

Environment

Message from the Director in Charge of Environment

In April 2023, the Company announced the GY 2050 Carbon Neutrality Target and is promoting initiatives based on three measures. Among these, we are focusing on reducing CO₂ emissions and water consumption, which are easy to achieve through independent efforts and contribute to strengthening corporate structure by reducing costs. We are promoting initiatives to reduce CO₂ emissions, such as improving the combustion efficiency of boilers and actively implementing energy-saving equipment using the ICP system, and to reduce water consumption, such by cooling water circulation during battery charging.

We are currently preparing to comply with CSRD and SSBJ and are discussing ways to further improve external evaluations at the management level. In addition, we are enhancing training to raise awareness among managers and suppliers with the aim of accelerating CO₂ emissions reductions, considering updates to our climate change strategy, and conducting research in preparation for complying with the Taskforce on Nature-related Financial Disclosures (TNFD).

Furthermore, as part of our efforts to set Scope 3 emissions reduction targets, we have begun compiling data from Japan and overseas and engaging with suppliers.

We intend to further accelerate our efforts to achieve carbon neutrality, thereby enhancing corporate value and contributing to the realization of a sustainable society.

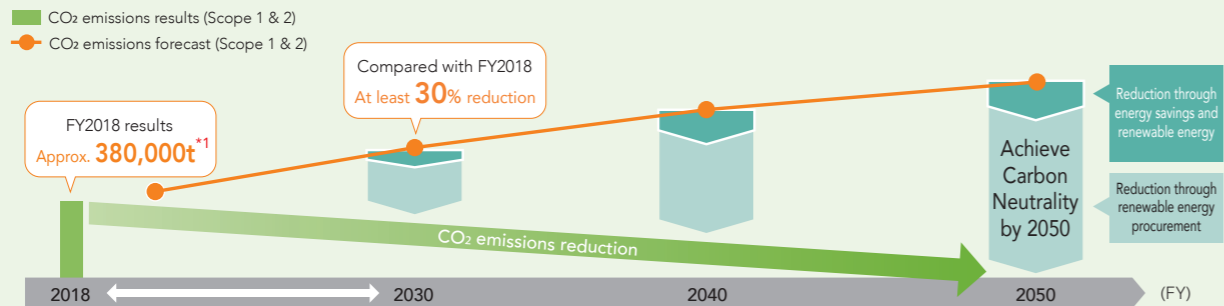
GS Yuasa Corporation
Vice President and Representative Director
Vice President and Representative Director,
GS Yuasa International Ltd.

Masahiro Shibutani

GY 2050 Carbon Neutrality Target

GS Yuasa is pursuing carbon neutrality by FY2050

Roadmap for achieving carbon neutrality



GY 2030 Long-Term Greenhouse Gas Target
Reduce CO₂ emissions by at least 30% compared with FY2018 levels by FY2030

*1 Since adoption of the Sixth Mid-Term Management Plan, the GS Yuasa Group's CO₂ emissions aggregation standards were changed, and we are undergoing third-party re-verification for FY2018.
 (1) Recalculated using the 2018 emission coefficient obtained from the Ministry of the Environment and IEA
 (2) Adopted the control standard as the calculation standard, and consolidated subsidiaries that can be directly influenced are included in the scope of calculation.

Efforts to achieve carbon neutrality

P.78 Contribution to Realization of Low-carbon Society

Promotion of energy-saving measures

- 1 Install energy-saving equipment
- 2 Develop formulas for efficient charging methods and develop new ones



*2 Energy Storage System

Promotion of generating renewable energy

- 1 Maximize implementation in all offices and plants in Japan and overseas
- 2 Introduce our own products including Energy Storage Systems (ESS*) and conduct a demonstration experiment



Procurement of renewable energy

- 1 Purchase electric power that uses renewable energy
- 2 Procure certificates of renewable energy



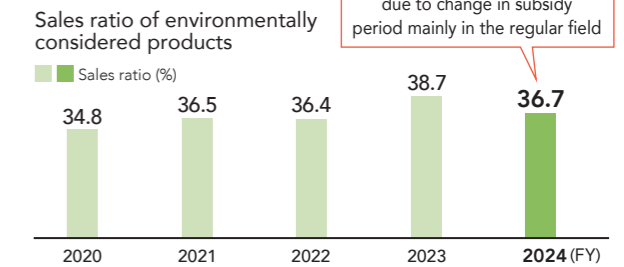
Environment - Environmental Initiatives

Development and Provision of Environmentally Considered Products

The Group's products have a certain impact on the environment at each stage of their life cycle (procurement, manufacturing, transportation, use, and disposal). Therefore, we strive to improve product performance by designing products that reduce environmental impact throughout their entire life cycle (including resource consumption, greenhouse gas emissions, and waste disposal) by taking into consideration factors such as raw material selection, ease of disassembly and segregation, energy conservation, and appropriate labeling. In addition, we will actively promote the development and popularization of products that contribute to reducing greenhouse gas emissions, thereby contributing to curbing global warming.

Popularizing environmentally considered products

We define products that contribute to the prevention of global warming as environmentally considered products, and promote the development and popularization of such products. We incorporate into the Mid-Term Management Plan sales targets for environmentally considered products, making it part of our business strategy to work on climate change through the products we provide to customers.

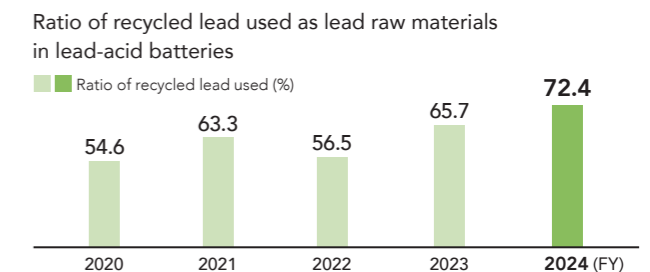


Examples of environmentally considered products

Business sector	Examples of products
Automotive batteries	<ul style="list-style-type: none"> Lead-acid batteries for vehicles with start-stop systems (ISS: idling stop systems) <p>Batteries for ISS vehicles for improving gas mileage by allowing the engine to stop instead of idling to reduce fuel consumption</p>
Industrial batteries and power supplies	<ul style="list-style-type: none"> Power conditioners Lithium-ion batteries <p>Effectively utilizing renewable energy</p>
Automotive lithium-ion batteries	<ul style="list-style-type: none"> Lithium-ion batteries for HEVs Lithium-ion batteries for BEVs and PHEVs <p>Batteries for HEVs, BEVs, and PHEVs installed in electric vehicles and that contribute significantly to reducing greenhouse gases</p>

Increasing usage rate of recycled lead in products

We are working to increase the usage rate of recycled lead—the primary material used in lead-acid batteries, one of our core products. The GS Yuasa Group has been taking action to recycle our post-use products by building and operating a recycling system based on extended producer responsibility (EPR). Going forward, we also plan to strengthen our efforts to promote the use of recycled materials in our products.



TOPICS

Initiatives to preserve biodiversity

The Group recognizes that we receive many benefits from ecosystems at every stage of our operations, from the procurement of raw materials such as lead to the production, distribution, and disposal of our products, while at the same time placing a certain amount of burden on these ecosystems. Therefore, we regard the conservation of biodiversity as a vital commitment for sustainable business operations. Based on this awareness, we have launched an initiative to systematically analyze the relationship between our business activities and nature in order to understand our dependence on and impact on nature and respond appropriately, as of FY2024.

Going forward, we will consider specific measures based on the results of this analysis, further expand the scope of this analysis, and continue to bolster biodiversity conservation efforts across the entire Group.

Environment - Environmental Initiatives


Contribution to Realization of Low-carbon Society

Reduction of CO₂ emissions by promoting Group-wide energy management

The GS Yuasa Group believes that it is important to continuously improve the energy management system associated with its business activities and promote the reduction of greenhouse gas emissions in order to respond to the social changes accompanying the transition to a decarbonized society.

Therefore, with the aim of achieving carbon neutrality and long-term environmental goals by FY2050, we are working to formulate specific action plans, such as promoting energy conservation activities in each business division and installing solar power generation equipment in our own factories, under the leadership of a specialized entity that promotes energy management across the entire Group. In addition, we are continuing to procure renewable energy from the market in order to promote the decarbonization of the electricity used in our own production processes.

Main activities related to energy saving and renewable energy (FY2024)

Category	Items	Main initiatives
Promoting measures to save energy	Review of facility renewal standards	● Formulation of an effective facility renewal plan (utilization of facility management ledger)
	Improvement of production processes	● Improvement of the storage battery charging process ● Consideration of improvements to charging facilities
	Efficient use of production facilities	● Thorough periodic inspections of capacity utilization status
Introduction of solar power generation facility in our own factories	Examination and implementation of the plan to introduce solar power generation facilities	● Consideration of introducing solar power generation systems at business sites and Group companies in Japan 
	Procurement of renewable energy certificates	● Utilization of electricity derived from renewable energy at the Kyoto Plant
Procuring renewable energy from the market	Procurement of electricity derived from renewable energy	● Procurement of renewable energy certificates at overseas sites

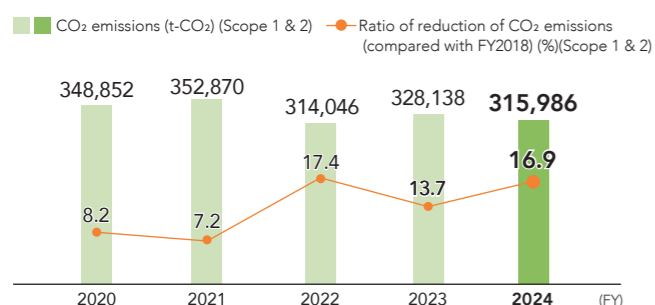
Usage status of renewable energy at our factories (FY2024)

Country	Category	Electric power (MWh)	Reduction effects (t-CO ₂)
Japan	In-house power generation	5,296	2,222
	External procurement	53,856	22,566
U.S.	In-house power generation	278	98
UK	External procurement	1,510	294

Country	Category	Electric power (MWh)	Reduction volume (t-CO ₂)
Thailand	In-house power generation	6,706	3,226
	External procurement	35,000	16,835
Indonesia	In-house power generation	154	78
	External procurement	30,000	15,240
Vietnam	In-house power generation	90	71

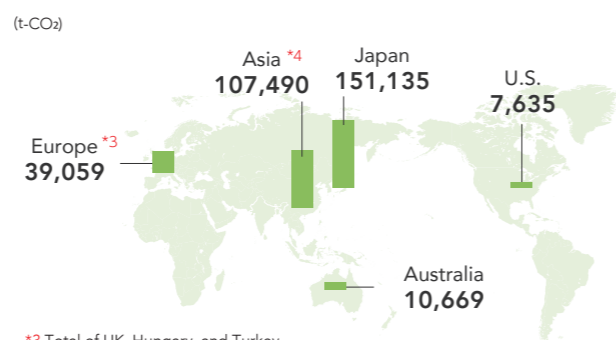
Note: The utilization rate of renewable energy in power usage at our factories is 19.6%.

Changes in the Group's CO₂ emissions and the reduction rate *2



*2 Compared with FY2018. Note: Figures for past fiscal years have been revised in line with the scope of application for FY2023.

Group's CO₂ emissions by region (FY2024)



*3 Total of UK, Hungary, and Turkey
*4 Total of China, Taiwan, Vietnam, Malaysia, Indonesia, and Thailand

VOICE

Comments from the carbon neutrality promotion staff



Carbon Neutral Promotion Group Leader, Environmental Management, Occupational Health & Safety Division

Yohei Oku

I am involved in administrative work for the committee that manages energy at GS Yuasa International Ltd. and its domestic sites, as well as planning energy reduction measures for the production and research divisions. In FY2024, we collaborated with major energy consumption departments at the Kyoto Plant to propose specific measures for reducing energy consumption and implemented energy conservation activities, resulting in a reduction of about 100 t-CO₂ per year.

In particular, in the production department, where we are required to improve productivity while reducing CO₂ emissions, I find it rewarding to be able to contribute to both profitability and CO₂ reduction by providing support ranging from verifying profitability to implementing energy-saving measures. With our ongoing activities, we hope to increase the number of employees who actively engage in energy conservation efforts by helping them realize that CO₂ reduction leads to lower costs and decreased environmental impact.

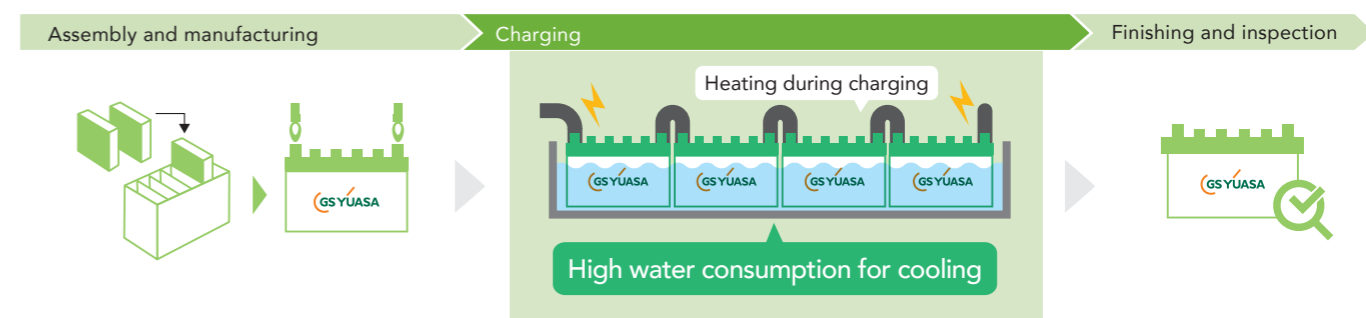
Initiatives for Water Security

The Group uses a large amount of quality fresh water for applications such as dilution of electrolytes, which are storage battery materials, and cooling of storage batteries in the charging process. Since water resources are important natural resources for the continuation of business activities, we believe it is important to work on ensuring quality fresh water and reducing water consumption. In addition, in the production process of lead-acid batteries, water containing harmful substances (such as lead) is discharged. We recognize the importance of properly treating wastewater so that such wastewater does not adversely affect the surroundings of our business sites.

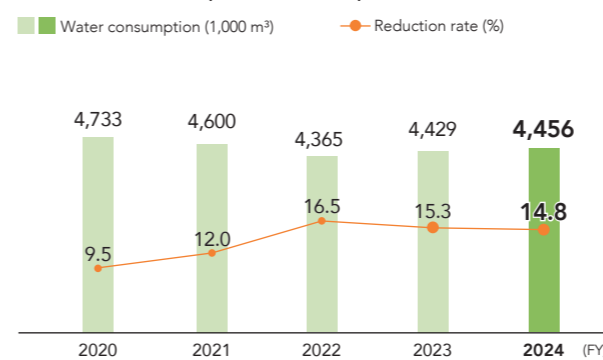
Reduction of water consumption associated with production activities

At our production plants, we promote the effective use of water by implementing measures such as water recycling and conservation, while at our lead-acid battery plants, we are promoting activities to reduce water consumption by recycling cooling water used in large quantities during the charging process and reusing water that has been properly treated, such as rainwater and backwash water from industrial water filtration systems. In addition, by switching the water nozzles of water-cooling devices in the outdoor units of dehumidifiers to spray nozzles at specialized battery factories, we are working to reduce the amount of cooling water used by air conditioning equipment while maintaining the necessary cooling performance.

Water usage processes in battery manufacturing

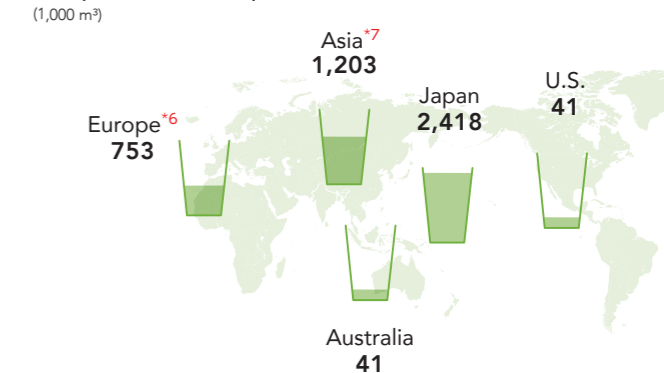


Changes in the Group water consumption and the reduction rate*5



*5 Compared with FY2018. Note: Figures for past fiscal years have been revised in line with the scope of application for FY2023.

Group's water consumption by region (FY2024)



*6 Total of UK, Hungary, and Turkey
*7 Total of China, Taiwan, Vietnam, Malaysia, Indonesia, and Thailand

Response to Environment and Climate Change (TCFD)

The GS Yuasa Group recognizes that climate-related issues are one of our important management issues. In December 2019 we announced our support for the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), and we are working on climate-related information disclosure based on the TCFD framework.

In FY2021, we launched a project to examine climate-related risks and opportunities in accordance with the TCFD framework. The major scenarios adopted for our analysis of risks and opportunities were the 1.5°C scenario and the stated policies scenario (equivalent to the 3°C scenario). We devised strategies based on the short-term (FY2025), medium-term (FY2030), and long-term (FY2040 and FY2050) time axes.

In FY2023 we disclosed quantitative financial impact assessments for each business for some climate-related risks and opportunities.



Governance

GS Yuasa International Ltd., our core operating company, plans and implements responses to climate change in the Group. The company's Board of Directors supervises the entire Group, receiving regular progress reports from GS Yuasa International Ltd. and providing guidance as necessary.

Policies, targets, and important topics related to the environment are formulated and deliberated upon by the Sustainability Promotion Committee and reported to the Corporate Executive Management Meeting and the Executive Briefing which is headed by the president.

Governance structures relating to climate issues



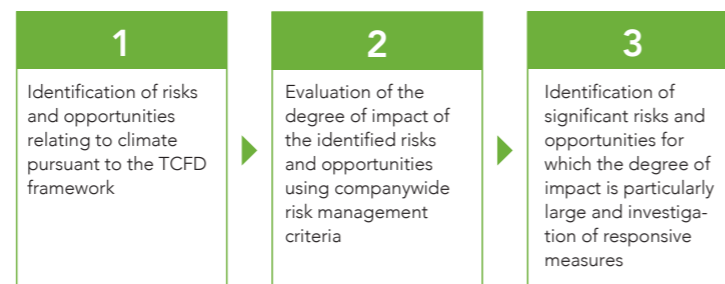
Examples of past reports and agenda items related to climate change (FY2019–2024)

Meeting entity	Topics reported and discussed
Board of Directors	<ul style="list-style-type: none"> Formulation of the Fundamental Environmental Policy Establishment of the GY 2030 Long-Term Greenhouse Gas Targets Disclosure of business strategies based on the TCFD Renewable energy procurement policy Setting of carbon neutrality targets
Corporate Executive Management Meeting, Executive Briefing, Sustainability Committee, Sustainability Promotion Committee	<ul style="list-style-type: none"> Endorsement of TCFD recommendations and membership of the TCFD Consortium Launch of the Energy Saving and Renewable Energy Project to reduce CO₂ emissions Progress report on the Energy Saving and Renewable Energy Project Introduction of internal carbon pricing (ICP) Introduction of in-house solar power generation Formulation of environmental targets in the Sixth Mid-Term Management Plan

Risk Management

Risks and opportunities are identified and evaluated through the process described below. Identified risks and opportunities, and the responses to them, are managed under our governance structures including the Sustainability Promotion Committee.

In FY2021, each business division and management division established a project team to conduct companywide analysis of scenarios and examine countermeasures.



Strategy

Assumed conditions / main scenarios

Main scenarios used in scenario analysis^{*1}

Temperature increase	Main scenarios used	Overview
1.5°C	IEA ^{*2} Net Zero Emissions by 2050 Scenario (NZE Scenario)	A scenario indicating what the world (policies, technologies, markets, etc.) needs to look like in order to achieve net zero global greenhouse gas (GHG) emissions by 2050 (assumed through a backcasting method)
	IPCC ^{*3} RCP ^{*4} 2.6 Scenario and SSP ^{*5} 1-2.6 Scenario	RCP 2.6: A scenario that assumes future temperature rise to be limited to less than 2°C used in the IPCC Fifth Assessment Report SSP 1-2.6: A scenario for the introduction of climate policies to limit future temperature increases to less than 2°C under sustainable development used in the IPCC Sixth Assessment Report
3°C	IEA Stated Policies Scenario (STEPS)	A scenario based on energy and climate policies previously implemented and individual policies that are currently being implemented by individual governments
	IPCC RCP 8.5 Scenario and SSP 5-8.5 Scenario	RCP 8.5: A scenario with maximum GHG emissions used in the IPCC Fifth Assessment Report SSP 5-8.5: A scenario with no climate policies used in the IPCC Sixth Assessment Report

^{*1} Scenario analysis uses the scenarios of public agencies and may differ from actual future social conditions. ^{*2} International Energy Agency ^{*3} Intergovernmental Panel on Climate Change ^{*4} Representative Concentration Pathways ^{*5} Shared Socioeconomic Pathways

Time axis

	Short term	Medium term	Long term
End year	2025	2030	2050
Reason for adoption	Fifth (FY2019–2022) and sixth (FY2023–2025) mid-term management plan periods	Achievement period of the GY 2030 Long-Term Greenhouse Gas Targets and SDGs	Achievement period of the GY 2050 Carbon Neutrality Target

Assumed social conditions based on scenario analysis

		Through 2025 (short term)	Through 2030 (medium term)	Through 2050 (long term)	
		Social demand for emissions reduction	-20%	-40%	-100%
		Carbon price	\$75 / t-CO ₂	\$130 / t-CO ₂	\$250 / t-CO ₂
1.5°C scenario	Operations	Changes in the automobile market			
	Automotive related business	<ul style="list-style-type: none"> Expansion of automobile electrification Structural changes in the automobile industry in conjunction with electrification 	Passenger cars (Global) Number of vehicles (compared to present) •Sales: 1.3 times •Ownership: 1.6 times Percentage of EVs, PHEVs, and FCVs ^{*6} •Sales: 64% •Ownership: 20% •Sales: 100% •Ownership: 86%		
	Industrial battery and power supply related business	<ul style="list-style-type: none"> Development of alternative technologies to replace lead-acid batteries 	Motorcycles and three-wheel vehicles (global) Percentage of EVs •Sales: 85% •Ownership: 54% •Sales: 100% •Ownership: 100%		
	Supply chains R&D	<ul style="list-style-type: none"> Raw materials Acceleration of the circular economy^{*7} Emergence and spread of alternative technologies to replace lithium-ion batteries 	<ul style="list-style-type: none"> In conjunction with increasing demand for batteries for applications relating to transportation and electric power, prices will decline for alternative technologies, such as lithium-ion batteries, to take the place of lead-acid batteries In conjunction with the rapid expansion of solar and wind power generation, demand for batteries used for electric power will expand Batteries for storing excess power from renewable energy sources will increasingly be converted to use for backup applications In conjunction with increasing demand for batteries for applications relating to transportation and electric power, prices will decline for alternative technologies, such as lithium-ion batteries, to take the place of lead-acid batteries Demand for lithium, nickel, and other resources will increase rapidly as demand for lithium batteries increases for use with energy storage technologies and renewable energy Competition to sustainably secure raw materials will intensify Needs for products adapted to a recycling-oriented society will increase year-by-year As battery demand for transportation and electric power related applications expands, the development and spread of battery technologies with higher added value in terms of safety, energy density, cost, charging speed, and life span will progress 		
3°C scenario	Operations	Storm and flood damage, storm surges			
Industrial battery and power supply related business	Storm and flood damage, storm surges	<ul style="list-style-type: none"> Expansion of business relating to disaster countermeasures The frequency of flooding will more than double compared to now in Japan and other regions Sea levels will rise approximately 0.3 m The frequency of intense storms in the vicinity of Japan will increase 			

^{*6} EV: Electric Vehicle; PHEV: Plug-in Hybrid Electric Vehicle; FCV: Fuel Cell Vehicle

^{*7} An economic mechanism for the circulation of resources without waste. Positioned as a medium- to long-term economic growth policy, particularly in European countries.

Response to Environment and Climate Change (TCFD)

Risks and opportunities

1.5°C scenario	Operations	● Introduction of carbon tax and renewable energy	
		Risk Increased costs for energy saving and renewable energy to reduce CO ₂ emissions	In the case of the 1.5°C scenario, targets for a major reduction of CO ₂ will be required and carbon taxes will be introduced to achieve carbon neutrality.
	Risk Increased carbon costs for the company's emissions in conjunction with the introduction of a carbon tax	On the other hand, by implementing CO ₂ reduction measures through the introduction of energy-saving equipment and renewable energy, it will be possible to reduce the carbon tax burden to a certain extent.	
	Risk Increased carbon costs for emissions in upstream segments of supply chains	Results of a scenario-based estimate of the financial impact indicated a risk that the introduction of a carbon tax will increase costs by about 3-4 billion yen over the medium to long term. By thorough energy saving and the planned introduction of renewables, however, the cost increase could be reduced to about 2 billion yen.	
	Automotive related business	Opportunity Higher demand for batteries in conjunction with increased sales and ownership of passenger vehicles	
		● Starting batteries and batteries for auxiliary equipment	
		Opportunity Higher demand for batteries for auxiliary equipment used in EVs and PHEVs	In conjunction with expansion of the market for EVs, PHEVs, and other such vehicles, demand for starting batteries used in internal combustion engine vehicles is expected to decline, but demand for batteries for auxiliary equipment is expected to increase. Also, the shift from a certain number of lead-acid batteries to lithium-ion batteries is expected to advance.
		Opportunity Risk Replacement of lead-acid batteries with lithium-ion batteries	As a result of our estimate of the financial impact, based on the establishment of certain conditions with reference to a scenario-based market, we concluded that while sales of starting batteries will decline sharply, overall sales could increase by 35-55 billion yen over the medium to long term due to a substantial increase in the demand for batteries for auxiliary machinery.
		Risk Declining demand for starting batteries used in internal combustion engine vehicles	
		● Batteries for HEVs*8, PHEVs, and EVs	
Industrial battery and power supply related business	Opportunity Higher demand for batteries used in EVs and PHEVs		
	Opportunity Risk Fluctuations in HEV and PHEV demand (expansion in the short to mid-term, contraction in the long-term)	It is expected that over the short to medium term, sales of HEVs and PHEVs will increase, but in the long term, as sales of EVs increase substantially and account for approximately 100% of sales in 2050, the battery market will change.	
	● Lead-acid batteries for backup applications and forklifts		
	Opportunity Higher demand for batteries	Demand for batteries used in transportation and electric power related applications is expected to increase, but as technological innovation progresses, it is expected that prices for lithium-ion batteries and other such products will fall and that a certain number of lead-acid batteries will be replaced by lithium-ion batteries.	
Supply chains R&D	Risk Replacement of lead-acid batteries with lithium-ion batteries		
	● Energy storage systems (ESS) for renewable energy		
	Opportunity Higher demand for batteries and peripheral systems and devices	It is expected that in conjunction with the increased introduction of solar, wind, and other renewable energy generation, demand for batteries and peripheral systems and devices for electricity load leveling and the like will increase. As a result of our estimate of the financial impact, setting certain conditions with reference to a scenario-based market, we concluded that sales could increase by 7-22 billion yen over the medium to long term due to an expansion of the market for energy storage systems for renewable energy in Japan.	
3°C scenario	Operations	● Natural disasters and temperature rise	
		Risk Increased damage to facilities due to storm and flooding disasters and increased loss of profit due to business suspension	There is a risk of greater impact due to increased storm and flooding damage, including property damage to facilities and machinery at the company's plants, loss of profits from business suspension, and the inability of workers to report to work. The interruption of supply chains is also anticipated.
	Risk Business suspension due to damage to supply chains	As a result of an examination of flood and storm surge risks based on future climate change impacts using natural disaster simulations, five sites and subsidiaries (two in Japan and three overseas) were evaluated as high-risk. In the event of a 100-year disaster at the Kyoto Plant, where the estimated scale of damage would be large, there could be a potential loss in sales of 9-13 billion yen over the medium to long term.	
	Risk Increased costs for air conditioning and cooling processes		
Industrial battery and power supply related business	● Emergency power supplies		
	Opportunity Increased demand for emergency power supplies as countermeasures against severe disaster	It is expected that demand for emergency power supplies will increase out of concern regarding intensification of natural disasters due to climate change.	

Note: Those items that were determined in the risk assessment to be of particular importance in the short to long term are listed. *8 HEV: Hybrid Electric Vehicle

Direction of business strategies

	Now	2050	
1.5°C scenario	Operations	Reduce CO ₂ emissions by at least 30% by 2030 Implement measures for energy conservation and use of renewable energy	Further accelerate measures for achieving carbon neutrality Further implement measures for energy conservation and procurement of renewable energy
	Automotive related business	Securing profits from lead-acid batteries for internal combustion engine vehicles Introduce differentiated products, strengthen our sales capabilities, and increase sales of high-value-added products with a focus on regions where internal combustion engine business remains such as ASEAN	
		Capture demand for batteries for auxiliary equipment used in electric vehicles Capture demand for 12 V lead-acid or lithium-ion batteries for auxiliary equipment used in electric vehicles as well (for new automobiles and for replacement)	
		Capture demand for redundant batteries used in electric vehicles Capture demand for lithium-ion batteries used for backup of self-driving vehicles	
	Industrial battery and power supply related business	Expand production of lithium-ion batteries for HEVs and PHEVs Production will increase, particularly for Japanese automakers, but will decline in the future	
		Full-scale entry into EV lithium-ion battery market Invest development resources to enter the market for lithium-ion batteries used in EVs, which are used under demanding environments and must be highly reliably	
	Supply chains R&D	Apply automotive lithium-ion battery know-how to industrial applications Establish a lineup that includes both lead-acid batteries and lithium-ion batteries for industrial applications according to market needs	
		Focus on the renewable energy and energy management fields • Strengthen operation, maintenance and inspection services • Develop more price-competitive batteries • Introduce products and services aligned with customer needs to capture demand for renewable energy • Capture demand for peak cutting, peak shifting, and other energy management services for business sites	
		Develop the market for lead-acid batteries with high recycling rates Commercialize lead-acid batteries compatible with the needs of a recycling-oriented society	
	3°C scenario	Operations	Countermeasures against intensifying disasters • Evaluate future risks including climate risks and implement countermeasures as necessary • Undertake BCP including supply chains
Industrial battery and power supply related business		Contribute to countermeasures against intensifying disasters using backup power supplies Focus on market expansion conditions and respond to needs	

Metrics and targets

Sixth Mid-Term Management Plan (FY2023-2025)

CO₂ emissions (compared with FY2018) At least 15% reduction	Water consumption (compared with FY2018) At least 15% reduction
---	--

Percentage of environmentally considered products in total sales of all products 45% or more	Ratio of recycled lead used as lead raw materials in lead-acid batteries 70% or more
--	--

Target for reduction of CO₂ emissions (Scope 1 and 2)

2030 (compared with FY2018) At least 30% reduction	2050 Carbon neutrality
---	---

ICP (Internal Carbon Pricing)

The price will be set at ¥15,000 / t-CO ₂ Use as reference information when making investment decisions regarding energy-saving and renewable energy measures
--