



Climate change is a global threat to the life of humanity and the health of the planet. It will also affect our business, our customers and our supply chain. The scientific assessment from the United Nations’ Intergovernmental Panel on Climate Change (IPCC) released in 2021 called for urgent deep decarbonization action in this decade in order to avoid the worst climate impacts and maintain a liveable planet.

We believe businesses have an important role to play to fight climate change. We recognize that climate change presents both risks of increased cost and disruption for our business as well as new

opportunities for Murata to create value to our business while meeting the needs of society. The next decade presents immense opportunities to expand our business into new domains, while living out Murata’s mission of contributing to the advancement of society by creating innovative products and solutions.

In this section, we adopted the framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD) to discuss in detail the risks and opportunities brought by climate change and our strategy in responding to these risks and opportunities.

GOVERNANCE

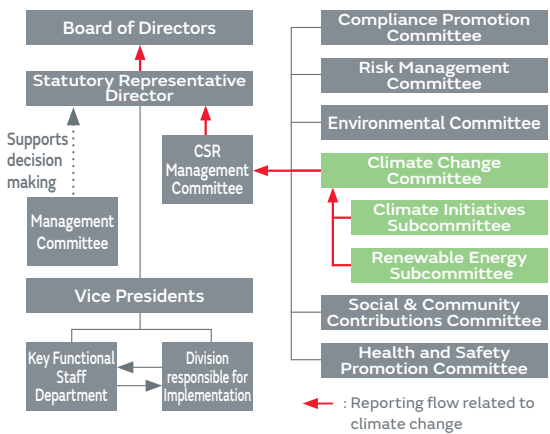
Murata is strengthening its governance in the fight against climate change. The Board has overall accountability for the management of all risks and opportunities, including climate change. Our President and an Executive Vice President, who are Executive Directors of the Board, chair Murata’s CSR Management Committee and Climate Change Committee respectively and are ultimately accountable for the oversight of our climate change agenda.

The Climate Change Committee is responsible for governing Murata’s overall strategies in response to climate change and monitoring the delivery of climate-related targets across the Murata group of businesses. The Committee, comprising heads of manufacturing operations, environment department, research & development and other business functions, meets at least twice a year, with additional meetings on selected topics. The agenda items discussed in fiscal 2020 included strategic initiatives to reduce GHG emissions at manufacturing operations, the development of lighter, thinner, and more efficient products to help our clients meet their carbon reduction targets, as well as progress in setting science-based emissions reduction targets (“SBT”), and the deployment of renewable energy.

The Climate Initiative Subcommittee, chaired by the General Manager of Murata Group’s environment department, with senior managers of relevant departments and business units as its members, supports the Climate Change Committee in deliberating the implementation of climate-related strategies and offering a platform for collaboration and best practice sharing across the Company.

Following the discussion at the Climate Change Committee, Murata made a key decision to become a signatory of the global initiative of RE100, committing to sourcing 100% renewable electricity by 2050. As a result, in fiscal 2021, the Committee set up a new Renewable Energy Subcommittee, with members from Murata’s battery, business

development and environment department, to mobilize effort to drive renewable energy adoption across the Company.



The Climate Change Committee reports different climate-related issues to the CSR Management Committee, which further scrutinizes the issues and reports to the Board of Directors. In its oversight of the Company’s management plans and business strategies, the Board of Directors would take into consideration the risks and opportunities posed by climate change, relevant company policies and the status of current initiatives.

To further enhance the governance of climate change issues and reinforce our focus on long-term value creation, starting from fiscal 2021, we introduced internal carbon pricing, assigning a monetary value to carbon reduction and embedding the value into an investment index. The shadow pricing aims to encourage investment decision-making that supports the reduction of emissions and associated business costs and risks in the long run. Going forward, we will explore incorporating shadow carbon pricing into our management accounting system and the performance evaluation of each department.

STRATEGY

Climate change is an issue of critical importance to Murata. The risks and opportunities brought by climate change are expected to have a significant impact on the sustainable development of our business in the medium and longer-term. To anticipate the potential impact and appropriately incorporate the potential effects in our strategic planning processes, we analyzed how Murata’s key assets and markets would be affected.

Our approach to climate scenario analysis

Two scenarios, with different extent of physical risks and strength of transition measures – one with high level of warming and another with strong policy interventions to limit temperature rise – were selected to assess the resilience of our assets, business strategies and climate change countermeasures.

- 4°C scenario based on IPCC Representative Concentration Pathway (RCP) 8.5, in which climate policy is less ambitious and emissions continue

to rise at current rates, with average global temperature increased by 4°C by 2100. Physical manifestations of climate change are increasingly apparent. Businesses and society at large are exposed to increasing risks of extreme climate hazards, such as extreme heat, typhoons, flooding, drought etc.

- 2°C scenario based on IPCC RCP 2.6, where average global temperature rise by 2100 is kept below 2°C in line with the goal of Paris Agreement, as a result of robust climate policies, supported by the development of innovative technologies, to curb emissions and deploy renewable energy. Physical ramifications of climate change are generally constrained but not avoided.

We focused the assessment on the material physical impacts of climate change to Murata’s business in the year 2030 and 2050, and the risks and opportunities brought forth by evolving policy and regulatory changes as the world aspires to transition to a low-carbon economy.

Our approach to climate scenario analysis (key assumptions and analytical choices):

Approach A mix of quantitative and qualitative methods: <ul style="list-style-type: none">• Quantitative modelling to assess potential direct physical climate impact on Murata’s assets• Qualitative approach to transition impact analysis	Scenarios IPCC RCP 2.6 (2°C scenario) and RCP 8.5 (4°C scenario) were used as base scenarios. <ul style="list-style-type: none">• The physical impact of 10 climate hazards¹ to the selected portfolio of assets• The transition impacts from policy intervention in Murata’s top markets	Scope The assessment covers: <ul style="list-style-type: none">• Direct physical impacts on 20 major manufacturing sites and business facilities• Transition impacts in Murata’s top operating locations and markets (based on revenue)
Timing Given the nature of global warming effect and typical process of public policy formulation, the following time horizons were adopted: <ul style="list-style-type: none">• Medium-term: 2030• Long-term: 2050	Climate models/data sets Referenced an ensemble of peer-reviewed climate models recognized by IPCC and leading climate bodies, such as CMIP5 (Fifth Coupled Model Intercomparison Project) ² , GFS weather forecast model, GPM flood and precipitation data, etc. with AI technology applied to enhance the predictive power of climate modelling	Physical risks <ul style="list-style-type: none">• Examined the direct physical impact of 10 climate hazards to the selected portfolio of assets.• We plan to analyze the impact on the value chain including suppliers and product transportation in the future.
Value-at-risk (VaR) Reflects the estimated financial loss that can incur to the selected portfolio or asset in a year, with a certain probability, if all the estimated hazard events occur under the considered scenarios and period. VaR is estimated based on a macro view of the following two aspects. <ul style="list-style-type: none">• Loss from physical damage to an asset: Evaluated with reference to historical events, asset types and cost of construction for the specific locations• Loss from business interruption: Evaluated based on macro-economic factors such as country GDP, population, land use (e.g. farming, commercial, residential, manufacturing, etc.), urbanization.		Policy <ul style="list-style-type: none">• Referenced relevant climate-related policy intentions and targets announced in Murata’s top operating locations and markets, including national carbon reduction targets, Nationally Determined Contributions (NDCs) for Paris Agreement, etc.• Policies are assumed to be more stringent in the 2°C scenario and less in the 4°C scenario.

¹ Storm surge, rainfall floods, river floods, landslides, typhoons, drought, precipitation, sea-level rise, snowmelt and extreme heat
² Coupled Model Intercomparison Project (CMIP5) is a collaborative framework led by World Climate Research Programme (WCRP) with the aim to foster climate model improvements and support national and international assessments of climate change impact, www.wcrp-climate.org/wgcm-cmip/wgcm-cmip5

Understanding the plausible impacts

The business implications of these climate scenarios were assessed without considering any actions that Murata might take to mitigate or adapt to the evolving circumstances. We outlined the material impacts of these scenarios and included a high-level discussion of how climate change is positioned in our business strategy and our assessment of the resilience of our strategy.

Physical risks			Transition Impact																							
Assessed Murata's top 20 manufacturing sites and business facilities			Assessed major markets (based on sales) and operating locations																							
Assets: Japan, China and South-East Asia			Markets: Japan, China, the USA, European Union, South East Asia and Korea.																							
IMPACTS TO MURATA'S BUSINESS	4°C scenario		2°C scenario		Transition risks	Transition opportunities																				
	<ul style="list-style-type: none">Over 80% increase in the risk of one or a group of these assets being affected by extreme climate hazards in 2050 from that in 2020Risk exposure by types of acute and chronic physical risks:		<ul style="list-style-type: none">25% increase in the risk of one or a group of these assets being affected by extreme climate hazards in 2050 from that in 2020, a 60% point reduction in the increase of risk exposure than that in the 4°C scenarioRisk exposure by types of acute and chronic physical risks:		<table><tr><th>Emerging Trends</th><th>Risks</th></tr><tr><td>Countries with net-zero emissions targets account for over 70% of Murata's sales in fiscal 2020. Although the electronic components industry is not being targeted for heavy regulatory emissions control across the assessed markets, policy interventions is expected to increase over time</td><td>Increase in cost of our production activities</td></tr><tr><td>Most countries have set energy efficiency improvement targets</td><td>Increase in utility costs of production operation.</td></tr><tr><td>Some countries intend to set product energy efficiency standards or carbon import tax</td><td>Increase in the cost of accessing these markets</td></tr></table>	Emerging Trends	Risks	Countries with net-zero emissions targets account for over 70% of Murata's sales in fiscal 2020. Although the electronic components industry is not being targeted for heavy regulatory emissions control across the assessed markets, policy interventions is expected to increase over time	Increase in cost of our production activities	Most countries have set energy efficiency improvement targets	Increase in utility costs of production operation.	Some countries intend to set product energy efficiency standards or carbon import tax	Increase in the cost of accessing these markets	<table><tr><th>Emerging Trends</th><th>Opportunities</th></tr><tr><td>All the assessed economies have set targets for adopting renewable energy and electric vehicles (EV) by 2025 or 2030</td><td>These commitments would fuel a soaring demand for EVs and renewable energy, and hence for Murata's products.</td></tr><tr><td>Over the past 4 years, automobiles sold globally declined by 18%³, but our sales of automotive electronic components increased by 3.7%, reaching 273.2 billion yen in fiscal 2020</td><td>EVs, with rising share in the global automobile market and demanding more electronic components than conventional cars, could generate higher demand for our product lines</td></tr><tr><td>Rising public concern on climate change and policy trends of pursuing a green and smart economic transition globally</td><td>Increase the demand and opportunities for new markets of our compact, energy-efficient electronic components over the medium to long term</td></tr><tr><td>Current NDCs are considered insufficient to limit the rise in global average temperature to below 2°C</td><td>Our innovative technologies and products will play an increasingly important role</td></tr><tr><td>Rising investor interest in green investment in the medium to long term</td><td>Murata's robust environmental management and carbon-efficient innovations will make it appealing to investors</td></tr></table>	Emerging Trends	Opportunities	All the assessed economies have set targets for adopting renewable energy and electric vehicles (EV) by 2025 or 2030	These commitments would fuel a soaring demand for EVs and renewable energy, and hence for Murata's products.	Over the past 4 years, automobiles sold globally declined by 18% ³ , but our sales of automotive electronic components increased by 3.7%, reaching 273.2 billion yen in fiscal 2020	EVs, with rising share in the global automobile market and demanding more electronic components than conventional cars, could generate higher demand for our product lines	Rising public concern on climate change and policy trends of pursuing a green and smart economic transition globally	Increase the demand and opportunities for new markets of our compact, energy-efficient electronic components over the medium to long term	Current NDCs are considered insufficient to limit the rise in global average temperature to below 2°C	Our innovative technologies and products will play an increasingly important role	Rising investor interest in green investment in the medium to long term	Murata's robust environmental management and carbon-efficient innovations will make it appealing to investors
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<ul style="list-style-type: none">Value at Risk (VaR): estimated to be approximately 1 billion yen. We aim to conduct analysis based on Murata-specific information in the future, and depending on the results, VaR may increase.Impact to our operating costs: The ramification of physical impact of climate change will likely cause increased incidences of disruption to our supply and distribution networks and higher prices of raw materials.		<ul style="list-style-type: none">Value at Risk (VaR): estimated to be approximately a few hundred million yen. We aim to conduct analysis based on Murata-specific information in the future, and depending on the results, VaR may increase.Impact to our operating costs: Increased in operating costs will likely come from transition measures, such as emissions restrictions, price of carbon relating to our operation, raw materials and products.																								
(Common for Physical and Transition risks) Company-wide emissions reduction programmes, led by the Climate Change Committee, have resulted in continued reduction of our carbon footprint since 2018.		Additionally, we are developing new internal systems and targets to guide emissions reduction effort.		(Physical risks)	<ul style="list-style-type: none">Positioning the mobility market as opportunity for business growth in our long-term vision “Vision 2030,” as the EV market, with high demand of electronic components, is expected to growSimilarly, harnessing business opportunity related to environmental countermeasures, including working to expand earnings from our battery business, such as from battery storage technologyDeveloping solid-state batteries that can be used in safety-conscious applications, such as consumer wearables, household and power-plant sensorsContinuing to evolve the technology behind our market-leading capacitors and piezoelectric componentsEnhancing our climate-related disclosure, including adopting the TCFD framework, to help communicate more effectively with both domestic and international investors																					
<ul style="list-style-type: none">Energy conservation: Initiatives to lower our demand for electricity, a major source of our emissions, included among others optimizing air-conditioning systems and production facilities’ energy management systems with sensing/IoT technology, and reducing standby power use of equipment, lowering emissions and operating costs.Renewable energy: Introducing solar power generation facilities, purchase of renewable energy (RE) and RE certificates. RE accounted for approximately 400 million kWh (15% of overall electricity use) in fiscal 2020, contributing to curbing around 240 kt-CO₂.		<ul style="list-style-type: none">Internal systems:<ul style="list-style-type: none">An internal carbon pricing system was introduced in 2021 to align investment decision-making with the Company's commitment to emissions reduction.New targets:<ul style="list-style-type: none">Joined RE100, committing to sourcing 50% electricity from renewables by 2030 and 100% by 2050.Plan to set emissions reduction targets in line with the SBTi criteria.		<ul style="list-style-type: none">The assessed VaR, in the range of a few hundred million yen to 1 billion yen, is not expected to have a material impact on the Company's financial position. As a reference, the potential financial loss would account for less than 0.5% of Murata's net profit in fiscal 2020.Business Continuity Plan (BCP) to minimize the impact of hazards on our operations. (▶ P.91 Business continuity management (BCM))																						
		These initiatives will promote product and process innovation internally and contribute to accelerating the transition to a low-carbon economy. In the future, we plan to engage different relevant departments to promote climate change countermeasures across our supply chain to reduce Murata's Scope 3 emissions. (▶ P.75-76 Strengthening Murata's response to climate change)		(Transitional risk)																						
				<ul style="list-style-type: none">The net costs of capital investment projects related to energy saving are considered to be negligible because these projects can generate saving in energy costs over time and hence have a less aggressive threshold on rate of return compared to other investments.																						
RESPONSE AND RESILIENCE OF STRATEGY																										

³ Source: Global sales statistics by International Organization of Motor Vehicle Manufacturers (<https://www.oica.net/category/sales-statistics/>)

RISK MANAGEMENT

CSR Management Committee regularly evaluates the materiality of a wide range of social, environmental, and economic issues through a structured process. In the most recent materiality assessment, climate change was identified as a critical risk and endorsed by the Board of Directors as an important issue that Murata should prioritize management oversight and actions. (▶ P.73 Key issues (materiality) originating from social issues)

On a strategic level, the Climate Change Committee provides oversight on Murata's climate change agenda, including the continuous monitoring of evolving climate-related risks. In fiscal 2021, we started to use scenario analysis to evaluate the potential risks and opportunities of plausible future climate states and the resilience of our business strategy. On the operational level, ISO 14001 is enforced in our production facilities to

assess environmental risks and drive continuous improvement.

Risks arising from climate change are incorporated into company-wide enterprise risk register under the supervision of the CSR Management Committee. For example, guidelines for responding to severe weather conditions are provided in our Business Continuity Plan (BCP) to minimize business disruption. (▶ P.69 Risk Management, ▶ P.91 Business continuity management (BCM))

Our participation in industry associations, such as Japan Climate Leaders' Partnership (JCLP), and global alliances, such as RE100, can help us gather insights into emerging risks and opportunities related to climate change.

METRICS AND TARGETS

We are in the process of setting science-based emissions reduction targets to contribute to the world's effort in keeping average temperature rise at 1.5°C. As a member of RE100, we have committed to achieving 50% electricity from renewable energy installation ratio by 2030 and 100% by 2050.

In fiscal 2021, although our business is expected to grow (sales up 6.3% year on year)⁴, we aim to reduce our Scope 1 and 2 GHG emissions by 2.4% from fiscal 2020 to 1.4 million t-CO₂e. (For a breakdown of our emissions by scope and category, please refer to P. 104.)

Looking ahead, we will expand the scope of climate scenario analysis to provide more comprehensive risks and opportunities assessment. We will formulate plans that take these into account and accelerate the decarbonization of the value chain.

GHG Emissions (kt-CO ₂ e ⁵)	FY2018	FY2019	FY2020
Total emissions	6,074	5,979	5,237
Scope 1	312	307	278
Scope 2 ⁶	1,320	1,302	1,157
Scope 3	4,442	4,371	3,801

Figures are rounded to the nearest unit, so the breakdown and total may not match

⁴ From the business forecast announced on July 29, 2021.
⁵ The approach we use in measuring our emissions (Scopes 1, 2 & 3) are in line with the emissions accounting methodology defined in the GHG Protocol. Our annual emissions data have been reviewed and certified by third-party assurer to ensure consistency and reliability of the emissions data.
⁶ Scope 2 emissions calculation method: Prior to FY2019, Murata's Scope 2 emissions were accounted through location-based method, using average emissions factor of the electricity grid in a specific region. In FY2019, Murata changed to market-based method, using emissions factor of individual electricity grid to account for its Scope 2 emissions.