 0.05 TGI is dedicated to creating a maternity-friendly workplace, and passed "2022 Excellent Breastfeeding Room Certification by the Taipei City Government Department of Health"
SDG6 Clean water and sanitation	Prioritized purchase of water-saving equipment Improved production procedures to use reclaimed water as diluting liquid, and thereby increasing water efficiency All factories recycled more than 90% of water resources
SDG7 Affordable and clean energy	Constructed approximately 8,770 KWH of solar power capacity
SDG8 Decent work and economic growth	Appointed a corporate governance officer Established a comprehensive talent development and retention policy Offered compensations and benefits that are more favorable than what the laws require
SDG9 Industry, innovation and infrastructure	Set Course of Action for the Excellent Products and Services of Taiwan Glass (TGI) Passed international certifications such as ISO, FSSC, CSi (Australia) etc. Low-carbon, low-pollution, and highly recyclable products accounted for more than 50% of total revenues

SDGs	TGI's actions
SDG10 Reduced inequalities	Complied with international human rights conventions such as principles of the "International Labour Organization," "The UN Global Compact," "UN Guiding Principles on Business and Human Rights," "United Nations Universal Declaration of Human Rights" etc. and established "TGI Human Rights Policy" Named "Excellent Performer in Over-quota Employment of Persons with Disabilities" by Changhua County Government, whereas Huang, Ching-Kai of Lukang Factory won Outstanding Employee with Disability
SDG11 Sustainable cities and communities	Hsinchu Factory took part in the Hsinchu City Water Environment Patrol Team and donated NT$60,000 in supplies Employees of Hsinchu Factory actively participated in the voluntary street cleanup at Puqian Li Hsinchu Factory committed to the maintenance of public toilets and contributed to the cleanliness of the community Taoyuan Factory committed to maintaining the green belt of the industrial zone as part of its corporate social responsibilities
SDG12 Responsible consumption and production	Established "Business Integrity Code of Conduct" and "Illegal, Unethical, and Dishonest Conducts Reporting Policy" Established "Intellectual Property Management Plan" All employees have signed "Employee Service Integrity Code of Conduct"
SDG13 Climate action	Adopted the TCFD framework and established governance, strategy, and risk management measurements and goals for the identification of climate change risks and opportunities
SDG15 Life on land	Created a circular economy value chain that recognizes water, glass, waste filament, and backwashing liquid as critical circular materials
SDG16 Peace, justice and strong institutions	Completed board performance evaluation for 2022 Developed information security policies using the PDCA system
SDG17 Partnerships for the goals	Participated in multiple industrial/commercial groups, cross-strait interactive organizations, regional economic/trade organizations, industry associations, and environmental/sustainability organizations to develop proactive and close working relationships with business partners TGI has implemented its "supplier ESG evaluation" since 2015, and encourages upstream and downstream partners to improve ESG performance in ways that contribute to the creation of a sustainable supply chain Taoyuan Factory participated in the Shulin Li Mid-autumn Festival Energy and Carbon Reduction Awareness Program and sponsored gifts to contribute toward a common carbon reduction vision

Composition of the ESG Committee

TGI has assembled an "ESG Committee" to facilitate the enforcement and management of corporate social responsibilities. The Chairman and CEO serve as conveners for the Committee, whereas independent directors assume the roles of advisory member and executive member. TGI's ESG Committee convenes meetings once every six months, which can be adjusted flexibly subject to no less than once a year. The Company held a total of two meetings in 2022 to discuss timeline for the preparation of ESG report and track sustainability performance of various factory sites including: energy conservation practice, upgrade of exhaust treatment equipment at Hsinchu Factory, switch of furnace fuel from heavy oil to 100% natural gas, construction of renewable energy capacity, and planning for greenhouse gas survey.

Organization of the ESG Committee



TGI's ESG webpage

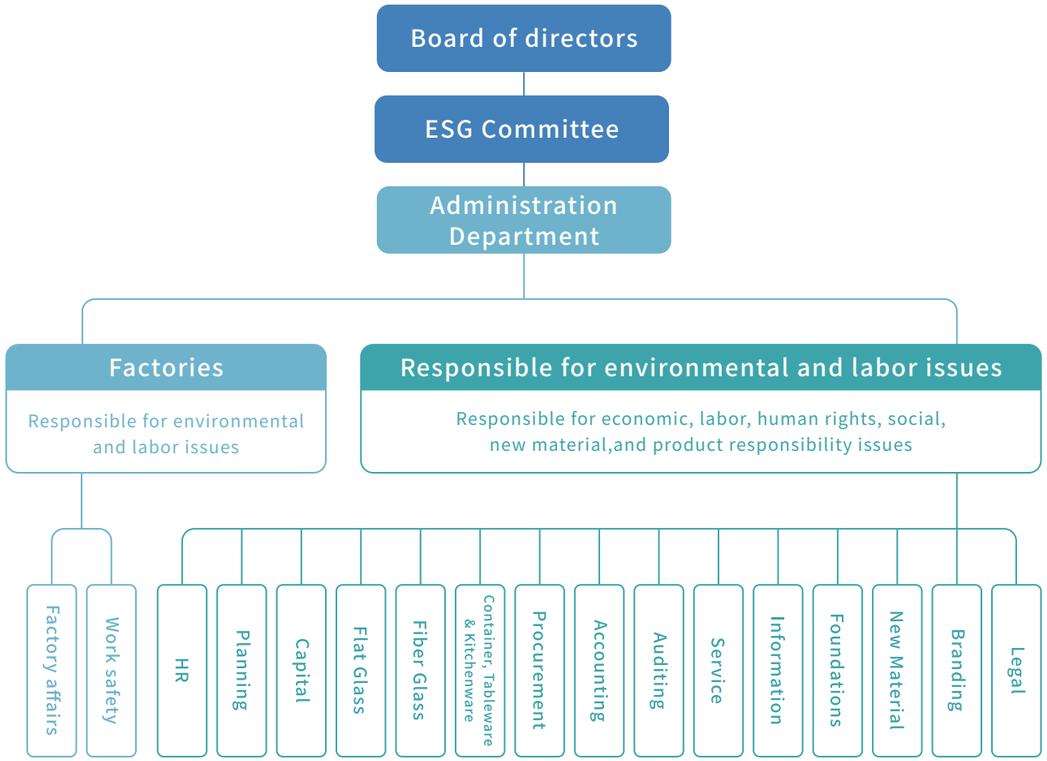
Click here to visit TGI's ESG webpage

Committee members

Taiwan Glass Industry Corporation ESG Committee members			
Designation	Name	Gender	Concurrent duty within the Company
Convener	Lin, Por-Fong	Male	Chairman
Convener	Lin, Por-Shih	Male	CEO
Advisory member	Wang, Yu-Che	Male	Independent Director
Executive members	Su, Yu-Te	Male	COO of Fiber Business
Executive members	Hung, Yo-Chin	Male	Vice President of Administration Headquarters
Executive Secretary	Pan, Ya-Lun	Female	Manager of Secretary Department

Duties of the Sustainable Development Task Force

We have also created a "Sustainable Development Task Force" under the ESG Committee to oversee planning of sustainability strategies, resource integration, and data consolidation and thereby ensure accomplishment of economic, social, and environmental performance targets. The Administration Headquarters is responsible for the coordination and execution of resources. Task force members are consisted of representatives from factories and relevant departments.



Structure of Task Force

Aside from preparing reports, task force members also actively take part in corporate sustainability-related courses, including those organized by Center for Corporate Sustainability (CCS) and workshops by Industrial Resources Integration and Development Association. Through these courses, the Company hopes to learn the sustainability practices of prominent businesses as well as the industry's future outlook, and gain more knowledge on the topic of sustainability while at the same time identify future trends and potential obstacles to ultimately improve preparation skills and risk management awareness.
Below is a description of the execution steps undertaken by the task force:

- **01** Identify stakeholders and material issues to provide basis for the preparation of ESG report.
- **02** Analyze material issues to learn the current state and devise responses.
- **03** Disclose economic, social, and social issues relating to operating activities in the ESG report.
- **04** Review, correct, and confirm contents and data of the draft report.
- **05** The amended draft report is forwarded to the heads of various departments for verification and finalization.
- **06** Engage an independent third-party institution to audit the chosen assurance indicators.
- **07** The final ESG report and assurance report are presented to the Chairman for approval before publication.

Corporate sustainability development efforts and outcomes

In addition to winning Corporate Sustainability Report Award - Silver in the [Traditional Manufacturing] category for 8 consecutive years, TGI also won numerous overall and single-category awards in 2022 including [Taiwan Top 100 Sustainable Enterprises Award], [Circular Economy Leadership Award], and [Growth through Innovation Leader Award] in 2022, which affirmed TGI's efforts.
TGI is committed to enforcing sustainable practices, and duly discloses progress and future outlooks to provide stakeholders with a better understanding of TGI's dedication to sustainability responsibilities. In terms of operating strategy, we have aligned our ESG focus with the United Nation's SDGs, and adopted the approach to exert positive influence in economic and social aspects. Through ESG practices, TGI hopes to ensure business continuity and grow alongside stakeholders to become the sustainable leader in the glass industry.

Taiwan Top 100 Sustainable Enterprises Award

TCSA Corporate Sustainability Report Award - Conventional Manufacturing - Silver

TCSA performance categories - Circular Economy Leadership Award and Growth through Innovation Leader Award

Alliance for Sustainable Development Goals, A · SDGs

SDGs now make up the main focus of TGI's sustainability strategies. The Company is a member of the Alliance for Sustainable Development Goals (A-SDGs), which was jointly founded in August 2018 by Taiwan Institute for Sustainable Energy, Center for Corporate Sustainability, businesses, government agencies, academic institutions, and non-government organizations, and it observes the rules of A-SDGs by exerting commercial influence on the industry. A-SDGs executes its strategies through "globalization," "integration," "partnership," "business participation," and "education." Using SDGs as a common global language, it invites participants from different fields toward developing sustainability as a competitive edge, and promises to create an inclusive society and a sustainable environment in joint effort with all stakeholders.

Green Factory Label

TGI values sustainability of the environment, and as a manufacturer, it places great emphasis on conserving energy, inputing the right resources, and reducing output of waste. Lukang Factory and Taoyuan Factory were awarded "Certificate of Cleaner Production Assessment" by the Industrial Development Bureau after 2019 and have since begun assessments for green building improvements. Taoyuan Factory was the first to receive Green Building Label in 2021 and was later awarded Green Factory Label in 2022; meanwhile, Lukang Factory is also making plans to apply for green factory certification in 2023. By conforming with green factory requirements inside and out, TGI takes pragmatic steps toward realizing its visions for sustainable energy conservation and green management, and secures its position as the sustainable leader in the glass-making business.

Taoyuan Factory -
Green Building Label

Taoyuan Factory -
Certificate of Cleaner Production Assessment

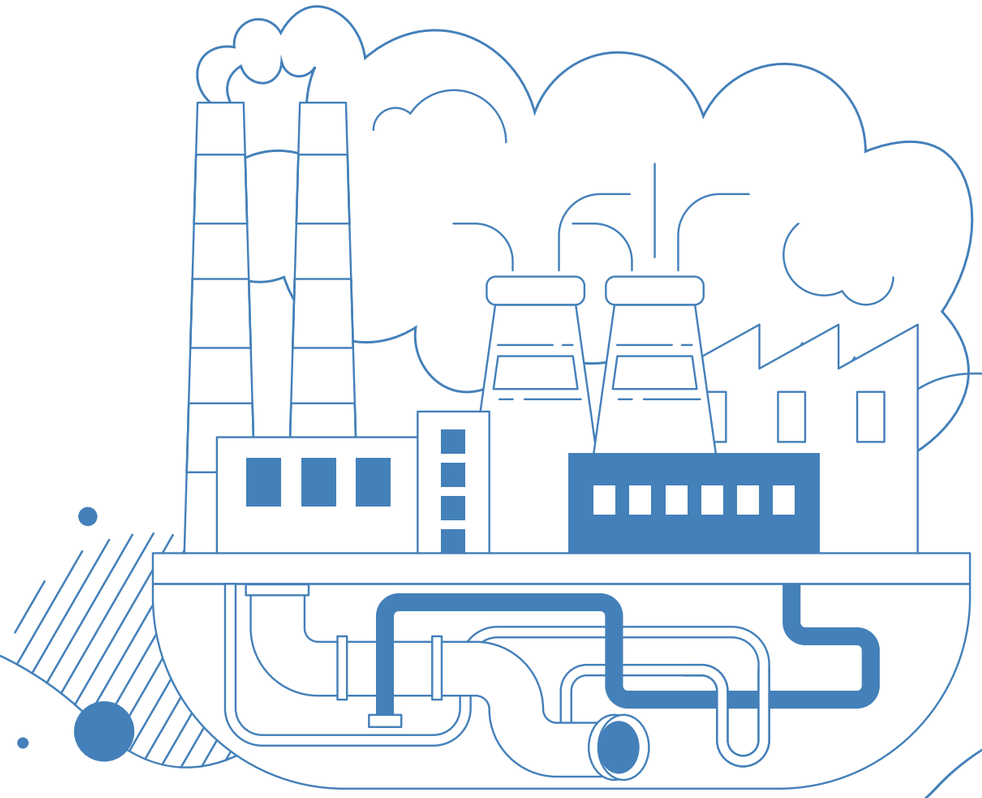
Taoyuan Factory -
Green Factory Label

Constituent of TIP Taiwan ESG Index

FTSE4Good TIP Taiwan ESG Index, jointly compiled by Taiwan Index Plus Corporation and FTSE Russell, was the first investment index in Taiwan selecting compositions using a comprehensive range of environmental (E), social (S), governance (G), and financial indicators. TGI has been selected a constituent of "TIP Taiwan ESG Index" for four consecutive years since 2019 and was awarded the "TIP Label." Being selected a composition is indicative of TGI's ESG performance, and the Company will continue communicating with stakeholders in the future to foster sustainable development alongside upstream and downstream supply chain partners, and contribute to the growth of Taiwan's economy by exerting positive influences over the industry.

FTSE4Good
TIP Taiwan ESG Index

TIP
Taiwan Index Plus



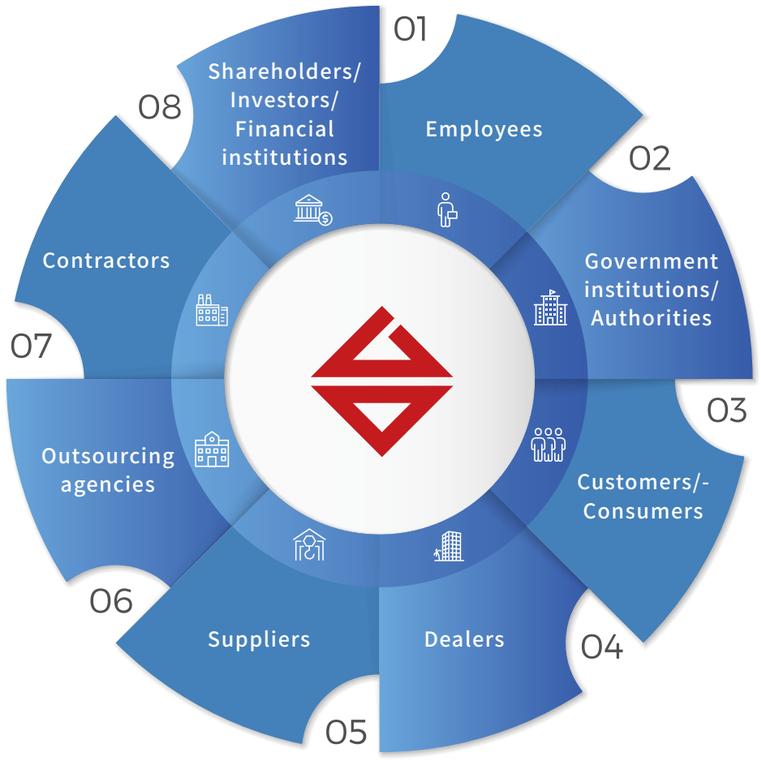
1.2

Stakeholder communication and identification of material issues

Taiwan Glass (TGI) Industry observes GRI Standards and AA 1000 SES Stakeholder Engagement Standards for the identification and analysis of stakeholders and sustainability-related issues. The "ESG Committee" distributes questionnaires to identify stakeholders and material issues each year. By gathering opinions from within and outside the organization, TGI ensures that sustainability disclosures are relevant to the Company's growth and conform with the expectations of internal and external stakeholders.

Stakeholder identification process

TGI evaluates the importance of each stakeholder based on the five main aspects of AA 1000 Stakeholder Engagement Standard (AA 1000 SES), namely "Dependency," "Responsibility," "Tension," "Influence," and "Diversity," for which the ESG Committee issues internal questionnaires to gather response, and a total of 26 valid questionnaires were received from different departments. After evaluating the responses, TGI has determined the five most important stakeholders as: employees, government institutions/authorities, customers/consumers, dealers, and suppliers.



Material issue identification process

01 STEP Gather corporate sustainability issues

Corporate sustainability issues are determined based on GRI Standards, issues of concern to domestic and foreign peers, and global sustainability trends.

24 sustainability issues

02 STEP Issue material issue questionnaires

Based on the 24 sustainability issues identified, TGI designed questionnaires and distributed them to the eight stakeholders as well as internal departments.

76 valid external questionnaires

26 valid internal questionnaires

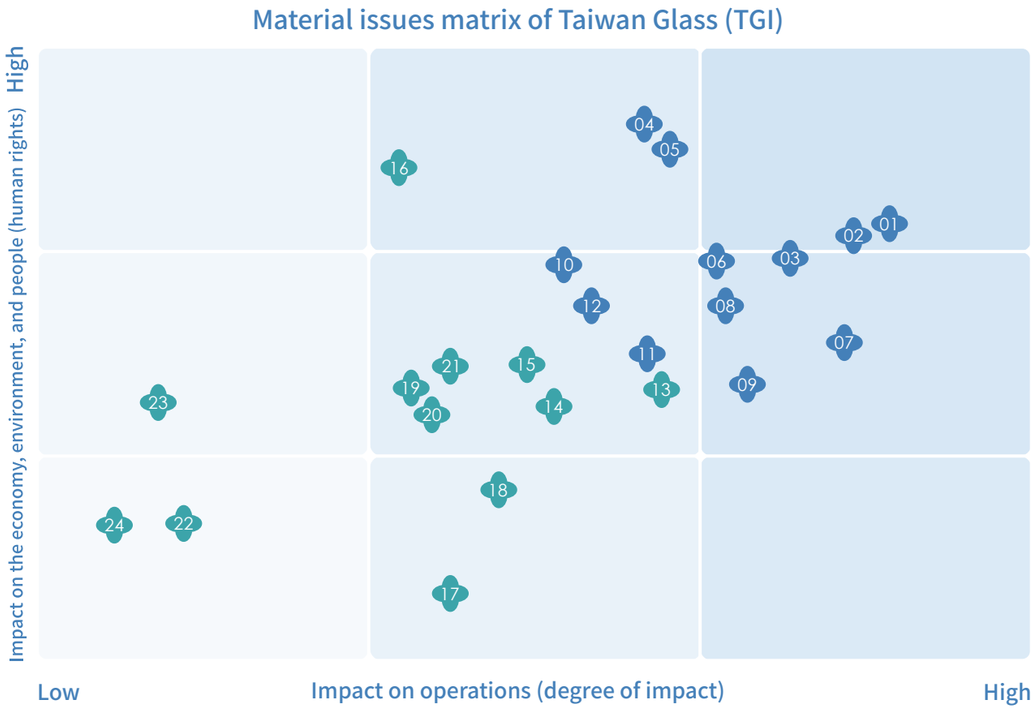
03 STEP Analyze and evaluate actual and potential impact of material issues

TGI adopts EU's double materiality principle to analyze how each sustainability issue impacts the external environment and corporate operations, and ranks them according to materiality.

04 STEP Identify material issues for the year and develop management solutions

12 material issues

TGI material issues matrix - 2022



- 01 Economic performance
- 02 Service quality management
- 03 Water resource management
- 04 Product quality management
- 05 Waste management, recycling, and reuse
- 06 Talent retention, salary, and welfare
- 07 Occupational Health and Safety
- 08 Renewable energy
- 09 GHG and energy management
- 10 Corporate governance
- 11 Product innovation and green design
- 12 Legal compliance
- 13 Raw materials management
- 14 Ethics and integrity
- 15 Climate change response
- 16 Business continuity management
- 17 Workers' human rights
- 18 Anti-corruption
- 19 Supply chain management
- 20 Risk management
- 21 Talent development
- 22 Collective bargaining agreement
- 23 Social influence
- 24 Biodiversity

Material issue	2022 ranking	2021 ranking	Differences
Economic performance	1	8	↑
Service quality management	2	1	↓
Water management	3	19	↑
Product quality management	4		New issue for the year
Waste management, recycling, and reuse	5	6	↑
Talent retention, salary, and welfare	6	10	↑
Occupational Health and Safety	7	7	-
Renewable energy	8		New issue for the year
Greenhouse gas and energy management	9	11/13	↑
Corporate governance	10	3	↓
Product innovation and green design	11	5	↓
Legal compliance	12	2	↓
Raw materials management	13	20	↑
Ethics and integrity	14	4	↓
Response to climate change	15		New issue for the year
Business continuity management	16	23	↑
Workers' human rights	17	15	↓
Anti-corruption	18	12	↓
Supply chain management	19	16	↓
Risk Management	20	9	↓
Talent development	21		New issue for the year
Collective bargaining agreement	22	22	-
Social influence	23	21	↓
Biodiversity	24	14	↓

Management policies for material issues

TGI's stakeholders			
A. Employees	B. Government institutions/authorities	C. Customers/consumers	D. Dealers
E. Suppliers	F. Outsourcing agencies	G. Contractors	H. Shareholders/investors/financial institutions

Economic performance

Implications for TGI	Commitments
Driven by goals toward sustainable management, TGI makes persistent improvements to product strategy and strives to increase production capacity in ways that accomplish financial excellence, support growth of the domestic economy, and create job opportunities.	Faced with the uncertainties and challenges caused by the pandemic and political conflicts around the world, TGI will continue responding to the needs of customers and the market by exploring ways to lower cost, shorten the R&D cycle, and increase product value. Securing business opportunities will ultimately improve the Company's competitiveness with respect to sustainable management.
Goals	**Corresponding standards**
Raise product value and increase collaboration and exposure opportunities with international partners for improved profitability and economic performance.	GRI 201: Economic Performance (2016) SDG 8 - Decent work and economic growth
Corresponding chapters: ◆ 2.1 About TGI	Value chain: IV

Service quality management

Implications for TGI	Commitments
With the support of a solid brand image and strong product quality, TGI hopes to provide good experience to customers and improve supply chain relationship in customers' best interest.	TGI strives to provide customers with a full range of services, which is why it engages customers in frequent communication to learn consumers' needs and expectations of TGI. By having complete knowledge of the market, TGI is able to improve service quality consistently over time.
Goals	**Corresponding standards**
TGI persists in making the finest glass products, and continues to work with Japanese designer Naoto Fukasawa on the development of new products. Through this collaboration, TGI aims to introduce a total of 200 products and convey its outstanding brand spirit by creating classic glassware collections that reflect Taiwan's culture.	GRI 417: Marketing and Labeling (2016) GRI 418: Customer Privacy (2016) SDG 17 - Partnerships for the goals
Corresponding chapters: ◆ 3.2Product quality ◆ 3.4 Customer service	Value chain: III, IV

Water management

Implications for TGI	Commitments
Uses and recycling of water resources and carbon emissions have become common issues of concern around the world and given the current state of climate change. TGI uses large volumes of water during the production process, which therefore makes optimal water resource utilization an issue of high concern for TGI.	TGI continues to recycle and reuse water resources in the production process, and encourages employees to conserve water where possible. The Company examines its water recycling system and conservation measures on a yearly basis, and continually explores ways to reduce water discharge and increase the volume of water reclaimed.
Goals	**Corresponding standards**
Save water by 1% per year Increase the percentage of water recycled from glass production Enhance employees' awareness to reduce the volume of water used in living activities	GRI 303: Water and Effluents 2018 SASB water management SDG 6 - Clean water and sanitation
Corresponding chapters: ◆ 4.2 Energy and resource management	Value chain: II, IV

Product quality management

Implications for TGI	Commitments
Providing customers with high-quality and reliable products and protecting consumers' interests help maintain TGI's brand image, support economic growth, and strengthen corporate competitiveness.	TGI actively introduces product quality, product safety, environment/safety/health, and transportation safety management systems to support its product quality enhancement and risk control efforts. TGI ensures that all products are backed by valid certificates or pass relevant quality, manufacturing safety, and food safety certifications local and abroad.
Goals	**Corresponding standards**
1. To continually enforce quality management system, CNS standards, and ANSI (USA) standards in all product lines 2. To obtain certification for electronic grade ultra-thin glass products	GRI 416: Customer Health and Safety (2016) SASB product design and life cycle management SDG 12 - Responsible consumption and production
Corresponding chapters: ◆ 3.1 TGI products ◆ 3.2 Product quality	Value chain: I, II, III, IV

Waste management, recycling, and reuse

Implications for TGI	Commitments
Global supply of energy and resources continues to decline despite rising demand. By improving the efficiency of existing procedures and introducing green production, TGI aims to minimize waste and ultimately accomplish its goals toward sustainable management and environment friendliness.	We continually implement environmental improvement solutions and are dedicated to increasing the efficiency at which energy and resources are used for glass production. By implementing energy conservation measures, we strive to reduce operating costs and lessen environmental impact at the same time.
Goals	**Corresponding standards**
TGI implements different measures and projects each year to increase production efficiency and lessen waste.	GRI 301: Materials (2016) GRI 306: Waste (2020) SASB waste management SDG 12 - Responsible consumption and production SDG 13 - Climate action
Corresponding chapters: ◆ 4.3 Green production management	Value chain: II

Renewable energy

Implications for TGI	Commitments
Development and use of renewable energy are closely related to a business' carbon reduction awareness, and are critical to TGI's efforts of bringing circular economy into the value chain. This practice not only conforms with the global sustainability trend, but also supports the domestic government's plans to develop renewable energy.	TGI will fulfill its environmental commitments and continue to increase the percentage of renewable energy sources used while taking actions to minimize environmental impacts.
Goals	**Corresponding standards**
TGI will install additional solar power panels on factory premises, and expects to complete installation and commence power generation at the end of 2022	GRI 302: Energy (2016) SASB energy management SDG 13 - Climate action
Corresponding chapters: ◆ 4.2 Energy and resource management	Value chain: I, II

Talent retention, salary, and welfare

Implications for TGI	Commitments
TGI views employees as its biggest asset, which is why the Company is dedicated to introducing favorable benefits and work conditions as a way to strengthen unity among employees, and raise employees' and customers' satisfaction for the sustainability of the organization.	TGI views employees as its biggest asset, which is why the Company is dedicated to introducing favorable benefits and work conditions as a way to strengthen unity among employees, and raise employees' and customers' satisfaction for the sustainability of the organization.
Goals	**Corresponding standards**
TGI ensures that the salary package it offers remains competitive on the market, and examines employee turnover on a yearly basis to maintain the stability of its workforce. TGI also listens to employees' voices and strives to become the preferred employer by introducing better benefits.	GRI 401: Employment (2016) SDG 3 - Good health and well-being SDG 4 - Quality education
Corresponding chapters: ◆ 5.1 Human resources and welfare	Value chain II, III

Occupational Health and Safety

Implications for TGI	Commitments
TGI has assembled a dedicated management unit in accordance with laws to plan and supervise factory operations and to prevent accidents and occupational hazards, so that employees may work in a safe environment to deliver optimal efficiency and product quality.	TGI's occupational hazard management practices are inspired by the "zero hazard" goal, which provides the basis for all safety campaigns, indicators, and efforts within factory premise.
Goals	**Corresponding standards**
TGI's ultimate goal is to reduce occupational hazards to zero, and currently aims to lower disabling injury frequency rate (FR) and disabling injury severity rate (SR) by 20% each. Hsinchu Factory, Taichung Factory, and Changpin Factory: All of which have set goals to keep work injuries to 0 for 100 straight days. Signs showing the cumulative number off days since the most recent injury are being used to remind employees to prepare for the unexpected each day. Lukang Fiber Glass Factory: Work injury frequency ≦ 0.2hrs /person. year Lukang Flat Glass Factory: Work injury frequency ≦ 0.04 hrs /person. year Taoyuan Factory: Work injury frequency ≦ 0.02 times/person. year	GRI 403: Occupational Health and Safety (2018) SASB worker health and safety SDG 3 - Good health and well-being SDG 8 - Decent work and economic growth
Corresponding chapters: ◆ 5.3 Occupational Safety and Health	Value chain: II

Greenhouse gas and energy management

Implications for TGI	Commitments
Reducing greenhouse gas emissions and environmental pollution helps raise TGI's corporate image, lower production cost, mitigate climate change risk, and ensure compliance with government and international laws.	TGI will actively follow the government's net zero plans and outline its own carbon reduction roadmap. Meanwhile, attention will be directed toward optimizing the energy footprint of all TGI products and developing energy-saving glass for improved competitiveness.
Goals	**Corresponding standards**
Gradually change to a hybrid combustion design in response to the furnace's service life and cold repair schedule, and reduce greenhouse gas emissions Lukang Flat Glass Factory replaced the use of heavy oil with natural gas, which is estimated to reduce the use of heavy oil by 68.742 kiloliters a year; at least 50% of the production process will transition from heavy oil to natural gas	GRI 302: Energy (2016) GRI 305: Emissions (2016) SASB energy management SDG 13 - Climate action
Corresponding chapters: ◆ 4.2 Energy and resource management	Value chain: I, II

Product innovation and green design

Implications for TGI	Commitments
TGI has the advanced production procedures and technologies needed to take advantage of growing IoT applications and increasing demands for industrial fiber glass and electronic grade glass fabric. The Company's products currently lead the industry in terms of environment friendliness, energy conservation, photovoltaic application, thin and light design, and diversity; green building-certified glass products are being developed to provide customers with more competitive, more environment-friendly, and safer solutions.	TGI devotes significant efforts into technological advancement as well as research and development of new products. In addition to introducing environment-friendly and energy-saving products, TGI also explores ways to minimize pollution from the production process and mitigate impact on the environment. An internal sharing system has been created to facilitate the exchange of creative ideas; furthermore, TGI helps customers and industry partners innovate in meaningful ways, including product innovation with customers and green innovation with suppliers.
Goals	**Corresponding standards**
Expand collaboration with ITRI (Industrial Technology Re search Institute) and universities Increase the percentage of scrap glass recycled and reused Improve the production capacity and quality of ultra-thin glass As we enter into the 5G era, TGI will be developing Low DK glass fabrics specifically for printed circuit boards (PCB) used in networking and communication equipment, and thereby expand application of composite fiber glass materials	SASB product design and life cycle SDG 12 - Responsible consumption and production SDG 13 - Climate action
Corresponding chapters: ◆ 3.1 TGI products ◆ 3.3 Innovative R&D	Value chain: II, III, IV

Corporate governance

Implications for TGI	Commitments
Sound corporate governance is key to business continuity and provides an important foundation for creating values. TGI not only upholds continuity as a core business philosophy, but also pays great attention to shareholders' interests and implements effective management practices and empowers the board of directors appropriately for improved competitiveness.	TGI holds the conviction of generating profits through transparency, which is why it goes the extra mile to make information comprehensible to stakeholders. In addition to having functional committees undergo self-evaluation, TGI also engages an external institution to evaluate the performance of its board of directors and functional committees. In doing so, the Company hopes to ensure the fairness and transparency of its governance practices.
Goals	**Corresponding standards**
Complete annual board performance self-evaluations according to laws Avoid violation against conflict of interest principles, anti-corruption requirements, and laws	SDG 8 - Decent work and economic growth
Corresponding chapters: ◆ 2.1 About TGI ◆ 2.2 Integrity of TGI	Value chain: I, II, III, IV

Legal Compliance

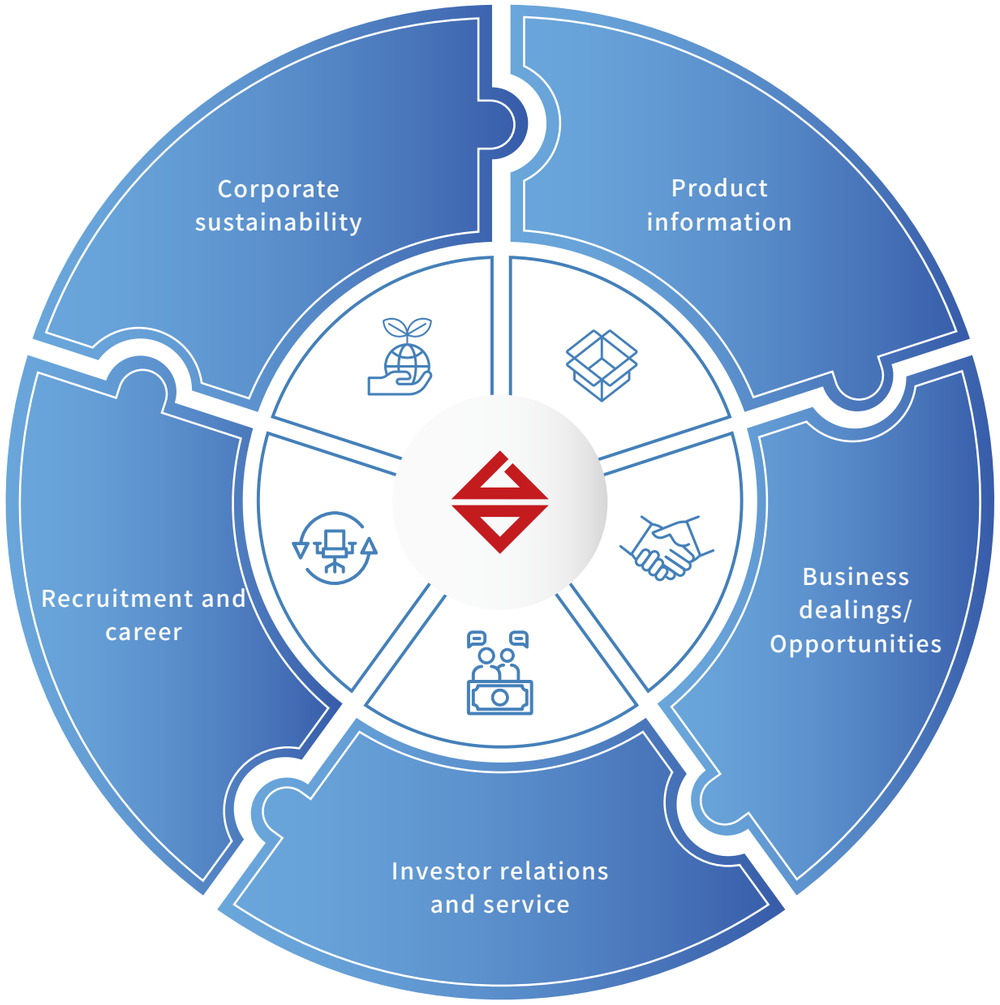
Implications for TGI	Commitments
Being an Asia Pacific-based glass manufacturer, TGI is required to obey the laws of many countries and develop an appropriate compliance system that helps prevent business risk, protect employees' rights, and improve operating performance.	TGI has legal affairs and internal audit units in place to provide reasonable assurance regarding compliance with environmental protection laws, labor safety laws, the Labor Standards Act, product laws, and relevant rules. Employees are also given appropriate training to ensure adequate understanding of relevant rules as well as strict adherence to the government's environmental protection policy.
Goals	**Corresponding standards**
Avoid any major violation of law (that involve penalty of more than NT$1 million). Organize labor-management meetings and orientation training in a timely manner	GRI 2-27 Legal Compliance (2021) SASB competitive behavior SDG 12 - Responsible consumption and production
Corresponding chapters: ◆ 2.1 About TGI ◆ 2.2 Integrity of TGI	Value chain:I、II、III、IV

TGI's value chain			
I. Raw material purchase	II. Design and manufacturing	III. Quality control	IV. Delivery to customers

Stakeholder engagement

TGI has identified eight main categories of stakeholder, including customers, suppliers, contractors, dealers, outsourcing agencies, government institutions, employees, and shareholders (including investors and financial institutions). TGI has various communication and grievance channels in place to enforce integrity, resolve issues, and address queries. The board of directors authorizes the ESG Committee to regularly review the progress and performance of corporate social responsibility tasks. Based on the performance assessment, the ESG Committee then proposes strategic plans and measures to facilitate bilateral communication with stakeholders.

Topics communicated between TGI and stakeholders



TGI listens to the voices of stakeholders; we take all opinions under advisement and make improvements immediately to meet the public's expectations. At TGI, we consider harmonious relationship with stakeholders to be the first step toward fulfilling corporate responsibilities.

Customers/consumers

Meeting customers'/consumers' product requirements has been TGI's operational and innovative goals

Concerned issues	Corresponding chapter
Legal Compliance Corporate governance Product quality management	2.1 About TGI 2.2 Integrity of TGI 3.1 TGI products 3.2 Product quality

Communication channels and frequency	
Questionnaire survey	Once every six months/once a year
Customer service mailbox	Unscheduled
Customer satisfaction survey	Once every six months/once a year
Participation in product exhibition	Once every two years/once a year
Customer factory visit, on-site inspection, audit, questionnaire, unscheduled meeting etc.	Unscheduled

Participate in relevant product exhibitions

The Flat Glass Division participates in construction materials exhibitions in Taiwan and Germany once every two years, whereas the Fiber Glass Business takes part in China Composites Expo and JEC World on a yearly basis. These exhibitions provide us with the opportunity to reach existing and potential customers, learn first-hand the future market trends, and engage stakeholders in bilateral communication.

Suppliers

Suppliers are important business partners of Taiwan Glass (TGI), and their operations affect the products and shipments of Taiwan Glass (TGI). Therefore, assisting our suppliers in paying attention to risk changes and reducing operational risks is an important goal for Taiwan Glass (TGI)

Concerned issues	Corresponding chapter
Talent retention, salary, and welfare Response to climate change Occupational health and safety Water management	2.1 About TGI 2.2 Integrity of TGI 2.3 Risk Management 3.2 Product quality 3.3 Innovative R&D 4.2 Energy and resource management 5.1 Human resources and welfare 5.3 Occupational Safety and Health

Communication channels and frequency	
Phone, Fax, E-mail	Unscheduled; once message is received, the Company will coordinate with users to resolve the problem
Supplier audit	Once a quarter

Contractors

TGI maintains close communication with contractors to ensure that both parties have a common understanding about the construction project and work safety

Concerned issues	Corresponding chapter
Renewable energy Waste management, recycling, and reuse Water Management Workers' human rights	2.1 About TGI 2.2 Integrity of TGI 4.2 Energy and resource management 4.3 Green production management 5.1 Talent Structure and Benefits

Communication channels and frequency	
Questionnaire survey	Once a year
Face-to-face discussion/phone communication	Unscheduled
Construction contractors are required to complete a **"Safety Commitment"** and **"Work Environment and Hazard Notice"**, and circulate them among workers to ensure that details are properly conveyed	Every time workers perform work at factory site
Health and safety training for contractors	Unscheduled

Dealers

TGI maintains good relationship with dealers to ensure the quality of products and services delivered

Concerned issues	Corresponding chapter
Collective bargaining agreement Waste management, recycling, and reuse Water Management	2.2 Integrity of TGI 2.3 Risk Management 3.2 Product quality 3.3 Innovative R&D 3.4 Customer service 4.2 Energy and resource management 4.3 Green production management 5.1 Talent Structure and Benefits

Communication channels and frequency	
Visits (personal visit, call visit, E-mail) are made to learn customers' needs and to assist in solving problems	Unscheduled
Project briefing, wind pressure deflection, glass tensile strength design, glass product planning, examination of standards etc.	Unscheduled
Assist in order processing, sample, customer complaint, quality, equipment maintenance, technical service etc.	Unscheduled
Customer satisfaction survey	Once a year
Participation in Taipei Building Show and BAUTEC	Once a year/once every two years
Participation in JEC World and China Composites Expo	Once a year

Outsourcing agencies

Outsourcing agencies are TGI's business partners; it is part of TGI's product requirement to ensure that outsourcees deliver the level of quality that is consistent with TGI's products

Concerned issues	Corresponding chapter
Renewable energy Water Management Waste management, recycling, and reuse	3.2 Product quality 4.2 Energy and resource management 4.3 Green production management

Communication channels and frequency	
Questionnaire survey	Once a year
Outsourcing agency evaluation	Unscheduled (Taichung Factory: once a quarter)
Outsourcing agency grievance hotline, fax, digital platform or E-mail	Unscheduled. Once message is received, the Company will coordinate with users to resolve the problem

Government institutions/authorities

As the leading glass manufacturer, TGI maintains good relationship with the authority and considers it an obligation to duly communicate and comply with regulations of the authority

Concerned issues	Corresponding chapter
Ethics and integrity Corporate governance	2.1 About TGI 2.2 Integrity of TGI 4.3 Green production management 5.3 Occupational Safety and Health

Communication channels and frequency	
Public hearings held by the authority	Unscheduled
Official correspondence with case handlers	Unscheduled
Official correspondence and project discussion meetings with local authorities	Unscheduled
Press conference on factory operations and launch of energy-saving products	Unscheduled

Employees

Human capital is what drives TGI's operations, which is why TGI considers it a responsibility to care for and develop employees

Concerned issues	Corresponding chapter
Talent retention, salary, and welfare Product quality management Legal Compliance Product innovation and green des Π ign Corporate governance	2.1 About TGI 2.2 Integrity of TGI 3.1 TGI products 3.2 Product quality 3.3 Innovative R&D 5.1 Talent Structure and Benefits 5.2 Employee Care & Development 5.3 Occupational Safety and Health

Communication channels and frequency	
Internal messaging system (e.g.: Intranet, online announcement)	Unscheduled
Occupational Health and Safety Committee	Every 3 months
Labor-management meetings	Every 3 months
Education/training/awareness/grievance hotlines, fax lines, and e-mail	Unscheduled. Employees have access to raise complaints regarding sexual harassment, and all reports received are referred to dedicated handlers
Face-to-face communication between workers' and management's representatives	Once a year

Shareholders/investors/financial institutions

Shareholders, investors, and financial institutions are the pillars that support TGI's operations, and the best return to them is to deliver consistent growth

Concerned issues	Corresponding chapter
Economic performance Corporate governance Legal Compliance	2.1 About TGI 2.2 Integrity of TGI

Communication channels and frequency	
Report of revenue information	Monthly
Annual financial statements and separate financial statements	Once a year
Convention of annual general meetings	Once a year
Appointment of Spokesperson and Acting Spokesperson	Unscheduled
"Information Disclosure" section on the corporate website (e.g.: financial statements, annual reports, shareholder service, audit, and material information)	Yearly, unscheduled
Investor seminar	Unscheduled

02

Pragmatic Business Management and Integrity Governance

2.1 About TGI

2.2 Integrity of TGI

2.3 Risk Management

Corporate Governance Performance of 2022

Completion of board of directors performance assessment

In 2022, the Company engaged an independent third party from outside the organization to conduct a board performance assessment, so that the board can be better empowered to deliver optimal results

6 sessions

A total of 6 board meetings were held in 2022

NT$ 1,987,527

Information security management budgets totaling NT$1,987,527 were committed in 2022 to strengthen information security equipment and measures

0 case

No case of corruption, bribery, or extortion had occurred within TGI, and no political donation was made in 2022

2.1 About TGI

TGI's management philosophy, goals, and quality policy

TGI was founded in 1964, and for more than half a century, we have adhered to founder Mr. Lin, Yu-Chia's pragmatic and professional approach toward glass making, which contributed significantly to Taiwan's prominent accomplishments in the global glass industry. In the future, TGI will continue adhering to its quality policy: "To deliver products to customers' satisfaction by adopting advanced technologies and organization-wide quality management," and make persistent improvements to R&D, raw material supply, capacity allocation, distribution, and service. By developing capacity in terms of sustainable management and social engagement, we hope to thrive against competitors in the global market.

Corporate Philosophy

To deliver exceptional performance with a global mindset, consistent operating strategies, and robust financial position.

Corporate Goals

To provide top-quality products and comprehensive service at reasonable prices for customers' satisfaction, while at the same time deliver returns to shareholders, care for employees, and give back to the society.

Quality Policy

To deliver products to customers' satisfaction by adopting advanced technologies and organization-wide quality management.

Introduction to TGI

TAIWAN GLASS IND. CORP.	
Market type	Overseas Chinese or foreign company/public-listed company
Stock code	TGI (1802)
Industry category	Glass and ceramics
Main business activities	Manufacturing and sale of flat glass
	Manufacturing and sale of glass fabric and fiber glass reinforced filament
	Manufacturing and sale of glass containers
Time of establishment	August 25, 1964
TWSE listing date	July 15, 1973
Capital	NT$ 29,080,608 thousand
Revenues	NT$12,595,543 thousand
Employee count	Taiwan-based employees: 3,956
Headquarters	11F Taiwan Glass (TGI) Building, No. 261, Section 3, Nanjing East Road, Songshan District, Taipei City

TGI milestones

For details relating to TGI's milestones, please refer to About Taiwan Glass (TGI).

TGI milestones

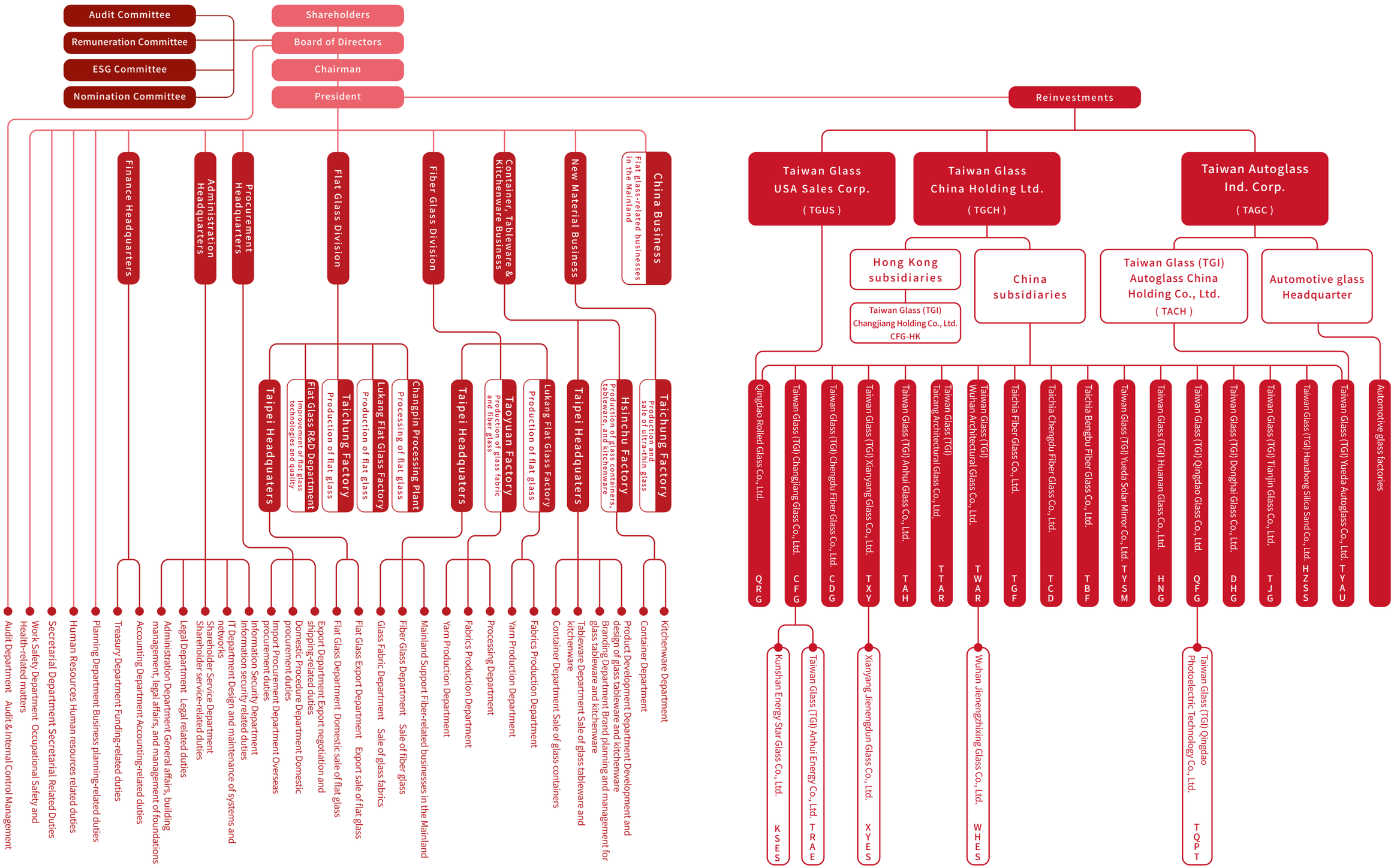
Click here or Scan QRCode to visit

Location of production sites

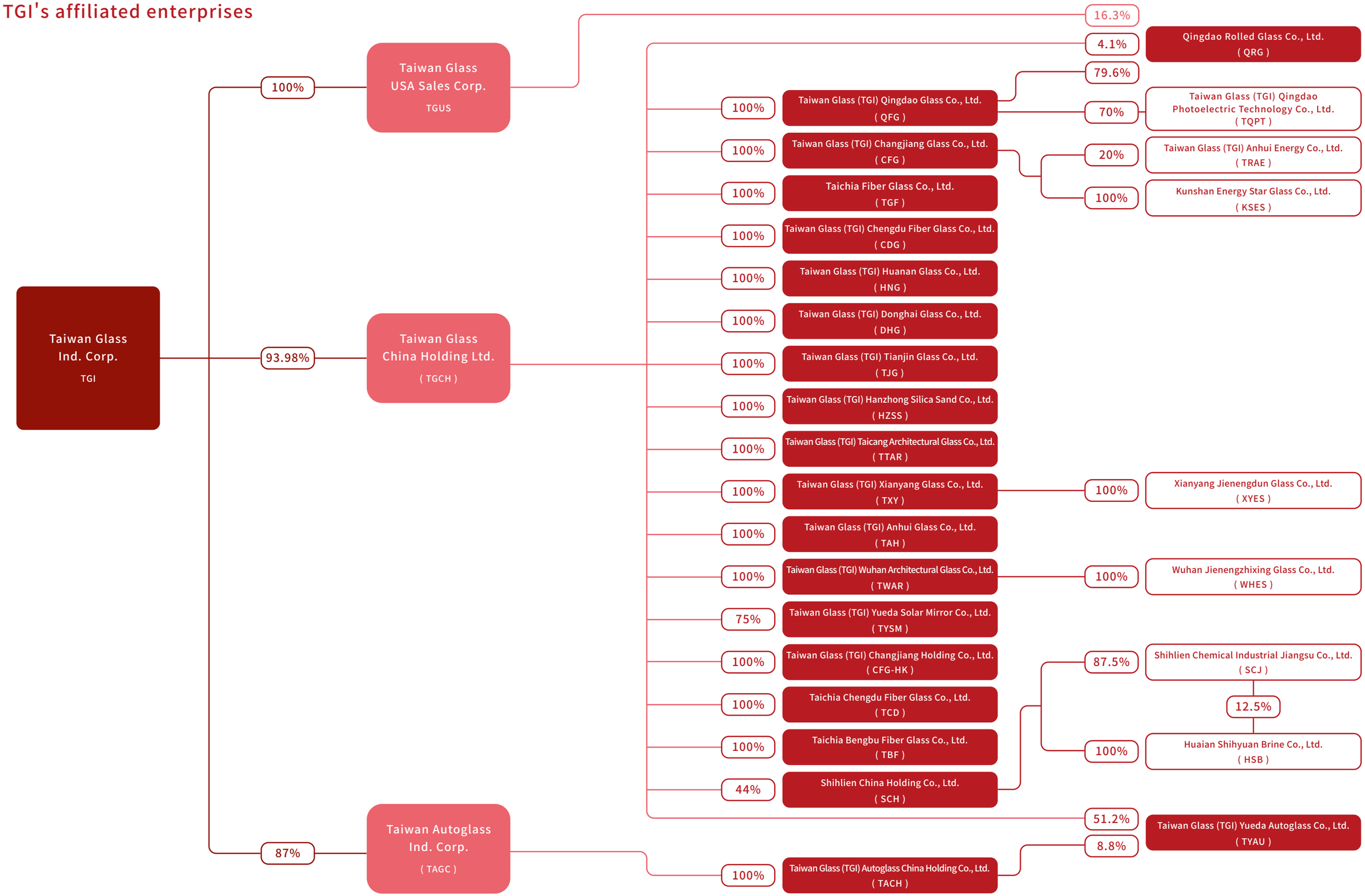
01	TAIWAN GLASS IND.CORP.
FLAT GLASS	
02	TAICHUNG FACTORY
03	CHANGPIN FACTORY
04	TG QINGDAO GLASS CO., LTD.
05	TG CHANGJIANG GLASS CO., LTD.
06	TG KUNSHAN GLASS CO., LTD.
07	TG CHENGDU GLASS CO., LTD.
08	TG HUANAN GLASS CO., LTD.
09	TG DONGHAI GLASS CO., LTD.
10	TG TIANJIN GLASS CO., LTD.
11	TG XIANYANG GLASS CO., LTD.
12	TG TAICANG ARCHITECTURAL GLASS CO., LTD.
13	TG ANHUI GLASS CO., LTD.
14	TG WUHAN ARCHITECTURAL GLASS CO., LTD.
15	QINGDAO ROLLED GLASS CO., LTD.
16	LUKANG FLAT GLASS FACTORY
FIBERGLASS REINFORCED，FIBERGLASS FABRIC	
16	LUKANG FACTORY

17	TAOYUAN FACTORY
18	TAICHIA GLASS FIBER CO., LTD.
19	TAICHIA CHENGDU GLASS FIBER CO., LTD
20	TAICHIA BENGBU GLASS FIBER CO., LTD.
ULTRA-THIN GLASS	
21	TAICHUNG ULTRA-THIN GLASS FACTORY
PHOTOELECTRIC GLASS	
22	TG YUEDA SOLAR MIRROR CO., LTD.
GLASS CONTAINER TABLEWARE & KITCHENWARE	
23	HSINCHU FACTORY
AUTOMOTIVE GLASS	
24	TAIWAN AUTOGLASS IND. CORP.
25	TG YUEDA AUTOGLASS CO., LTD.
SILICA SAND	
26	TG HANZHONG SILICA SAND CO., LTD.
SODA ASH	
27	SHIHLIEN CHEMICAL INDUSTRIAL JIANGSU CO., LTD.
28	HUAIAN SHIHYUAN BRINE CO., LTD.

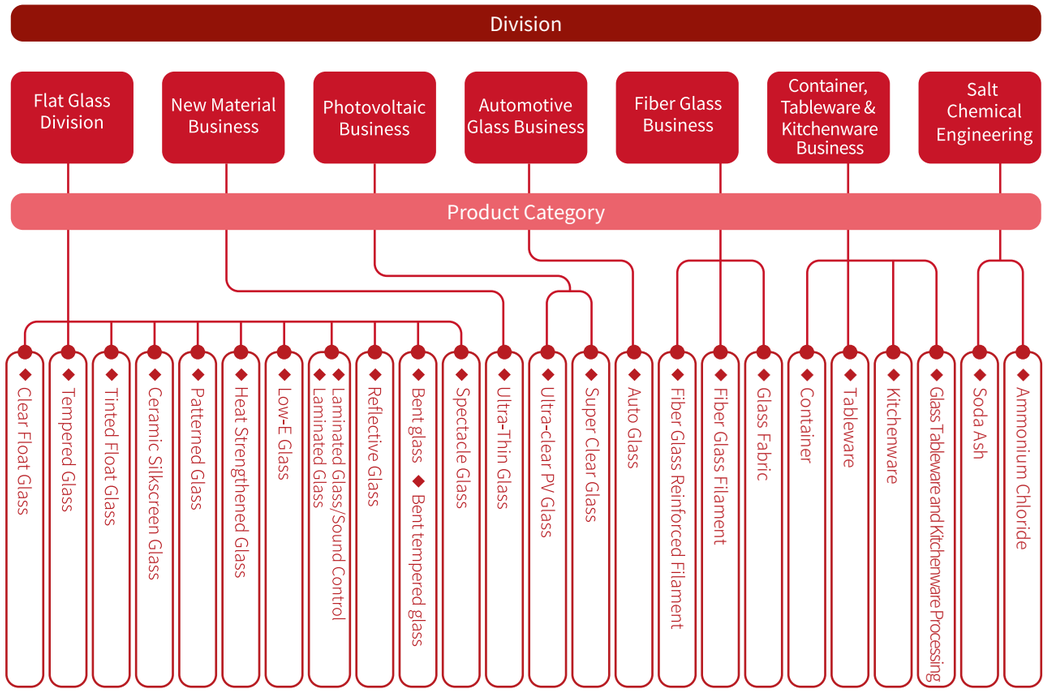
Organization and responsibilities of main departments



TGI's affiliated enterprises



Our Main Products



Green product

TGI improves its production procedures and equipment by adopting the latest world-class technologies; the Company also works with suppliers to build up its own R&D capacity, and directs resources to researching and developing new products.

In addition to receiving multiple quality and environmental certifications, TGI has also responded to green energy issues worldwide, taken the initiative to lower pollution from production activities, explored ways to mitigate environmental impact, and shifted focus toward the development of environment-friendly and energy-saving products in recent years.

Engagement in associations and groups

TGI maintains close interaction with nationwide industrial/commercial development groups as well as cross-strait exchange, regional trade, industry, and sustainability organizations. Through participation in various events, exhibitions, conferences, and multi-lateral meetings, we engage and share successful experiences with peers and contribute to the sustainable growth of the business world.

Chairman Mr. Lin, Por-Fong received "Kyokujitsusho Medal" from the Ministry of Foreign Affairs of Japan

TGI has long been collaborating with Japanese businesses. Chairman Lin, Por-Fong, in particular, has a long-term relationship with industry associations in Japan and has made significant contributions to the improvement of economic and trade relations between Taiwan and Japan, for which he was awarded the "Kyokujitsusho Medal" by the Emperor of Japan in 2019. Lin's efforts provided a solid foundation for the global visibility of Taiwan's industries and businesses, and opened up opportunities for local businesses to build relationship with international counterparts.

Industrial/commercial organizations	
Chinese National Association of Industry and Commerce, Taiwan	Chairperson
Chinese National Federation of Industries	Director
Taiwan Chamber of Commerce & Industry	Director
The Third Wednesday Club	Vice Chairperson
Cross-strait exchange organizations	
Straits Exchange Foundation	Director
Straits Economic & Cultural Interchange Association	Standing Director
Cross-Strait CEO Summit	Director
Regional economic/trade organizations	
Chinese East Asia Economic Association	Director
Chinese International Economic Cooperation Association	Member
Taiwan-Africa Business Association	Member
Industry-related associations	
Taiwan Glass Industry Association	Convener of board of supervisors
Chung-Hwa Railway Industry Development Association	Member
Taiwan Fire Safety & Material Association	Member
Taiwan Composites Association	Standing Director
Taiwan Weaving Industry Association	Member
Taoyuan City Guanyin Industrial Park Manufacturers' Association	Member
Hsinchu City Industrial Association	Member
Taichung Harbor Related Industrial Park Manufacturers' Association	Member
Changhua Coastal Industrial Park Manufacturer Association	Member
Taiwan Printed Circuit Association	Member
Environmental and sustainable development-related organizations	
Center for Corporate Sustainability (CCS)	Consulting director
Taiwan Green Building Council	Member

Operating performance

Financial performance in the last 3 years (unit: NTD thousands)

Category	Item/Year	2020	2021	2022
Financial performance	Operating revenues	11,758,874	13,152,625	12,595,543
	Operating costs	(10,314,282)	(10,481,615)	(10,611,170)
	Gross profit	1,444,592	2,671,010	1,984,373
	Operating expenses	(1,936,837)	(2,554,931)	(2,084,039)
	Operating profit (loss)	(494,591)	106,323	(19,569)
	Non-operating income and expenses	3,023,426	11,444,975	(466,467)
	Pre-tax profit/loss	2,528,835	11,551,298	(486,036)
	Current net income (loss)/current net income from continuing operations	2,468,521	11,476,678	(720,576)
	Other comprehensive income	1,174,962	213,901	407,309
	Total comprehensive income for the current period	3,643,483	11,690,579	(313,267)
	EPS (NTD) after retrospective adjustment	0.85	3.95	(0.25)
Economic values distributed	Operating costs	10,314,282	10,481,615	10,611,170
	Employee salary and welfare	3,044,111	3,526,175	3,073,262
	Payments to capital contributors	87	1,454,149	4,782,942
	Payments to government authorities	42,753	45,036	88,116
	Social donations	2,538	59,109	10,370
Subtotal		13,403,771	15,566,084	18,565,860

Remark:

1. All yearly financial information above has been audited.
2. The Company has adopted IFRS since 2013.
3. With regards to the 5-year (2014-2018) profit-seeking enterprise income tax exemption granted under the Statute for Upgrading Industries: TGI had applied for exemption for Changpin Factory, Hsinchu TS-7 Furnace, and Taoyuan TT-1 Furnace
4. Operating revenues in 2022 were lower compared to the previous year due to the zero COVID policy enforced in China, which led to weakened demand and a drastic fall in selling price. Meanwhile, outbreak of the Russia-Ukraine war combined with port congestion and container shortages triggered a wave of inflation and surges in the cost of raw materials and energy.

Income tax information (unit: millions; %)

		2020	2021	2022	Average
Pre-tax profit		2,529	11,551	-486,036	-118,356
Income tax expense	Current income tax	2	38	251	76
	Deferred income tax	58	37	-16	12
Effective tax rate (%)		20%	20%	20%	0
Income tax paid		2	4	46	30

Production capacity - 2022

Product	Taiwan		Mainland		Total	
	Furnace	ton(s)	Furnace	ton(s)	Furnace	ton(s)
Float flat glass	2	340,000	11	2,670,580	13	3,010,580
Glass fabric	1	20,000	5	104,000	6	124,000
FRP (fiber glass reinforced filament)	1	80,000	-	-	1	80,000
Glass container	6	165,400	-	-	6	165,400
Total	10	605,400	16	2,774,580	26	3,379,980

Main product sales information - 2022

No.	Product category	Percentage of domestic sale	Percentage of export sale	Revenue weight	Sales destination	Customers
1	Flat Glass	90%	10%	37.16%	Taiwan, Asia, Central/South America, Australia, Europe, Africa, North America	Construction, automobile, furniture, renovation, photovoltaic, bathroom accessories, lighting equipment, gifts, electronics
2	Glass fabric and fiber glass	41%	59%	35.37%	Europe, USA, China, Japan, Korea, The Middle East, Southeast Asia, India, New Zealand, Australia	Electronics, appliances, communication equipment, fishing vessels, pleasure yacht, automobiles, Piping, storage containers, construction materials, rain gear, and plastics processing
3	Glass container	65%	35%	25%	USA, New Zealand, Australia, China, Germany	Alcohol making, food production, pharmaceuticals, dairy production, home appliances, retailing
4	Glass tableware	95%	5%	0.08%	India, Korea, Germany, Australia	
	Glass kitchenware	10%	90%	0.97%	Mainland China	
5	New materials (ultra-thin glass)	5%	95%	1.42%	Mainland China	Photovoltaic, electronics

※ Excludes subsidiaries

Market share - 2022

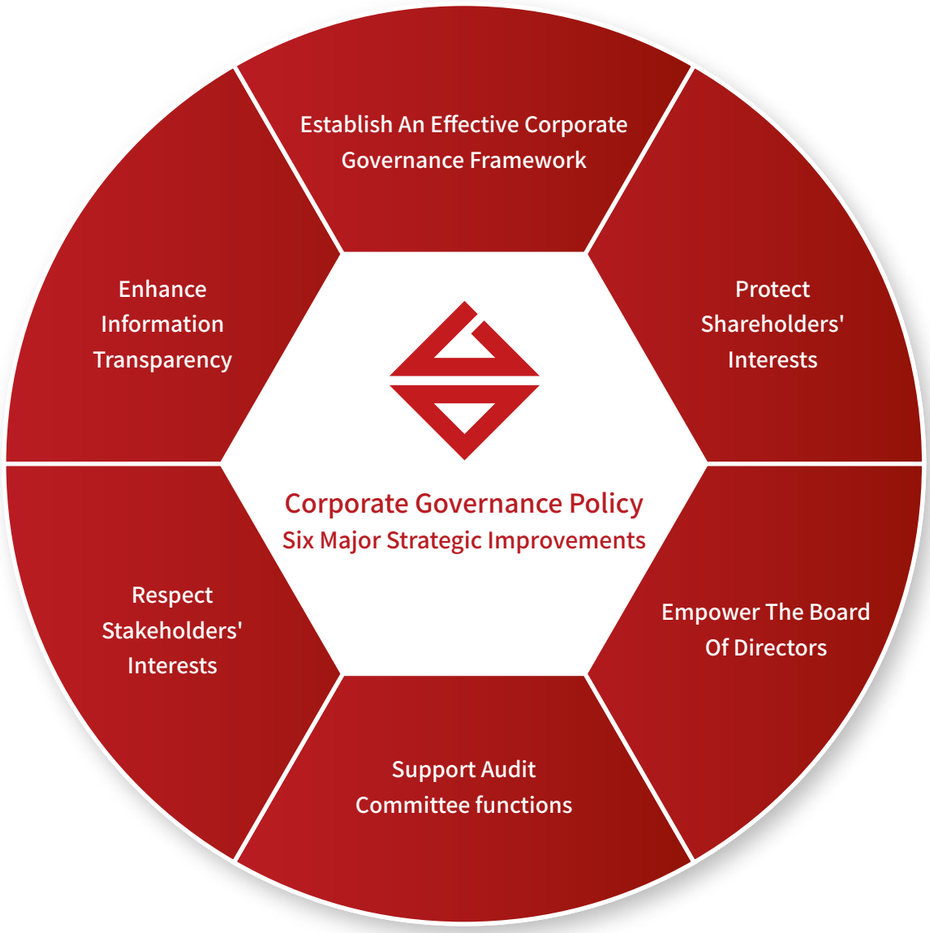
Serial No.	Product category	Market share
1	Flat Glass	65%
2	Glass fabric	35%
3	Fiber glass	55%
4	Glass container	35%
5	Glass tableware/kitchenware	10%
6	New materials (ultra-thin glass)	China10%

2.2

Integrity of TGI

Board of Directors

TGI values the interests of its shareholders and investors, and considers the presence of an honest, transparent, and efficient board of directors to be the foundation of a benchmark business. We believe that sound corporate governance fosters growth and enables us to bring high-quality products and services to the market in ways that increase long-term value and set model examples. We have devised our corporate governance policy in accordance with "Corporate Governance Best-Practice Principles for TWSE/TPEX Listed Companies" and related laws, which incorporate six main strategies:



The board of directors serves as TGI's highest governance unit. The Audit Committee, Remuneration Committee, ESG Committee, and Nomination Committee have been assembled to assist the board of directors with supervisory duties. All committees have had their charters approved by the board of directors, and the chief of each committee makes regular reports to the board regarding activities and resolutions.

The board of directors is the maker of TGI's major operational decisions; its duties include:

- Appointment and supervision of the management
- Overseeing performance of the Company and offering guidance to the management team
- Reviewing the management's quarterly reports on the state of economy, environmental protection, and factory operations
- Maintaining close communication with the management: the management proposes growth strategies while the board of directors examines and evaluates the outcome and expected results, offering advices as deemed appropriate

TGI appointed a corporate governance officer in accordance with laws back in 2019 to oversee "matters relating to board of directors and shareholder meetings," "preparation of board meeting and shareholder meeting minutes," "assistance with directors' duties and ongoing education," "provision of information that is relevant to directors' duties," and "assistance with directors' compliance." The corporate governance officer completed 12 hours of mandatory training in 2022.

Composition of the board of directors

TGI's board of directors had a total of 15 directors in 2022. All directors and corporate director representatives are highly experienced either in corporate management or academics. There were also 3 independent directors on the board. We rely heavily on directors' knowledge, insight, and business judgment for our sustainable management efforts. TGI directors serve a term of three years and are elected during shareholder meetings from persons of adequate capacity. The directors will elect a Chairman from among themselves to represent the Company in all business dealings. The Chairman does not hold the concurrent position of CEO.

The board of directors convenes meetings at least once a quarter. A total of 6 board meetings were held in 2022, and the directors averaged an overall attendance rate of 97%. The Company holds two types of shareholder meeting: the annual general meeting and extraordinary shareholder meeting. The annual general meeting is held once a year within six months after the end of an accounting period, whereas extraordinary shareholder meetings may be held whenever deemed necessary, subject to compliance with relevant laws.

TGI board members

Name	Designation	Date on board	Gender	Concurrent employment at the Company	Professional knowledge and skills					
					Glass industry	Finance and banking	Import and export trade	Commerce and management	Finance	International businesses and trade
Lin, Por-Fong	Chairman	1967-09-16	Male	Yes	V			V		
Lin, r-Shih	Director	1967-09-16	Male	Yes	V			V		
Lin, Por-Chain	Executive Director	1976-04-21	Male	No	V			V		
Lim, Han-Ton	Director	2009-06-10	Male	No		V		V		
Peng, Cheng-Hao	Director	2018-06-13	Male	No			V	V		
Hsu, Li-Lin	Director	2015-06-09	Female	No				V		
Lin, Chia-Hung	Director	2000-04-28	Male	Yes	V			V		
Su, Yu-Te	Director	1996-04-01	Male	Yes	V					
Lin, Chia-Yu	Director	2004-10-06	Male	Yes	V			V		
Lin, Charles Ming	Director	2006-06-09	Male	Yes	V	V			V	
Tsai, Tseng-Ming	Director	2017-10-26	Male	Yes	V		V			V
Lien, Sheng-Wu	Director	2021-07-02	Male	No		V		V	V	
Lin, Sheng-Chung	Independent Director	2021-07-02	Male	No				V		V
Lin, Zui-Yeh	Independent Director	2021-07-02	Male	No			V	V		V
Wang, Yu-Che	Independent Director	2021-07-02	Male	No				V		

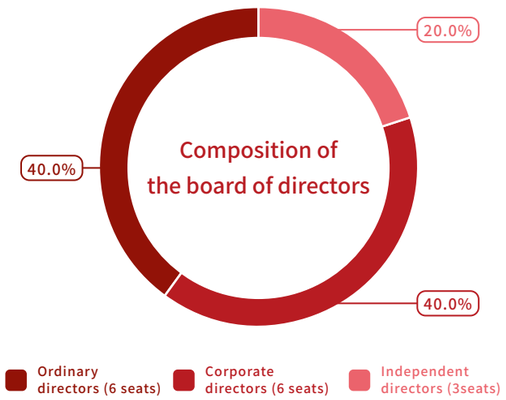
Board diversity

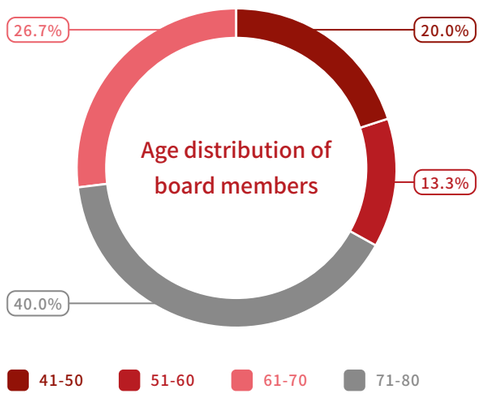
TGI has implemented a "Board Member Diversity Policy" and disclosed details on the Company's website. Board members are selected based on professional capacity and level of commitment while taking into consideration a broad number of diversity criteria including but not limited to gender, age, cultural and educational background, ethnicity, professional experience, skills, knowledge, and duration of service. The average age of TGI's current board members is 64.4. According to Article 20 of "Corporate Governance Code of Conduct," the board as a whole shall possess the following capacities: operational judgment, accounting and financial analysis, business administration, crisis management, industry knowledge, global market vision, leadership, and decision-making.

In the future, the Company will nominate independent directors in line with long-term growth targets and functions of the Audit Committee and Remuneration Committee, while taking into consideration whether the candidates complement each other to improve overall skills, experiences, and knowledge of the board. Candidates of relevant expertise will be nominated to meet the Company's board diversity targets.

Management goals for board diversity policy

At least one-third of directors possess relevant experience and skills in the glass industry Target met V





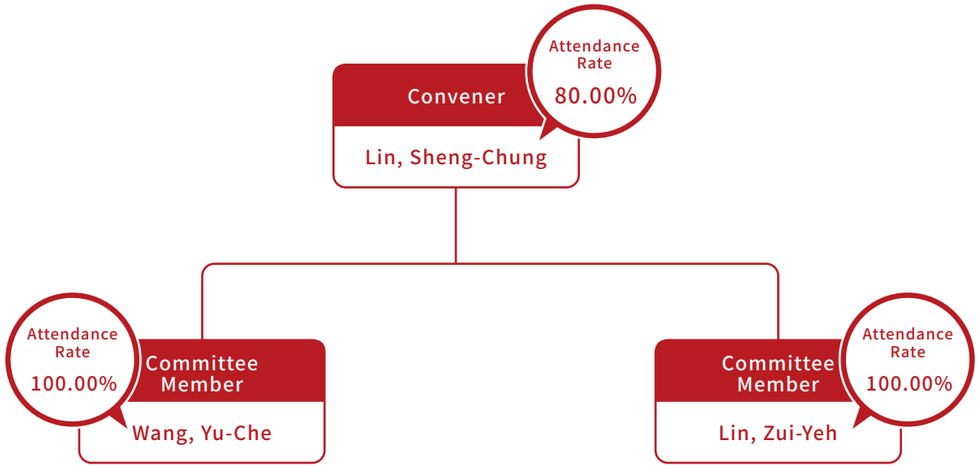
Corporate governance information disclosure

Details of the board diversity policy and implementation are explained in the "ESG" section of the corporate website

The Audit Committee

For the implementation of sound corporate governance, the Company has observed "Regulations Governing the Exercise of Powers by the Audit Committees of Public Companies" and assembled the Audit Committee since August 2015 that comprises all 3 independent directors, including at least one with accounting or financial expertise.

The Audit Committee members



Main duties of the Audit Committee members include:

- Helping the board of directors supervise fair presentation of financial statements
- Appointment (dismissal) of financial statement auditors, and evaluation of independence and performance
- Effective implementation of internal control system
- Compliance with regulations and rules
- Control of current and potential risks

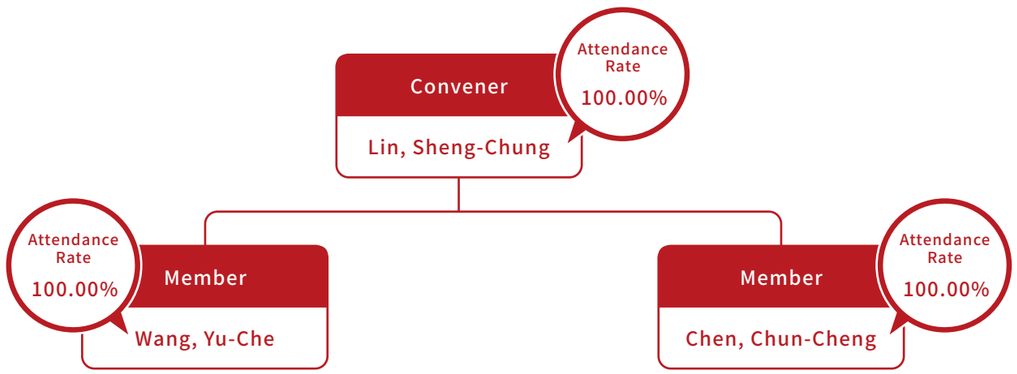
The Audit Committee held 5 meetings in 2022 to address the following issues:

Details of the Audit Committee's function are explained in P.22 of the 2022 annual report

Remuneration Committee

A Remuneration Committee has been assembled in accordance with "Regulations Governing the Appointment and Exercise of Powers by the Remuneration Committee of a Company Whose Stock is Listed on the Taiwan Stock Exchange or the Taipei Exchange" to support a robust salary and compensation system for directors and managers. The committee comprises 3 members including 2 independent directors.

Remuneration Committee members



Duties of the Committee are to evaluate the salary and compensation policy for TGI's directors and managers in the utmost professionalism and objectivity. The Committee then presents its recommendations to the board of directors on issues such as:

- Regular examination of committee charter
- Review of annual and long-term performance targets for directors and managers of the Company, as well as their salary/compensation policy, system, standard, and structure
- Regular assessment on the accomplishment of performance targets by directors and managers, and details and amounts of individual compensation for decision-making.

The Remuneration Committee convened 2 meetings in 2022 to discuss "payment of 2021 compensation to TGI directors and managers," review the "Director and Manager Compensation Policy," and amend the "Remuneration Committee Charter."

Details of the Remuneration Committee's function are explained in P.29 of the 2022 annual report.

Board of directors' compensation system

Directors' compensation includes cash compensation, warrants, stock dividends, retirement benefits, severance pay, allowances of all kinds, and any incentives of material value. This definition is consistent with the scope of directors', supervisors' and managers' compensation stated in "Regulations Governing Information to be Published in Annual Reports of Public Companies."

Directors' remuneration is allocated in accordance with Article 26 of the Articles of Incorporation and linked to the Company's profit and operational performance. Profits concluded from a year are subject to employee remuneration of 1.5% and director remuneration of no higher than 1.5%. However, profits must first be taken to offset against cumulative losses, if any.

Aside from the above, no other compensation program, retirement benefit, severance pay, or clawback arrangement was applicable to directors.

The salary policy for 2022 was determined without direct inquisition for stakeholders' opinions. In the future, the Company will engage stakeholders and gather opinions to serve as reference.

Compensation system for senior managers

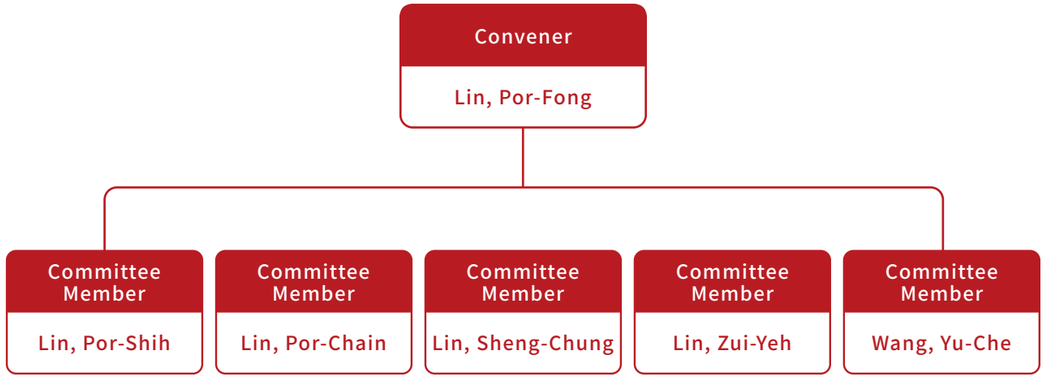
The Company has established its Senior Managers Compensation Management Policy in accordance with internal rules. Senior managers' compensation determined based on job duty, responsibilities, performance, management capabilities, and current market levels. Managers' compensation includes monthly fixed salary, bonuses, and pension. The performance evaluation system has been reviewed and approved by the Remuneration Committee, and implemented with the resolution of the board of directors.

Compensation of the Company's directors, independent directors, and managers and association with performance are explained in P.19 of the 2022 annual report

Nomination Committee

A Nomination Committee has been assembled in accordance with Corporate Governance Best-Practice Principles for TWSE/TPEX Listed Companies since 2016 to support the director nomination system. The Nomination Committee has a total of 6 members. The Nomination Committee operates under the delegation of the board of directors and helps the board with the search, review, and nomination of director candidates. The committee also contributes to the development of a robust board structure, and ensures optimal composition of board members. When determining board composition, the Nomination Committee would consider diversity from a number of perspectives including but not limited to gender, age, culture, education, ethnicity, professional expertise, skills, knowledge, and duration of service to ensure that the board has the diversity needed to support sustainable and balanced growth. Details of the Nomination Committee's function are explained in P.30 of the 2022 annual report.

Nomination Committee members



Please visit the TGI website for the Nomination Committee, the Audit Committee, and Remuneration Committee Charters and a detailed description of their duties

Click or scan QRCode

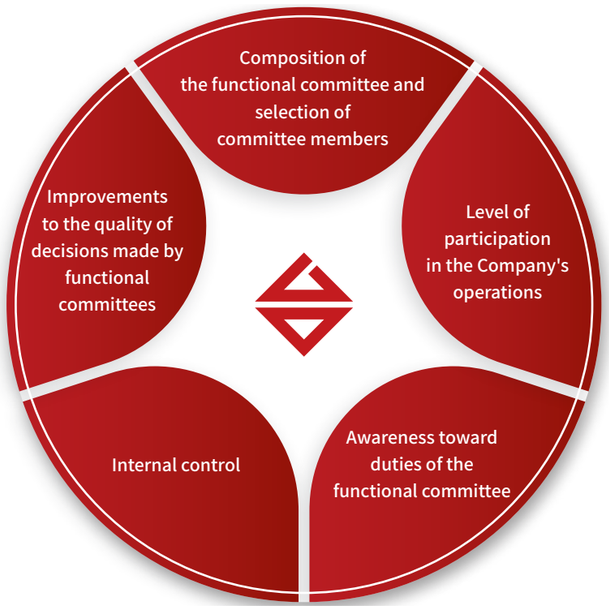
Board of directors performance assessment

In an attempt to enforce sound corporate governance practices and procedures and to empower the board of directors for more sophisticated duties, TGI passed a set of "Board of Directors Self-assessment or Peer Assessment Policy" in 2021 that serves as guidance for the evaluation of board of directors' and functional committees' performance. The Company also issues performance self-assessment questionnaires to individual directors and functional committee members, and gathers opinions from peers as well as outside experts to establish individual directors' understanding of corporate issues and determine how the board operates as a whole. The policy was renamed "Board of Directors Performance Evaluation Policy" late in 2022, and it requires internal performance evaluations to be conducted by the board on its performance as a whole, as individual directors, and by functional committees on a yearly basis, and external evaluation is to be conducted by professional institutions, experts, or scholars at least once every 3 years. Outcomes of the performance evaluation will be presented to the board of directors to serve as reference for decisions regarding compensation, nomination, and renewal, and to facilitate goal-setting for improved board efficiency.

Board of directors internal self-assessment

A total of 23 assessment indicators covering six main aspects, including: directors' awareness towards the Company's goals and missions, awareness to their respective duties, level of engagement in the Company's operations, maintenance of internal relations and communication, continuing education, and enforcement of internal control system, were used to evaluate board performance. The outcome of the 2022 overall assessment was "Good", and the board will continue making improvements to low-scoring aspects while encouraging directors to undergo continuing education.

Five main assessment indicators for functional committees (The Audit Committee and Remuneration Committee)



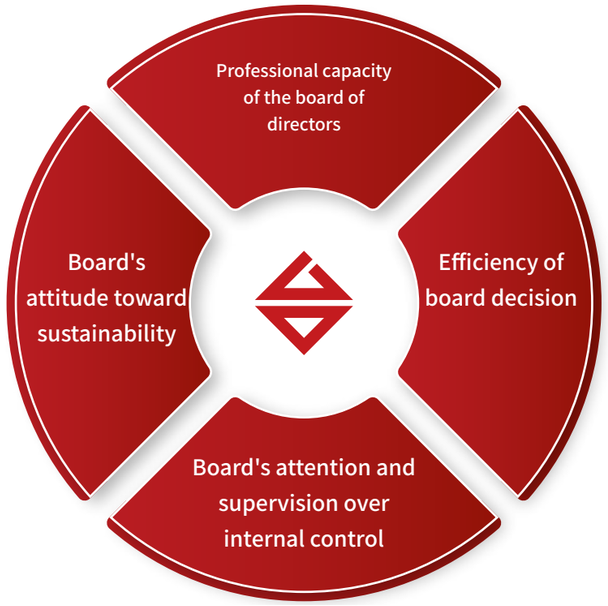
Outcomes of the 2022 board internal assessment, the Audit Committee members performance assessment, and Remuneration Committee members performance assessment were reported during the board of directors meeting held in the first quarter of 2023. Performance scores are explained below:

Assessment aspect	No. of assessment indicators	Assessment score (out of 5)
Board internal performance assessment	23	4.88
Audit Committee	22	4.93
Remuneration Committee	19	4.94

Board external performance assessment

To ensure the objectivity and validity of board of performance assessment, TGI engaged "Taiwan Institute of Ethical Business" to conduct external assessment on board performance for 2022. The Company then followed the Institute's recommendations to devise and implement measures aimed at optimizing current practices.

Four main aspects of external performance assessment



Of which, "Board's attitude toward sustainability" encompasses several indicators including disclosure of ESG information, talent development plan, succession plan, and continuity practices.

Execution of board performance evaluation is explained in detail in P. 21 of the 2022 annual report.

Functionality of TGI's board of directors

Board independence and avoidance of conflict of interest

Avoidance of conflict of interest

The Company has established a recusal system for directors as part of its “Board of Directors Conference Rules.” Directors are required to disassociate from all discussion and voting, but may express opinion and reply, on any board meeting motion that poses a conflict of interest between the Company and themselves or the entities they represent. Furthermore, they are prohibited from exercising voting rights on behalf of other directors on such proposals.

Directors are expected to uphold a high level of discipline, and voluntarily recuse themselves from discussing and voting on any board meeting motion that poses a conflict of interest between the Company and themselves. Furthermore, they are prohibited from exercising voting rights on behalf of other directors. Directors are expected to exercise self-discipline and refrain from supporting each other in inappropriate ways.

In addition, we have independent directors in place to provide objective views based on their professional experience when deciding on future strategies. These opinions are fully taken into consideration during board discussions, and the reasons for any agreement or disagreement with such opinions are recorded in meeting minutes. This conflicting interest principle serves to protect the Company's interests.

Directors' independence criteria and conformity with such criteria are explained in detail in P.12-13 of the annual report.

Directors' ongoing education

All members of the board undergo continuing education to enhance board performance, enforce sound governance, and learn the latest trends that are relevant to improving corporate sustainability. Board members complete a broad variety of training courses organized by external institutions such as Chinese National Association of Industry and Commerce, Securities and Futures Institute, Taiwan Corporate Governance Association, Taiwan Academy of Banking and Finance etc. for at least 3.0 hours, and averaged 4.0 hours overall. The courses completed covered topics such as IoT, information security protection, financial crime, corporate governance, anti-tax evasion etc.

Board of directors election system

TGI has established a "Directors Election Policy" in accordance with The Company Act and Articles of Incorporation. The election is carried out by way of a candidate nomination system using registered votes. Votes may be registered using shareholder ID instead. Under the nomination system, shareholders will elect from a list of candidates those that best protect their interests. Directors' may be re-elected. TGI directors serve a term of three years. The directors elect a Chairman from among themselves to represent the Company in all business dealings.

Shareholder communication and shareholders' interests

The Company values communication with shareholders and devotes significant attention to shareholder service as part of its response to stakeholders. TGI holds two types of shareholder meeting: the annual general meeting and extraordinary shareholder meetings. The annual general meeting is held once a year within six months after the end of an accounting period, whereas extraordinary shareholder meetings may be held whenever deemed necessary, subject to compliance with relevant laws. TGI has created an "ESG" section on its website to disclose financial, business, and corporate governance information in a timely manner. Furthermore, contact information is provided to shareholders and investors to facilitate routine communication and to address shareholders' suggestions.

Business integrity and anti-corruption

TGI values business integrity as part of its corporate culture, and has implemented "Business Integrity Code of Conduct," "Illegal, Unethical, and Dishonest Conducts Reporting Policy," and "Employee Service Integrity Code of Conduct" with board of directors' approval to enforce integrity. The Company has also developed robust corporate governance and risk management practices to ensure continuity of its business activities.

The Company has legal affairs and internal audit units in place; the legal affairs unit is staffed with 4 members and the internal audit unit is staffed with 4 members. Responsibilities of the two units are to ensure compliance with laws such as The Company Act, Securities and Exchange Act, Anti-Corruption Act, Government Procurement Act, regulations applicable to TWSE/TPEX listed companies, and other regulations on business dealings across all internal departments while carrying out various duties. This compliance serves as the prerequisite for business integrity. Conduct that employees are bound to comply with include but are not limited to the following:

(1) Reject vendors' benefits and gifts as a principle.
(2) Acceptance of vendors' benefits must be reported and approved in advance; any money and gifts received must be immediately reported and surrendered.
(3) Refrain from exploiting the vested authorities for private monetary dealings with vendors.

TGI handles all external donations and sponsorships in accordance with applicable laws and internal standard operating procedures to prevent offering and acceptance of bribe and making of illegal political donations. TGI made no political donation in 2022.

Enforcement of business integrity for the year

TGI has a human resources unit staffed with 6 employees that is responsible for organizing regular internal training on business integrity as well as orientation training for new recruits, so that all employees may comprehend what is expected of them. The HR unit also makes regular disclosures on the execution of Business Integrity Code of Conduct over the Company's website, annual report, and prospectus. TGI employees committed no corruption, bribery, extortion, or any other action in violation of integrity in 2022.

All employees had signed the "Employee service integrity code of conduct" as of November 2015. All 202 new permanent employees recruited in Taiwan in 2022 had signed the document, representing a 100% completion rate. The Company also conducted training on business integrity-related topics in 2022 (Including employee handbook, policies, and corporate social responsibilities), which received a total of 1,176 enrollments and delivered 1,075 training hours.

Business integrity training and awareness

No. of Completions:	Training Hours:
1,176	1,075

Employee Service Integrity Code of Conduct

No. of New Recruits Signed:	Completion Rate:
202	100 %

Whistleblower system and grievance system

TGI has robust accounting policies and internal control systems in place to establish reasonable assurance that all internal departments uphold business integrity and are able to comply with relevant regulations while pursuing growth. Furthermore, to duly enforce Article 20 of the Company's Business Integrity Code of Conduct, TGI's board of directors passed a set of Illegal, Unethical, and Dishonest Conducts Reporting Policy in 2018 that outlines the internal unit responsible for receiving misconduct report, the whistleblowing channels available, and the handling procedures. We have disclosed employee grievance e-mail and hotline on Intranet pages, and set up e-mails, hotlines, and written correspondence channels that employees may use to raise complaints and suggestions at any time. The identity of whistleblower and details of each misconduct report are kept confidential. TGI received no report on violation of business integrity in 2022, whether through internal or external channels.

Grievance channels	Contact information	Handler
E-mail	ad@taiwanglass.com	Audit Office
	pn@taiwanglass.com	Human Resources Department
Grievance hotline	02-2715-8051	Audit Office
	02-2715-8060	Human Resources Department
Grievance via written correspondence	11F, No. 261, Section 3, Nanjing East Road, Songshan District, Taipei City	

TGI website

Terms of the "Business Integrity Code of Conduct," "Illegal, Unethical, and Dishonest Conducts Reporting Policy," and "Employee Service Integrity Code of Conduct" are disclosed on the TGI website

In 2022, TGI invited representative from the Investigation Bureau to promote awareness on "anti-corruption" and "business secrecy" for a total participant size of 26.

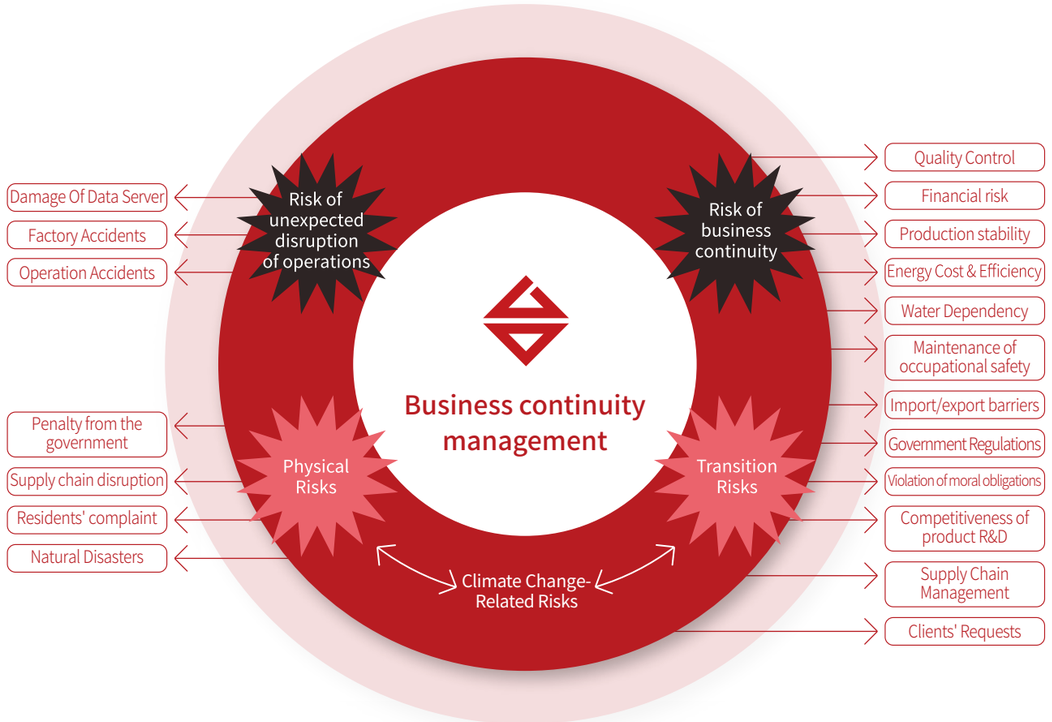
Internal audit

TGI's Audit Office operates independently under the board of directors. In addition to making routine reports at board of directors meetings, internal auditors also present reports to the Chairman, the Audit Committee, and independent directors on a regular basis and at times deemed necessary. A total of 33 internal audits were completed in 2022, and no abnormality was found.

TGI has devised internal audit implementation rules in accordance with "Regulations Governing Establishment of Internal Control Systems by Public Companies" to facilitate the review and assessment of internal control system, operational results, and efficiency, so that improvements and suggestions can be raised in time to ensure that the internal control system continues to be effective. The scope of internal audits cover all operations of the Company and subsidiaries. Based upon the risks identified through regular or special audits, the Company is able to evaluate the effectiveness of its internal control system and issue Declaration of Internal Control System.

2.3 Risk Management

The ESG Committee is responsible for overseeing risk management on an organization level. TGI requires its internal departments to conduct comprehensive reviews of relevant risk issues, adopt robust risk management practices, and implement appropriate measures for improved corporate governance, performance, and continuity. Our goals for the identified risks are to minimize chances of occurrence and impact.



- Enhance Risk Manage Practice
- Lower Business Risk Exposure
- Strengthen Crisis Management Capacity
- Adopt Sustainable Management

Risk Management

Risk category	Risks	Impacts or future responses
Financial risk	Financing risk	Maintain banking limits and negotiate with banks for more preferential financing rates to reduce funding cost and maintain optimal capital structure.
	Liquidity management risk	Increase interest income from liquid capital and optimize yield and availability of liquid capital.
	Interest rate risks	We have always maintained a strong financial position and used it as strong leverage to bargain and negotiate with financial institutions for favorable terms. We also maintain close communication with banks to gain access to preferential borrowing rates.
	Risks of exchange rate change	Exchange rate risks associated with purchases and sales denominated in non-functional currencies are offset against each other, therefore the Company is not exposed to significant exchange rate risk.
	▶ High-risk and highly leveraged investments ▶ Loans to external parties ▶ Endorsements and guarantees	The Company did not engage in high-risk or highly leveraged investments in 2022, and neither did it lend capital to external parties. Loans, guarantees, and endorsements were granted only to Mainland subsidiaries for factory construction or working capital.
Business risks	Legal risks	TGI checks regulatory updates on a monthly basis to ensure compliance with relevant laws. The Company has implemented an internal control system on legal risks, and as internal control requirements tighten, the system has been expanded to cater for contract review and related policies. All contracts are turned into digital format and presented to Legal Affairs for review. Examples: Regulation Governing Reporting of Greenhouse Gas Emission, Reclaimed Water Resources Development Act, Water Supply Act, Water Act, employment dispute, and work safety incidents.
	Procurement risk	Internal control and audit systems have been implemented to enhance internal risk prevention and control. Procurement and tender information is made transparent online. All procurement orders and contracts are reviewed and verified by Legal Affairs. TGI conducts investigations on suppliers' brand, reputation, size, performance, and ability to accommodate with ad-hoc requests. The quality control department and the department-in-use will visit suppliers if necessary to learn and evaluate whether they meet the quality, delivery capacity, technology capability, after-sale service capacity, and price expectations of the company. All factories maintain a minimum inventory of raw materials (2-3 months for foreign supplies and 2-4 weeks for domestic supplies); supply of important raw materials is secured using long-term contracts; vendors have been instructed to make deliveries at the timing and in quantities needed by various factories.

Risk category	Risks	Impacts or future responses
Business risks	Cost risks	TGI evaluates how new regulation affects costs, and explores ways to save costs and expenses. Examples: Imposition of water conservation charge and carbon tax, supply and safety of products and raw materials, and impact of globalization on raw material supply and competition. Production units used to draw water through pumps, but now draw water using in-factory pressure differential. These improvements have the potential to increase the water conservation rate, and have been completed to date.
	Risk of customer complaint	TGI renews non-life insurance coverage on a yearly basis and progressively increases premiums to expand scope of coverage. TGI actively communicates with customers to keep up-to-date on market trends and demand, and maintains tight control over product quality.
	Product recall risk	Tightening requirements of the U.S. FDA poses additional risks of product recall, and the Company purchases additional insurance coverage as a way to mitigate the impact of product recall risk.
	Information security risks	The Company handles enormous amounts of data including confidential documents. Data is backed up daily and access rights are configured on systems to protect information against leak and to ensure that it is used only by appropriate personnel. TGI organizes information security training every six months to help employees develop the basic awareness they need to avoid cyber attacks, and thereby minimize occurrence and damage of information security incidents.
	Human resources risk	TGI offers salary packages that are more favorable than the laws require, and makes adjustments based on regular reviews of the labor market. TGI uses a wide range of channels to recruit suitable talents. TGI introduced a ‘Counselor system for new recruits’ in which the Company assigns experienced employees to guide and teach new recruits. By enabling mutual assistance between employees, the Company hopes to shorten the learning curve and ultimately increase employees' retention rate. A robust training system has been established based on organizational strategies and analysis of needs to help adapt to the changing environment.
	Production risk	To ensure continuity of the production line, it is essential to implement uninterrupted designs for the supply of raw materials, fuel, and energy. Policies have been implemented to maintain safety stock of raw materials; as for fuel, TGI has taken the initiative to construct a natural gas combustion system that runs concurrently with and as a backup to the existing oil-based system.With regards to energy source, TGI primarily uses electricity and has uninterrupted power supply available to support critical equipment.

Risk category	Risks	Impacts or future responses	
Business risks	Raw materials risk	Glass production is highly sensitive to changes in formula. All raw materials fed into the furnace must be strictly controlled, as incorrect use of formula will result in heavy losses.	**Risks** ▨ Placing raw materials into the incorrect warehouse ▨ Contamination of the raw materials storage site **Risk events** ▨ Formula error may result in the output of non-conforming products **Risk mitigation measures** ▨ Rigorous warehousing control ▨ Regular sample check on the content of raw materials stored on site ▨ Personnel training ▨ Raw materials are stored at separate locations, and any change of location is subject to prior approval ▨ Item name is duly labeled on the external package and inspections are properly performed
	Environment and safety risk	The Work Safety Section devises emergency response plans and investigates environmental incidents to address possible environmental and safety-related emergencies at factory premises. The Factory Affairs Section plans training programs and assists internal units with the execution. Each factory has established its own "Emergency Response Plan" to address accidents such as fire, failure of waste treatment facility, air pollution, major leakage of oil or chemical substance, explosion etc, The Work Safety Section may amend the Emergency Response Plan depending on the state of each factory.	**Level 1** Incident occurs ▼ On-site emergency response ▼ Determine whether the incident can be effectively controlled on the spot ▼ **Level 2** Emergency broadcast/reporting through reception or security staff ▼ Divide in groups and execute emergency resepons plan ▼ Determine whether the incident can be effectively controlled on the spot ▼ **Level 3** Request for outside support ▼ Execute rescue and disaster response tasks ▼ Disaster response ends; emergency response plan deactivated ▼ Review

TGI started paying attention to climate-related risks in 2021 due to increasing severity of the consequences of climate change. After adopting the framework of Task Force on Climate-related Financial Disclosures (TCFD), the Company conducted evaluations across factory facilities and has identified climate change-related risks including: risk of tightening environmental regulations, risk of rising cost of raw material/energy, and risk of extreme weathers and natural disasters. Impacts are primarily attributed to two main causes:

- Transition risk: Market change and tightened regulation associated with climate change.
- Physical risk: Climate change gives rise to natural disasters that may cause factory workers to become injured or trapped, or damage equipment in a way that ultimately disrupts operations.

With regards to the transition risks associated with climate change, TGI has long been keeping up with regulatory amendments and taking preemptive responses for them. Meanwhile, the Company monitors changes in the market price of raw materials and customers' demand for low-carbon solutions so that adjustments can be made to achieve growth. All of TGI's factories have implemented emergency response procedures and business continuity plans to address risk of disaster, and thereby ensure the continuity of its operations. This year, we have adopted TCFD's management system to simulate and analyze climate risks (please refer to section 4.4 Climate action for an overview of the analysis and the final outcome). By examining climate risks using international standards, we hope to plan our responses ahead and minimize impact on our operations.

Intellectual property management

TGI has devised intellectual property strategies in line with operational goals to support its search for new glass applications and development of high value-adding products and production technologies. The Company has progressively introduced new measures to manage intellectual properties since 2021, and an "Intellectual Property Rights Management Policy" has been established to guide the management of intellectual properties within the group. Meanwhile, intellectual property management plans and targets have been established in association with operational goals to optimize IP investment, IP planning, IP contracting, and raise IP awareness.

Legal Affairs is responsible for the maintenance and use of patents and trademarks. The department takes regular count, maintains records, and examines the validity of patents and trademarks, and applies for extensions as needed to ensure rightful claim over patents and trademarks, and to identify and prevent possible disputes ahead of time.

The Legal Affairs Department may be required to cooperate with a law firm that specializes in intellectual property rights to protect TGI's trademarks, patents, and production procedures. Depending on the requests of internal units, the Company may engage the law firm to search and apply for patent/trademark registration locally and abroad, and perform subsequent maintenance works. The information security department will be involved and internal work rules will be amended to prevent leak of intellectual property. An intellectual property management unit has been assigned to make annual briefings to the board of directors on "intellectual property management plan and execution." Outcomes for 2022 are explained below:

Intellectual property	Number acquired						Application in progress
	Taiwan	China	Japan	USA	Germany	Total	
Patent	46	4	1	2	2	55	7
Trademark	87	30				117	1

Information security management

The Information Security Department (formerly "Information Security Task Force") of Taiwan Glass (TGI) is responsible for formulating, promoting and implementing relevant policies such as information security and risk management, and reviewing the effectiveness of the Company' s information security management, information security-related issues, and directions. The Department currently has one information security director, one information security supervisor, and two information security officers.

Chairman

CEO/President

Administration Headquarters

Information Security Department

Information Security Director

Responsible for the enforcement, coordination, approval, and supervision of information security management-related matters within the Company.

Head of Information Security Department

Responsible for: planning and supervision of information security response; investigation of cause of incident; evaluating the scope of impact and losses; execution of emergency response measures; crisis reporting; execution of solutions; establishment, implementation, and evaluation of policies, plans, and protocols concerning information security; and arrangement of information security meetings.

Information Security Department personnel

Responsible for: planning and supervision over the gathering of information security data; establishment of system security levels; implementation of information security measures; execution of information security monitoring; and management tasks concerning protection, auditing, and use of confidential information.

Information security management strategies and framework

In 2022, TGI established a set of "Information Security Management Guidelines" and developed an effective information security system supported by appropriate management practices, organization, and equipment to maintain continuity of all businesses and operations. The guidelines are based on the PDCA (Plan → Do → Check → Act) cycle, and are intended to facilitate reviews over the appropriateness of information security policy, protection measures, and execution outcome. Appropriate information security technologies and equipment will be introduced at the proper time to comply with regulations and keep up with the latest information security protection requirements.

Plan

Plan an information security management system in line with the Company's business development requirements that aims to protect against information security risks and minimize security threats for business continuity

Do

The Company has built a multi-level information security protection system as we continue to enhance the integration of information security defense technology and control mechanisms to ensure that important operational processes for business, production, procurement, finance, stock affairs, human resources, and documents can operate normally, ensure the confidentiality, integrity, and availability of the Company' s important assets.

Check

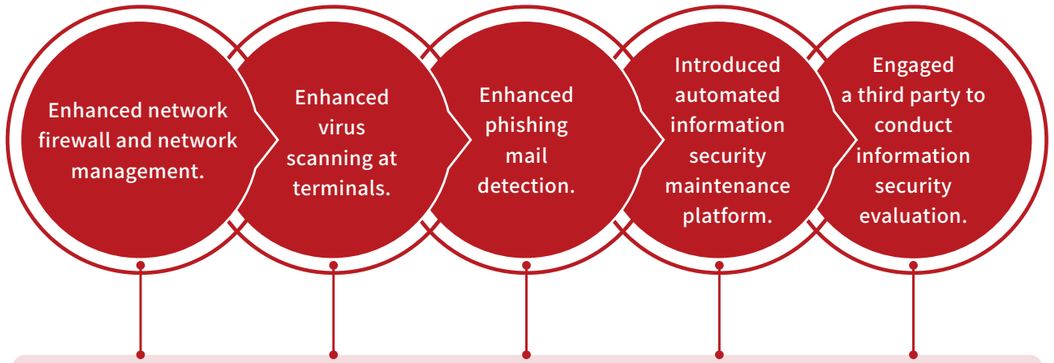
Enforce evaluation as well as internal and external audits and supervision; examine information security weaknesses based on audit findings and make enhancements accordingly

Act

Actively monitor information security management performance to ensure that current practices continue to be effective; organize regular training and conduct drills on cyber attacks to raise employees' awareness to information security protections.

Under the framework of "Information Security Management Guidelines," the Company promotes "information security training and awareness" on four main aspects including: "security of information/communication environment and equipment," "security of network communication," "security of information system development," and "data security."

TGI's information security protection measures



Minimize damage of potential information security risks where possible to maintain proper functioning of the Company, and protect the interests of key stakeholders including customers, shareholders, suppliers, and employees.

TGI had planned and tested several information security protection measures in 2022, and plans to introduce them in 2023 for enhanced information security. Being an active member of Taiwan Computer Emergency Response Team/Coordination Center, TGI is able to receive and exchange intelligence on information security and work with other participants to enhance information security protection at the industry level. In the future, TGI will adopt frameworks that conform with the latest ISO 27001 - Information Security Management System standards, and adopt a systematic approach toward revising and enhancing the information security management. TGI did not encounter any major information security event in 2022 that resulted in losses.

Information security training and goals

TGI commits significant resources into information security training with the hope of improving employees' information security protection awareness. Information security management budgets totaling NT$1,987,527 were committed in 2022 to strengthen information security equipment and measures.

Meanwhile, more pro-active efforts will be made to carry-out training and promotion related to information security, including the training of 154 internal instructors whose responsibilities are to convey the importance of information security, and use case reviews to improve employees' ability to identify information security issues, avoid falling into information security traps, and effectively enhance their awareness of information security protection.

Topic	Course content	Enrollments
Information security seminar (North Taiwan Branch)	Information security management Communication security Avoidance of malware Protection of personal data	27
Information security seminar (Taoyuan Factory)		23
Information security seminar (Hsinchu Factory)		33
Information security seminar (Taichung Factory)		22
Information security seminar (Lukang Factory)		24
Information security seminar (TF4 Factory)		11
Information security seminar (Changpin Factory)		14
Total head count		154

Information security seminar

Information security training at Taichung Factory and Lukang Factory

Protection of customers' confidential information

The Company has established "Personal Data Security Management Policy" along with relevant rules in accordance with the "Personal Data Protection Act" to enforce personal data security management. Furthermore, all new recruits are required to undergo orientation upon commencing duty, during which they are taught on the protection of personal data. As for internal instructors, they are required to undergo training on information security every six months and training on personal data protection every year to minimize potential legal risks, protect customers' interest, and improve employees' ability to deal with information security incidents.

We are also dedicated to protecting customers' confidential information, and prevent data leaks by enforcing strict controls over the access right of information equipment. All employees have the duty to keep customers' secrets and exclusive information entrusted to TGI, and are prohibited from obtaining customers' data in any improper way. The Company provides employees with regular training on information security and has imposed strict requirements on the use of computer password, thereby ensuring conformity with Subparagraph 3, Paragraph 11 of Authorized Economic Operator (AEO) Guidelines. TGI Group encountered no violation of customers' privacy or loss of customers' data in 2022 that resulted in major complaint or violation.

Personal data security seminar

Personal data security seminar

In 2022, TGI's Legal Affairs Department organized a seminar to promote awareness on "personal data protection" issues, during which it instructed participants to keep track of personal data under management and to rehearse proper responses for personal data incidents, and thereby avoid violation of laws from personal data leak. The seminar received total participant count of 27.

03

Service Excellence and Product Innovation

3.1 TGI Products

3.2 Product Quality

3.3 Innovative R&D

3.4 Customer Service

3.5 Sustainable Supply Chain

Product Responsibility Performance of 2022

0 case

TGI committed no violation against product health, safety, labeling, or marketing regulations in 2022

100 %

- 100% of flat glass products had passed CE (Europe), ANSI (USA), and CNS (Taiwan) standards
- 100% of fiber glass products had complied with RoHS and REACH requirements
- 100% of glass container products had complied with Sanitation Standard for Food Utensils, Containers and Packages in Taiwan and the FSSC 22000 standards

-30 %

Low-E glass products reduce air conditioning energy consumption by 30%

-12.5 %

Lightweight bottle technology not only reduces product weight by 12.5%, but also makes products 100% recyclable and reusable

0 case

TGI encountered no violation of customers' privacy or loss of customers' data in 2022 that resulted in complaint

14 case

With regards to food grade fiber glass applications, the Company had 4 products that complied with US FDA regulations, 8 products that passed EU 10/2011 and BfR certification for drinking water in Germany, and 2 products that met the CAS drinking water requirements in France

3.1

TGI products

TGI's main products include flat glass, fiber glass, and glass container, tableware, and kitchenware. The Company has also been active in the development and manufacturing of new products in recent years. Production activities take place primarily in Taiwan and Mainland China; products are marketed mainly to areas including Taiwan, China, Japan, Korea, North America, The Middle East, Australia, Europe, and South Africa. None of TGI products were found to have violated product health, safety, labeling, or marketing regulations in 2022, and no product was banned from sale. TGI was not involved in any lawsuit concerning anti-competition, anti-trust, or anti-monopoly in 2022.

Private brand - TG

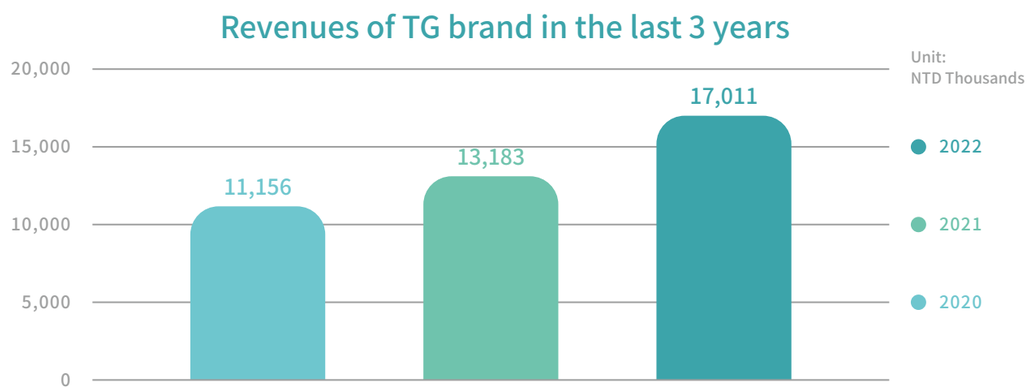
TGI rivals the best in the world in terms of container, tableware, and glassware production technology. It markets products under the proprietary brand, TG, to consumers who are highly aware of lifestyle quality. In an attempt to shape our own brand identity and product style, we have invited world-renowned designer Naoto Fukusawa to bring new life into our glass products by incorporating Japanese craftsmanship, his observation of the Taiwanese culture, his appreciation for relationships with people, his feelings toward the Taiwanese people, and elements of "kindness," "balance," and "nature" into the design.

TG

Since 2019, TGI has been producing a line of stylish, heat-resistant glassware for water, coffee, and alcohol that aims to promote Taiwan's local culture. Made with techniques accumulated for more than half a century, these glassware products are being marketed under a new brand and have been tasked with the mission to compete in the global market. In the future, we aim to work with Taiwanese designers and artists from different fields to bring local culture into the "TG" brand, and create a broader range of glassware featuring classic designs that reflect Taiwan's culture.

The TG brand includes products such as water glass, coffee mug, wine decanter, tea pot, dining utensil, and home decorations; they are made with materials including glass, ceramics, stainless steel, and acacia. The number of product items under TG was increased from 113 to 123 in 2022, and the Company has plans to expand product portfolio to more than 200 items.

Brand revenues



TG flagship store

The TG flagship store opened on December 15, 2020 on the first floor of Taiwan Glass (TGI) Building on Nanjing East Road. The interior space design was jointly completed by Naoto Fukasawa from Japan and architect Jen-Suh Hou of Ho+Hou Studio Architects from Taiwan. Naoto Fukasawa even designed a new glass collection, labels, packaging, and indoor layout specifically for the flagship store, making it Fukasawa's first retail store project in the world that he has designed from head to toe. The display window showcases photographs of TG products produced by Tamotsu Fujii, reputable commercial photographer from Japan.

TGI even established a new "Loobah Restaurant" in 2021 where consumers are able to try out TG tableware for themselves, and offered consumers an experience space that combined glass aesthetics and gourmet food.

The restaurant uses "have a nice meal" as its core concept with the most familiar national delicacy of Taiwan, braised pork rice, and adds Taiwanese hand-cut pork with skin, shallots, brown sugar, and premium soy sauce to stir fry the rice until it melts in your mouth. It is served with the perfect combination of Chen Sie He Chi Shang Rice's grainy and chewy rice for a satisfying culinary experience. The tableware and the space jointly designed and created by Taiwan Glass brand "TG" and Naoto Fukasawa has a comfortable dining atmosphere that allows people to "have a nice meal" at "Loobah Restaurant," making the most simple and purest ordinary food as the first step into the aesthetics of life.

Improved product packaging and design

Driven by strong awareness for sustainable values, the Company prints packaging labels using environment-friendly ink made with soybeans that are free of heavy metals for all TG products, and has been tested and certified by SGS for the use of eco-friendly ink. TG product packaging won Red Dot Design Awards in 2021 due to the use of excellent materials, outstanding designs, strong emphasis on eco-friendly features, and absence of any materials that contain environmental hormones, emit plastic particles, or have concealed cladding.

Red Dot Design Awards

Eco-friendly ink certificate

Awards

The TG brand has won awards during the 2021 30th Taiwan Excellence Awards "Design Selection - Water Appliance Series," "Design Selection - Tableware Series," "Design Selection - Home Decoration Series," "Design Selection - Tea Series," "Design Selection - Coffee Series." "All product series" were named as 2021 Japan Good Design and was nominated for the "Best 100" Special Award.

TG's "All product series" won the 2021 Red Dot Design Awards

"All product series" won 2021 Japan Good Design and Nominated for the Best 100 Special Award.

30th Taiwan Excellence Awards

Being Taiwan's most iconic glass manufacturer, TGI is dedicated to perfecting consumers' lifestyle, which is why it has collaborated with renowned designer Naoto Fukasawa from Japan to create a new line of products under the proprietary brand TG, by combining more than half a century of glass-making experience with the world's best design aesthetics.

The "Designer's Collection" of TG glass is characterized by unobtrusive and simplistic outlines that carry Naoto Fukasawa's concept of "Without Thought." In the absolute subtlety, every curve of each piece has been thoughtfully designed to blend naturally into our daily lives, and can only be appreciated by those who use them.

With the affirmation of Taiwan Excellence Awards, we aim to work with Taiwanese designers and artists from different fields to bring local culture into the "TG" brand, and create a broader range of glassware featuring classic designs that reflect Taiwan's culture.

Taiwanese Local Culture — Yingge Ceramics

To promote the local culture of Taiwan, TG combined its excellent designs with Yingge’s ceramics to launch a series of Yingge ceramic products that includes coffee cups and plates, Chinese rice bowls, salt and pepper shakers, teapots, bouillon cups and plates, and ceramic tea cups. Every ceramic utensil relies on decades of experience and strict standards, and an insistence on using hand fettling to refine the details.

Ceramic Whiteware Espresso Cup and Plate Set

The unique handlebar design helps relieve weight on the knuckles, making the espresso cup stable and easy to hold.

Ceramic Whiteware Teapot

The heat transfer and heat preservation characteristics of the ceramic whiteware teapot is appropriately achieved, making the occurrence of chemical reactions with the tea very unlikely.

Ceramic tea cup

These cups have a clear and smooth surface, have good heat dissipation and air permeation characteristics, making them suitable for clearly appreciating the color and appreciating the warmth from the tea.

Brand value

The Company currently has a total of three direct retail branches in Taiwan: the Taiwan Glass (TGI) Flagship Store, "TG Mart" at Xue Xue Taste Lab, and Xinyi Eslite. There are approximately 40 domestic and foreign entities and online channels in cooperation with the Company, which includes global e-commerce platform for design products Wallpaper Store, Kaohsiung Museum of Fine Arts and National Taiwan Museum of Fine Arts Stores, Tsutaya Bookstore, Store Marais, Xiaoqi, funfuntown, Everyday ware & co., 30Select, OR Coffee, PEKOE, 61 note, LE CLUB, Pinkoi, momo, and Udesign.

TG also actively collaborated with magazines, TV channels and movies in 2022 by providing gift boxes, printed milk bottles, glass bottles and glass utensils that are showcased in magazines, TV programs, TV series, and movies.

Form of collaboration	Partner	Progress	
Flash restaurant	The Seedin Lab	In 2022, The Seedin Lab organized an exhibition called "EAT" featuring soil as the fundamental concept, during which it cooperated with TG to explore menus, interior decorations, and containers that convey values of nature, sustainability, legacy, and renewability, thereby creating an edible exhibition. During this exhibition, TGI sponsored the glassware used at the restaurant and attracted 6,500 followers on IG.	
Brand placement in video productions	Bad Education	TGI's glassware appeared in the film - "Bad Education," which achieved exposure to an audience size of 2,290	
	Till We Meet Again	TGI's glassware appeared in the film - "Till We Meet Again," which achieved exposure to an audience size of 1.38million	

Flat Glass

100% of TGI's flat glass products had passed CE (Europe), ANSI (USA), and CNS (Taiwan) standards We produce flat glass using advanced lead-free and copper-free production to prevent heavy metal contamination to downstream products. Meanwhile, we’ve actively promoted tempered glass needing to be hot-dipped to reduce the risk of instantaneous glass breakage. Laminated glass offers greater safety, shock resistance, and anti-theft and explosion-proof properties compared to other forms of glass because a strong and adhesive interlayer in laminated in between, which makes the glass less penetrable and the shards less likely to scatter when cracked. Low-E insulated glass has excellent thermal insulation, and can effectively block infrared heat from entering the room while maintaining transmittance of visible light, and greatly reducing the energy consumption of air conditioning equipment and creating the most comfortable indoor spaces. TGI will emphasize on the sale of large Low-E flat glass over the long term, and aims to raise users' environmental awareness with the popularity of Low-E glass.

Flat glass-related certifications

CE (Europe) | ANSI (USA) | CNS (Taiwan) | ISO 9001 | ISO 14001 / SGS | PASMARK | IGCC

Technological collaboration

- **1980** Introduced physical vapor deposition (sputtering) technology for reflective glass from LEYBOLD (Germany).
- **1984** Introduced float glass production equipment and technology from PILKINGTON (UK)
- **1999** Introduced sputtering technology for reflective glass and double silver low-E glass from APPLIED FILMS (USA).
- **2003** Introduced sputtering technology for double silver low-E glass from VON ARDENNE (Germany).
- **2012** Collaborated with TECO Nanotech Co. Ltd. on the development of continuous vacuum glass production technology.
- **2017** Developed sputtering technology for triple silver low-E glass; mass production is expected to commence in the following year.
- **2018** Signed a technology licensing, manufacturing, and supply agreement with U.S. company - Owens Corning (NYSE: OC).
- **2022** 2022 - Collaborated with ITRI on the "Scenario construction and environmental parameter gathering project for Low-E energy-saving glass"

Collaborated with ITRI on the "Scenario construction and environmental parameter gathering project for low-E energy-saving glass"

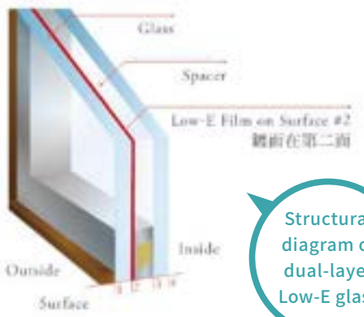
Working with ITRI, TGI made use of the resources of "SPINLab - subtropical green building technology development test bed" to conduct tests relating to energy-saving glass. Doing so would enable further improvements to the energy-saving benefits of multi-layer Low-E glass. The type of glass tested was the multi-layer Low-E glass, a green building material, and data on energy conservation and comfort was gathered for comparison with laminated glass.

The project has been completed, and it was found that multi-layer Low-E glass reduced air conditioning load by 50% compared to ordinary laminated glass and significantly improved comfort and temperature stability indoors.

Exterior view of SPINLab

Room A - Low-E glass with 100% transparency

Room B - Laminated glass with 100% transparency



Structural diagram of dual-layer Low-E glass

Introduction of Flat Glass
Click or scan QRCode to watch

Green products - flat glass

Low-E glass, a new-generation energy-saving glass, blocks thermal radiation from the sun while allowing a good amount of light to penetrate through, which not only solves the dilemma between light and heat but also reduces power consumption of air conditioning systems by a significant extent. TGI's Low-E glass has passed certification for national standard CNS12681, international standard ISO 9001, and quality standards of Insulating Glass Certification Council (IGCC) in the U.S. The glass is being widely used in buildings.

Taiwan Glass (TGI) Group uses the most advanced coating technology to develop its single-piece Low-E glass: the Jie Neng (JN) series. Compared to general Low-E coating, the JN series layered structure uses a hard semiconductor nano-glass to greatly reduce the radiance of the glass surface. The JN series has excellent thermal insulation, and the Low-E layer has high hardness, wear resistance, and oxidation resistance for zero oxidation and film deterioration issues when exposed. The creation of the JN series has enhanced the multi-application characteristics for Low-E glass.

Introduction of Low-E glass
Click or scan QRCode to watch

The JN series is used with sandwich glass for safety glass properties and excellent thermal conductivity. The JN series is used with Low-E insulated glass to further reduce the U value of Low-E insulated glass, and effectively reduce even more energy consumption and improve indoor comfort.

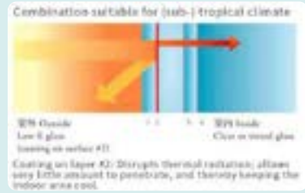
TGI Knowledge Base

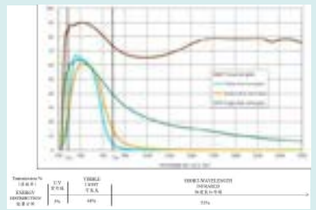
What is Low-E glass

Low-E (Low-Emissivity) glass is the most ideal glass material for reducing heat from sun exposure. It blocks most ultra violet and infrared radiations while allowing visible light to penetrate, and in doing so prevents rise of indoor temperature from sun exposure, thereby reducing energy usage and carbon emission.

The solar radiation can be distinguished between ultra violet (UV) light, visible light, and near infrared light. Emissivity (ε) measures how much a piece of glass radiates the solar radiation it receives from the sun. *Note. A lower ε value indicates better thermal insulation.

Low-E glass blocks solar radiation through the use of special glass coating. According to national standard - CNS, only coated glass with ε value of less than 0.20 can be called Low-E.
*Note: Emissivity value refers to an object's ability to radiate the thermal energy absorbed at certain temperature. A higher value indicates higher amounts of thermal radiation being absorbed and radiated; whereas a lower value indicates lower amounts of thermal radiation being absorbed and radiated, which means more effective thermal insulation.





TGI's Low-E glass helps customers obtain green building label

TGI's customers are increasingly aware of the importance of energy conservation, as well as how green building label benefits corporate image and increases floor area ratio. TGI has been supplying Low-E glass to many prominent landmarks in Taiwan in recent years, helping customers save energy and obtain diamond/gold/silver grade green labels. Depending on the needs of individual buildings, TGI also provides specialized products such as heat strengthened glass, laminated glass, silkscreen glass, and photovoltaic cover glass.

Customers first present us with the energy conservation targets for the curtain wall of the project they wish to obtain green building certification for; TGI then provides customers with the energy-saving solution that delivers their target performance. By directing marketing efforts toward architects and construction companies, TGI hopes to raise the visibility of multi-layer Low-E glass so that potential customers in need may have a better understanding of how TGI products may help them reduce energy and carbon, obtain green building certification, and improve sustainability performance.

Fiber glass

Compared to metallic weight-bearing materials, fiber glass has excellent anti-corrosion and weather resistant properties and offers advantages such as low cost, high tensile-strength-to-weight ratio, and longer lifespan. Glass fabric products are highly diversified in terms of structure and characteristics. They are also widely used for heat retention, thermal insulation, fire proofing, and material enhancement.

Low-E website

For more explanations on Low-E glass, visit the Low-E website or scan QR Code

100% of TGI's products had complied with RoHS and REACH requirements. With regards to food grade glass products, the Company applies for certification in different countries depending on customers' needs, and currently has 4 products that comply with US FDA regulations, 8 products that pass EU 10/2011 and BfR certification for drinking water in Germany, and 2 products that meet the CAS drinking water requirements in France. These products conform with CNS, and the labels indicate conformity with RoHS depending on customers' requirements.

The world entered an era of high bandwidth and high-speed data transmission with the introduction of 5G service in 2020. In order to meet the high bandwidth and high speed requirements of 5G, it is essential to make printed circuit boards (PCB) for networking and communication equipment using Low DK materials. TGI was the world's 3rd manufacturer, after U.S. and Japanese counterparts, to successfully develop Low DK glass fabrics for high-end PCBs; these products have been certified by domestic and foreign equipment manufacturers for use on 5G equipment. Although the outbreak of COVID-19 in 2020 delayed the deployment of 5G infrastructure, construction activities progressed nevertheless, and as auto manufacturers invested into the production of electric vehicles, demand for glass fabric have increased rapidly since 2021. As a response, TGI will continue increasing the production of Low DK and ultra-thin fabric, and develop thinner and higher value-adding products to meet customers' needs.

White Fiberglass Fabric passed REACH test for substances of very high concern (SVHC)

Direct Roving

Conventional Roving

Woven Roving

Chopped Strand Mat

Chopped Strand

Fiber Glass

For more explanations on fiber glass, visit the official website or scan QR Code

Glass container/tableware/kitchenware

We have been developing specialized bottles of high unit price, such as alcohol decanters, since 2020, and continue to improve quality in line with customers' food safety requirements. In the heat-resistant container segment, we continue to grow our presence and explore new customers in the market of nurser bottles.

Glass containers offer excellent transparency that truly represent the colors of the inner content. Other properties such as ease of seal, long preservation time, heat resistance, and suitability for microwave heating make glass containers an essential item for the modern population. All of TGI's glass container-making factories have passed certification for ISO 9001 - Quality Management System and FSSC 22000 - Food Safety System, and 100% of products have conformed with Sanitation Standard for Food Utensils, Containers and Packages. TGI also has the ability to supply products that pass RoHS and REACH standards if requested by customers. As for heat-resistant products, 100% of nurser bottles have passed EU's latest EN 14350 tests, whereas coffee brewers can have temperature tolerance labeled on the package box if requested by customers.

Green Products - Glassware

Taiwan Glass (TGI) is committed to conserving raw materials and energy, and also contribute towards environmental protection to meet the market demand for green and eco-friendly products while maintaining product strength, and ensure that the products match the future trends of glass containers.

TGI first introduced the NNPB process from Germany back in 1983 to produce lightweight bottles that have even thickness and pleasing aesthetics. In recent years, TGI has been engaging Heye-Glass Group from Germany in a series of technological collaborations to develop more than one hundred types of lightweight bottles and produce more than 200 million pieces a year. By lowering the weight of the bottles, we help customers reduce production costs. We have been able to improve our lightweight glass-making technologies in recent years, and achieved success in reducing the weight of 750ml red wine bottles to 415 grams in 2021, and reducing the weight of bottles for 2.5oz essence of chicken to 10 grams in 2022. Through these accomplishments, we continue to secure our competitiveness against international peers.

Advantages of lightweight bottles

Advantages of lightweight bottle

- Saves raw materials
- Lowers energy consumption
- Reduces production cost for customers
- 100% recyclable and reusable

A 1L liqueur bottle has a usual weight of 540g
NNPB lightens it to 480g

Reducing product weight by

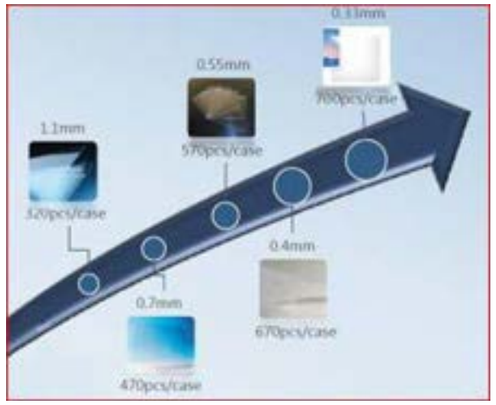
12.5%

In addition to lightweight bottles, TGI continues to explore ways to minimize the environmental impact of its production activities. The Company also works with the Industrial Development Bureau to promote recycling and reuse of limited resources, and to produce green products that meet international standards. Hsinchu Factory obtained "Certificate of Green Recycled Product" in 2019 and later renewed validity of the certification in 2022.

TGI had 1,012 products that met the criteria for Green Recycled Products, including: 148 items in the food category, 513 items in the decanter category, 285 items in the beverage category, and 66 items in the pharmaceuticals category.

Through this certification, the Company is able to reduce the amount of raw materials used and ensure effective reuse of waste energy and resources, thereby minimize impact on the environment and reduce health hazards for both economic and environmental benefits.

Ultra-thin glass



The Taichung Factory is TGI's latest production line for ultra-thin touchscreen glass. It features a fully automated production management system and has advanced equipment including cleanroom and robotic arms. The factory commenced production in November 2014 and is capable of mass-producing ultra-thin glass with a thickness of 0.33-1.1. Having achieved success in the development of ultra-thin glass with increased aluminium oxide content (2.3% → 3%) in 2019, the Company set goals to manufacture products with 4% content in 2020 to accommodate the market's demand for lightweight yet high tensile equipment, which helps increase sales volume and unit price. In 2022, aluminium oxide content was maintained at 4% to meet the market's demand. By applying TGI's proprietary AR Coating to glass, the Company was able to reduce reflection by 0.5%-1%, thereby making images clearer with less glare and less double vision. This technology is being used on special medical equipment and showcases (e.g. in art gallery and departmental store). Glass with 0.55-1.1mm thickness can also be used as touch panel on ITO, and sale of 0.55mm glass had been strong in 2020, particularly to Mainland China and India. Glass with 0.33-0.4mm thickness can be used as screen protector on consumer electronics. All products are rigorously tested to ensure that the quality meets international standards and that the products are accepted by domestic and foreign manufacturers for the production of premium consumer electronics. In light of increasing demand for 0.33mm glass from Mainland China and India, the Company will be producing 0.33mm glass as a staple starting from 2021. In the future, TGI will focus not only on increasing market share in Mainland China and India, but also explore other markets such as: Vietnam, Bangladesh, Malaysia, and Africa.

Ultra-thin glass	Production volume
0.33mm	3,709 mt
0.55mm	2,373 mt
0.7mm	6,210 mt
1.1mm	3,422 mt

Container Glass

For more explanations on glass containers, visit the official website or scan QR Code

3.2 Product Quality

TGI actively introduces product quality, product safety, environment/safety/health, and transportation safety management systems to provide the responses it needs to foster financial growth, promote sustainability of the environment, build a healthy and inclusive workplace, reduce risks, and minimize impacts.

TGI's action plans for product and service excellence

The Three Lines of Defense for Product Safety

Line of Defense 1: Quality System

Flat Glass | All factories have passed the ISO 9001 Quality management system certification

- CNS Mark from the Bureau of Standards, Metrology and Inspection of the Ministry of Economic Affairs
- Green Building Material Mark of the Ministry of the Interior
- CSi Safety Glass Certification
- IGCC Insulated Glass Certification
- Taoyuan Factory passed ISO 16949 - Automotive Quality Management System
- The Zhangbin Factory passed the certification of SGCC tempered glass and sandwich glass, and IGCC insulated glass

Fiber Glass | All factories have passed the ISO 9001 Quality management system certification

- DNV and GL certification

Line of Defense 2: Product Health and Safety System

- The Hsinchu Factory continues to pass FSSC 22000 Food Safety System Certification
- The Taoyuan Factory obtained Lloyd' s Register Shipbuilding Safety Certification
- The Taoyuan Factory obtained TZW Food Container Manufacturing Safety Certificate

Line of Defense 3: Product Transportation Security System

- As an excellent import and export firm, the Company obtained the Certified Mark in 2014, issued by the Ministry of Economic Affairs Bureau of Foreign Trade, and obtained substantial and convenient customs clearance benefits
- In 2018, the Company once again obtained the AEO Safety Certification from the Ministry of Finance Customs Administration.
- Enterprise approved by the Ministry of Finance that has a Secure Supply Chain with Excellent Contributions

Two-level Sustainable Enterprise

Level 1: Environmental, Health and Safety System

- All factories have passed ISO 14001 Environmental Management System certification
- All factories (except the Changpin Factory) have passed ISO 14064-1 Organizational Greenhouse Gas Emission Inspection and Verification
- The Hsinchu Factory passed the ISO 45001 Occupational Health and Safety Management System certification
- Actively introduced the latest version of the ISO Systems and continue to pass certifications
- Hired a UK industrial safety consultant to improve workplace safety

Level 2: Energy Management System

- The Taoyuan, Hsinchu, Taichung and Lukang flat glass factories have passed ISO 50001 Energy Management System certification and continues to make improvements every year

※For more actions on environmental protection and workplace safety of Taiwan Glass (TGI), please refer to Chapter 4 and Chapter 5 of this report

List of certifications attained by factory facilities

Certification/ factory	Head-quarters	Taoyuan Factory	Hsinchu Factory	Taichung Factory	Lukang Factory	Lukang Flat Glass Factory	Changpin Factory
AEO	■	■	■	■	■	■	■
Certificate expiry		No expiry	April 19, 2012 (No expiry)	No expiry	2012/4/19 (No expiry)	April 19, 2012 (No expiry)	April 19, 2024
ISO 9001		■	■	■	■	■	■
Certificate expiry		2023/7/26	2026/03/22	2025/11/9	2025/4/15	2023/12/8	2024/6/5
ISO 14001		■	■	■	■	■	■
Certificate expiry		2023/10/14	2023/9/14	2023/9/14	2026/03/18	2022/6/18	2025/05/13
ISO 14064-1		■	■	■	■	■	
Certificate expiry	Reviews are being planned	Regular reviews are conducted on a yearly basis	Regular reviews are conducted on a yearly basis	Regular reviews are conducted on a yearly basis	Regular reviews are conducted on a yearly basis	Regular reviews are conducted on a yearly basis	Reviews are being planned
ISO 50001		■	■	■		■	
Certificate expiry		2023/12/30	2023/11/27	2023/11/20		2024/12/08	
ISO/IATF16949		■					
Certificate expiry		2024/05/15					
FSSC 22000			■				
Certificate expiry			2024/12/23				
ISO 45001			■				
Certificate expiry			2025/08/31				

Note: " ■ " denotes that the factory has been certified.

Hsinchu Factory - Certificate for ISO 14064 Greenhouse Gas Inventory

Hsinchu Factory - FSSC 22000 Food Safety Management System

Lukang Flat Glass Factory - ISO 50001 Energy Management System

Taichung Factory - ISO 9001 Quality Management System

Changpin Factory - ISO 14001 Environmental Management System

Hsinchu Factory - ISO_45001:2018 Occupational Health and Safety Management System

3.3 Innovative R&D

In addition to increasing R&D and equipment capacity and achieving efficiency breakthroughs across product lines, TGI also draws innovations and resources from outside the organization, such as engaging foreign research institutions for the development of aluminosilicate glass with enhanced properties, inviting foreign technicians to give instructions on-site, and introducing new production technologies. TGI has also been collaborating with China University of Science and Technology, Southern Taiwan University of Science and Technology, and Plastics Industry Development Center on researching applications of thermoplastic fiber composites.

In 2020, TGI joined National United University's "Advanced Specialty Glass Technology and Manufacturing Alliance" where it is able to engage academic institutions in conferences, consultation, and knowledge exchange. Furthermore, TGI sponsored the creation of Glass and Optical Materials Research Center at the university by providing glass samples for display.

The Company remains persistent at improving technological and R&D capacity, and has made the following accomplishments:

- The Company continues to develop new steel and double-silver coating. With double-silver Low-E glass gradually becoming the mainstream product of the market, we’ ve continued to develop and add different types of coating to meet the market demand.
- We have developed steel and triple-silver products to meet the increasing demand for energy-conserving glass, and are committed to increasing the workability of triple-silver Low-E glass. The development of related products is expected to be completed next year.
- With the completion of Changpin Processing Factory's main factory, the Company now has the capacity to meet the demand of the domestic constructions market. Equipment for high-performance Low-E glass and various processing activities have been completed and progressed into mass production, thereby giving TGI the competitive advantage of making better quality glass in greater variety.
- Low-E coating for single flat glass (the JN series): using rigid, nano-grade semiconductor materials for the coating, TGI is able to maintain very low surface radiation as well as excellent temperature control while achieving high degree of hardness, anti-abrasion, and anti-oxidation, thereby preventing the coating from oxidation and deterioration even when exposed to the atmosphere.
- TGI has made successful breakthroughs in the development of Low DK fiber glass for high-end PCBs. Being able to meet the high bandwidth and high speed requirements of 5G will help secure market presence and create values.

- Heat-resistant nurser bottles and lab bottles have consistently improved in quality Technological improvements are being made to container products; by adopting a problem-solving approach and making trial productions of specialized models, the Company is trying to switch mold material from metal to composites. Liquor decanters and bottles are also being developed.
- Ultra-thin glass has already begun production. Measuring only 0.33mm-1.8mm in thickness, the product is commonly used as protective cover and external casing for electronics.
- The Company adds 30 new container products to the TG brand each year and strives to bring added value with each offering. These products are being marketed via the B2C channel. Almost all of the 200+ products have been awarded product patents and are being sold directly through physical channels as well as online platforms.
- A more lightweight glass fabric, #1017, passed customers' certification and commenced sale in 2020.
  The Taiwan Glass (TGI) Group and Chinese companies continue to search for technology, equipment, and build factories for TCO glass, AR glass, and ultra-thin glass to adapt to the changes and needs of the global market.
- TGI continues to secure reliable sources of recycled glass and explore ways to increase the clarity of glass recycled. In the flat glass segment, recycled glass now accounts for 20% of raw materials.

TGI's short/medium/long term R&D plan

Short-term

- Increase the range of temperable triple-silver Low-E coated products to provide the market with more energy-saving glass options.
- Increase the level of digitalization across production equipment so that data can be cross-analyzed more effectively to provide real-time feedback on the production progress.
- Upgrade production equipment to improve load balancing and stability, and raise product quality to expand product applications.
- 95% of products are customized; TGI will continue making lightweight samples and convey to customers the advantages of lightweight products

Medium-term

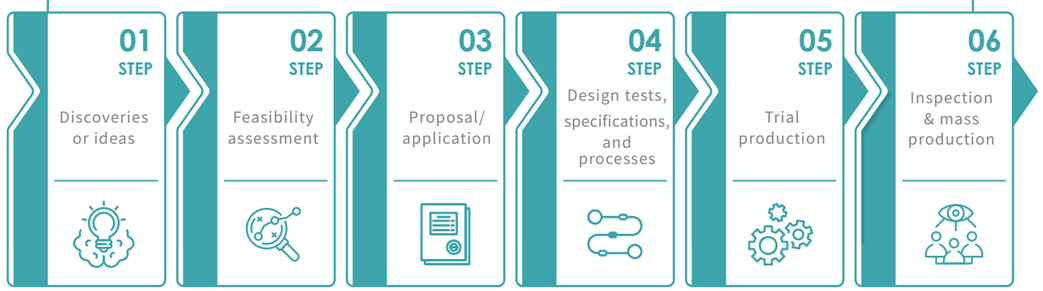
- Explore improvements to the glass coating materials and structure, and develop energy-saving products that offer better performance and workability.
- Introduce AI-assisted software and monitoring platform, and perform dynamic analyses to obtain the optimal parameters for quality, cost, and energy consumption (carbon emission).
- Develop low-carbon production procedures and introduce low-carbon equipment to reduce product carbon footprint.
- Adopt lightweight bottle design in new product development (aim to achieve 50% of total products)

Long-term

- Persistently develop glass products of different features based on the market's needs, and make ongoing optimizations to glass product features.
- Continually explore ways to improve product carbon footprint and quality for increased competitiveness.
- Increase the level of production automation and digitalization; make more extensive use of AI to provide real-time optimal production parameters that help reduce human errors.
- Lightweight bottles to account for 45% of the production in 2030.

We pay incentives to encourage TGI employees in making suggestions on ways to improve production technology, quality, environmental protection, safety, business, or even administrative practice. For employees involved in major R&D projects, the Company pays bonuses based on the outcome of the project and contribution of individual participants. In doing so, we hope to strengthen employees' unity toward the organization while at the same time reduce cost, improve work environment, increase productivity, and raise quality standard. We also give credit and reward those who make special contributions to production technology or business management that are ultimately implemented.

Product Development Procedures



Amount of spending (NTD) and manpower committed into R&D for the year			
Year	Amount (NTD)	Commitment of internal manpower	Commitment of external manpower
2019	51,691,291	56	-
2020	51,792,029	55	-
2021	52,915,721	51	-
2022	42,067,378	46	-

3.4 Customer Service

Customer service management policy

TGI has always valued customers' opinions and feedback for more than 50 years since it was first incorporated. With each service, we hope to strengthen customers' trust and satisfaction and build a professional image that can withstand the test of time. We hold the conviction that trust and satisfaction stem from the foundation of product excellence, which is why TGI has implemented policies to build interactive channels, improve production terms, enhance training, and evaluate customers' satisfaction across all business segments including new materials, flat glass, containers, and fiber glass. In doing so, we hope to maintain competitive advantage and earn customers' support.

Customer satisfaction survey

The Company conducts annual "customer satisfaction surveys" to gather customers' opinions on "the speed and accuracy of complaint handling," "speed and accuracy of message reply," "correctness of shipment and consistency of delivery timing," "sales representatives' attitude," "ability to accommodate ad-hoc orders," "professional capacity," "quality consistency" etc., so that improvements can be made to meet customers' needs. TGI also analyzes customers' response to key questions so that meetings can be held to discuss responses and improvements, and raise customers' satisfaction in ways that strengthen the Company's service competitiveness and reputation.

In 2022, the Company conducted a customer satisfaction survey on various products from different departments, and a total of 170 responses were recovered in 2022. We also improved and enhanced the communication with customers on our shortcomings, and look forward to improving customer satisfaction in 2022.

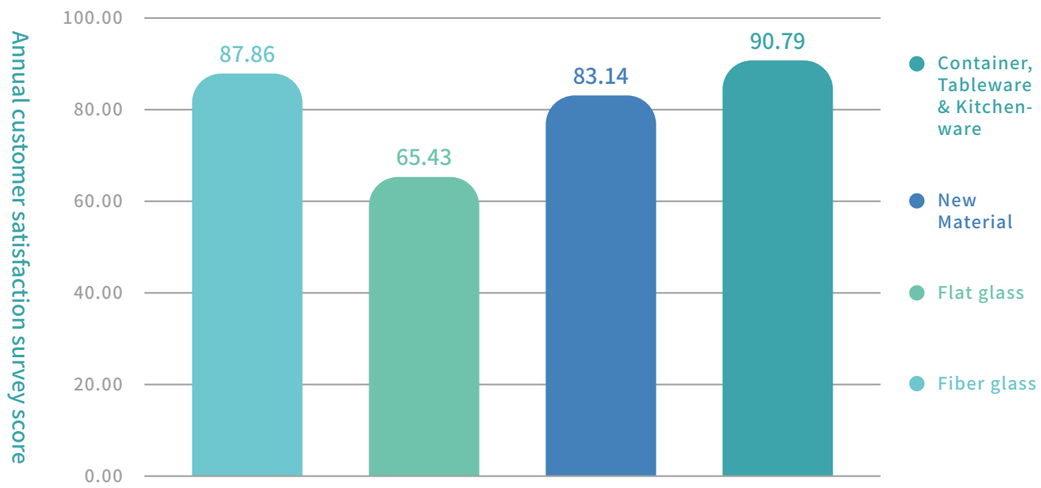
Outcome of customer satisfaction survey

Business segment	Container	Tableware/ Kitchenware	Flat glass	Fiber glass	New Material
Total sample count	73	20	46	21	10
Percentage of response from domestic customers	100%	100%	78.26%	23.81%	60%
Percentage of response from foreign customers	-	-	21.74%	76.19%	40%

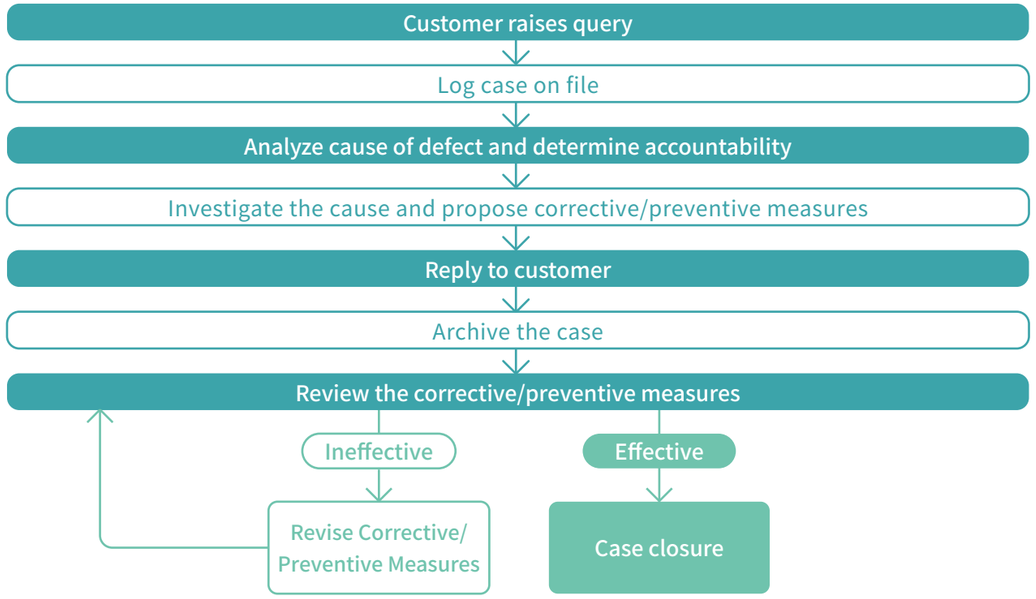
Outcome of customer satisfaction survey

Container	Tableware/ Kitchenware	Fiber glass	Flat glass	New Material
項目	2022	2022	2022	2022
Timeliness of complaint handling - speed	89.3	100	65	80
Timeliness of complaint handling - accuracy	88.9			
Information feedback - speed	90.4	89	63	84
Information feedback - accuracy	90.1	91	68	84
Sales representatives' attitude	94.6	90	74	86
Professional capacity	93.6	85	71	84
Quality consistency	89.3	83	56	80
Shipment - consistency of delivery time	88.4	-	-	-
Shipment - accuracy	91.0	-	-	-
Accommodation for urgent orders	-	90	61	84

Outcomes of annual customer satisfaction survey



Resolution workflow for customers' queries



Improve Customer Ordering Experience and Service Efficiency

TGI launched online ordering APPs on two major platforms in 2021 for distributors of the Flat Glass Division. They allow customers to place orders online using mobile devices instead of telephone, fax, and e-mail, thereby reducing the need for manual input. Overall, the APPs help reduce error rate, shorten order turnaround time, speed up shipment, improve dealers' service quality, and increase service efficiency.

3,366 orders were placed through the above in 2021 whereas 12,415 orders were placed in 2022, representing a 268% increase in usage volume. By 2022, 82% of flat glass orders were placed using the APP. With the completion of an online ordering system for flat glass processing in 2022, TGI expects to greatly reduce the cost of customer service and communication and increase the accuracy of its business efforts.

82%

Of flat glass orders were placed by using Taiwan Glass iAPP

Reduce the cost of customer service and communication and increase the accuracy of its business efforts.

268%

increasing of placed order

2021: 3,366 orders
2022: 12,415 orders

Order placement homepage on mobile APP

Flat glass ordering page

Customer Relations Management and External Sales

All of TGI's business segments take the initiative to pay regular visits to customers or participate in exhibitions. By creating opportunities to engage customers and communicate with the public, we are able to demonstrate the competitive advantage of Taiwan's industries. TGI continued to take part in Taipei Building Show, the largest building materials exhibition in Taiwan, in 2022. It also traveled overseas to promote the TG brand at Meet Design Exhibition in Tokyo and RK Gallery in Shanghai, so that more people get to see our products and the innovations and the thoughtfulness that went into the design.

Nangang Taipei Building Show

The entire exhibition was planned similarly to previous years and included areas for "Main theme," "Green Buildings and Materials," "Miscellaneous Building Materials," "Furniture and House Decorations," "Lighting and Lamps," "Bath & Kitchen Facilities," "Ceramic Tile & Decoration Materials," "Door & Window Hardware" etc. More than 500 vendors participated in the show and more than 2,000 standard booth areas were occupied, making it Taiwan's largest and most professional international building materials exhibition of the year.

Meet Design Exhibition Tokyo

Being one of the 26 businesses that participated in the furniture and lifestyle exhibition held for the first time in Tokyo in 2022, the Company took this opportunity to convey to visitors TG's persistence toward high quality as well as the charisma and energy of Taiwan's culture.

RK Gallery Shanghai

Heat-resistant glassware was displayed for sale at RK Gallery in Shanghai alongside exquisite furniture to insert TG's brand into the art community.

3.5 Sustainable supply chain

Taiwan Glass (TGI) has set up a CSR Code of Conduct for Suppliers and pays high attention to labor rights, environmental protection, Occupational Health and Safety, ethics, business management systems. The Company expects suppliers to abide by the relevant standards, and sign a letter of commitment. The Company also has a sustainable supply chain management policy to drive suppliers to improve their economic, social and environmental performance by integrating counseling mechanisms, and assist suppliers in their sustainable development.

Supplier management policy

Procurement Policy

TGI has been disclosing information on procurement tenders publicly over its website since 2020. By adopting a fair, just, and transparent procurement policy, the Company provides manufacturers with raw materials that meet quality standards, conform with supply chain safety requirements, produce low levels of pollution and hazard, and are priced reasonably. TGI conducts quarterly evaluations on the pricing, delivery timing, and quality of suppliers that have the potential to affect the quality of products made, and takes outcomes into consideration when making subsequent purchases.

Supply Chain CSR Management Policy

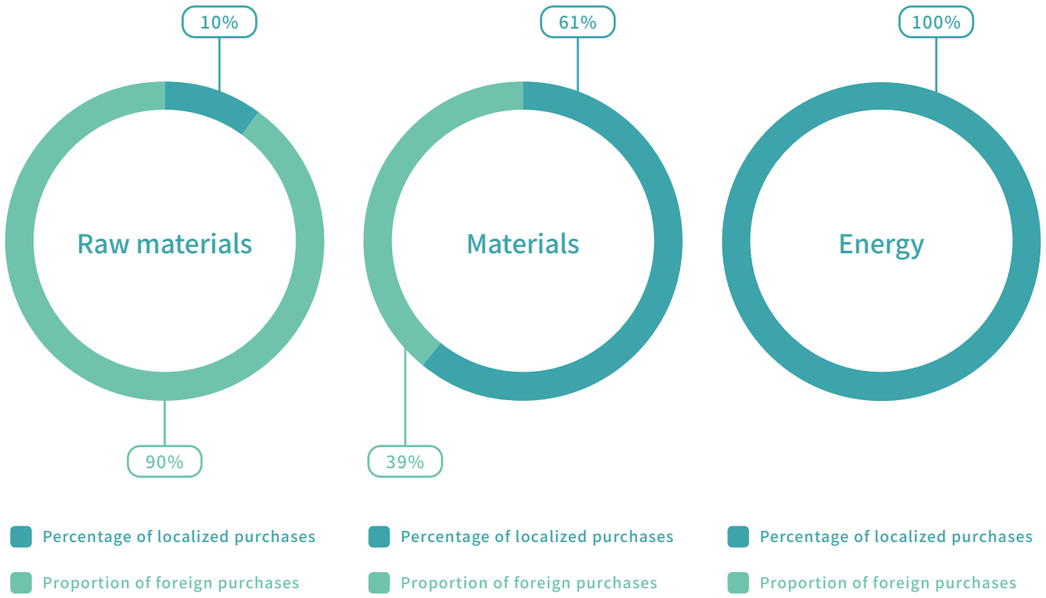
TGI hopes to work with suppliers to stimulate ESG performance in the future by adopting sustainability-related practices such as the "Supplier Evaluations" and "Sustainable Code of Conduct for Suppliers," and require them to pass the aforementioned standard inspections and create sustainable value in the supply chain.

Suppliers are the most important stakeholder and partner to TGI's sustainable management efforts. As we build a supply chain that meets international standards, we treat our suppliers as partners and try to engage them in a mutually beneficial manner. We invite all suppliers to join us on becoming a positive influence to the society and contributing to the sustainability of the industry and the environment.

TGI had business dealings with a total of 1,931 domestic suppliers and 246 foreign suppliers in 2022. The Company adopts a localized procurement policy and 88.7% of its suppliers are based in Taiwan.

TGI currently sources limestone and some of the dolomites from Hualien, whereas other key raw materials (such as silica sand, sodium carbonate, kaolin clay etc.) are imported from abroad as there is no mine site in Taiwan. This is why in dollar terms, 10% of raw material purchases are made domestically whereas 90% are imported.As for supplies, approximately 61% are purchased domestically while 39% are imported. In terms of energy sources, TGI purchases premium diesel from Formosa Petrochemical Corporation and sources fuel oil, natural gas, and L.P.G from CPC. 100% of the electricity used is supplied by Taiwan Power Company. Aside from considerations regarding flexibility and responsiveness of materials supply, TGI hopes to adopt operational measures that benefit Taiwan's industries in terms of increased job opportunities, local prosperity, and reduced carbon footprint on transportation and energy. Over the course of engagement, we provide suppliers with counseling, training, and knowledge exchange to help them build awareness and capacity toward quality and environmental issues.

Sources of raw material, supplies, and energy



Supplier/contractor eligibility, audit, and evaluation

Suppliers delivered excellent performance overall in 2022

approximately **95%** of suppliers were in the A-tier and 5% were in the B-tier

We use a "Supplier Evaluation Sheet" to conduct quarterly evaluations on the delivery timing, pricing, and quality of key suppliers that affect the quality of products made. Outcomes of the evaluation are taken into account in future purchasing decisions, and we strive to build mutual trust with all supply partners we work with. With regards to supplier evaluation, the procurement unit evaluates the pricing while the warehousing unit evaluates the delivery of supply; the quality control unit or department-in-use conducts overall assessment on the quality of supply and maintains record on file to serve as reference for subsequent purchases.

Each quarter, procurement personnel make statistical analyses on the above evaluation and plot results on a chart. Data is analyzed and compared every six months, and any negative trend discovered will be investigated upon to facilitate improvements or to determine the appropriateness and effectiveness of the existing procurement system.

The Company's suppliers are required to undergo evaluations on a quarterly basis to ensure that they continue to meet our requirements and maintain high-quality long-term cooperative relationships. Taiwan Glass (TGI) requires its suppliers to be rigorous in selecting quality outputs, and low-risk high-quality suppliers (tier A or tier B) are listed as priority procurement suppliers for the Company.

Suppliers are divided into three tiers (A, B, and C)

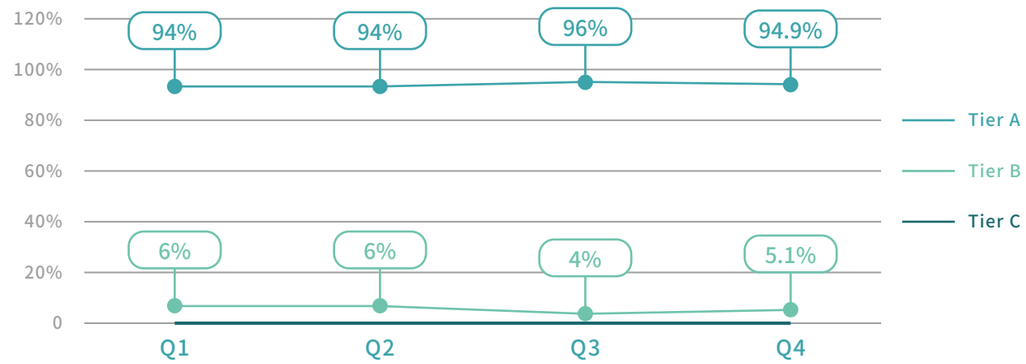
Details of supplier evaluation	
Time Of Evaluation	The end of December is the cutoff time for annual evaluations, which are completed with supplier tier assigned before the 20th day of the next month. Quarterly evaluations are conducted using March, June, September, and December as cutoff times, and are completed before the 15th day of the next month.
Accountability And Presentation Of Results	The quality control unit or department-in-use is responsible for the quality of goods supplied, the department-in-need or warehousing unit oversees the delivery of goods, and the procurement unit evaluates pricing and summarizes the final evaluation. Outcomes of quarterly evaluation are retained by the procurement unit, whereas outcomes of annual evaluation are reported to the Chairman or CEO

Outcomes of TGI supplier evaluation - 2022

The following results show that TGI had no Tier C supplier in 2022, whereas Tier A supplier have increased in percentage from 92% in 2021 to 95% in 2022. TGI expects its suppliers to continue their rigorous practices on quality control and delivery timing, and do their best to offer more favorable prices.

Number Of Suppliers Evaluated By Quarter	Q1	Q2	Q3	Q4
Tier A	175	168	170	167
Tier B	12	11	8	9
Tier C	0	0	0	0
Total	187	179	178	176

Percentage Of Suppliers Evaluated By Quarter	Q1	Q2	Q3	Q4
Tier A	94%	94%	96%	94.9%
Tier B	6%	6%	4%	5.1%
Tier C	0%	0%	0%	0.0%



Supply chain sustainability management

In addition to enforcing the current supplier management strategy, TGI also tries to convey the concept of sustainable management to all partners of the supply chain. This was why we have implemented "Supply Chain ESG Evaluation" since 2015. The Company conducts annual evaluations on how certain new suppliers and existing suppliers perform with regards to environmental protection, labor practice, human rights, social practice, and product responsibilities/impacts using consistent standards. Through this process, we hope to determine whether suppliers are able to make voluntary improvements and share social responsibilities on an ongoing basis.

In addition, Taiwan Glass (TGI) has set up the "Sustainable Code of Conduct for Suppliers" that regulates workers' human rights, environmental protection, and Occupational Health and Safety. This includes prohibiting the use of child labor and paying attention to employee wages and benefits. Suppliers should also obtain Environmental Impact Assessment (EIA) permits; avoid the use of harmful and dangerous substances; and control solid pollutants, wastewater and exhaust; and ensure the occupational safety of their employees through preparing an emergency response and designing safety procedures.

Taiwan Glass (TGI) looks forward to improving ESG performance through the influence of the supply chain, and upstream and downstream suppliers to create sustainable value for the enterprise.

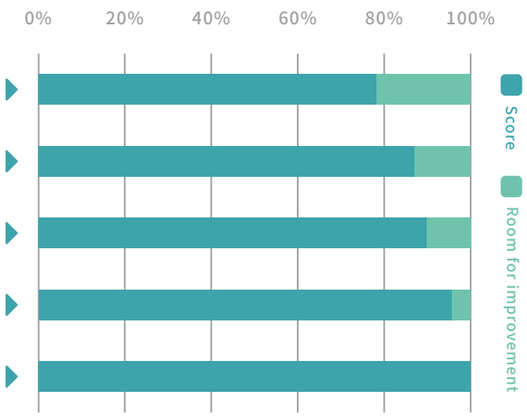
Supply chain sustainability evaluation outcomes and analysis

TGI evaluates suppliers' sustainability practices by way of questionnaire and assigns ratings based on questionnaire responses. Suppliers' responses are analyzed on five major aspects and the outcomes are used to generate an overall score.

Suppliers' overall score (%) by aspect

Aspect	Score	Room for improvement	Total score
Environmental (EN)	82.46	17.54	100
Labor (LA)	94.14	5.86	100
Human rights (HR)	88.75	11.25	100
Social (SO)	91.00	9.00	100
Product responsibilities PR)	100.00	0.00	100

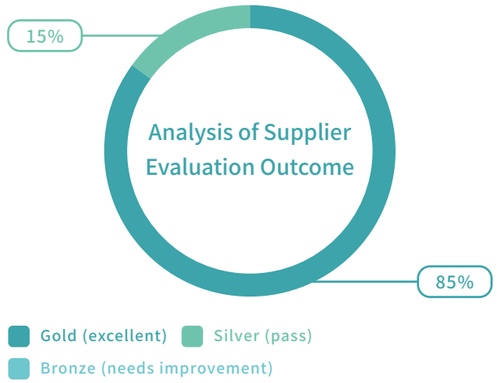
Suppliers' information disclosure score (%) by aspect



Total score analysis for 20 suppliers

Tier	Score range	Entity count	Percentage
Gold (excellent)	100~85	17	85.00%
Silver (pass)	84~60	3	15.00%
Bronze (needs improvement)	<60	0	0.00%
Total		20	100%

Analysis of supplier evaluation outcome



Supply chain sustainability evaluation outcomes, weakness reviews, and improvement actions

Based on the sustainability evaluation outcomes recovered from 20 suppliers, 85% of which were rated excellent, which was 16% more compared to 2021; 15% of which were rated pass and 0% needed improvement. Judging by the evaluation outcomes above, environment and human rights were the two low-scoring aspects that required attention, for which TGI has identified two main defects, implemented improvement plans, and is tracking improvement progress.

85 %
Of suppliers were rated excellent

16 %
excellent supplier percentage was rased

Category	Main issues	Improvement actions
Environmental assessment	Water conservation	Increase the scale of water conservation equipment and the volume of wastewater recycled and reused
	Under-utilization of renewable materials	Increase the use of renewable materials
Human rights assessment	No relevant rules or measures exist	Add human rights clauses into the procurement or investment contract
	Employees' awareness of the human rights policy	Arrange to have employees undergo training on human rights policy

TGI supplies glass products to international brands, which is why we take the initiative to incorporate customers' supply chain codes of conduct into our internal management. For example: Taichung Factory sells the flat glass it produces to dealers - Taiwan Mirror Glass, and because the dealers started supplying to the Swedish brand IKEA in 2016, we complied with IKEA's human rights requirements by issuing a statement of our commitment to prohibit against the use of child labor, and that no child labor is used.

With regards to issues for the management of conflict minerals, Taiwan Glass (TGI) has cooperated with suppliers to issue relevant declaration documents for conflict minerals such as gold (Au), tantalum (Ta), tungsten (W), cobalt (Co) and tin (Sn). The Company also promised not to purchase conflict minerals mined with the abuse of human rights or armed coercion, and avoid using conflict minerals from the Democratic Republic of Congo and its surrounding countries and regions.

Supplier's protection and career guidance for workers under 18

TGI complies with the IWAY clause

TGI statement on no use of conflict minerals

Eligibility of environmental protection partners and auditing/evaluation practices

Environmental protection partners undergo yearly evaluation and review according to the Company's "Environmental Protection Partner Evaluation Worksheet." Any supplier found to have committed a major violation of environmental protection, worker safety, or health issue within evaluation cycle will be reported to the senior manager immediately and have qualified supplier status revoked. We actively issue certificates and provide suppliers with training to help them accomplish the tasks assigned. When signing the initial contract, factory affairs personnel would also visit waste disposal service providers to learn how waste is handled, the operating environment, and the validity of service provider's permit to ensure that the Company's waste is disposed of properly using appropriate procedures. A tri-party agreement is signed for each of the arrangements made.

Environmental

04

Sustainability, Energy Conservation, and Green Practices

4.1 Sustainable Management Strategy

4.2 Energy/Resource Management

4.3 Green Production Management

4.4 Climate Action

Taiwan Glass (TGI) is committed to promoting the concept of sustainable management of coexisting with the environment, and firmly understands the importance of environmental protection and sustainable development. Therefore, TG encourages the implementation of energy conservation and water conservation strategies at each Factory every year, and uses a good management model to continuously carry out the management of energy resources.

Green Production Performance of 2022

NT$ 270 million

More than NT$270 million was spent on environmental protection in 2022

179,000 ton(s)

About 179,000 ton(s) of scrap glass was recycled and used in production in 2022

-8.6 %

Total GHG emission in 2022 was 8.6% lower than 2021

-10.6 %

Direct GHG emission in 2022 was 10.6% lower than 2021

-24 %

In 2022, the Hsinchu Factory increased its use of recycled water to significantly reduce the use of groundwater by 24% compared to 2021, and installed proportional valves in the water plants to reduce groundwater extraction.

-8.15 %

The volume of wastewater discharged by Changpin Factory was 8.15% lower compared to 2021

3.7 million kWh

By improving the energy efficiency of production equipment and procedures, such as solar panels, fans motors, and lighting, the Company was able to save power consumption by nearly 3.7 million kWh for the year across all factories

217 million ton(s)

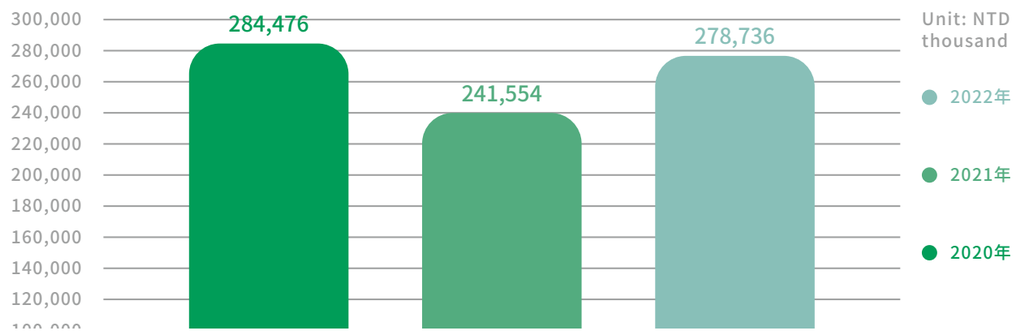
217,153,595 ton(s) of water was circulated and recycled across all factories in 2022

4.1

Sustainable Management Strategy

More than NT$270 million were spent on environmental protection across TGI's factories in 2022. Regardless of whether the Company makes profit, it persistently invests into new equipment and procedure improvements to increase energy efficiency or lower pollution. Solar power systems are progressively introduced onto factory sites starting from 2022, and the Company now has nearly 8,770 KW of capacity. TGI also makes ongoing investments into environmental management systems and organizes environmental protection training to ensure compliance with environmental regulations, reduce pollution, and contribute to the sustainability of the environment.

Environmental protection spending in the last 3 years (NTD thousands)



Environmental Sustainability Strategy

Taiwan Glass (TGI) adheres to ethics and awareness of environmental protection, and especially invests in protection measures to combat the impact and challenges of climate change. Taiwan Glass (TGI) believes that enterprises should take responsibility for mitigating environmental impact, and actively calls for members of the supply chain to join the cause. All of TGI's factories in Taiwan (i.e. Taoyuan Factory, Hsinchu Factory, Taichung Factory, Taichung Flat Glass Factory, Lukang Factory, Lukang Flat Glass Factory, and Changpin Factory) operate while observing environmental sustainability as the main principle, and make it a priority not to cause significant impact to the local ecosystem.

Circulation and reuse of water resources

217,153,595 ton(s) of water was circulated and recycled across all factories in 2022

Persistent recycling and reuse of scrap glass

In theory, smelting scrap glass only requires 50% of energy compared to smelting raw materials, which helps save energy and reduces greenhouse gas emission.

Energy conservation and carbon reduction

TGI conducts ongoing greenhouse gas surveys across factories to keep up to date on emissions, so that actions can be taken to reduce emissions. Meanwhile, plans are being implemented to reduce the volume of energy used in production activities, which in turn contributes to lower energy intensity.
Each Factory continues to conduct certifications for its energy management systems, and establish carbon reduction targets every year to improve its energy efficiency. They have also proposed numerous advancement measures with the sustainable development of the Group as the goal.

Energy-saving products

TGI continues to develop and produce Low-E glass, and tries to reduce use of supplies such as product labels and pallets where possible during packaging, shipment, and recycling.

Investment into renewable energy source

2022 was the year when TGI began investing into the construction of solar power panels across factories; the Company will continue increasing the volume of renewable energy sources used by various factories. TGI is also evaluating the feasibility of using natural gas for production as a way to reduce dependency on fossil fuel and to transition into low-carbon economy.

Green purchase

The Company prioritizes purchase of green, energy-saving products; motors used in production activity are upgraded to high efficiency variants, and most forklifts are electric powered.

Illustration of TGI's environmental inputs and outputs in 2022

Raw material input (ton(s))

Silica Sand	Dolomite	Limestone	Sodium Carbonate	Scrap Glass (Including Axternal Purchase)	Kaolin Clay	Gerstley Borate
300,636	78,284	29,655	80,857	179,516	29,541	2,011

Total Water Consumption **1,762,097** ton(s)

Energy Consumption

Heavy Oil (kiloliters)	Diesel (liter)	Natural Gas (cubic meters)	LPG (kg)	Electricity (KWH)
64,592	637,319	69,720,056	83,347	484,668,284

Production Capacity(ton(s))

Flat Glass	Fiber Glass	Glass Containers
309,973	71,977	135,376

Total **517,326** ton(s) Glass

Air Pollutants(kg)

NOx	SOx	VOCs	Particulate Matter
892,107	198,901	65,397	32,447

Wastewater discharge Total **1,042,232** ton(s) across factories

Total volume of water circulated and recycled **217,153,595** ton(s) across factories

			Count (ton(s))
General Industrial Waste	Incinerate	Waste plastics, waste rubber, waste from living activities	447.84
	Landfill	Scrap glass, waste thermal insulation	369.56
	Physical Treatment	Waste filament, waste wood, waste glass, waste lubricant, non-hazardous precipitator ash or mixture	648.80
	Heat Treatment or Curing	Sludge	1327.98
	Recycle	Waste pallet, non-spun yarn, sludge, waste paper, waste iron, waste wood, waste aluminum cap, waste brick	15601.22
	Reuse	Waste lubricant, waste fiber glass, waste fire brick, waste wood	3843.14
	Biological treatment	Nightsoil	102.22
Hazardous Industrial Waste	Landfill	Other corrosive mixture, selenium and compound	46.17

CO_2 Emission

Scope 1 **432,649** ton(s) CO_2e

Scope 2 **248,448** ton(s) CO_2e

Note 1. Scope 1 and Scope 2 CO2 emission cover the North Taiwan Branch, Taoyuan Factory, Hsinchu Factory, Taichung Factory, Lukang Factory, Lukang Flat Glass Factory, and Changpin Factory

Note 2. Calculations other than CO2 emission cover only the production facilities (namely Taoyuan Factory, Hsinchu Factory, Taichung Factory, Lukang Factory, Lukang Flat Glass Factory, and Changpin Factory); the North Taiwan Branch is not a production site and has therefore been excluded

Main Production Procedure and Value Chain of Taiwan Glass (TGI)

The value chain of Taiwan Glass covers five major categories of upstream raw materials such as silica sand, limestone, dolomite, soda ash and recycled cullet; the midstream covers the processing and manufacturing, and the downstream covers products and diverse applied fields. Taiwan Glass (TGI) is committed to examining the impact and effects of the product value chain on the environment and society, and is working towards sustainable development by working closely with its suppliers. Meanwhile, Taiwan Glass (TGI) expects to continue offering high-quality products that meet market demands through the R&D and innovation of products and technology, and long-term cooperation with its partners in the upstream and downstream value chain to drive the sustainable competitiveness of Taiwan Glass (TGI)' manufacturing industry chain.

TGI's Value Chain

Operation

Raw Material Purchase
Includes minerals and essential raw materials such as silica sand and limestone purchased from other suppliers. Selection of raw materials is crucial to the quality of glass produced.

Design and Manufacturing
Raw materials are smelted in furnace at high degree and shaped into glassware. Subsequent processes such as surface treatment, coating, grinding, cutting, and polishing are then applied.

Quality Control
Quality control and testing are performed during the production process, including tests on raw materials and the final product, to ensure conformity with standards and rules.

Delivery to Customers
Glass products are packaged in a way that is safe for transportation before shipping to customers.

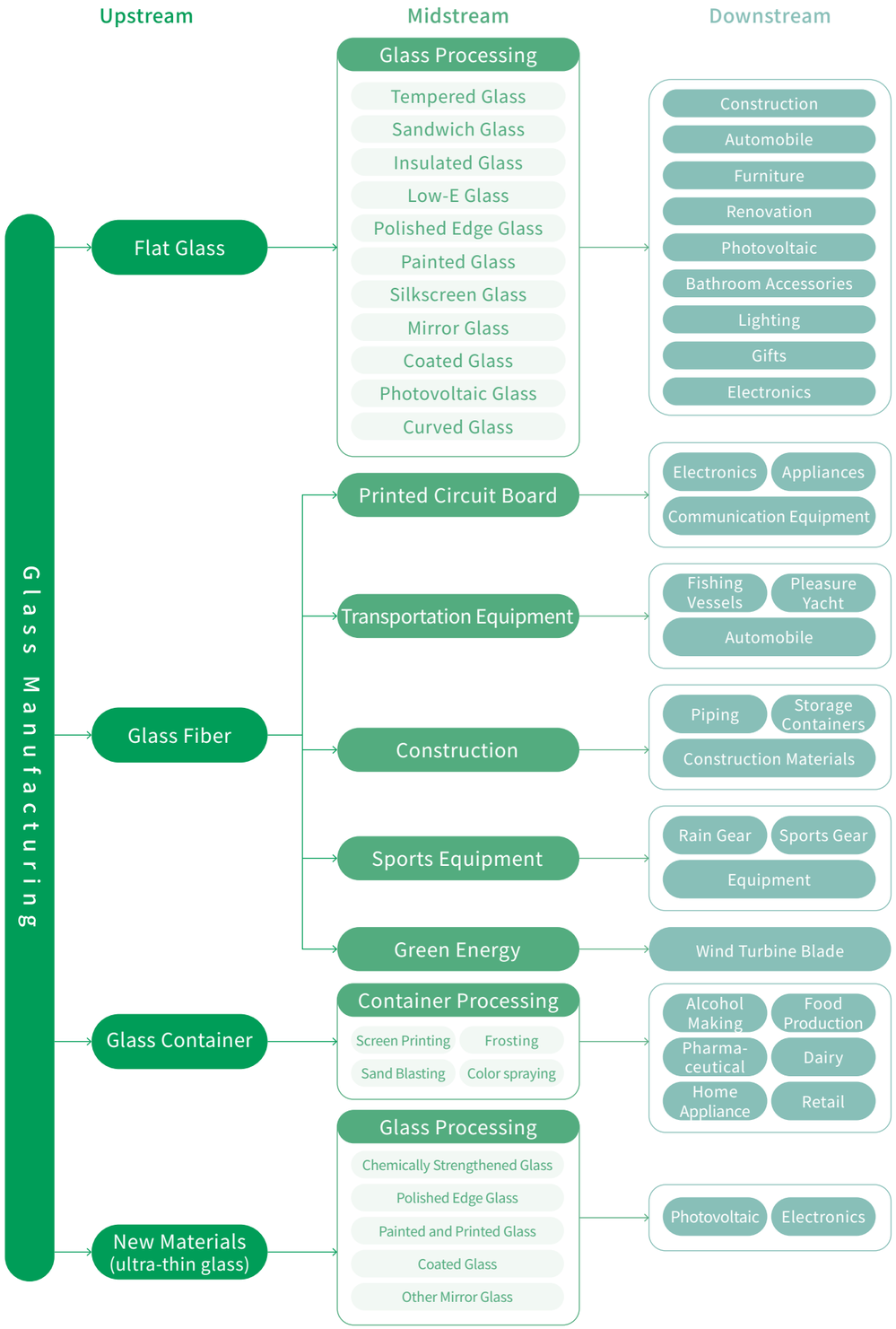
Production Process

Raw Materials
- Fine Silica Sand
- Kaolin Clay
- Sodium Carbonate
- Gerstley Borate
- Mirabilite
- Nepheline Powder
- Dolomite
- Scrap glass
- Limestone

→ Grind Weigh Mix → Feedstock → Smelt → Smelted Glass

Smelt ← Fuel Oil, Natural Gas, Electricity

TGI's industry position

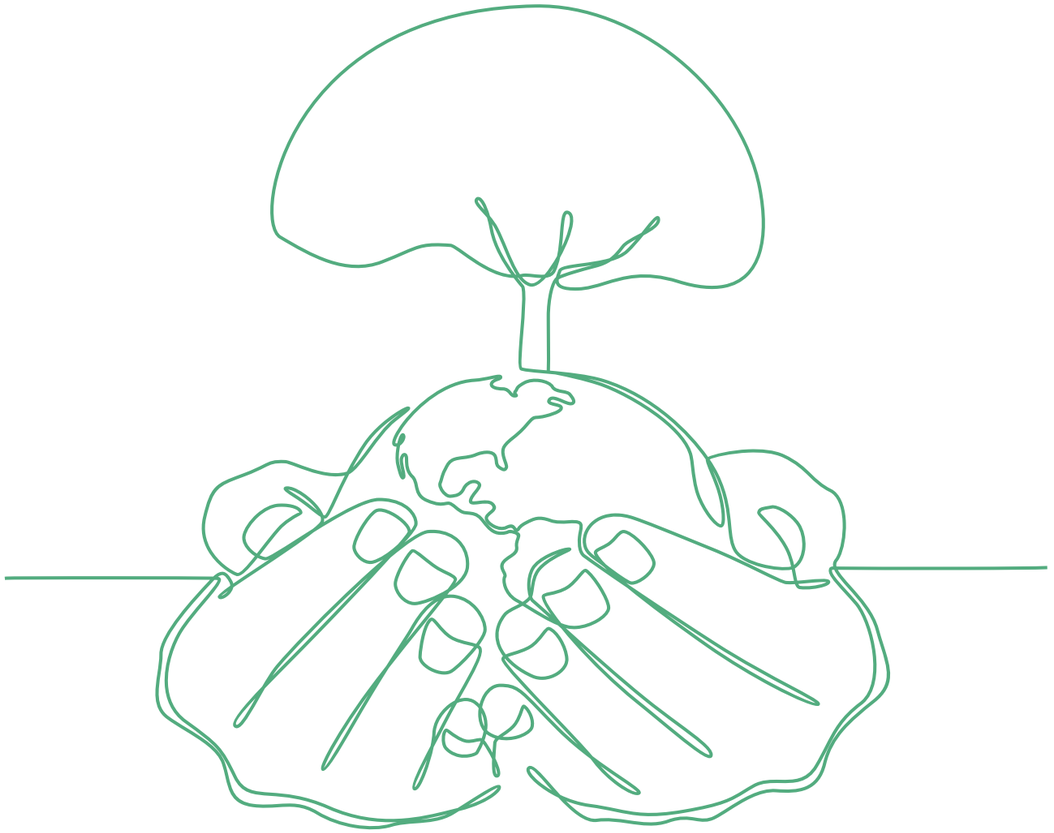


Legal compliance with environmental laws

Taiwan Glass (TGI)' goal is "zero pollution and zero disasters," and its compliance with government laws and regulations is an important business foundation as the Company's principle is "environmental protection and industrial safety first." TGI surpasses government regulations for the bare minimum of social responsibilities that a business is bound to fulfill. Any major amendments will be immediately communicated to relevant internal departments and examined so that optimizations can be made to prevent violation. None of TGI's factory sites encountered any major leakage or complaint regarding environmental impact in 2022.

Factory	Violations of Environmental Regulations	Amount of penalty (NTD)	Improvement Measures
Taoyuan Factory	Penalty imposed for violation against Air Pollution Control Act	100,000	A new supervisory unit for "Work Safety" has been added and operators are being instructed to keep operational logs in two copies, for which the head of department is required to sign off and forward to the supervisory unit for filing.

Note: Taoyuan Factory was penalized for violations that occurred in 2021, and 2022 was the year when the fines were paid. This occurrence is being disclosed in this year's report on conformity with GRI 2-27.

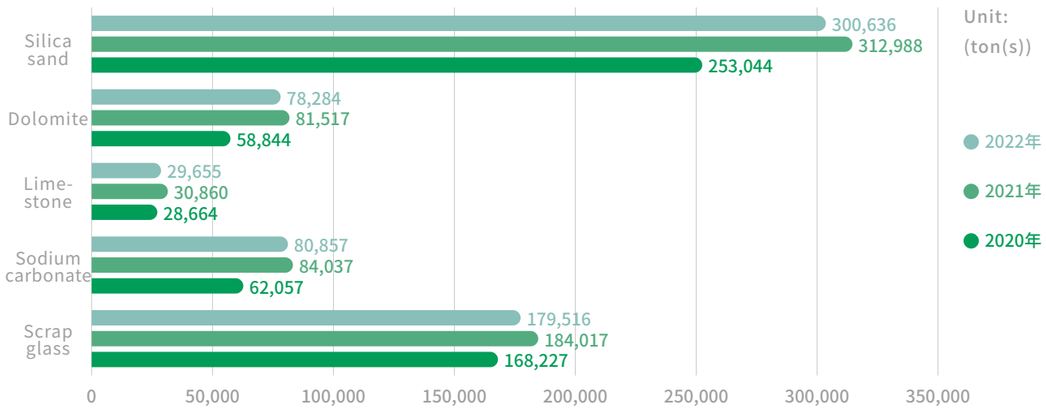


4.2

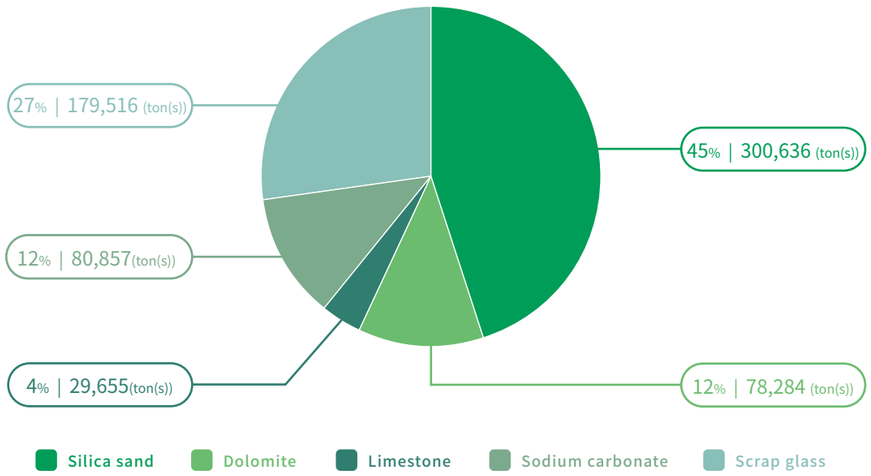
Energy/Resource Management

TGI's main products include flat glass, fiber glass, and glass containers, whereas main raw materials include silica sand, limestone, dolomite, sodium carbonate, and recycled scrap glass. Silica sand was the largest form of raw materials used in 2022, totaling 300,000 ton(s) and representing 43% of all materials. Percentage of raw materials used:

Volume of key raw materials used in the last 3 years (ton(s))



Volume of raw materials used in 2022 (percentage)



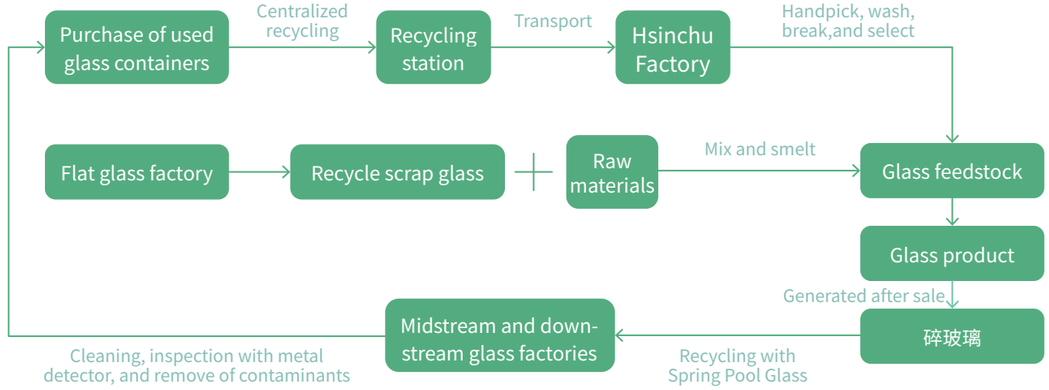
Note 1. Other raw materials such as kaolin clay, gerstley borate, and nepheline accounted for a smaller percentage and were not listed here.

Note 2. Calculation of raw materials covers only the production facilities (namely Taoyuan Factory, Hsinchu Factory, Taichung Factory, Lukang Factory, Lukang Flat Glass Factory, and Changpin Factory); the North Taiwan Branch is not a production site and has therefore been excluded

Circulation and reuse of glass

Glass is a material that helps reduce pollution to the environment. It is widely used by the general public and even international organizations and governments around the world have recognized the recyclability and reusability of glass. Scrap glass is not treated as waste in the glass industry, but an essential raw material for glass production. This is why TGI has established a recycled glass processing center to clean and reuse the recycled glass, regularly send samples to SGS to verify lead content, and reuse the recycled waste glass in large amounts in the production procedures at various factories. For example: the flat glass factory accepts recycled scrap glass as reusable materials, whereas the glass container factory recycles defective and waste products and smelts them along with other raw materials to reduce the use of silica sand and minerals for lower environmental impact. In addition to recycling waste glass from factory facilities, TGI also purchases used glass containers from the market, gathers waste glass at the recycling station, and engages recyclers to transport the recycled goods to Hsinchu Factory where they are selected, washed, broken, and remade into raw materials, and thereby reduce the amount of minerals used. Taiwan Glass cooperates with Spring pool Glass on the recovery of post-sales cullet generated by customers for the cullet sold to the middle and downstream glass factories, where it is cleaned and inspected using metal detectors to remove most of the metal pollutants such as stainless steel, aluminum, copper, and tin to improve production quality.

Scrap glass recycling diagram

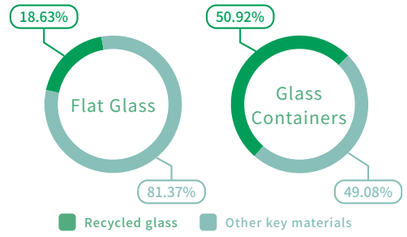


In 2022, the recycling rate of flat glass and container glass reached 18% and 51% respectively for a constant increase in the recycling rate.

Percentage of Recycled Glass Used Unit: %

Year/Product	Flat Glass	Glass container
2020	21.06%	47.92%
2021	19.37%	47.92%
2022	18.63%	50.92%

Percentage of Recycled Glass Used Unit: %



Energy Management

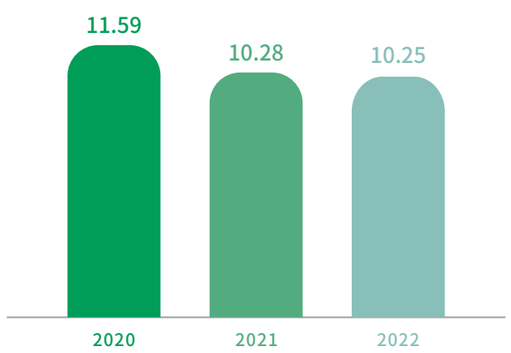
Taiwan Glass (TGI) has installed regenerators for heat exchange using furnaces to improve energy efficiency in the glass production process, and also uses energy conservation measures such as oxyfuel combustion tank furnaces with optimal control technology to reduce the environmental impact of operating costs. The main types of energy used include electricity, heavy oil, natural gas and diesel fuel, and non-electric or energy for sale (electricity, heat, cooling, steam). The usage of various types of energy over the years is as follows:

Energy consumption in previous years							
Year/Energy		Heavy oil (liters)	Diesel (liter)	Natural Gas (M^3)	LPG (KG)	Electricity (kWh)	Percentage of Electricity
2020	Total	75,560	1,193,605	47,721,881	38,325	524,221,915	28.74%
	Calorific Value (GJ)	3,036,416	42,015	1,598,683	1,939	1,887,199	
2021	Total	89,511	684,245	54,070,693	4,636	527,276,704	25.90%
	Calorific Value (GJ)	3,597,065	24,059	1,810,719	234	1,898,175	
2022	Total	64,592	637,319	69,720,056	83,847	484,668,284	26.03%
	Calorific Value (GJ)	2,595,668	22,410	2,334,785	4,234	1,744,786	

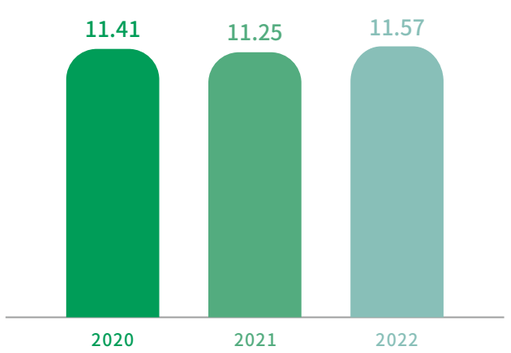
Note 1. Energy calculations for 2020 and 2021 cover only TGI's production facilities (namely Taoyuan Factory, Hsinchu Factory, Taichung Factory, Lukang Factory, Lukang Flat Glass Factory, and Changpin Factory), and exclude the North Taiwan Branch

Note 2. Energy calculations for 2022 cover TGI's production facilities (namely Taoyuan Factory, Hsinchu Factory, Taichung Factory, Lukang Factory, Lukang Flat Glass Factory, and Changpin Factory) and office building of the North Taiwan Branch

Energy intensity of flat glass (GJ/ ton(s))



Energy intensity of glass containers (GJ/ ton(s))



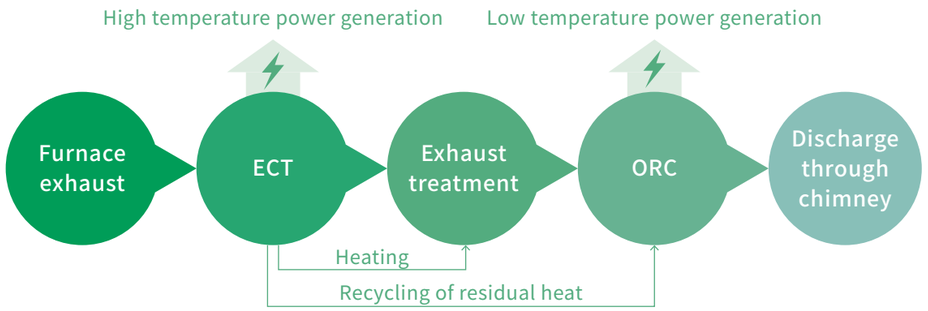
Note. Energy calculations for 2022 cover TGI's production facilities (namely Taoyuan Factory, Hsinchu Factory, Taichung Factory, Lukang Factory, Lukang Flat Glass Factory, and Changpin Factory) and office building of the North Taiwan Branch

Energy management highlights

Heat recycling at Taichung Factory

Taichung Factory recycles heat from combustion by directing exhaust through a dedicated treatment system to different areas for heating and power generation. There are two uses of the heat from exhaust:

1. Exhaust is directed through the treatment system to areas where heating is needed, which reduces the use of natural gas for heating.
2. Exhaust is used over two stages for maximum utility; heat at high temperature is directed to the Energy Conservation Turbine (ECT), whereas heat at low temperature is directed to Organic Rankine Cycle (ORC) turbine.



This project is currently in the design stage and installation is scheduled after cold repair (2026). The solution is expected to generate 2.54 million kWh of power in the future and lessen the use of natural gas by 368,000 cubic meters.

Green House Gases Management

Greenhouse Gas Inventory Policy

All employees take part in reducing energy, carbon, and greenhouse gas emission, and actions are being taken to promote awareness toward green production and to track emissions on a regular basis. All TGI factories observe rules of the Environmental Protection Administration and follow the sustainability development roadmap for TWSE/TPEX listed companies to execute and complete greenhouse gas surveys; the outcomes of which are reported in quarterly board of directors meetings. Changpin Factory and North Taiwan Branch began Scope 1 and Scope 2 survey in 2022, and the parent company expects to commence Scope 3 survey in 2023.

TGI calculates greenhouse gas emissions by including key emission sources such as heavy oil, diesel, natural gas, LPG, electricity, dolomite, limestone, and sodium carbonate. Emissions are distinguished between direct and indirect emissions; direct emissions arise from the various energy sources used in production (such as heavy oil, diesel, natural etc.), whereas indirect emissions arise from purchased electricity. Indirect emissions totaled 248,000 ton(s) CO2e in 2022, down 5% from 2021; indirect emissions from flat glass were measured at 74,000 ton(s), representing a 3% decrease from 2021; indirect emissions from glass containers were measured at 42,000 ton(s), down 8% from 2021; and indirect emissions from fiber glass were measured at 132,000 ton(s), down 17% from 2021. Greenhouse gas emission intensity was calculated at 1.32 ton(s), and has been decreasing in the last 3 years.

Carbon emission by factory

Factory/ Measurement	2022						
	Direct emissions	Sales intensity	Product intensity	Indirect emissions	Sales intensity	Product intensity	Total carbon emissions
North Taiwan Branch	204	-	-	177	-	-	382
Taoyuan Factory	41,680	18.03	0.61	60,528	26.18	0.88	102,208
Hsinchu Factory	113,534	39.64	0.84	41,909	14.63	0.31	155,443
Taichung Factory	124,367	127.69	1.41	47,176	48.43	0.53	171,542
Lukang Factory	28,007	17.53	8.45	71,860	44.96	2.95	99,867
Lukang Flat Glass Factory	124,617	86.85	0.61	17,017	11.83	0.08	141,634
Changpin Factory	240	0.32	0.01	9,781	12.93	0.54	10,021
Total	432,649	43.51	0.84	248,448	24.99	0.48	681,097

Note 1. 2022 data for Changpin Factory and North Taiwan Branch was internally surveyed. Meanwhile, TGI's Taoyuan Factory, Hsinchu Factory, Taichung Factory, Lukang Factory, and Lukang Flat Glass Factory are all required by the Environmental Protection Administration to disclose greenhouse gas emissions, and their data has all been verified by an independent third party (SGS).
Note 2. Greenhouse gas emissions are calculated using the operational control approach, by multiplying the measured data with emission coefficient and GWP value (emission coefficient is taken from Environmental Protection Administration's Greenhouse Gas Emission Coefficient Sheet version 6.0.3, whereas GWP value is taken from IPCC 2007 4th evaluation report). Greenhouse gases include CO2, CH4, N2O, and HFCs; there was no emission of PFCs, SF6, or NF3.
Note 3. Emissions are presented in ton(s) CO2e; product intensity is presented in ton(s) CO2e/million dollars of revenue
Note 4. Emission volume and intensity for Taichung Factory represents an aggregate between Taichung Factory and Taichung 3rd Flat Glass Factory

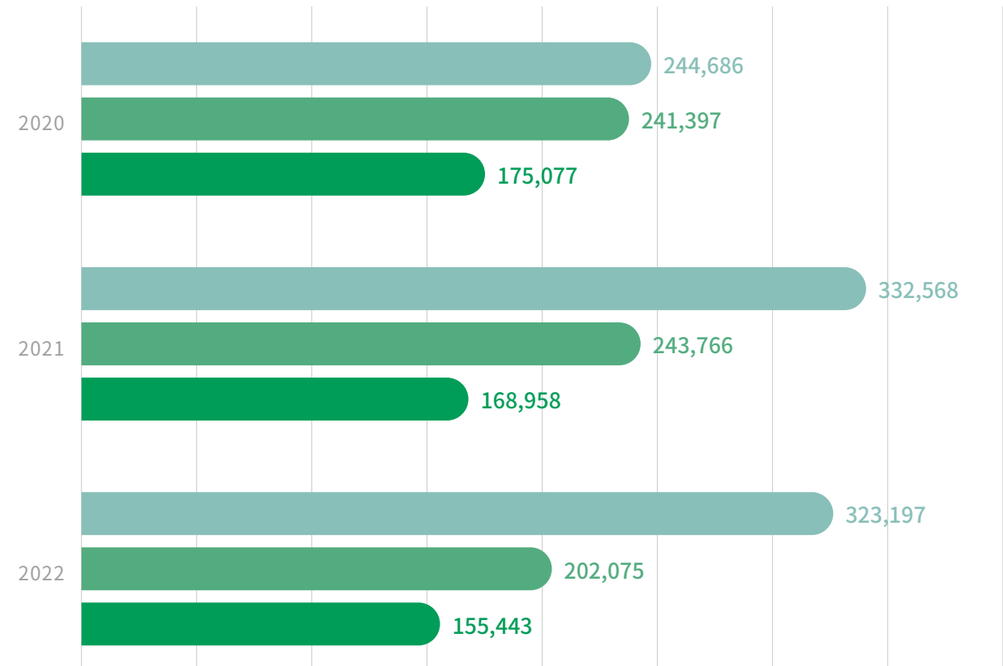
Carbon emission by product in previous years

Unit: ton(s) CO_2e

Product/Year	2020		2021		2022	
	Direct emissions	Indirect emissions	Direct emissions	Indirect emissions	Direct emissions	Indirect emissions
Flat Glass	192,834.00	51,852.00	273,121.00	59,447.00	249,223.08	73,973.99
Fiber Glass	87,149.00	154,248.00	86,303.00	157,463.00	69,687.79	132,387.64
Glass Containers	125,327.00	49,750.00	124,331.00	44,627.00	113,533.80	41,909.43
Subtotal	405,310.00	255,850.00	483,755.00	261,537.00	432,444.67	248,271.06
Total	661,160.00		745,292.00		680,715.73	

Note 1. TGI has changed the way greenhouse gas data is presented in this year's report to provide readers with a better understanding of environmental performance. Major emission sources have been converted using coefficients published by Environmental Protection Administration and Bureau of Energy across all factories, and data in the last two years have been amended accordingly.
Note 2. TGI engages a 3rd-party institution to conduct annual surveys on greenhouse gas emissions for the previous year. Survey data is uploaded onto the Environmental Protection Administration's National GHG Platform and onto the Market Observation Post System as required by laws.
Note 3. Calculation of emission intensity covers TGI's North Taiwan Branch and production facilities.
Note 4. Flat glass calculations cover Taichung Factory, Changpin Factory, and Lukang Flat Glass Factory; fiber glass calculations cover Taoyuan Factory and Lukang Factory; glass container calculations cover Hsinchu Factory.

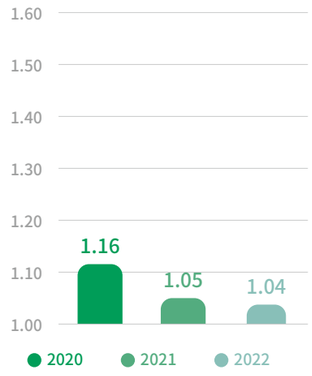
Emission by product category



TGI encourages all employees to contribute to energy and carbon reduction, and invites them to take part in the common goal of reducing greenhouse gas emission. Energy/carbon reduction plans and actions are being implemented across all factories to promote green production awareness, enforce regular tracking of carbon emissions, and ultimately reduce the amount of greenhouse gas emissions from production and activities.
Taichung Factory, Hsinchu Factory, Taoyuan Factory, and Lukang Flat Glass Factory have passed certification for ISO 50001 - Energy Management System since 2014 and continues to maintain certification to date. By creating an energy management system, TGI hopes to improve energy efficiency closely in line with operational strategies and goals over time. The system is further supported with PDCA (Plan-Do-Check-Action) practices to ensure ongoing improvements in energy utilization across the organization.

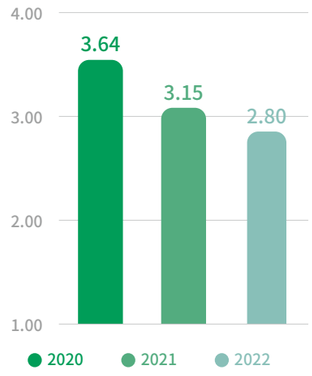
GHG emission intensity of flat glass

(ton(s) CO2e/ton of glass produced)



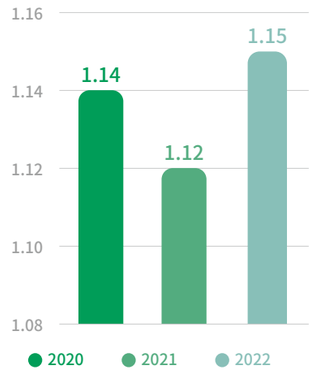
GHG emission intensity of fiber glass

(ton(s) CO2e/ton of glass produced)



GHG emission intensity of glass container

(ton(s) CO2e/ton of glass produced)



Energy and carbon reduction performance by factory

The energy and carbon reduction measures adopted at TGI's factory facilities had achieved prominent results in 2022, saving 4,299,456 KWH of electricity and 2,206,919 cubic meters of natural gas. Total emissions had reduced by 64,195 ton(s) compared to 2021, and in particular, Scope 1 emissions was 51,106 ton(s) lower whereas Scope 2 emission was 13,089 ton(s) lower compared to 2021.

Taoyuan Factory

1. **131,071** ton(s) of the wastewater discharged from backwashing of the resin softening tanks was recycled in 2022
2. Solar power equipment was acquired to generate approximately **2 million** kWh of electricity and save **NT$5 million** each year
3. Taoyuan Factory switched furnace fuel from heavy oil to natural gas in 2021, and later underwent an audit carried out by "Taiwan Green Productivity Foundation" on the Industrial Development Bureau's behalf in April 2022, in which it was assessed to reduce use of heavy oil by **5,822KL**/year, lower carbon emissions by **5,233 ton(s)**/year, and produce investment yield of **NT$14.77 million**/year
4. The Taoyuan Factory was recognized as an excellent firm for its voluntary energy conservation and carbon-reduction by the Ministry of Economic Affairs Industrial Development Bureau in 2022
5. Taoyuan Factory was named Taoyuan City Excellent Performer in Air Pollution Control in 2022

Hsinchu Factory

1. The factory accelerated use of renewable energy and had constructed **1,328.38 KWH** of power capacity by October 2022
2. To conform with the lowering of nitrogen oxide emission standards from 300ppm to 180ppm, TGI installed selective catalytic reduction (SCR) equipment at TS3, TS6, TS7, and TS8 in 2020 for a total of **NT$94 million**, which began operation in March 2022. Additional SCR equipment (including electrostatic precipitator) totaling **NT$53 million** was installed at TS2 in 2022 and later commenced operation in May 2022.
3. Hsinchu Factory has been designated by the Environmental Protection Administration, Executive Yuan, as a mandatory waste recycler, and its scrap glass treatment facility was awarded the Resource Cycling Foundation Label for "Non-plastic Waste Container"

Taichung Factory

1. Old air compressors (EAC4, EAC5, and EAC6) were replaced with new air compressors from Fusheng (including one fixed frequency and one variable frequency) to reduce energy consumption; annual power savings are estimated at **1,002,610 KWH**

Lukang Factory and Lukang Flat Glass Factory

1. **700KW** of TF-4 roof type solar system was completed, which is expected to save greenhouse gas emission by **455.173** ton(s) CO2/year
2. Lukang Factory completed **3,063** KWH of solar power system in 2022, which is expected to generate **4,471,980**KWH of electricity each year.

Changpin Factory

1. Adjustments were made according to the existing production line; a 300HP chiller was replaced with a 100HP chiller, which saves electricity by **720,000** KWH a year
2. Ongoing improvements to power usage at factory site during public holidays

TGI reduced carbon emission by a total of 7,361.29 ton(s) in 2022; the energy/carbon reduction measures adopted by various factories and the results achieved are explained in the following chart:

Fact \ Item	Energy Conservation	Type of Energy	Volume of Energy Saved (in standard units of measurement)	Volume of CO2 Reduced (ton(s))
Taoyuan Factory	Planned Implementation of Solar Panels	Electricity (KWH)	1,971,547.5	1003.52
	Improvements to energy conservation for the TT-6 Fabric Ventilation Fans by installing VFD	Electricity (KWH)	146,292	74.46
Hsinchu Factory	Upgraded TS-2 EP ID FAN 100HP to 125	Electricity (KWH)	104,099	52.3
	Used sensor lights at all toilets	Electricity (KWH)	74,825	38
Taichung Factory	Replaced old TF-2 air compressor	Electricity (KWH)	1,002,610	510.3
Changpin Factory	Reconfigured air compressors from 300HP to 100HP during public holidays	Electricity (KWH)	170,016	86.5381
	Reduced pressure of two circulation pump (from 50HZ to 40HZ) during public holidays	Electricity (KWH)	69,000	35.121
	Improved power draw for production water at water station (from 2 units to 1 unit)	Electricity (KWH)	261,048	132.8734
	Replaced 300HP chiller with 100HP chiller	Electricity (KWH)	720,000	366.48
Lukang Factory	4-foot fluorescent tubes were replaced with 4-foot LED tubes; in-factory lighting was changed from fluorescence tubes (38W) to LED tubes (18W) for energy conservation, and a total of 2,000 LED lights have been replaced	Electricity (KWH)	345,600	191.5
	The channel forehearth stage of furnace TL-1 now burns combustion air instead, which reduces gas usage	Natural gas	2,179,152	4094.6
	Changed high bay light (mercury lamp) to LED light	Electricity (KWH)	526,968	268.2
	Recycling of heat emitted through the bottom of boilers	Natural as	27,767	52.2
Lukang Flat Glass Factory	Installation of TF-4 roof type solar power system	Electricity (KWH)	894,250	455.2
Total carbon reduction across all factories (ton(s)):				7361.29

Results of Implementing Solar Panels in the factories

Taiwan Glass (TGI)' environmental sustainability policy actively promotes energy conservation, carbon reduction, and the use of renewable energy. The Company also complies with the Ministry of Economic Affairs' announcement of the "Regulations for the Management of Setting up Renewable Energy Power Generation Equipment of Power Users above a Certain Contract Capacity," stipulating that power users with a contracted capacity above 5000KWH are obligated to implement renewable energy equivalent to 10% of their contracted capacity. Taiwan Glass (TGI) is committed to promoting the implementation of solar panels in the factories, and will establish management regulations for renewable energy power generation equipment in response to the announcement of the Ministry of Economic Affairs for power users with a certain contracted capacity, and maximize energy conservation. TGI's construction plan for 2022 has the potential to bring 8,770 KWH of power capacity.

Hsinchu Factory used 104,599 kWh of solar power in 2022, which partially replaced the need for purchased electricity, lowered carbon emissions from energy use, and contributed to the sustainability of the environment.

Strategy	According to the Renewable Energy Development Act, energy-heavy industries are required to set up renewable energy sources equivalent to more than 10% of their contracted capacity that they will generate and use themselves			
Factory Promotion Progress	Construction progress		Power capacity constructed (KWH)	Construction expense (NTD)
Construction of Solar Power System - 2022	Taoyuan	All completed and connected to power grid by the end of 2022	1,993	92,289,745
	Hsinchu		1,328	65,014,554
	Lukang		3,063	150,563,007
	Lukang Flat Glass		700	-
	Taichung		1,685	72,255,708
	Total across all factories		8,769	380,122,744

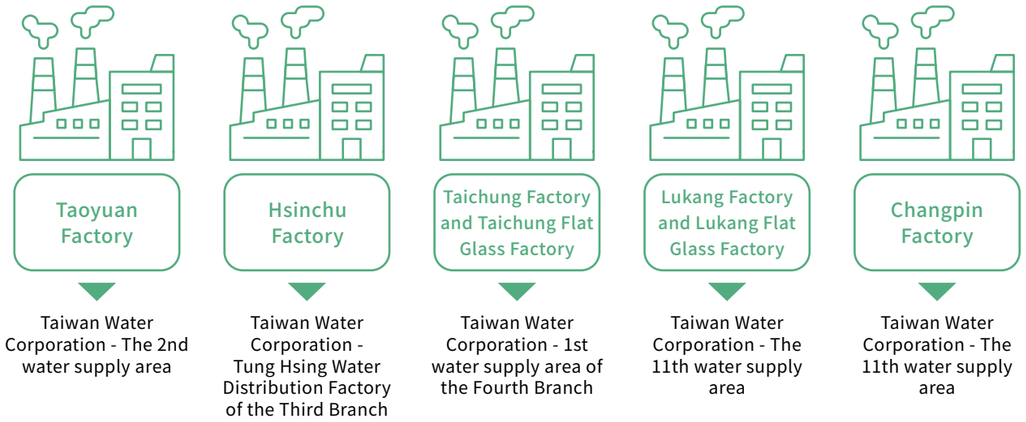
Implementation of Solar Panels in Taiwan Glass (TGI) factories

Water reduction management

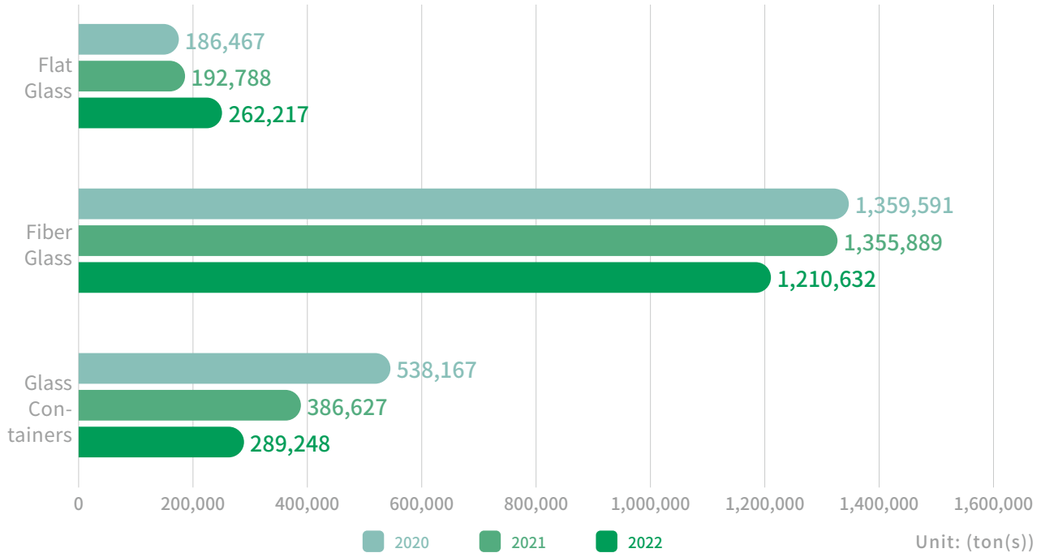
Water resource policy

Increase water efficiency, prioritize purchase of water-saving equipment, enhance green production awareness, and circulate use of water resources.

TGI uses large volume of water in glass production activities such as glass edging, blanking, boring etc. TGI persistently improves water-saving technologies at various factories and explores feasible ways to reduce water usage for the sustainability of water resources. Factories use water for three main purposes: production activities, living activities, and others (some of which is used for the exhaust system). By using reclaimed water instead of fresh water, TGI is able to reduce the amount of water drawn from the public water supply. Water drawn by TGI's factory facilities posed no major impact on the local water source. Water sources are explained in the following chart.



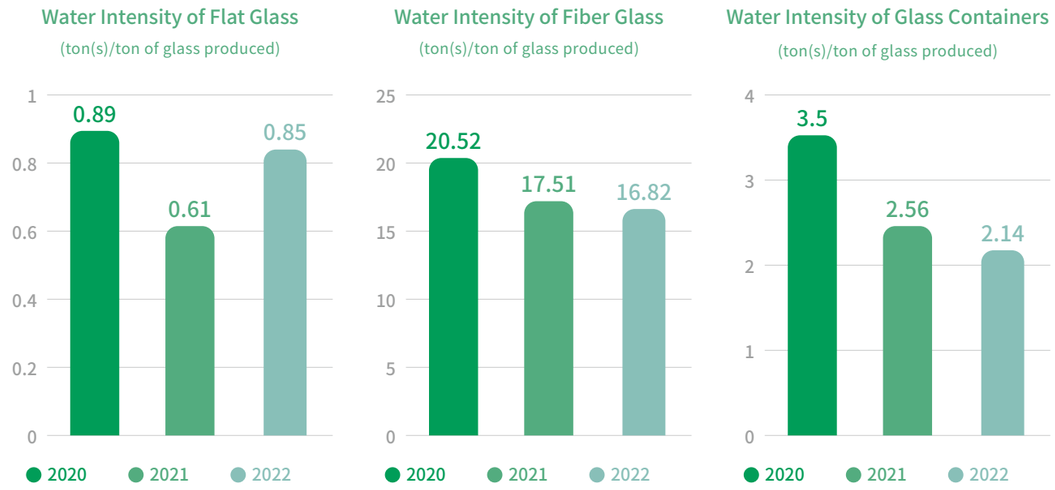
TGI used approximately 1.71 million ton(s) of water and discharged 1.04 million ton(s) of effluent across all factories in 2022. The Company has made improvements to some of its production procedures since 2017, using reclaimed water as diluting liquid. As the water recycling system became robust, TGI was able to slow down the increase in water usage.



Year	2020	2021	2022
Water drawn (million liters; ML)			
Surface water	0.00	0.11	0.33
Groundwater	493.78	335.10	255.08
Sea water	0.00	0.00	0.00
Production water	1,674.09	1,602.23	1,614.52
Water from 3rd parties	1,655.07	1,672.30	1,557.45
Total water drawn	3,822.94	3,609.74	3,447.38
Water discharge (million liters; ML)			
Surface water	0.00	0.00	0.00
Groundwater	387.00	260.60	255.08
Sea water	0.00	0.00	0.00
Water from 3rd parties	885.43	920.90	828.35
Total water discharge	1,272.43	1,181.50	1,083.43
Water consumption (million liters; ML)			
Total water consumption	2,550.51	2,428.24	2,363.94

Note: 2020 data on water from third parties, total water discharge, and total water consumption was amended and differed from the figures presented in reports of the two preceding years.

In terms of water intensity, TGI reported 0.69 ton of water per ton of flat glass produced and 16.82 ton(s) of water per ton of fiber glass produced, which was 0.69 ton lower compared to 2021 and marked the 3rd consecutive year of decrease; meanwhile, water intensity for glass containers was reported at 2.14 ton(s) of water per ton of glass container produced, down nearly 20% from 2021. Overall, TGI has made prominent progress in water conservation.



Previous environmental protection awards won by TGI

2020

Taoyuan Factory

Obtained Certificate of Cleaner Production Assessment from the Industrial Development Bureau

Hsinchu Factory

Won "Award of Excellence in Water Conservation Improvement" from Water Resources Agency, Ministry of Economic Affairs

2021

Taoyuan Factory

Named "2021 Excellent Firm for the Reduction of Industrial Greenhouse Gases" by the Industrial Development Bureau, Ministry of Economic Affairs, and received medal of accomplishment

Hsinchu Factory

Won "Bronze Award" in the 3rd Annual Enterprises Environmental Protection Awards - Manufacturing Industry Category

TGI Environmental protection award highlights - 2022

2022 Excellent Firm for the Reduction of Industrial Greenhouse Gases

Taoyuan Factory switched furnace fuel from heavy oil to natural gas in 2022; this change significantly reduced greenhouse gas emissions, and for which the factory was named "2022 Excellent Firm for the Reduction of Industrial Greenhouse Gases" by the Industrial Development Bureau, Ministry of Economic Affairs, and was awarded a medal of accomplishment.

Taoyuan City Excellent Contributor to Air Pollution Prevention

In support of the local environmental protection policy, Taoyuan Factory made significant progress in the reduction of air pollutants by replacing heavy oil-based boilers with natural gas-based boilers, which is estimated to reduce carbon by 3,079 ton(s) a year, and for which it was named "Taoyuan City Excellent Contributor to Air Pollution Prevention" by Taoyuan City Department of Environmental Protection in 2022.

Passed 2022 Green Factory Label Review

Taoyuan Factory changed conventional fluorescent tubes to LED tubes, including 3,220 tubes in the green building area. This replacement was expected to save 420,589 kWh of electricity and reduce carbon by 214 ton(s). The Factory also acquired Clean Production Label in 2020 and Green Building Label in 2021, and passed Green Factory Label review and received certificate in 2022

Awarded the Resource Cycling Foundation Label for "Non-plastic Waste Container

Hsinchu Factory took part in the "Mandatory Waste Recyclers Evaluation" organized by the Environmental Protection Administration, Executive Yuan, in 2022. The evaluation covered four main aspects including "environmental image," "operational quality," "fire and workplace safety," and "materials," and TGI's Hsinchu Factory was awarded the Resource Cycling Foundation Label for "Non-plastic Waste Container."

Reuse of water resources

Given the prevalence of extreme weather, water management has become a critical issue to all industry participants. TGI has been promoting water conservation measures across all factories for many years. By improving the water resource system, reducing water usage per unit of product made, and conveying change of water usage behavior among employees, TGI has made significant progress. Total volume of water circulated and recycled in 2022 was reported at 194,189,483 ton(s); the volume and percentage recycled by factory site in 2022 are explained below:

Volume (m3) and percentage of water recycled by factory site in 2022		
Measurement/Site	Total volume of water circulated+recycled	Recycling rate (reuse rate)
Taoyuan	63,377,867	99.04%
Hsinchu	12,014,050	97.65%
Taichung	23,062,095	99.42%
Lukang	92,000,857	99.35%
Lukang Flat Glass	12,671,855	99.58%
Changpin	14,026,871	99.47%

Note: Volume of water circulated: refers to the volume of water used and recycled by a water user for reuse by the same water user.
Note: Volume of water recycled: refers to the volume of water used and recycled by a water user (system) for reuse by a different water user (system).
Note: Recycling rate (reuse rate): (total volume of water circulated+recycled) / total water usage*100%
Note: Recycled water that Taichung Factory had supplied to Taiwan Autoglass Ind. Corp. was excluded from calculation for Taichung Factory.

Water conservation highlights by factory

Taoyuan Factory

Taiwan Water Corporation - The 2nd water supply area

Wastewater discharged from backwashing of the TT1,7 resin softening tank was recycled and used for washing TT1 E/S SYS.

131,071 ton(s) of water was recycled in 2022

Hsinchu Factory

Dongxing Water Purification Plant

Recycling and reuse of backwashing liquid:
1. Backwashing liquid is treated using water treatment equipment before discharge
2. Plans have been made to collect the wastewater and pump it to the backwashing liquid recycling equipment located near TS-6; once the wastewater has been treated to meet clean water standards, it will be recycled back into the TS-6 clean water pool for reuse.

Reduction of groundwater extraction: **1,800 ton(s)/month**

Reduction of effluent **1,800 ton(s)/month**

Lukang Factory

Taiwan Water Corporation - The 11th water supply area

Increased recycling of U/T(1,2) fabric washing liquid

Reduced water usage by **4,268 ton(s)/year**

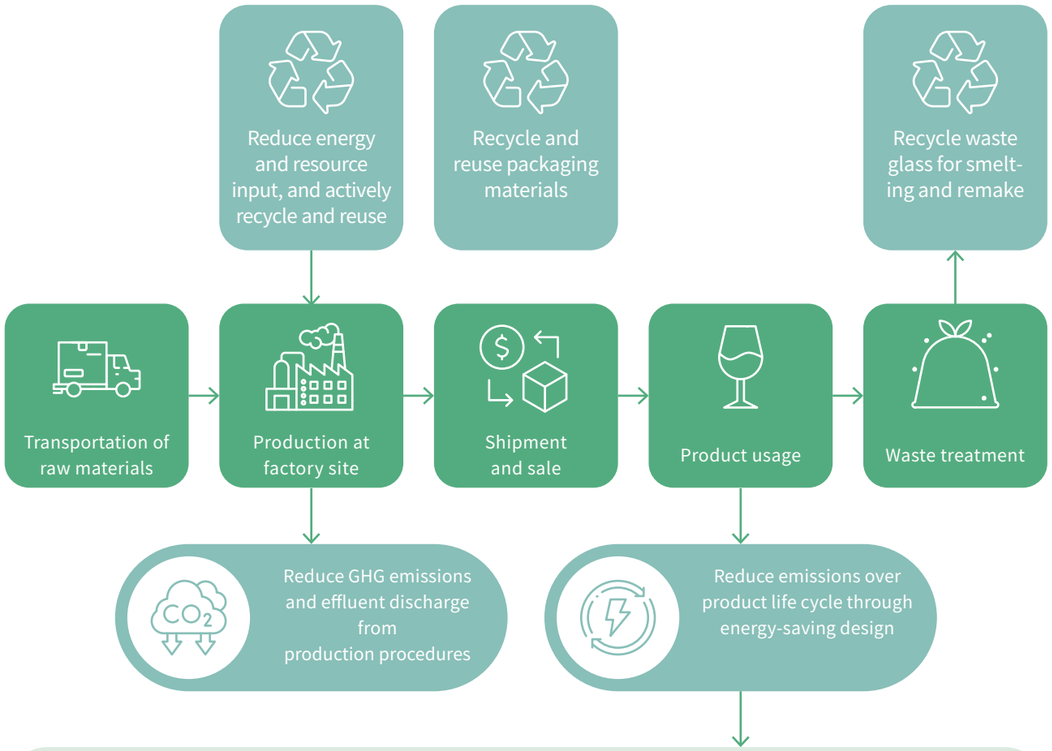
Lukang Factory: Storage equipment of fabric washing liquid

The U/T(1) COND.W pool draws water primarily from fabric washing liquid followed by soft water. By using the redundant FRP 12-ton RO tank as a buffer tank for fabric washing liquid at U/T(1), we were able to recycle additional 624 ton(s) of liquid. The concept of fabric washing liquid storage is explained below:

1. If the volume of fabric washing liquid is greater than the volume of water used at U/T(1)COND.W, the excess fabric washing liquid is stored inside the 12 M^3 buffer tank for fabric washing liquid.
2. During the acid wash process when no fabric washing liquid is available, the excess fabric washing liquid can be drawn from the buffer tank to replenish the U/T(1) COND.W pool.

4.3 Green Production Management

Green production strategies of Taiwan Glass (TGI)



Taiwan Glass (TGI) is committed to improving the efficiency at which raw materials, energy, and resources are used and reducing the environmental cost of production activities as a response to rising environmental protection awareness around the world and manufacturers' shift toward green production procedures. Meanwhile, Taiwan Glass (TGI) maintains and analyzes environmental data, keeps track of resource consumption, and evaluates greenhouse gas intensity, air pollution, wastewater, and the waste associated with its production activities. By imposing rigorous requirements and enforcing the clean production philosophy, Taiwan Glass hopes to contribute to the sustainability of Earth's environment.

Management of Packaging Materials

TGI's packaging materials management policy demands effective control and management over the use and recycling of packaging materials for glass, and encourages reduction in the use of packaging materials. Furthermore, TGI promotes implementation of a recycling system to ensure that glass packaging materials are properly recycled and reused. Through recycling of packaging materials, TGI hopes to effectively reduce environmental impact, minimize resource wastage, and promote circular economy.

Packaging material	Recycling policy	Volume of packaging materials used	Quantity recycled
Pallets	Pallets used in internal sales are recycled for thermal treatment or reuse	3,832 ton(s)+3,875pcs	3,826 ton(s)+3,133pcs
Paper tube	Repurchase and recycling of paper tube	18,030pcs	3,655pcs
PE fabric	PE fabric leftovers are moved to junkyard for recycling	12 ton(s)	12 ton(s)

Note 1. Due to differences in factory activity, recycling of packaging materials was calculated only for Taoyuan Factory, Hsinchu Factory, Changpin Factory, and Lukang Factory.
Note 2. Lukang Fiber Glass Factory uses paper tubes and pallets that have different dimensions; packaging materials are presented in pieces instead as the weight can not be estimated reliably.

Waste management

Taiwan Glass (TGI) has established two principles for waste disposal: improve production yield and reduce waste volume, and recycle reusable waste.

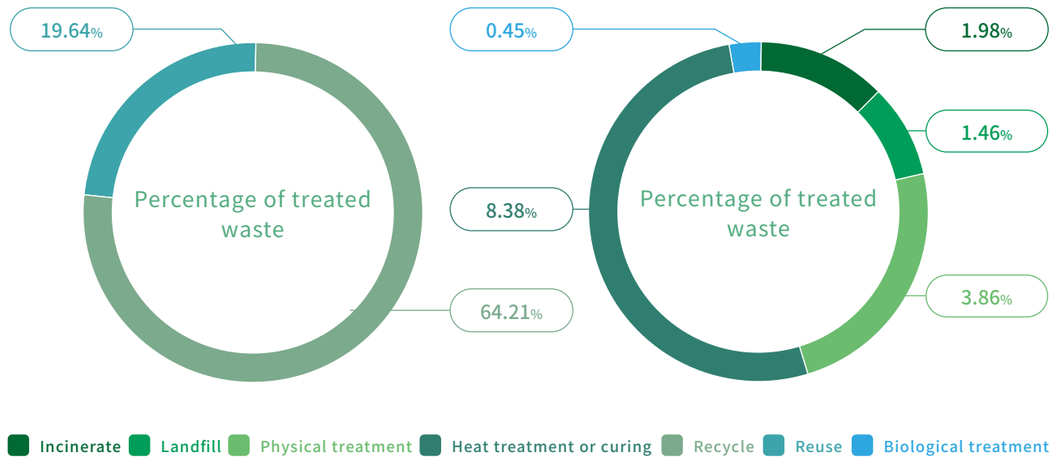
All recyclable waste is handed over to qualified recyclers for disposal; reusable pallets and packaging materials are also recycled and reused for the production procedure. This not only reduces the cost, but also reduces the impact on the environment as the selection of raw materials and packaging materials contribute towards the Company's fulfillment of CSR. The Taiwan Glass (TGI) factories will also continue to sort garbage, recycle, and reduce waste.

Qualified waste treatment companies are commissioned to handle non-recyclable wastes, which is then handed over to the local environmental protection bureau incineration plants and landfills for treatment. The Company also commissions qualified treatment firms for the treatment and recycling of the sludge generated from the waste-water treatment. The disposal of non-recyclable industrial waste is handled by qualified treatment firms after filling out the "Commission Form for Joint Treatment and Management of Industrial Waste" online, and then handed over to qualified treatment sites for disposal. Taiwan Glass (TGI) continues to carry out waste management, and work towards the goal of recycling and waste reduction.

Taiwan Glass (TGI) factories Implementation of Waste Management	
Taoyuan	The principle for waste management of the Taoyuan Factory is to improve the production yield to reduce the amount of generated waste, and recycle the reusable waste.
Hsinchu	Sludge from the wastewater treatment process is entrusted to qualified processors for reuse. Recyclable waste such as waste paper, scrap iron, and waste plastic are also handed over to qualified recyclers for disposal. We will continue to require sorting of garbage, recycle, and reduce waste.
Taichung	The Taichung Factory commissions qualified professional waste treatment firms with the disposal and recycling of its waste, and the waste is classified and disposed based on the nature of the waste.
Changpin	To achieve waste reduction, the Factory conducts on-site inspections on the implementation of recycling every week. Those who do not carry out proper recycling will be issued warnings, and are required to make improvements.
Lukang	To be eco-friendly and carry out energy conservation, the Lukang Factory continues to recycle industrial waste and has a dedicated unit for the waste management to do as much recycling of valuable waste.

Waste disposal volume (ton(s)) - 2022

General industrial waste								
Treatment Method	Waste composition	Taoyuan Factory	Hsinchu Factory	Taichung Factory	Changpin Factory	Lukang Factory	Lukang Flat Glass Factory	Total
Incinerate	Waste plastics, waste rubber, waste from living activities	68.86	266.23	81.9	8.2	20.3	2.35	447.84
Landfill	Scrap glass mixtures	0	330.8	0	0	0	0	330.8
Physical treatment	Waste filament, waste wood, waste glass, waste lubricant, waste thermal insulation, non-hazardous precipitator ash or mixture	0	224.03	0	475.6	151.12	26.08	876.83
Heat treatment or curing	Sludge	1,128	565.84	9.57	66.79	142.69	0	1,912.89
Recycle	Waste pallet, non-spun yarn, sludge, waste paper, waste iron, waste wood, waste aluminum cap, waste brick	12,872	1,633.11	0	0	0	0	14,505.11
Reuse	Waste lubricant, waste fiber glass, waste fire brick, waste wood	0	596.14	638.28	0	3,204.14	0.73	4,436.28
Biological treatment	Nightsoil	0	0	102.22	0	0	0	102.22



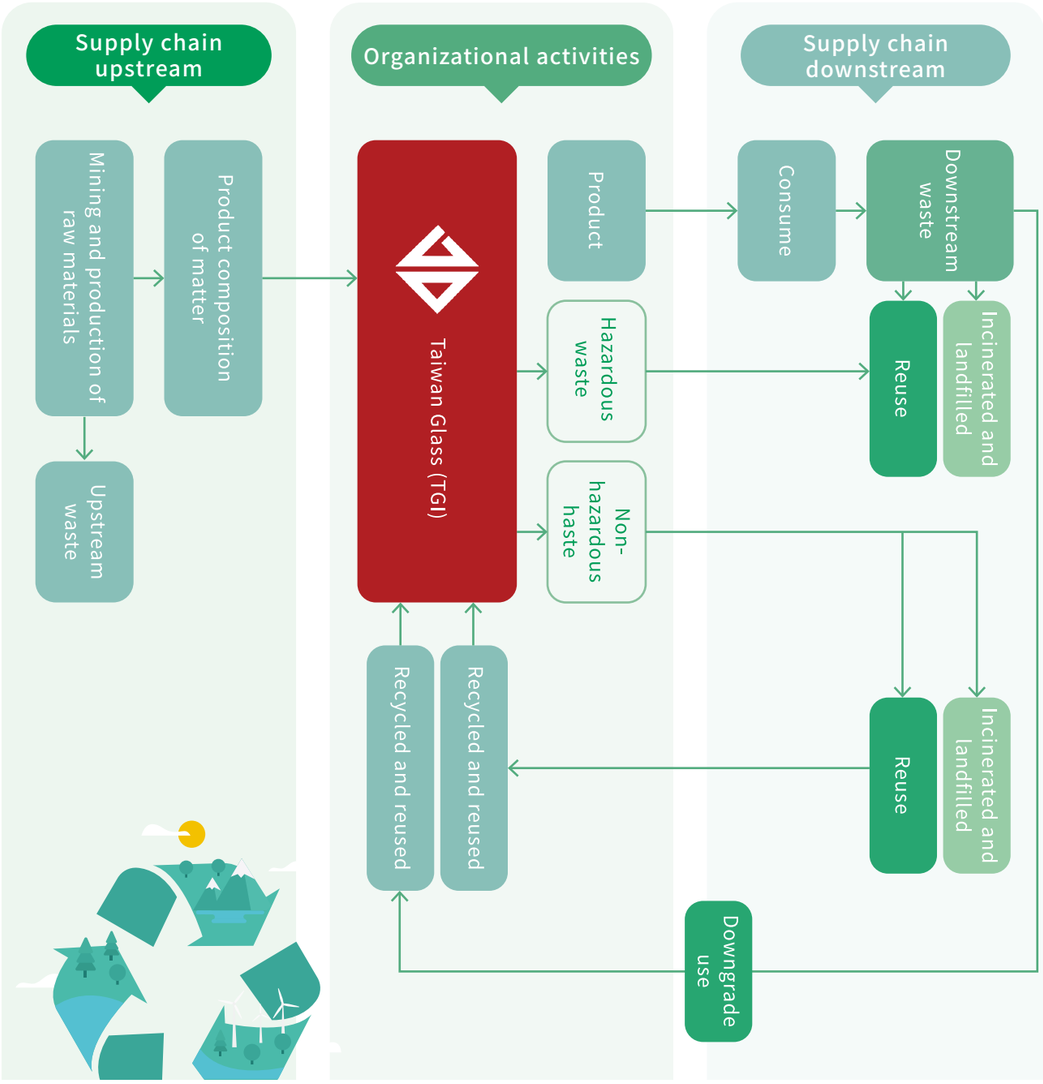
Circular Economy

The concept of circular economy encourages and enables the recycling and reuse of waste within the glass industry. Glass is a material that can be infinitely recycled. Recycling and reuse of waste glass helps reduce consumption of raw materials and energy by a significant extent. Doing so also lessens the industry's dependency on natural resources, reduces the volume of energy used, and minimizes negative impact on the environment.

TGI continually improves the sustainability of its products by targeting product design and the manufacturing process. Optimization of product design, such as using less materials and making use of biodegradable materials, helps reduce the volume of waste generated. Circular economy also encourages use of greener and renewable energy sources for glass production, which contributes further to the reduction of carbon emission and environmental impact.

Circular economy brings new opportunities and creates new value chain for TGI. Furthermore, the waste glass recycled has the potential to be turned into new products such as glass containers and construction materials. This greatly expands TGI's industry value chain and promotes growth of green economy.

TGI's Circular Economy Value Chain



Commitment of critical resources to circular economy

TGI continues to improve its materials recycling technology and has committed significant amount of resources into the circular model. By recycling and reusing waste to the fullest potential, TGI is able to reduce its needs for raw material and lower the volume of waste generated.

Item	Critical resource	Description
Recycled water	Wastewater discharged from backwashing of resin softening tank was recycled	The recycled water was used for washing TT1 E/S SYS., and 131,071 ton(s) of water was recycled in 2022 in total.
Recycled glass	Increased percentage of recycled glass added into production	Due to war and changes in the economy, several industry peers had halted or reduced production in 2022, which put recycled CULLET in excess supply in the second half of the year. Meanwhile, Hsinchu Factory increased the percentage of recycled materials added into production to an average of 50% in 2022.
Reuse of waste filament	Reused instead of landfill	No waste filament was landfilled in 2022; instead, TGI handed waste filament over to certified treatment service providers for reuse.
Recycling and reuse of backwashing liquid	Backwashing liquid is treated using water treatment equipment before discharge	Plans have been made to collect the wastewater and pump it to the backwashing liquid recycling equipment located near TS-6; once the wastewater has been treated to meet clean water standards, it will be recycled back into the TS-6 clean water pool for reuse. Doing so reduces groundwater extraction by 1,800 ton(s)/month and effluents by 1,800 ton(s)/months.

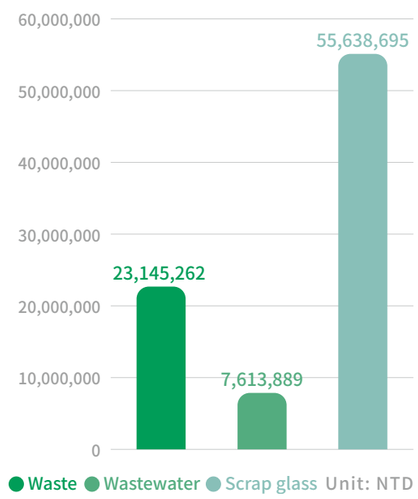
Economic Benefit Assessment of Circulation/Recycling

TGI implements total circulation and recycling policy for waste, wastewater, and waste glass. According to the outcome of assessment, waste recycling lessens dependency on landfill and reduces risk of pollution to the environment. Next, wastewater recycling allows TGI to make more efficient and repeated use of water to lessen consumption of water resources. Lastly, by recycling, smelting, and remaking glass, TGI cuts down on the use of raw materials while at the same time reduces energy consumption and carbon emission. Overall, TGI's circulation and recycling measures have accomplished prominent results whether in terms of economic performance, environmental protection, and resource efficiency.

TGI estimates having generated NT$86,397,846 of economic benefit in 2022 from the recycling of waste, wastewater, and waste glass. In terms of economic benefit, waste recycling has the potential to save materials cost or increase revenue by NT$23,145,262; wastewater recycling has the potential to save water cost by NT$7,613,889, whereas waste glass recycling has the potential to save materials cost or increase revenue by NT$55,638,695.

Lukang Factory, in particular, reused 5.69 million ton(s) of dust collected from air pollution control equipment to replace mirabilite in 2022; using a waste disposal rate of NT$17,700 per ton, the factory was estimated to save NT$10,071,300 in waste disposal charges. Glass washing liquid from the glass washer is filtered and redirected back into the grand pool for reuse by the entire factory. This measure saved 27,296 ton(s) of water in 2022; using the current tax-inclusive water rate of NT$12.5 per ton, total savings were estimated at NT$341,200. Lukang Factory recycles glass that has been cut or is defective or of poor quality. Some of which can be recycled and reused as raw materials to save cost. 20,823 ton(s) of waste glass was recycled and reused in 2022; using the waste glass base rate of NT$2,500 per ton, total savings were estimated at NT$52,057,500.

Economic benefits from recycling - 2022



Note 1. Due to differences in factory activity, circulation and recycling was calculated only for Taoyuan Factory, Hsinchu Factory, Changpin Factory, Lukang Factory, and Lukang Flat Glass Factory.
Note 2. Taoyuan Factory and Lukang Factory did not recycle waste glass, and waste of Lukang Flat Glass Factory was counted into Lukang Factory.
Note 3. Economic benefits from waste cycling include waste iron, waste paper, and waste wood. Waste disposal charge is calculated at NT$17,700 per ton, tax-inclusive fresh water charge is calculated at NT$12.5 per ton, and waste glass is calculated using the base rate of NT$2,500 per ton.

Air pollution control

TGI's primary goals are to meet the emission standards set by the Environmental Protection Administration, and progressively lower emissions of pollutants based on actual measurements. TGI's improvements begin with production procedures; by replacing heavy oil and diesel with natural gas and using specialized equipment to treat pollutants, the Company is able to reduce air pollution and use of fossil fuel for the sake of employees' health.

We observe ISO 14001 for air pollution management and duly enforce air pollution prevention practices. All equipment are regularly serviced and maintained depending on their characteristics, and inspected by the accountable department. Any abnormality in air pollution control or emissions would trigger an emergency response, in which employees are required to investigate the cause and regain control in the shortest time possible to reduce pollution from production activities.

Taoyuan Factory tests pollution sources regularly for air pollutants to maintain air quality, and any finding that exceeds standard will have to be improved upon immediately. With regards to the different pollution sources: furnaces are tested twice a year whereas boilers are tested once a year. Outcomes of the 2022 test were entirely compliant with legal standards.

Emission intensity of air pollutants for each product is shown in the figure below. Taiwan Glass (TGI) will carry out stricter control for various types of air pollutants to hopefully reduce pollutant emissions while increasing production capacity, and do its part to protect the global environment and public health.

Emission of air pollutants in previous years (total across all factories) Unit: kg

Air pollutant test \ Year	2020	2021	2022
NOx	817,046	727,271	892,107
SOx	324,950	274,642	198,901
VOCs	69,148	70,023	65,397
Particulate matter	61,894	54,377	32,447

Air pollutant control highlights of each factory

Lukang Flat Glass Factory: Addition of CF dust collector for exhaust treatment

In an attempt to achieve more efficient removal of particulate matters and protect SCR equipment, Lukang Flat Glass Factory added CF (ceramic filter) dust collection equipment to the front end of the emission pipeline, which works in conjunction with existing electrostatic precipitator (EP) to remove particulate matters at greater efficiency. The addition of CF helped reduce emission of particulate matters and improve stability of air pollution control equipment. It has been tested that combining the two yielded a particulate matters removal efficiency rate of 99.73%.

CF dust collector

Taichung Factory: Dust purification and reuse

In 2022, Taichung Factory cooperated with ITRI on a dust purification and reuse project in which the two parties explored ways to purify toxic substances and recycle them for reuse. Experiments on the purification stage have already been completed, and plans are being made to reuse the purified content for production and to determine whether it compromises the quality of glass products. This project has the potential to lower output of toxic waste in the future.

Hsinchu Factory: Addition of SCR denitrification equipment for improved air quality

In response to global warming, Hsinchu Factory added several sets of SCR denitrification equipment to meet the lowered nitrogen oxide emission standard from 300ppm to 180ppm. Total cost of equipment installation was estimated at NT$94 million, and the new devices were used in production in March 2022. The factory also added TS-2 SCR denitrification equipment (including electrostatic precipitator) in 2022; total cost of equipment installation was estimated at NT$53 million, and the new devices were in production in May 2022.

Item \ Year	2021	2022
Nitrogen oxide	109ppm	59ppm

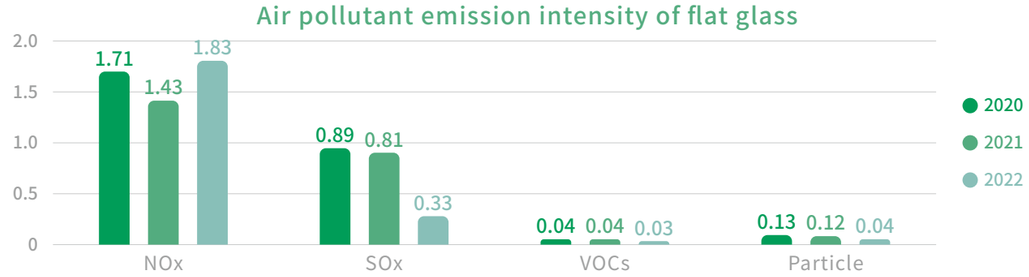
TS-3 SCR denitrification equipment

TS-7 SCR denitrification equipment

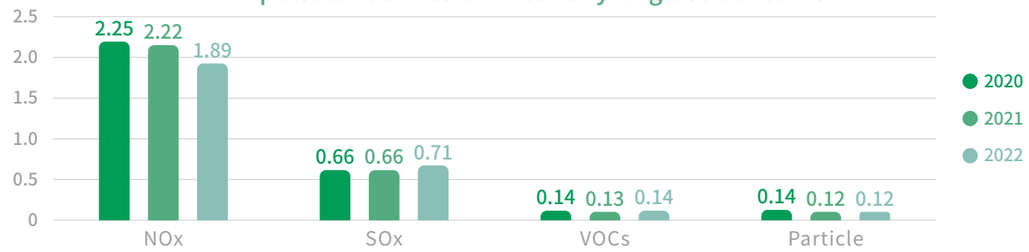
Hsinchu Factory: Natural gas/heavy oil fuel switch for TS-2 furnace

Hsinchu Factory expects to replace its existing furnace with hybrid models that run on both natural gas and heavy oil in an attempt to lower energy cost, air pollution, and carbon emission. Two to three hybrid furnaces will be introduced in the future, and a natural gas/heavy oil fuel switching system will be installed before August 2023 for TS-8 and TS-7.

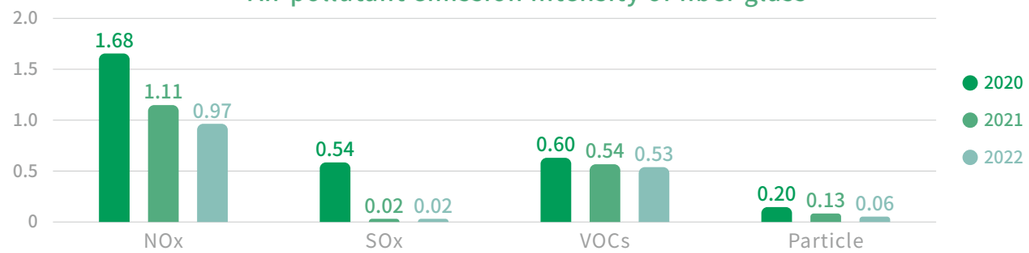
Air pollutant emission intensity of flat glass



Air pollutant emission intensity of glass container



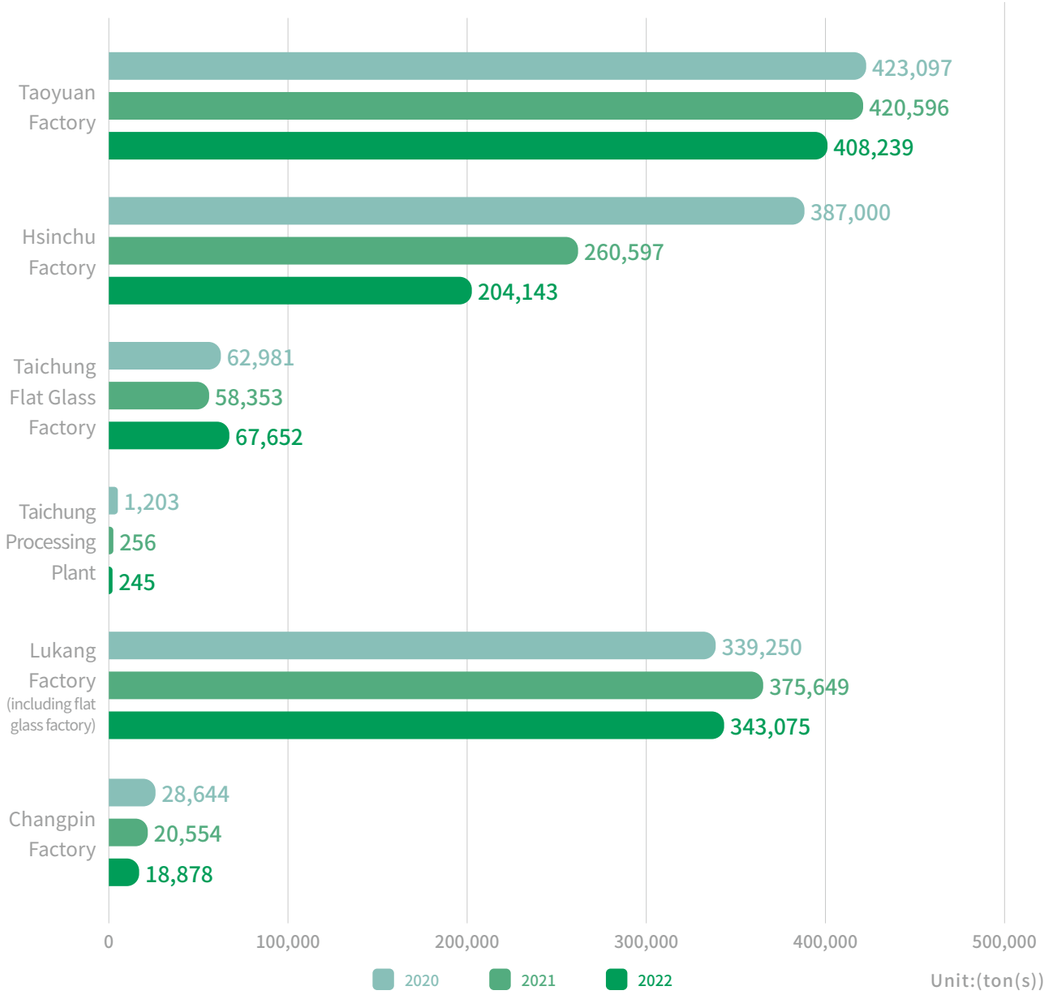
Air pollutant emission intensity of fiber glass



Water pollution management

All TGI factories have installed wastewater treatment equipment to reduce the amount of pollutants contained in industrial wastewater below the local wastewater discharge standards, and thereby prevent production pollutants from entering the water body. Wastewater from living activities is also treated and discharged into the water body only if it meets the legal standards. TGI discharged 1,042,232 ton(s) of wastewater in 2022, down 8.25% from 2021. Wastewater from Taoyuan Factory is treated internally before discharging into the water treatment center of the industrial zone. The quality of raw water and wastewater is tested regularly to ensure conformity with discharge standards, whereas water pollution control measures are examined twice a year. The outcomes of all tests conducted in 2022 found the factory having met the discharge standards of the water treatment center of the industrial zone.

Wastewater volume by factory in the last 3 years



Details:
1. The Taiwan Glass (TGI) wastewater volume is presented based on the emission amount paid by each Factory. The measured emission amount of the Taichung Processing Factory includes the emission amount of Taiwan Auto Glass Co., and the measured emission amount of the Changpin Factory includes the emission amount of TG TECO Vacuum Insulated Glass Corp.
2. The Taichung Factory and Taichung Processing Factory recycle the wastewater for cleaning filter fabrics and road surfaces. Therefore, the measured amount for the payment is actually lower than the actual emission amount.
3. In 2021, the Hsinchu Factory increased its use of recycled water to significantly reduce the use of groundwater, and installed proportional valves in the water pants to reduce groundwater extraction.

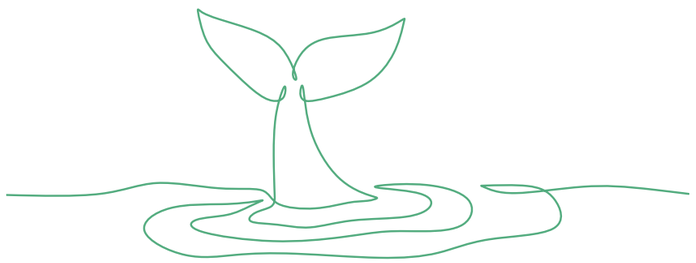
Locations of wastewater discharge and related regulations and standards

Factory	Location of discharge	Related regulations and standards
Taoyuan Factory	Guanyin Industrial Park Operations Center	Water quality standards of Guanyin Industrial Park sewage
Hsinchu Factory	Sanxinggong River	Effluent standard
Taichung Factory (including Taichung Processing Plant)	Discharged into the sewer system of the Related Industrial Park	Water quality standards of Taichung Port Special District Water Resource Recycling Center
Lukang Factory (including Taichung Processing Plant)	Sewers of Chang Hua Coastal Industrial Park	Management policy on use of Chang Hua Coastal Industrial Park Sewer
Changpin Factory	Sewers of Chang Hua Coastal Industrial Park	Management policy on use of Chang Hua Coastal Industrial Park Sewer

Effluent test values by factory - 2022

Water pollution test/ Factory		Taoyuan Factory	Hsinchu Factory	Taichung Factory	Taichung Processing Plant	Lukang Factory and Lukang Flat Glass Factory	Changpin Factory
Chemical oxygen demand (COD) (mg/l)	Test value	219	19.2	21.4	21.5	40.21	34
	Emission standard	560	<100	800	800	<640	<640
Suspended solids (SS) (mg/l)	Test value	21.1	4.5	13.7	16.5	12.09	7.3
	Emission standard	480	<50	600	600	<400	<400

1. TGI is charged for the amount of wastewater discharged; with the exception of Hsinchu Factory, which reports wastewater volume and is charged once every six months, all other factory sites will have their wastewater tested and discharge volume calculated by the industrial zone on a monthly basis. TGI also complies with rules of the Environmental Protection Administration by engaging a third-party institution to make sample tests and file reports.
2. With regards to the presentation of test values, Hsinchu Factory presents the quarterly average test value measured by the external institution, whereas all other factories present the monthly average test values measured by the respective industrial zones. For this reason, test value of Taichung Processing Plant includes Taiwan Autoglass Ind. Corp. whereas the test value of Changpin Factory includes TG TECO Vacuum Insulated Glass Corp.



4.4 Climate Action

Taiwan Glass (TGI) TCFD Core Framework

Reports from the Global Economic Forum in recent years indicated that extreme weather events and climate action failure are among the top five global risks, and they have been ranked as the top 2 risks in the past 4 years. Therefore, Taiwan Glass (TGI) introduced TCFD (Task Force on Climate-Related Financial Disclosures) framework with the four aspects of "governance," "strategy," "risk management," and "indicators and targets" to formulate strategies and actions for climate change, which will hopefully mitigate the impact of climate risks.

Governance

The Board of Directors is the highest governance unit on climate issues of Taiwan Glass (TGI) as it is responsible for supervision and decision-making, and the "ESG Committee" regularly reports the progress of climate risks and opportunities to the Board of Directors.

- Board of Directors

The Board of Directors formulates the medium and long-term sustainable development goals of Taiwan Glass (TGI), and is responsible for integrating the Company' s cross-departmental resources, identifying climate issues related to the Company' s operations, formulating climate strategies, tracking the achievement of targets, and regularly reporting the implementation to the Board of Directors.

- ESG Committee

Strategy

Carry out climate risk and opportunity identification on a regular basis.

- ESG Committee

Analyze the possible financial impact of major climate risks, and formulate contingency and preventive measures to enhance the Company' s climate resilience.

- ESG Committee and Management of each Factory

Risk Management

Integrate major climate risk and opportunity issues and corresponding control measures, and regularly review and track them.

- ESG Committee

Review changes in policies, regulations, technologies, markets, and goodwill on transformation risks and opportunities every year; also regularly review the assessment of physical risks, transformation risks and opportunities

- ESG Committee

Indicators and Targets

- Analyze the impact of climate risks and opportunities based on Factory conditions, and outline management policy.
- Regularly conduct supplier evaluations in response to the TCFD risk identification results, and reduce production risks caused by insufficient raw materials.
- Phase out high-energy-consuming equipment according to Factory demands.
- Plan to implement solar power and annually increase the usage percentage of renewable energy, and implementation is expected to be completed by the end of 2022.

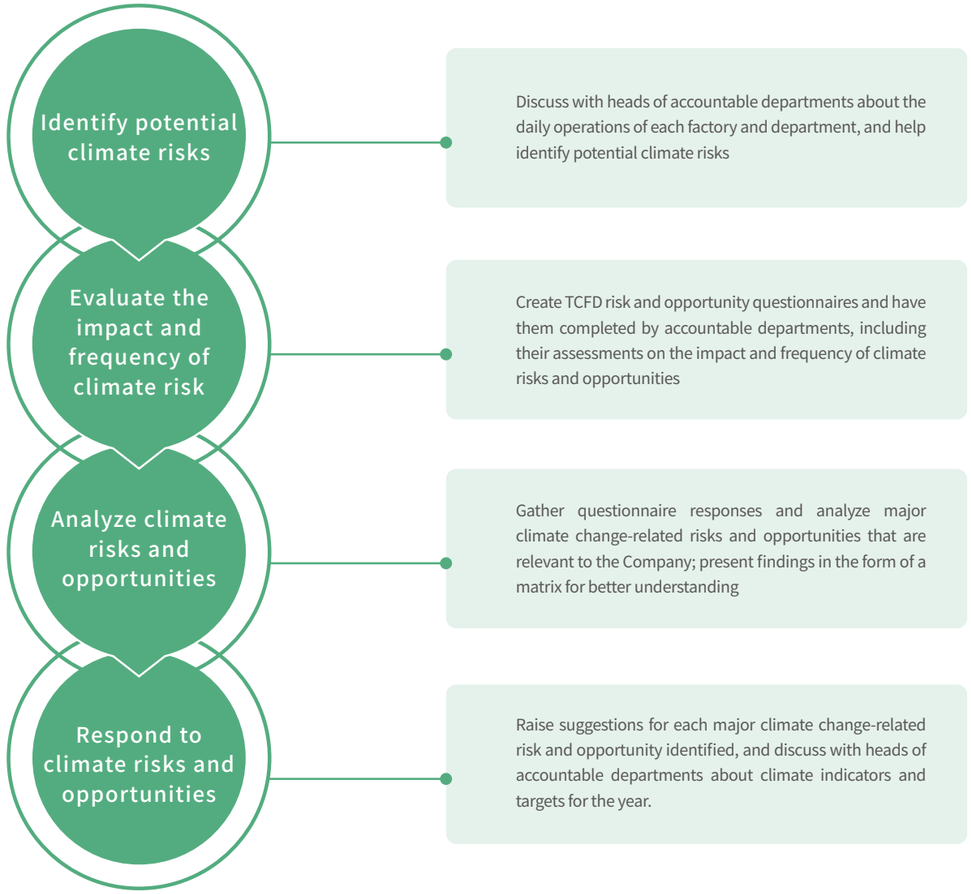
- Taiwan Glass (TGI) factories

Identify Climate Change Risks and Opportunities

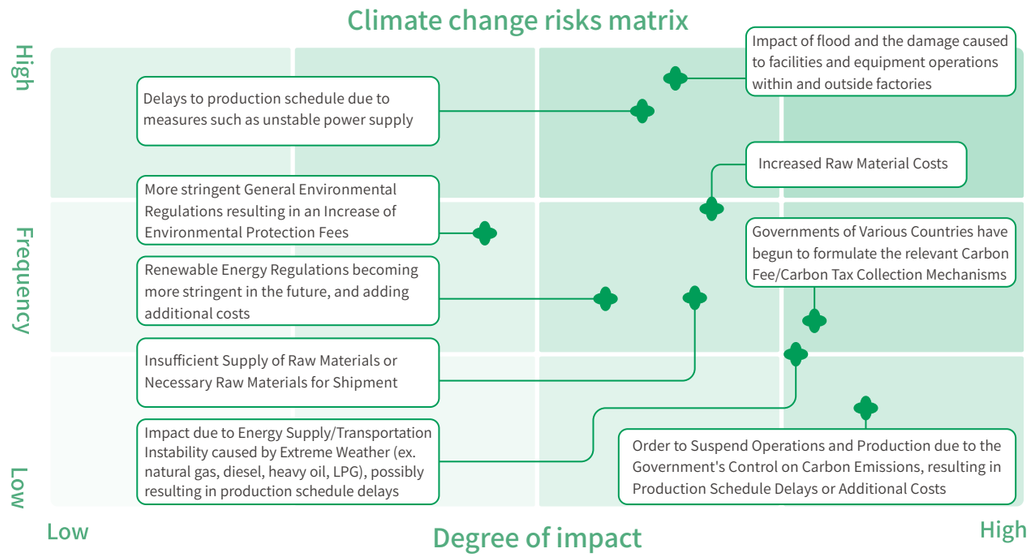
TGI worked together with external consultants and experts to distribute surveys to employees of each Factory, and carried out rigorous analysis after collecting the surveys. Matrix analysis was used based on the two parameters of "occurrence frequency" and "degree of impact," and a total of 9 major climate change risks and 7 high potential future climate opportunities were identified.

Description of the identification process

The Company will use the TCFD's physical risks, transition risks, and climate change opportunities as the direction of interviews, and meetings with external consultants and the directors of various factories and departments of Taiwan Glass (TGI) to jointly identify possible climate change risks and opportunities. The focus is then placed on the actual climate change risks that the Company will face and potential future opportunities during daily operations, and the design and distribution of surveys to analyze major climate change risks and opportunities to formulate an appropriate climate change management policy for the Company.



Taiwan Glass (TGI) Climate Change Risks and Opportunities



Risk Evaluation	Risk Issues	Risks	Stakeholders
Physical risk	Intensification of Extreme Weather Events	Impact of flood and the damage caused to facilities and equipment operations within and outside factories	Taiwan Glass (TGI), Supply Chain, Customers
		Delays to production schedule due to measures such as unstable power supply	Taiwan Glass (TGI), Supply Chain, Customers
	Production Schedule Delays	Impact due to Energy Supply/Transportation Instability caused by Extreme Weather (ex. natural gas, diesel, heavy oil, LPG), possibly resulting in production schedule delays	Taiwan Glass (TGI), Supply Chain, Customers
	Raw Material Related	Insufficient Supply of Raw Materials or Necessary Raw Materials for Shipment	Taiwan Glass (TGI), supply chain, customers, employees
Transition risk	Environmental Regulations	Renewable Energy Regulations becoming more stringent in the future, and adding additional costs	Taiwan Glass (TGI), Supply Chain, Customers
		More stringent General Environmental Regulations resulting in an Increase of Environmental Protection Fees	Taiwan Glass (TGI), Supply Chain, Customers
	Carbon Fee Issues	Governments of Various Countries have begun to formulate the relevant Carbon Fee/Carbon Tax Collection Mechanisms	Taiwan Glass (TGI), Supply Chain, Customers
	Production Schedule Delays	Order to Suspend Operations and Production due to the Government's Control on Carbon Emissions, resulting in Production Schedule Delays or Additional Costs	Taiwan Glass (TGI), Supply Chain, Customers
	Raw Material Related	Increased Raw Material Costs	Taiwan Glass (TGI), Customers

Description of Climate Change Risk

Climate Change Risk Events ▶ Impact of flood and the damage caused to facilities and equipment operations within and outside factories

Description of Risk Impact
Extreme weathers such as Typhoons and heavy rains are starting to cause disasters (e.g. flood) of unprecedented scale. These disasters have the potential to damage buildings, operations, and information equipment and pose a direct threat to all business locations.

Potential Financial and Operational Impact
The additional need to maintain or purchase new equipment increases operating costs, and the higher frequency of equipment damage may disrupt operations and delay delivery, thereby giving rise to compensations.

Opportunities
Floods may cause large-scale damage to buildings, vehicles, and infrastructures. The need to repair or rebuild after a disaster may increase demand for glass and related products, such as windows, glass panels, and facade materials.

Management Policy or Response Measures
1. Observe climate change and the effects it has on weathers and disasters, keep up to date on current affairs for possible scenarios, and follow ISO 14001(8-ES-B10) on emergency response.
2. Monitor the mediation measures imposed in countries around the world, and help local authorities and industrial parks implement training and measures in response to potential climate risks.
3. Enhance flood prevention equipment to prevent instability of power supply at times of flood

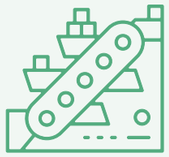
Indicators and Targets
1. Conduct regular checks on flood prevention equipment at factory sites, and make sure that they are usable when needed.
2. No facility within or outside factory premise was damaged by flood in 2022

Climate Change Risk Events ▶ Delays to production schedule due to measures such as unstable power supply

Description of Risk Impact	Unstable power supply has affected production operations and reduced glass yield, resulting in scrapped glass and untimely deliveries.
Potential Financial and Operational Impact	Increase in operating costs, possible interruption to operations, and delays in product delivery will result in customers losing confidence in Taiwan Glass (TGI).
Opportunities	Taiwan is facing the risk of power shortage or unstable supply and with the need for energy-conserving glass possibly increasing significantly in the future, adding energy-conserving glass can create new business opportunities for Taiwan Glass (TGI).
Management Policy or Response Measures	1. Each plant has implemented a Uninterruptible Power Supply System and tests them regularly as they are activated when power is unstable or shut off, other unnecessary energy consumption is turned off to minimize production risks. 2. Adjustments to the Processing Procedure: For example, when part of the small flat glass production is shut down, hand production can be used to replace machine production.

Indicators and Targets

1. When a power outage occurred in 2022, the emergency power system failed to start normally 0 times.
2. Check the UPS regularly to avoid equipment damage. During the cold repair in 2020, the battery equipment was replaced and the UPS could be used for approximately 30 minutes.
3. Regularly start and test the diesel generators to avoid failures when they are required to generate power.



Climate Change Risk Events ▶ Increased Raw Material Costs

Description of Risk Impact	Raw material suppliers have increased carbon emission costs (carbon fees or carbon taxes), energy costs and logistics costs to meet low-carbon requirements, which is further reflected in the price of raw materials.
Potential Financial and Operational Impact	1. Increased Safety Inventory and Reduced Funding Flexibility. 2. Increased Operating Costs and Decrease of Profit.
Opportunities	If downstream customers are more willing to purchase circular economy glass containers while Taiwan Glass (TGI) continues to increase the ratio of waste glass in its products, it will reduce the amount of purchased raw materials and the cost of raw materials. This contributes to the circular economy and reduces costs, and makes the supplier the preferred firm by downstream customers.
Management Policy or Response Measures	1. Regularly conduct supplier evaluations to ensure stable supply of raw materials, assess the carbon footprint of the raw materials, and carry out planning for carbon reduction by the suppliers. 2. Add upstream raw material suppliers, and compare the prices of other qualified suppliers. 3. Increase the ratio of waste glass added to the products, and reduce the amount of raw material used. 4. All factories maintain minimum inventory of raw materials (2-3 months for foreign supplies and 2-4 weeks for domestic supplies). 5. Stipulate long-term contracts for important raw materials that require suppliers to make regular and quantitative deliveries.

Indicators and Targets

1. Raw material cost increases <10% by 2030.
2. Inventory of raw materials was maintained in 2022.
3. Increase the use of waste glass as input material by 2% a year, provided that supply remains ample.

Climate Change Risk Events ▶ Governments of Various Countries have begun to formulate the relevant Carbon Fee/Carbon Tax Collection Mechanisms

Description of Risk Impact	Taiwan Glass (TGI) is a leading glass enterprise and may be listed as a priority subject for taxation by the government, which will result in the overall increase of production costs for its products.
Potential Financial and Operational Impact	Increase of Operating Costs, affecting the Competitiveness of Product Prices.
Opportunities	Customers will turn to make procurements from low-carbon emission suppliers and with the increased demand for high-end energy-conserving products such as coated glass, Taiwan Glass (TGI) can establish a presence in the Net Zero supply chain.
Management Policy or Response Measures	1. Match the Government's Net Zero Emissions progress, and plan its Carbon Emission Reduction Roadmap. 2. Reduce carbon emissions: Replace heavy oil with natural gas under the conditions that natural gas reducing carbon emissions and having favorable prices. 3. Implement solar panels.

Indicators and Targets

1. No violations have occurred according to relevant government regulations.
2. Gradually change to a hybrid combustion design in response to the furnace's service life and cold repair schedule, and reduce greenhouse gas emissions.
3. The solar panels are expected to be implemented and start generating electricity by the end of 2022. The scale of implementation for each Factory is different, please refer to 4.2 Management of Energy Resources for more details.
4. The Lukang Flat Glass Plate Factory partially replaced the use of heavy oil with natural gas, which is estimated to reduce the annual use of heavy oil by 68.472 kilograms.
5. Increase the use of natural gas by at least 50%.
6. The missed payments for Carbon Fees/Carbon Taxes since it has been levied is 0.

Climate Change Risk Events ▶ Impact due to Energy Supply/Transportation Instability caused by Extreme Weather (ex. natural gas, diesel, heavy oil, LPG), possibly resulting in production schedule delays

Description of Risk Impact	Forklifts (diesel) were unavailable for use as large sheets or extra-heavy glass could not be delivered after they were produced, which possibly hinders production.
Potential Financial and Operational Impact	1. Hinderance of production resulting in idle equipment could potentially result in delayed deliveries. 2. In addition to increasing labor costs, the additional use of manual handling also presents concerns regarding work-related injuries when handling glass.
Opportunities	The use of manual electric forklifts reduces the risk of delays in production schedules for Taiwan Glass (TGI), and makes the supplier the preferred firm by downstream customers.
Management Policy or Response Measures	Set the load limit of the electric forklifts, and the pieces of glass placed on the forklifts cannot exceed the load limit.

Indicators and Targets

1. The inventory for heavy oil should be maintained for at least 1 month of usage to avoid fuel shortages.
2. There were no production schedule delays caused by measures such as lacking natural gas supply/transportation instability.
3. The power supply improvement plan for switching to LPG gas supply was completed in 2022.

Climate Change Risk Events ▶ Insufficient Supply of Raw Materials or Necessary Raw Materials for Shipment

Description of Risk Impact	Shortage of stock for upstream suppliers due to climate change, resulting in no raw materials available for production. Those with minor shortages will reduce production, and those with severe shortages will suspend production. Restarting the furnace for production after a suspension may take up to half a year.
Potential Financial and Operational Impact	Increase in operating and raw material costs, and possibly failing to meet customer requirements may affect customer willingness to take delivery. This will result in loss of orders and overdue fines, reduced revenue, and even interruptions to the Company’s operations.
Opportunities	1. Implement a customer-friendly procurement policy, increase the percentage of local procurement, and reduce carbon emissions from logistics. 2. Adopt a multi-supplier strategy to diversify supply risks, stabilize the supply chain, and create potential business opportunities.
Management Policy or Response Measures	1. Demand forecasting and information sharing for supply chain management. 2. Adjust safety inventory and select reliable, high-quality, and affordable suppliers. 3. Assess the feasibility of backup suppliers, and add other sources of supply.

Indicators and Targets

1. There were 0 events of insufficient supply of raw materials or necessary raw materials for shipment.
2. Increased the primary inventory of raw materials to 60 days of use, and the inventory of raw materials at factories is to be kept as full as possible.

Climate Change Risk Events ▶ Order to Suspend Operations and Production due to the Government's Control on Carbon Emissions, resulting in Production Schedule Delays or Additional Costs

Description of Risk Impact	Taiwan Glass (TGI) is an energy-heavy industry and when regulations require the control of carbon emissions, the Company may face risks of partial suspension and shutdown.
Potential Financial and Operational Impact	Some of the equipment in the factories are machines that cannot be shutdown and if shutdowns are required, the equipment may suffer damage and shutdowns will also reduce the Company’s revenue.
Opportunities	Reduce energy consumption and improve equipment efficiency, implementing solar power, and using more green electricity to reduce carbon emissions not only reduces additional costs, but also makes the Company the preferred firm by customers.
Management Policy or Response Measures	1. Reduce carbon emissions, switch to natural gas, and implement solar power 2. Build exhaust control equipment with higher specifications.

Indicators and Targets

1. There were no reductions in production in 2022.
2. Increase the use of natural gas by at least 50%.
3. Continue to identify regulations, and formulate responses to regulations.
4. Implement solar power generation. The scale of implementation for each Factory is different, please refer to 4.2 Management of Energy Resources for more details.

Climate Change Risk Events ▶ Renewable Energy Regulations becoming more stringent in the future, and adding additional costs

Description of Risk Impact	The increase in operating costs due to changes in regulations resulted in situations such as payments of cash or transfer for administrative execution.
Potential Financial and Operational Impact	Implementation of green power will increase operating costs.
Opportunities	Using green electricity to reduce the usage of supply mains and greenhouse gas emissions not only reduces additional costs, but also makes the Company the preferred firm by customers.
Management Policy or Response Measures	1. Implement solar panels. 2. Commit resources into the research and development of innovative and low-carbon products, and make ongoing improvements to in-factory energy efficiency.

Indicators and Targets

1. Solar panels at certain factory sites have been completed and have been generating electricity since 2022. The scale of implementation is different at each factory. Please refer to 4.2 Management of Energy Resources for more details.
2. Continually promote Certificate of Cleaner Production Assessment and Green Building Certificate for Lukang Factory and Taoyuan Factory

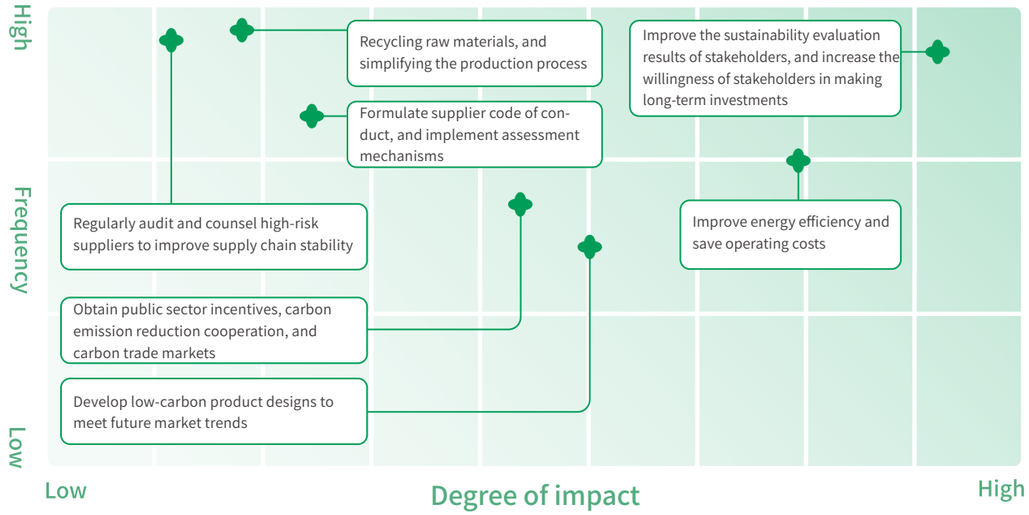
Climate Change Risk Events ▶ More stringent General Environmental Regulations resulting in an Increase of Environmental Protection Fees

Description of Risk Impact	After the implementation of the total greenhouse gas control regulations, the increase in greenhouse gases will be controlled by the competent authority. This will result in restrictions to orders and production, which will result in increased operating costs.
Potential Financial and Operational Impact	Eat into the production profits as water costs, carbon fees, and raw material costs will continuously increase.
Opportunities	Actively search for innovative technologies or production procedures such as recirculated water and recycled glass to reduce exhaust emissions and improve recycling rates.
Management Policy or Response Measures	1. Formulate relevant issues such as water and energy conservation, and continue to improve the production yield and reduce the output of waste glass. 2. In 2017, Taichung Factory introduced Selective Catalyst Reduction Equipment (SCR) to reduce the concentration of nitrogen oxide and meet regulatory requirements. 3. TP-4 in 2021, CF was introduced to improve the service life of back-end exhaust equipment.

Indicators and Targets

1. There were no missed payments for environmental protection fees in 2022.
2. There was no increase of environmental protection fees caused by more stringent general environmental regulations
3. The nitrogen oxide emission concentration was controlled below the regulatory emission standard of 180ppm.
4. 2022 Exhaust Re-modification Project.

Climate change opportunities matrix



Climate opportunities and implementation strategies

Climate Change Opportunity Events ▶ Improve the sustainability evaluation results of stakeholders, and increase the willingness of stakeholders in making long-term investments

Opportunity Issues	Stakeholders	Indicators and Targets
Increase Willingness to Make Investments	Taiwan Glass (TGI), Supply Chain, Customers	Evaluation will continue in 2022. Lightweight bottles to account for 45% of the production in 2030.

Description of Opportunity Event

Disclose the net zero carbon emission schedule and strategy, which helps build investors' confidence in the sustainability operations of the Company, enhance the Company's image, and help obtain external funding.

Potential Financial and Operational Impact

1. Investor recognition of the Company's business model and objectives.
2. Improve the sustainability evaluation results.
3. The injection of external funding is beneficial for enterprises to expand

Management Policy or Response Measures

1. Establish a carbon reduction schedule and goals based to the government's Net Zero Emissions Roadmap.
2. Supply Chain CSR Management Evaluation[1].
3. Continue to promote the weight reduction

[1] TGI has been implementing "Supply Chain CSR Evaluation" since 2015. The Company conducts annual evaluations on how certain new suppliers and existing suppliers perform with regards to environmental protection, labor practice, human rights, social practice, and product responsibilities/impacts using consistent standards. Through this process, we hope to determine whether suppliers are able to make voluntary improvements and share social responsibilities on an ongoing basis.

Climate Change Opportunity Events ▶ Recycling raw materials, and simplifying the production process

Opportunity Issues	Stakeholders	Indicators and Targets
Circular Economy	Taiwan Glass (TGI)	200mt of dust was removed from exhaust control equipment in 2022.

Description of Opportunity Event

Search for reusable raw materials in the Factory such as structural adhesives, aluminum strips, PVB film, and recycled paper to process and use them, and reduce waste disposal costs.

Potential Financial and Operational Impact

Improve the recovery of raw materials, reduce expenditures, and enhance the use of circular economy within the Factory to not only reduce waste disposal costs, but also be more environmentally friendly.

Management Policy or Response Measures

1. Reclassify and use the used raw materials (residual materials).
2. Increase the use of exhaust control equipment.
3. Increase the amount of purchased cullet and increase the addition rate of recycled cullet.

Climate Change Opportunity Events ▶ Regularly audit and counsel high-risk suppliers to improve supply chain stability

Opportunity Issues	Stakeholders	Indicators and Targets
Improve supply chain stability	Taiwan Glass (TGI), Supply Chain, Customers	Evaluation and counseling will continue in 2022.

Description of Opportunity Event

Maintain stable product quality.

Potential Financial and Operational Impact

Having stable upstream supply results in stable quality and supply for Taiwan Glass (TGI) products, and increase repurchase rates of downstream customers.

Management Policy or Response Measures

Regularly audit, evaluate, and counsel high-risk suppliers, and find new suppliers as secondary suppliers to improve supply chain stability.

Climate Change Opportunity Events ▶ Improve energy efficiency and save operating costs

Opportunity Issues	Stakeholders	Indicators and Targets
Improve energy efficiency	Taiwan Glass (TGI)	Cooperate with Academia Sinica on automated control of furnaces in 2022.

Description of Opportunity Event	Improve energy efficiency to reduce cost and carbon emissions.
Potential Financial and Operational Impact	Improve energy efficiency, reduce energy costs and carbon emissions.
Management Policy or Response Measures	1. Introduction of AI to control the temperature and energy of the melting glass. 2. Prioritize procuring products with energy labels, and prioritize energy conservation upgrades or newly-purchased operating equipment. 3. The air compressor adopts high/low voltage split sharing to reduce the number of startup units and reduce energy consumption. 4. Motors and pumps are replaced with new ones, and have IE3 energy efficiency.

Climate Change Opportunity Events ▶ Formulate supplier code of conduct, and implement assessment mechanisms

Opportunity Issues	Stakeholders	Indicators and Targets
Carry out supplier assessments	Taiwan Glass (TGI), Supply Chain, Customers	Evaluation and counseling will continue in 2022.

Description of Opportunity Event	Ensure that all suppliers comply with the standards when conducting business with Taiwan Glass (TGI), and maintain stable product quality.
Potential Financial and Operational Impact	Having stable upstream supply results in stable quality and supply for Taiwan Glass (TGI) products, and increase repurchase rates of downstream customers.
Management Policy or Response Measures	1. Every year, Eco-friendly Subcontractors will undergo the Company's evaluation and audit according to the "Evaluation Form for Eco-friendly Subcontractors." 2. Supplier evaluation norms have been included in the ISO procedure, and quarterly evaluations are carried out.

Climate Change Opportunity Events ▶ Obtain public sector incentives, carbon emission reduction cooperation, and carbon trade markets

Opportunity Issues	Stakeholders	Indicators and Targets
Obtain public sector incentives	Taiwan Glass (TGI), customers, government authorities	The Bureau of Energy's waste heat recycle subsidy project, measures of the project will be introduced during the next cold repair (currently estimated during 2023).

Description of Opportunity Event	Follow the trend of net zero emissions, and build the Company's corporate image.
Potential Financial and Operational Impact	Add carbon reduction equipment that will increase operating costs in the short term, but might increase customers' willingness to purchase products in the long run.
Management Policy or Response Measures	1. Regularly update high energy-consuming and high carbon emission equipment. 2. Continue implementing environmental management systems and energy management systems.

Climate Change Opportunity Events ▶ Develop low-carbon product designs to meet future market trends

Opportunity Issues	Stakeholders	Indicators and Targets
Develop low carbon products	Taiwan Glass (TGI), Customers	Lightweight bottles to account for 45% of the production in 2030.

Description of Opportunity Event	1. The Company's primary products are food containers. Since domestic and foreign customers/channels have become stringent, low-carbon products can help expand the market and enhance the Company’s competitiveness. 2. Improve energy-conserving glass products.
Potential Financial and Operational Impact	1. Lightweight bottles use less energy and raw materials, reduce carbon fees and shipping costs, and costs by weight. 2. Meet market demands for energy conservation, and increase operating income.
Management Policy or Response Measures	1. Continue technical collaborations with foreign firms to guide customers in adopting lightweight bottle products. 2. Use natural gas to replace heavy oil, and continue to improve production procedure equipment. 3. Increase the procurement of low-carbon raw materials, carry out carbon reduction for various production procedures, and offer low-carbon products based on the Government’s Net Zero Emissions Roadmap.

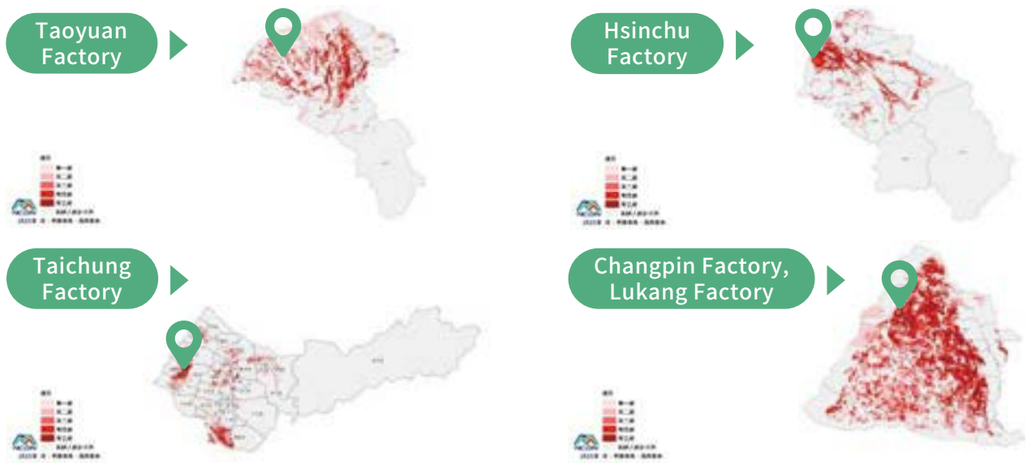
Analysis of climate change risk scenarios

TGI is prone to the high risk of climate change. The high elevation difference in Taiwan combined with drastic changes in climate have resulted in uneven precipitation, causing more frequent water shortages in dry seasons in certain regions and more frequent floods during wet seasons. Furthermore, environmental regulations have tightened progressively, and TGI may incur significantly higher expenses in the future due to additional costs and controls relating to carbon emission. Whether it is "physical risk" or "transition risk," we will evaluate thoroughly how they affect us and adopt management practices with the utmost caution.

Through internal analysis and discussion, we have decided to perform scenario analysis on two physical/transition risks that have the "highest impact and highest frequency" on the Climate Change Risk Matrix, which are: "Delays to production schedule due to measures for flood or unstable power supply" and "Imposition of carbon tax by governments around the world." A more detailed explanation is provided below:

Analysis on risk of flood at places of business

TGI conducted scenario analysis on the physical risk - "Impact of flood and the damage caused to facilities and equipment operations within and outside factories" and included production sites (Taoyuan Factory, Taichung Factory, Hsinchu Factory, Changpin Factory, and Lukang Factory) in the analysis. For this analysis, we followed the 5th evaluation report of Intergovernmental Panel on Climate Change (IPCC) and used Representative Concentration Pathways (RCPs) and Radiative Forcing between the years 2100 and 1750 as indicators. The analysis also adopted scenario RCPs 8.5 and used the information published on the "Climate Change Disaster and Risk Mediation Platform of National Science and Technology Center for Disaster Reduction" to project climate change for the years 2036 to 2065.



According to map data analysis, Taoyuan Factory was the only site located in a level 2 risk area, whereas Hsinchu Factory, Taichung Factory, Changpin Factory, and Lukang Factory were all located in a level 5 risk area, indicating high risk of flood. Based on the outcomes derived above, all of TGI's production sites are prone to high risk of flood, and the hazards will only escalate given the increasing prevalence of extreme weathers. For this reason, we will devise proper responses based on the outcomes of this analysis to prevent flooding of factory sites that may disrupt operations or affect employees' commute in the event of extreme weather. We will also take the initiative to evaluate potential hazards and devise management practices and actions in advance.

Note 1: Risk of flood is evaluated using three indicators on severity, vulnerability, and exposure; risk levels are determined using baseline period (1976-2005) and multi-GCM (2036-2065) approach under the RCP8.5 scenario
Note 2: Disaster risk is graded using standards as of the baseline period, whereas the Projected Disaster Risk Chart is derived from a modal analysis of 33 forecast models.
Note 3: A level-5 flood risk indicates highest "relative" risk for the given area, whereas a level-1 flood risk indicates relatively low risk, and not risk-free or disaster-free
Note 4: RCP8.5 is a high emission scenario that assumes an increase of radiative forcing to 8.5 watts per square meter by 2100 while the carbon reduction policy remains unchanged and the rate of greenhouse gas increase stays consistent, and the higher concentration of greenhouse gas in the atmosphere ultimately raises temperature by nearly 4° C, causing unavoidable damage to the global environment

Carbon tax risk analysis

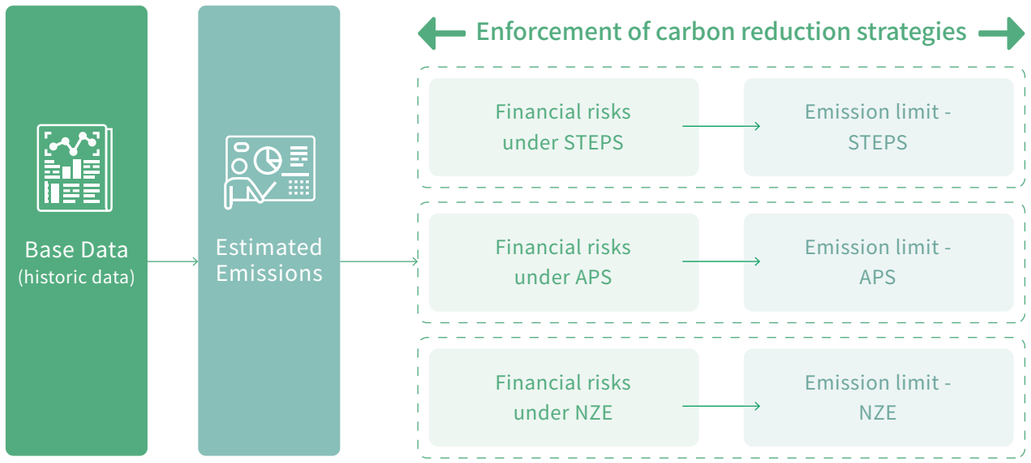
TGI conducted scenario analysis on the transition risk - "Carbon credit/carbon tax systems imposed by governments around the world" considering that the Legislative Yuan had passed the "Climate Change Response Act" in early 2023 in support of the Taiwanese government's goal to achieve "net zero emission by 2050." In the foreseeable future, carbon taxes will be imposed on domestic emission sources. Having reported total greenhouse gas emission (Scope 1+Scope 2) of 681,097 ton(s) for 2022, TGI is considered a carbon-intensive business in Taiwan, and the imposition of carbon tax by the local government would result in a surge of operating costs and impact profits significantly.

For this reason, we have analyzed TGI's future emissions using three scenarios proposed by International Energy Agency (IEA), namely the Stated Policies Scenario (STEPS), the Announced Pledges Scenario (APS), and the Net Zero Emissions by 2050 Scenario (NZE). We also adopted two carbon pricing scenarios to accommodate possible changes in carbon tax per unit of emission. These scenarios enabled us to analyze potential carbon taxes up until 2050.

Carbon Emission Scenarios	We adopted the emissions scenarios proposed by IEA and applied them to forecast changes in greenhouse gas emissions. The scenarios adopted include the following: Stated Policies Scenario (STEPS) Announced Pledges Scenario (APS) Net Zero Emissions by 2050 Scenario (NZE)
Carbon Pricing Scenarios	We adopted two carbon pricing scenarios to analyze possible changes in carbon tax. The scenarios adopted include the following: NGFS_2050 Net Zero NGFS_Below 2°C
Year of Assessment	Baseline year: 2022 Years of carbon tax change analyzed: 2022 to 2050
Explanation to Scenario Calculations	Calculations were made to determine the additional operating costs (unit carbon price*emission volume) and their impact on operations in terms of "operating profit margin" that a business may encounter, after taking into consideration the possible changes in emission level and carbon pricing local and abroad using 3 emissions scenarios (as shown in the following figure) and 2 carbon pricing scenarios.

Businesses have to implement rigorous procedures and methods to duly enforce climate-related financial disclosures. Given the prevailing climate change risks, TGI has distinguished climate scenarios into two categories: transition and physical. In the transition scenario analysis, TGI adopted STEPS, APS, and NZE while taking into consideration the possibility of net zero to estimate financial impacts.

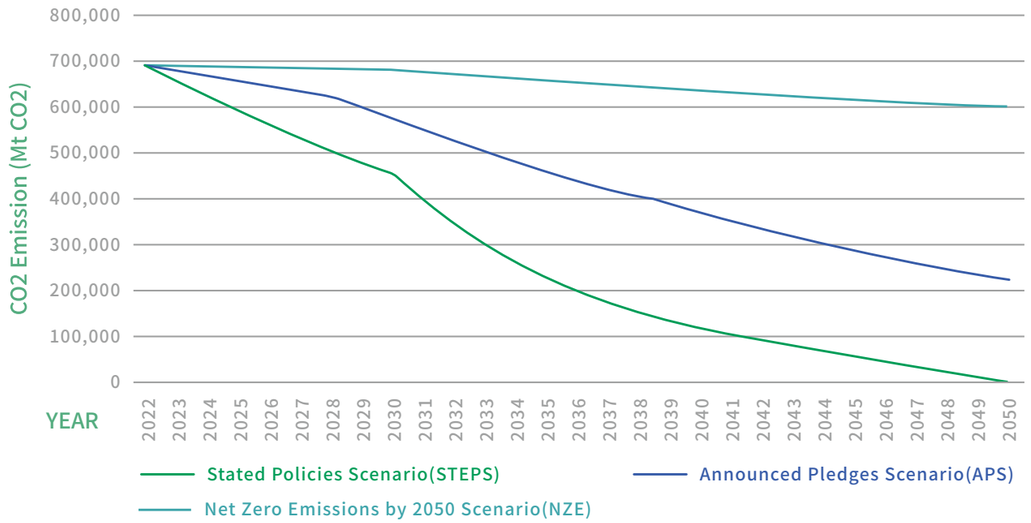
Scenario analysis and simulation



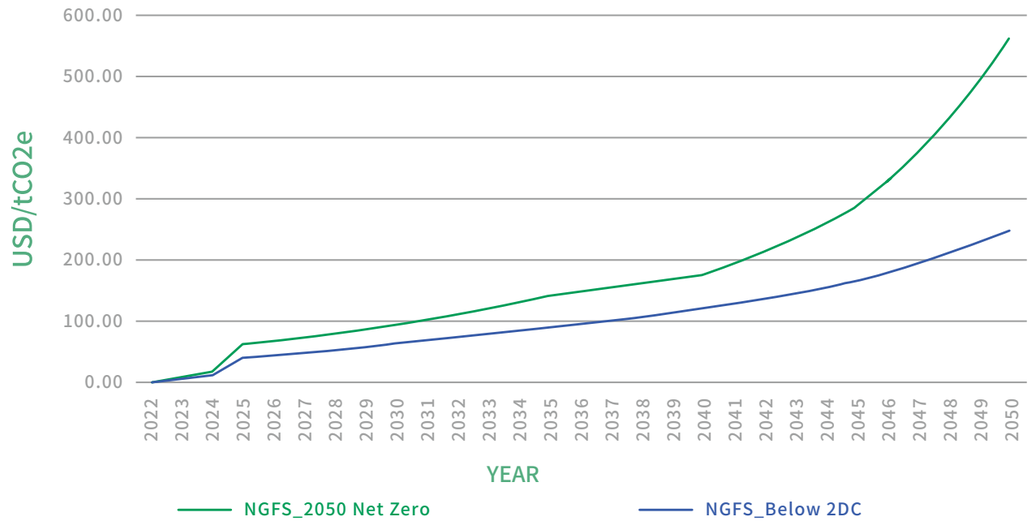
External Scenario	Description	Risks Assessed	Emission Source
STEPS	Assessment based on Taiwan's current carbon emission targets	Legal risks Market risks Reputation risk	Scope 1 + Scope 2
APS	Estimation based on IEA's APS		
NZE	Estimation based on IEA's NZE		

TGI has evaluated the possible financial impacts associated with climate change by focusing on net zero with less than 2° C warming and by simulating legal, market, and reputation risks. Using the three scenarios proposed by IEA and the two carbon price predictions: "NGFS 2050 Net Zero" and "NGFS Below 2DC," we performed simulations to determine the possible risk exposures between 2022 and 2050 under different scenarios. International or local cost factors were then taken into consideration to estimate possible financial impacts over the medium and long term.

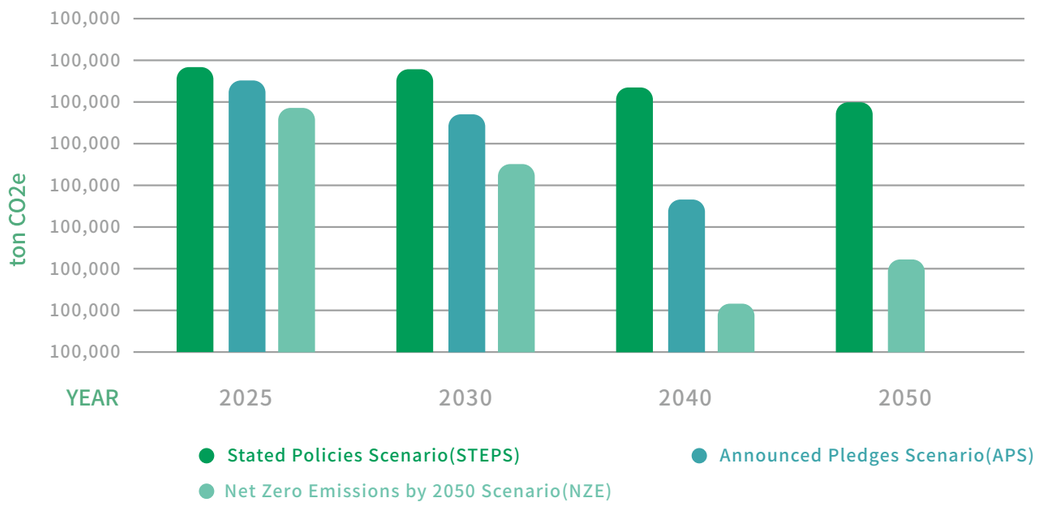
TGI's carbon emission scenarios---based on IEA's net zero roadmap



Carbon tax analysis---NGFS carbon pricing scenarios and trends



Emissions and targets estimated from scenarios



Outcomes of the scenario analysis suggest that carbon taxes impact TGI significantly in the future. In addition to acquiring renewable energy equipment, we also strive to optimize the percentage of waste reused and explore technological improvements to minimize carbon emission in every stage of product life cycle, thereby providing customers with products that are environment-friendly and of low carbon footprint.

05

Safe Workplace, Trust, and Growth

5.1 Human resources and welfare

5.2 Talent development and training

5.3 Occupational Safety and Health

Employee Care Performance of 2022

8.89 %

TGI reported an attrition rate of 8.89% in 2022; ongoing efforts are being made to keep the attrition rate low for the stability of the work force

155 %

TGI's entry-level employees were paid 155% of the local minimum salary on average

100 %

TGI complies with the government's labor regulations and ensures that its work force is 100% compliant with the "People with Disabilities Rights Protection Act"

81.54 %

81.54% of employees had taken up birthday leaves in 2022

80.65 %

80.65% of employees who took unpaid parental leave were reinstated in 2022

99.9 %

99.9% of senior managers were locally hired; in doing so, TGI created job opportunities for Taiwanese talents to the benefit of local residents

26.81

A total of 52 employees retired in 2022; the retirees averaged 26.81 years of service

18.5 hours

TGI's general employees averaged 18.5 hours of training per person in 2022

72 %

72% of new employees who were trained under the 'Counselor system for new recruits' in 2022 remained in duty at the end of 2022

5.1

Human resources and welfare

TGI cares for employees' welfare and places the work environment, career development, and physical and mental health care at the top of its priority while at the same time introduces a broad range of welfare measures. TGI offers salary packages that are more favorable than what the laws require, and regularly reviews market salary levels to serve as reference for future salary adjustments. Compensations are not different based on gender, ethnicity, religion, political affiliation, marital status, union membership, or association with any particular organization. We not only offer compensations that are more favorable than the minimum salary, but also pay bonuses based on corporate performance and fair assessment of employees' individual performance as a way to inspire their potentials. TGI has established its management systems and policies in accordance with laws. With the support of our managerial staff, we hope to care for our employees at work and in life, and maintain harmonious employment relations.

TGI's workforce structure

All of TGI's employees are directly hired and no temporary workers are used. The Company considers its workforce structure to be stable and robust. TGI had a total employee size of 3,979 and hired 1,208 Taiwanese managers at the end of 2022. 99.9% of senior managers were locally hired; in doing so, TGI created job opportunities for Taiwanese talents to the benefit of local residents.

TGI has business locations in northern, central, and southern parts of Taiwan; it hires employees either on a permanent or contract basis. Detailed breakdown of the current work force (including local/foreign employees):

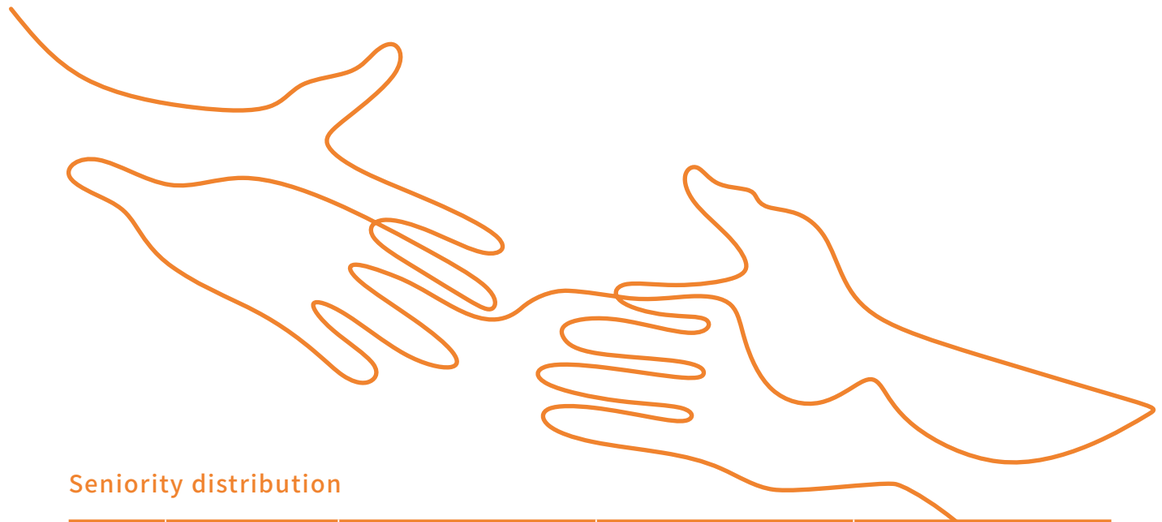
Employee nationality/gender distribution in previous years

Year		2020		2021		2022	
Item	Category	Male	Female	Male	Female	Male	Female
Nationality	Taiwanese employees	3,010	550	2,878	532	2,800	531
	Foreign employees	639	89	520	111	544	104
	Subtotal	3,649	639	3,398	643	3,344	635
Employee size		4,288		4,041		3,979	

Distribution of permanent/contract employees

Item	Category	Male		Female		Total	
		Head count	Percentage	Head count	Percentage	Head count	Percentage
Variant	Permanent employees	2,710	81.36%	525	15.76%	3,235	97.12%
	Contract employees	90	2.70%	6	0.18%	96	2.88%
	Total	2,800	84.06%	531	15.94%	3,331	100.00%

Note: Excludes foreign employees



Seniority distribution

Item	Category	Male		Female		Total	
		Head count	Percentage (%)	Head count	Percentage (%)	Head count	Percentage (%)
Years of service	5 years and below	926	23.27%	213	5.35%	1,139	28.62%
	6-15 years	1,262	31.72%	173	4.35%	1,435	36.06%
	16-24 years	848	21.31%	178	4.47%	1,026	25.78%
	25 years and above	308	7.74%	71	1.79%	379	9.53%
	Subtotal	3,344	84.04%	635	15.96%	3,979	100%

Employee age distribution

Item	Category	Male		Female		Total	
		Head count	Percentage (%)	Head count	Percentage (%)	Head count	Percentage (%)
Age	30 and below	484	12.16%	125	3.14%	609	15.30%
	Age 31-40	1,285	32.30%	242	6.08%	1,527	38.38%
	Age 41-50	1,156	29.05%	212	5.33%	1,368	34.38%
	Age 51 and above	419	10.53%	56	1.41%	475	11.94%
	Subtotal	3,344	84.04%	635	15.96%	3,979	100.00%

Distribution of education background

Item	Category	Male		Female		Total	
		Head count	Percentage (%)	Head count	Percentage (%)	Head count	Percentage (%)
Academic background	Masters & above	134	4.02%	11	0.33%	145	4.35%
	Bachelor Degree	1,781	53.47%	359	10.78%	2,140	64.25%
	Senior high school and below	885	26.57%	161	4.83%	1,046	31.40%
	Total	2,800	84.06%	531	15.94%	3,331	100.00%

Note: Excludes foreign employees.

Distribution of managerial roles

Nature of work	Gender	Total Head count	Percentage (%)	Aggregate percentage (%)
General employees	Male	2269	57.02%	69.64%
	Female	502	12.62%	
Entry-level managers	Male	983	24.71%	27.70%
	Female	119	2.99%	
Mid-level managers	Male	73	1.83%	2.16%
	Female	13	0.33%	
Senior managers	Male	19	0.48%	0.50%
	Female	1	0.02%	
Total		3,979	100.00%	

Recruitment and attrition

296 employees resigned in 2022, representing a 8.89% attrition rate. The Company has been able to keep attrition rate below 15% each year for the last 3 years. 234 new recruits were hired in 2022, representing a new recruitment rate of 7.02%. By having new members join in on a constant basis, we hope to maintain healthy turnover of our work force.

Total new recruits - 2022

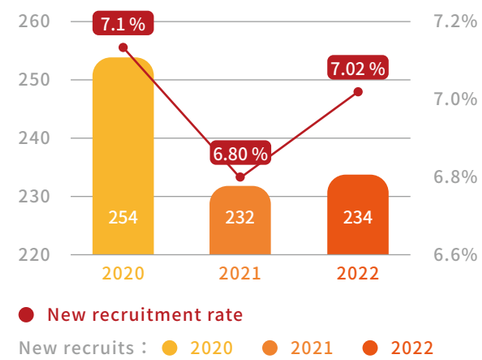
Location	Head count	Gender		Age							
				Male				Female			
		Male	Female	30 and below	Age 31-40	Age 41-50	Age 51 and above	30 and below	Age 31-40	Age 41-50	Age 51 and above
Northern Taiwan	107	76	31	34	23	9	10	19	8	3	1
Central Taiwan	127	113	14	53	30	18	12	9	3	2	0
Total	234	189	45	87	53	27	22	28	11	5	1

No. of resignees - 2022

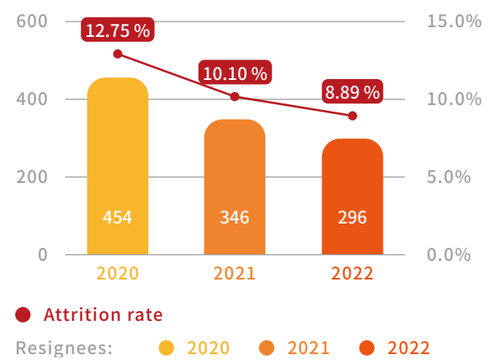
Location	Head count	Gender		Age							
				Male				Female			
		Male	Female	30 and below	Age 31-40	Age 41-50	Age 51 and above	30 and below	Age 31-40	Age 41-50	Age 51 and above
Northern Taiwan	171	138	33	42	35	31	30	16	10	4	3
Central Taiwan	125	112	13	40	42	23	7	5	5	3	0
Total	296	250	46	82	77	54	37	21	15	7	3

Note: The number of new recruits and resignees excludes those who are on extended unpaid leave and internal transfers.
2.Northern area: includes the Headquarters, Taoyuan Factory, and Hsinchu Factory; central area: includes Taichung Processing Plant, Lukang Factory, Lukang Flat Glass Factory, and Changpin Factory.

New recruitment rates in previous years



Attrition rates in previous years

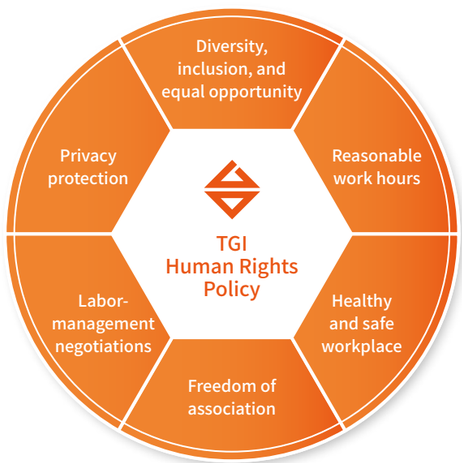


Note: New recruitment rate (%)= No. of new recruits for the given category of the year/total local employees for the given category at the end of year.
Attrition rate (%)= No. of resignees for the given category of the year/total local employees for the given category at the end of year.

Human rights protection and talent employment

TGI observes principles of "International Labour Organization," "The UN Global Compact," "UN Guiding Principles on Business and Human Rights," "United Nations Universal Declaration of Human Rights" etc., respects globally recognized human rights, and protects basic human rights of employees, customers, and stakeholders as part of its sustainable development efforts. The human rights issues that we are concerned with include: prohibition of child labor, care for the underprivileged, freedom of association, elimination of all forms of forced labor, and elimination of discrimination in employment.

TGI's human rights policy applies to all departments and specifically addresses the following human rights issues for improved human rights practice:



TGI upholds principles of integrity and fairness when recruiting talents, and complies with government regulations with respect to the sourcing, testing, and hiring of talents. TGI sets salaries based on candidate' education background and work experience while taking into consideration the responsibilities borne, grade, professional capacity, and overall performance. In addition to complying with the Labor Standards Act and relevant workplace and labor regulations, TGI does not discriminate or differentiate in terms of compensation based on ethnicity, social status, religion, language, thoughts, political party, origin, place of birth, gender, sexual orientation, age, marital status, looks, physical/mental disability, blood type, zodiac sign, or previous union affiliation for the protection of employees' human rights.

TGI strictly complies with the government's quota on the hiring of persons with a disability. Despite being a conventional manufacturer, we remain committed in creating a stable and satisfying work environment for persons with a disability.

Written statements on prohibition of workplace violence

As of the end of 2022

TGI employs an average of **102** persons with a disability throughout the year

Surpassing legal requirements by more than **140** %

In the future, we will continue creating diverse job opportunities and decent work environment for people with disabilities. In 2022, TGI hired 25 people of indigenous origin, which demonstrated the organization's attention to diversity. No violation against the rights of indigenous people occurred in 2022.

Human rights risk control program - 2022

Concerned issues	Risk Mitigation Measures	Impact Compensation Measures
Workplace Health	Employee health checks are implemented every two years to help employees keep track of their own health. Doctors and factory nurses regularly check the health examination reports and provide health consultation, advice, and care.	Employees with abnormal health examinations will be notified and reviewed by the partner hospital. Analyze results of the overall health checks, and plan health promotion events and lectures. Encourage the establishment of sports clubs, and subsidize club-related expenses.
Workplace Safety	Handle occupational safety education and training for new employees. Handle occupational safety education and training for in-service colleagues. Conduct fire-fighting drills to improve disaster prevention knowledge. Promote the Four Major Programs for Occupational Safety	Occupational accident reporting and handling procedures. Emergency medical first aid kits are available. Doctors and factory nurses are regularly stationed to provide consultation services. Occupational Health and Safety committee meetings are held regularly, and issues are discussed during the meetings.
Workplace Diversity	Any form of discrimination is prohibited to create a friendly workplace environment. Employees with disabilities are employed in full according to laws and regulations.	Ensure the number and proportion of people with disabilities surpasses quota. Create a friendly workplace environment. The total number of employees with disabilities employed by the Group in general is higher than the number stipulated in legal regulations.

TGI's Lukang Factory was named "Excellent Performer in Over-quota Employment of Persons with Disabilities" by Changhua County Government in 2022, whereas employee Huang, Ching-Kai won 2022 "Changhua County Outstanding Employee with Disability." Lukang Factory is dedicated to improving the work space and equipment, and strives to provide people with disabilities a work environment where they can find a sense of accomplishment and belonging, and contribute to the organization's competitiveness.

Lukang Factory was named 'Excellent Performer in Over-quota Employment of Persons with Disabilities' by Changhua County Government in 2022

A role model of overcoming workplace boundaries

Kai is a person with hearing disability who has been referred by the county government's career counselor to work at TGI's Lukang Factory. From the first day, Kai has been diligent with the tasks assigned and managed to fit in and develop good interaction with colleagues. Kai even takes the initiative to care for new employees, and has always embraced challenges with optimism and persistence, setting a good example for others.

Lukang Factory employee won the title of 'Outstanding Employee with Disability'

Fostering a diverse and friendly work environment

Birthday leave

Friendly workplace column - birthday leave for employees

The Company has set its goals to create a satisfying work environment that "cares for employees and brings joy to work." As a gratitude for employees' contribution, the Company introduced birthday leave as a benefit in 2019, which allows employees to take one day off in their birth month. 81.54% of employees had taken up birthday leave by the end of 2022, indicating employees' strong support for the birthday leave system.

Execution of birthday leave - 2022

No. of employees entitled to birthday leave (A)	No. of employees applied for birthday leave (B)	Execution rate (B/A)(%)
3,321	2,708	81.54%

Execution of parental leave

Taiwan Glass (TGI) has always upheld its philosophy of "equally emphasizing work and family," and employees of both genders can apply to take parental leaves. From 2021 to 2022, 22 employees of Taiwan Glass (TGI) applied for parental leave without pay; female employees accounted for 54.84% of the applicants while male employees accounted for 45.16% of the applicants, and 25 of them were reinstated in 2022, representing a reinstatement rate of 80.65%. In 2022, the parental leave for employees without pay were handled in accordance to the legal regulations.

Unpaid parental leave - 2022	Male		Female		Total	
	Head count	Percentage	Head count	Percentage	Head count	Percentage
A. No. of employees due for einstatement (=B+C)	14	45.16%	17	54.84%	31	100.00%
B. No. of employees reinstated when due	12	38.71%	13	41.94%	25	80.65%
C. No. of employees resigned when due	2	6.45%	4	12.90%	6	19.35%
Reinstatement rate (B/A) %	85.71%		76.47%		80.65%	

According to the statistics for unpaid parental leaves for the period 2021-2022, a total of 13 employees of Taiwan Glass (TGI) were reinstated after their unpaid parental leaves in 2021, and the retention rate of employees still in service in 2022 was 69.23%.

2021-2022 Unpaid Parental Leaves	Male		Female		Total	
	Head count	Percentage	Head count	Percentage	Head count	Percentage
E. No. of employees reinstated at the end of unpaid parental leave in 2021	5	38.46%	8	61.54%	13	100.00%
F. The Number of Employees who were be reinstated after the end of their Unpaid Parental Leaves in 2021 and were be	3	23.08%	6	46.15%	9	69.23%
Retention Rate F/E %	60.00%		75.00%		69.23%	

Maternity-friendly workplace

We care for employees' work environment and the maternity friendliness of our workplace. In addition to conducting workplace risk assessment and caring for female employees during pregnancy and for one year after giving birth, we also arrange medical consultations with work health physicians to provide suitability assessment and recommendations given the state of health of each employee. Meanwhile, relevant health knowledge is disseminated to promote work safety and balanced work load.

TGI offers accessible and user-friendly nursery spaces decorated with mild color tones to give users the most relaxing and comfortable experience. For safety assurance, the nursery room door can be locked and a notice board is used to remind employees that the facility is in use. The nursery environment is cleaned and refrigerator temperature is checked daily. Furthermore, TGI provides comfortable couches and extra supplies of breast milk storage bags, nurser bottle, pillow, breast milk fridge, wet wipes, nurser bottle sterilizer etc. that users may use free of charge. For employees who have just given birth, TGI would provide them with relevant information on nursing, refer them to appropriate events and consultation services, check on their physical and mental state, offer support and assistance, and introduce experienced employees that they can share with, thereby creating a maternity-friendly workplace.

Headquarters

Hsinchu Factory

Changpin Factory

Employee salary and benefits

Fair performance management and compensation system

TGI devotes significant attention to employees' wellbeing and welfare, and has adopted a differentiated bonus system that rewards employees based on corporate performance, individual performance, and level of contribution as a way to effectively improve and commend employees' performance. We evaluate each employee based on education and career background, professional knowledge, experience, and individual performance. The evaluation does not differentiate by gender, ethnicity, religion, political affiliation, marital status, or union association. With the exception of blue collar foreign employees and those who have not completed probation, all employees are required to undergo regular performance evaluation, which mainly takes into account employees' "work performance," "efficiency," and "accountability."

In 2022, the male-to-female basic compensation ratio for general employees was calculated at 1:0.95; the 0.05 discrepancy was mainly attributed to differences in the nature of work and seniority. In 2022, non-managerial permanent employees averaged yearly salary of NT$677,000, with the median being NT$631,000. We strive to provide equal pay for employees engaged in the same line of work, and do not differentiate by gender, ethnicity, religion, political affiliation, marital status, or union association. TGI's HR unit has been tasked with the mission of tracking and analyzing general employees' salary on an ongoing basis, and found that all salaries were at least 155% of the statutory minimum.

Employee Welfare Committee

To ensure adequate care for employees, TGI not only arranged the basic protections required by laws but also introduced a multitude of benefits and subsidies aimed at promoting work-life balance. The Employee Welfare Committee oversees welfare of TGI employees, and is responsible for the arrangement and execution of employee benefits. Overview of existing welfare measures:

TGI employee welfare measures	
Health care	Employee health checkups that are more favorable than what the laws require. Privileged health checkup packages for employees' dependents. Stationed physicians and nurses or on-site labor health service. Enforcement of the four occupational safety programs and employee health management Active support for sports clubs and health seminars. Construction of basketball court, fitness center, and table tennis room. Introduction of after-work sports courses (employee hobby survey).
Lifestyle care	Availability of employee diner, dormitory, and nursery room. Employee meal subsidy (50%)/travel subsidy/ club activities subsidy. Wedding, funeral, and birth cash/gift Extended unpaid compassionate leave. Comprehensive death benefit system. Unpaid parental leave for employees. Quarantine leave, quarantine care leave.
Festive care	Birthday leave Festive cash. Year-end party/cash. Labor Day cash.
Learning care	Introduction of employee development program and complimentary language course. Incentives for ongoing education. Children's education scholarship.
Insurance care	Group accident insurance coverage that is more favorable than what the laws require, which employees and dependents may subscribe to at a discounted rate. Travel insurance for business trips/expatriates.

Retirement system

TGI has established its own employee retirement policy in accordance with the "Labor Standards Act" and "Labor Pension Act." Employees who came onboard on and before June 30, 2005 were covered by the old pension scheme, and those who opted for the new pension scheme were entitled to carry over their years of service accumulated under the old scheme. Currently, 100% of employees are covered by pension scheme. TGI makes consistent pension contributions and benefit payments. It engages professional accounting consultants to make actuarial calculations on the pension fund each year to ensure that adequate contributions are made. TGI had 52 employees averaging 26.81 years of service retire in 2022. All senior retirees will receive a commemorative medal presented personally by the Chairman or CEO as a gesture of gratitude for their long-time contribution.

Old pension scheme

For every employee under the old pension scheme, the employer contributes an amount equal to 6% of monthly salary into a pension account held with the Central Trust of China

New pension scheme

- The employer contributes an amount equal to 6% of monthly salary into employee's pension account
- Employees may choose to make additional pension contributions of 0%-6%

Employee communication channels

Union

TGI observes international labor conventions and domestic union regulations by assembling worker unions in some of its factory sites. The union serves as a communication channel and is able to convey opinions of the labor and management in an effective manner. In September 2018, TGI signed a collective bargaining agreement with the union to provide a solid foundation for harmonious employment relations. In June and November 2019, Lukang Factory received commendations from Changhua County Government and the Ministry of Labor, respectively, for the efforts it made on promoting employment relations. The union convenes representative meetings once a year, during which an open vote is held to elect suitable representatives. The union also convenes director meetings every three months and ordinary meetings regularly to discuss issues concerning employees' meals, group accident insurance, incentive trips, year-end gatherings etc. E-mail, bulletins, and a hotline have all been made available for employees to express opinions directly. The Company may assign relevant personnel to attend meetings and respond to the motions discussed if necessary, and gather opinions for subsequent improvements and coordination. In 2022, TGI had 1,161 employees being union members.

Union participation by factory - 2022		
Factory	Hsinchu Factory	Taichung Factory
Male	774	285
Female	82	20
Total	856	305
Employee count	883	411
Percentage	97%	74%

Note: Foreign workers were excluded for Hsinchu Factory; all factory workers were union members.
No union was assembled at Taoyuan Factory, Lukang Flat Glass Factory, or Changpin Factory.
Lukang Factory union is unable to provide relevant information.

Union Representatives Conference - 2022

Union Representatives Conference of Taichung Factory

Union Representatives Conference of Hsinchu Factory

Minimum notice period for operational change

TGI is bound to serve the following notice periods in the event that employment contract is terminated in accordance with the exception clause stated in Article 11 or Article 13 of the Labor Standards Act:

I. 10 days of advance notice for employees with 3 months to less than 1 year of continuous service
II. 20 days of advance notice for employees with 1 year to less than 3 years of continuous service
III. 30 days of advance notice for employees with more than 3 years of continuous service

5.2 Talent development and training

Talent development has always been one of TGI's goals. We value employees' career plan and individual growth, and take training as an opportunity to convey TGI's mission, vision, and value. TGI has assigned dedicated personnel to survey and analyze training requirements based on organizational strategies for the given year, and to plan courses for new recruits as well as existing employees. We have implemented a comprehensive training system along with diverse learning channels and access to everything from common courses, specialist courses, management knowledge to self-development courses. Through systematic training such as: standardized practice for entry-level workers, optimization of managers' responsibilities, promotion of workplace safety and health etc., TGI raises employees' awareness toward human rights, workplace safety, and legal compliance. To facilitate response to the fast-changing market, we have committed resources into developing talents and technologies in fields such as photovoltaic, energy conservation, and touch control that would help sustain the Company's competitiveness and growth.

TGI's general employees averaged

18.5 hours

of training per person in 2022

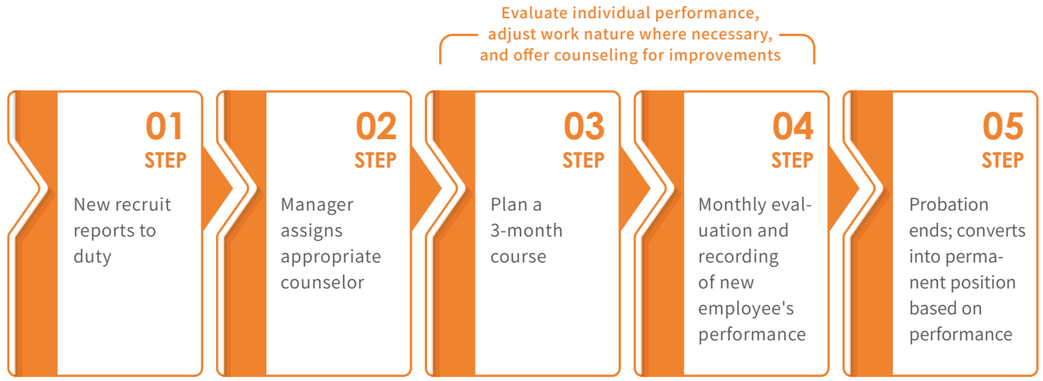
In 2022, general employees averaged 18.5 hours of training per person, whereas entry-level managers averaged 17.8 hours, mid-level managers averaged 12 hours, and senior managers averaged 5.9 hours.

Statistics on 2022 employee training							
Item	Factory	Male		Female		Total	
		Head count	Hours	Head count	Hours	Head count	Hours
General Employees	Headquarters	27	144	20	82	47	227
	Taoyuan Factory	192	6,423	80	2,501	272	8,924
	Hsinchu Factory	548	7,196	78	1,066	626	8,262
	Taichung Factory	252	3,066	20	189	272	3,255
	Lukang Factory	593	8,720	179	2,396	772	11,116
	Lukang Flat Glass Factory	116	2,532	8	120	124	2,652
	Changpin Factory	154	7,582	23	250	177	7,833
	Subtotal	1,882	35,663	408	6,604	2,290	42,268
	Average hours	18.9		16.2		18.5	

Statistics on 2022 employee training							
Item	Factory	Male		Female		Total	
		Head count	Hours	Head count	Hours	Head count	Hours
Entry-level Managers	Headquarters	24	160	24	191	48	351
	Taoyuan Factory	148	4,981	13	413	161	5,394
	Hsinchu Factory	291	3,998	13	132	304	4,129
	Taichung Factory	165	2,177	4	35	169	2,212
	Lukang Factory	202	3,090	15	160	217	3,249
	Lukang Flat Glass Factory	62	1,474	1	2	63	1,476
	Changpin Factory	82	1,798	1	7	83	1,804
	Subtotal	974	17,678	71	938	1,045	18,616
	Average hours	18.1		13.2		17.8	
Mid-level Managers	Headquarters	9	52	5	54	14	106
	Taoyuan Factory	1	43	0	0	1	43
	Hsinchu Factory	12	267	1	24	13	291
	Taichung Factory	10	62	0	0	10	62
	Lukang Factory	3	3	0	0	3	3
	Lukang Flat Glass Factory	1	7	0	0	1	7
	Changpin Factory	1	6	0	0	1	6
	Subtotal	37	440	6	78	43	518
	Average hours	11.9		13		12	
Senior Managers	Headquarters	1	4	0	0	1	4
	Hsinchu Factory	1	10	0	0	1	10
	Changpin Factory	1	4	0	0	1	4
	Subtotal	3	18	0	0	3	18
	Average hours	5.9		0		5.9	

TGI's training system

Training for new recruits



TGI introduced a 'Counselor system for new recruits' in 2019 to facilitate transfer of experience and tacit knowledge among employees. In this system, we assign senior counselors who are familiar with the organization's culture and skills to care for, guide, and teach new recruits on a one-to-one basis. This internal support system is what enables new recruits to quickly blend in and adapt to the work culture and environment, which helps increase the retention rate. A total of 22 employees underwent the counselor system in 2022; 18 of whom were converted into permanent employment at the end of probation and 72% of whom remained in duty at the end of 2022, indicating good results of the counselor system.

On-job training

- Yearly training plan:
  At the end of each year, the Company instructs all departments to plan their course requirements so that course timing and orientation can be planned ahead for the following year.
- External training request:
  Each department may assign employees to undergo external training as deemed necessary to improve professional knowledge and skills.

Diverse training

TGI offers a diverse range of training courses in accordance with legal requirements and the needs of various factories to help employees expand the diversity of their knowledge and skills.

Regulation courses

Training organized by the Headquarters - 2022

Occupational Health and Safety Training — 27 sessions, 39 participants

Help colleagues establish workplace safety awareness, analyze and introduce the causes of various disasters, avoid disasters and reduce risks, and improve workplace safety.

Self-defense Firefighting Team Training — 2 sessions, 22 participants

Use exercises to hone skills and simulations in advance to ensure that colleagues we remain calm in critical situations, make correct judgments, and effectively reduce casualties and property losses.

Information security seminar — 1 sessions, 27 participants

The Company recognizes the importance of information security, and uses case reviews to improve the employees ability to identify information security issues, avoid falling into information security traps, and effectively enhance their awareness of information security protection.

Personal data security course — 1 sessions, 26 participants

Insider trading case studies were used to deter potential wrongdoers. The course promoted awareness on the importance of personal data security as well as the level of discretion needed to handle personal data in order to avoid leaks that may result in regulatory violation.

Worker safety training by Changpin Factory - 2022

3 sessions, 125 participants

Includes awareness course on workplace violence, seminar on ergonomic hazards etc.

Information security training by factory - 2022

Lukang Factory

Taoyuan Factory

Taichung Factory

AED placement and training

Given the increasing prevalence of cardiovascular disease in recent years, North Taiwan Branch began deploying AEDs (automated external defibrillators) in 2020 as a way to strengthen response to health emergencies at the workplace, and thereby create a safer work environment. AEDs were deployed across all factories in 2022 to strengthen response to health emergencies; CPR+AED training courses were also organized to familiarize employees with the use of the equipment.

AEDs deployed at Headquarters

AED and CPR training at Taichung Factory — 23 participants

CPR+AED seminar at Lukang Flat Glass Factory — 47 participants

AED training at Changpin Factory — 47 participants

Specialist skill courses

Taiwan Glass (TGI) established an education and training center, assigned full-time personnel to plan various types of education and training, formulate annual training plans, and cultivate the required glass-related technical and management talent using professional curriculums, training and practice. If the work requires other conditions such as education level, skills or licenses, experiences, the Factory Affairs Section will evaluate and select capable personnel: operators of overhead overhead cranes and forklifts should have qualified licenses to operate them.

In an attempt to minimize occurrence of occupational hazard and raise employees' crisis awareness, Hsinchu Factory assigned suitable employees to undergo exams for Class-C Occupational Health and Safety manager. A total of 25 employees participated in the training and 92% of whom completed.The factory also invited Hsinchu City Police Bureau Traffic Police Brigade to host training on vehicle and personnel safety control at factory premise. A total of 23 employees participated and 100% of whom completed. Through these courses, TGI hopes to lessen chances of accident for the safety of the factory premise.

Program name	No. of training participants	Training completion rate
Class-C Occupational Health and Safety manager (preliminary training)	25	92%
Traffic controller training	23	100%

Class-C Occupational Health and Safety manager (preliminary training) at Hsinchu Factory

Traffic controller training at Hsinchu Factory

5.3 Occupational Safety and Health

Occupational Health and Safety Committee

TGI has assembled occupational safety committees at the Headquarters and all factory sites to foster a safe work environment and facilitate communications. Worker-elected representatives account for more than one-third of committee members, as required by laws. The committees convene quarterly meetings to discuss safety and health issues, and these meetings serve as official channels for communication between departments, managers, and employees. The occupational safety committees have implemented safety and health guidelines, and any work accident will be reported immediately to the appropriate authority in a manner that complies with laws. TGI has set targets on safety, health, and environmental protection to cater for employees' physical and mental health, whereas the Occupational Health and Safety Committee devises safety and health promotion goals on an organizational level and persistently implements improvement plans. TGI is also dedicated to the enforcement of environmental safety and health tasks and risk controls, and has work safety management units created at the Headquarters and factory sites to conduct regular safety and health inspections. Occupational Health and Safety Committee meetings are convened on a quarterly basis to brief factory managers, relevant departments, and worker representatives on potential issues so that preventive measures can be taken ahead of time. Through execution of the 5S program, TGI promotes safety awareness among employees during orientation and on-job training so that they can better respond to emergencies and minimize chances of accident to create a safe and healthy work environment.

- 01 Raise suggestions regarding employer's Occupational Health and Safety policy
- 02 Coordination and recommendation on the execution of Occupational Health and Safety management program
- 03 Review of implementation plans for safety and health training
- 04 Review of environment monitoring plans, results, and measures
- 05 Review of health management, occupational illness prevention, and health promotion tasks
- 06 Review of safety and health proposals
- 07 Review of self-inspections and safety and health audits
- 08 Review of preventive measures against machinery, equipment, and material hazards
- 09 Review of occupational hazard investigation reports
- 10 Evaluation of workplace safety and health management performance
- 11 Review of safety and health management tasks for contracted jobs
- 12 Other matters relating to Occupational Health and Safety management

Percentage of worker representatives in Occupational Health and Safety Committee - 2022

Measurement/Factory	Headquarters	Taoyuan Factory	Hsinchu Factory	Taichung Factory	Lukang Factory	Changpin Factory	Total
No. of Occupational Health and Safety Committee members	14	17	15	19	10	41	116
No. of worker representatives	6	7	6	7	5	13	47
Percentage of worker representatives (%)	42.9%	41.18%	40.0%	36.8%	50.0%	31.7%	40.5%

Note: Lukang Flat Glass Factory is not required to assemble its own Occupational Health and Safety committee according to laws; nevertheless, the factory still organizes annual training programs to enhance employees' awareness toward Occupational Health and Safety.

Occupational safety management

Zero hazard has been the ultimate goal of TGI's occupational hazard management efforts, and is the benchmark of all safety campaigns implemented at various factory sites. The Company currently aims to reduce disabling injury frequency rate (FR) and disabling injury severity rate (SR) by 20% each year. In 2022, TG used these programs in hopes of providing employees with a healthy and safe workplace.

Fire Fighting Drill

Use exercises to hone skills and simulations in advance to ensure that colleagues we remain calm in critical situations, make correct judgments, and effectively reduce casualties and property losses.

AED

The number of people in Taiwan suffering from heart-related diseases has increased in recent years, and setting up AEDs helps improve the on-site first-aid capabilities of the workplace.

COVID-19 Education

The Company uses internal announcements of relevant measures for COVID-19 prevention, rolling revisions of various government regulations resulted in the Company establishing a real-time reporting mechanism to reduce the risk of employees contracting COVID-19.

On-site health service

Doctors and nurses provide on-site services such as organizing, analyzing, and saving health inspection reports; learning about the health status of the Company' s colleagues; provide health education for high-risk colleagues; arranging follow-up tracking and treatment; regular care, and plan and promote health promotion events.

Arrangements are made to have occupational medical specialists and nurses provide service at factory premise every one to two months

Improvement of forklift operations

LED warning lights have been installed on forklifts used at factory premises to alert personnel and vehicles and ensure the safety of work activities. Installation was completed on all 15 forklifts used at Changpin Factory in 2022.

No. of health consultation visits by workers

Headquarters	Sessions	24	Health service consultation	16
Taoyuan Factory	Sessions	12	Health service consultation	44
Hsinchu Factory	Sessions	24	Health service consultation	87
Taichung Factory	Sessions	12	Health service consultation	52
Changpin Factory	Sessions	6	Health service consultation	68
Lukang Flat Glass Factory	Sessions	4	Health service consultation	19
Lukang Fiber Glass Factory	Sessions	12	Health service consultation	68

Health service column

Changpin Factory cooperated with the local health office and made arrangements to have Chang Bing Show Chwan Memorial Hospital administer influenza vaccines at factory premise, thereby strengthening employees' immunity against influenza. A total of 32 employees were vaccinated during the year.

Occupational health and safety highlights column

In order to provide a safe and healthy workplace environment for Taiwan Glass (TGI) employees, we provide employees with safe working environments by actively improving the their safety with improving equipment safety, reviewing risk assessments, and optimizing the content of safety education and training. Internal units of Taoyuan Factory enforce work safety by promoting work safety awareness on a monthly basis, and the number of in-factory work injuries was reduced by 5 cases in 2022 compared to the previous year, whereas the number of days lost was also reduced by 225.

Having discovered that many of employees' injuries were attributed to traffic accidents that happened while commuting, Hsinchu Factory embarked on a mission to promote traffic safety, and assigned its Work Safety Section to gather and distribute information and footage relating to traffic safety on a monthly basis. By promoting defensive driving and right of way, TGI hopes to minimize traffic accident when commuting and therefore keep employees safe to and from work.

Furthermore, for the safety of forklift use inside factory premise, TGI made plans to install LED warning lights at the back of each forklift, and Hsinchu Factory managed to complete installation of LED on 67 forklifts in 2021, whereas Changpin Factory completed installation of LED on 15 forklifts in 2022. These LED lights are intended to alert personnel and vehicles, and prevent accident particularly in places where vision is obscured, thereby improving workplace safety.

LED warning lights on forklifts used at Changpin Factory

Reporting and handling of emergencies

01 STEP
The injured person's department head/team leader duly submits report within 3 days

02 STEP
Complete an "Employee Accident Report" or "Employee Commuting Accident Report"

03 STEP
Circulate for sign-off by the Safety Officer, department head, Work Safety Section, safety and health manager, and manager of the highest authority in the stated order

04 STEP
The original/duplicate copy to be retained by 〈Work Safety〉, 〈Human Resources〉, and the department where the accident had occurred

To deal with accidents, traffic accidents and false alarms, Taiwan Glass (TGI) established an operational mechanism for managing occupational accidents that actively implements procedures for reporting, investigating, and improving accident prevention. Occurrence and cause of occupational hazard are analyzed every six months to identify prevention points. Preventions are communicated to each department to minimize chances of recurrence and impact. Any major accident suffered by other businesses will be communicated immediately to all departments via internal correspondence, so that employees can be made aware of the safety requirements. The following safety indicators were used in 2020-2022:

Item/Year	Gender	2020	2021	2022
Disabling injury frequency rate (FR) No. of tasks lost (only if break time is greater than 8 hours) X 1,000,000 / total work hours	Male	5.82	7.25	7.99
	Female	5.34	4.66	7.15
	Total	5.75	6.85	7.85
Disabling injury severity rate (SR) No. of work days lost X1,000,000 / total work hours	Male	166	215	239
	Female	179	100	197
	Total	168	197	232
Absenteeism rate (AR) Total absent days / total working days	Male	0.01	0.01	0.01
	Female	0.02	0.02	0.02
	Total	0.01	0.01	0.01

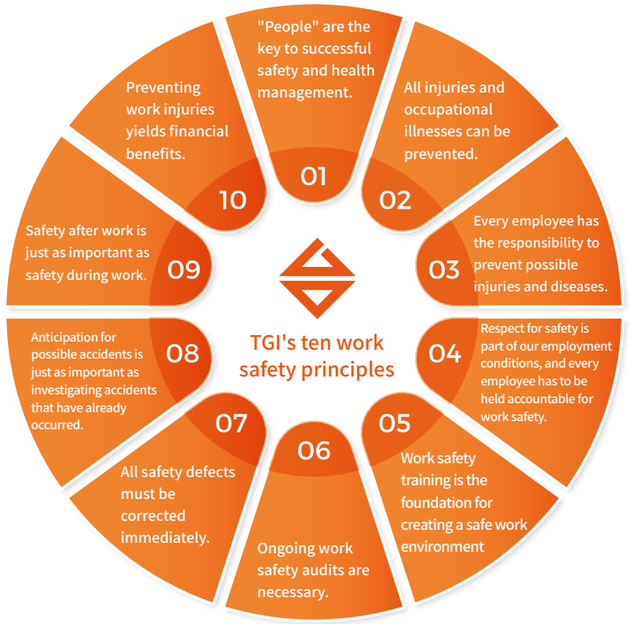
Note: Total absent days include days of unpaid leave, illness leave, and work injury leave:

- Illness leave (includes unpaid illness leave, partially paid illness leave, and menstruation leave): 40,801 hours
- Unpaid leave (includes family care leave): 23,489 hours
- Work injury leave: 19,016.5 hours
- Total work hours: 7,893,264 hours

TGI hired Warwick Mayall, a British work safety consultant, to provide work safety consultation and counseling at each factory site. Through persistent data gathering and observation, the consultant helped improve risk management capabilities and enabled greater insight into the forms and probabilities of injury, so that we may analyze the underlying cause and learn from each incident, such as injuries that can be treated on-site and near misses. These practices also helped turn safety awareness into work attitude, and teach employees to look out for each other and place safety above all else in order to achieve our goal of zero work injury. TGI even organizes annual competitions where factory sites that report zero injuries for the year are evaluated using environmental safety indicators and commended with Awards of Exceptional Performance/Excellence/Achievement, presented personally by the Chairman/CEO.

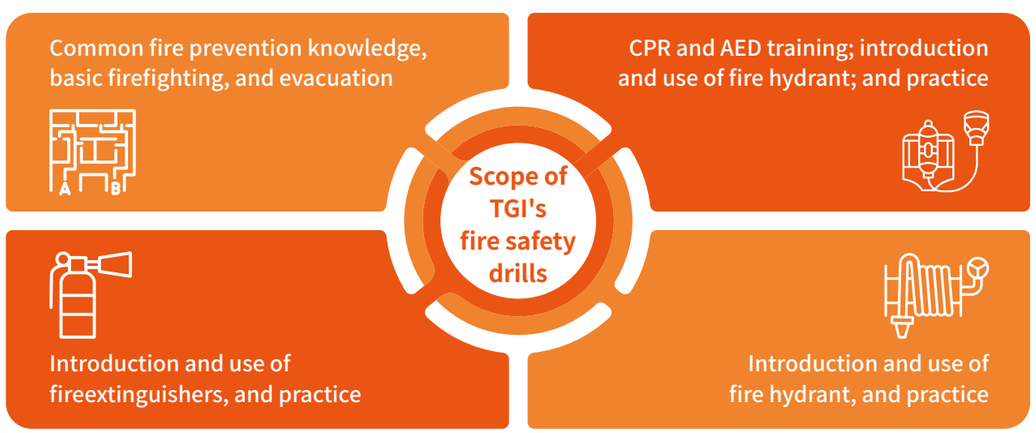
Work safety consultant visited Lukang Flat Glass Factory

Lukang Flat Glass Factory won Outstanding Zero Work Injury Award



Taichung Factory hosts factory meetings every Monday to review work safety incidents of the previous week. The department where an incident had occurred is required to present a report along with improvement measures to all department heads present at the meeting, while the Work Safety Section and other departments would also provide recommendations. If no work accident occurred on factory premises, meeting participants would gather information on work safety accidents from other parts of the country for simulation, analysis, and review. Changpin Factory, on the other hand, placed emphasis on the assessment and management of risks associated with personnel and machinery, and tried to prevent potential hazards by making improvements to the equipment and protective gear used in high-risk operations. As for Lukang Factory, much of its attention was directed toward regular promotion of traffic safety. Training efforts were especially targeted at foreign workers in order to minimize chances of accidents while commuting.

Apart from Occupational Health and Safety training, TGI also organizes training, drills, and awareness courses to address emergency events within the factory. For example, professionals are invited to host courses on CPR and use of AED at factory premises; training on prevention, evacuation, and emergency response to fire outbreak are also held in addition to existing fire safety drills.



Factory	No. of fire drills	No. of participants
Headquarters	2 times/year	22
Taoyuan Factory	2 times/year	112
Hsinchu Factory	2 times/year	156
Taichung Factory	2 times/year	32
Lukang Fiber Glass Factory	2 times/year	33
Lukang Flat Glass Factory	2 times/year	12
Changpin Factory	2 times/year	66

Fire extinguishing training at Hsinchu Factory

Taichung Factory organized self-defense firefighting team training, which covered incident reporting, fire extinguishing, evacuation guiding, and rescue

Fire extinguishing training at Changpin Factory

Lukang Factory organized an introductory seminar on the mission of the self-defense firefighting team, training on the use of fire extinguisher, and evacuation drill

Occupational Health and Safety training for new recruits and existing employees

Factory	Enrollment count	Training hours
Headquarters	39	117
Taoyuan Factory	992	3,039
Hsinchu Factory	1,188	1,463
Taichung Factory	451	829
Changpin Factory	281	395
Lukang Flat Glass Factory	78	364
Lukang Fiber Glass Factory	264	1,232

Occupational Health and Safety awareness courses for Changpin Factory - 2022

Occupational Health and Safety awareness courses for Taichung Factory - 2022

Labor Safety Inspection and Legal Compliance

There were no risks of forced or compulsory labor in any of Taiwan Glass (TGI)' internal operations, and the relevant labor conditions were handled in accordance with the relevant provisions of the Labor Standards Act. There was no use of child labor, no complaints regarding major labor-related issues, and no discriminatory behavior in 2022. The list of relevant inspections in 2022 and the follow-up improvement methods are as follows:

Factory	Labor Safety Inspections and Regulatory Violations	Amount of penalty (NTD)	Description of Event	Follow-up Improvement Measures
Hsinchu Factory	Violations of the Occupational Health and Safety Act	60,000	An operator lost footing on a work platform and fell to the ground from an elevation of 60cm, resulting in fracture of the left arm.	Added protective rails to the work platform Identified hazards and evaluated risks associated with the glass re-examination process.
Hsinchu Factory	Violations of the Occupational Health and Safety Act	100,000	When unloading goods at the unloading bay, the forklift operator made a turn without paying attention to truck driver's movement, which resulted in crushing injury to the truck driver.	Enhanced safety and health training on the prevention of forklift hazards. Employees are being reminded of safety issues concerning forklift operation before commencing work each day. Assigned traffic controllers at the loading/unloading bay.
Changpin Factory	Violations of the Occupational Health and Safety Act	120,000	Two operators loaded semi-finished laminated glass onto the L-rack to manually remove the aluminum frame and adhesive. Due to a suspected deterioration of the suction cup, the suction cup could not create a vacuum state and the glass toppled, causing work injury.	Enhanced training to raise employees' safety awareness. All subsequent glass separation works shall be performed with the side that has residual adhesives facing outward, and firmly placed onto the conveyor belt before cleaning. Developed standard operating procedures for glass removal work, and created a pre-work checklist that checks for the integrity of suction cup on overhead cranes.

Employee Health Promotion and Management

Health Risk Issues	Amount of Impact	Control Measures	Actual Results
Employee Health	High Risk	Consultation services by on-site doctors and nurses. Provide sphygmomanometers for colleagues to measure and monitor their blood pressure. Health check items that are better than the ones stipulated in laws and regulations. Management of the health of new and in-service employees by level. Sports Club Subsidies.	70 health service sessions were organized across factories and a total of 338 consultations were completed. TGI organized an annual health checkup that covered 18 more tests than the legal requirement, such as uric acid, blood urea nitrogen, glomerular filtration rate, corpuscular volume etc. The Company also collaborated with hospitals to provide more favorable health check packages that employees may purchase as needed. Passed the "Healthy Workplace Certification" by the Ministry of Health and Welfare Health Promotion Administration.
Workplace Safety	Moderate Risk	Implement the Four Major Programs for Occupational Safety Regularly hold Occupational Health and Safety committee meetings. Set up AED first aid equipment. Fingerprint identification system controls the access of Company personnel. The office area, entrances and exits of passageways are well illuminated. Security guards are present at entrances to control personnel access. Handle Occupational Health and Safety education and training for new and in-service employees	100% implementation rate of the Four Major Programs for Occupational Safety. Occupational Health and Safety committee meetings were held as scheduled. Employees, customers, and firms abide the Factory's access control measures. There were no incidents of intrusion or injury. Occupational Health and Safety training for new recruits and existing employees received a total of 3254 enrollments and delivered 7322 training hours in 2022.
Maternity Health Protection	Moderate Risk	Set up a feeding room for colleagues to use. Provide maternity leave, accompanying prenatal visit leave and paternity leave, prenatal visit leave, and breastfeeding leave. Application for unpaid parental leave	69.23% reinstatement from unpaid parental leave Parental leave granted to 18 applicants for a total of 104 hours. Passed the "Excellent Breastfeeding Room Certification" by the Taipei City Government Department of Health.

Workers' health service

Having recognized employees as "the greatest advantage," TGI has established health centers across all factory sites and staffed them with professional nurses and contract physicians specializing in occupational health. These health centers are responsible for promoting employee care, including health care, special protection, and health promotion among other health management solutions. By catering for practical medical requirements and risk management, these health centers contribute persistently to the prevention of occupational hazard and disease and the promotion of employees' physical and mental health.

All new recruits are required to complete a physical health check before commencing duty; outcomes of the health check report will be be taken into consideration for work assignment, tier-based health management, health education, and tracking. Permanent employees are subject to a health checkup once every two years. Those who engage in hazardous operations are required to undergo annual special health checkups and complete four health training sessions a year. The stationed nurse will: consolidate, analyze, and file health checkup reports; establish an understanding of employees' health state through the checkup data; arrange health education, follow-up tracking, treatment, and care for high-risk groups; evaluate the appropriateness of existing job role; assist with work adjustments if necessary; and plan health promotion activities based on employees' overall health state. Through the use of e-bulletins, TGI kept employees up-to-date on relevant health information, seasonal disease, and the COVID-19 pandemic. TGI also recommended employees in the high-risk group to take vaccines as a form of protection, and disseminated proper information on personal/home care that employees can read at their own convenience.

TGI observes "Regulations Governing Protection of Worker Health" and organizes regular health checkups to provide employees with a healthy work environment. The Company also engages physicians to manage employees' health based on the health checkup results. A total of 3,969 health checkups were completed in 2022, including 1,345 general health checkups and 2,624 special health checkups.

Year/ Measurement	Special health checkup (No. of checks)										General health checkup (No. of checks)	Total
	High temperature	Dust	Noise	N-hexane	Lead	Chromic acid and chromium salt	Ionizing radiation	Nickel and compounds	Mercury and non-organic compounds	Subtotal		
Headquarters	No special health checkup was conducted at Headquarters										215	215
Taoyuan Factory	0	27	257	0	0	0	0	0	0	284	530	814
Hsinchu Factory	204	164	560	0	60	3	3	63	3	1060	27	1,087
Taichung Factory	163	180	20	0	0	0	94	0	0	457	356	813
Lukang Factory	0	25	613	5	0	0	0	0	0	643	0	643
Lukang Flat Glass Factory	61	45	0	2	0	0	39	0	0	147	0	147
Changpin Factory	0	28	0	0	5	0	0	0	0	33	217	250
Total	428	469	1450	7	65	3	136	63	3	2624	1345	3969

Note: General health checkups are organized once every two years, whereas special health checkups are organized once a year.

Considering that the furnace section of Taichung Factory operates at a high temperature, TGI has devised an "Overstress-induced disease prevention program" and adopted preventions and improvements according to plan to ensure that employees' work hours, break duration, and leave of absence are duly compliant with employment regulations, thereby helping employees maintain physical and mental health and good work-life balance. Both Taoyuan Factory and Taichung Factory arranged special health checkups in 2020 to address work activities that posed higher health risk, such as: high temperature, noise, dust, and ionizing radiation. In 2021, Hsinchu Factory added "Nickel and compound" and "Mercury and non-organic compound" to its health checkup.

Employee health checkup at Headquarters

Employee health checkup at Changpin Factory

For employees who work shifts or extended hours that also exhibit cardiovascular disease risk factors such as obesity, smoking habit, abnormal blood pressure, diabetes etc., the work safety unit would use the work hours checklist furnished by HR in conjunction with all relevant scorecards to shortlist the people who are at risk. Based on the data collected and the evaluations conducted, employees will be referred to physicians for diagnosis, treatment, and health education, and may have work details adjusted, restricted, and followed up continually to ensure employees' physical and mental health, which is also in the Company's best interest.

In addition, Taiwan Glass (TGI) also installed a "Weight and Body Composition Monitor and Body Scanner" in the Health Room (which measures body weight, body fat, body age, basal metabolic rate, visceral fat; the subcutaneous fat and skeletal muscle of the entire body, arms, body, and feet) for employees to manage their health and weight loss.

Adjustment of disease control practice for employees' health

As the threat of COVID-19 lessened in 2022, TGI made flexible adjustments to its disease control measures with respect to the work environment, training, and employees' attendance while at same time maintaining full compliance with government rules. By enforcing proper controls against communicable disease, we hoped to ensure the physical and mental health of all our employees.

Implementation of Measures	Purpose	Execution Method	Implementation Results
Online clock-in	Reduces risk of contact in fingerprint clock-in	Opened system function and access	The online clock-in function was used more than 40,000 times as of December 2022
Temporary closure of employee diner	Reduces risk of infection by limiting verbal communication when dining	The employee diner was closed during the disease control period	Employees cooperated 100% with the execution
Disease monitoring system at points of entry	Measures body temperature and identifies infected person	Infrared sensors were used to take temperature. Abnormal findings were reported and recorded immediately, and all infected persons were informed to seek medical attention	All employees, vendors, and customers had cooperated with the temperature taking
Deployment of alcohol dispenser/ seat sanitizer	To maintain cleanliness of the environment and personal hygiene	Alcohol dispensers and seat sanitizers were deployed	Disinfectants were used by employees, vendors, and customers
Video conferencing/ online interview	Reduces risk of contact in face-to-face interactions	Video conference rooms, software, and hardware were acquired	Meetings and interviews were carried out using video conference, and physical visits were reduced
Addition of isolation cover for elevator buttons	Reduces risk of contact	Cleaners were assigned to sanitize on a regular basis	Regular sanitization and cleaning removed virus from buttons.
Disease control leave	Employees who felt discomfort and suspected of having been infected were granted quarantine leave and allowed to rest at home, and avoid infecting others.	Employees who felt discomfort were required to notify their managers and the HR immediately, which then triggered the reporting system	As of December 2022, 129,285 hours of quarantine leave and quarantine care leave had been taken up
Actively care for employees	Provide individual care to the employees to get rid of their doubts and insecurities	Internal announcements promote the latest COVID-19 prevention information, make rolling revisions to the prevention policies for COVID-19, and provide norms that are tighter than the current legal regulations	All colleagues follow the Company's COVID-19 prevention policies, and abide by relevant regulations
High-risk Colleagues working from home	Have colleagues from high-risk areas work from home to reduce the risk of contracting COVID-19	Pay attention to the information of the Central Epidemic Command Center (CHCC), have colleagues carry out risk management and control in their residences, and provide software and equipment support for colleagues in high-risk areas to work from their homes.	Employees cooperated 100% with the execution
Add partitions	Reduce the risk of droplet infection during physical meetings or face-to-face conversations	Adding partitions at conference venues	Colleagues, firms, and customers have all implemented measures in accordance with the regulations

Taiwan Glass (TGI) also actively promoted COVID-19 health education for migrant workers at various factory sites, and controlled cross-border traffic to reduce the risk of contracting COVID-19.

Implementation of Measures	Impact Range	Execution Method	Implementation Results
Enhance the promotion of COVID-19 related information and health education concepts to migrant workers	Enhance the health education and COVID-19 related knowledge for migrant workers.	Created a LINE group for migrant workers that provides daily updates COVID-19 related information, and installed hand sanitizers at the entrances and exits of the dormitories.	The willingness of the migrant workers to get vaccinated increased after the LINE group was created.
Implement Infrared Thermometers	To avoid the risk of contracting COVID-19 when responsible personnel are required to come into close proximity with all employees and guests entering the factories, and measure temperature measurements by using forehead thermometers	All employees and guests entering the factories can measure their body temperature by aligning themselves with the infrared thermometer at the designated location, and the thermometer will issue alerts if there is an abnormality.	Been in use since November 2020 Employees that have a fever should immediately return home and rest
Guests and outsourced personnel who enter the factories and do not have proof of receiving 3 doses of vaccines are required to undergo rapid testing before entering the factories	In order to reduce the incidence of contracting COVID-19 at the factories, personnel access will be controlled during the peak of the COVID-19 epidemic	Employees entering the factories are required to measure their body temperature and undergo disinfection with alcohol. Non-company personnel entering the factories for business needs to scan the QR Code and present a certificate of receiving 2 doses of COVID-19 vaccines or rapid-test certificate within the past 3 days to enter.	No outsourced employees were quarantined or diagnosed with COVID-19

	Expatriates	Domestic employees
Care	Supported the government's disease control policy and reduced the number of return trips to minimize infection risk. Employees were commended and paid incentives for their persistence in their duties during this time. The Company fully subsidized disease control expenses (including salary, quarantine hotel charges, PCR test, and quarantine transport during quarantine). Return air tickets that were unused due to the pandemic were issued in cash instead.	Employees who needed to undergo voluntary health management or quarantine were granted quarantine leave. Employees who needed to care for infected family members were granted quarantine care leave. Antigen rapid test kits were given to employees who felt discomfort or were exposed to high risk.
Recruitment and talent selection	Candidates were interviewed using "video conference" where possible to minimize physical contact and reduce risk of infection. Where physical interview was needed, disease control measures such as face mask, temperature taking, and sanitization were duly enforced.	
Education and training	Online learning platform and video were used for teaching instead; external visitors were limited to minimize spread of disease. Disease control measures such as face mask, temperature taking, and sanitization were duly enforced for participants. The latest disease control information and response measures were provided through internal announcement.	

Sports-friendly enterprise

TGI recognizes employees as "the greatest advantage" and continues to promote a wide range of sport-related clubs, courses, and seminars that encourage exercise after work hours. The appeal of club activities attracted many employees into healthy exercise, which provided opportunities for them to bond and interact, and served as a means to maintain work-life balance and health.

"Badminton club" by TGI employees

As people returned to their normal lifestyles amidst weakened COVID threat in 2022, employees of TGI's North Taiwan Branch voluntarily assembled a badminton club and met up on a weekly basis to practice. Not only do they compete on the court, the skilled players would also take the initiative to teach others. Through this sport, employees were able to gain a sense of accomplishment and strengthen bonds with each other.

Badge of Accredited Healthy Workplace

The Company is dedicated to creating a comfortable, healthy, and safe work environment, for which it was awarded "Badge of Accredited Healthy Workplace" in 2019 with a validity of three years. TGI once again received "Badge of Accredited Healthy Workplace" in 2022, and continued to bring "joy in work and life" to all TGI employees.

Taipei Headquarters received "Badge of Accredited Healthy Workplace"

Changpin Factory received "Badge of Accredited Healthy Workplace"

Overstress-induced disease prevention program

This program is intended to help employees prevent against cerebrovascular/cardiovascular disease and reduce mental stress. TGI conducts ongoing investigations and risk evaluations about employees' health state, work nature (shift, night shift, long hours, abnormal workload etc.), and work hours, and extends care and follows up on those who are in the high-risk group by referring them to physicians where they can receive health guidance, medical assistance, educational knowledge, and recommendations on work adjustment.

Abnormal workload improvement process

Self-evaluation questionnaire on overstress

↓

Analyze and shortlist the high-risk group

↓

Health promotion management for the high-risk group

- One-on-one medical consultation by stationed physician on record
- Organized health promotion seminars (on overstress, metabolic disease etc.)

↓

Evaluation and adjustment

↓

Phase 1

Evaluation and education based on in-factory health checkup reports.

Phase 2

- Follow-up on abnormal health check results 3
- Work evaluation and adjustment
- Present for discussion during meeting; explore improvements

Changpin Factory - stress relief seminar

Prevention of ergonomic hazard

It is TGI's goal to create a safe and healthy workplace where employees are able to prevent against ergonomic hazards and repetitive musculoskeletal injuries. By gathering and analyzing data on the nature of works performed, TGI is able to apply tier-based management and propose solutions to improve repetitive musculoskeletal injuries and the overall work environment. Below is an example of changes made to TGI's Custom Cutting Section:

Ergonomic hazard analysis and improvement flowchart

Survey of in-factory occupational hazard

Confirm ergonomic hazard

↓

Evaluate, select, and execute improvements

↓

Control and tracking/evaluate improvement performance

↓

Whether conforms with expectation → NO

↓

Performance evaluation and record keeping

Changpin Factory - ergonomic hazard seminar

- The stationed physician and nurse accompanied the head of Custom Cutting Section to the operation site, where they observed how workers of the Custom Cutting Section handled finished glass products

- The height of the work bench that workers use to move finished glass products is above waist level and below shoulder level, which is within the range of ergonomic safety. Workers have ample room to handle finished glass products with proper posture. Finished glass products that weight 10kg and above are moved by a team of two or more. The work still requires repetitive use of force, and prevention of ergonomic hazard is deemed essential.

The stationed physician showed workers the correct lifting posture and recommended wearing of protective gear when handling finished glass products to prevent cuts and musculoskeletal injuries.

06

Inclusion and Social Care

6.1 Social Engagement

6.2 Community Engagement

Social Care Performance of 2022

2,813 beneficiaries **NT$32.25** million

Since 2000, TGI Cultural and Educational Foundation has rewarded a total of 2,813 college students and paid NT$32.25 million in scholarship

NT$2.3 million

TGI made NT$2.3 million in social donations in 2022

120 individuals **NT$10,000** each

A total of 120 students received scholarship of NT$10,000 each in 2022

35 bags

TGI advocates the idea that "Blood Donation Saves Lives" and managed to donate 35 bags of blood across all factories in 2022

6.1
Social engagement

To commemorate its 25th anniversary, TGI donated to the founding of TGI Cultural and Educational Foundation in 1989. The foundation was established with the mission to reward young students for studying and to support cultural and art businesses. In addition to sponsoring art and cultural activities, the foundation has rewarded a total of 2,813 college students and paid NT$32.25 million in scholarship since 2000.

Zodiac exhibition area

In 2018, "Xue Xue Foundation" invited TGI Cultural and Educational Foundation to assist in the organization of Zodiac - Scholarship Artist Exhibition, for which it received "Regular Award - Bronze" in the 14th "Arts & Business Awards" in 2019 from the Ministry of Culture.

"Arts & Business Awards" is an event organized by the Ministry of Culture in accordance with "Regulations on Subsidizing and Rewarding Art and Cultural Enterprises by Ministry of Culture," a law created under the "Culture and the Arts Reward and Promotion Act." The event is intended to commend businesses, organizations, or individuals for supporting cultural and art enterprises, and it presents two different awards: a "Regular Award" and a "Special Award" distinguished by the amount and nature of sponsorship. With this commendation, TGI Cultural and Educational Foundation hopes to inspire businesses toward supporting cultural and art activities, and make culture a part of the nation's soft power.

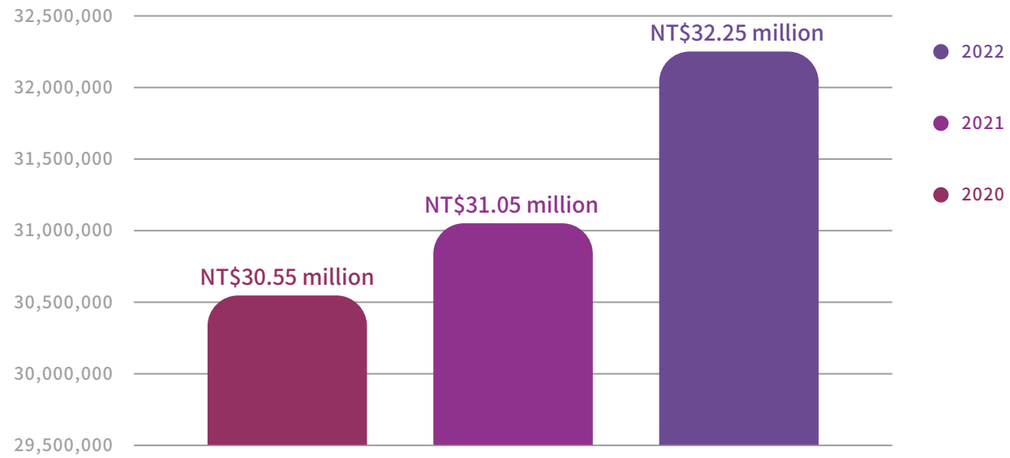
Arts & Business Awards trophy

TGI is dedicated to supporting social development through action. This award has been an affirmation of our efforts and will provide us with the motivation to make further social contributions in the future. Founder Lin, Yu-Chia encourages all sponsored students to learn, grow, and develop a sense of honor and responsibility, and looks forward to seeing the donations used in the best interest of the nation, the society, and the individual.

Past events of TGI Cultural and Educational Foundation

Year	Event	Location	Details
2022	Payment of scholarship/tuition aid	Taipei City	A total of 120 students received scholarship of NT$10,000 each
2021	Payment of scholarship/tuition aid	Taipei City	A total of 120 students received scholarship of NT$10,000 each
2020	Payment of scholarship/tuition aid	Taipei City	A total of 50 students received scholarship of NT$10,000 each
2019	Payment of scholarship/tuition aid	Taipei City	A total of 90 students received scholarship of NT$10,000 each
2018	Payment of scholarship/tuition aid	Taipei City	A total of 90 students received scholarship of NT$10,000 each
	Art exhibition	Kaohsiung City	Sponsored Zodiac - Scholarship Artist Exhibition.
2017	Payment of scholarship/tuition aid	Taipei City	A total of 80 students received scholarship of NT$10,000 each
2016	Payment of scholarship/tuition aid	Taipei City	A total of 140 students received scholarship of NT$10,000 each
2015	Payment of scholarship/tuition aid	Taipei City	A total of 140 students received scholarship of NT$10,000 each
2014	Payment of scholarship/tuition aid	Taipei City	A total of 129 students received scholarship of NT$10,000 each
2013	Payment of scholarship/tuition aid	Taipei City	A total of 143 students received scholarship of NT$10,000 each
	Cultural/artistic event	Taipei City	Purchased 131 tickets for the screening of Chi, Po-Lin's Beyond Beauty - Taiwan from Above.
2012	Payment of scholarship/tuition aid	Taipei City	A total of 196 students received scholarship of NT$10,000 each
	Art exhibition	Taipei City	Sponsored Álvaro Siza: The Beauty of Function
2011	Payment of scholarship/tuition aid	Taipei City	A total of 180 students received scholarship of NT$10,000 each
	Art exhibition	Taipei City	Sponsored Álvaro Siza: The Beauty of Function
2010	Payment of scholarship/tuition aid	Taipei City	A total of 160 students received scholarship of NT$10,000 each
	Special movie screening	Taipei City	Assisted in the special screening of Let the Wind Carry Me for 200 viewers. By promoting quality film productions from Taiwan, the Foundation hopes to contribute to the growth of outstanding local filmmakers.
	Green building seminar	Taipei City	Beautify Taipei - Green Building Seminar; audience size: 300. The foundation supported Taipei City Government Department of Urban Development in the execution of urban redevelopment projects. The redevelopment not only renews old buildings, but also introduces green energy and environmental features.

Cumulative amount of scholarships paid in the last 3 years



Three main emphases of TGI Cultural and Educational Foundation

Technology Education

"Technology and the Future" - The event uses different forms of media and high-tech tools to promote understanding of future technologies across different generations and to inspire imagination about how technology may change our world. These new visions will ultimately guide us to the path toward a digital future.

Plan Details

By supporting technology education and application, we aim to help the young generation develop technological skills and expand global vision.

Sports Activities

Promote sports activities and healthy exercise.

Plan Details

Though golf events, we aim to provide incentives for golfers to improve their game and share their experience.

Corporate Sustainability

Being an active promoter of sustainability in Taiwan, the foundation pays ongoing attention to issues concerning climate change, sustainable energy, and corporate sustainability, and contributes to the sustainability initiative through action. It is our hope to expand social influence and lead the society toward the right path.

Plan Details

- SDGs Asia
- Award ceremony of Global Corporate Sustainability Forum

Donations by TGI Cultural and Educational Foundation and Taiwan Glass (TGI) Industry Corporation - 2022

Item	Name	Amount (NTD)
1	SanCode Foundation	NT$500,000
2	Professional Golfer's Association of Taiwan	NT$1,200,000
3	Taiwan Institute for Sustainable Energy - SDGs Asia 2022	NT$300,000
4	Taiwan Institute for Sustainable Energy - Award ceremony of 2022 Global Corporate Sustainability Forum	NT$300,000
Total donations - 2022		NT$2,300,000

Remarks: Items (1) and (2) were made by TGI Cultural and Educational Foundation, whereas items (3) and (4) were made by Taiwan Glass (TGI) Industry Corporation

Award ceremony of the 1st SanCode Literature and Art Award

Winning creations of the SanCode Literature and Art Award

Global Corporate Sustainability Forum (GCSF)

Amendments to the Donation Policy of TGI Cultural and Educational Foundation

The TGI donation policy has been established as a show of commitment to fulfilling responsibilities to the society. Through the donation policy, TGI aims to support/promote social initiatives that benefit the society as a whole. TGI cares for the underprivileged and hopes to provide some form of support through the donation policy. In doing so, TGI not only fulfills its commitment to fostering sustainable growth of the society, but also conveys its values as a socially aware enterprise.

In 2022, TGI added sports activities to the donation policy to facilitate the sponsorship of sport events, for it recognized the positive effect of sport on the society and individuals. This amendment also emphasized TGI's attention to overall welfare.

Amendments of the TGI donation policy

Amendments

Article 3: The foundation was established in commemoration for the 25th anniversary of TGI to sponsor cultural education through the following activities:

- Reward/subsidize research of glass-making technologies; donate to colleges or postgraduate institutions for the creation of glass-making courses.
- Donate to schools and finance the establishment of scholarships to help train talents for the glass industry.
- Facilitate growth of domestic glass-related industries and collaboration with foreign peers.
- Establish institutes of technology.
- Donate to other cultural/educational enterprises, sports, and charity events.

6.2 Community engagement

For many years, TGI has cared for the sustainability of the environment, prioritized recruitment of local residents, contributed to local community development, and engaged locals in active communication. The Headquarters organizes social care and environmental actions as means to convey our philosophy. We place great emphasis on our relationship with the local community and have long been committed to building a mutually beneficial relationship with locals. In an attempt to give back to the local community and improve corporate image, we have taken the initiative to create a safe and comfortable work environment for our employees and sponsor green transformations within the industrial zone with the hope of spreading our green vision to others. We also support organizations within the community by offering TGI's products as a form of sponsorship.

Annual blood donations

TGI advocates the idea that "Blood Donation Saves Lives" and encourages employees to donate blood as a form of charity and a way to give back to the society.

Blood donation at TGI Taichung Factory

Taichung Factory has been organizing blood donation events for many years, during which it invites employees to roll up their sleeves and contribute to the society's wellbeing. Employees of Taichung Factory once again demonstrated unrivaled passion in 2022, donating 35 bags of blood in total.

This charity event not only demonstrated the level of care that Taichung Factory has to the local community, but also united employees toward a common goal and inspired them to care for others and take part in charity.

TGI's community engagement activities

Hsinchu City Water Environment Patrol Team

In 2022, Taiwan Glass (TGI) Hsinchu Factory participated in the Hsinchu City Water Environment Patrol Team and sponsored the Patrol Team with NT$ 60,000 in supplies, and the Hsinchu City Government issued a special certificate of appreciation to the Company. Factory employees had voluntarily committed to maintaining the local environment through monetary contributions and action. Over the course of their sustainability efforts, they gained a better understanding of the local environment and took pride in being a part of it.

TGI's Community investment activities

Hsinchu City Neighborhood Care

To create a friendly urban and rural environment, employees of Hsinchu Factory took part in volunteer street-cleaning activities in the Puqian Neighborhood, through which the Company was able to insert itself as a member of the community and work together to contribute to the local environment.

Maintenance of public toilet in Hsinchu City

Hsinchu Factory took the initiative to maintain the public toilet located near Feng An Temple in Hsinchu City for a period of 3 years from November 1, 2021 until October 31, 2024, thereby contributing to the cleanliness of the community's place of worship.

Maintenance of green belt in Taoyuan City

Taoyuan Factory made the commitment to maintain the green belt of the industrial zone for a period of 5 years from January 1, 2019 until December 31, 2023, which can be renewed upon expiry if agreed between the two parties. The maintenance applies to land lot No. 124, Sub-section 4, Guanyin Industrial Zone Section, Guanyin District, Taoyuan City. Employees of Taoyuan Factory have committed themselves to watering the vegetation 2-3 times a week as well as quarterly branch trimming, regular leaf clearing, weeding, fertilization, pest control, and erection of supporting braces in this 4,001 square meters of land. Together, they contribute to the cleanliness and beautification of the green belt.

Taoyuan City Shulin Li Mid-autumn Festival Energy and Carbon Reduction Awareness Program

TGI's Taoyuan Factory is located in Shulin Li of Guanyin District. In 2022, Shulin Li Office and Development Association jointly organized an "Energy and Carbon Reduction Awareness Program" during the Mid-autumn Festival, and Taoyuan Factory was invited to participate.

For this event, Taoyuan Factory sponsored six 960cc coffee pots and six round food containers to be used as lottery prize.

Appendices

Appendix 1 GRI Standards

The following content has passed the assurance of an independent third party; outcome of the assurance is explained in Appendix 5 - Independent Assurance Report.

" * " denotes material topic; " ● " denotes external assurance.

Declaration on the application of GRI Standards	The 2022 sustainability report has been prepared in accordance with GRI Standards; the data covers the period from January 1 to December 31, 2022.
GRI version	GRI 1: Foundation 2021
Applicable GRI Industry Standards	None

GRI 2

Indicator	Disclosures	Corresponding chapter	External Assurance	Page
Organization and reporting practices				
GRI 2-1	Information on the organization	About the report 2.1 About TGI	●	004 040
GRI 2-2	Entities included in the organization's sustainability reporting	About the report 2.1 About TGI	●	004 040
GRI 2-3	Reporting period, frequency and contact point	About the report	●	004
GRI 2-4	Restatements of information	No part of current year's report was restated	●	004
GRI 2-5	External assurance	Appendix 4: Assurance report	●	197
Activities and workers				
GRI 2-6	Activities, value chain and other business relationships	1.2 Stakeholder communication and identification of material issues 2.1 About TGI 3.1 TGI products 3.5 Sustainable Supply Chain 4.1 Sustainable Environment Strategy 4.3 Green production management	●	022 040 076 093 100 121
GRI 2-7	Employees	5.1 Human resources and welfare	●	152
GRI 2-8	Non-employee workers	5.1 Human resources and welfare	●	152
Governance				
GRI 2-9	Governance structure and composition	2.2 Integrity of TGI	●	052
GRI 2-10	Nomination and selection of the highest governance body	2.2 Integrity of TGI	●	052
GRI 2-11	Chair of the highest governance body	2.2 Integrity TGI	●	052
GRI 2-12	Role of the highest governance body in overseeing the management of impact	1.2 Stakeholder communication and identification of material issues 2.2 Integrity TGI	●	022 052
GRI 2-13	Delegation of responsibility for managing impacts	2.2 Integrity TGI	●	052
GRI 2-14	Role of the highest governance body in sustainability reporting	About the report 1.1 TGI Sustainable Management	●	004 012
GRI 2-15	Conflicts of interest	2.2 Integrity TGI	●	052
GRI 2-16	Communication of critical concerns	2.2 Integrity TGI	●	052
GRI 2-17	Collective knowledge of highest governance body	2.2 Integrity TGI	●	052
GRI 2-18	Evaluation of the performance of the highest governance body	2.2 Integrity TGI	●	052
GRI 2-19	Remuneration policies	2.2 Integrity of TGI	●	052
GRI 2-20	Process for determining remuneration	2.2 Integrity of TGI 5.1 Human resources and welfare	●	052 152
GRI 2-21	Annual total compensation ratio	Not disclosed due to confidentiality	●	-
Strategy, policies and practices				
GRI 2-22	Statement on sustainable development strategy	Message from the Chairman	●	006
GRI 2-23	Policy commitments	1.1 TGI Sustainable Management	●	012
GRI 2-24	Embedding policy commitments	1.1 TGI Sustainable Management	●	012
GRI 2-25	Processes to remediate negative impacts	2.2 Integrity TGI	●	052
GRI 2-26	Mechanisms for seeking advice and raising concerns	Integrity of TGI	●	052
GRI 2-27	Legal Compliance	2.3 Risk Management 3.1 TGI products 4.1 Sustainable management strategy 5.3 Occupational Safety and Health	●	065 076 100 166
GRI 2-28	Membership of associations	2.1 About TGI	●	040
Stakeholder engagement				
GRI 2-29	Approach to stakeholder engagement	1.2 Stakeholder communication and identification of material issues	●	022
GRI 2-30	Collective bargaining agreements	5.1 Human resources and welfare	●	152

Topic-specific GRI standards

*Material issues

GRI category/ topic	Serial No.	GRI indicator	Corresponding chapter	External assurance	Page
2022 Material topic	3-1	Material issue identification process	1.2 Stakeholder communication and identification of material issues		022
	3-2	Material topic list	1.2 Stakeholder communication and identification of material issues		022
Governance					
Economic performance*	3-3	Material topic management	1.2 Stakeholder communication and identification of material issues		022
	201-1	Direct economic value generated and distributed	2.2 Integrity of TGI		052
	201-2	Financial implications and other risks and opportunities due to climate change	4.4 Climate action		132
Market presence	202-1	Ratios of standard entry level wage by gender compared to local minimum wage	5.1 Talent Structure and Benefits		152
Procurement impacts	204-1	Proportion of spending on local suppliers	3.5 Sustainable supply chain		093
Anti-corruption	205-3	Confirmed incidents of corruption and actions taken	2.2 Integrity of TGI		052
Anti-competition	206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	3.1 TGI products	●	076
Taxation	207-1	Approach to tax	2.1 About TGI		040
Environmental					
Materials	301-1	Materials used by weight or volume	4.2 Energy and resource management		106
	301-2	Percentage of renewable materials used	4.2 Energy and resource management		106
Energy*	GRI 3	Material topic management	1.2 Stakeholder communication and identification of material issues		022
	302-1	Energy consumption within the organization	4.2 Energy and resource management		106
	302-3	Energy intensity	4.2 Energy and resource management		106
	302-4	Reduction of energy consumption	4.2 Energy and resource management		106
	302-5	Reductions in energy requirements of products and services	4.2 Energy and resource management		106
Water and effluent*	3-3	Material topic management	1.2 Stakeholder communication and identification of material issues		022
	303-2	Management of water discharge-related impacts	4.3 Green production management	●	121
	303-3	Water withdrawal	4.2 Energy and resource management		106
	303-4	Water discharge	4.2 Energy and resource management		106
	303-5	Water consumption	4.2 Energy and resource management		106

GRI category/ topic	Serial No.	GRI indicator	Corresponding chapter	External assurance	Page
Environmental					
Biodiversity	304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	4.1 Sustainable management strategy		100
Emissions*	GRI 3	Material topic	1.2 Stakeholder communication and identification of material issues		022
	305-1	Direct (Scope 1) GHG emissions	4.2 Energy and resource management		106
	305-2	Energy indirect (Scope 2) GHG emissions	4.2 Energy and resource management		106
	305-4	GHG emissions intensity	4.2 Energy and resource management		106
	305-5	Reduction of GHG emissions	4.2 Energy and resource management		106
	305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	4.3 Green production management		121
Waste*	GRI 3	Material topic	1.2 Stakeholder communication and identification of material issues		022
	306-1	Waste generated and significant waste-related impacts	4.3 Green production management		121
	306-2	Management of significant waste-related impacts	4.3 Green production management		121
	306-3	Waste generated	4.3 Green production management		121
	306-4	Waste diverted from disposal	4.3 Green production management		121
	306-5	Waste directed to disposal	4.3 Green production management		121
Supplier environmental assessment	308-1	New suppliers that were screened using environmental criteria	3.5 Sustainable supply chain		093
	308-2	Negative environmental impacts in the supply chain and actions taken	3.5 Sustainable supply chain		093
Social					
Labor-management relations*	3-3	Material topic management	1.2 Stakeholder communication and identification of material issues		022
	401-1	New employee hires and employee turnover	5.1 Talent Structure and Benefits		152
	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	5.1 Talent Structure and Benefits		152
	401-3	Parental leave	5.1 Talent Structure and Benefits		152
Labor/ management relations	402-1	Minimum notice periods regarding operational changes	5.1 Talent Structure and Benefits		152
Procurement Practices	204-1	Percentage of local procurement	3.5 Sustainable supply chain		093
Occupational Health and Safety*	3-3	Material topic management	1.2 Stakeholder communication and identification of material issues		022

GRI category/ topic	Serial No.	GRI indicator	Corresponding chapter	External assurance	Page
Social					
Occupational Health and Safety*	403-1	Occupational health and safety management system	5.3 Occupational Safety and Health		166
	403-2	Hazard identification, risk assessment, and incident investigation	5.3 Occupational Safety and Health		166
	403-3	Occupational health services	5.3 Occupational Safety and Health		166
	403-4	Worker participation, consultation, and communication on occupational health and safety	5.3 Occupational Safety and Health		166
	403-5	Worker training on occupational health and safety	5.3 Occupational Safety and Health		166
	403-6	Promotion of worker health	5.3 Occupational Safety and Health		166
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	5.3 Occupational Safety and Health		166
	403-9	Work-related injuries	5.3 Occupational Safety and Health	●	166
	403-10	Work-related ill health	5.3 Occupational Safety and Health		166
Training and education	404-1	Average hours of training per year per employee	5.2 Employee Care & Development		161
	404-2	Programs for upgrading employee skills and transition assistance programs	5.2 Employee Care & Development		161
Diversity and equal opportunity	405-1	Diversity of governance bodies and employees	5.1 Talent Structure and Benefits		152
Forced or compulsory labor	409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	TGI encountered no such incident		-
Supplier social assessment	414-1	Selection of new suppliers using social principles	3.5 Sustainable supply chain		093
	414-2	Negative social impacts in the supply chain and actions taken	3.5 Sustainable supply chain		093
Customer health and safety*	3-3	Material topic management	1.2 Stakeholder communication and identification of material issues		022
	416-1	Assessment of the health and safety impacts of product and service	3.1 TGI products	●	076
	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	3.1 TGI products		076
Marketing and Labeling*	3-3	Material topic management	1.2 Stakeholder communication and identification of material issues		022
	417-1	Product and service information labeling requirements	3.1 TGI products		076
Customer privacy*	3-3	Material topic management	1.2 Stakeholder communication and identification of material issues		022

GRI category/ topic	Serial No.	GRI indicator	Corresponding chapter	External assurance	Page
Social					
Customer privacy*	418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	2.3 Risk Management		065

GRI category/topic	GRI indicator	Corresponding chapter	External assurance	Page
Other				
Corporate governance	Non-GRI Standard indicators	1.2 Stakeholder communication and identification of material issues 2.2 Integrity TGI 2.3 Risk Management		022 052 065
Product innovation and green design	Non-GRI Standard indicators	1.2 Stakeholder communication and identification of material issues 3.1 TGI products 3.3 Research and Innovation		022 076 087

Appendix 2: Table of Reference to The UN Global Compact

Item No.	Content	Corresponding chapter	Page
1. Human right			
1	Businesses should support and respect the protection of internationally proclaimed human rights	3.5 Sustainable supply chain 5.1 Talent Structure and Benefits	093 152
2	Business should make sure that they are not complicit in human rights abuses	5.1 Talent Structure and Benefits	152
2. Labor			
3	Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining	5.1 Talent Structure and Benefits	152
4	Elimination of all forms of forced and compulsory labor	CH5 Safe workplace, trust, and growth	150
5	Effective abolition of child labour	5.1 Talent Structure and Benefits	152
6	Elimination of discrimination in respect of employment and occupation	5.1 Talent Structure and Benefits	152
3. Environment			
7	Business should support a precautionary approach to environmental challenges	2.3 Risk Management CH4 Sustainable, energy conservation, and green practices	065 098
8	Business should undertake initiatives to promote greater environmental responsibility	CH4 Sustainable, energy conservation, and green practices	098
9	Business should encourage the development and diffusion of environmentally friendly technologies	3.1 TGI products 4.2 Energy and resource management 4.3 Green production management	076 106 121
4. Anti-corruption			
10	Business should take actions to prevent corruptive behaviors, including fraud and bribery	2.2 Integrity TGI	052

Appendix 3: Table of Reference to Standards of Sustainability Accounting Standards Board (SASB)

Topic of disclosure	Indicator code	Category	Disclosure indicator	Corresponding chapter/description	Page No.
Greenhouse gas (GHG) emission	EM-CM-10a.1.	Quantitative	Total Scope 1 GHG emission in the world; Percentage of controlled GHG emission in the world.	4.2 Sustainable Resource Management	106
	EM-CM-10a.2.	Qualitative	Long-term and short-term strategies for Scope 1 emission management; description of reduction plans and targets, and analysis of target performance	4.2 Sustainable Resource Management	106
Air quality	EM-CM-20a.1.	Quantitative	Air pollutants include the following: NOxx (excluding N2O) Sox Suspended solids (PM10) Dioxin/furan VOCS PAHs Heavy metal	4.3 Green production management	121
Energy management	EM-CM-30a.1.	Quantitative	Total energy consumed Percentage of power drawn from grid Percentage of alternative energy used Percentage of renewable energy used	4.1 Sustainable Environment Strategy 4.2 Sustainable Resource Management	100 106
Water management	EM-CM-40a.1.	Quantitative	Total water withdrawn Percentage of water reclaimed Percentage of high or extremely high water stressed area	4.2 Sustainable Resource Management *TGI is not located in any high water stressed area.	106
Waste management	EM-CM-150a.1.	Quantitative	Volume of waste generated; Percentage of hazardous waste; Percentage of waste recycled.	4.3 Green production management	121
Effect on biodiversity	EM-CM-160a.1.	Qualitative	Describe environmental management policies and practices at active sites	4.1 Sustainable Environment Strategy	100
Worker health and safety	EM-CM-320a.1.	Quantitative	Recordable incidents rate for permanent and contract employees; Frequency of near misses encountered by permanent and contract employees.	5.3 Occupational Safety and Health	166
	EM-CM-320a.2.	Quantitative	Number of reported silicosis	5.3 Occupational Safety and Health *TGI reported no silicosis in 2022	166
Product design and life cycle management	EM-CM-410a.1.	Quantitative	Percentage of certified products that can be supplied to the design and construction of sustainable buildings	3.1 TGI products	076
		Quantitative	Potential demand and market share for products of lower energy, water, and material impact during usage and production	3.1 TGI products	076
Competitive behavior	EM-CM-520a.1.	Quantitative	Total amount of monetary losses as a result of legal proceedings associated with cartel arrangement, price fixing, and anti-trust activities	*TGI encountered no such occurrence in 2022.	-
Activity indicators	EM-CM-000.A.	Quantitative	Capacity of main production lines	2.1 About TGI	040

Appendix 4: Climate-related information for TWSE/TPEX listed companies

Item	Current progress
1. Describe how the board of directors and the management exercise supervision and governance over climate-related risks and opportunities.	With regards to the supervision of climate-related risks and opportunities, the Board of Directors is the highest governance unit on climate issues within Taiwan Glass (TGI) as it is responsible for supervision and decision-making. An "ESG Committee" has been assembled under the board, which regularly reports progress on climate risks and opportunities to the Board of Directors. The "ESG Committee" formulates medium and long-term sustainable development goals of Taiwan Glass (TGI), and is responsible for integrating the Company's cross-departmental resources, identifying climate issues related to the Company's operations, formulating climate strategies, tracking the achievement of targets, and making unscheduled reports to the Board of Directors.
2. Describe how the climate risks and opportunities identified affect the entity's businesses, strategies, and financial position (short-term, medium-term, and long-term).	The "ESG Committee" will carry out climate risk and opportunity identification on a regular basis, and work with the management of each factory to analyze the possible financial impact of major climate risks, and formulate contingency and preventive measures to enhance the Company's climate resilience.
3. State the financial impacts of extreme weather events and transition actions.	Based on TCFD's guidelines on physical risks, transition risks, and climate change opportunities, TGI will set up meetings to have factory managers and department heads work with external consultants to determine the financial impacts of extreme weather events and transition actions, as well as the potential financial and operational impacts of climate change. Delays to production schedule due to unstable power supply: increased operating costs, possible interruption to operations, and delays in product delivery that result in customers losing confidence in TGI. I. Imposition of carbon taxes by governments around the world: increased operating costs that impact competitiveness of product pricing. II. Possible production delays caused by unstable supply/transportation of energy (e.g. natural gas, diesel, heavy oil, and LPG) under extreme weathers: disrupts production activities, puts equipment in idle state, and delays delivery. III. Order to suspend operations and production due to the government's control on carbon emissions, resulting in production schedule delays or additional costs: some of the equipment used for production are machines that cannot be shutdown; forcing a shutdown may damage these equipment and will reduce revenues. IV. Renewable energy regulations become more stringent in the future, which present additional costs: construction of green power capacity incurs additional operating costs. V. More stringent environmental regulations result in an increase of environmental protection expenses: increased water charges, carbon taxes, and raw material costs will erode production margin.

Item	Current progress
4. Describe the procedures undertaken to identify, evaluate, and manage climate risks, and how they are integrated into the risk management system.	Based on the outcomes of the climate change risks and opportunities questionnaire, "ESG Committee" consolidates climate-related risks, opportunities, and management measures for regular review and tracking. Furthermore, the committee reviews how changes in policies, regulations, technologies, markets, and reputation affect transition risks and opportunities on a yearly basis, and regularly reviews the assessment of physical risks, transition risks, and opportunities through the identification of climate risks and opportunities, so that it may coordinate with factories to devise proper responses.
5. Where scenario analysis is used to evaluate resilience to climate change risk, describe the underlying scenarios, parameters, assumptions, factors, and key financial impacts.	TGI adopts climate scenario analysis as a way to evaluate how extreme weathers affect operations, so that actions can be taken to prevent termination of operations by extreme weather, and therefore ensure business continuity. For more details on climate scenario analysis, please refer to section 4.4 Climate action
6. Where transition plans have been made to manage climate risks, explain plan details and the indicators and goals used for the identification and management of physical risks and transition risks.	Each TGI factory analyzes climate risks and opportunities and would devise management policies based on the current state of factory. They also conduct regular supplier evaluations based on the outcomes of TCFD risk identification to minimize the production risks associated with shortage of materials. Energy-intensive equipment is replaced progressively as needed for each factory. Meanwhile, TGI plans to construct and make use of solar power to increase the percentage of renewable energy sources over time.
7. Where internal carbon pricing is used as planning tool, explain the pricing basis.	TGI will adopt internal carbon pricing in the future to provide employees with a stronger incentive toward reducing carbon. By setting the good example, TGI hopes to rally industry peers to carbon reduction.
8. If climate-related goals have been implemented, explain the activities covered, the scope of greenhouse gas emissions, any timeline planned, and the progress made each year. Where carbon offset or renewable energy certificate (REC) is used to accomplish the above goals, explain the source and quantity of carbon credit or the quantity of REC.	According to the "sustainability development roadmap for TWSE/TPEX listed companies" published by the Financial Supervisory Commission in March 2022, the Company has paid-up capital of more than NT$10 billion, which means that the entity (i.e. the parent company) is subject to phase 1 greenhouse gas survey (to be completed by 2023 and validated by 2024). TGI will observe the guidelines and rules published by the authority and continue monitoring completion greenhouse gas survey and validation.

9. Greenhouse gas survey and assurance.

Company profile	Minimum disclosure according to the sustainability development roadmap for TWSE/TPEX listed companies
■ Company with share capital ≥ NT$10 billion; or participant of steel or cement industry □ Company with share capital ≥ NT$5 billion but < NT$10 billion □ Company with share capital < NT$5 billion	■ Survey of parent company □ Survey of subsidiaries included in consolidated financial statements □ Assurance of parent company □ Assurance of subsidiaries included in consolidated financial statements

Scope 1	Total emission (ton(s) CO2e)	Intensity (ton(s) CO2e/NTD million)	Assurer	Assurance
Parent company	432,649.13	34.35	SGS	With the exception of North Taiwan Branch and Changpin Factory, all other factory sites have completed external validation.
Scope 2	**Total emission (ton(s) CO2e)**	**Intensity (ton(s) CO2e/NTD million)**	**Assurer**	**Assurance**
Parent company	248,448.45	19.73	SGS	With the exception of North Taiwan Branch and Changpin Factory, all other factory sites have completed external validation.
Total	**Total emission (ton(s) CO2e)**	**Intensity (ton(s) CO2e/NTD million)**	**Assurer**	**Assurance**
Parent company	681,096.88	54.07	SGS	With the exception of North Taiwan Branch and Changpin Factory, all other factory sites have completed external validation.

Note: Converted based on the individual revenue of Taiwan Glass, 12,595,543 thousand NT dollars in the year 2022.

Appendix 5: Assurance report

EY 安永 Building a better working world

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會計師有限確信報告

台灣玻璃工業股份有限公司　公鑒

確信範圍

本會計師接受台灣玻璃工業股份有限公司(以下簡稱台玻公司)之委任，對2022年度永續報告書中所選定之永續績效資訊 (以下稱「標的資訊」)，執行財團法人中華民國會計研究發展基金會所發布之確信準則所定義之「有限確信案件」並出具報告。

標的資訊及其適用基準

有關台玻公司之標的資訊及其適用基準詳列於附件一。

管理階層之責任

台玻公司管理階層之責任係依據臺灣證券交易所「上市公司編製與申報永續報告書作業辦法」之規定，以及參考適當之基準編製標的資訊，包括參考全球永續性報告協會(Global Reporting Initiatives, GRI)所發布之2021年GRI 準則(GRI Standards)，台玻公司管理階層應選擇所適用之基準，並對標的資訊在所有重大方面是否依據該適用基準報導負責，此責任包括建立及維持與標的資訊編製有關之內部控制、維持適當之記錄並作成相關之估計，以確保標的資訊未存有導因於舞弊或錯誤之重大不實表達。

本會計師之責任

本會計師之責任係依據所取得之證據對標的資訊作成結論。

本會計師依照財團法人中華民國會計研究發展基金會所發布之確信準則3000號「非屬歷史性財務資訊查核或核閱之確信案件」之要求規劃並執行確信工作，以發現標的資訊在所有重大方面是否有未依適用基準編製而須作修正之情事，並出具有限確信報告。

本會計師依據專業判斷，包括對導因於舞弊或錯誤之重大不實表達風險之評估，以決定確信程序之性質、時間及範圍。

本會計師相信已取得足夠及適切之證據，以作為表示有限確信結論之基礎。

會計師之獨立性及品質管理

本會計師及所隸屬組織遵循會計師職業道德規範中有關獨立性及其他道德規範之規定，該規範之基本原則為正直、公正客觀、專業能力及專業上應有之注意、保密及專業行為。

本事務所遵循品質管理準則1號「會計師事務所之品質管理」，該品質管理準則規定組織設計、付諸實行及執行品質管理制度，包含與遵循職業道德規範、專業準則及適用之法令規範相關之政策或程序。

所執行程序之說明

有限確信案件中執行程序之性質及時間與適用於合理確信案件不同，其範圍亦較小，因此，有限確信案件中取得之確信程度明顯低於合理確信案件中取得者。本會計師所設計之程序係為取得有限確信並據此作成結論，並不提供合理確信必要之所有證據。

儘管本會計師於決定確信程序之性質及範圍時曾考量台玻公司內部控制之有效性，惟本確信案件並非對台玻公司內部控制之有效性表示意見。本會計師所執行之程序不包括測試控制或執行與檢查資訊科技(IT)系統內資料之彙總或計算相關之程序。

有限確信案件包括進行查詢，主要係對負責編製標的資訊及相關資訊之人員進行查詢，並應用分析及其他適當程序。

本會計師所執行之程序包括：

- 與台玻公司之管理階層及員工進行訪談，以瞭解台玻公司履行永續發展之整體情況，以及報導流程；
- 透過訪談、檢查相關文件，以瞭解台玻公司之主要利害關係人及利害關係人之期望與需求、雙方具體之溝通管道，以及台玻公司如何回應該等期望與需求；
- 針對報告中所選定之永續績效資訊進行分析性程序；蒐集並評估其他支持證據資料及所取得之管理階層聲明；如必要時，則抽選樣本進行測試；
- 閱讀台玻公司之永續發展報告書，確認其與本事務所取得關於永續發展整體履行情況之瞭解一致。

先天限制

因永續報告中所包含之非財務資訊受到衡量不確定性之影響，選擇不同的衡量方式，可能導致績效衡量上之重大差異，且由於確信工作係採抽樣方式進行，任何內部控制均受有先天限制，故未必能查出所有業已存在之重大不實表達，無論是導因於舞弊或錯誤。

結論

依據所執行之程序及所取得之證據，本會計師未發現標的資訊有未依照適用基準編製而須作重大修正之情事。

安永聯合會計師事務所

會計師：李育儒

民國一一二年七月三十一日

附件一：

編號	頁次	內文標題	標的資訊	適用基準
1	符合性確信		台玻揭露 2022 年度永續發展報告書係依據全球永續性標準理事會(Global Sustainability Standards Board, GSSB)發布之 GRI 準則(GRI Standards 2021)編製	GRI 準則(GRI Standards 2021)
2	76	3.1 台玻產品	2022 年台玻產品無違反產品健康與安全、標示及市場推廣相關法規，亦無發生產品被禁止銷售之事件；亦無涉及反競爭行為、反托拉斯與壟斷措施之法律訴訟	公司適用之商品標示法、食品安全衛生管理法、國際反托拉斯法、消費者保護法
3	128-129	4.3 綠色生產管理-水汙染管理	2022 年水汙染管理	公司統計資料
4	154-155	5.1 人力資源及福利-員工新進率及離職率統計	2022 年員工新進率及離職率統計	公司統計資料
5	169	5.3 職場安全與健康-職業安全管理	2022 年失能傷害頻率、失能傷害嚴重率、缺席率	公司統計資料