






CH6

Green Environment



Target Formulation

	Targets for 2024-2025	Targets for 2026-2027	Targets for 2028 and beyond	Corresponding SDGs
Energy and Process Water Management	<ul style="list-style-type: none"> We continue to promote energy conservation and carbon reduction measures and set an energy saving target rate of 5% for each of our three factories in 2024, which will reduce energy usage by an estimated 1,459,870 kWh equivalent to 720,000 kg of carbon emissions. We transfer solar power to our headquarters, and target to transfer 1,200,000 kWh in 2025. Complete and verify the energy-saving enhancement project for ESCO air conditioning equipment and water pump system at Zhongli Factory, which will conserve energy at an estimated rate of 33.2%. 	<ul style="list-style-type: none"> Continue to promote energy conservation and carbon reduction measures, strengthen intensity of energy management, reduce energy usage and set an average energy saving target rate of over 3%. Reduce natural gas usage at our Pingzhen, Zhongli, and Longtan factories by more than 3% compared to 2022 in 2027. Gradually increase renewable energy consumption and achieve a target of over 5% of renewable energy consumption across all three factories. Assess other spaces within the factory and generate low-carbon energy through either a collaborative model with equipment vendors or self-generation. 	<ul style="list-style-type: none"> Strengthen intensity of energy management and set an average energy saving target rate of over 5%. Gradually increase renewable energy consumption and achieve a target 5-15% of total renewable energy consumption across all three factories. Assess other spaces within the factory and generate low-carbon energy through either a collaborative model with equipment vendors or self-generation. Recycle process water at our Pingzhen, Zhongli, Longtan and Yungfeng factories by more than 5% compared to 2022 in 2030. Reduce total tap water usage at all four factories by more than 5% compared to 2022 in 2030. 	
Wastewater Management	<ul style="list-style-type: none"> Ensure all wastewater is legally discharged and the quality of water discharge exceeds average Chemical Oxygen Demand (COD) standards by 35%. Reduce the average amount of water discharge by more than 5% Continue to conduct inspections of wastewater pipelines and catch basins to ensure effective collection and proper disposal of wastewater. 	<ul style="list-style-type: none"> Ensure all wastewater is legally discharged and the quality of water discharge exceeds average Chemical Oxygen Demand (COD) standards by 40%. Reduce the average amount of water discharge by more than 7% Actively obtain ISO14001 and other environmental management system verifications Continue to implement pipeline inspections and increase water recycling programs. 	<ul style="list-style-type: none"> Ensure all wastewater is legally discharged and the quality of water discharge exceeds average Chemical Oxygen Demand (COD) standards by 40% Continue to reduce the average amount of water discharge by more than 7% Achieve company-wide environmental protection targets and become an environmentally friendly enterprise. Obtain awards related to environmental protection. 	 
Management of Toxic Substances and Waste	<ul style="list-style-type: none"> Conduct audits of waste disposal and reuse vendors at least once every year Enhance the reusability value of sludge and assess the reuse of food sludge to reduce environmental impacts. Increase the recycling rate of resources by seeking pathways for the recycling of waste plastics (waste code D-0299). 	<ul style="list-style-type: none"> All waste disposal vendors hold legal licenses. Aim to reduce the volume of domestic waste at all factories by 1-3%. Reduce the volume of sludge and aim to enhance sludge reuse by 60%. Reduce the volume of waste plastic and aim to enhance waste plastic reuse by 50%. Actively obtain ISO14001 and other environmental management system verifications. 	<ul style="list-style-type: none"> Achieve company-wide environmental protection targets and become an environmentally friendly enterprise. Obtain awards related to environmental protection. 	 



Director of
Manufacturing
Division
Yi-Ru Hu



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Grape King Bio strives to co-exist with nature. Our manufacturing processes incorporate energy-saving, carbon-reduction, water-saving, and waste-reduction concepts into all stages of product life cycle to minimize environmental impacts.

”

6.1 Grape King Bio Climate Actions Under the Task Force on Climate-Related Financial Disclosures (TCFD)

The Global Risks Report 2024 issued by the World Economic Forum stated that, of the top ten risks for the next ten years, five are environmental risks, namely, “Extreme weather events,” “Critical change to Earth systems,” “Biodiversity loss and ecosystem collapse,” “Natural resource shortages,” and “Pollution.” The Emissions Gap Report 2022 released by the United Nations Environment Programme in October 2022 also pointed out that if current carbon emissions from various nations remain the same, global temperatures will rise by 2.8°C by the end of the century. The world is still far from ideal carbon emissions levels, and therefore the report warned that “the window of climate opportunity is about to close.”

Recognizing the urgency of global climate change issues, Grape King Bio began adopting the Task Force on Climate-related Financial Disclosures (TCFD) issued by the Financial Stability Board (FSB) starting in 2020, using this framework to assess impacts caused by climate change, identify climate risks and opportunities, and mitigate and management impacts to the Company from environmental changes. We became the first healthcare enterprise in Taiwan to officially sign on as a TCFD Supporter in 2021. In 2023, we initiated the plan for Science Based Targets initiative (SBTi) 1.5°C targets setting. In the future, we plan to incorporate net zero emissions targets into our long-term goals and vision while actively adhering to the National Development Council’s “Taiwan 2050 Net Zero Emissions Path” and fulfilling our responsibilities to the environment and the earth as an RE100 member and a health care expert for the nation.

1. Governance

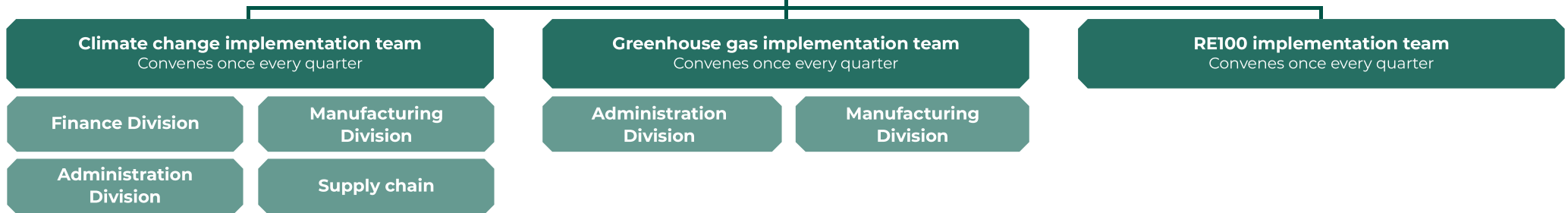
We stay highly attentive to our climate change risks and opportunities to ensure that we fulfill our responsibilities to society, the environment, and all our stakeholders. All members of our management team from our chairman to senior managers consider climate change to be an important corporate issue and work to monitor and manage climate topics using an effective governance framework.

Additionally, we actively participate in industry initiatives associated with sustainability and climate change. We joined related associations, and our chairman serves as a director of the Taiwan Center for Corporate Sustainability and attends quarterly director meetings. We also work with other enterprises to mitigate climate change issues through our efforts, actions, and contributions.



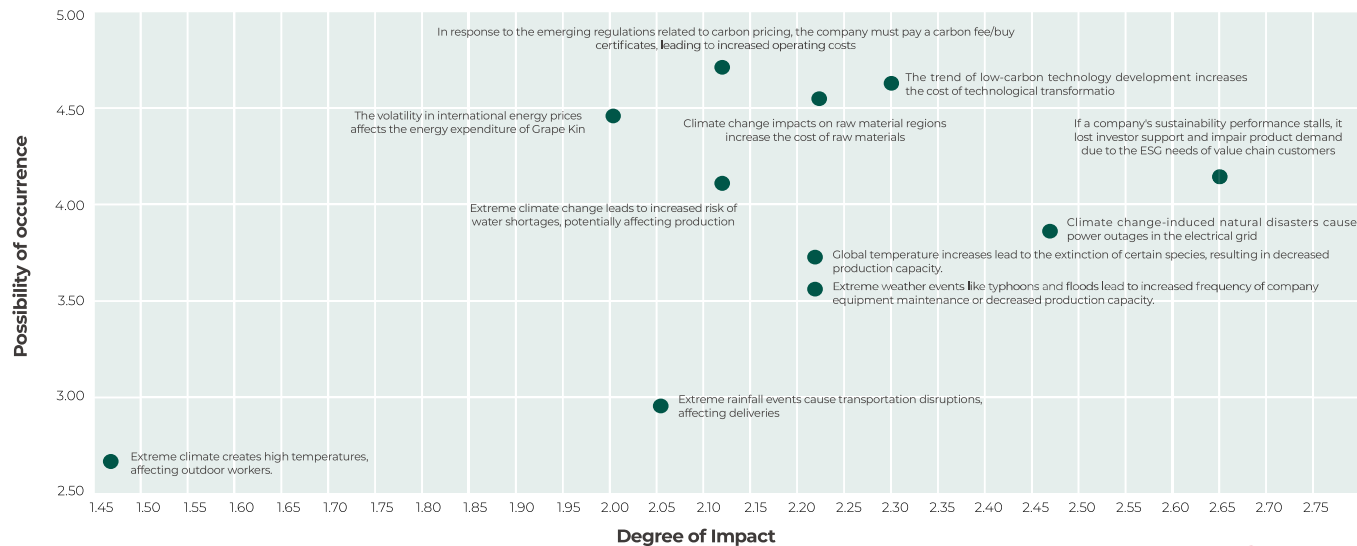
Sustainability and ESG Committee

The Chairman serves as the Chief Commissioner of the Sustainability and ESG Committee. Under the ESG Committee, there are project groups, including those focused on climate risk, greenhouse gas issues, and the RE100 implementation group. These groups meet at least once a quarter and are responsible for setting the company's targets and actions on these issues. The relevant units coordinate and communicate with the departments involved according to the requirements and suggestions of the current period, obtaining related information, and regularly review and report on the implementation results and direction of improvement to the Chairman and the Board of Directors.



2. Strategies

The Sustainability and ESG Committee invited the heads and executives of each implementation team to assess the current major climate risks and opportunities faced by Grape King Bio through the TCFD questionnaire. We collected a total of 20 responses and used these to build a TCFD climate change risks and opportunities matrix as shown below:



Additionally, regarding timelines and financial impacts of climate risks and opportunities, we use the following definitions based on consensus reached by internal and external experts and internal managers:

Timeline

Short-term	2024-2025
Mid-term	2026-2030
Long-term	2031-2050

Level of financial impacts

Material	5% of net profits before tax in 2022
High	3.75%-5% of net profits before tax in 2022
Medium	0.25%-3.75% of net profits before tax in 2022
Low	0.25% of net profits before tax in 2022

Climate Related Risk and Opportunity Analysis

Grape King Bio considers the "degree of impact" and "possibility of occurrence" of climate-related risks and opportunities for prioritization and setting threshold value for materiality. Therefore, we have identified four major climate-related risks and one climate-related opportunity.

Climate Related Risks		Transition-Market	Transition-Costs to transition to lower emissions technology	Transition- Mandates on and regulation of existing products and services	Transition-Reputation
	Description	In response to customer demand, international advocacy, and the company's own set emission reduction targets, our factories continue to increase the use of renewable energy, leading to a rise in operational costs.	To adapt to the development of low-carbon technology, Grape King Bio needs to use recycled materials in product packaging, which increases the cost of lower emissions technology.	To achieve our carbon reduction goals, operational costs have increased.	In response to the ESG demands of customers in the value chain, if the company's sustainability performance does not progress, it could lose favor with investors and impact product demand.
	Timeline	Short to medium term	Short to medium term	medium term	medium term
	Level of financial impacts	Medium to high	Medium to high	Medium to high	Medium to high
	Financial impacts	Increased operating costs	Capital investments in technology development	Increased operating costs	Reduced revenue from decreased demand for goods/services
	Response Measures	Grape King Bio made a commitment to join the RE100 in 2019. We plan to achieve our first-stage target of 15% renewable energy consumption by 2030 and achieve full use of renewable energies by 2035. In 2023, we achieved a 1.6% energy saving across all three of our factories. Moreover, we completed the installation of our solar photovoltaic system at the Longtan Factory, which generated 205,764 kWh of electricity. Additionally, we made a cumulative purchase of 900,000 kWh of renewable energy.	We actively work to reduce the environmental impacts from our product lifecycles. In terms of sustainable packaging, recyclable plastic materials are one of the main packaging products used by Grape King Bio, and we will continue to establish recycling sites. We also continue to assess and develop products which use packaging made from plastic-free paper materials and recyclable materials.	In 2022, Grape King Bio established four strategies to prevent stockouts, including completion rates of customer orders, Pro-Partner's continuous supply goals, raw materials and spare components assessment goals, response rates of sustainability self-assessment surveys from significant suppliers, and SIMP promotion rates. For more information, please refer to 2.1.1 Procurement Strategy.	In response to the heightened focus of investors on the ESG performance of the company, Grape King Bio is proactively addressing this issue. To meet investors' expectations and maintain market competitiveness, we have been striving to improve our ESG performance, enhance communication with investors, and incorporate feedback into our strategic planning.

Physical Risk Climate Scenario Analysis

Climate Related Opportunities		Access to new markets
	Description	Expand ESG disclosures to attract investor interest: In the face of climate change, Grape King Bio is responding to global climate goals by committing to join the RE100 initiative and disclose information through TCFD (Task Force on Climate-related Financial Disclosures). This allows investors to better understand the company's emphasis and actions on climate change-related issues, gaining their attention.
	Timeline	Short to medium term
	Level of financial impacts	Medium to High
	Financial impacts	Increased revenues through access to new and emerging
	Response Measures	In response to the impacts of climate change, Grape King Bio has pledged to join the RE100 initiative and has signed on as a TCFD (Task Force on Climate-related Financial Disclosures) Supporter to disclose information. This demonstrates our commitment to global climate goals and underlines our focus on climate change risk.

Although no major physical climate-related risks were identified in this climate risk and opportunity assessment, multiple international scientific reports have indicated that climate change will dramatically impact the environment and human health in the long term. Therefore, Grape King Bio continues to utilize the AR6 statistically downscaled data proposed from the Taiwan Climate Change Projection Information and Adoption Knowledge Platform (TCCIP) to run analyses in Taoyuan City (where main production bases of Grape King Bio and Pro-Partner are located) to understand the “changes in annual maximum value of daily maximum temperature (Note 1)” and “rate of change in annual maximum 1-day precipitation (Note 2)” under the worst-case scenario (SSP5-8.5). Compared with the base period (1995-2014), Taoyuan City is expected to see an average rise in temperature of 1.6°C and reach maximum temperatures of 35.4°C in 2050.

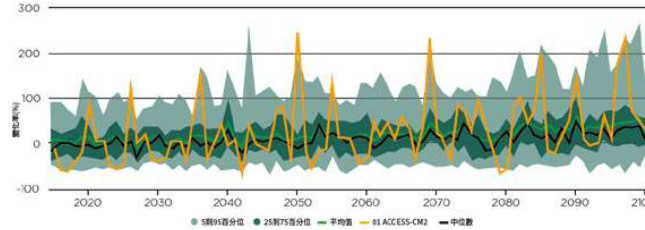
Research conducted by Academia Sinica based on information taken from the National Health Insurance Research Database shows that the number of days where the temperature was higher than 34°C has increased, and this has increased the number of emergency patients suffering from heat stroke and other associated conditions.

Additionally, the rate of change in annual maximum 1-day precipitation will increase by 13.8% in 2050, reaching 213.5 mm, thereby increasing the risks of “short-duration intense rainfall.” Current municipal drainage systems may not be able to drain the excess water in a timely manner, so cities and factories are at risk of flood, and people outdoors may be at risk of emergencies.

Annual maximum value of daily maximum temperature in Taoyuan city under SSP5-8.5 scenario; Subtitle: Observational base period: 33.8°C

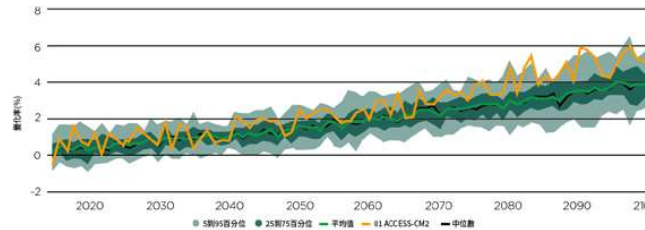
Annual maximum value of daily maximum temperature in Taoyuan city under SSP5-8.5 scenario

Observational base period: 33.8°C



Annual maximum 1-day precipitation in Taoyuan city under SSP5-8.5 scenario

Observational base period: 187.6mm



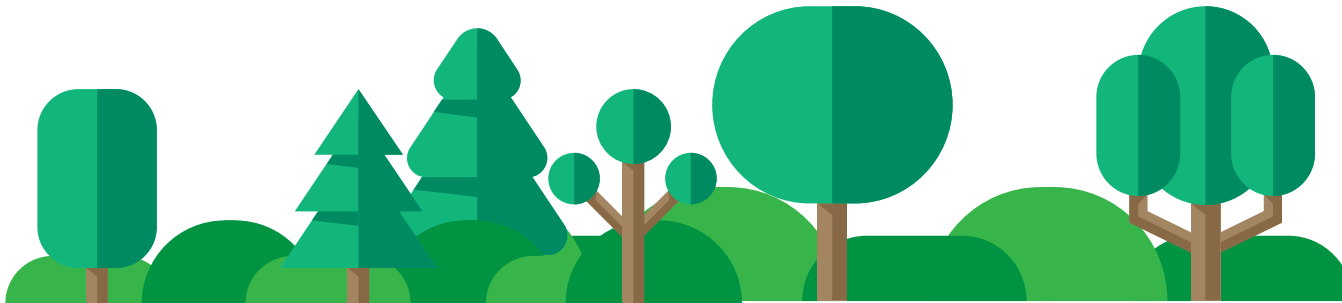
Based on the aforementioned analysis, Grape King Bio has established the following strategies:

Item	Strategy
Increased likelihood of heat injuries in employees	<ul style="list-style-type: none"> We conduct annual scenario to analyze the management systems at our factories so we can understand the conditions, risks, and opportunities faced by factory personnel and propose improvement plans based on these issues. We facilitate regular health checks for our employees. Our chairman signed a workplace health promotion declaration, and we continue to host occupational health and safety activities each year to help our employees build their safety inspection, emergency first-aid, and health management capabilities.
Increased likelihood of short-duration intense rainfall	<ul style="list-style-type: none"> We continue to evaluate flood prevention measures at our factories and strengthen our responses to acute flooding disasters. We monitor water conditions using real-time information provided by the Water Resources Agency and formulate corresponding countermeasures.

Note:
 1.Maximum daily high temperature: The maximum value of the daily high temperature within a year, measured in °C.
 2.Annual maximum one-day rainfall change rate: The maximum value of daily rainfall within a year, measured in millimeters.

3. Risk Management

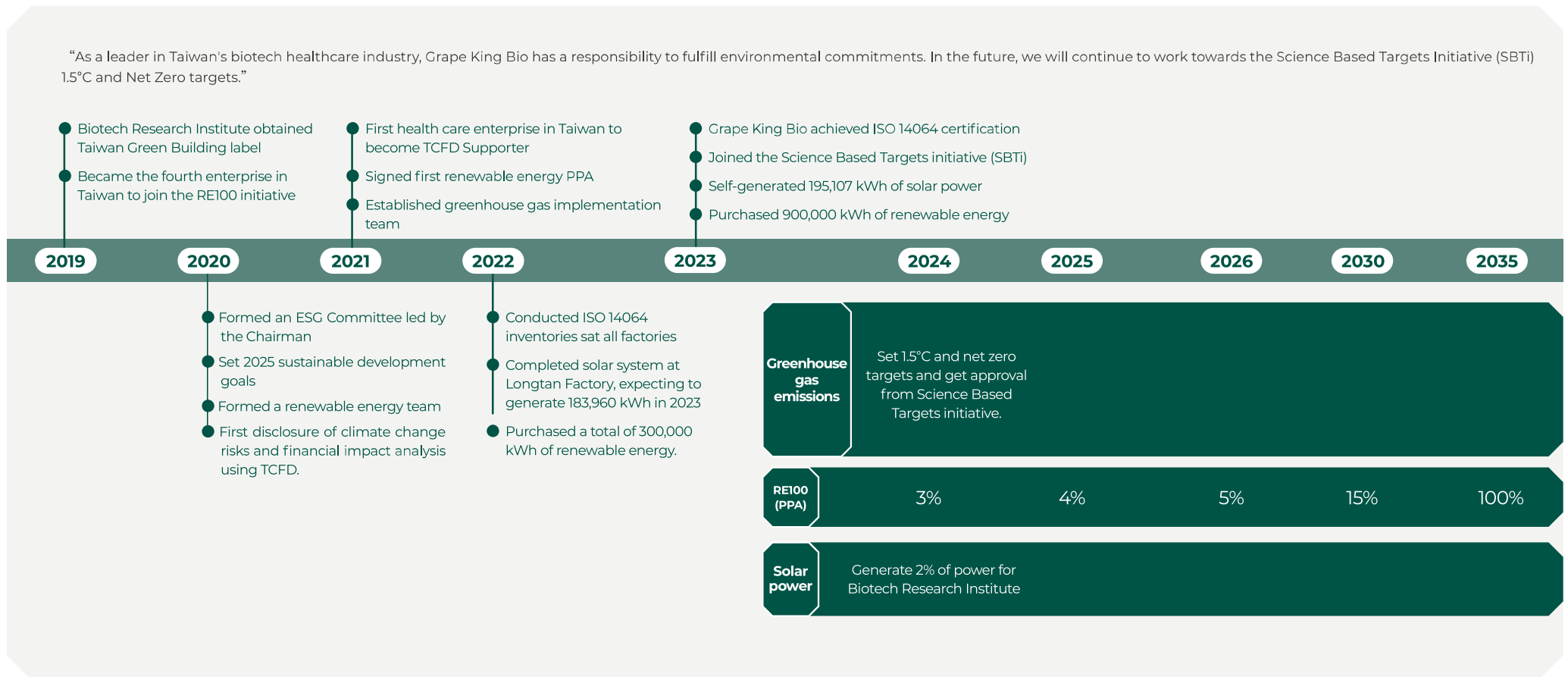
Climate change related issues are reported twice a year in the committee meetings by our Climate Change Implementation Team and Greenhouse Gas Implementation Team under the "Sustainability and ESG Committee". Additionally, we also plan to form a “Risk Management Committee” to manage responses to climate risks. In terms of processes for identifying and assessing risks, we currently use a bottom-up approach where frontline units report on-site climate issues and formulate related strategies.



4. Metrics and Targets

Grape King Bio is a company with many food manufacturing factories. Therefore, energy usage, greenhouse gas emissions, water consumption, and waste management are all indicators that have direct impacts on operations (please refer to 6.2 Management of Energy Resources and Greenhouse Gases, 6.3 Management of Water Resources, and 6.4 Waste Management). Please refer to the following image for information on our timeline of climate change responses, future plans, and targets:

Grape King Bio climate change timeline



6.2 Management of Energy Resources and Greenhouse Gases

The issue of climate change has become an operational focus for corporations seeking to achieve sustainable development. Green operations, environmental protection, and sustainable development are part of Grape King Bio's social responsibility and commitment. Our environmental safety and health management policies stipulate that we have a responsibility to implement environmental protection actions. Grape King Bio adheres to the ISO14001 environmental management system and adopts the PDCA methodology for continued implementation of key environmental protection and management tasks. Our Pingzhen headquarters has already obtained ISO14001 environmental management system certification.

Fulfill compliance obligations / Reduce hazard risks / Implement environmental protection
Build friendly work environments / Support low-carbon energies
Enhance energy efficiency / Promote full employee participation / Improve sustainability cycles

Grape King Bio's Product Lifecycle Management

Raw Materials

- A total of 279.84 tons of product packaging are made from eco-friendly materials, accounting for 57.50% of the total weight of all product packaging.
- Aluminum foil package products account for 29.60% of Pro-Partner's revenue.

Disposal Stage

- In 2023, 41 tons of food sludge will be used as fuel
- In 2023, 2,940 tons of plant waste will be transformed into livestock feed.
- Recycle and reuse white bottles.
- Transformation of fermentation waste into liquid fertilizer.

Product Lifecycle Management

Production Stage

- Energy Saving : In 2023, Pingzhen, Zhongli and Longtan factories aim for 1.5% energy saving. With 10 energy saving measures, we have saved a total of 481,641 kWh, equivalent to 1.6% energy saving.
- Water Saving : In 2023, the three factories recirculated 53,060 tons of water, reducing CO2 emissions by about 8,489 kg.
- Renewable Energy : In 2023, Pingzhen and Longtan factories used 195,107 kWh of self-generated solar power.

RE 100 :

Working with Global Enterprises to Achieve 100% Renewable Energy

"Grape King Bio is committed to RE100 targets and will continue to improve energy efficiency and use of renewable energies to generate value from waste, create positive environmental impacts, and maximize benefits from energy consumption."

RE100 is a global renewable energy initiative led by the Climate Group and the CDP, which gathers the most influential enterprises in the world and works to achieve environmental friendliness from an electricity demand perspective by increasing use of renewable energy. Participating enterprises must publicly commit to 100% green electricity usage at a time between 2020 to 2050, as well as report annual progress.

Grape King Bio joined the international RE100 renewable energy initiative in 2019 and committed to the first stage of 15% usage of renewable energy by 2030 and the second stage of 100% usage of renewable energy by 2035. In June 2022, we began transferring solar power to our Pingzhen headquarters, and have transferred 900,000 kWh as of November 30, 2023.

The main energy sources used at Grape King Bio are electric power and natural gas. Electricity is mostly used to power common systems and production equipment, while natural gas is used for boiler fuel within factories.

6.2.1 Management of Energy Resources and Greenhouse Gases

Grape King Bio completed re-evaluations of the ISO 50001 Energy Management System in August 2022. We executed the following strategies in 2023:

1. We continued to adhere to the PDCA energy management system in setting an energy-saving target of 1.5% in 2023 for all three factories. We use energy performance indicators and other tools to survey, track, and manage overall power usage of energy-consuming equipment and areas within our factories.

2. We have formulated internal training programs, implemented internal audits and management reviews, as well as compiled regularly updated documentation of internal and external risk issues.



The following measures were formulated in 2023:

Factory	Measures
Pingzhen Factory	(1) Adjusted 28 heaters within the electricity substation on the third floor, saving 23,974 kWh of electricity (2) Adjusted operation schedules for the chemical treatment systems in wastewater plants, saving 8,889 kWh of electricity (3) Improved 100HP blowers in wastewater plants and adjusted their operation schedules and enhanced operation efficiency thereof during holidays, saving 70,070 kWh of electricity (4) Adjusted operation schedules of chilled water systems for the soft belt line process, saving 16,897 kWh of electricity
Zhongli Factory	(1) Adjusted operation schedules of air conditioners on the second floor of building C from continuous operation for 24 hours a day to ceasing operation during non-production hours for 7 hours at night, saving 171,360 kWh of electricity (2) Stopped using the original 5-ton air-cooled chiller for PKL filling machine and replaced with a shared system using chilled water with a supply fan, saving 21,000 kWh of electricity (3) Adjusted operation schedules of air conditioners on the second and third floors of building G from continuous operation for 24 hours a day to ceasing operation during non-production hours for 7 hours at night, saving 37,800 kWh of electricity
Longtan Factory	(1) Adjusted operation schedules of process cooling water supply pumps (40HP and 15HP), saving 50,894 kWh of electricity (2) Adjusted operational schedules for outdoor air conditioners, cooling fan motors, electric heaters and humidifiers on the first floor, saving 100,958 kWh of electricity (3) Reduced water supply pressure for the 400RT chiller's primary pumps (50HP) from 1kg to 0.6kg during the summer from June to October, saving 11,978 kWh

We convene EHS and Energy Management Committee meetings hosted by our Chairman every quarter to report on implementation status, project progress, internal and external issues, and follow-up items relating to ISO14001/ISO50001 systems.

Environmental Management Plans for Grape King Bio Biotech Research Institute (Longtan Branch)

Our Biotech Research Institute was officially launched in 2019. We regularly repair and maintain all of our environmental protection equipment to ensure that they operate normally. To fulfill our corporate social responsibilities, we installed gas collection devices in our production areas and linked these to our gas processing equipment to improve environmental air quality. We began using food sludge as organic fertilizer in 2020 to enhance waste recycling rates and reduce related environmental burdens.

Our Biotech Research Institute has already passed Green Building label evaluations. To enhance overall production capacity and maximize resource usage rates, we continue to implement environmental management facilities such as HVAC designs, steam condensate recovery equipment, boiler economizers, and so on.



Carbon Reduction Measures

- The solar photovoltaic system at Longtan Factory was completed and began generating electricity for self-use on November 10, 2022, with an installed capacity of 180 kW. The system is expected to generate 183,960 kWh of electricity and reduce carbon emissions by 92,347 kg during the first year of operations. In 2023, the system generated 194,582 kWh of total electricity and reduced carbon emissions by 96,318 kgs, which is equivalent to the annual electricity usage of 53 households and the carbon quantities adsorbed by 14,818 trees per year.
- In June 2022, we began transferring solar power to our Pingzhen headquarters and the transferred amount exceeded our second-phase target of 900,000 kWh as of November 2023.
- We continued to enhance circular recycling of water resources and accumulated 53,060 tons of ROR recycled water in our three factories as of 2023, reducing carbon emissions by 8,283 kgs.
- The flash steam heat recovery and reuse project at our Longtan Factory was completed and put into operation on November 27, 2023. The operational efficiency statistics as of December 29 are as follows: (1) Accumulated 91 tons of recycled condensate water by two pumps. (2) The energy saved by condensate water and flash steam recovery amounted to N\$40,275. (3) The system reduced carbon emissions by 5 tons.

6.2.2 Energy Usage

In 2023, we compiled energy usage data from Grape King Bio, Longtan Branch, Rivershine Co. Ltd., and Pro-Partner. Total heavy crude oil, natural gas, electric power, diesel, and gasoline energy usage for the past three years is shown in the following table :

Item (Unit: MWh)		2021	2022 ^(Note 1)	2023
Direct energy use	Natural gas energy consumption	19,477	18,434	19,931
	Diesel energy consumption	111	76	83
	Gasoline energy consumption	99	177.45	198
Indirect energy use	Electric power consumption	29,542	32,178	33,114
	Purchasing of Renewable energy (Power Purchase Agreement ,PPA)	-	300	600
	Renewable energy from self-generation and self-consumption (Solar Photovoltaic ,PV)	1	12	195
Total energy consumption		49,230	51,177	54,121

Note 1: We began incorporating energy usage data from Pro-Partner in 2022.

Energy Intensity

Production weight was used as a basis for calculating our energy intensity levels. Energy consumption by production weight at our Pingzhen Factory, Zhongli Factory, and Longtan Branch was calculated in kilograms. Our energy intensity levels for 2021-2023 are shown below.

Item	Unit	2021	2022	2023
Total energy consumption	GJ	177,177	184,226	194,774
Production weight	kg	5,384,000	7,835,000	7,884,489
Energy intensity	GJ/kg	0.0329	0.0235	0.0247

Greenhouse Gas Emissions

In 2022, Grape King Bio first introduced the external inventory of ISO 14064-1:2018, conducted by using the operational control method. The organizational boundary includes Grape King Bio's Taipei Sales Office, Headquarters, Distribution Center, Zhongli Factory, Biotech Research Institute (Longtan Branch), Telesales Center, Pro-Partner Co., Ltd., and Rivershine Co. Ltd.

Item (Unit: tons CO ₂ e)	2021	2022	2023
Scope 1 (Note 1)	3,862.04	5,633.72	6,227.32
Scope 2 (Note 2, Note 3)	14,829.39	16,544.05	16,425.70
Total	18,691.43	22,177.78	22,653.03
GHG emissions per unit of revenue (tons CO ₂ e / per million NTD)	1.91	2.13	2.13
GHG emissions per product (tons CO ₂ e / Production weight in kg)	3.47	2.83	2.87

Note 1: In 2021, Grape King Bio used the "GHG Protocol" to conduct voluntary greenhouse gas inventories. Relevant parameters were taken from the Greenhouse Gas Emission Factor Table (version 6.0.4) released by the Ministry of Environment. The scope of our voluntary inventory conducted in 2021 encompassed Grape King Bio and Pro-Partner. Because we implemented external ISO 14064-1:2018 inventories for the first time in 2022, the base year was set as 2022.

Note 2: Electricity emission factors for 2023 referenced the electricity emission factor of 0.495 kg CO₂e/kWh released by the Bureau of Energy.

Note 3: Electricity emission factors for 2022 referenced the electricity emission factor of 0.509 kg CO₂e/kWh released by the Bureau of Energy.

Note 4: Electricity emission factors for 2021 referenced the electricity emission factor of 0.502 kg CO₂e/kWh released by the Bureau of Energy.

Note 5: The Global Warming Potential (GWP) adopts the factors of Sixth Assessment Report (AR6) of Intergovernmental Panel on Climate Change (IPCC).

The significant increases in scope 1 emissions for 2022 was due to our comprehensive inventory of fugitive emissions, including emissions from air-conditioners, industrial refrigeration equipment, and other greenhouse gas sources.

The final greenhouse gas emission values for Grape King Bio are as shown above. After obtaining verification of our ISO 14064 greenhouse gas inventory system in August 2024, we will release the details on our website (Green Environment: Energy and greenhouse gas management). Please refer to our corporate website for more information.



[Column] Leading the Way: Collaborating with Suppliers to Promote Smart Manufacturing, Real-time Monitoring of Carbon Emission Data

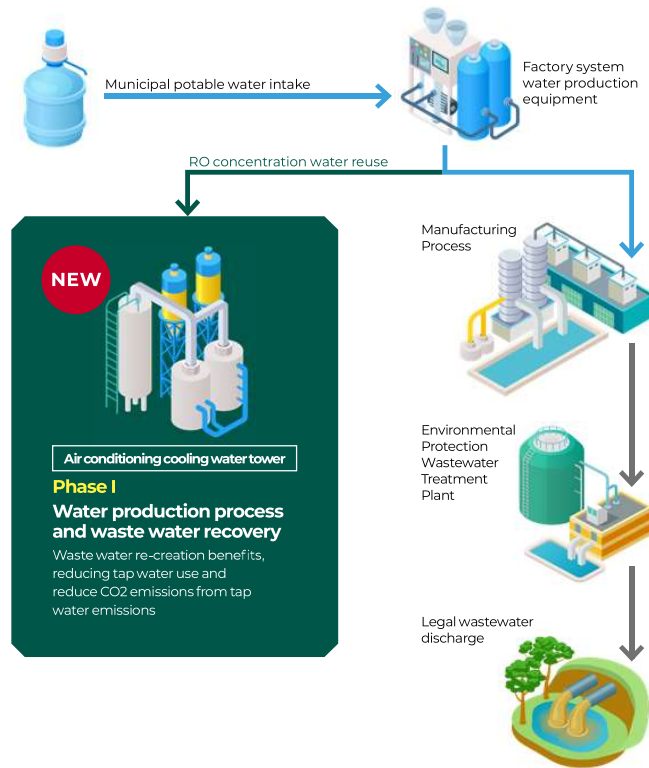
Responding to the Ministry of Economic Affairs' Industry Development Bureau's "Large firms help smaller ones" initiative, Grape King Bio is working with four suppliers to promote smart manufacturing. By 2024, we plan to establish visual management systems at our Pingzhen and Zhongli factories. In addition to real-time tracking of production line status, we will also be able to monitor water usage, energy consumption, and carbon emissions data, precisely understanding energy consumption during the production process.

6.3 Management of Water Resources

In appreciation of our precious water resources, we work to prevent wastage of water resources and ensure efficient use of energy resources. Grape King Bio developed a process water recirculation system based on a circular economy framework. By making simple adjustments to existing equipment and systems, our factories were able to recycle and reuse high-concentration process water originally discharged to wastewater plants, thereby reducing wasted water resources and wastewater volumes. We expect the total water consumption from our four factories to decrease by more than 5% in 2030 compared to 2022, a cumulative reduction of 53,060 tons. In 2023, we've saved a total of 18,989 tons of process water. Grape King Bio did not incur any violations of legal standards related to water quality/quantity permits in 2023.



Process for Water Reclamation Processes



Additionally, as a food manufacturer, Grape King Bio places high importance on the control and management of water quality inspection and wastewater discharge. We are also evaluating the introduction of water-saving manufacturing equipment and the expansion of wastewater treatment facilities. By increasing our water recovery rate, we can effectively reduce water usage and wastewater discharge, thereby reducing our impact on the environment.

Year		2021	2022		2023	
			Manufacturing sites (Note 4)	Office sites (Note 5)	Manufacturing sites (Note 4)	Office sites (Note 5)
Water withdrawal (million liters) (Note 1)	Groundwater withdrawal (million liters)	72.00	119.40	0	122.16	0
	Water from third party-municipal potable water withdrawal (million liters)	208.43	206.33	12.38	218.82	14.20
	Total water withdrawal (million liters)	280.43	338.11		355.18	
Water discharge (million liters) (Note 2)		215.84	260.02		238.55	
Water consumption (million liters) (Note 3)		64.59	65.71		102.43	
Water use intensity (million liters/million dollars in revenue)		0.0348	0.0325	NA (Note 6)	0.0334	NA (Note 6)
Wastewater disposal intensity (million liters/million dollars in revenue)		0.0220	0.0250		0.0224	

Note 1: All water was sourced from ground water and third party-tap water, and was not taken from any other sources. All water was taken from Taiwan, not from water-stressed sites.

Note 2: After the sewage treatment, it will be discharged into the sanitary sewer.

Note 3: Water consumption = Water withdrawal - Water discharge

Note 4: Manufacturing sites included Pingzhen Factory, Zhongli Factory, Longtan Branch, and Yungfeng Factory.

Note 5: Office sites included Logistics center, Taipei Operational Headquarters, Telesales call center, Taichung Office, Pro-Partner.

Note 6: Because the amount of water discharge of office sites could not be calculated, the amount of water discharge and water consumption only included Pingzhen Factory, Zhongli Factory, Longtan Branch, and Grape King Bio Park.

Note 7: Due to the use of recycled Water water (such as rainwater and domestic water) solely for irrigation of landscaping, it does not re-enter the production process, and therefore, no numerical disclosure is conducted.



6.3.1 Production and Related Inspections for Process Water

The pure water used in manufacturing processes at Grape King Bio passes through multiple stages to remove impurities and hazardous substances. We continually inspect and monitor water quality to ensure compliance with standards of raw materials used for health food manufacturing.

Pure water production process

- (1) Impurities are removed by quartz filter machines
- (2) Activated carbon is used to neutralize residual chlorine and absorb dissolved organic substances
- (3) Water softener machines are used to filter out calcium and magnesium ions
- (4) Finally, reverse osmosis and UV sterilizers are used to remove heavy metals, bacteria, hazardous substances, and dead bacteria to meet the requirements for pure water.

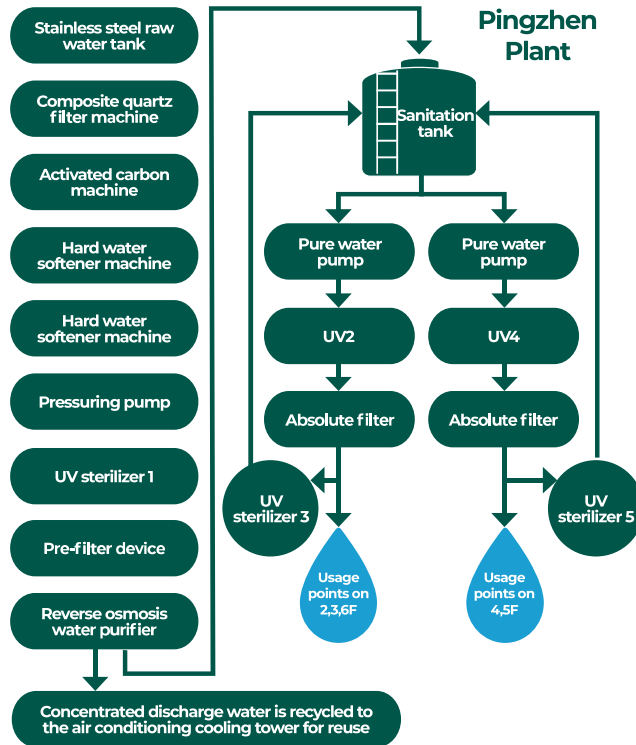
Pingzhen Factory

In 2023, Grape King Bio invested NT\$ 620,000 in outsourced water quality inspections. Grape King Bio conducts internal monitoring procedures and also commissions external institutes to conduct periodic water quality inspections. A total of 1,140 items were inspected internally this year. Quality assurance specialists periodically collect water samples and perform multiple inspection procedures under relevant regulations (please refer to Appendix Table 3 for more information).



6.3.2 Wastewater Discharge Management

In order to expand green benefits, Grape King Bio adheres to the 3R principles (reduce, recycle, reuse) to further optimize waste classification processes for recyclable items while also working to create additional value from waste sludge. Grape King Bio has formulated comprehensive operational procedures for management of wastewater disposal. All discharged wastewater must pass through specific processing procedures, and water quality is inspected periodically to ensure compliance with governmental regulations. We implemented the following wastewater management measures:



1. Production EHS requirements:

For water pollution prevention and control management, in addition to compliance with laws and regulations, it is also oriented towards water-saving planning and management.

(1) Daily tests of water quality: To strengthen wastewater management, we require our wastewater treatment plants to regularly inspect water quality at frequencies higher than that required by law, to ensure that the quality of our discharged water adheres to environmental regulations.

(2) Water-saving improvements for process water: Installed new machinery and equipment with water-saving designs that can be used during planned periods to reduce the amount of water consumption and wastewater discharge.

(3) Reusing reclaimed water: Our Pingzhen and Longtan factories are respectively equipped with 690-ton and 400-ton rainwater storage tanks for water for non-process and non-contact personnel use.

2. Preventive maintenance procedures:

As part of our aim to become an eco-friendly company, we not only replace old equipment and pipelines from time to time, but also implement preventive maintenance procedures and regular internal water quality inspections to ensure that our discharged water adheres to relevant standards.

3. Upgrades to wastewater treatment equipment:

(1) From time to time, we voluntarily sample and test the water discharged by our treatment vendors and also train professional technicians responsible for wastewater treatment

(2) We work with our production units to segregate high- and low-concentration wastewater to enhance treatment efficiency

(3) We optimize wastewater system settings to increase treatment capacity

(4) Process wastewater which has undergone chemical treatment and biological decomposition processes can only be discharged when water quality adheres to legal standards. Additionally, hazardous industrial waste is collectively stored and managed before periodic disposal and treatment by government-approved vendors.



Wastewater Quality Inspections: Inspection Items for Discharged Water

Zhongli Factory							
Inspection Items	Standard Range	2021 (First half)	2021 (Second half)	2022 (First half)	2022 (Second half)	2023(First half)	2023(Second half)
pH value	6~9	8.2	8	7.3	7.5	7.4	8.1
COD (Chemical oxygen demand)	<100mg/l	37.3	15	30.8	67.3	42.7	17.2
BOD (Biochemical oxygen demand)	<30mg/l	2	<1	2.9	17.5	2.4	1
True color	<400ADMI	30	35	<25	63	46	<25
SS (Suspended solids)	<30mg/l	13.1	4.2	12.2	18.3	13.1	5.3
Water temperature	<38°C (May to September) <35°C (October to April)	36.7	24.4	28.9	31.9	29.1	26.2
Free available residual chlorine	<2.0mg/l	0.06	0.03	ND	0.03	0.05	0.03
Coliform levels	<200,000CFU/100 ml	—	3,100	—	—	85,000	45,000

Pingzhen Factory							
Inspection Items	Standard Range	2021 (First half)	2021 (Second half)	2022 (First half)	2022 (Second half)	2023(First half)	2023(Second half)
pH value	6~9	7.2	7.5	7.6	8.0	7.9	8.2
COD (Chemical oxygen demand)	<100mg/l	31.8	27	18.2	8.2	16.4	14.3
BOD (Biochemical oxygen demand)	<30mg/l	9.8	8.4	7.4	<1.0	4.4	1.1
True color	<400ADMI	—	—	---	---	-----	----
SS (Suspended solids)	<30mg/l	9.5	10.9	7.8	<2.5	9.9	2.6
Water temperature	<38°C (May to September)<35°C (October to April)	28.6	27	32.4	28.6	31.5	27.2
Oil levels	<10mg/l	2.4	2.2	<0.5	<0.5	<5	<5
Coliform levels	<200,000CFU/100 ml	57,000	310	57,000	310	16,000	<10

Longtan Factory							
Inspection Items	Standard Range	2021 (First half)	2021 (Second half)	2022 (First half)	2022 (Second half)	2023(First half)	2023(Second half)
pH value	6~9	8.2	8.8	7.8	8	8.3	8.2
COD (Chemical oxygen demand)	<100mg/l	4.8	23.1	27.7	19.2	13.6	ND
BOD (Biochemical oxygen demand)	<30mg/l	29.6	<1	1.5	1.3	<1	<1
True color	<400ADMI	57	112	69	44	<25	<25
SS (Suspended solids)	<30mg/l	2.9	1.4	< 2.5	10.2	2.7	<1.25
Water temperature	<38°C (May to September)<35°C (October to April)	34.8	22.9	27.9	28.4	27.5	24.7
Oil levels	<10mg/l	1.3	0.6	< 0.5	0.8	< 0.5	0.5
Coliform levels	<200,000CFU/100 ml	—	—	—	—	—	—

6.4 Waste Management

Grape King Bio conducts waste classification, collection, storage, management, and disposal to effectively manage industrial waste and other types of waste. Disposal, handling, and reuse of waste materials are conducted per environmental laws and regulations. Our Longtan Branch uses food sludge as organic fertilizer to enhance waste recycling rates and reduce waste disposal costs. Other relevant management measures included :

1. In accordance with environmental laws and regulations, our factories have formulated industrial waste disposal plans and implement waste management procedures in accordance with law.
2. In accordance with ISO 14001 environmental management system requirements, our factories have established waste management operational standards and implement waste management procedures in accordance with our management regulations.
3. We have signed waste disposal and treatment contracts with authorized public and private waste disposal and treatment companies to handle relevant procedures.
4. In accordance with laws and regulations, waste disposal and treatment processes are filed online, and tracking and confirmation of final processing statuses are implemented within required time limits.
5. Our environmental management personnel conduct irregular on-site inspections of waste treatment companies to ensure that waste disposal and treatment processes adhere to relevant regulations. Our Longtan Factory has completed 3 audits of waste treatment and reuse vendors and our Pingzhen Factory has completed 4 audits of waste treatment and reuse vendors.

Waste disposal amounts for Grape King Bio from 2021 to 2023 were as follows :

Types and disposal method Unit (ton)		2021	2022	2023
Non-Hazardous Waste	Reuse and recycling	1,517.71	2,407.39	3,256.91
	Incineration	37.52	112.091	124.38
	Landfill disposal	0	0	0
	Other disposal methods (physical treatment)	40.78	18.93	14.19
	Other disposal methods (thermal treatment)	366.53	276.69	29.93
	Total	1,962.54	2,815.101	3,425.41
Hazardous Waste	Reuse and recycling	0	0	0
	Incineration	7.02	10.81	4.49
	Landfill disposal	0	0	0
	Other disposal methods	0	0	0
	Total	7.02	10.81	4.49
Recyclable		105.47	94.68	93.23

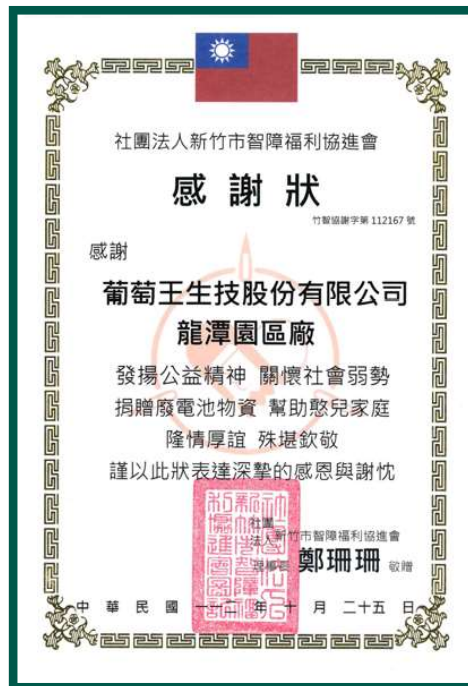
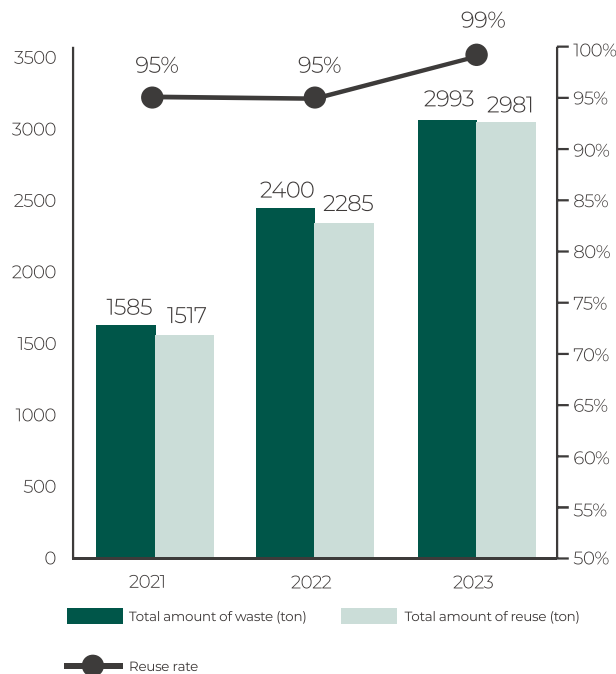
Grape King Bio Environmental Program Investments in 2023 (NTD) :

Air pollution management costs	294,684
Wastewater management costs	320,339,482
Waste management costs	9,154,309
Noise management costs	0
Total	329,788,475



Waste management highlights

1. Promoted classification and treatment procedures for sterilized non-infectious industrial waste (D-2101). (Zhongli Factory)
2. Promoted reuse of food sludge to generate green electricity. (Zhongli Factory)
3. Under the CSR “Bottles of Love” charity event, our Environmental Protection Administration collected and temporarily stored 360 kgs of recycled bottles which are scheduled to be decomposed into reusable plastic pellets in June 2024 for recycling and reuse as part of our environmental protection initiative. (Pingzhen Factory)
4. Our Longtan Factory has actively promoted the utilization of waste resources and achieved a waste recycling rate of over 95% in the past three years, progressing towards a circular economy. Please refer to the following figure for details.
5. Our Longtan Factory promoted charity activities related to environmental protection, actively facilitating the recycling of waste batteries and donating them to the Hsinchu City Disability Welfare Association as charitable assistance for disabled people. Please refer to the following figure for details.



6.4.1 Prevention of Air Pollution

Grape King Bio has installed and maintained air pollution prevention equipment to enhance and improve the environmental protection. All of our factories implement regular maintenance procedures for our equipment to ensure that they operate normally.

Results of Air Pollution Inspections at Zhongli Factory

Inspection Items	Standard Range (2022)	Boiler (E001)		
		2021	2022	2023
Particulate contaminants	<30mg/Nm3	—	—	No inspection required.
Sulfur oxides	<150ppm	—	—	
Nitrogen oxides	<100ppm	24	26	
Inspection Items	Standard Range (2022)	Boiler (E002)		
		2021	2022	2023
Particulate contaminants	<30mg/Nm3	—	—	No inspection required.
Sulfur oxides	<150ppm	—	—	
Nitrogen oxides	<100ppm	52	67	

Results of Air Pollution Inspections at Longtan Branch

Inspection Items	Standard Range (2022)	Boiler (E002)		
		2021	2022	2023
Nitrogen oxides	<100ppm	42	43	34

Note: At present, all boilers at Grape King Bio use natural gas as fuel. We conduct inspections according to regulations, with regular inspections of nitrogen oxide emissions each year, and measurements of particulate contaminants taken in the years when permits are being renewed.

6.5 Biodiversity

Biodiversity

Formal assessments of potential biodiversity impacts from our operations (including assessments of environmental impacts prior to construction of factories in protected areas)

Grape King Bio also has the following biodiversity and environmental related projects :

SDGs	Issue	Project Name	Description	Total Amount
 	Clean water	Subscription of farmland utilizing rationalized fertilization	This year, Grape King Bio collaborated with the Northern Region Water Resources Branch of the Water Resources Agency under the Ministry of Economic Affairs and farmers to subscribe to farmland utilizing rationalized fertilization. This initiative not only reduces soil degradation and preserves biodiversity but also conserves water resources. The Oldham bamboo shoots produced by farmers not only serve as our company's lunch and catered meals for colleagues but also benefit individuals with Down Syndrome supported by the Chensenmei Social Welfare Foundation and solitary seniors cared for by the Huashan Social Welfare Foundation, which achieves multiple positive outcomes at once.	100,000
	Environmental education	Environmental education program	Grape King Bio supports environmental protection, education, and promotion. We have made donations to the Taiwan RE-THINK Environmental Education Association, which builds interactive educational websites and teaching materials with innovative designs that integrate board games and design thinking concepts. Their materials have been promoted to schools all over Taiwan, and cover issues such as marine waste, plastic reduction, resource recycling, and circular economy. The Recycling Encyclopedia designed interactive and educational board games and websites around concepts such as “the myths of classification” and “the value of recycling,” enabling students to understand systemic factors behind resource recycling and changes that can be done on a personal level by playing games. This corresponds to SDG 12 “Responsible Consumption and Production.”	1,000,000
	Ocean conservation	Cetacean stranding rescue van program	The “Taiwan Cetacean Society” initiated the establishment of “Marine Wildlife Medical Rehabilitation Stations” in the northern region to address the shortage of medical resources for marine wildlife. To protect marine wildlife, Grape King Bio donated funds to this organization, enabling them to promptly rescue and rehabilitate stranded whales, dolphins, and sea turtles, as well as cultivate more marine veterinarians through the construction of holding pools, medical rooms, and autopsy laboratories, thereby enhancing the quality of medical care for marine wildlife in the northern region. Grape King Bio sponsored one 3.5-ton and one 2-ton rescue pools, aiming to save more stranded sea turtles. We also promoted this organization's concepts internally, providing education and training on beachside rescue for marine wildlife to employees. We further invited employees to participate in naming and blessing activities, hoping for the successful rescue of more “Grape King Little Turtles” that can return to the ocean in the future and enjoy a carefree life!	800,000
	Biodiversity	Wild animal rescue support program	Grape King Bio has donated medical expenses required by 1,600 wild animals over the past four years, including fruits and vegetables, feed, live bait, nutritional supplements, materials for surgery and care, animal medications, autopsies, pathological examinations, and materials to enrich the environments of veterinarian hospital cages to enhance the immediate medical resources used by wild animals in the eastern region and increase the number of rescued wild animals.	1,200,000
 	Biodiversity	Restoration program for Taiwan oil millet	The program is based on food and agriculture education and strives to integrate local knowledge and professional education. By teaching about the restoration of the “Taiwan oil millet,” we enabled children to participate in growing “future foods” while also gaining an understanding of the history and culture of their ancestors so they could become protectors of sustainable climate goals and take action corresponding to SDG 13 “Climate Action.” We plan to establish exhibition rooms on campuses all over Taiwan as well as a demonstration area of around 20 pings for food and agriculture education, where we will arrange professional teachers to promote the Taiwan oil millet, invite tribe elders to participate in farming activities, promote local education by cultivating and training teachers, and finally disseminate these concepts domestically and internationally in hopes of restoring growth of the Taiwan oil millet both at home and overseas as it is a super crop which can adapt to climate change and regions lacking arable land.	1,000,000
	Biodiversity	Commitment to a sustainable Earth	To protect and establish low-altitude forests as well as expand community conservation areas, and build an environmental learning center for all, we implemented the habitat management program to protect and establish low-altitude forests, promote biodiversity, eliminate Mikania micrantha (an exotic species which kills other plants), and maintain environmental protection by establishing automatic infrared cameras at four activity hotspots for wild animals to provide round-the-clock ecological monitoring. Additionally, we aim to promote our environmental education program and build an environmental learning center for all, which participates in environmental education classes in elementary schools, designs teaching activities, exchanges educational resources, and trains volunteer guides to strengthen environmental education and cultivate relevant sensibilities.	600,000



Sustainable Use and Conservation of the Ocean

Grape King Bio assisted the Taiwan Cetacean Society in rescuing sea turtles and promoting marine education

In the event of marine wildlife stranding incidents along the northern coast, the best time for emergency rescue is often missed due to the absence of nearby temporary rescue stations.

Therefore, the “Taiwan Cetacean Society” initiated the establishment of “Marine Wildlife Medical Rehabilitation Stations” in the northern region to address the shortage of medical resources for marine wildlife.

Grape King Bio sponsored one 3.5-ton and one 2-ton rescue pools, aiming to save more stranded sea turtles. We also promoted this organization's concepts internally, providing education and training on beachside rescue for marine wildlife to employees. We further invited employees to participate in naming and blessing activities, hoping for the successful rescue of more “Grape King Little Turtles” that can return to the ocean in the future and enjoy a carefree life.

Our other assistance includes:

1. Mini Grape Camp on the Theme of Marine Conservation: Grape King Bio has hosted several parent-child workplace experience activities and invited the Taiwan Cetacean Society to promote ocean conservation among employees' children, enabling the concept of ocean conservation to take root in the young.

2. Visit to Medical Rescue Stations Where Chairman Serving as a One-Day Care Volunteer for Sea Turtles: This visit includes a tour of the rescue station, assisting in the medical treatment of sea turtles, maintaining water quality in turtle pools, preparing bait and feeding turtles, and examining turtle feces.

Collaborate with ReThink to develop marine educational materials and conduct beach cleanup activities

Grape King Bio supports environmental protection, education, and promotion. We have made donations to the Taiwan RE-THINK Environmental Education Association (ReThink), which builds interactive educational websites and teaching materials with innovative designs that integrate board games and design thinking concepts. Their materials have been promoted to schools all over Taiwan, and cover issues such as marine waste, plastic reduction, resource recycling, and circular economy.

The Recycling Encyclopedia designed interactive and educational board games and websites around concepts such as “the myths of classification” and “the value of recycling,” enabling students to understand systemic factors behind resource recycling and changes that can be done on a personal level by playing games. This corresponds to SDG 12 “Responsible Consumption and Production.”

Additionally, Grape King Bio’s volunteers, along with our 11 suppliers and the Taiwan RE-THINK Environmental Education Association, joined our first beach cleanup event at Houcuo Harbor in Taoyuan and worked together to remove marine debris from the beach. A total of 75 volunteers participated in this event and successfully cleared a total of 288.4 kgs of garbage.

