

NANYA

TCFD

| 2022 Task Force on Climate-Related
Financial Disclosures

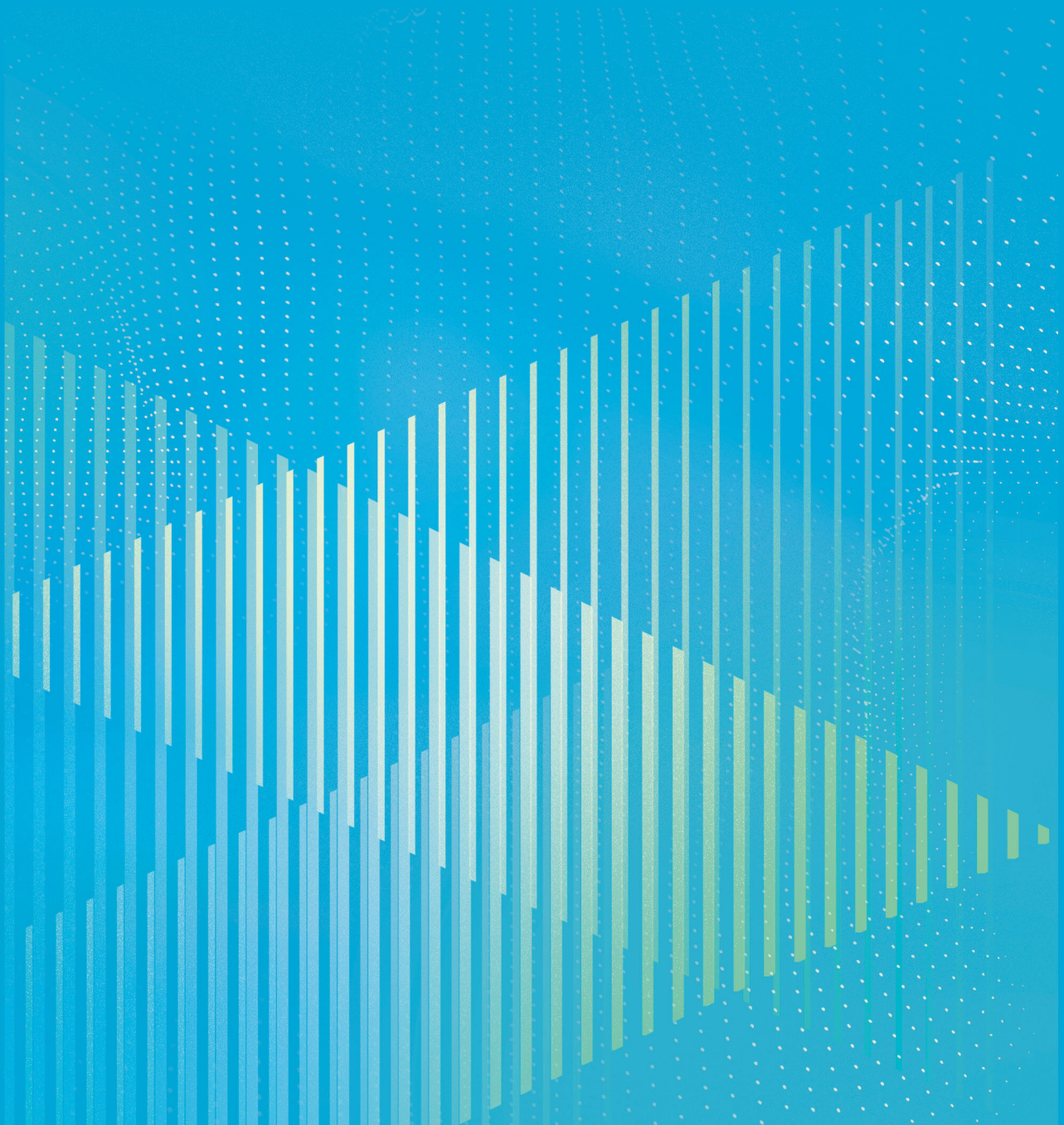


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About this Report

In addition to compliance with international and government regulations, the Task Force on Climate-Related Financial Disclosures (TCFD) framework developed by the Financial Stability Board (FSB) was voluntarily introduced by Nanya Technology Corporation in 2018, followed by formal registration as a supporter in 2021 and the release of a TCFD Report ("the Report") in 2022. This is the second TCFD Report published by Nanya Technology Corporation, and reports contents from January 1 to December 31, 2022 according to the TCFD framework. The Report sets out the methodology used by Nanya Technology Corporation to identify and assess climate change risks during our operations and production processes, the potential impacts associated with such risks, and the management measures taken to strengthen climate resilience.

The Report follows the TCFD framework and encompasses the entire value chain of Nanya products: Part one covers disclosure on the climate governance model and organizational strategies of the Board of Directors and management; part two covers the climate risk strategies and executive policies adopted by the Company; part three covers the organization and quantitative assessment process for climate change risks and opportunities; part four focuses on our mitigation and adaptation measures for climate change risk scenarios. Scenario analysis tools are used to assess the potential for actual impact on operations so that a response can be developed in terms of low-carbon operational management, adaptation to physical climate change risks, supply chain cooperation, as well as product and customer management; part five outlines the methods used by Nanya to cultivate and communicate climate change awareness among stakeholders; part six uses quantitative indicators and future goals to communicate the direction of Nanya's low-carbon transition.

The scope of contents includes Nanya Technology Corporation and subsidiaries, in which GHG and energy use data does not include the design house in Hsinchu, Taiwan, overseas design houses, and sales offices (including San Jose, Houston, and Burlington in the US, Dusseldorf in Germany, Shenzhen in China, and Tokyo in Japan). Since the locations do not engage in any production, the impact of their environment related use and consumption is insignificant (compared with Nanya Technology Corporation's 12-inch fab in New Taipei City, Taiwan). Emissions from subsidiaries will be fully disclosed in the 2023 report in coordination with the FSC's corporate governance blueprint.

Date of Publication

Nanya Technology Corporation's TCFD Report is published annually

Current edition: June 2023

Last edition: June 2022

Next edition: June 2024



Information Disclosure Timeframe

From January 1, 2022 to December 31, 2022



Scope of Data

Nanya Technology Corporation's operations system include Nanya Technology Corporation and its subsidiaries



Data Quality Management

Financial data: KPMG Taiwan
Organization GHG inventory ISO 14064-1: SGS
Sustainability Information AA1000AS V3: AFNOR ASIA



Management System Verification

Quality management ISO 9001, IATF 16949: LRQA
Environmental management ISO 14001: LRQA
Information Security Management System ISO 27001: SGS
Energy Management ISO 50001: LRQA
Safety and Health ISO 45001/TOSHMS: LRQA
Responsible Business Alliance RBA VAP (V5.1): TUV



Guidelines and Standards for Drafting

TCFD and Rules Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies



Sustainability Contact

Sustainability and Risk Management Division
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President's Message

To all stakeholders who care about climate change:

In 2022, The threat and concerns brought by climate change is greater than ever. The energy shortage and inflation crisis accompanying the Russia-Ukraine war have accelerated the world's transition away from fossil fuels towards clean energy. At the same time, Taiwan has officially approved the "Climate Change Response Act" and declared its determination to achieve the goal of net-zero emissions by 2050. Facing these challenges, Nanya Technology continues to actively manage the risks and opportunities associated with climate change through its five strategies: "Low-Carbon Products", "Green Production", "Adaption to Climate Risks", "Sustainability Partnership", and "Climate Advocacy and Awareness Education", in order to further strengthen the company's resilience to climate changes and commit to our sustainable goals.

Since the adoption of the TCFD framework in 2018, we are integrating climate-related considerations into the company's operations, which covers four core elements in line with the TCFD recommendations: governance, strategy, risk management, and metrics and targets. The Sustainable Development Committee of Nanya's Board of Directors is responsible for overseeing and mitigating the Company's business risks in relation to climate-related issues. In 2022, a total of 31 risks and opportunities were identified. The top risk identified was power stability and cost concerns from energy crisis to energy transition; the top opportunity was the energy-saving benefits and new business opportunities attributed from high-performance and energy-efficient DRAM products. In 2022, Nanya received approval of GHG emissions reduction targets by Science Based Target Initiative (SBTi). Nanya commits to reduce 25% of GHG emissions by 2030 from a 2020 base year.

Green Innovations

DRAM is a critical component for the smart age. Nanya is devoted ourselves to providing energy-efficient DRAM products to our customers. Through the supply of innovative products featuring high efficiency and low-power consumption, Nanya had enabled our end-users to saved over 600 million kWh of energy in year 2022. With continued development in leading-edge technology and next-generation products, the resource utilization of our production lines are improved by more than 30% for each generation of technology. The Company's first generation 10nm-class technology process (1A) has entered small volume production in 2022, and the second generation (1B) is also under smooth development with the goal of entering small volume production in 2023. The newly developed DDR5/ LPDDR5 products are expected to save energy by 16-35% compared to DDR4/ LPDDR4 products as the working voltage and power consumption can be significantly reduced. The diverse applications of our next-generation products are expected to enable more low-carbon and intelligent innovation for future technologies.

Low-carbon Manufacturing

An operational model based on green production has been deployed by Nanya to reduce our environmental impact. Since 2017, we have completed 147 projects on reducing raw materials

consumption by improving the utilization on the production line. In addition, the company has reduced more than 90% GHG emissions by implementing highly energy-efficient abatement equipment. Between 2017 and 2022, a total of 139 energy management projects were executed through our energy management system, which have generated cumulative electricity savings of up to 63,230 MWh annually. Nanya also actively engaged in the renewable energy projects. We have used 10,400 MWh of green electricity in total between 2021 and 2022, and could use at least 25,000 MWh of green electricity annually from 2023 onwards for the next 10 years. Thanks to the green energy projects outlined above, the GHG emission intensity per unit of production at Nanya is now 34% lower than 2017.

Adaptation to Climate Change

Nanya has actively engaged in the Climate Change Risks Management. This included hardening of infrastructure against typhoons, heat waves, earthquake, and epidemics to strengthen climate and disease resilience. To counter water shortages, we continued to improve the water recycling rate of our processes so that it reached 92.9% in 2022. A comprehensive emergency response plan for water droughts, earthquake, epidemics, and other nature disasters, were also devised to ensure continuity of operations. Moreover, the Company are enhancing our water management framework by introducing Alliance for Water Stewardship (AWS) standard. Nanya considers employees to be an important asset. To ensure workplace safety, we have conducted extensive industrial safety education, training, and drills for safety and epidemic across all organizations. As a result, there has no industrial accidents and epidemic casualty at Nanya since 2017.

Building a Sustainable Supply Chain, Working Towards Net Zero

With the aim to become the "Best DRAM Partner for Smart World", Nanya is actively exerting positive influence on the supply chain. We have conduct audits on the climate risks of our suppliers and work with our business partners to address GHG emissions issues. Since 2022, we are proactively working with our suppliers and integrating the necessary resources to find sustainable solutions together throughout various platforms, including workshops, seminars, initiatives and allies. We engage our employees to raise more sustainability awareness by supporting the "Earth Hour" event for six consecutive years and subsidizing our employees' purchase of electric motorcycle. In order to further enhance the climate literacy of thousands of students, the company has cooperated with Ming Chi University of Technology to promoting ESG related topics, including SDGs, climate changes, and sustainability trends through creative design thinking courses.

Nanya has been recognized with numerous outstanding sustainability achievements, including the CDP Climate Change "A List" in 2020 and 2021 and the CDP Water Security "A List" in 2022. This not only represents the Company's active response to climate change but also drives the company to continue pursuing low-carbon transformation, strengthening our stewardship and reactions to climate risks in our daily operation. Nanya has also joined the "Semiconductor Climate Consortium (SCC)" and become one of the founding members. We look forward to partnering with all the stakeholders and taking concrete actions to drive toward a more sustainable future for our value chain.

Climate Governance Framework and Functions

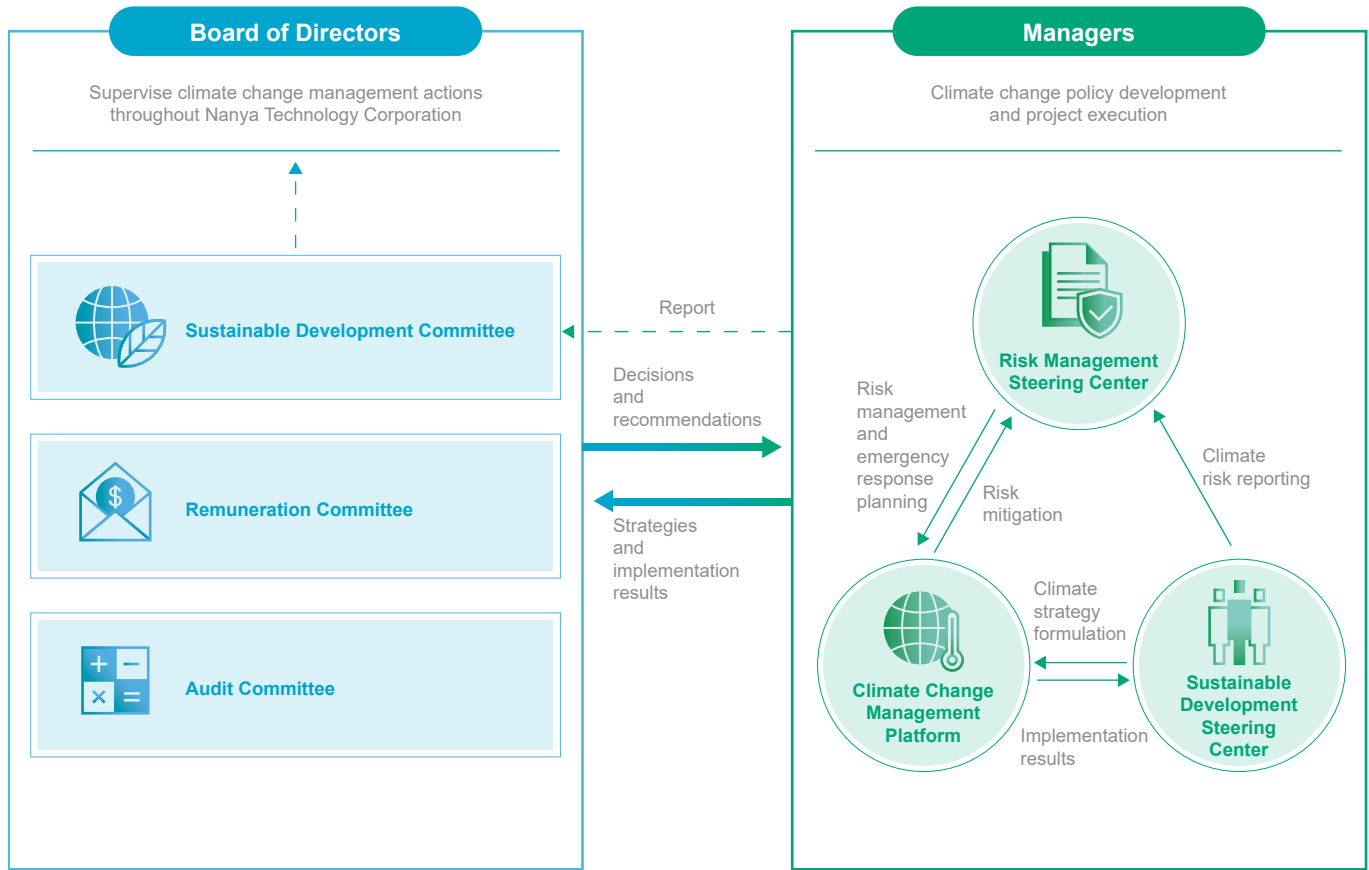
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1.Climate Governance Framework and Functions

Climate change is now changing international socio-economic dynamics and the natural environment. Nanya Technology Corporation implements climate change management through a complete corporate governance framework and two-way interactions between the Board of Directors and managers.

Nanya Technology Corporation Climate Change Management Framework



1.1 Board Participation and Supervision

Nanya Technology Corporation's board of directors complies with related laws and resolutions of the shareholders' meeting in its operations. Our directors maximize the interest of shareholders based on sustainability principles. The main duties of the board of directors are to ensure information transparency and legal compliance, appoint senior management supervisors, formulate earnings distribution proposals, and supervise and provide guidance for the Company's operations. The Board of Directors supervises and provides guidance on climate change related topics. Nanya Technology Corporation convened 6 board meetings in 2022 to discuss matters, including GHG inventory project and implementation results, renewable energy purchase, international carbon reduction initiatives, and sustainability assessments.

In recent years, Nanya Technology Corporation used the "Corporate Governance 3.0 -Sustainable Development Roadmap" proposed by the Financial Supervisory Commission (FSC) as a guide to make continuous improvements to sustainability governance. The Company introduced the TCFD in 2018 and became an official supporter in 2021. The Risk Management Committee (functional committee) was established in 2020 for a more comprehensive response to emerging risks and opportunities brought by climate change and other topics. The Company formally restructured the Sustainable Development Committee into a functional committee under the Board in August 2022, and then merged governance functions of the Risk Management Committee into the Sustainable Development Committee.

Functional Committees of the Board

Nanya Technology Corporation Board of Directors has three subordinate functional committees. The committees help the board carry out its duties and also serve the following functions on climate change topics:

Functional Committees of the Board



Sustainable Development Committee

Review sustainable development and risk management policies, strategies, and management approaches, supervise sustainable development and risk management related affairs and implementation plans, including climate change and GHG management, and review disclosures of material information on sustainable development, such as the Sustainability Report and TCFD management, and report results to the Board of Directors.



Audit Committee

Supervise the Company's business operations and financial status. Assist directors in carrying out their supervisory duties, as well as tasks under the relevant laws and international standards. (E.g. Renewable Energy Development Act and Greenhouse Gas Management Act).



Remuneration Committee

Establish and periodically review director and manager performance evaluation and remuneration policies, systems, standards, and structures. Salary adjustments, bonuses and other compensation for senior executives take into account their contribution and performance in the economic, environment and social aspects, so that executive compensation is linked to climate change governance.

The Sustainable Development Committee under the Board of Directors convenes at least 2 meetings each year. It convened one meeting due to organizational adjustments in 2022, and discussed sustainable development work plans, risk management evaluation, and response to regulations. In the meantime, the committee reported projects to the Board of Directors for discussions to strengthen internal reforms and move towards the vision of sustainable development. The Board of Directors charged the Sustainable Development Steering Center with the responsibility of managing internal sustainability affairs, and also charged the Risk Management Steering Center with the responsibility of identifying, reviewing, and managing physical and transition risks brought by climate change. As such, controllable risks are included in daily operations, and uncontrollable risks are monitored for preparation and response, thereby minimizing Nanya's overall operational risks.

Work items of the Sustainable Development Committee related to climate change in 2022 include:

Evaluate the purchase of electricity from offshore wind farms in **2025-2030** along with the green electricity purchase plan previously decided on

Deepen **ISO 50001** Energy Management System, and promoted energy action management improvement projects

Continue to implement the GHG inventory plan and implemented improvements to Scope 1, Scope 2, and Scope 3 GHG emissions

Continue to implement the **LCA** (Life Cycle Assessment) inventory mechanism and hotspot improvement following the inventory

Circular economy and waste disposal source tracing mechanism

Identify, audit, and guide suppliers with high sustainability risks, and conduct key supplier audits **every 3 years** and provide guidance

1.2 Management Responsibility

Nanya Technology Corporation set up three main management platforms to respond to the latest trends, opportunities and challenges. Each platform is headed by top management and regular meetings are held to examine their performance and progress as part of the management cycle for climate change policy.



Sustainable Development Quarterly Meetings

The Company has a Sustainable Development Steering Center, in which the Chief Sustainability Officer holds the position of director. Meetings are held quarterly and progress reports are made to the board of directors. A Sustainable Development and Risk Management Task Force was set up under the President's Office responsible for the planning and management of action plans in response to sustainability ratings, trends, and initiatives. The task force also draws up climate change promotion strategies and targets, consolidates and supervises their progress and results, and ensures the effectiveness of horizontal and vertical communications within the organization, so that sustainable development can be put into practice. Material risks related to climate change are identified each year, and results are submitted to the Risk Management Steering Center for risk assessment.

★ 2022 Results: The SBT were certified, promoted sustainability communication between senior managers of suppliers, and offshore wind farm CPPA assessment.



Risk Management Quarterly Meetings

The Company has a Risk Management Steering Center, responsible for the promotion and supervision of each risk management group's activities and overall risk management. The Executive Vice President shall serve as the director of the center and convene quarterly meetings to review the operational performance and business continuity plans of each risk management group to ensure the applicability, suitability, and effectiveness of their ongoing operations. The Risk Management Steering Center has overall responsibility for climate change risks. It assesses management risk issues within the climate change strategy, and draws up management indicators and targets.

★ 2022 Results: Management reviews were conducted for 179 risk items including climate change compliance risk, low-carbon energy transformation and other emerging risks, as well as physical risks due to natural disasters.



Climate Change Management Platform

A level 1 supervisor serves as the chair and calls on employees that specialize in sustainability, EHS, plant, business management, and human resources to join the organization. The Company's ISO14001 environmental management and ISO50001 energy management platforms and related units periodically convene meetings to examine project progress, in order to implement low carbon operations and cleaner production to improve the Company's climate change management performance.

★ 2022 Results: 25 energy conservation projects (energy savings of up to 4,370 MWh) and 24 raw material improvement plans (annual savings of up to NT\$41,270,000) were implemented. CDP A- for climate change and A for water security, and wins Nokia's 2022 Supplier of the Year Award.

Climate Strategy

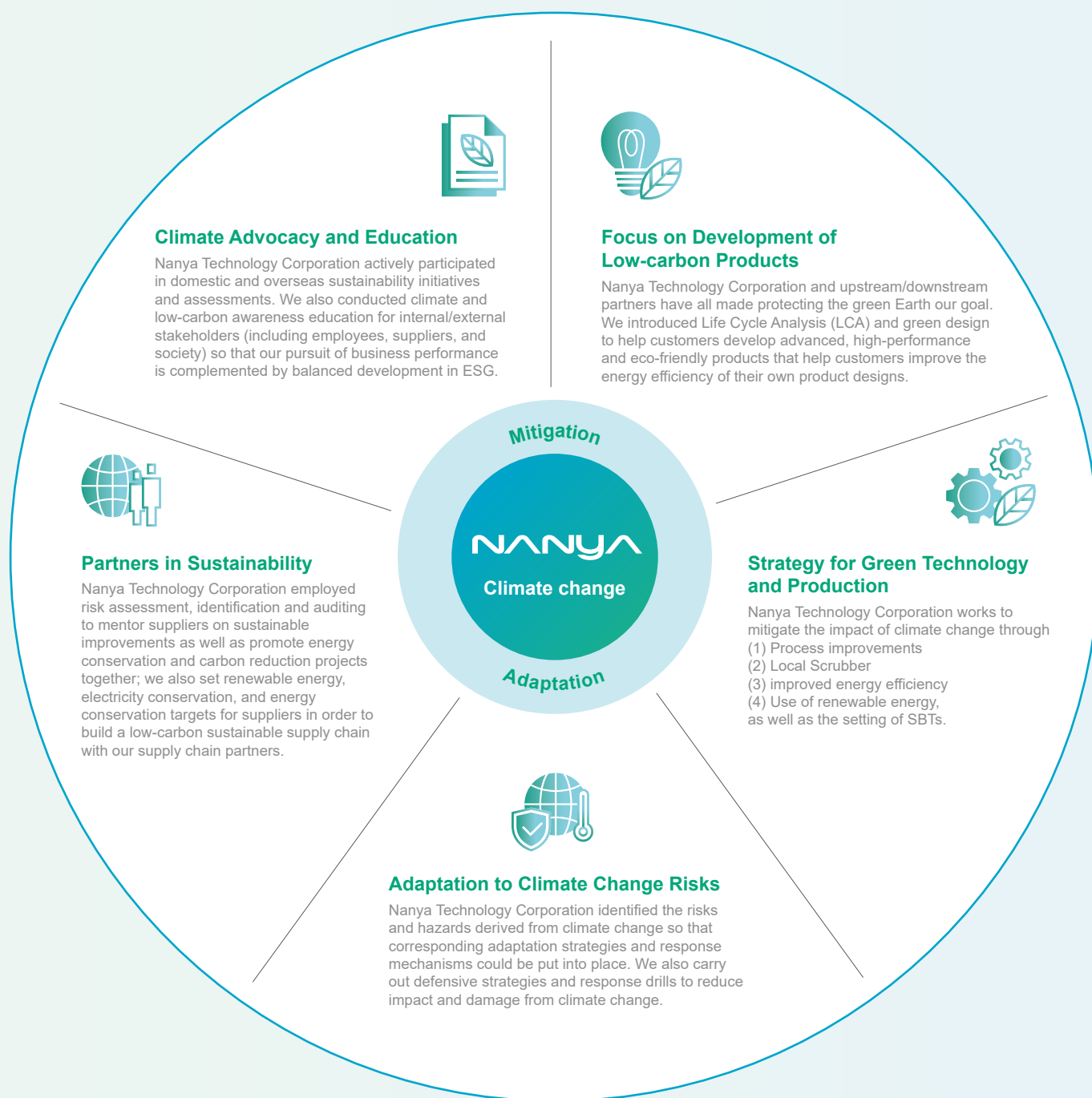
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2.Climate Strategy

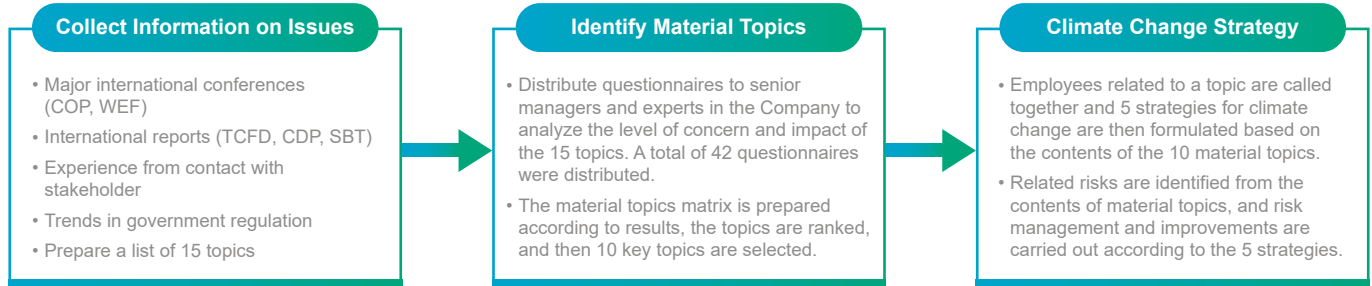
As the leader of Taiwan's DRAM industry, Nanya Technology Corporation responds to the goal of international society and Taiwan to achieve net zero emissions by becoming a manufacturer that uses green technologies. The Company collected topics of concern to stakeholders, determined the materiality of topics through an internal identification process by employees, and formulated five strategies for promoting low carbon transformation and climate adaptation. We support the Paris Agreement through our own actions, and work with stakeholders to fulfill our commitment to achieving net zero emissions.

Nanya Technology Corporation Climate Change Strategies

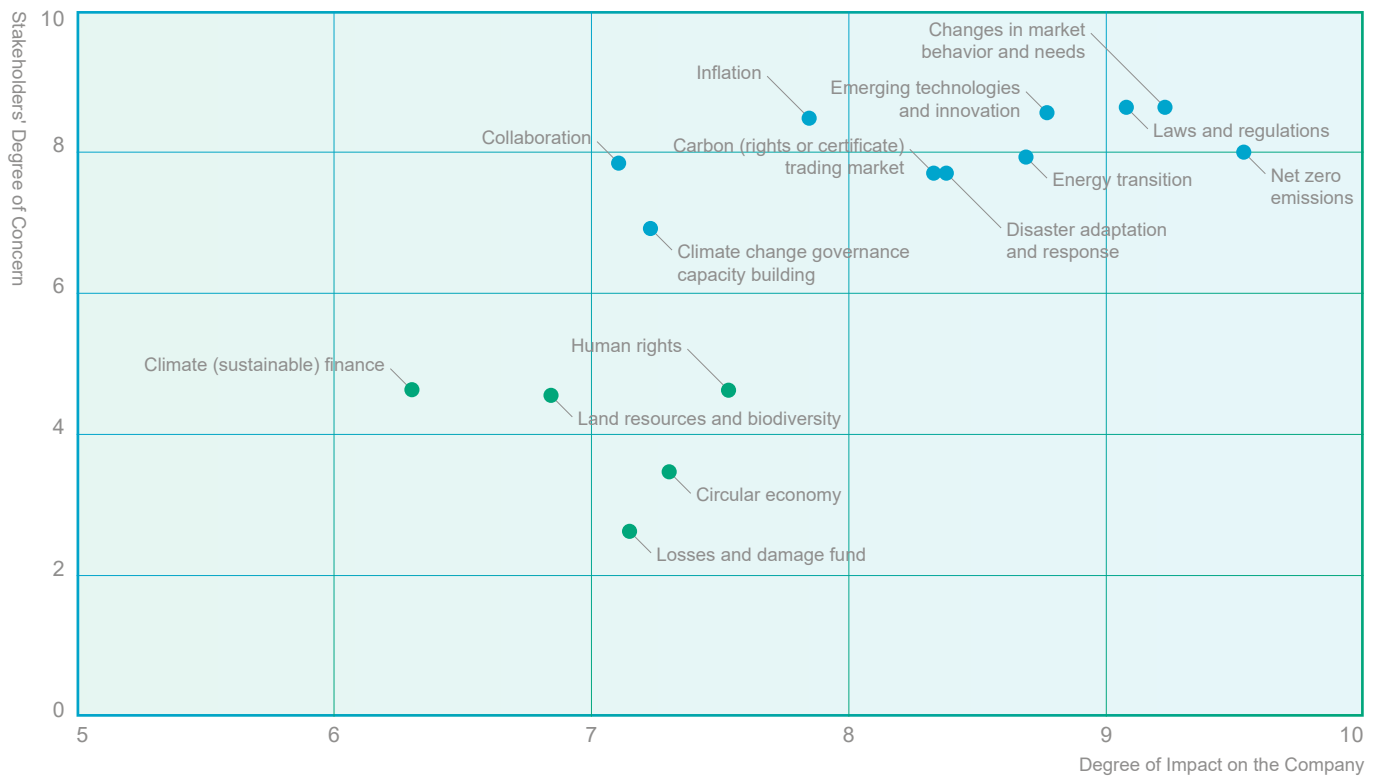


2.1 Formulating Climate Change Material Topics and Strategies

Nanya Technology Corporation sets out from material topics of concern to stakeholders. The topics are then evaluated by internal business managers and employees to select topics related to company development and plan corresponding strategies, ensuring that the topics are aligned with corporate sustainability and business development. In 2022, Nanya Technology Corporation collected 15 topics from international organizations, reports, government policy and regulations, news media, and experience from contact with stakeholders. The level of concern and impact on stakeholders is then analyzed to generate a materiality matrix, in which 10 key topics are selected and converged into 5 strategies. This is used as the theme for the Company's long-term development and response to climate change.



Climate Change Topic Materiality Matrix



Issue	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10
	Changes in market behavior and needs	Domestic and overseas laws and regulations	Emerging technologies and innovative R&D	Net zero emissions	Energy transition	Disaster adaptation and response	Carbon (rights or certificate) trading market	Inflation	Collaboration	Climate change governance capacity building
Response Strategy	① ② ⑤	② ③ ④	① ②	① ② ⑤	② ③	③ ⑤	② ④	① ② ⑤	① ② ③ ④ ⑤	④ ⑤

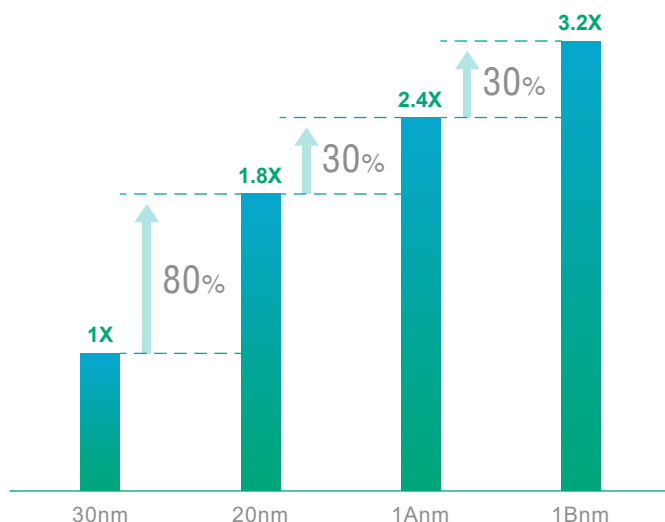
5 Strategies

- ① Development of Low-carbon Products
- ② Strategy for Green Technology and Production
- ③ Adaptation to Climate Change Risks
- ④ Climate Advocacy and Education
- ⑤ Partners in Sustainability

2.2 Development of Low-carbon Products

Nanya Technology Corporation upholds the core philosophy of “innovation”, leveraged its extensive R&D experience and outstanding technical team to make the successful transition to innovative R&D and technological independence in 2017. Nanya Technology Corporation's first generation 10nm process (1A) completed its technology and product validation process in 2021 and already commenced small-scale production in 2022. We were the first Taiwanese company to develop proprietary 10nm DRAM technology, proving that Taiwan is now among the world leaders in DRAM technology development. Development of the second generation 10 nm process (1B) is also going according to plan, small-scale production is expected to begin in 2023, and third generation (1C) will begin in 2025. Nanya Technology Corporation's R&D and improvements for every generation of process technology greatly increases the unit output per wafer. Our 20nm process increased its unit output per wafer by more than 80% compared to 30nm. In the future, every generation of the 10nm process should increase unit output per wafer by more than 30%. The 1B process is expected to more than double the unit output per wafer compared to the 30nm process and help the factor make more efficient use of energy resources during production.

Bit Output from a Single Wafer for Each Generation



Demand from 5G communications, artificial intelligence (AI) and smart phone memory upgrades means that next-generation memory products (e.g. DDR5 and LPDDR5) will become the preferred type of next-generation memory if they can provide low voltage, low power consumption and faster transmission rates. A comparison of DDR5 and LPDDR5 against DDR4 and LPDDR4 showed a reduction of 16-35% in average power rating but a doubling in bandwidth/speed. Being able to handle high-speed transfers while using less energy will bring very significant energy savings for the customer. A comparison with products from the 30nm process showed that Low Power products and 20nm advanced process products sold by Nanya in 2022 reduced power consumption by more than 621.7 GWh, the equivalent of reducing CO₂e emissions by 316,000 tons.

R&D Policy for Low Energy Consumption Products



Nanya continues to develop advanced manufacturing processes, so the energy consumption of new generation products developed with new processes is reduced by 15% compared with the previous generation.

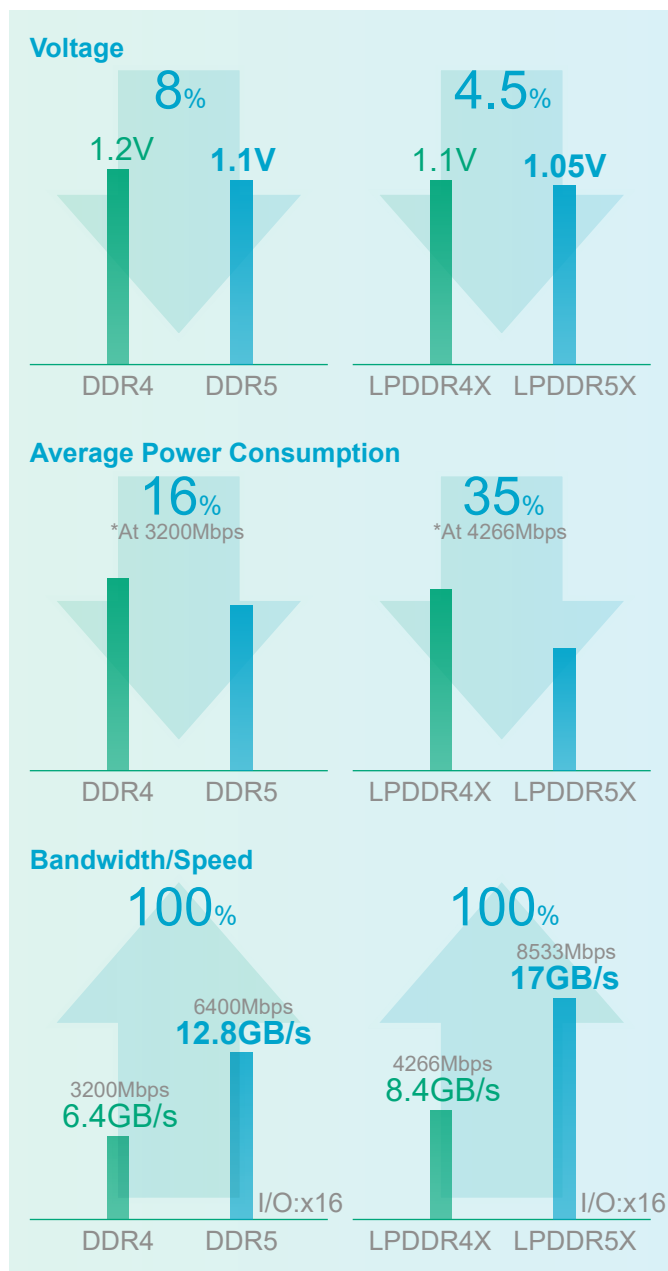


Nanya cooperates with major chip customers, adopting the method of multi chip package (MCP) to reduce back-end assembly and testing as well as energy consumption.



Nanya strengthens the development of low energy consumption product lines and enlarges product portfolios in order to satisfy the need of various mobile devices and electronic products.

DDR5&LPDDR5 provided specifications that save more electricity with high bandwidth/high speed



2.3 Strategy for Green Technology and Production

Nanya Technology Corporation's current business locations formally passed SBT verification in 2022. We plan to focus on carbon reduction in the following four areas to reduce energy consumption and carbon emissions from our business and production processes. These will lower the environmental impact of our production operations and mitigate the impact of climate change on Nanya Technology Corporation.

Process Improvements

As of the end of 2022, Nanya Technology Corporation completed the development of 90 AI applications that can

improve product yield and quality, increase the utilization of machinery, reduce raw material consumption, and allow overall production lines to operate more efficiently with annual benefits reaching NT\$360 million. We will continue to strengthen AI development, adopt advanced AI technologies, and expand AI applications to different departments. With that, Nanya Technology Corporation can comprehensively improve overall manufacturing performance. The development of AI applications is expected to generate benefit more than NT\$2 billion in total cumulative benefits over five years (2022-2026).

Nanya is continuing to make improvements through the ISO 14001 environmental management platform, Green Product R&D platform, and other management systems. A dedicated organization sets annual targets for raw material reduction and conducts regular reviews of the Company's overall performance in raw material reduction. Reduction plans are focused mainly in four areas: development of new process formulas, shortening process times, extending operating cycles, and reducing process consumption. A total of 24 raw material usage improvement proposals were carried out in 2022, and will reduce Scope 1 and Scope 3 emissions of Nanya Technology Corporation.

Local Scrubber

Nanya Technology Corporation is supporting the GHG reduction initiative of Taiwan Semiconductor Industry Association by actively reducing direct GHG emissions from production processes. Local scrubbers have been progressively installed for process equipment to break down GHG gas molecules and greatly reduce the dissipation of GHG into the atmosphere. The fluorinated GHG reduction rate for acceptance of local scrubber was set by Nanya as over 90% for CF₄, over 95% for C₃F₈, C₄F₆, C₄F₈, CHF₃, CH₂F₂, and SF₆, and over 99% for NF₃. The reduction rate for N₂O used in the thin-film process was also set as 90% to effectively reduce N₂O emissions. The reduction equipment installed by Nanya Technology Corporation currently reduces GHG emissions by 590,000 tons CO₂e annually. Local scrubber will be installed throughout all new factories built by Nanya Technology Corporation in the future to minimize our environmental impact.

Enhancing Energy Usage Efficiency

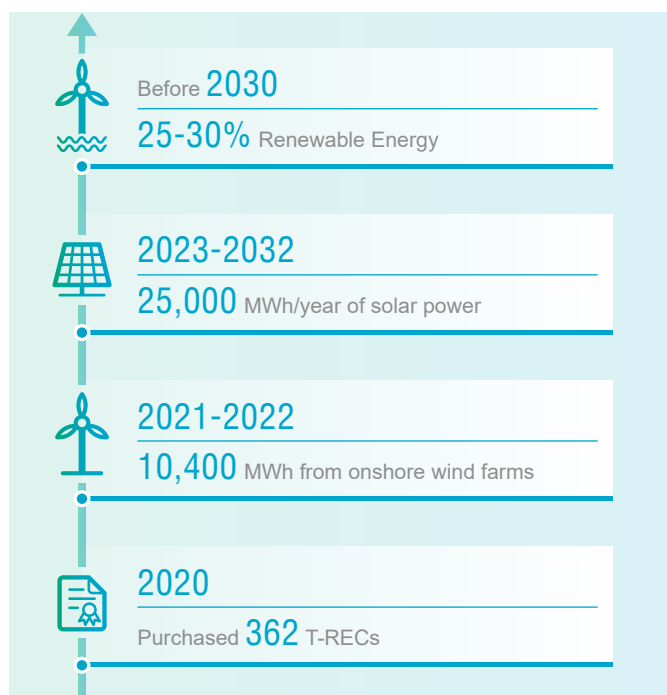
Approximately 85% of Nanya Technology Corporation's GHG emissions originate from electricity use. Validation of the ISO 50001 energy management system was completed by Nanya Technology Corporation in 2018. The platform enabled a systematic review of energy usage within the Company and verification of reductions. A variety of energy-saving technologies have been introduced by our sites including dual chilled water systems, heat recovery and reuse from freezers,

equipment automation, efficiency upgrades to equipment, as well as improvements to production management and scheduling to date.

Renewable Energy Use

Nanya Technology Corporation has been actively planning and progressively implementing the use of renewable energy. In 2020, Nanya Technology Corporation supported government policy and conducted an inventory of usable areas at our sites. We obtained 362 T-RECs from Taiwan's renewable energy certificates market and conducted a feasibility study on the installation of a 440 kW photovoltaic system at our existing plant. Nanya Technology Corporation also collaborated with renewable energy companies to use a combined total of 10,400 MWh of onshore wind power in 2021 and 2022. In 2022, we signed a 10-year contract with a solar power provider to purchase 250,000 MWh of renewable energy. The Company will therefore use at least 25,000 MWh of renewable energy a year from 2023 onwards. To meet the SBTs and connect with international initiatives, such as RE100, a working group was set up by Nanya Technology Corporation to plan for further large-scale introduction of renewable energy use. We now aim to meet the target of 25-30% renewable energy use by 2030.

Nanya Technology Corporation Renewable Energy Blueprint for the Next Decade



2.4 Adaptation to Climate Change Risks

Nanya Technology Corporation has formulated adaptation measures in response to the impact of natural disasters and external policies and regulations. Comprehensive emergency response plans for natural disasters have also been prepared

for site operations, assets and equipment, and the storage and transportation of raw materials. With regard to the stability of power supply, Nanya Technology Corporation has voltage and frequency stability systems and backup power supplies to stabilize the power supply quite of our sites. The ISO 50001 platform and smart management system are also being used to improve energy efficiency. An increase in non-rainy days will increase the frequency of droughts. Nanya Technology Corporation is therefore introducing aggressive water conservation measures and water reclamation to strengthen our adaptation ability. Our process water recovery rate has now reached 92.9% and we also prepare water cisterns, flood retention ponds, and wells. A water shortage emergency response organization was also set up in partnership with nearby Formosa Plastics Group sites to facilitate the emergency transfer of water sources within the organization during droughts. The design of all infrastructure within the Nanya Technology Corporation site took the parameters of past extreme weather events into account and also incorporate green building design features, such as water-permeable paving. The risk of flooding up until the middle of the century was therefore assessed to be slight. Drains however still need to be cleaned regularly to ensure proper drainage. We will continue to conduct rolling reviews on whether further capacity upgrades will be necessary based on the latest scientific data and the state of site operations.

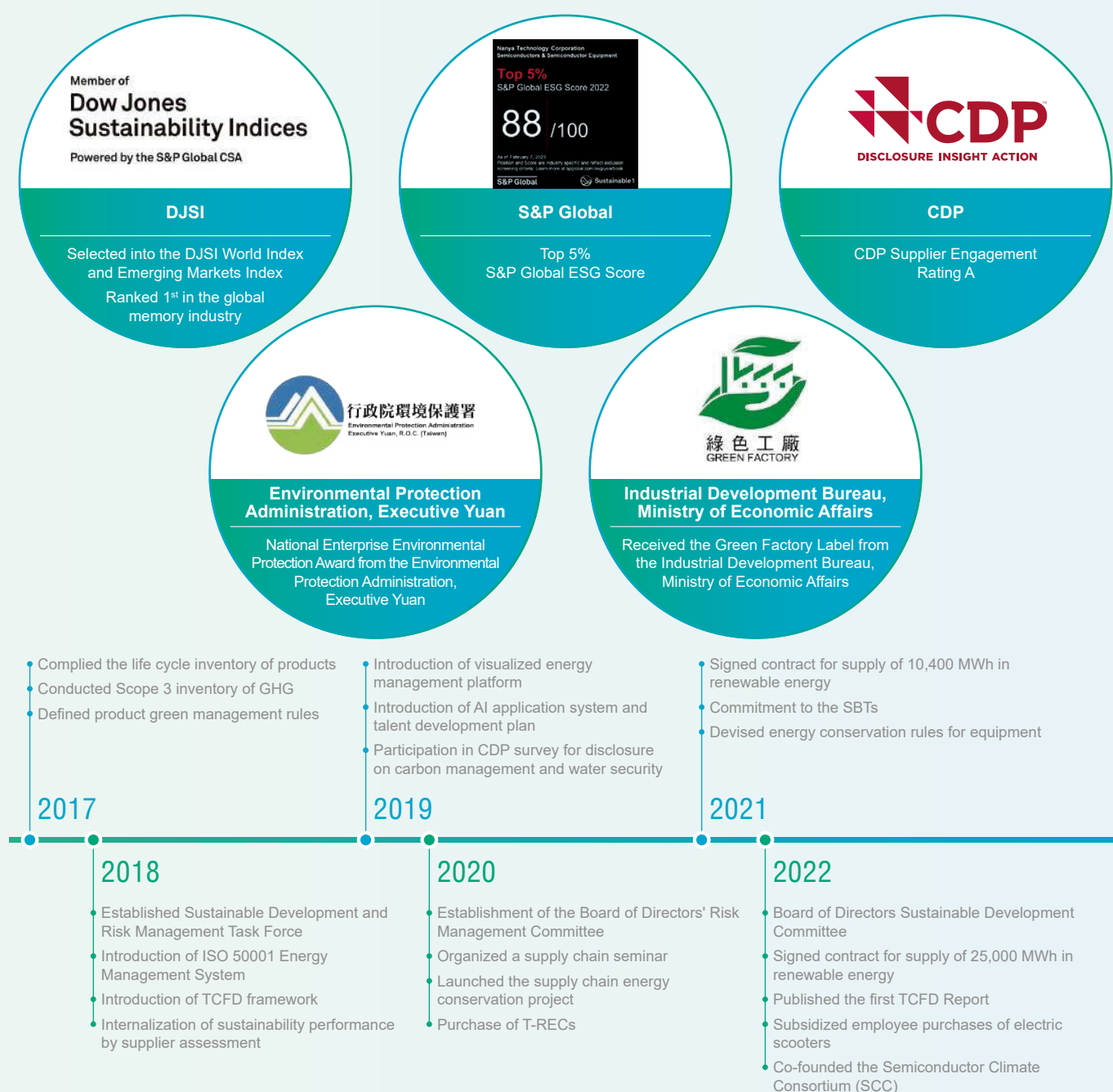
2.5 Partners in Sustainability

Nanya Technology Corporation is working with suppliers to build a low carbon, sustainable supply chain by focusing on three areas: supply chain risk management, cooperation and exchange, and improving sustainability. In terms of risk management, a sustainable supply chain management process has been put into place by Nanya to manage supply chain risks and strengthen the sustainability performance of suppliers through regulations, risk investigation, field audits/improvement measures, and supplier capability development; in terms of cooperation and exchange, "Sustainability Supply Chain Conference" are held on a regular basis during which we promote our sustainable supply chain management strategy and share issues important to Nanya with suppliers; in terms of improving sustainability, Nanya not only actively engages in internal energy conservation and carbon reduction initiatives but also expects suppliers to participate as well by setting renewable energy and energy conservation targets for suppliers. These include renewable energy accounting for 3% of total energy consumption by 2025, and reducing energy consumption by 10% and carbon emissions by 20% in 2030 compared with 2020.

2.6 Climate Advocacy and Education

As a responsible corporate citizen, Nanya Technology Corporation considers ESG to be an important commitment of companies, and continues to dedicate efforts to sustainable development. We actively take part in domestic and overseas sustainability initiatives and assessments to highlight the our efforts and ambitions on sustainability topics. These included joint promotion of TCFD, SBT, Taiwan Alliance for Net Zero Emission, Semiconductor Climate Consortium, as well as continued participation in the international assessments DJSI and CDP. The promotion of climate change is not just the responsibility of certain units or personnel within the company. Nanya Technology Corporation hopes that all employees can be involved as well. Workshops and internal training courses were therefore used by Nanya Technology Corporation to give employees a basic understanding of current climate change topics and the Company. Nanya Technology Corporation also communicated with suppliers, customers and society on climate change. These included connecting with suppliers through supplier symposiums, informing customers about our green and carbon reducing activities through the Sustainability Report, and cooperating with schools to set up courses on climate change and sustainability. Internal and external communication were employed to enhance the overall level of climate and carbon reduction awareness and culture throughout Nanya Technology Corporation.

Key Milestones from Climate Transformation at Nanya Technology Corporation



Climate Change Risk Management Overviews

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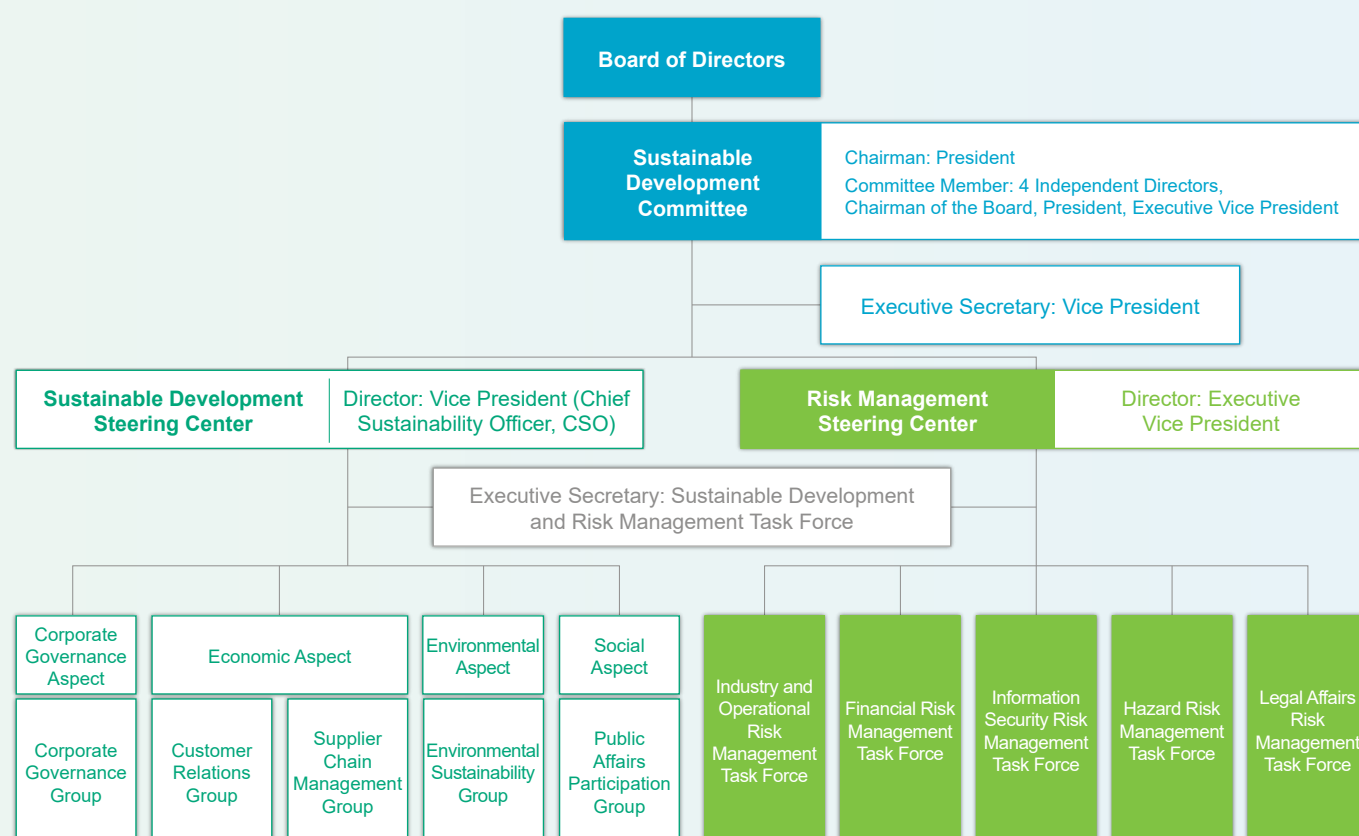


3.Climate Change Risk Management Overview

Nanya Technology Corporation has a full range of corporate governance capabilities. A sound risk management framework is used to control operating risks and mitigate loss. In response to the new challenges brought by climate change topics, Nanya Technology Corporation formulated a climate change strategy based on internal/external factors. This enabled the identification of climate change risk based on existing foundations, and also built on them for the identification of climate change risks and opportunities. Related measures were also proposed to complete the management cycle.

3.1 Nanya Technology Corporation Risk Management Framework

Nanya Technology Corporation's risk management systems are used to identify and analyze risks currently faced by the Company, establish suitable risk limits and control procedures, and supervise compliance with various risks and risk limits. Through the establishment of the Board of Directors' Sustainable Development Committee and the Risk Management Steering Center, compliance with the relevant ISO mechanisms, potential risk and opportunities for the Company in the five dimensions of industry and operations, cybersecurity, threats, finance, and legal affairs are identified. Effective risk control is enforced to ensure continuity of operation as well as the creation of value for shareholders, employees, customers and society in order to realize the sustainability goals of the Company.



In accordance with the mechanisms and values of the ISO 31000 Enterprise Risk Management (ERM) Guidelines, Nanya Technology Corporation formulated risk management policies and procedures in combination with the long-term goals of our business strategy to serve as guiding principles. We annually review and track emerging risks in the next 3-5 years. Through long-term planning and promotion, we aim to raise risk awareness among all employees and further internalize the awareness in daily management to ensure the continuity of company operations.

The Company abides by the principles, framework and spirit set forth in ISO 22301 in formulating the “Emergency Response Procedure.” These are implemented through the emergency response mechanism and measures of the ISO 9001, ISO 14001, ISO 50001, ISO 27001, and ISO 45001 management systems. For shortages in raw materials that affect production output by more than 10% (e.g. natural disasters caused by climate change), public system anomalies, automation system anomalies, anomalies in outsourced production, and mass returns by customers after product sales, sound and substantive measures and improvement plans have been put into place.

Nanya Technology Corporation will continue to conduct regular reviews every quarter to lower the potential impacts of risks. To make standard operating procedures more thorough, Nanya Technology Corporation regularly conducts emergency response drills, including one site-wide emergency evacuation drill and two firefighting drills every year. These ensure the effectiveness of emergency response measures and minimize risks.



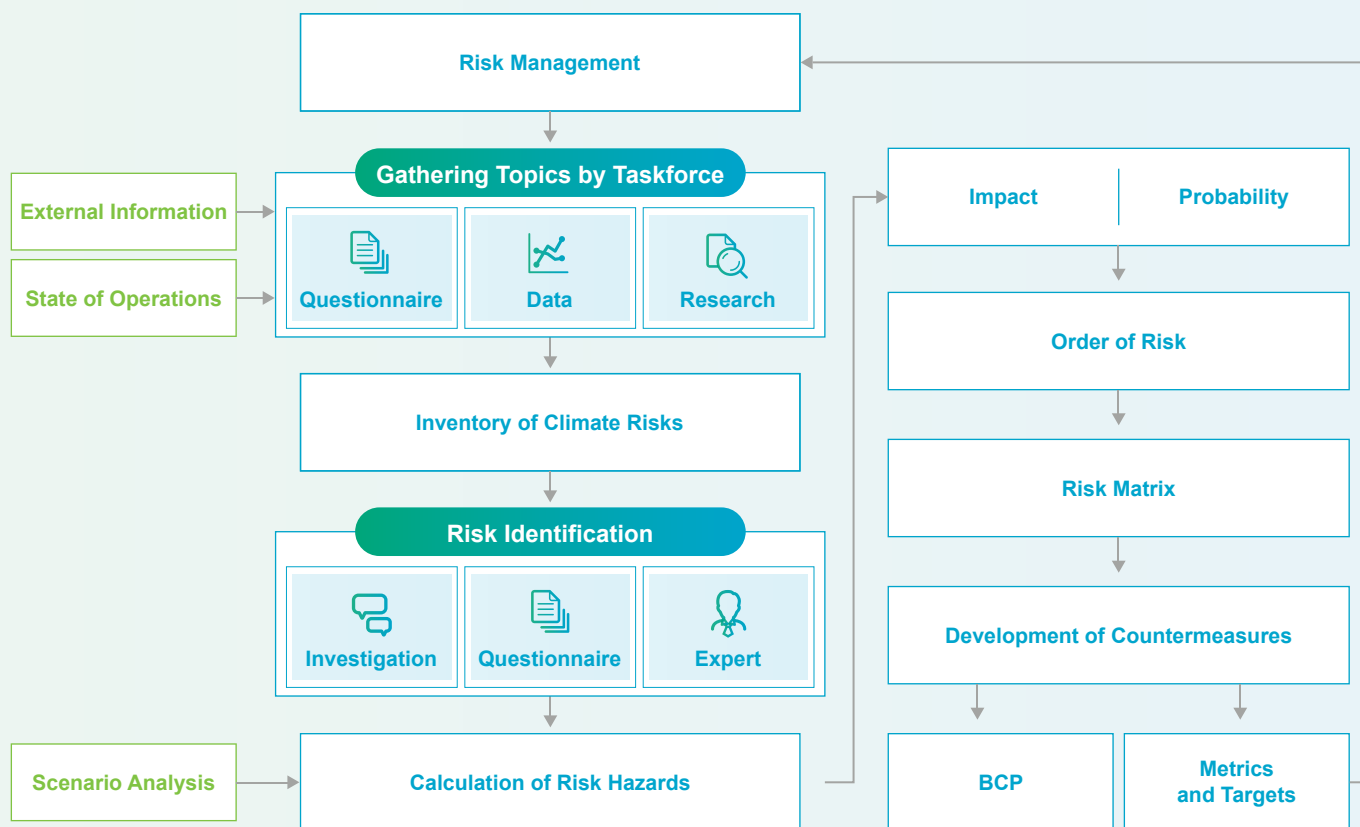
3.2 Climate Change Risk Identification Process

Climate change topics are now a risk factor in areas such as industry operations, finance, legal affairs, and site operations. As climate change involves knowledge across multiple disciplines, such as basic science and socioeconomics, risk identification was carried out separately in the form of workshops and the conclusions submitted to the Risk Management Center. Management reviews as well as emergency response drills were then carried out during regular meetings. The Company will continue to promote climate change education and literacy to raise climate risk awareness throughout the organization.

Nanya Technology Corporation is gradually incorporating climate change risks into our Enterprise Risk Management (ERM) system in accordance with the TCFD Guidance on Risk Management Integration and Disclosure, and Committee of Sponsoring Organizations of the Treadway Commission (COSO).

By inventorying and gathering information on external environmental changes and the state of internal operations, five strategies were formulated by Nanya for responding to climate change risks. Identification of related risks and opportunities was also carried out. The identification process was as shown in the diagram below:

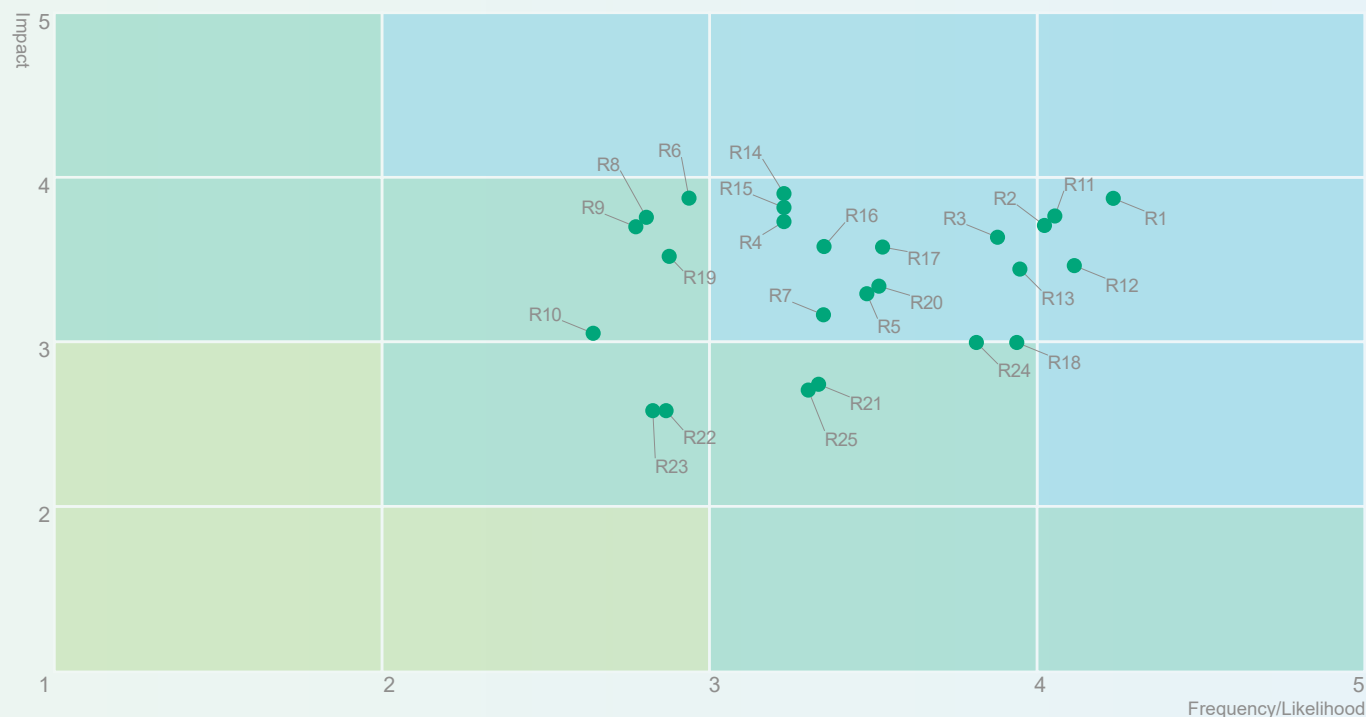
Risk Identification Process



At the beginning of the company's promotion of climate change risk identification, the company's sustainability team coordinated finance, environmental protection, utilities, product, supply chain, marketing, and human resource departments to convene workshops to identify climate change risk. In addition to reviewing the current and future policies and regulations, and discussing possible derived technology, regulations, market, reputation, immediate and long-term risk items, according to the internal risk control schedule. Short-term is defined as within 3 years; mid-term for 3-10 years; and long-term for more than 10 years. The risk identifications cover the upstream of the value chain, the organization, and the downstream. Nanya combines scenario analysis and other tools to calculate the impact of each risk and classify the risks according to the assessment results, and propose continuous management and follow-up to different levels of risk.

3.3 Identification Results of Climate Change Risks and Opportunities

Climate Change Risk Matrix



R1 Stable power supply	R8 Carbon inventory regulations	R15 Board of Directors and Management Capacity Building	R22 Obtained from carbon offset quota
R2 SBTs	R9 Internal carbon pricing	R16 Communication with stakeholders	R23 Green trade secrets and patent portfolio
R3 Energy acquisition cost	R10 Renewable energy regulations	R17 Industry chain cooperation	R24 Drought
R4 Collection of carbon fees	R11 Product application market	R18 Supply chain management	R25 Typhoon (torrential rain, strong winds), high temperature, and sea level rise
R5 Energy conservation and carbon reduction regulations	R12 Carbon footprint reduction	R19 Employee capacity building	
R6 Environmental impact assessment building regulations	R13 Inflation	R20 New generation energy efficient products	
R7 Carbon border tax	R14 Sustainability evaluation and disclosure	R21 Eco-friendly green processes	

Following the strategy outlined in Chapter 2 and the climate change risk and opportunity identification process described in section 3.2, a total of 25 climate change risks and 6 derived opportunities were identified in 2022: 5 high-risk factors mainly come from transformation risks such as “energy policy, SBT practice and customer needs” , and the remaining risks cover physical risks such as market, reputation and technology. The remainder were all low-risk factors or items awaiting observation and evaluation. Nanya will continue to monitor any trends or changes related to these risks. There were also 6 opportunities, including market demand on DRAM driven by climate change, and benefits from better energy and resource use efficiency.

Policy and Regulatory Risks

Period	Impact	Countermeasure	Corresponding topic
R1	Stable power supply		I5
Short-term, mid-term	<ul style="list-style-type: none"> Increase in operating costs X Production line suspension X 	<ul style="list-style-type: none"> Enhancing energy usage efficiency Increase backup power supply Distribute power supply 	
R2	SBTs and clean energy use		I4
Mid-term, long term	<ul style="list-style-type: none"> Increase in operating costs X Risks of not reaching goals X Reduce environmental and carbon footprint O 	<ul style="list-style-type: none"> Set SBT and renewable energy goals and pathway Plan carbon reduction plans for Scope 1, 2, and 3 	
R3	Energy acquisition cost		I5 I8
Short-term, mid-term	<ul style="list-style-type: none"> Increase in operating costs X 	<ul style="list-style-type: none"> Enhancing energy usage efficiency, implementing energy conservation plans 	
R4	Collection of carbon fees		I2 I4 I7
Short-term	<ul style="list-style-type: none"> Increase in operating costs X 	<ul style="list-style-type: none"> Further improvement of GHG inventory Plan Scope 1 and Scope 2 carbon reduction projects 	
R5	Energy conservation and carbon reduction regulations		I2 I4
Short-term	<ul style="list-style-type: none"> Energy conservation reduces operating costs O Reduce environmental and carbon footprint O Taking action increases operating costs X Not achieving goals may result in penalties X 	<ul style="list-style-type: none"> Implement ISO50001 energy conservation plan Continue to examine compliance through the compliance platform 	
R6	Environmental impact assessment and building regulations		I2
Short-term	<ul style="list-style-type: none"> Increase in operating or expansion costs X Increase in uncertainty during expansion X Decrease in carbon footprint and environmental footprint O Obtain green factory certification O 	<ul style="list-style-type: none"> Continue to apply for the Green Building Label When the plant is first established and considering sustainability and concepts 	
R7	Carbon border tax		I2 I7
Mid-term	<ul style="list-style-type: none"> Increase in operating and sales costs X 	<ul style="list-style-type: none"> Collaborate with the industry chain and the import/export regulations of each country. The latest version CBAM of the EU has not included the semiconductor industry into controls and regulations. Engage in GHG reduction actions to mitigate the impact of carbon border tax 	
R8	Carbon inventory regulations		I2
Short-term	<ul style="list-style-type: none"> Increase in operating costs X The market has insufficient verification capacity X Improvement in carbon management ability O 	<ul style="list-style-type: none"> Continue to improve the inventory methodology to ensure regulatory compliance 	
R9	Internal carbon pricing or carbon cost calculation		I10
Mid-term	<ul style="list-style-type: none"> Increase in operations management costs X Improvement in carbon management ability O 	<ul style="list-style-type: none"> Incorporate the concept of carbon cost into financial and accounting systems Continue to build the Company's climate change literacy 	
R10	Renewable energy regulations		I2 I5
Short-term	<ul style="list-style-type: none"> Increase in operating costs X Carbon footprint reduction O 	<ul style="list-style-type: none"> Requirements of the government on major electricity users has already been achieved in advance Continue to increase the use of renewable energy with the goal of reaching 25% and above in 2030 	

Market Risk

Period	Impact	Countermeasure	Corresponding topic
R11	Increase in product application markets		I1 I3 I4
Short-, mid-, and long-term	<ul style="list-style-type: none"> Increased cost of maintaining market share - Revenue and customer growth O 	<ul style="list-style-type: none"> Continue to engage in product innovation and R&D, launch new generation processes, and develop diverse product applications Monitor market developments and customer needs through periodic review and management of sales and marketing goals 	
R12	Carbon footprint reduction requirements		I1 I4
Mid-term	<ul style="list-style-type: none"> Increase in operating costs X Increased opportunities for customer engagement O 	<ul style="list-style-type: none"> Develop high energy efficiency products to lower the electricity consumption of end customers Engage in energy conservation and carbon reduction actions and use clean energy to produce products 	
R13	Inflation		I8
Short-term	<ul style="list-style-type: none"> Increase in operating costs X Increased risk due to imbalance in market supply and demand X 	<ul style="list-style-type: none"> Actively engage suppliers to monitor market supply Increase the safety stock of raw materials and formulate an emergency response plan 	

Reputation Risks

Period	Impact	Countermeasure	Corresponding topic
R14	Sustainability evaluation and disclosure		I9 I10
Short-term	<ul style="list-style-type: none"> Questioned by stakeholders for poor performance X Disclose the management cost that needs to be increased X Improvement in reputation and image due to excellent performance O 	<ul style="list-style-type: none"> Comply with the GRI, SASB, TCFD standards and continue to participate in ESG and sustainability ratings and disclosures Integrate internal and external resources to implement improvement plans 	
R15	Board of Directors and management climate capacity building		I10
Short-, mid-, and long-term	<ul style="list-style-type: none"> Improvement in Company Operations O Improvement in company image and reputation O 	<ul style="list-style-type: none"> Implement education, training, and promotion activities Remuneration of managers and employees linked to sustainability performance 	
R16	Communication of stakeholders' needs		I9
Short-, mid-, and long-term	<ul style="list-style-type: none"> Increase in operating and management costs X Development of relationships with stakeholders O Improvement in company reputation and image O 	<ul style="list-style-type: none"> Continue to engage stakeholders through various departments and organizations to understand their topics of concern and needs with respect to climate change Apart from the contact persons of each department, climate change results are shared through reports, websites, social media platforms, and the CDP 	
R17	Cooperation in industry chain issues		I4 I9
Short-, mid-, and long-term	<ul style="list-style-type: none"> Increase in operating and management costs X Expand partnership with suppliers and customers O 	<ul style="list-style-type: none"> Participate in associations to create cooperation opportunities from industry trends Irregularly engage in exchanges with customers and suppliers on sustainability topics 	
R18	Sustainable management of supply chain		I6 I9
Short-term, mid-term	<ul style="list-style-type: none"> Increase in operating and management costs X Improve the risk management ability of suppliers O 	<ul style="list-style-type: none"> Periodically audit high risk suppliers and suppliers of concern Provide guidance to make improvements for deficiencies found in audits Promote exchanges and cooperation in sustainability projects between suppliers and Nanya Technology Corporation 	
R19	Employee climate literacy and capacity building		I10
Short-, mid-, and long-term	<ul style="list-style-type: none"> Customer relations development O Decrease in cross-departmental communication cost O 	<ul style="list-style-type: none"> Incorporate climate change courses into new employee training, and provide safety training to all employees, while each department plans related training courses according to its needs Incorporate elements of climate change and sustainable development into events 	

Technology Risks

Period	Impact	Countermeasure	Corresponding topic
R20	New generation energy efficient products		I1 I3
Short-term, mid-term	<ul style="list-style-type: none"> Increase in R&D and production cost required X Customer relations development O 	<ul style="list-style-type: none"> Become a member of JEDEC to discuss and formulate standards for new generation products Invest R&D resources into new generation processes and construction of new fabs 	
R21	Eco-friendly green processes		I3 I4
Short-term	<ul style="list-style-type: none"> Increase in operating costs X Process carbon footprint reduction O 	<ul style="list-style-type: none"> Cooperating suppliers evaluate substitute chemicals and the implementation of circular economy plans Continue to implement raw material consumption improvement plans 	
R22	Natural solutions or carbon capture or obtain carbon offset quota		I7
Mid-term	<ul style="list-style-type: none"> Increase in operating and management costs X Means for achieving carbon neutrality O 	<ul style="list-style-type: none"> Evaluate the applicability of laws to improve the Company's quantified reduction benefits 	
R23	Green trade secrets and patent portfolio		I1 I3
Mid-term	<ul style="list-style-type: none"> Promote mutual prosperity of the industry and disclose the risk of confidential data leakage X The Company incorporates the concept of environmental protection into innovations O 	<ul style="list-style-type: none"> Establish guidelines and find a balance between exchanges and disclosure with the protection of trade secrets Promote and provide incentives for patent proposals that incorporate the concept of environmental protection 	

Physical Risks

Period	Impact	Countermeasure	Corresponding topic
R24	Drought		I6
Short-term, mid-term	<ul style="list-style-type: none"> Production suspension X Operating costs increased X Water use efficiency increased O 	<ul style="list-style-type: none"> Implement the AWS management framework to strengthen water resource governance Increase process water recovery equipment to increase water recovery ratio Increase backup water supply and formulate emergency response plans 	
R25	Typhoon (torrential rain, strong winds), high temperature, and sea level rise		I6
Long-term	<ul style="list-style-type: none"> Production suspension X Increase in operating costs X 	<ul style="list-style-type: none"> Promote green buildings to strengthen adaptation ability Periodically evaluate plant facilities based on the latest scientific data 	

Opportunities

Description of opportunity

Management measures

O1 Increase in product application markets	Corresponding risks R11
<p>Clean energy technology markets, such as renewable energy and smart grid, will significantly grow with the trend of net zero emissions. Since DRAM is a smart generation key component, its demand will also increase.</p>	<ul style="list-style-type: none"> Continue to engage in product and process innovation and R&D, implement advanced 10nm processes and mass production of products, and develop diverse applications. Actively expand partnerships with customers and provide the most suitable services to meet their demand, actively monitor issues brought by climate change, and set and periodically examine product sales goals.
O2 Increase in energy use efficiency	Corresponding risks R1 R2 R3 R5 R6
<p>Achieve GHG reduction goals through the implementation of energy conservation and carbon reduction plans, and improve the overall efficiency of energy and resource use to reduce production cost. The Company can also achieve relatively good performance and enjoy preferential treatment in environmental impact assessments, government fees, and subsidy projects.</p>	<ul style="list-style-type: none"> Energy conservation plans are implemented through ISO50001; 126 projects were implemented since 2018 and reduced electricity consumption by approximately 52.38 million kWh. Implementation of water conservation measures increased water recovery rate and accumulated water conservation reached 1.7 million tons. Implement the AWS water resource management framework to strengthen water resource governance, and certification is expected to be completed in 2023.
O3 Customer requirements on low carbon products	Corresponding risks R12 R17 R20
<p>The market is inclined to use products with low carbon footprint in response to climate change. Nanya Technology Corporation engaging in reduction activities and developing products with high energy efficiency will benefit product sales and promotion. It will secure current customer groups as the basis for developing next generation products.</p>	<ul style="list-style-type: none"> Invest R&D resources for plant expansion, introduce new generation products, and develop advanced high performance products to help customers create energy conservation benefits. Advanced energy efficient products sold by Nanya Technology Corporation in 2022 helped customers saved over 600 million kWh. Invest resources into GHG reduction measures during the production stage, and further implement reduction projects in the upstream supply chain to reduce the overall carbon footprint of products.
O4 Improve climate governance and carbon management ability	Corresponding risks R9 R15 R16 R17 R19 R23
<p>Improving the climate change literacy and governance ability of the Company's directors and business managers will help the Company make well thought out business decisions, reducing the decision-making risk brought by climate change, while driving the future implementation of improvement measures. Employees apply their better climate change literacy in work scenarios to accelerate the Company's attainment of net zero emissions, reducing cross-departmental communication cost and immediately responding to stakeholders' needs.</p>	<ul style="list-style-type: none"> Implement education, training, and promotion activities. Remuneration of the Board of Directors, managers and employees linked to sustainability performance. Incorporate the concept of internal carbon pricing and carbon cost, and add a field for carbon cost in monthly reports, so that decision-makers can review the Company's financial performance and consider related carbon risks at the same time.
O5 Participate in the Dow Jones Sustainability Index (DJSI)	Corresponding risks R16 R17
<p>Nanya Technology Corporation has achieved excellent performance in sustainability indexes and evaluations. Besides obtaining a better reputation, an increasing number of financial products in the market are referencing evaluation results. If Nanya Technology Corporation is selected into a sustainability index, it will help stabilize the investor structure. The Company can also determine the direction for sustainability strategies based changes in items.</p>	<ul style="list-style-type: none"> Continue to participate in and receive good ratings in ESG evaluations, such as the DJSI and CDP, conduct placement analysis based on results, and implement improvement plans. Nanya Technology Corporation was selected into the DJSI World and Emerging Markets in 2022, and was in the CDP A List for water security and A- for climate change.
O6 Industry chain cooperation	Corresponding risks R17 R18 R19
<p>Reduction of Scope 1 and Scope 3 emissions cannot be completed by the Company on its own, and requires upstream and downstream cooperation to successfully achieve climate goals. Cooperation in climate change issues and information sharing will drive the development progress of carbon reduction plans and reduce implementation cost. It will allow management ability to be improved for climate issues and reduce losses brought by related risks.</p>	<ul style="list-style-type: none"> Participate in associations such as SEMI and TSIA, and jointly discuss methods for improving sustainability with the semiconductor industry. Nanya Technology Corporation and peers in the industry co-founded the Semiconductor Climate Consortium (SCC) in 2022. Promote sustainable supply chain management, improve the carbon management ability of suppliers through exchanges and promotion, set energy conservation and carbon reduction goals, and jointly implement reduction measures with the supply chain. Collaborate with suppliers in evaluating the development of low carbon processes with substitute raw materials or jointly developing circular economy projects.

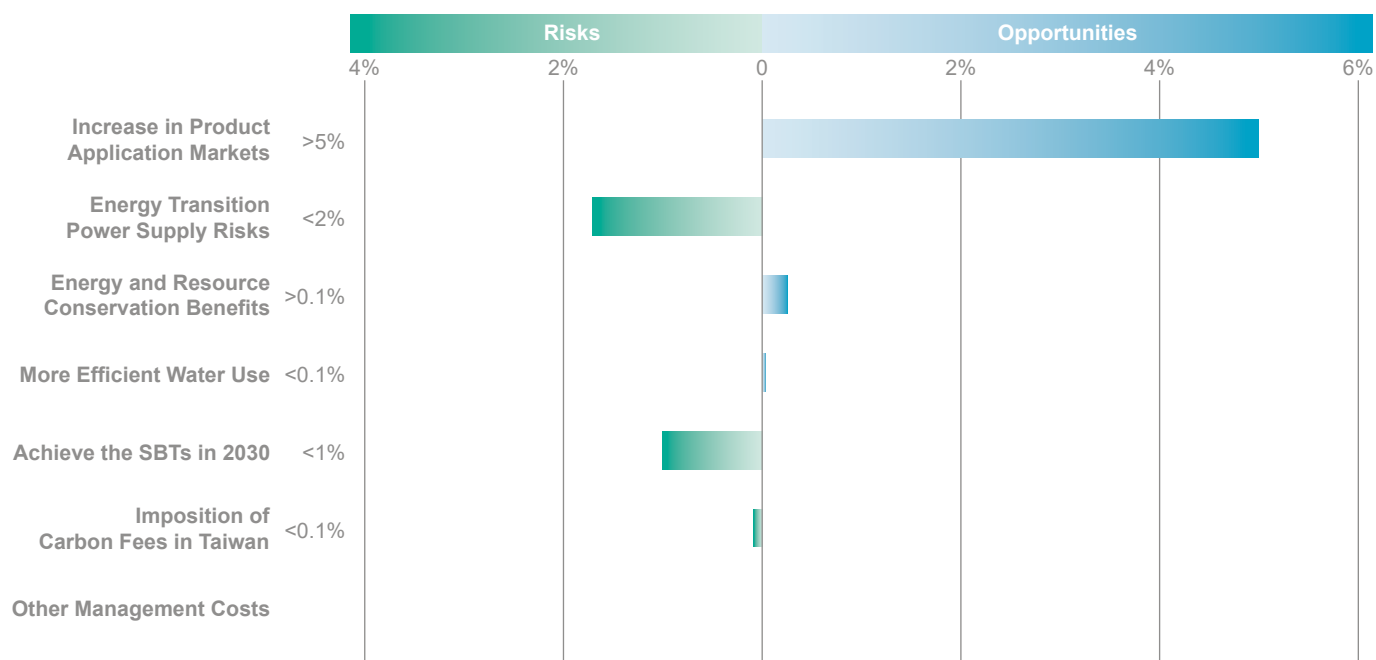
3.4 Financial Impact and Management of Climate Change Risks

Nanya evaluated the financial impact of climate change risks and opportunities for all stakeholders to evaluate operations. The Company has also implemented internal carbon pricing and carbon cost systems in the profit and loss statement.

Risks and Opportunities	Financial Impact Assessment and Description	Percentage of Revenue Impacted
Increase in product application markets	DRAM is a smart generation key component. Smart energy technologies will be more extensively applied due to climate change, and will drive growth in DRAM demand. According to the IEA's report, investments in clean energy technologies worldwide will grow 2 to 3 times in 2030. Nanya Technology Corporation continues promote consumer product and automotive product applications, which is expected to bring a 5% positive impact.	> 5%
Power supply risk and increase in electricity fees due to energy transition	In response to the power supply risk brought by the energy transition policy, Nanya Technology Corporation invested in backup power supply and a power stability system. Due to the rise in international raw material prices, new infrastructure of Taiwan Power Company, and change in energy structure, electricity prices are expected to increase by approximately 50% before 2030. Nanya Technology Corporation's energy costs currently account for approximately 3% of revenue, and related power supply risks may impact another 2%.	< 2%
Energy and resource conservation benefits	Nanya Technology Corporation invested over NT\$125 million in energy management plans the past 5 years, reduced electricity consumption by over 63,000 MWh, and saved approximately NT\$150 million in electricity expenses, accounting for 0.1% and above of revenue.	> 0.2%
Drought	Nanya invested over NT\$140 million in water management plans the past 10 years to prevent drought, and saved up to 1.7 million ton of water each year.	< 0.1%
Achieve the SBTs in 2030	Nanya Technology Corporation invested in necessary improvements to reduce 25% of Scope 1+2 emissions by 2030 and expects to use 25%-30% of renewable energy, increasing the cost of each kWh by approximately NT\$2; the additional expenses account for less than 1% of revenue.	< 1%
Collection of carbon fees in Taiwan	Using Nanya Technology Corporation's 440,000 tons of GHG emissions and the carbon fee released by the EPA in 2022 for estimation, the Company will need to pay NT\$130 million in carbon fees (300NTD/tons CO ₂ e), which is less than 0.2% of revenue.	< 0.2%
Other management costs	GHG inventory, system implementation, communication with stakeholders, supply chain management, and training costs.	< 0.1%

Note: Due to different boundary conditions and assumptions used, the evaluation above is only provided to stakeholders for evaluation.

Quantified Risks and Opportunities



Value Chain Climate Risk Analysis and Countermeasures

4.1	Greenhouse Gas Inventory	27
4.2	Scenario Analysis of Climate Risks for Nanya Technology Corporation's Operations	29
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4.4	Scenario Analysis for Customer and Operational Downstream Climate Risks	37



4.Value Chain Climate Risk Analysis and Countermeasures

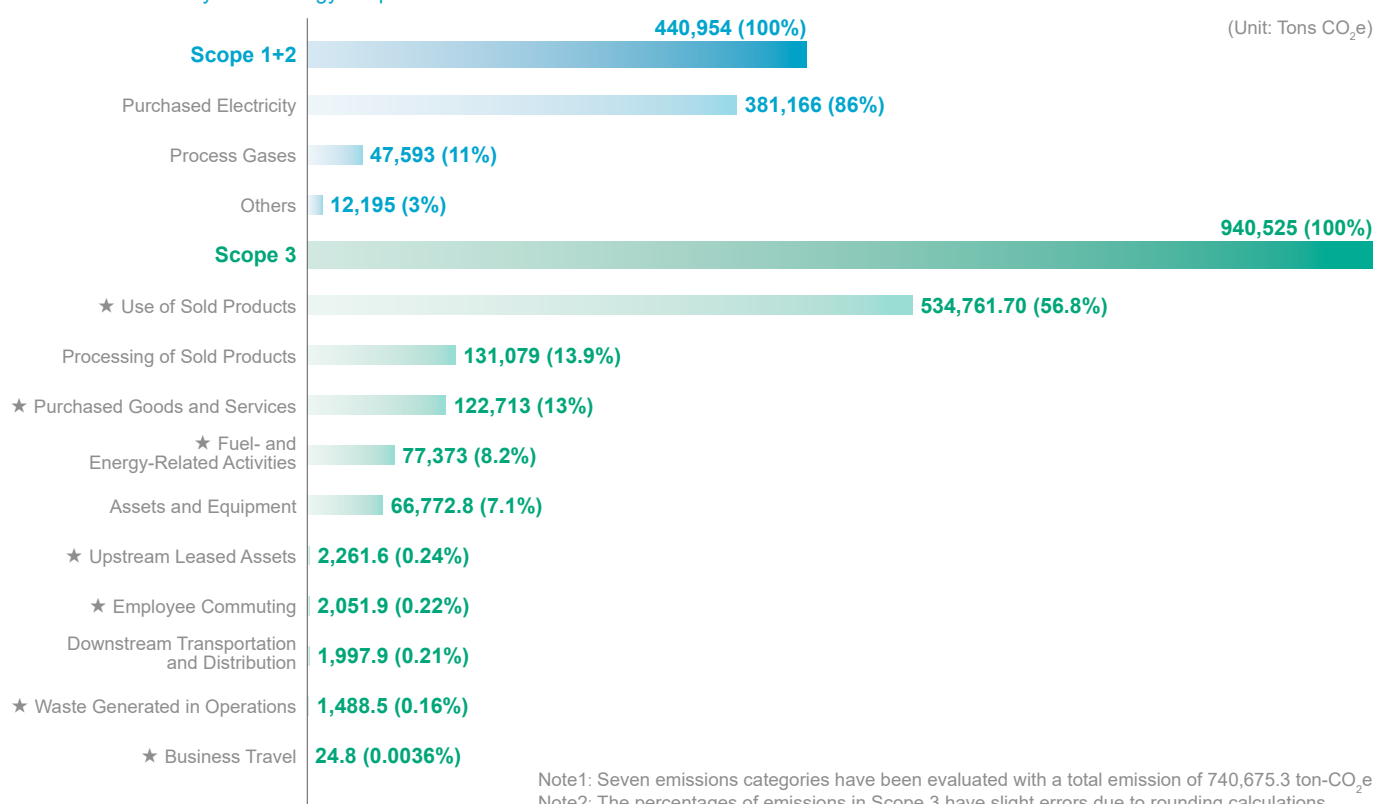
Nanya Technology Corporation is at the center of the memory industry chain and is a manufacturer of important electronic parts and components. The Company is a talent, technology, and capital intensive investor. Nanya Technology Corporation needs to rely on the massive supply chain system to jointly engage in cleaner production in response to climate change, and continue to invest resources into innovative R&D, in order to produce energy-efficient products to meet market demand. Apart from our own operations, we evaluated the potential climate challenges that upstream and downstream parts of the value chain (including suppliers, customers, and downstream operations) may face. The information is then used as the basis for planning climate risk mitigation and adaptation in order to reduce the effects and impacts of climate change risks.

4.1 Greenhouse Gas Inventory

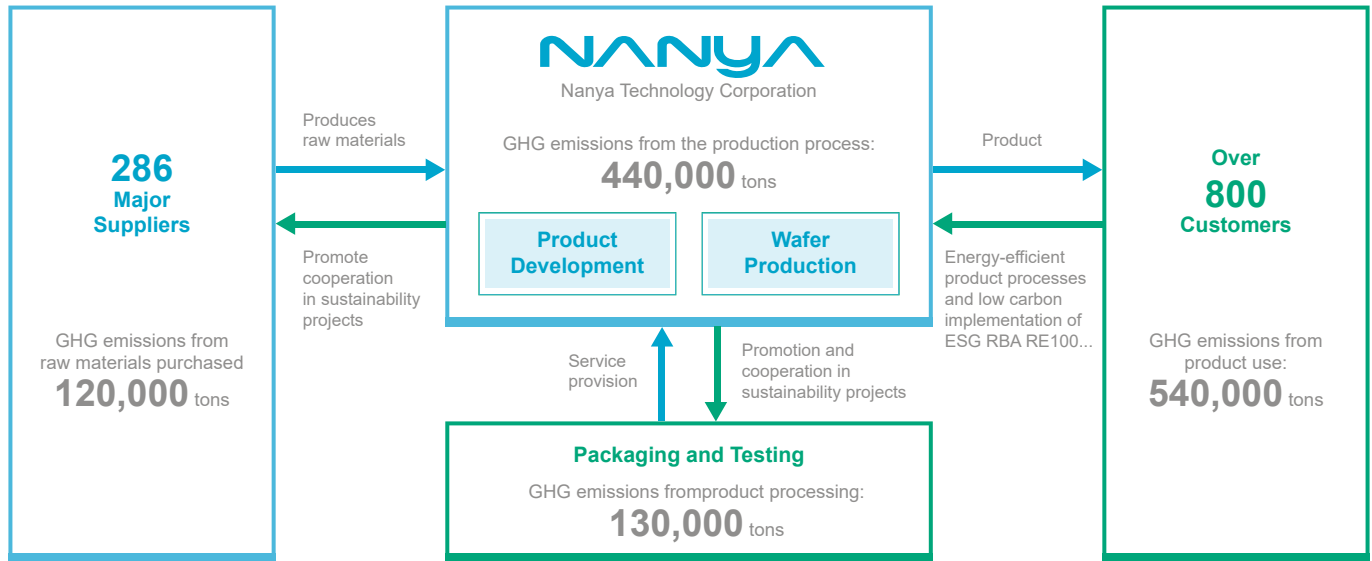
Nanya Technology Corporation began compiling its GHG inventory in 2005, and obtained ISO 14064-1 Organization GHG Inventory certification in 2008. We began compiling an inventory of Scope 3 emissions in 2018 to effectively manage GHG emissions from our value chain. Nanya Technology Corporation's Scope 1 and Scope 2 emissions amounted to 440,954 tons in 2022, in which GHG emissions from electricity use reached 381,166 tons (accounted for 86%) and was the main source of GHG emissions. The remaining roughly 60,000 tons (accounted for 14%) was from using fluorine-containing gases and nitrous oxide gas. Hence, electricity and process improvements must be made to achieve reduction goals.

For 2022, Scope 3 emissions total amount is 940,525 tons. Main emissions came from the use of sold products and the processing of sold products. The use of sales products emissions is the power consumption of products from the end customers with a total of 535,000 tons (accounting for 56.9%). As for the processing of sold products, which includes packaging and testing foundries emissions allocated according to production capacity, the total is 131,000 tons (accounting for 13.9%). Seven emissions categories have been evaluated with a total emission of 740,675.3 ton-CO₂e, which are "purchased goods and services, fuel- and energy-related activities, upstream leased assets, waste generated in operations, business travel, employee commuting, and use of sold products." Supply chain management and innovative R&D of products are the keys to reducing Scope 3 emissions. Nanya has discussed with external experts through the construction of methodology and database and regularly checks the data to ensure the supplier's reduction results.

Emissions from Nanya Technology Corporation's Overall Value Chain in 2022



Reduction - Carbon Reduction Relations in the Product Value Chain



Supplier and Packaging and Testing Plants

Target

1. Renewable energy use reaches 3% by 2025
2. 20% reduction in carbon emissions by 2030
3. 10% reduction in electricity consumption by 2030

Method Achieved

1. Compile the Company's GHG and product carbon footprint inventory
2. Implement energy conservation and carbon reduction (green electricity) projects with vendors
3. Share green factory and clean production experiences

Customer Product Use

Target

Successful volume production of products using 10nm process technologies

Method Achieved

Continue to invest R&D resources and promote high performance low power products

	Supplier Procurement	Nanya Technology Corporation	Clients
Risk			
Net zero emissions	Increase in management and operating costs leads to increase in product prices	Increase in management and operating costs	Requirements on the reduction of product carbon footprint increase in hopes that Nanya Technology Corporation will use clean energy and achieve carbon reduction goals
Carbon fees/ Carbon tax/ Carbon border tax	Increase in expenses for compliance causes product price to increase	Increase in expenses for compliance causes production cost to increase	Require Nanya Technology Corporation to clearly disclose GHG management measures and reduction activities
Energy transition	Increase in operating costs	Increase in production costs	Hopes for upstream to use clean energy and carbon reduction goals
Natural disasters	Natural disasters prevent normal supply	Natural disasters cause abnormalities in production or supply	Require Nanya Technology Corporation to formulate emergency response plans
Opportunities			
Increase in energy use efficiency and management ability	Investments in reduction activities increase energy and resource use efficiency, and strengthen climate resilience and emergency response ability	Investments in reduction activities increase energy and resource use efficiency	Increase trust in Nanya Technology Corporation and build stronger partnership
Low carbon products and application market growth	Nanya Technology Corporation is inclined to use low carbon eco-friendly products, which increases cooperation opportunities	Nanya Technology Corporation sells diverse products and market demand drives revenue growth	Inclined to use products with low carbon footprint and high energy efficiency

4.2 Scenario Analysis of Climate Risks for Nanya Technology Corporation's Operations

Transition Risk

The imposing of carbon levies (fees) is a common way of internalizing the external costs of GHG during global efforts to mitigate climate change. Cost is used to pressure GHG emitters into agreeing to reducing their carbon emissions. Nanya used three scenarios to analyze the impact of carbon levies (fees) on future operations. The carbon tax in Taiwan is expected to be around NT\$100-\$300 per ton of CO₂e emissions. The impact on operations will therefore be less than 0.2%. At the same time, the global nature of Nanya Technology Corporation's operations meant that we also assessed the carbon tax (levy) scenario published by the International Energy Agency (IEA) in its World Energy Outlook (WEO). The impact of carbon costs on company revenues will be far greater if the targets of the 2° C (Announced Pledge Scenario (APS)) and 1.5° C Net Zero Scenario (NZE) are to be met.

The use of low-carbon energy therefore shows the greatest potential for reducing GHG emissions. A scenario analysis was therefore conducted by Nanya based on the use of low-carbon energy and the carbon reduction path of SBT. In the scenario where national targets and international carbon reduction targets are both achieved, the impact on Nanya Technology Corporation's revenues will be around 1%-2.1%. If this is compared against the impacts of carbon taxes (levies) and renewable energy use however, assuming that high carbon taxes (levies) will be imposed, then we can see that early investment in low-carbon electricity such as renewables will reduce costs and reduce the impact on operations.

Scenario Analysis of Transition Risks for Nanya Technology Corporation's Operations

2030 Impact on Revenue (%)	Evaluation Method	2030 Impact on Revenue (%)	Evaluation Method
Collection of Carbon Taxes (fees)		Using Low-carbon Energy	
National Target <0.2%	Estimate based on NT\$100-NT\$300 per ton of carbon	National Target 1-1.2%	Investment in clean energy required for 10% reduction compared to 2020
2°C Target 1.9-2.5%	Estimate based on IEA WEO 2021 APS of US\$100 per ton of carbon	SBT 2°C Target 1.2-1.7%	Investment in clean energy required for 25% reduction compared to 2020
1.5°C Target 2.3-2.9%	Estimate based on IEA WEO 2021 NZE of US\$130 per ton of carbon	SBT 1.5°C Target 1.6-2.1%	Investment in clean energy required for 42.5% reduction compared to 2020

Physical Risk

To understand the physical disaster risks brought by climate change, Nanya Technology Corporation referred to the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) and analyzed the climate data from the future climate model. Nanya Technology Corporation's business locations and water catchments were analyzed to determine the operating risk for Nanya Technology Corporation in the middle of the century (2040-2060) using the climate data for scenarios RCP 2.6-RCP 8.5. This included the impact of increased temperatures, increased rainfall, and increase in non-rainy days.

Mid-Century Risk	Potential Impact	Operational and Financial Impact
RCP2.6		
<ul style="list-style-type: none"> Average days of no-rain increased by 1.2 days Flow decreased 6% during dry season 	<ul style="list-style-type: none"> Impact on operations from water shortages or rationing 	<p>The factory now has a fully-fledged management framework and emergency response plan for water resources that can be implemented in the event of a water shortage.</p>
<ul style="list-style-type: none"> Average temperature increased by 1.2° C Average duration of heat wave increased by 2.7 fold 	<ul style="list-style-type: none"> 3% increased in electricity consumption by air conditioning Increased load on factory and Taipower electrical systems 	<ul style="list-style-type: none"> Impact of higher electricity fees on revenue is < 0.1%, an AI chiller system has been installed and controls air conditioning based on optimal conditions, and will reduce energy consumption by 18% UPS and diesel generators have been installed as backup to ensure continuity of production
<ul style="list-style-type: none"> 15% increase in average maximum rainfall Average days of heavy rain increased by 0.09 days 	<ul style="list-style-type: none"> Increased flooding Construction delays due to torrential rain 	<ul style="list-style-type: none"> Factory is located on high ground so is immune to large-scale flooding from rain that impact on operations or production. Plants have construction regulations and weather is taken into consideration during scheduling, so there should not be any delay.
RCP8.5		
<ul style="list-style-type: none"> Average days of no-rain increased by 2 days Flow decreased 4% during dry season 	<ul style="list-style-type: none"> Impact on operations from water shortages or rationing 	<p>The factory now has a fully-fledged management framework and emergency response plan for water resources that can be implemented in the event of a water shortage.</p>
<ul style="list-style-type: none"> 1.9° C increase in average temperature Average duration of heat wave increased by 3.9 fold 	<ul style="list-style-type: none"> 5% increased in electricity consumption by air conditioning Increased load on factory and Taipower electrical systems 	<ul style="list-style-type: none"> Impact of higher electricity fees on revenue is < 0.1% UPS and diesel generators have been installed as backup to ensure continuity of production
<ul style="list-style-type: none"> 19% increase in average maximum rainfall Average days of heavy rain increased by 0.12 days 	<ul style="list-style-type: none"> Increased flooding Construction delays due to torrential rain 	<ul style="list-style-type: none"> Factory is located on high ground so is immune to large-scale flooding from rain that impact on operations or production. Plants have construction regulations and weather is taken into consideration during scheduling, so there should not be any delay.

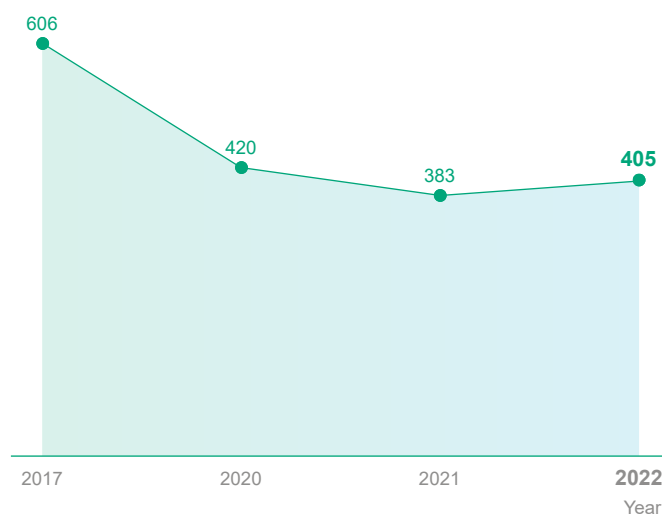
Countermeasures

Countermeasures for Transition Risks

To mitigate the threat posed by transition risks to Nanya Technology Corporation's operations, we are applying our own expertise and influence to implement carbon reduction measures in our operations and production processes, in order to reduce our GHG footprint and environmental impact. Nanya Technology Corporation passed the review of SBTs for existing operating locations in 2022. The four carbon reduction strategies of process improvements, local scrubber, enhancing energy use efficiency, and use of renewable energy have since reduced our total GHG emissions in 2022 by approximately 5% compared to 2020; GHG emissions per unit capacity decreased 3.6% compared to 2020, and significantly decreased approximately 35% compared to 2017, when the new plant began operations. Nanya Technology Corporation uses SBT to align ourselves with international trends, reduce our GHG emissions, and mitigate the impact and losses caused by transition risks due to climate change

GHG Emissions Per Unit Capacity

GHG emissions per unit capacity
(kg CO₂e/thousand die)

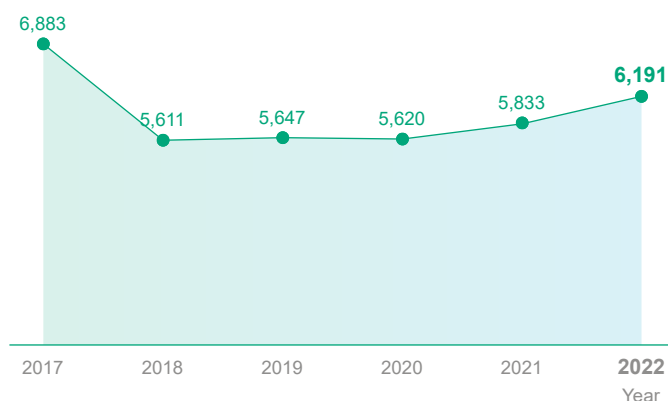


Note: The calculation of production capacity was the output of Good Electronic Chip (GEC), and the output of various products was converted into around 4Gb product particle numbers, using per thousand die (k-pcs) as the calculation unit.

In terms of process improvements, raw materials consumption significantly increased in the past two years due to new processes and trial production of new products. However, Nanya Technology Corporation has completed 147 projects to improve the use of raw materials since 2017, and process gas usage per unit capacity went from 6,883m³/k-pcs to 5,833m³/k-pcs between 2017 and 2022, a decrease of 10.1% over 5 years. Chemical usage per unit capacity also dropped by 26.4% compared to 5 years ago.

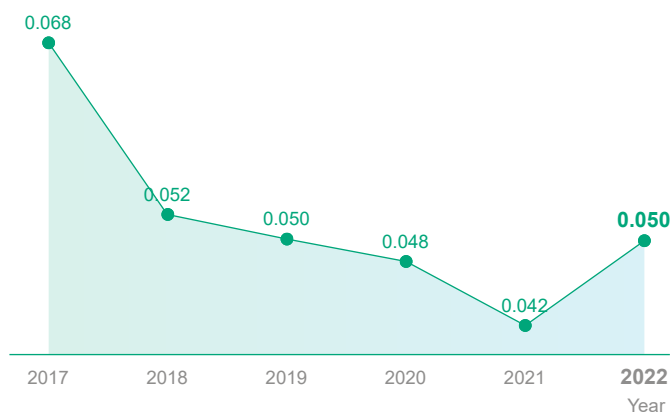
Process Gas Usage Per Unit Capacity

Process gas per unit die produced
(m³/kpcs)



Chemical Usage Per Unit Capacity

Chemicals per unit die produced
(metric tons/kpcs)



Nanya Technology Corporation purchased a local scrubber (LS) when planning fab construction. The LS is mainly used to reduce fluorine-containing GHG emissions from etching processes by 93% and above. N₂O reduction equipment was also installed in film process machinery for 90% and above reduction. Total reduction performance in 2022 was approximately 650,000 tons CO₂e. We also engaged exhaust reduction equipment manufacturers to discuss the optimization of LS management, ensure that LS efficiency is maintained at a certain level, and achieve more precise results in GHG inventory and management.



Local Scrubber for Process Equipment



In terms of enhancing energy usage efficiency, Nanya Technology Corporation has obtained ISO 50001 energy management system certification. The platform enabled a systematic review of energy usage within the Company and verification of reductions. A variety of energy-saving technologies have been introduced by our sites including dual chilled water systems, heat recovery and reuse from freezers, equipment automation, efficiency upgrades to equipment, as well as improvements to production management and scheduling to date. A total of 139 energy conservation projects were introduced between 2017 and 2022 to save more than 63,220 MWh in electricity.

Energy Consumption Real-time Monitoring Platform

The energy consumption real-time monitoring platform was set up by Nanya Technology Corporation in 2019 to carry out smart energy conservation management. A hierarchical management structure was adopted to facilitate the statistical analysis of systems and equipment at each node. The initial investment amounted to NT\$21.8 million. The system is currently linked to over 1,600 nodes, and real-time monitoring of visualized data enables effective management and improvement of energy consumption by each unit and machine group.

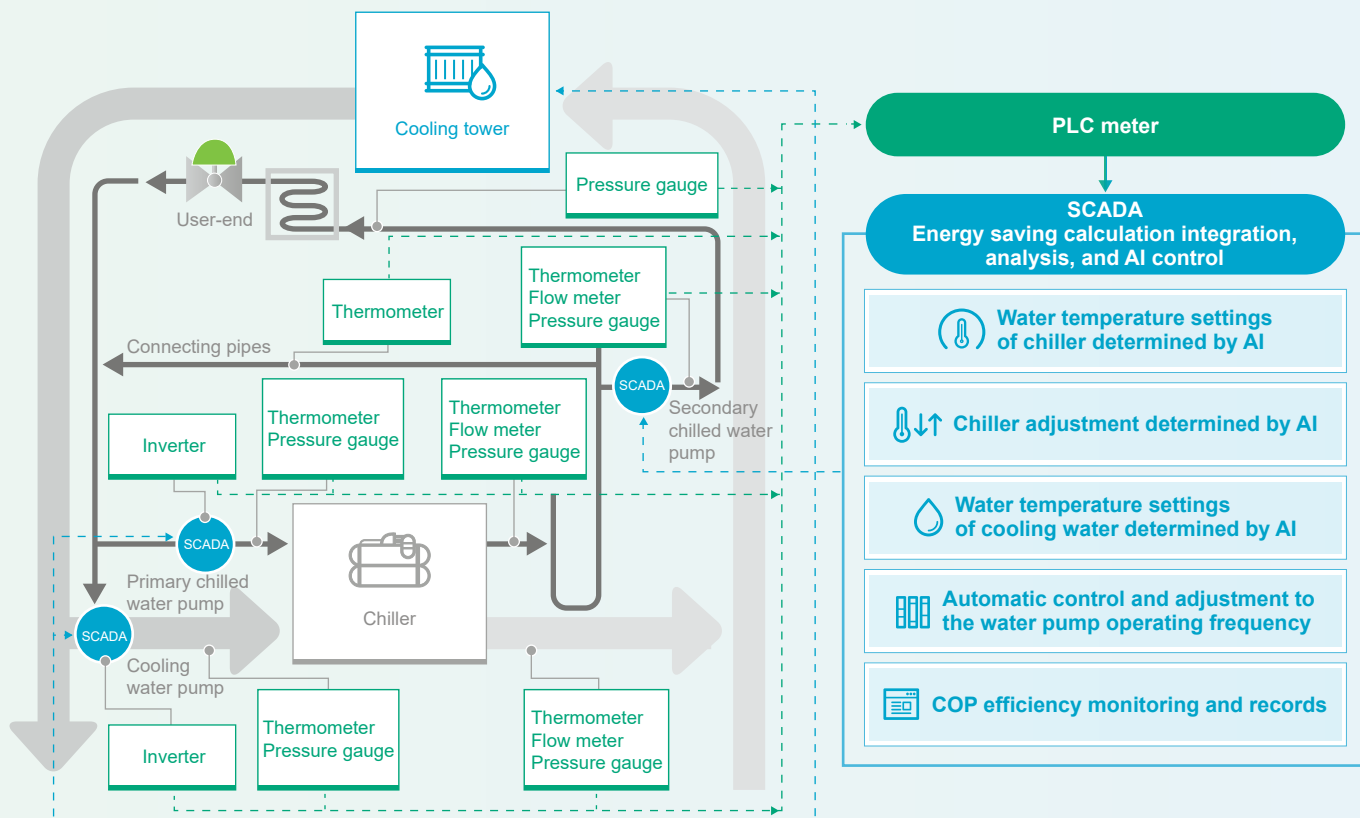


Energy Consumption Real-time Monitoring Platform

AI-Controlled Air Conditioning System

Nanya Technology Corporation introduced smart management systems for air conditioning equipment as they consumed the most electricity (20% of total electricity consumption). Big data analysis and modeling was then used to optimize the scheduling and configuration of compressors, chilled water flow and related refrigeration equipment based on external temperature conditions. It also improved the resilience of air conditioning equipment to climate change. Nanya began collecting AC operating data and analyzing their potential for improvement in 2017. Work commenced in 2019 and once the upgrades were completed in 2020, the electricity consumption of the chilled water system was reduced on average by 18.17% and saved up to 1,550 MWh a month.

Smart Chiller Upgrade Project



Renewable Energy Use

The planning and implementation of renewable energy targets at Nanya Technology Corporation can be divided into the following three phases

Phase 1: Self-development evaluation and trial implementation. Nanya Technology Corporation purchased 362 T-RECs through the renewable energy trading platform in 2020, and also began evaluating available spaces in existing factories, planning the establishment of a solar power plant with installed capacity of 456.28 kW (completed in coordination with the expansion of the new factory). We are also installing 27.36 kW of solar panels on the rooftop of our new building, which was completed and began use in 2022. New plants in the future will also fully utilize land resources to install green energy facilities.

Phase 2: External cooperation. Nanya Technology Corporation is working with renewable energy providers to obtain more electricity, and is gradually expanding consumption based on regulatory requirements. In 2021, we used a total of 2,600 MWh in renewable energy, and expect to use 7,880 MWh or more of renewable energy in 2022. Starting in 2023, we will gradually increase renewable energy use in coordination with reduction goals in response to climate change, until we reach 25,000 MWh or more each year.

Phase 3: International integration and net zero. In order for the percentage of renewable energy to reach 25-30% by 2030 to achieve the SBT or RE100, Nanya Technology Corporation will target the supply contracts of large renewable energy plants to further increase its renewable energy consumption.

Response to the Government's Energy Transition Risks

In response to the electricity price hikes brought by the energy transition policy, Nanya Technology Corporation continues to increase the benefits from every kWh through energy conservation projects based on the energy management framework. We will continue to increase the amount of renewable energy purchased at a fixed price under long-term contracts, to lower the risk of higher electricity cost due to domestic and overseas factors.

The pressure on the power grid in Taiwan has significantly increased in recent years due to industrial development and changes in the power supply structure. Taiwan Power Company may need to lower the voltage or frequency and even implement a demand response plan. Even tiny changes in power may impact sophisticated semiconductor production processes. To maintain our yield and the stability of production lines, Nanya Technology Corporation has prepared emergency response plans, including:

1. prepared 18 emergency generators and 26 DUPS in its fabs, which can supply approximately 60% of electricity when there is a power shortage.
2. Furthermore, all machinery in the fabs must comply with SEMI-F47, which lowers the sensitivity of machinery to a drop in voltage and prevents circuit breaker tripping.
3. Power supply of fabs use a dual circuit design to lower the risk of abnormal power supply from any single circuit. Maintenance and testing is periodically carried out to ensure stable power supply of fabs.

Countermeasures for Physical Risks

In terms of physical risks, Nanya Technology Corporation has devised and implemented measures for adapting to rising temperatures, increase in non-rainy days, and increase in precipitation. Comprehensive emergency response plans for natural disasters have also been prepared with respect to site operations, assets and equipment, as well as the storage and transportation of raw materials. The adaptation measures for rising temperatures, increase in non-rainy days, and increased precipitation are explained below.

• Adaptation Measures for Warming

In the temperature rise scenario, hot weather will also increase the use of energy. In response, Nanya Technology Corporation's current production and operating locations are green factories. New factories built by Nanya Technology Corporation in the future will adopt green building standards (the new Fab 5A is expected to obtain a green building candidate certificate in the first half of 2023) as well by strengthening building insulation

and factory energy efficiency. These will reduce the sensitivity of electricity supply to weather changes.



• Adaptation Measures for Drought and Water Shortage

The Aqueduct tool for evaluating water resources from the World Resources Institute (WRI) indicated that Nanya Technology Corporation's water source is a low to medium risk area in the short-term. To avoid short-term water shortage risks due to the natural environment, we will continue to strengthen water resource management functions. We launched the Alliance for Water Stewardship (AWS) – International Water Resource Management Standard Certification Project in 2022, comprehensively enhancing water resource management functions with the goal of obtaining platinum level certification in 2023. Nanya also received CDP Water Security A list honor for 2022. We will continue to implement water conservation measures and recycle and reuse water to strengthen our adaptation ability. With the effective treatment of acidic and alkaline wastewater, hydrofluoric wastewater, and organic wastewater, current process water recycling rate reaches 92.9%.

Nanya Technology Corporation has devised comprehensive emergency response plans to mitigate the immediate impacts of short-term water shortage and guarantee the water supply for our fabs. A cistern with a capacity of 43,000 tons, two detention basins each with a capacity of 4,060 tons, and seven wells have been built on-site to effectively harvest rainwater during the rainy season. Moreover, Nanya Technology Corporation and the adjacent factories of the Formosa Plastics Group have cooperated to set up an emergency response organization for water shortages. When water shortages occur, the members of the emergency response organization can deploy water resources to support each other on an emergency basis. With the proper support measures we can continue to operate for 40 days or more without external resupply. TCCIP scenario analysis showed that even if the average number of continuous non-rainy days increased by 1.2 to 2 days in the future, the impact on company operations is still in the acceptable range. Shihmen Reservoir in our catchment has now been upgraded so the probability of water outage due to turbid water after a storm has

been reduced. Our own internal water treatment capability is rated at 10,000 NTU (nephelometric turbidity unit) and can handle most situations. Nanya Technology Corporation will continue to upgrade our use and management of water resources, and new fabs will have a water recycling center, detention basins, and backup water supplies to prepare for the uncertainties of climate change.

Nanya Technology Corporation's Complete Process Water Recycling System



Acidic and Alkaline Wastewater System



Organic Wastewater Recycling System



Hydrofluoric Wastewater Recycling System

Please refer to the Nanya Technology Corporation's Sustainability Report for details on the water resource management process.

• Adaptation to Torrential Rain and Flooding

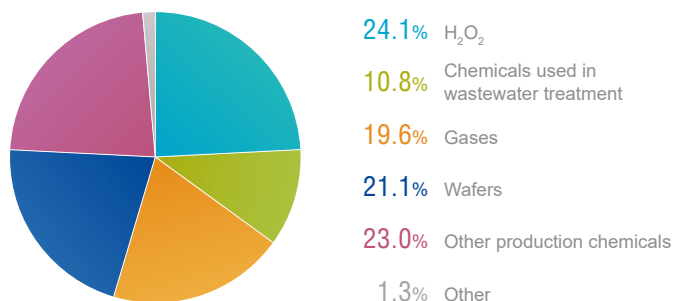
Increased number of rainy days may result in on-site flooding. The current design of Nanya Technology Corporation's site infrastructure is based on past extreme weather events with a certain safety margin. Planning of drains, for example, used the maximum precipitation in the last 25 years plus a 20% safety margin. When combined with permeable paving of green building design, flood risk by the mid-century remains low. Regular cleaning of the drains is, however, necessary to ensure their proper function. In the future, we will continue to conduct rolling reviews on the latest scientific data and the operational state of the site to determine whether the drains need to be widened.

4.3 Scenario Analysis for Supply Chain Climate Risks

Transition Risk

Similar to Nanya Technology Corporation, the operations of upstream suppliers may also be impacted by climate change policies and regulations, such as implementation of carbon taxes (fees), mandatory use of renewable energy, and impact of carbon tariffs on exports. Nanya Technology Corporation is actively reviewing and understanding the impacts on suppliers. By analyzing Scope 3 emissions and product life cycle, we learned about GHG emission hotspots and chose key suppliers for cooperation.

Raw Material Procurement As a Percentage of Nanya Technology Corporation's Carbon Footprint



Impact on Revenue | Evaluation Method

Major Electricity User Clauses for Renewable Energy

Less Than
0.01%

Supplier passing on the costs of complying with Taiwanese government's requirement that 10% of installed capacity should be renewable energy

Increase in Energy Costs

Less Than
0.5%

Supplier passing on the costs from rising fossil fuel prices and changes in energy structure is expected to increase market electricity costs by another 50% in 2030

Collection of Carbon Fees

Approximately
0.01-0.03%

Estimated from the current carbon tax of NT\$100 to NT\$300 per ton with supplier passing on the costs^{Note 1}

Investment in GHG Reduction

Less Than
0.1%

Estimate based on a minimum 25% reduction in GHG emissions by 2030 from suppliers participating in the SBTs. Suppliers passing on costs^{Note 2}

Note 1: Comparable to the Taiwan NDC scenario.
Note 2: Comparable to the IEAAPS scenario.

Evaluation and analysis found that the impact of transition risks at each supplier on the operating costs of Nanya Technology Corporation was negligible (less than 0.1%). To reduce the carbon footprint of products and achieve climate goals, Nanya Technology Corporation has engaged senior managers

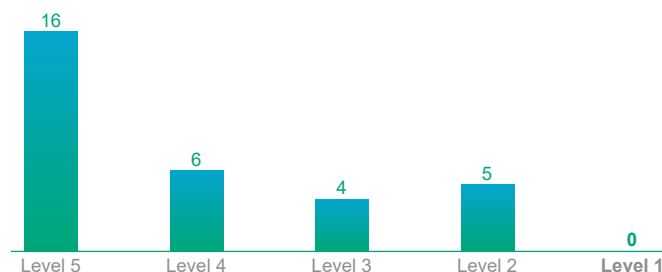
of suppliers to discuss renewable energy, product carbon footprint, and circular economy. In 2022, Nanya Technology Corporation's sustainability officer visited 8 suppliers, including wafer, chemical and gas suppliers and contractors, and received very positive feedback, helping to better understand the industry's challenges in net zero strategies. Nanya Technology Corporation will continue to share its experience and sustainability information, help vendors obtain external resources, and participate in industry associations to resolve common issues.

Physical Risk

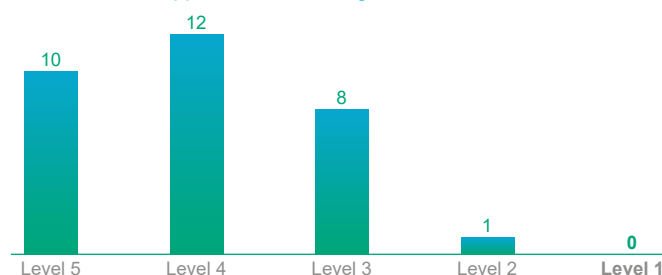
In addition to the transition risk that the supply chain will face, the increasing severity of natural disasters due to climate change may impact supplier production and disruption of supply. Nanya Technology Corporation is therefore working actively to establish the disaster potential of climate change at suppliers' operating locations. Nanya Technology Corporation prioritized the assessment of suppliers' production and supply locations (31 sites in total) in Taiwan. Cross-referencing with the IPCC AR5 RCP8 scenario database published by the Disaster Risk Adaptation (DR.A) platform of the National Science and Technology Center for Disaster Reduction (NCDR) found that 22 suppliers' production locations were at high risk of flooding and drought (Level 4 and 5), and the locations were concentrated in central and southern Taiwan.

Nanya Technology Corporation has now drawn up emergency response plans for high-risk supplier locations. The physical risks to Taiwanese suppliers from climate change were therefore assessed by Nanya Technology Corporation to be low and should not disrupt production. We will continue to manage the high-risk suppliers mentioned above. We will conduct climate change risk assessments for production locations outside of Taiwan in our supply chain, as well to ensure the security of production and supply of the overall supply chain.

Distribution of Supplier Flood Risk Level



Distribution of Supplier Water Shortage Risk Level



Countermeasures

Nanya Technology Corporation is working with suppliers to build a low carbon, sustainable supply chain by focusing on three areas: supply chain risk management, cooperation and exchange, and goal-setting.

Risk Management

Nanya Technology Corporation has now compiled the *Supply Chain Security Management Handbook* and *Supply Chain Security Emergency Response Management Procedure* to govern internal risk assessment on interruption to supply of raw materials. Regular rehearsals of the emergency response management procedure are conducted as well to ensure that our inventory of raw materials and emergency backup suppliers are sufficient to cope with unexpected natural disasters and international inflation.

Externally, Nanya Technology Corporation established a sustainable supply chain management process. We use regulations, risk surveys, on-site audits/improvement measures, and supplier capability development to strengthen suppliers' sustainability performance. The "Nanya Technology Corporation Supply Chain Code of Conduct Questionnaire" is sent to key suppliers every year to provide a basis for sustainability risk management, and the potential impacts of climate change management/GHG/water resource management are included in the assessment, including whether the vendor has implemented an environmental management policy, GHG management policy, energy management policy, and emergency response plan. High-risk suppliers are then selected for on-site audits and guidance is provided for improvement.

The questionnaire is used by Nanya Technology Corporation to conduct a risk assessment for all suppliers. Emergency response plans have now been drawn up for high-risk production locations to ensure continuity of supply for Nanya Technology Corporation in the event of natural disasters, such as flooding and water shortages. We conduct on-site audits of key raw materials suppliers every three years starting in 2020, and examine related documents to ensure that there are no issues with the supply of raw materials used in Nanya Technology Corporation's production, so that the supply will not be disrupted due to hazards derived from sustainability issues. We completed the sustainability audit (once every three years) in 2022 and did not find any deficiencies related to the risk of climate change and natural disasters.

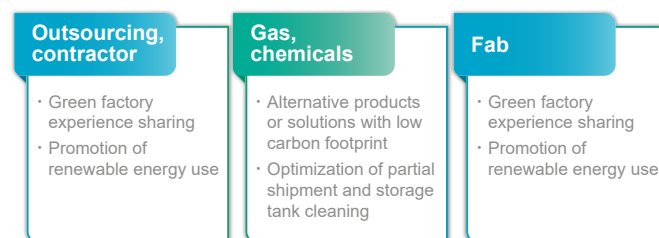
Cooperation and Experience Exchanges to Increase Sustainability

Nanya Technology Corporation regularly hosts the "Sustainability Supply Chain Conference" with experts, scholars, and suppliers invited to attend. Nanya Technology Corporation uses the seminar to promote our sustainable supply chain management strategy and share the topics of concern to Nanya Technology Corporation with all suppliers. The annual supplier evaluation is used by Nanya to host a conference and discuss production-

related requirements. Sustainability topics are also promoted at the conference. The outcomes of the annual evaluation are used to host a supplier award event as well. Top executives communicate Nanya Technology Corporation's sustainability targets and requirements for the supply chain during the event.

Starting in the second half of 2022, Nanya Technology Corporation reexamined the connections in its supply chain from the perspective of Scope 3 GHG emissions, and reviewed the methodology and database. We arranged exchanges between senior managers of Nanya Technology Corporation and suppliers, and prioritized suppliers with high transaction amounts and (relatively) high emissions. In the process, Nanya Technology Corporation learned about how different raw materials suppliers, such as fabs, chemicals, and gas suppliers, respond to sustainability issues, and provided customers with solutions for potential dilemmas in sustainable development. We also hope to discuss solutions and invited major electricity users, such as commissioned testing plants, to jointly use clean energy.

Direction for Cooperation



Set Goals and Promote Mutual Benefit

Nanya Technology Corporation hopes that suppliers can join us in promoting energy conservation and carbon reduction initiatives as well. During the 2022 supply chain conference, we invite suppliers to jointly declare the "Nanya Technology Corporation Sustainable Development Mutual Benefit Initiative" to create opportunities for future climate issues collaboration. Nanya Technology Corporation is setting renewable energy, electricity conservation, and energy conservation targets for suppliers to accelerate improvements to the environmental performance of our supply chain. Suppliers are now expect to have 3% of their actual electricity usage come from renewable energy by 2025, introduce the ISO 50001 energy management system and ISO 14064 GHG inventory by 2030, as well as cut their electricity consumption and carbon emissions by 10% and 20% respectively by 2030 compared to 2020.

Nanya Technology Corporation co-founded the Semiconductor Climate Consortium (SCC) with other members of the semiconductor industry before COP27 at the end of 2022, working together with the industry in GHG inventory, education, innovative technologies, and policy to achieve net zero emissions. Nanya began serving as the chairman of SEMI Sustainable Manufacturing Committee in 2022, integrating industry resources and jointly planning the vision for the semiconductor industry to resolve the dilemma currently faced by the industry.

4.4 Scenario Analysis for Customer and Operational Downstream Climate Risks

Transition Risk

Many customers have begun seeking Nanya Technology Corporation's support or cooperation on climate change topics in recent years. These include the setting of SBTs, use of low-carbon energy, or supply of low-carbon products. Nanya Technology Corporation studied and took an inventory of our customers' climate change strategy and potential requirements. Public disclosures through SBT, RE100, and customers' sustainability reports were assessed and taken into consideration for Nanya Technology Corporation's planning of our own low-carbon initiatives.

The results for 2022 show that customers are becoming more and more active in climate change. The number of customers participating in RE100 increased by 2, and the number of customers that set SBTs increased by 7 compared with the previous year. After customers participate in SBT, they also become more proactive in setting goals and implementing climate actions with their suppliers (including Nanya Technology). Currently, the cumulative number of customers reaches 19.

Customers participating in RE100	Customers with SBTs (including commitment and set targets)	Customers that set climate goals for suppliers (including setting SBTs, using renewable energy, compiling GHG inventory, and participating in the CDP)
Number of Customers Participating in 2022		
10	24	19

Nanya Technology Corporation's sales personnel continues to communicate with customers, and sends weekly projections of the customer's future demand forecast back to the Company. Demand forecasts reported by global sales are converted through the production and sales system into production plans. The Document Management System (DMS) and Customer Requirement System (CRS) then distribute the information to the relevant departments for assessment and implementation. Continuous adjustments are based on weekly feedback from sales personnel to ensure customer expectations are met.

Physical Risk

Nanya conducts climate change risk assessments for delivery locations. The DR.A database^{Note} of NCDR was used to analyze the climate change risk level (flooding) of 18 shipping locations in Taiwan; 12 out of the 18 destinations were determined to be high risk. Nanya has formulated the Incoming and Outgoing Product Management Process and Rules Governing the Product Transportation, Storage, Packaging and Delivery for emergency response plans for situations (including natural disasters) that may impacted shipping to ensure Nanya products delivery . In the future, we will expand the scope of our inventory, continue to meet customer needs, and monitor the conditions at the shipping location to ensure the intact delivery of our products.

Climate Change Risk Rating for Shipping Location

Level 5	Level 4	Level 3	Level 2	Level 1
11 vendors	1 vendors	4 vendors	1 vendors	1 vendors

Note: The database was analyzed using the IPCC AR5 RCP8.5 scenario.

Countermeasures

Our vision of becoming "The Best DRAM Partner for Smart World" guides Nanya Technology Corporation's focus on the DRAM industry. We leverage our innovative R&D capability to develop advanced processes and products, enhance our low-power product portfolio, and upgrade packaging methods. We continue to supply high-performance, energy-efficient products in accordance with our R&D strategy of focusing on low-power products. Aggressive energy conservation and carbon reduction through green production processes also reduce the carbon footprint of the products we supply with flow-on benefits for the customer's end product. Nanya Technology Corporation has set goals for carbon reduction and renewable energy use, and the use of new processes can effectively lower the carbon footprint of each product. The development of new generation products will improve Nanya Technology Corporation's Scope 3 GHG emissions. The SBT of reducing GHG emissions per unit product by 27% and above will be achieved by 2030.

Nanya Technology Corporation knows that climate change topics are of high concern to many customers. In addition to regular disclosures of related information through the sustainability report, we also participate in domestic/overseas initiatives or evaluations related to sustainable development or climate change such as TCFD, SBT, and Taiwan Alliance for Net Zero Emission. We continue to take part in international evaluations, such as DJSI and CDP. Our comprehensive customer service management system provides customers with an up-to-date picture on the green carbon reduction initiatives of Nanya Technology Corporation.

Sustainability Recognition

As a responsible corporate citizen, Nanya Technology Corporation considers ESG to be an important corporate commitment and is continuing to focus on sustainable development. Domestic and foreign recognition of our sustainability performance showed that Nanya Technology Corporation was able to balance its pursuit of business performance with the development of ESG. In terms of international recognition, Nanya Technology Corporation continued to be selected as a constituent stock of DJSI World and Emerging Markets (ranked 1st in the global memory industry) in 2022; received the highest honor "A List Leadership Level" in the CDP Climate Change Evaluation in 2020 and 2021; CDP "A List Leadership Level" for water security in 2022 and CDP Supplier Engagement Rating (SER) A. In terms of domestic recognition, Nanya Technology Corporation received the National Enterprise Environmental Protection Award and Top Ten Sustainable Companies Award from the TCSA.

In the future, Nanya Technology Corporation will actively take part in climate action and related improvement measures. We will also incorporate the feedback and experience from taking part in evaluations to maximize the returns from mitigation and adaptation actions, and work with all stakeholders to make concrete contribution to climate change.

Cultivation and Communication of Climate Change Awareness

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5. Cultivation and Communication of Climate Change Awareness

5.1 Continued Development for Board of Directors and Management

Nanya Technology Corporation's directors know that climate change is a potential risk topic and a global trend. Besides monitoring the Company's ESG implementation status through the Sustainable Development Committee, The Company also offers courses on climate change-related topics, such as global risk trends and international carbon tax developments, to enhance directors' understanding of climate change and professional qualifications. In 2022, our directors undertook 92 hours of continuing education in total including 45 hours (48.9%) in climate change-related courses. [See the Market Observation Post System for details](#)

Nanya Technology Corporation also actively participates in industry organizations, such as the SCC, Net Zero Alliance, and TSIA's ESG initiative as well as international evaluations, such as Dow Jones Sustainability Index (DJSI) and Carbon Disclosure Project (CDP), to stay on top of the latest international developments and standards. The industry information and feedback help us enhance our expertise and governance on climate change.



5.2 Cultivation and Communication of Employee Awareness

The promotion of climate change is not just the responsibility of the management or dedicated unit. Nanya Technology Corporation hopes that all employees can be part of the effort too. Orientation training for new employees include courses on "Introduction to GHG Inventory and Carbon Footprint", "Introduction to Green Product Management

System and RBA," and "Introduction to the Sustainability of Nanya Technology Corporation" to provide employees with a basic knowledge of climate change topics and company actions. This will help employees take climate change into account in their work.

To provide employees with the latest information, the company irregularly organizes climate change-related workshops, training, and courses on "Equipment energy-saving design and GHG reduction solutions" and "Industry technology developments in the global trend of ESG" by request. The Company also updates employees on the latest business accomplishments through press release and e-newsletters as well. These help employees take pride in their company's performance and encourage them to play a part in climate change.

Employee commutes generate air pollution and carbon emissions (Scope 3). To solve this problem, Nanya Technology Corporation set up 4 employee shuttle bus routes as well as free shuttle services (available to employees, suppliers, and customers visiting the Company on business) at National Taiwan Sports University Station and Chang Gung Hospital Station on the Airport MRT. Ride-sharing is used to reduce the GHG footprint from private vehicles and employees are provided with a range of commuting options.

In 2022, Nanya Technology Corporation and affiliates of Formosa Plastics Group partnered with an electric scooter company in Taiwan to launch the "Ride to be Green" program. A subsidy of NT\$10,000 was provided to employees for purchasing new electric scooters, and NT\$16,000 for upgrades. When local government subsidies are factored in that meant employees could pay just 60% of the market price on electric scooters, greatly reducing the cost of switching to low-carbon transportation. There are currently 102 applicants that have reduced carbon emissions by 234.6 metric tons CO₂e.

5.3 Cultivation and Communication of Supplier Awareness

In order to respond to trends in corporate sustainability, enhance sustainability awareness in the supply chain, and expand our influence to the entire product value chain, the "Sustainability Supply Chain Conference" was held by Nanya since 2020. Experts, scholars, and key suppliers were invited to take part in the exchange on corporate sustainability topics. The sustainable supply chain management strategy of Nanya Technology Corporation was promoted during the seminar, and issues of concerned were shared with suppliers. Suppliers shared the measures they implemented for environmental and social sustainability, so that other suppliers attending the event could learn from each other. SEMI was invited to analyze ESG trends in supply chains, and two successful model, our supplier,

Merck and KPPC were also invited to share their experience in 2022, exchanges during the seminar allow us to jointly move forward on the path to sustainability together with suppliers.

2022

Sustainability trends in the semiconductor industry, Nanya Technology Corporation's inclusive supply chain planning, supplier one-carbon products, and circular economy results sharing

2021

Sharing of sustainable supply chain trends, Nanya Technology Corporation's sustainable supply chain strategy, renewable energy planning of suppliers, and the outcomes of the foreign worker human rights project

2020

Sharing of sustainable supply chain trends, energy conservation accomplishments, new energy technologies



5.4 Cultivation and Enhancement of Social Awareness

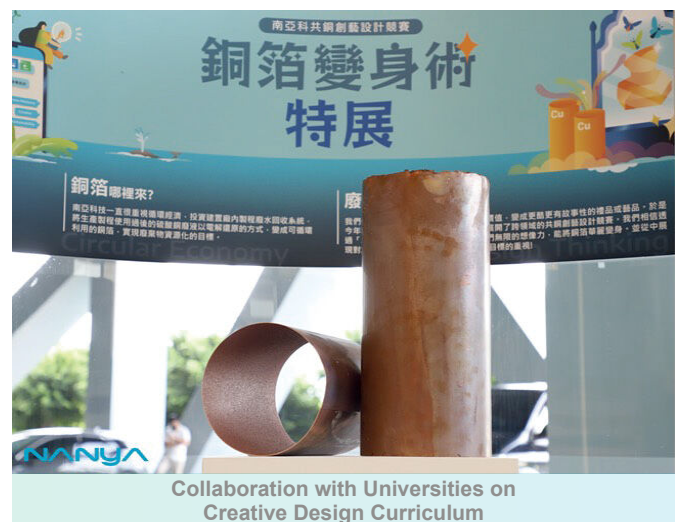
Nanya Technology actively participates in external activities to expand its sustainable impact. The company continues to respond to Earth Hour by using online and offline interactive games led by senior executives and social media to promote energy conservation and environmental awareness among employees. In 2022, a total of 478 people participated in the event. Through organizing various events within the company and connecting with society, such as setting up fair trade tea rooms, charity bazaars, or planning eco-friendly parent-child camps, Nanya Technology promotes SDGs in every corner of the company.

We are committed to promoting the common good and prosperity through its four social participation aspects of "talent cultivation," "humanistic care," "environmental conservation," and "community harmony." Under the talent cultivation framework, in addition to the memory industry, Nanya Technology also considers the key capabilities and qualities that future generations need, including SDGs, corporate social

responsibility (CSR), and environmental, social, and governance (ESG). Therefore, Nanya Technology collaborates with universities' University Social Responsibility (USR) programs, planting the seeds of sustainability consciousness on campuses.

Starting in 2022, Nanya Technology officially launched the "Copper Together" project, which cooperates with campuses to promote a circular economy and environmental sustainability. Through the "Copper Together - Copper Foil Transformation" creative design competition with Ming Chi University of Technology's Industrial Design Department, Nanya Technology utilizes waste copper from its water recycling process as a material for creation. Combining environmental issues such as SDGs 13 (climate action), 14 (ocean conservation), 15 (land ecology), and design thinking research models, the competition guides freshman designers to unleash their creativity and cultivate practical skills, transforming waste copper into sustainable design gifts. The final results not only demonstrate the importance of industry-academic cooperation and increase everyone's awareness of environmental SDG concepts but also enable participating teachers and students to experience the company's business philosophy.

The same year, Nanya participated in the "Design Thinking and Creative Integration" plan at Ming Chi University of Technology, incorporating SDG spirit into the design thinking curriculum. Approximately 1,200 undergraduate students in their first, second, and third years exchanged ideas and discuss solutions to local cultural or social issues in a cross-disciplinary and cross-departmental manner from a sustainable perspective. During the process, Nanya Technology's management executives also participated and shared the company's ESG practices and experiences in responding to climate change, initiating sustainable intergenerational communication. Nanya Technology hopes to expand or replicate this model in other campuses, allowing for more diverse possibilities for sustainable development in the corporate sector.



Metrics and Targets

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6 Metrics and Targets

6.1 Climate Change Management Goals

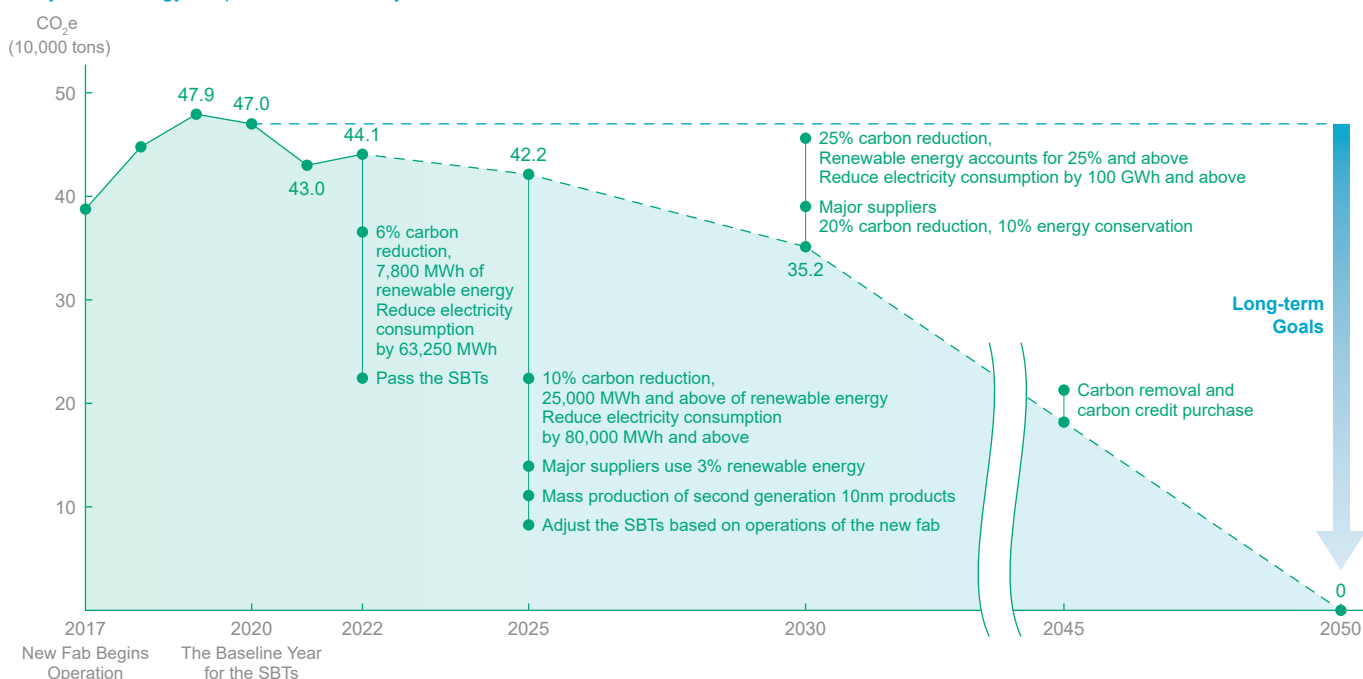
Five strategies have been adopted by Nanya Technology Corporation for managing climate change risks and opportunities, so targets have been set for Development of Low-carbon Products, Strategy for Green Technology and Production, Adaptation to Climate Change Risks, Partners in Sustainability, and Climate Advocacy and Education.

On the mitigation level, the Paris Agreement set a goal of limiting global warming to below 2°C and no more than 1.5°C if possible. Nanya Technology Corporation developed its climate strategy using international IPCC, AR6 and IEA WEO reports. Planning was ultimately based on SBT (scientifically based and in line with international trends) and targets were set based on the scenario of well below 2°C using 2020 as the baseline year:

- Scope 1+2 emissions: Annual average reduction by 2.5%, and reduce emissions in the current scope by 25% by 2030
- Scope 3 emissions: Under the premise of total emissions not increasing, our goal is to reduce emissions per unit product by 27% by 2030

Scope 3 emissions encompass the product and supply chain aspects. Nanya Technology Corporation has therefore set targets for product innovation and is investing in the R&D of 10nm products. Our goal is to start mass production of Gen2 10nm products in 2025 in order to provide DRAM products with higher performance and lower power consumption. Our supply chain management targets and joint initiatives with supplier partners are also aiming for a 20% reduction in carbon emissions and 10% reduction in energy consumption in 2030 compared to 2020. At the same time, Nanya Technology Corporation is strengthening plant facilities, improve its resilience to natural disasters, and set adaptation targets with business continuity and zero personnel losses as the goal. We also participate in DJSI, CDP, climate advocacy and education to raise the profile of these topics and respond to stakeholder expectations.

Nanya Technology Corporation's Pathway to Net Zero Emissions



6.2 Climate Change Management Indicators

Nanya Technology Corporation looks to the latest international trends and stakeholder requirements when developing its climate change strategy (Chapter 2), and identifying related risks and opportunities (Chapter 3). A variety of indicators are set for each aspect for tracking purposes. Different management platforms such as the Innovation Committee, Sustainable Supply Chain Committee, ISO 14001, ISO 50001 and ISO 14064 are employed for promoting related strategies and action plans, in order to reduce the effect of our overall supply chain on climate change, and vice versa.

Nanya Technology Corporation has invested innovation resources towards the R&D of low-carbon products. Products based on the 20 nm process are now seeing robust development and making tremendous contributions to energy conservation for our customers. Products based on the 10nm process are now moving towards mass production. The production of products using new generation processes is not stable yet, and our electricity consumption and GHG emissions have slightly increased, but we are investing in green technologies for production. Through equipment management, process improvements, as well as energy conservation and renewable energy measures, Scope 1 and 2 GHG emissions began showing a downward trend in 2021, and the GHG emissions in 2022 decreased by 6% compared to 2020.

The Company is now promoting inclusive supply chain, and conducts sustainability audits to identify climate change risks to the supply chain. Mentoring and improvements have been completed for 100% cases to ensure continuity of supply in the event of natural disasters or new regulations. We also used the opportunity to inventorize supplier capabilities to prepare for joint advocacy of sustainable supply chains. Nanya Technology Corporation embraced green building and green factory standards in the construction of operating locations. Continued improvements in are being made to our ability to respond and adapt to natural disasters as well. Emergency response plans have been refined through sound science to ensure our operations and the safety of our employees are not disrupted by natural disasters.

Finally, Nanya Technology Corporation continues to enhance its climate governance ability and qualifications. We participate in international initiatives and evaluations to keep track of the trends for key indicators and quantify the results of our action plans. Since 2019, Nanya Technology Corporation has maintained a Leadership rating in the CDP climate change questionnaire and was included in the DJSI for the fourth time. To improve employees' capabilities, we continue to organize events that incorporate concepts of climate change for employee participation, and offer general education courses to all employees. Training coverage is expected to reach 100% in 2023. The Company also advocates the importance of climate change and risk management, in which the Company has included climate change issues in employee performance evaluation items since 2018. For entry-level personnel and grade 2 or above managers, climate change accounts for approximately 7% of evaluation importance. As for the CEOs, the importance reached 10% for evaluation, considering the impact of decision-making that will cause profound effects on climate change.

Strategy	Mitigation Item						
	Indicator	2017	2019	2020	2021	2022	2030
Focus on Development of Low-carbon Products	Development Progress for Advanced Processes and Products	20nm Production Process Enters Mass Production	-	-	Complete the verification of 10nm DRAM process and component technology reliability	Small-scale production of DRAM products using 10nm process	Mass production of DRAM products using second generation 10nm process in 2025
Strategy for Green Technology and Production	Scope 1 Greenhouse Gases (metric tons CO ₂ e)	61,287	88,701	90,327	56,406	59788	352,308
	Scope 2 Greenhouse Gases (metric tons CO ₂ e)	315,141	390,021	379,417	373,639	381116	
	Scope 1+2	376,428	478,722	469,744	430,045	440954	
	GHG emissions per unit product (metric tons CO ₂ e/k-pcs)	0.61	0.445	0.42	0.383	0.405	
	Cumulative Electricity Savings (10,000 kWh)	1,084.2	2,714.8	5,126.5	5,885.0	6322.8	10000
	Renewable Energy Consumption (10,000 kWh)	0	0	36.2	2.60	780	More than 25%

Strategy	Mitigation Item						
	Indicator	2017	2019	2020	2021	2022	2030
Partners in Sustainability	Coverage of Supplier Sustainability Risk Assessment (%)	100	100	100	100	100	100
	Defect Improvement Rate (%)	100	100	100	100	100	100
	Scope 3 Emissions (metric tons)	-	1,001,224	1,073,770	972,973	940,525	783,852
Adaptation to Climate Change Risks	Adaptation Item						
	Indicator	2017	2019	2020	2021	2022	2030
	Water Recovery Rate (%)	78.1	91	87.3	90.8	92.9	93
	Business interruption due to natural disasters (days)	0	0	0	0	0	0
	Occupational injury due to natural disaster (cases)	0	0	0	0	0	0
	Green Factory Certification	-	-	-	Obtain certification	Maintain certification	Maintain certification
Climate Advocacy and Education	General Item						
	Indicator	2017	2019	2020	2021	2022	2030
	DJSI	-	Emerging Markets Index	Bronze Class Medal in The sustainability Yearbook published by S&P Global	DJSI World Emerging Markets Index	DJSI World Emerging Markets Index	Inclusion
	CDP Climate Change	-	A-	A	A	A-	Leadership level and above
	CDP Water Management	-	F	A-	A-	A	
	Climate change-related activities of all employees	Earth Hour	Earth Hour	Earth Hour	Earth Hour	Earth Hour	At least one
	Employee Training Courses	100% of new recruits receive training	100% of new recruits receive training	100% of new recruits receive training	100% of new recruits receive training	100% of new recruits receive training	100% of employees receive training

Future Outlook - Achieving Net Zero through Sustainability

Appendix 1-TCFD Indicator Reference Table
Appendix 2-References

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7.Future Outlook - Achieving Net Zero through Sustainability

A complete climate change risk and opportunity management cycle has been constructed by Nanya Technology Corporation based on the TCFD framework. Analysis of the climate change risk and opportunity matrix found that the greatest risks for Nanya Technology Corporation were regulatory requirements and customer expectations of the company against a background of net zero emissions. Nanya Technology Corporation has in turn devised and put into action five strategies to open up corresponding opportunities.

True corporate sustainability can only be realized through co-prosperity with the Earth's environment. Nanya Technology Corporation is leveraging our advanced process technologies, high efficiency, and energy-saving products to create energy savings and sustainable competitiveness, and engage in GHG mitigation through green production. Adaptation is also being implemented through energy management and water management to increase our climate resilience.

At the same time, Nanya Technology Corporation is also leveraging our own experience and those of our suppliers to enhance our sustainability performance together. A comprehensive audit and mentoring framework is employed to strengthen their climate resilience, face the challenges of climate change together and realize joint advocacy. Everyone from our directors to all employees are also actively working to enhance the climate change capabilities of the Company. We actively reach out to society as well as to make a positive contribution.

This Report was prepared by Nanya Technology Corporation using a systematic disclosure framework to communicate the efforts made by Nanya Technology Corporation in managing climate change topics to all stakeholders. Guided by the spirit of sustainability, Nanya Technology Corporation is now partnering with the rest of society on net zero emissions so that we can become "the best DRAM partner" in the "smart generation" and "climate generation."

Appendix 1 – TCFD Indicator Reference Table

Aspects	Recommended Disclosures	Corresponding Section of the Report	Page
Governance	Board's oversight of climate-related risks and opportunities.	Ch1.1, Ch5.1	6 , 39
	Management's role in assessing and managing climate-related risks and opportunities.	Ch1.2, Ch5.1	8 , 39
Strategy	Climate-related risks and opportunities identified over the short, medium, and long term.	Ch3.3	21
	Impact of climate related risks and opportunities on businesses, strategy, and financial planning.	Ch2, Ch3.3, Ch4	11 , 20
	Scenario Analysis (including 2°C or worse scenarios).	Ch4	29
Risk Management	Processes for identifying and assessing climate-related risks.	Ch3.2	19
	Process for managing climate-related risks.	Ch3.1, Ch3.2	17 , 18
	How processes for identifying, assessing, and managing climate-related risks are integrated into overall risk management.	Ch3.1, Ch3.2	17 , 18
Metrics and Targets	Disclose the metrics and targets used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	Ch3.2, Ch6	19 , 42
	Disclose Scope 1, Scope 2, and if appropriate, Scope 3 GHG emissions, and the related risks.	Ch3.3, Ch6.2	27 , 42
	Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	Ch2, Ch4, Ch5, Ch6.2	12 , 39 , 42

Appendix 2 – References

1. [2022 Nanya Technology Corporation Annual Report](#)
2. [2022 Nanya Technology Corporation Sustainability Report](#)
3. [Nanya Technology Corporation Corporate Sustainability Website](#)
4. TCFD(2017), Recommendations of the Task Force on Climate-related Financial Disclosures
5. TCFD(2020), Guidance on Scenario Analysis for Non-Financial Companies
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7. IPCC(2021), 6th Assessment Report
8. CSCO(2018), Enterprise Risk Management- Applying enterprise risk management to environmental, social and governance-related risks
9. IPCC(2018), Special Report Global Warming of 1.5° C
10. IEA(2021), World Energy Outlook 2021
11. [National Science and Technology Center for Disaster Reduction, Taiwan Climate Change Projection Information and Adaptation Knowledge Platform Project](#)
12. [Disaster Risk Adaptation Platform](#)
13. Lin, Sheng-chung et al. (2020), Climate Risk Assessment and Response in the Semiconductor Industry: Application of TCFD and Hedge Accounting Methods, Journal of Business Administration, Vol. 45, Issue 2, p. 01-27.



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