2023

TCFD REPORT

nuvoTon
新唐科技

Task Force on Climate-related Financial Disclosures
(TCFD)

According to The Global Risks Report released by the World Economic Forum (WEF) in 2023, the global risk trend has shifted from primarily economic risks to environmental risks, with extreme weather events and failure in climate actions identified as medium- to long-term focus. Since the Paris Agreement set the goal of limiting the temperature increase to 1.5°C, governments around the world have consecutively announced net zero goals and actively enacted laws and regulations to enhance climate change adaptation efforts. Dealing with the impact of climate change has become a common issue for the world. Nuvoton Corporation (hereinafter referred to as “Nuvoton”, “the Company” or “We”) recognizes the importance of mutual impact of climate change and sustainable business operation and has adopted the risk management approach recommended by the Task Force on Climate-related Financial Disclosures (TCFD), which focusing on four core elements including “Governance”, “Strategy”, “Risk Management” and “Metrics and Targets”, to identify material risks and opportunities that may affect operations and to drive climate change mitigation and adaptation tools in order to continuously reduce risks, enhance resilience and create opportunities for sustainable development.

About This Report

This report is prepared in accordance with both the proposed framework of the Task Force on Climate-related Financial Disclosures (TCFD) issued by the Financial Stability Board (FSB) and the guidelines regarding Climate-related Information of Listed Companies - Risks and opportunities posed by climate change to the Company and the relevant measures taken by and relevant countermeasures taken by the company, guidelines that are issued by the Financial Supervisory Commission. The reporting scope in this report covers Nuvoton Corporation and Nuvoton Corporation Japan. Unless otherwise stated, the monetary unit presented in the report is New Taiwan Dollars. The monetary figures in Japanese Yen were converted into New Taiwan Dollars using the average exchange rate in 2022.

01

Climate Change Governance

Climate Change Governance

Climate Change Governance and Management Framework

Nuvoton's climate change governance and management framework is led by the Board of Directors, which is ultimately responsible for overseeing material climate-related risks and guiding the management strategy, key action plans and goal achievement. The Sustainable Development Committee, chaired by the President or appointed senior executive, convenes various functional groups to formulate the Company's sustainability strategy and vision, in order to push forward sustainability-related efforts and management, and regularly reports to the Board of Directors on the implementation of sustainability, including the issue of climate change. The Finance Center is responsible for planning and providing guidance to the Company's responsible departments in identifying and managing the risks and opportunities of climate change. It also regularly reports to the Sustainable Development Committee on the trends, impacts and implementation results of relevant issues. Duties and responsibilities related to climate change are outlined below.

Board of Directors:

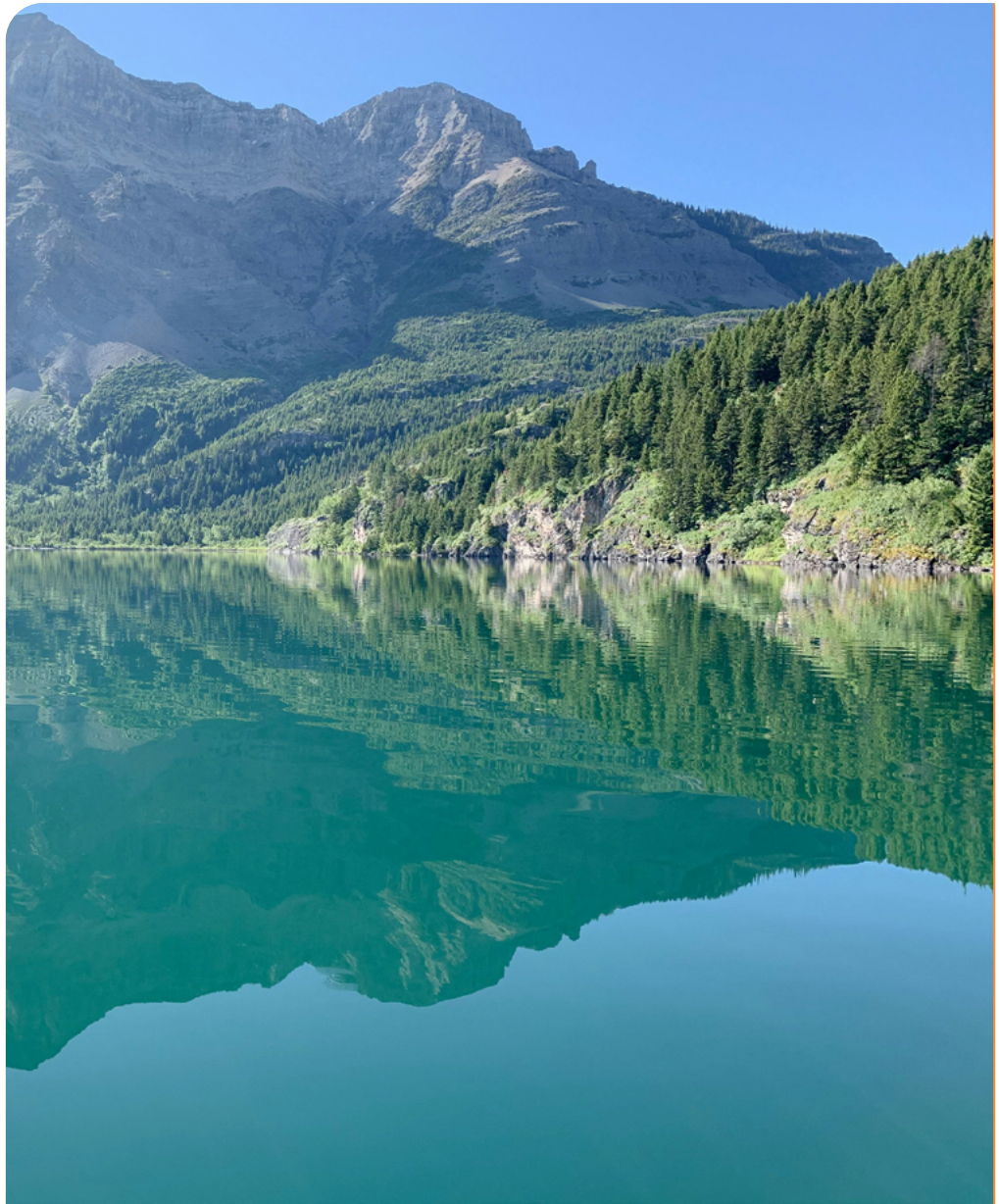
- The Board of Directors is the corporate body who exerts the highest governance and is responsible for making decisions on various corporate issues, which include sustainability. To ensure sustainable development, the body listens to the implementation of all kinds of sustainable tasks, containing climate change risk management, from Sustainable Development Committee, discusses opinions on such tasks, and gives directions taken in devising sustainable strategies.
- The Board of Directors reviews not only the annual budget, business plans, and major capital expenditures, but also executive plans regarding and expenditures incurred by climate change-related risks and opportunities for the Company.
- The Board of Directors and the Compensation Committee regularly evaluate and determine the remuneration of directors and managers, by taking into account not only individual performance and the Company's operating results, but also non-financial sustainability performance related to economic, environmental, and human impacts.

Sustainable Development Committee:

- The Sustainable Development Committee is responsible for driving the implementation and management of climate change risks and opportunities. It reports to the Board of Directors twice a year on the operational risk issues related to corporate governance and sustainable development (including climate change issues), risk assessment and control measures to facilitate decision-making of the Board of Directors on important issues.
- The Sustainable Development Committee is responsible for implementing the climate change management policy, made annually, and major resolutions, reviewed by the Board of Directors. It has set up various working groups under its supervision, responsible for mitigating climate change risks and capitalizing on opportunities.

Finance Center:

- The Finance Center is responsible for tracking information on global climate change development trends on a regular basis and enhancing the awareness of global risk trends and climate change among the Company's colleagues.
- The Finance Center is responsible for identifying and assessing the risks and opportunities of climate change. It regularly coordinates climate change discussion meetings, convenes the risk management team to identify the physical risks, transition risks and opportunities of climate change, and leads the formulation of corresponding improvement measures to strengthen the management of climate risks and opportunities.



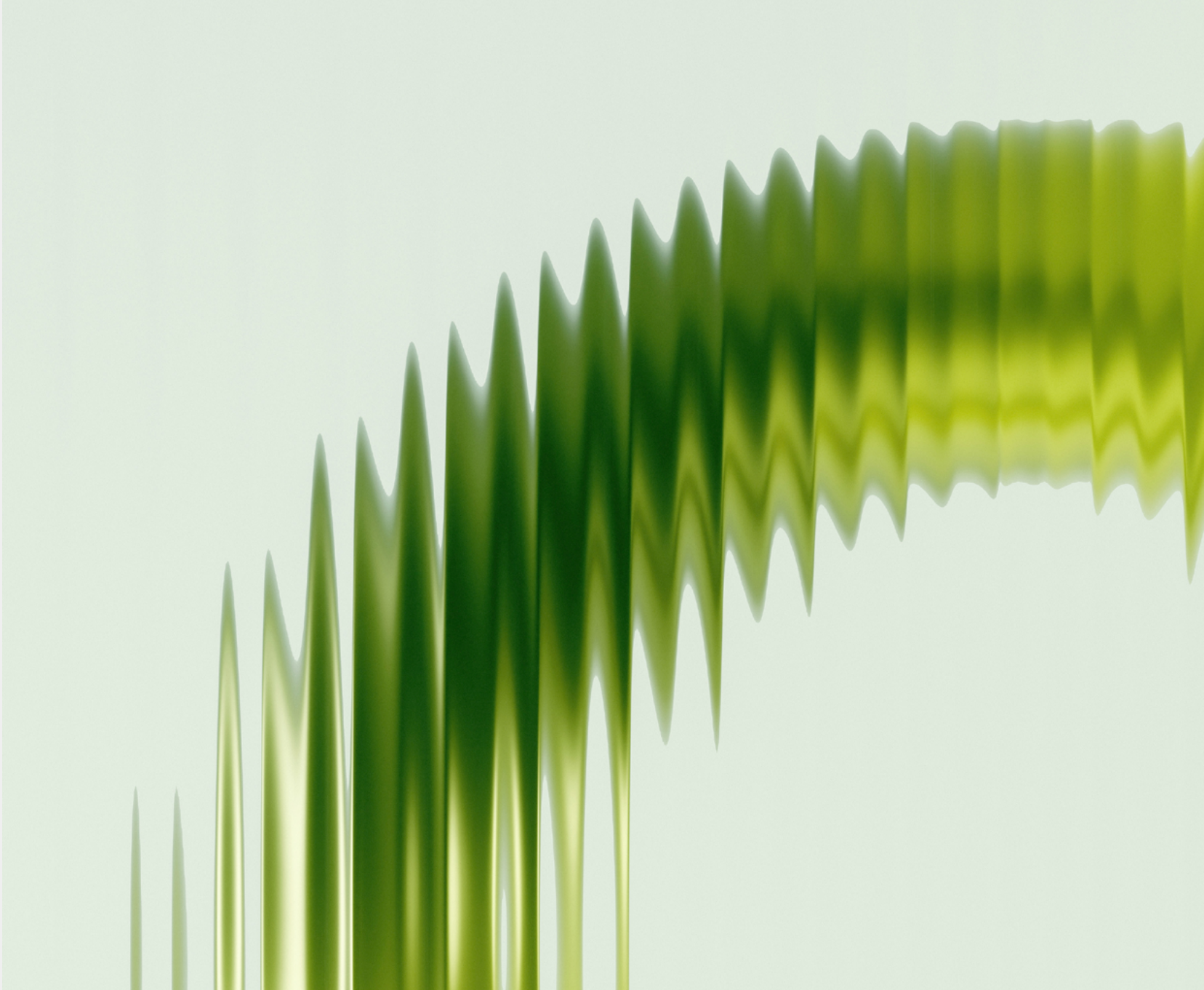
02

Management of Climate Change-related Risks and Opportunities

Identification Process of Climate Change-related Risks and Opportunities

Management of Climate Change Risks and Opportunities

Risk and Opportunity Scenario Analysis



Management of Climate Change-related Risks and Opportunities

Identification Process of Climate Change-related Risks and Opportunities

- To effectively manage climate-related risks and opportunities, the Finance Center of the Company incorporates climate change-related risks into the enterprise overall risk management and pays attention to climate risks that may impact operations, including global regulatory requirements, extreme weather events, etc. Moreover, the Finance Center estimates financial impacts and management costs, realigns management mechanism, and proposes strategies to enhance the Company's operational resilience.
- All departments work together to conduct climate risk assessment and comprehensively evaluate the potential impacts of related risks on operational processes. Through education and training, we enhance colleagues' awareness of global risk trends and climate change, and guide them to identify risks and opportunities associated with climate change they may face and to assess the likelihood, impacts and consequences of those risks and opportunities.
- To establish a climate risk management mechanism and formulate strategies to address such risk, the Company holds a second meeting that department heads or colleagues who are familiar with the business processes of their departments are invited to attend. At the meeting, the participants identify the high risks and high-severity risks that highly related to their department, from the risks and opportunities that are previously compiled, and develop appropriate management strategies (e.g., mitigation, transfer, acceptance, or control) to address these risks.

★ Identification Process of Climate Change-related Risks and Opportunities

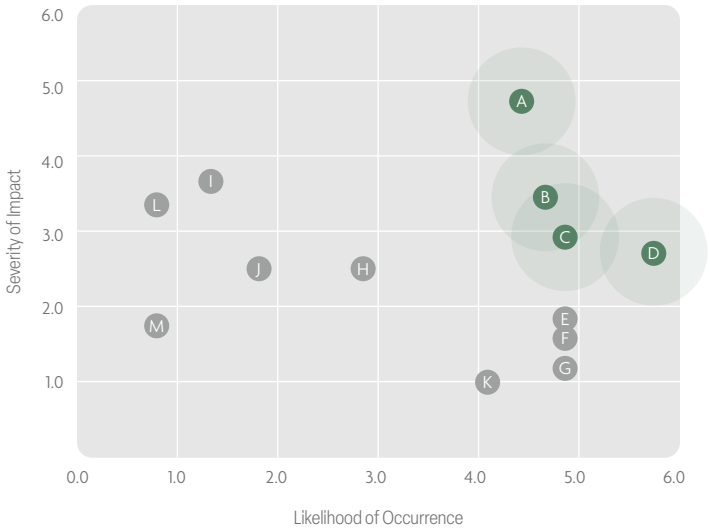
1	Collect	Collect climate change risk/opportunity lists	→ Identify climate-related risks and opportunities using scenario analysis and internal and external information
2	Identify	Hold TCFD workshop	→ Each department assesses climate change risk and opportunity factors that may have the greatest impact on their business
		Compile identification results	→ The Finance Center consolidates climate change risk and opportunity factors relevant to the business of each department
3	Identify Materiality	Develop climate change risk/opportunity matrix	→ Estimate the probability and the severity of impact of each climate change risk and opportunity, and develop corresponding matrix
4	Strategy and Financial Impacts	Formulate strategy	→ Responsible units formulate strategies for responding to material climate risks and opportunities
		Calculate financial impacts	→ Responsible units calculate the financial impact of risks/opportunities and expenses required to address the impact
		Establish metrics and targets	→ Responsible units set corresponding metrics and targets to assess the implementation of these strategies
		Climate change management policy and related tasks	→ The Sustainable Development Committee regularly monitors the implementation and periodically submits progress reports to the Board of Directors so that the Board of Directors can evaluate whether the performance meets the established goals

★ Assessment Standard

Dimension of Risk Likelihood Assessment	Dimension of Risk Impact Assessment	Dimension of Opportunity Likelihood Assessment	Dimension of Opportunity Impact Assessment
Previous risk experience Potential timing of future risks Likelihood of future risks	Operational impact Reputational impact People impact Early warning Magnitude of financial impact	Previous opportunity experience Potential timing of future opportunities Likelihood of future opportunities	Reputational impact Magnitude of financial impact

Management of Climate Change Risks and Opportunities

★ Climate Change-related Risk Matrix



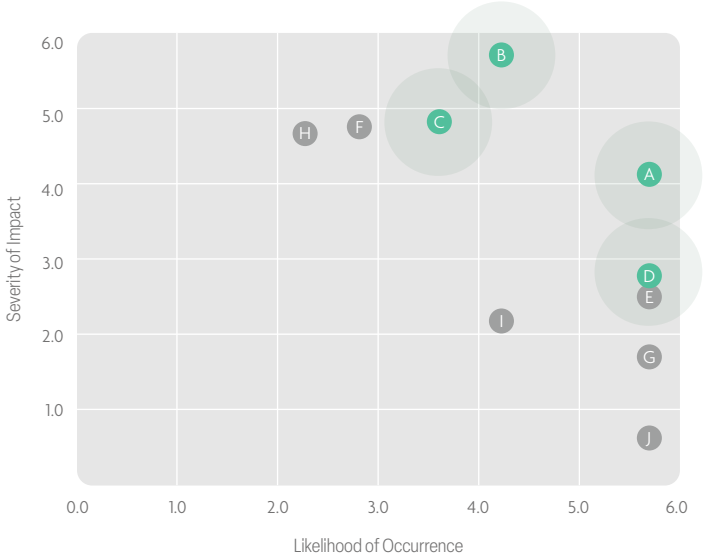
- A Increased severity of extreme weather events such as typhoons and droughts
- B Costs of transitioning to low-carbon technologies
- C Increase in greenhouse gas emission pricing
- D Rising average temperature
- E Changing customer behavior
- F Rising raw material costs
- G Failure in new technology investment
- H Replacing existing products and services with low-carbon alternatives
- I Changes in rainfall (water) patterns and extreme changes in climate patterns
- J Facing litigation risks
- K Strengthened emission reporting obligations
- L Shifting consumer preferences
- M Rising concern and increasing negative feedback from stakeholders

★ Summary of Climate Change Risk Identification

Risk Ranking	Risk Number	Risk Type	Risk Factor	Estimated Time Horizon
1	001	Physical risk - Acute	Increased severity of extreme weather events such as typhoons and droughts	Short term
2	002	Transition Risk - Technology	Costs of transitioning to low-carbon technologies	Short term, medium term
3	003	Transition Risk - Policy and Legal	Increase in greenhouse gas emission pricing	Short term
4	004	Physical Risk - Chronic	Rising average temperature	Short term, medium term

Note: Definition of time horizon - Short-term: 2024, Medium-term: 2025, Long-term: 2026-2030.

★ Climate Change-related Opportunity Matrix



- A Energy substitution/diversification
- B Development of new products and R&D and innovation in services
- C Participation in incentive schemes
- D Developing climate adaptation solutions
- E Utilizing new technologies
- F Entering new markets
- G Adoption of more efficient production and distribution processes
- H Participation in the carbon trading market
- I Use of renewable energy and adoption of energy saving measures
- J Utilization of more energy-efficient buildings

★ Summary of Climate Change Opportunity Identification

Opportunity Ranking	Opportunity Number	Opportunity Type	Opportunity Factor	Estimated Time Horizon
1	001	Opportunity - Resilience	Energy substitution/diversification	Short term, medium term
2	002	Opportunity - Products and Services	Development of new products and R&D and innovation in services	Short term, medium term
3	003	Opportunity - Market	Participation in incentive schemes	Medium term
4	004	Opportunity - Products and Services	Developing climate adaptation solutions	Short term, medium term

Note: Definition of time horizon - Short-term: 2024, Medium-term: 2025, Long-term: 2026-2030.

Risk and Opportunity Scenario Analysis

Following TCFD guidance, Nuvoton referenced four climate change scenarios to complete the identification of climate-related risks and opportunities.

Type of Climate-related Risks and Opportunities	Scenario Selected for Devising Strategy	Scenario Description
1. Transition Risk 2. Opportunity Risk	• NDC: The Nationally Determined Contributions of the R.O.C. • IEA Net zero Emissions by 2050 (NZE 2050)	• The Nationally Determined Contributions (NDC) of the R.O.C. aims to limit the global temperature increase to 1.5, so the Company is facing the risks associated with the low-carbon transition. • The analysis is based on the scenarios provided by the International Energy Agency (IEA) World Energy Outlook (WEO), under which global warming is under control and increase in temperature will be no more than 1.5.
Physical Risk	• IPCC AR6 Warming Scenario SSP3-7.0 • IPCC AR6 Warming Scenario SSP5-8.5	• We assess the climate risks that the Company may encounter based on the scenarios used in the Sixth Assessment Report (AR6) published by the Intergovernmental Panel on Climate Change (IPCC) in August 2021. The Shared Socioeconomic Pathways (SSP) 3-7.0 represent medium to high emissions scenarios where global GHG emissions are projected to peak by 2060. • Under the extremely high GHG emissions scenario SSP5-8.5, climate change will result in intensified changes in future average temperatures, extreme heat, annual total rainfall, annual maximum 1-day rainstorm intensity, maximum number of consecutive dry days, and the proportion of strong typhoons, which may have impacts on the operations of the Company and across the value chain.

After completing the identification of climate risks and opportunities, Nuvoton has short-listed 4 high-risk factors and 4 high-opportunity factors based on the "likelihood of occurrence" and "severity of impact" of these risks and opportunities. The climate change risk matrix and opportunity matrix are shown below:

★ Identification Process of Climate Change-related Risks and Opportunities

A — Developing Climate Change Scenarios

Based on our operating conditions and locations, we develop four climate change scenarios to assess climate-related risks and opportunities.

B — Assessing Impacts on Business Operation

Assess the impacts and implications that climate change may have on our operation and stakeholders.

C — Identifying Climate Risks and Opportunities

- Identify climate-related risks and opportunities via the risk and opportunity assessment form.
- Establish risk and opportunity matrices to determine key climate risks and opportunities.

Impacts:

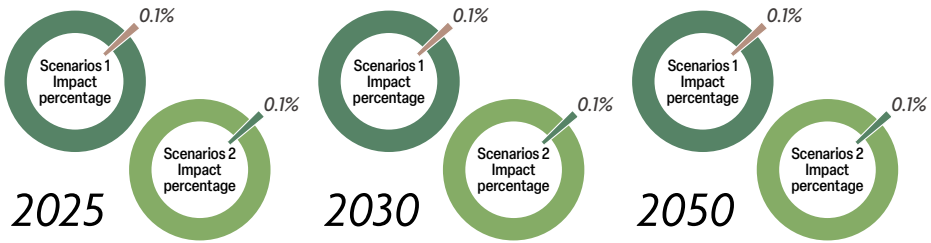
Changing climate patterns have led to an increase in the frequency and the severity of impact of floods and droughts, in turn heightening the likelihood of damage to machinery equipment and factories. Under these circumstances, the operations of the Company will be affected by multiple factors, including disruptions in its own production operation, upstream and downstream manufacturers in the supply chain, and transportation. These factors will result in financial losses and physical damage, while increasing operating costs and affecting the efficiency of operations, ultimately leading to a decline in the Company's revenue.

Scenarios:

Scenario 1: IPCC AR6 Global Warming Worst-case Scenario SSP5-8.5
Scenario 2: IPCC AR6 High Emissions Scenario SSP3-7.0

Using the forecast data from the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) developed by the Ministry of Science and Technology and the National Science and Technology Center for Disaster Reduction, we assess the financial impacts that increased severity of extreme climate has on both Nuvoton and Nuvoton Corporation Japan under the two scenarios mentioned above.

★ Potential Financial Impacts [1]



[1] Potential financial impact here is measured by the percentage of impact in monetary value to group total revenue in 2022

Impact Dimension

1. **Due to the drought, the government restricts industrial water usage, which leads to reduced production capacity of the factory because of water shortage, resulting in a decrease in revenue:** Depending on the severity of drought, the factory is required to carry out autonomous water conservation measures with different water-saving ratios, ranging from 5% to 7%, which increase as the circumstances of drought become more severe. If the water conservation plan implemented within the factory is not able to meet the required water-saving ratios, the Company may face water shortage issue and thus has to constraint or cut its production. Additionally, raw material suppliers may be unable to deliver goods as scheduled due to production constraints caused by water shortages, leading to delays in the Company's production.
2. **Increased costs of finding alternative water sources as a result of water scarcity:** Facing the issue of water scarcity, the factory may need to seek alternative water sources or process wastewater for reuse, incurring additional costs. These costs will be passed on to customers, thereby increasing the sales amount of products. Raw material suppliers also need to purchase water from external sources due to water scarcity. The cost of external purchases will then be passed on to the Company, leading to an increase in procurement costs.
3. **Water shortage has an impact on on-site services:** The water supply for people's livelihood in the factory area is impacted. The provision of services such as pantries, restrooms, kitchens and cafeterias, and fitness centers may be suspended.
4. **Disruption in operations and decrease in revenue:** Extreme weather events may have impacts on our own operations or operating locations of suppliers. These impacts may give rise to disruptions in supply chain or difficulties in maintaining normal operations, resulting in a halt in the Company's production. Consequently, the Company's revenue will be affected and decrease.
5. **Increased operating costs due to repair and maintenance of machinery and facilities:** As a result of extreme weather machinery and factory facilities may be damaged and the Company will incur more maintenance fees and operating costs.
6. **Increased operating costs for the supply chain due to the impacts of extreme weather:** Suppliers who experience impacts from extreme weather events or implement mitigation measures may incur additional operating costs, resulting in increased procurement costs for the Company.
7. **Reputation impacts:** Customers are concerned about product quality and on-time deliveryand thus transfer their orders or placing orders among a number of vendors. Based on their assessments, investors or financial institutions may be skeptical about the Company's business outlook given that water shortages are likely to impact the Company, and therefore become less willing to make investments.

Strategy addressing the risk

1. **Investment in water storage facility:** Invest and build water storage facilities and water treatment plants.
2. **Supply chain management:** Identify suppliers who are vulnerable to extreme climate impacts, request them to strengthen their Business Continuity Plans (BCP), and assist them in mitigating the impacts of climate change; Conduct assessments on the market supply of specific raw materials every three years to enhance supply chain resilience.
3. **Strengthening operational resilience:** Develop or utilize climate monitoring equipment such as weather simulators and observation instruments and implement extreme weather contingency measures timely to minimize potential impacts and financial losses; Increase investment that can strengthen the resilience of buildings against extreme weather and establish backup power to ensure continuous operations.

Costs incurred to address the risk: NT$296 million

Impacts:

Given the requirements of greenhouse gas reduction become increasingly stringent, the Company will need to invest additional capital expenditure in research and development of low-carbon products and services in order to provide green offerings. Research and development of green products will increase R&D expenses. However, failure to replace existing products and services with low-carbon alternatives may lead to customer loss, resulting in a decline in revenue.

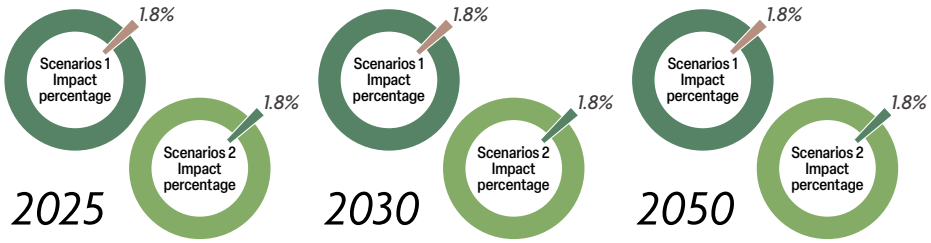
Scenarios:

Scenario 1: NZE proposed in IEA WEO 2022

Scenario 2: The Nationally Determined Contributions of the R.O.C.

In both scenarios, companies across industries initiate their net zero emission strategies and comprehensively call for carbon emission reductions at the value chain level. We assess the potential financial impacts on the Company under these scenarios respectively.

★ Potential Financial Impacts



Impact Dimension

1. **Developing low-carbon products drives R&D expenses higher:** Companies need to boost R&D spending to develop new products that not only consume less energy but also remain or even surpass the performance efficiency of existing products in order to meet low-carbon demands. If the pursuit of energy savings compromises the competitiveness of the product and leads to waste of manpower and time, additional R&D expenses may incur. Some low-carbon technologies are still at the development stage; as a result, the immature and unstable technology may result in project delays, unstable performance or the need for frequent maintenance and adjustments, generating additional operating costs. Each country has its own unique requirement for energy conservation. It is necessary to continue to pay attention to the changes in energy conservation standards across the globe and develop efficient products with adaptable functionalities based on different energy conservation standards. As the products are developed mainly based on the judgment of oversea branches and manufactured locally, the product portfolio is expected to expand, resulting in an increase in operating costs.
2. **Increased production costs due to adoption of new technologies:** Companies need to transform their manufacturing processes to reduce product energy consumption while maintaining existing product performance. For the Company, the manufacturing process conversion requires effort of related experiments. Additionally, in order to smoothly adopt new low-carbon technologies, employees may need training to get themselves familiar with new workflows and operations, boosting the expenses of employee training. Outside the factory, a costly manufacturing process is required. The software and hardware such as more accurate and faster simulation software or more precise measurement instruments for advanced processes will cost more money. Even if the unit input cost is expected to drop in the future due to widespread adoption of the process, there will still be related additional costs and expenses. Due to the limited capacity of the advanced processes and advanced packaging in the supply chain, any disruption or delay in the supply chain will affect the Company's ability to acquire business and clients, and hence pose more risks to the stability of the Company's profitability.
3. **Decreased revenue due to failure to provide low-carbon products that meet customer expectations:** If customers demand low-carbon products and the carbon footprints of the products produced by the Company do not meet customers' requirement, product demand may decrease. During the R&D process in which carbon footprints of products are reduced through lower energy consumption, if the competitiveness of the products is compromised because of the effort to reduce energy consumption, the low-carbon products will not meet customers' requirement, thus impacting product sales and the Company's operating income. Moreover, a trust crisis among clients may occur and thus jeopardize the Company's reputation. Failure to capture the energy-saving market and provide energy-saving products may result in the loss of sales opportunities and reduction in profits, such as the decline in sales of energy-saving semiconductor products used in both electric vehicles and electric motor control.
4. **Decreased revenue due to disruptions in operation:** In terms of operations, transitioning to low-carbon practices such as adopting electric vehicles for transportation and reducing machine power consumption in the design process will increase operating costs.
5. **Increased operating costs due to machinery equipment and factory maintenance:** Under the impact of carbon taxes and fees, suppliers will reflect the incremental costs in the unit prices of materials, resulting in increased operating costs for the Company.

Strategy addressing the risk

1. **Preliminary market demand research:** Conduct assessments on the compliance risks associated with energy efficiency laws and regulations in various countries and develop production plans for each market. Proactively understand market demand and consumer preferences to enhance our grasp of customer needs and ensure that low-carbon products are in line with the market demand so that the time required for adjusting product design can be reduced. Place R&D focus on innovation and optimization of low-carbon products to improve product performance, reduce costs, and gain acceptability in the market. Planning ahead and responding to changes in energy efficiency standards in various countries, the Company is committed to developing products with minimized area and lower greenhouse gas emissions, and producing green products that comply with the requirements of energy efficiency in various markets across the globe.
2. **Improving design and production efficiency:** Drive digital transformation and introduce artificial intelligence technology to improve the efficiency of low-carbon design and reduce the potential development costs and negative financial impacts arising from the increase in the number of products developed. Strengthen the digital transformation across operations, including procurement and logistics, and evaluate projects that can enhance the resilience of the supply chain in each region to meet the product demands of customers in different regions.
3. **Enhancing the resilience of the supply chain:** Evaluate the capabilities and reliability of suppliers, select partners that meet environmental requirements, and establish long-term and stable partnerships with them. Conduct risk assessments on the supply chain and establishes contingency plans for supply chain disruptions to ensure the stability and reliability of the supply chain.
4. **Appropriate capital allocation:** As a result of increased capital expenditures for low-carbon transition, capital allocation will need to be readjusted, and financing plans may also be revised to ensure the stability of initial cash inflow for investment.

Costs incurred to address the risk: NT$166 million

Impacts:

As regulations related to greenhouse gas reduction become increasingly stringent and greenhouse gas emission pricing rises, if regulatory scrutiny continues to increase, the Company will see an increase in carbon taxes and carbon fees and thus face the pressure of higher greenhouse gas management costs. Greenhouse gas emissions generated during business operations may be subject to carbon taxes/carbon fees and hence the operating expenses are expected to increase. Managing greenhouse gas emissions will also add to operating costs.

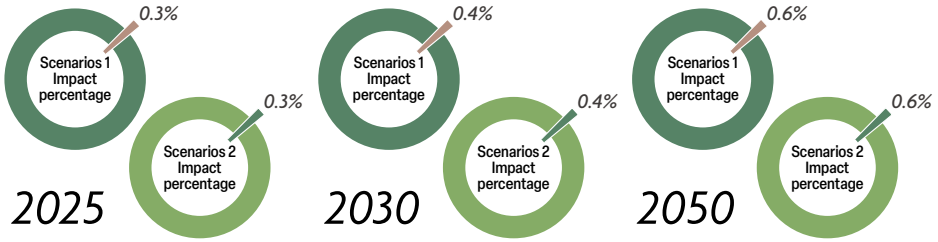
Scenarios:

Scenario 1: NZE proposed in IEA WEO 2022

Scenario 2: The Nationally Determined Contributions of the R.O.C.

Under the above two scenarios, we assess the financial impacts on the Company based on estimated carbon pricing in various countries of different times.

★ Potential Financial Impacts



Impact Dimension

1. **The increase in operating costs is reflected in product selling prices, resulting in a decrease in revenue:** The imposition of carbon fees increases operating costs. Additionally, the related system installation and inspection expenses associated with the organization carbon inventory and product carbon footprint verification further add to the operating costs. These additional costs may need to be passed on to consumers in the form of higher product prices. As a result, consumer demand may reduce, the market competitiveness of the product will be negatively impacted, and a decrease in sales volume and revenue will thereby arise.
2. **Increased raw material costs in response to the requirements of greenhouse gas emissions:** To comply with greenhouse gas emission-related policies, customers demand low-carbon services from the supply chain and require information on greenhouse gas emissions. The supply chain places greater emphasis on sustainability and environmental initiatives, including prioritizing the use of low-carbon emission raw materials, adopting energy-efficient manufacturing processes, and employing green logistics methods to enhance the company's environmental image. Relevant incremental costs may be reflected in the selling prices of raw materials, driving up procurement costs for the Company.
3. **Greater uncertainty stemming from supply chain risks:** The semiconductor industry has a global supply chain that spans many countries and regions. When some countries implement different greenhouse gas emission pricing policies, it may cause disruptions, adjustments or restructuring of the supply chain, affecting production and delivery schedules and thus increasing uncertainty and risks across the supply chain.

Strategy addressing the risk

1. **Increasing investment in low-carbon equipment:** Install equipment with Fluorinated GHG reduction technologies to reduce greenhouse gas emissions.
2. **Enhancing supply chain resilience:** Ensure diversified sources of raw material supply, and seek alternative raw materials or modify product design to reduce reliance on specific raw materials to mitigate the risks associated with raw material costs. Establish long-term and stable supply chain relationships to minimize the impact of raw material price fluctuations on the Company.

Costs incurred to address the risk: NT$524 million

Impacts:

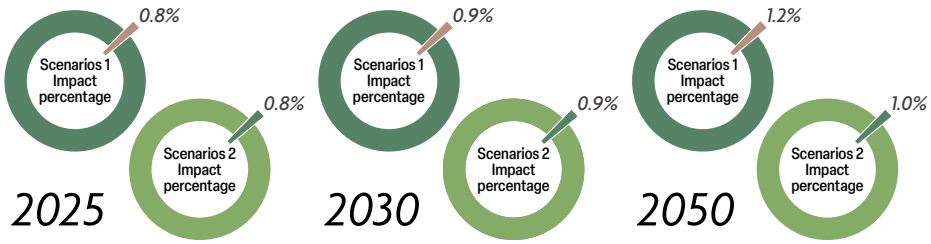
Rising surface temperatures and an increase in the number of hot days put employees at increased risk of heat-related illnesses such as heat exhaustion. Rising temperatures also lead to increased demand for electricity. High temperatures reduce employee productivity, increase health hazards for employees, and increase electricity consumption during operation, thereby boosting operating expenses.

Scenarios:

Scenario 1: IPCC AR6 Global Warming Worst-case Scenario SSP5-8.5
Scenario 2: IPCC AR6 High Emissions Scenario SSP3-7.0

Using the forecast data from the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) developed by the Ministry of Science and Technology and the National Science and Technology Center for Disaster Reduction, we assess the financial impacts on both Nuvoton and Nuvoton Corporation Japan under two scenarios in which the severity of extreme climate increases.

★ Potential Financial Impacts



Impact Dimension

1. **Rising average temperature poses greater risks associated with disease transmission and health and safety, leading to higher labor costs:** Regarding the impact on human health, there is an increase in heatstroke, individual diseases (such as cardiovascular and respiratory diseases), and animal-borne infectious diseases (such as malaria, dengue fever, etc.) and employees are exposed to the risk of health hazards. Consequently, labor supply may be at shortage, pushing up labor costs and product prices. When operational processes, including procurement, production, warehousing and logistics, are handled manually, sales may be impacted by delivery issues and product prices.
2. **Increased operating costs due to summer high temperatures:** High temperatures in summer give rise to increased air conditioning costs and electricity consumption, resulting in higher operating costs.

Strategy addressing the risk

1. **Increase investment in the health and safety improvement in the operating environment to avoid health hazards.**
2. **Identify potential risks of global warming on a regular basis and improve human resources management.**

Costs incurred to address the risk: NT$110 million

Scenario:

The Company develops low-carbon products and services to address growing customer demand for such products. The Company also helps customers enhance the energy efficiency of the products so as to satisfy customer needs and improve customer relationships. This will lead to an increase in revenue streams from low-carbon products. Additionally, miniaturization in product development and design are expected to reduce production costs.

Impact Dimension

1. **Diversifying energy sources to reduce operational risks:** By incorporating diverse energy sources such as solar power generation, the use of natural gas in exhaust gas treatment equipment for fluorine-containing gases, and replacing electric boilers with natural gas boilers, the Company can mitigate operational disruptions caused by power outages.
2. **Meeting customers' requirement of green/low-carbon products to increase revenue:** Adopting low-carbon energy not only complies with customers' requirement of low-carbon products but also reduces emissions of air pollutants, such as sulfides, nitrogen oxides and particulate matter. The adoption of low-carbon energy can also reflect the Company's commitment to energy transformation and environmental protection, enhancing its corporate image. It also helps increase trust among existing customers and attract new ones, thereby boosting revenue. Additionally, continuous investment in the research and development of low-carbon green products ensures ongoing compliance with customers' low-carbon requirement. This not only reduces greenhouse gas emissions during the use of end products but also helps customers reduce their carbon footprint, aligning with industry trends and further increasing operating income.
3. **Reducing carbon emissions in the supply chain to decrease the cost of GHG emissions and to increase profits:** By mandating suppliers to utilize low-carbon or alternative energy sources, a low-carbon supply chain is established with effectively reduced Scope 3 greenhouse gas emissions. A low-carbon supply chain facilitates the provision of low-carbon products that meet the expectations of both customers and other stakeholders, thereby increasing operating income.
4. **Mature low-carbon technology is expected to reduce operating expenses:** Using low-carbon energy can reduce greenhouse gas emissions and lower the costs associated with carbon taxes and carbon fees. While initially utilizing low-carbon energy may increase operating expenses, as low-carbon energy technology matures, costs may decrease in the long term. Investing in the development of low-carbon products facilitates reduced power consumption in end products.

Strategy addressing the risk

1. **Establishment of in-house renewable energy generation capacity:** Installation of solar power generation systems within the factory premises.
2. **Increasing the utilization of diverse energy sources:** Use natural gas to replace electricity, install exhaust gas treatment equipment for fluorine-containing gases using natural gas, and replace electric boilers with natural gas boilers. Nuvoton Corporation Japan will make a plan to generate solar power in 2024 and increase solar power generation in 2025.
3. **Strengthening greenhouse gas emission management:** In 2024, Nuvoton Corporation Japan will provide customers with a third-party certified carbon footprint report and continue to increase the installation of energy-saving equipment (including LEDs). Suppliers are required to set greenhouse gas reduction targets and update their reduction performance on a regular basis. Moreover, carbon credits(in 2023) and afforestation will be instructed to achieve netzero emissions. The Company will continue to communicate its achievement of carbon footprint reduction with customers to earn their trust.

Scenario:

The Company develops low-carbon products and services in response to the increasing demand from customers for such products. Through assisting customers in improving the energy efficiency of the products, the Company fulfills customer demands, enhances customer relationship, and possibly increases revenue streams from low-carbon products. Furthermore, through miniaturization in product development and design, the Company is able to cut its manufacturing costs.

Impact Dimension

1. **Building up competitive edges with low-carbon products to increase revenue:** Low-carbon development is the future industry trend. With the increasing customer demand for low-carbon products and other products featuring energy efficiency, Internet of Things (IoT), sensors, advanced weather forecasting, etc., developing new low-carbon products and services becomes essential to meet market demands and gain customer trust. This, in turn, enhances the competitiveness of products in the market, increases market share, and improves the Company's position in the industry. By actively promoting low-carbon products and improving energy efficiency, the Company can become an industry leader, driving industry advancement.
2. **Enrich low-carbon technology application to facilitate the entry to new markets:** The launch of low-carbon products increases the diversity in our product portfolio, catering to the needs of different customer segments. Additionally, it opens up new market opportunities and boosts product sales, leading to increased operating income. For instance, in the low-carbon industry, electric vehicles are required to use Power Management IC (PMIC) products, which align with the high-voltage process platform developed by Nuvoton. This assists customers in entering the automotive market, increasing demand for Nuvoton's platform, fostering trust, and building long-term partnerships, ultimately generating operating income.
3. **Enhance corporate reputation:** Investing in low-carbon R&D and improving product energy efficiency, along with promoting low-carbon products, help enhance the Company's sustainability image. For instance, the development of the 3rd gen semiconductor manufacturing platform that performs a higher conversion efficiency can increase product energy efficiency for clients and reduce greenhouse gas emissions. Furthermore, utilizing advanced manufacturing processes and advanced packaging technology to produce new products will lead to an increase in the sales of high value-added products and strengthen the Company's positive corporate image.
4. **Improve low-carbon technologies across the supply chain to reduce production costs:** The development of low-carbon technologies in the automotive and industrial sectors is becoming increasingly mature. With the growing demand for electric vehicles and related industrial products, there will be an expansion in the supply chain and value chain of electric vehicle solutions, leading to lower procurement costs.

Strategy addressing the risk

1. **Increase in Investment in Research and Innovation:** Allocate resources to professional R&D teams to enhance technological innovation and product design. Allocate funds and resources to support the research and production of low-carbon products. Furthermore, the Company will also allocate budgets for the procurement of manufacturing machines; the development of power management chips, electric vehicles and accessories production line, and the 3rd gen semiconductor manufacturing platform; and other aspects such as other products R&D, marketing promotion, and training expenses. Implement artificial intelligence technology to enhance productivity in product design.
2. **Focus on Research on and Innovation in Improvement of Product Efficiency:** Evaluate energy efficiency standards and the demand for green products in various countries and respond promptly. Given the rapid progress in the electric vehicle industry towards low-carbon solutions, it is beneficial to develop semiconductor products used in electric vehicles to increase sales opportunities and profit margins. Expand market presence in various regions and strengthen the supply chain to ensure uninterrupted supply.
3. **Collaboration with Value Chain to Enhance Resilience and Increase New Product Production Capacity:**
   a. Collaborate with suppliers to inventory the carbon emissions and energy consumption of raw materials and products in the supply chain. Prioritize raw materials and products that meet low-carbon and environmental standards as references for low-carbon design to meet customer demand for low-carbon products. The adoption of advanced manufacturing and packaging processes in new products will promote overall technological advancement in the industry and contribute to efforts on decarbonization. At the same time, it will bring more efficient and resource-saving green products to people. For example, the usage of 40-nanometer manufacturing process in new products can minimize product size, enhance product performance, and reduce product energy consumption, resulting in less demand for materials used in production.
   b. Enforce a sustainable supply chain by measuring efficiency indicators such as raw material procurement, production cycles, and logistics, and incorporating environmental impact indicators including carbon emissions, resource consumption, and waste disposal. Regarding the selection of suppliers, conduct thorough due diligence survey on candidates to ensure they meet the company's environmental and quality requirements.
4. **Business Expansion and Marketing Strategy:** By actively expanding sales channels and enhancing marketing promotion, we aim to convey the advantages and value of our low-carbon products to customers, thereby increasing product awareness and market share. At the same time, throughout the product development and operational processes, we will adhere to the principles of sustainable development, focusing on environmental protection and social responsibility, striving to minimize our environmental impact, and enhancing our brand image.

Scenario:

The government has proposed policies to cope with climate change. The Company constantly keeps abreast of government's policies related to energy and environment, and assesses the opportunities to participate in the incentive schemes. By executing relevant initiatives developed based on incentive schemes, the Company can increase revenue or reduce its operating costs.

Impact Dimension

1. **Applying for incentives and receiving subsidies:** By reducing the organization's greenhouse gas emissions, decreasing energy usage, introducing products aligned with low-carbon trends, or participating in renewable energy projects and carbon trading markets, the Company has the opportunity to obtain government incentives, such as cost subsidies, carbon credit incentives, tax exemptions, etc.
2. **Access to investment funding:** Complying with the international financial standards ISO 14097, financial institutions have established carbon emission inventory and tracking mechanisms for the companies they have invested in and financed, and have actively promoted climate action plans and engagement activities to understand the greenhouse gas emission of invested and financed companies to achieve the goals of the Paris Agreement. Therefore, by planning and promoting climate change initiatives, the Company is more likely to receive better loan terms and financing terms issued by financial institutions, reducing financing costs. Additionally, taking proactive actions on climate change and environmental issues enhances the Company's image and reputation.

Strategy addressing the risk

1. **Assessing and planning participation in government incentive schemes:** Continue to pay attention to the government's incentive schemes, coordinate with relevant departments for evaluation, and plan to apply for incentive schemes.
2. **Establishing and implementing greenhouse gas management:** Carry out greenhouse gas inventory and set carbon reduction goals and pathways based on our own operating conditions, implement relevant carbon reduction actions, and communicate and discuss the results with external stakeholders to achieve the purpose of applying for relevant incentive schemes.
3. **Implementing sustainability-related management plans:** Identify and address sustainability risks through self-assessment and stakeholder engagement. Execute risk response and mitigation measures in accordance with the Company's internal risk management workflow, while also aligning with the assessment standards of investment and financing institutions.

Scenario:

Being equipped with resilience to cope with increasingly extreme climate phenomena and events can reduce the risk of operational disruptions, gain customer trust, and enhance reputation, thereby attracting talents. Strengthening operational resilience enhances reputation, attracting customers and thereby contributing to increased revenue.

Impact Dimension

Strengthening operational and supplier resilience: By implementing a Business Continuity Plan (BCP) or Business Continuity Management (BCM) system, the Company can prioritize the production order of key products based on their business criticality. Prioritizing production order ensures a stable supply of products, enhances customer trust, improves reputation, and ultimately increases income. Additionally, implementing the supplier management system and customer management system reduces operating costs.

Strategy addressing the risk

Establish BCP/BCM system, select suppliers that comply with the Company's criteria, and increase the expenses for the development and assessment of such system. Introduce the managerial framework in ISO 14064 and ISO 50001 and obtain such certifications by increasing IT construction and maintenance expenses and engaging in necessary investment for IT and human resources.

03

Climate Change Strategy

Net Zero Pathway

Green Products

Climate Change Strategy

In response to the risks and opportunities posed by extreme weather, Nuvoton, with the vision of "Be a hidden champion in providing sustainable semiconductors to enrich human life", has been proactively undertaking various carbon reduction initiatives and has established greenhouse gas reduction goals for the group. The Company has set up an Energy Conservation Working Group to create a green and low-carbon operating model. Through ongoing technological innovation and R&D capabilities, we aim to improve the path of green manufacturing processes (green semiconductor technology) and refine our green products.

★ Net Zero Pathway

Sites and Scope		Baseline Year Emission (2020)	2025	2030
			Emission	Emission Target
Nuvoton Corporation	Scope 1	66,260	13,549	11,010
	Scope 2	36,313	34,514	32,822
Sub-total		102,573	48,063	43,832
Nuvoton Corporation Japan	Scope 1	33,700	13,367	11,953
	Scope 2	106,635	55,315	53,839
Sub-total		140,335	68,683	65,792
Total		***242,908***	***116,746***	***109,624***

Note: The emissions in 2020 of both Nuvoton Corporation and Nuvoton Corporation Japan are calculated based on the emission factors issued in 2024 by Ministry of Environment.

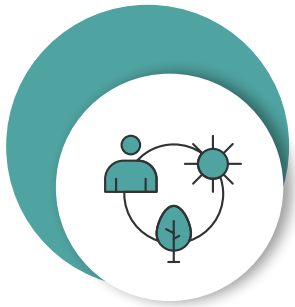
Low Carbon R&D and Investment

Nuvoton continues to invest in cutting-edge manufacturing processes to significantly reduce chip size through manufacturing process advancement, improve resource utilization efficiency, and lower energy consumption and greenhouse gas emissions along with reducing the overall carbon footprint of our products. Advanced manufacturing processes also help enhance product performance and reduce energy consumption. Nuvoton will continue to move towards green products, with the following directions as R&D goals, by continuously investing in advanced manufacturing processes for ongoing process enhancement.

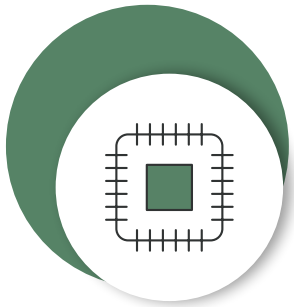
- **Short-Term Goal:** Achieve a growth rate of over 50% in the number of products using advanced manufacturing processes in 2024 compared to 2023.
- **Medium-Term Goal:** Achieve a growth rate of over 60% in the number of products using advanced manufacturing processes in 2024 compared to 2023.

★ Carbon Reduction Strategies

Green Manufacturing Processes



Green Operation



Green Products

Action Plans

- Install local scrubbers that process greenhouse gas emissions
- Develop renewable energy
- Implement carbon pricing
- Enhance energy efficiency
- Carbon reductions at supplier level
- Sustainable products
- IC miniaturization

Achievements

- Installed wet local scrubbers in business units
- Nuvoton Corporation Japan purchased2,366 tons of non-fossil certificate and plans to purchase 10 million kWh/year of green electricity
- OSAT vendors purchased 1 million kWh/year of green electricity
- Nuvoton's parent company expects to own 880,000 kWh/year of green power (solar energy) in 2024
- Set short-term, mid-term, and long-term reduction goals of greenhouse gas emissions
- Requested suppliers to set 2030 reduction targets
- The proportion of sustainable products in the Nuvoton Business Group reached 65%
- The area of our critical computer ECs is now 75% smaller than that of ICs produced in 2019, as a result of the adoption of miniaturized packaging technology in 2021

★ Green Products

Design Phase

Low power consumption design: Product design focuses on reducing operating voltage. Through modification of circuit design, the energy conversion efficiency is improved and the usage of external components is minimized. During the initial development phase of microcontrollers, efforts are made to incorporate power-saving and high-performance designs into the products. Precise control designs tailored to user scenarios are implemented to minimize unnecessary circuit designs. Additionally, logic gates are added to the design of each function to ensure that the microcontroller consumes less power in different usage scenarios and reduces unnecessary leakage currents.

Low power design: Collaborating with computer system vendors on innovation in mobile laptops and high-productivity personal computers, the Company developed various embedded controller (EC) management chips that consume less power, perform high computing capacity, and operate safely. The EC product series has obtained Project Athena, the highest honor certification for ultra-low power design from the third-party Intel Labs, for its outstanding energy-saving performance.

Production Phase

Green manufacturing processes: Through process and equipment optimization, the overall energy savings at the factories in Taiwan reached 111,000 kWh in 2022.

Packaging material recycling: Nuvoton employs recycled cassettes entirely for IC shipment through the recycling mechanism of the outsourced packaging and test (OSAT) vendors. Recycled trays, instead of new ones, are used as many as possible for product shipments. The life cycle of packaging materials is extended, reducing packaging materials usage and incurred expenses, along with reduction of waste generated.

Transportation Phase

Evaluate and optimize transportation routes to reduce energy consumption.

Usage Phase

Product Efficiency Improvement: For power management and energy storage markets, low-power microcontrollers are used to extend the battery life of electric bicycles, electric motorcycles, major appliances, and energy storage systems, reducing power consumption and minimizing battery damage caused by frequent charging. The low-power next-generation microcontroller M251 chip consumes 20% to 30% less power compared to the previous generation Nano100 chip, achieving energy savings. The EC product series help personal computer users achieve higher productivity while effectively reducing the power consumption of personal computers and lowering their environmental energy demands.

Microcontroller energy saving: Microcontrollers contribute to reducing global carbon emissions from IC manufacturing. Nuvoton assists the traditional and EV manufacturers to develop more efficient vehicle control products with MCUs that are heat resistant, high noise resistant, and small packaging.

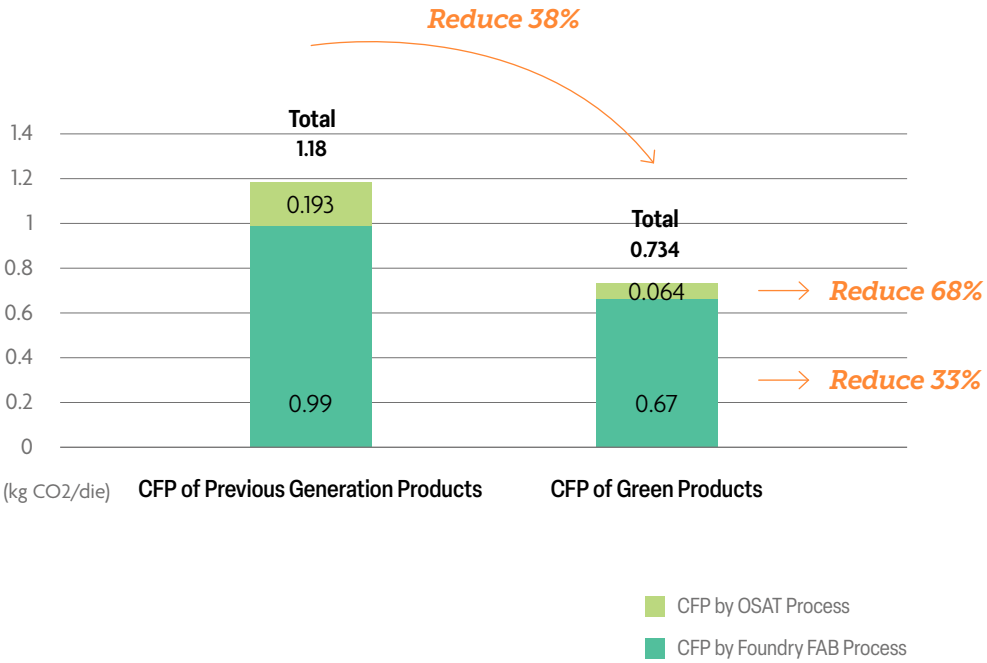
Disposal Phase

IC Miniaturization: The miniaturization of product IC reduces the amount of raw materials used in terminal devices and the amount of discarded wastes, thus lowering the impact on the environment. Nuvoton since 2021 has adopted smaller packaging technology in a large proportion of its critical computer ECs, resulting in an IC area that is 75% smaller than that of ICs produced in 2019.

Green Product Carbon Footprint

To enhance the recognition of low-carbon products and services, Nuvoton calculates the Carbon Footprint (CFP) of green products based on ISO 14067. By reducing the environmental impact of green products, the Company aims to reduce greenhouse gas emissions while simultaneously boosting its revenue growth, so as to achieve the purpose of mitigating impacts arising from climate change.

★ 2023 Nuvoton green product Carbon Footprint (CFP) target is 0.734 kg CO2/die, and -38% reduction performance



04

Climate Change-related Metrics and Targets

Climate Change-related Metrics and Targets

Item	Metrics	Targets
Risk 001 - Increased Severity of Extreme Weather Events Such as Typhoons and Droughts		
Risk assessment	• Conduct risk assessments of each operating site based on SSP5-8.5	▪ 100% operating sites have gone through risk assessment
Risk Mitigation Plan	• Develop or utilize climate monitoring equipment such as weather simulators and observation instruments and implement extreme weather contingency measures timely to minimize potential impacts and financial losses; Increase investment that can strengthen the resilience of buildings against extreme weather and establish backup power to ensure continuous operations • Promote water conservation	▪ 100% operating sites have equipped with backup power ▪ Reduce water consumption by 10% by 2030 (baseline year: 2020)
Risk 002 - Costs of Transitioning to Low-carbon Technologies		
Preliminary market demand research	• Conduct assessments of the compliance risks associated with energy efficiency laws and regulations in various countries and develop production plans tailored to each country's requirements. Proactively understand market demand and consumer preferences to enhance our grasp of customer needs and ensure that low-carbon products are in line with the market demand so as to reduce the time required for adjusting product design; Place R&D focus on innovation and optimization of low-carbon products to improve product performance, reduce costs, and gain acceptability in the market. Planning ahead and responding in advance to changes in energy efficiency standards in various countries, the Company is committed to developing products with minimized area and lower greenhouse gas emissions, and producing green products that comply with the requirements of energy efficiency markets across the globe	▪ Research on market demand is conducted in 60% of our target markets ▪ 100% completion rate of preliminary market demand research before new products are submitted for review
Improving design and production efficiency	• Drive digital transformation and introduce artificial intelligence technology to improve the efficiency of low-carbon design and reduce the potential development costs and negative financial impacts arising from the increase in the number of products developed	▪ Reduce cost of labor involved in product development

Item	Metrics	Targets
Risk 003 - Increase in Greenhouse Gas Emission Pricing		
Establishing a carbon accounting system	• Adopt internal carbon pricing in phases, quantify and commodify greenhouse gas emissions, enhance internal decarbonization incentives,and manage the financial impacts of external policies	▪ Complete the establishment of the carbon accounting system by 2025 ▪ Set internal carbon pricing by 2030
Greenhouse gas reduction	• Actively participate in the domestic carbon credit system to achieve carbon neutrality with high-quality carbon credit • Establish and collect greenhouse gas emissions reduction targets and major suppliers' greenhouse gas emissions reduction targets and baselines used to measure reduction and assist key suppliers without targets in setting greenhouse gas emission reduction targets	The followings will be executed solely in Nuvoton: ▪ Reserve carbon credits of 5,000 tons of carbon by 2027 ▪ Reserve carbon credits that equal to the amount of emission in a year by 2035 ▪ Reduce greenhouse gas emissions from major suppliers by 15% by 2030 (baseline year 2020)
Increasing investment in low-carbon equipment	• Install equipment with Fluorinated GHG reduction technologies to reduce greenhouse gas emissions • Install energy-saving manufacturing equipment to reduce greenhouse gas emissions	▪ Given 2020 as baseline, Scope 1 emission is planned to reduce by more than 73% and 77% by 2025 and 2030 respectively ▪ Given 2020 as baseline, Scope 2 emission is planned to reduce by more than 37% and 39% by 2025 and 2030 respectively
Risk 004 - Rising Average Temperature		
Regular assessment of high temperature risks	• Identify potential risks of global warming and improve human resources management	▪ 100% operating sites have gone through the risk assessment of potential warning
Reducing health risks	• Promote activities to prevent disasters caused by global warming and avoid health hazards	▪ Number of consecutive accident-free days continues to increase

Item	Metrics	Targets
Opportunity 001 - Energy Substitution/Diversification		
Ensuring renewable energy generation capacity	• Install solar power generation systems • Nuvoton Corporation Japan will make a plan to generate solar power in 2024 and increase solar power generation in 2025	▪ In Taiwan, solar power in factories accounts for 1% of total electricity consumption in 2024 ▪ Nuvoton Corporation Japan will purchase solar power by 2025
Increase the utilization of alternative energy sources	• Evaluate alternative energy sources and enhance energy supply resilience; utilize natural gas to replace electricity, install local scrubbers using natural gas, and replace electric boilers with natural gas boilers	The followings will be executed solely in Nuvoton: ▪ Install 2 local scrubbers using natural gas ▪ All energy-saving measures should reduce greenhouse gas emissions by 2% (baseline year 2022)
Opportunity 002 - Development of New Products and R&D and Innovation in Services		
Increase investment in R&D and innovation	• Allocate resources to the professional R&D team to enhance technological innovation and product design; Invest appropriate funds and resources to support the R&D and production of low-carbon products; Allocate budget for the procurement of the procurement of manufacturing machines; the development of power management chips, electric vehicles and accessories production line, and the 3rd gen semiconductor manufacturing platform;and other aspects such as R&D on other products, marketing promotion, and training expenses; Adopt artificial intelligence technology to enhance design productivity	▪ The output value of products of of Nuvoton Corporation Japan that have obtained green labels, energy-saving labels or equivalent labels accounts for 3% of the total output value ▪ Compared with that of previous generations, the carbon footprint of new generation product will be on the decrease
Focus on research on and innovation in improvement of product energy efficiency	• Evaluate energy efficiency standards and the demand for green products in various countries and respond promptly. Given the rapid progress in the electric vehicle industry towards low-carbon solutions, it is beneficial to develop semiconductor products used in electric vehicles to increase sales opportunities and profit margins. Expand market presence in various regions and strengthen the supply chain to ensure uninterrupted supply • Increase the production of green products	

Item	Metrics	Targets
Opportunity 003- Participation in Incentive Schemes		
Implementing sustainability-related management plans	• Identify and address sustainability risks through self-assessment and stakeholder engagement. Execute risk response and mitigation actions in accordance with the Company's internal risk management workflow, while also aligning with the assessment standards of investment and financing institutions • Continuously pay attention to the government's incentive schemes and inform relevant departments of the specific details of incentive schemes to facilitate their assessment	▪ Set sustainable development goals (greenhouse gas reduction measured by absolute value and emission intensity ,energy and resource usage and consumption, waste generation) based on financial institution's evaluation metrics, government policies, and assessments of incentive schemes
Opportunity 004 - Developing Climate Adaptation Measures		
The assessment of the introduction of a system and its application	• By introducing the managerial frameworks of International standards such as ISO 14064, and ISO 50001, and ISO 22301 and obtaining these certifications from third parties, we can establish BCP/BCM system. The system will allow us to manage and strengthen the partnerships with our suppliers and clients and enhance our operational resilience	▪ Obtain ISO 14064 and ISO 50001 certifications that applies only to Nuvoton Corporation Japan ▪ Develop a plan to obtain ISO 22301 certification that applies only to Nuvoton Corporation Japan

Appendix: Climate-Related Information of TWSE/TPEx Listed Company

Item	Corresponding Chapter in the Report
1. Describe the board of directors' and management's oversight and governance of climate-related risks and opportunities	Climate Change Governance
2. Describe how the identified climate risks and opportunities affect the business, strategy, and finances of the business (short, medium, and long term)	Identification Process of Climate Change-related Risks and Opportunities
3. Describe the financial impact of extreme weather events and transformative actions	Risk and Opportunity Scenario Analysis
4. Describe how climate risk identification, assessment, and management processes are integrated into the overall risk management system	Identification Process of Climate Change-related Risks and Opportunities
5. If scenario analysis is used to assess resilience to climate change risks, the scenarios, parameters, assumptions, analysis factors and major financial impacts used should be described	Risk and Opportunity Scenario Analysis
6. If there is a transition plan for managing climate-related risks, describe the content of the plan, and the indicators and targets used to identify and manage physical risks and transition risks	Climate Change-related Metrics and Targets
7. If internal carbon pricing is used as a planning tool, the basis for setting the price should be stated	Climate Change-related Metrics and Targets
8. If climate-related targets have been set, the activities covered, the scope of greenhouse gas emissions, the planning horizon, and the progress achieved each year should be specified. If carbon credits or renewable energy certificates (RECs) are used to achieve relevant targets, the source and quantity of carbon credits or RECs to be offset should be specified	Climate Change-related Metrics and Targets, Net Zero Pathway
9. Greenhouse gas inventory and assurance status (separately fill out in point 1-1 below)	Net Zero Pathway