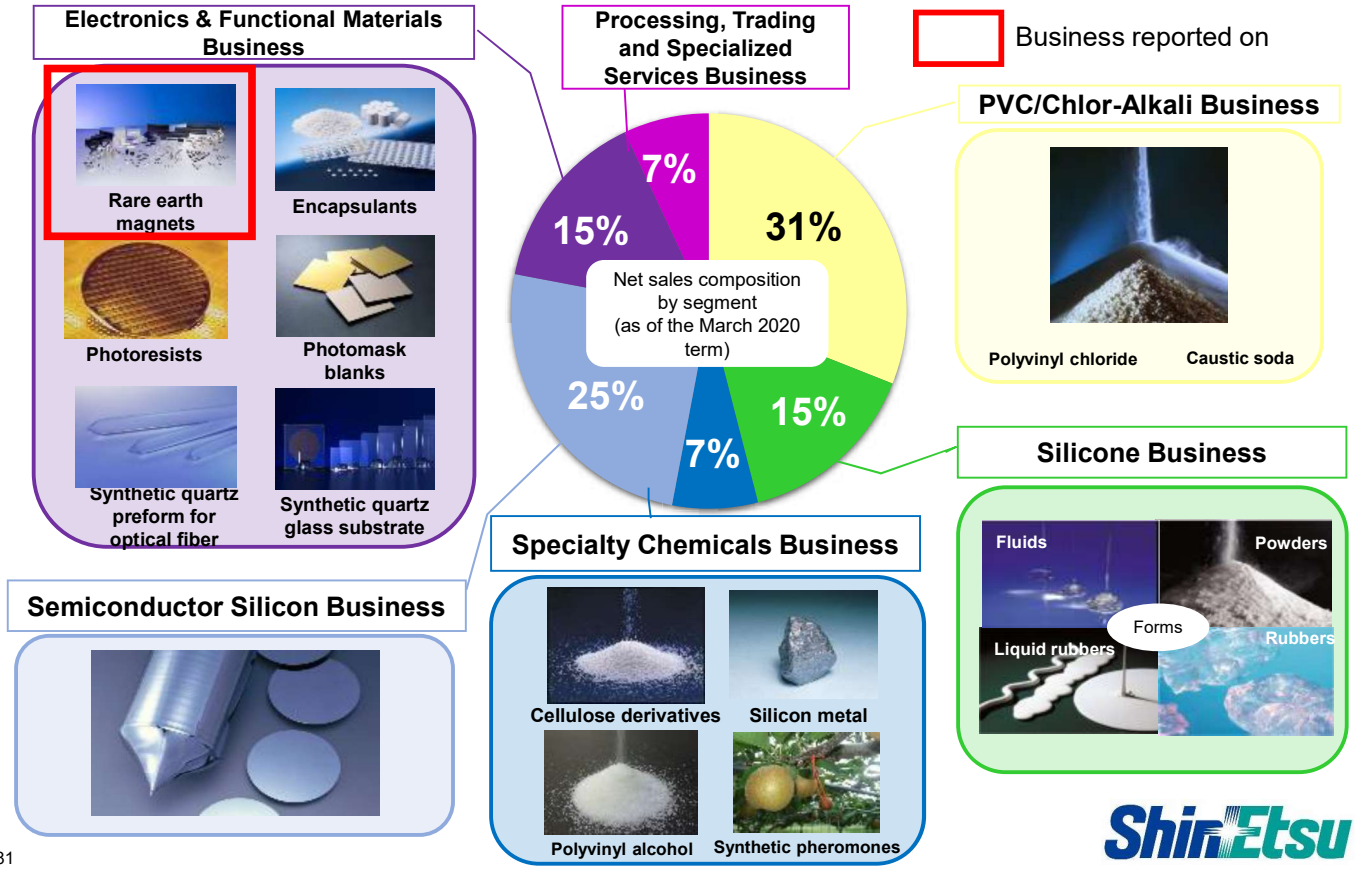
Materials

- ✓ Practice Case① : GUNZE LIMITED
- ✓ **Practice Case② : Shin-Etsu Chemical Co., Ltd.**
- ✓ Practice Case③ : Nippon Paper Industries Co., Ltd.
- ✓ Practice Case④ : Mitsui Mining & Smelting Co., Ltd.
- ✓ Practice Case⑤ : UACJ Corporation

Overview of the Shin-Etsu Group (as of March 31, 2020)

1	Established	*September 16, 1926*
2	Location of head office	6-1, Ohtemachi 2-chome, Chiyoda-ku, Tokyo
3	Number of group companies	150 Japan: 55/Overseas: 19 countries, 95 companies
4	Number of employees	22,783 (consolidated)
5	Capital	119.4 billion JPY
6	Sales	1.5435 trillion JPY
7	Ordinary income	418.2 billion JPY
8	Market capitalization	Approx. 8 trillion JPY (as of January 26, 2021)

Details of the Shin-Etsu Group's business



Structure for scenario analysis of climate change

Scenario analysis is handled by the Climate Change-related Subcommittee established within the ESG Promotion Committee, as well as the committee members and administrative staff of the divisions being analyzed

[ESG Promotion Committee overview]

Established: April 1, 2005 CSR Promotion Committee established

August 1, 2017 ESG Promotion Committee established

Committee Chairman: Yasuhiko Saitoh (President and CEO)

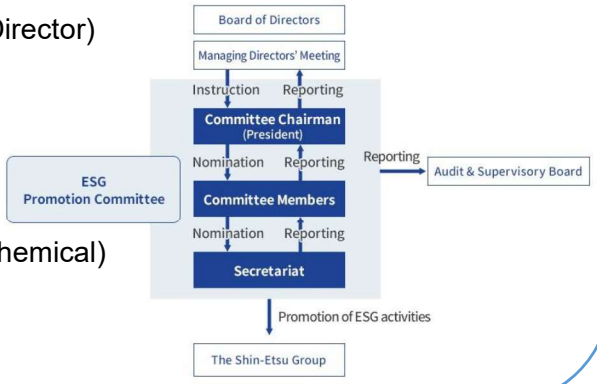
Vice Chairman: Toshiya Akimoto (Managing Director)

Committee members, administrative staff:

Group company ESG officers: 45

(including the 11 directors and

general managers of divisions of Shin-Etsu Chemical)



Climate change scenario analysis: Task details

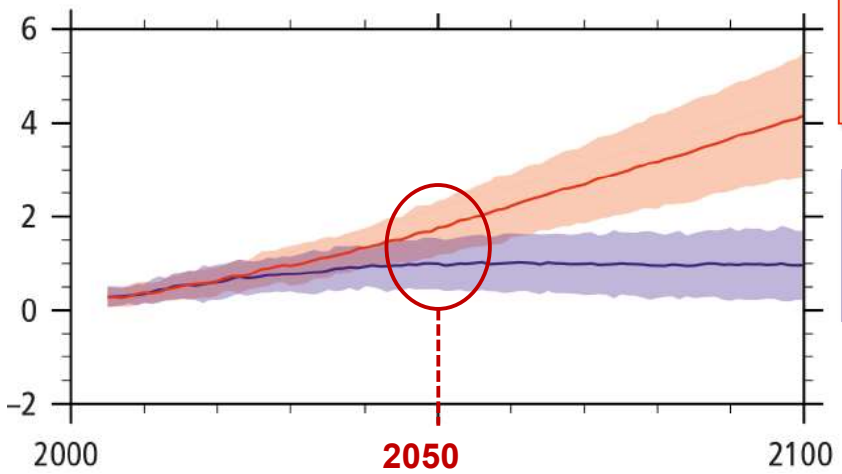
Step	Details
1	Understanding of climate change analysis and each item for disclosure
2	Hypothesizing worldviews for the 2 ˚C and 4 ˚C (2.7 ˚C and above) scenarios Setting the time frame
3	Hypothesizing risks and opportunities to business that may be expected due to climate change, as well as their degrees of significance Assessment of financial impact
4	Evaluation of risk countermeasures and seizing of opportunities
5	Reporting of analysis results (ESG officers, environmental officers)
Future plans	
6	Report to management at the Board of Directors meeting
7	Disclosure of the sustainability report, etc.

STEP 2 3 4 5 6

Setting the timeframe for climate change scenarios

The 2˚C and 4˚C (2.7˚C and above) scenarios as of 2050 have been selected based on the impact from climate change

[Projected average global surface temperature change]
(compared with the average from 1986 - 2005)



Over 4˚C (2.7˚C and above) scenario:
As of 2100, temperatures will be 3.2-5.4˚C higher than pre-Industrial Revolution levels if no additional measures against global warming are taken

2˚C scenario:
As of 2100, temperatures will be 0.9-2.3˚C higher than pre-Industrial Revolution levels if strict measures are taken

Prior to 2030, the change in <u>temperature is nearly the same</u> in both the 2˚C and 4˚C (2.7˚C and above) scenarios. The gap <u>between the scenarios widens</u> after 2030.

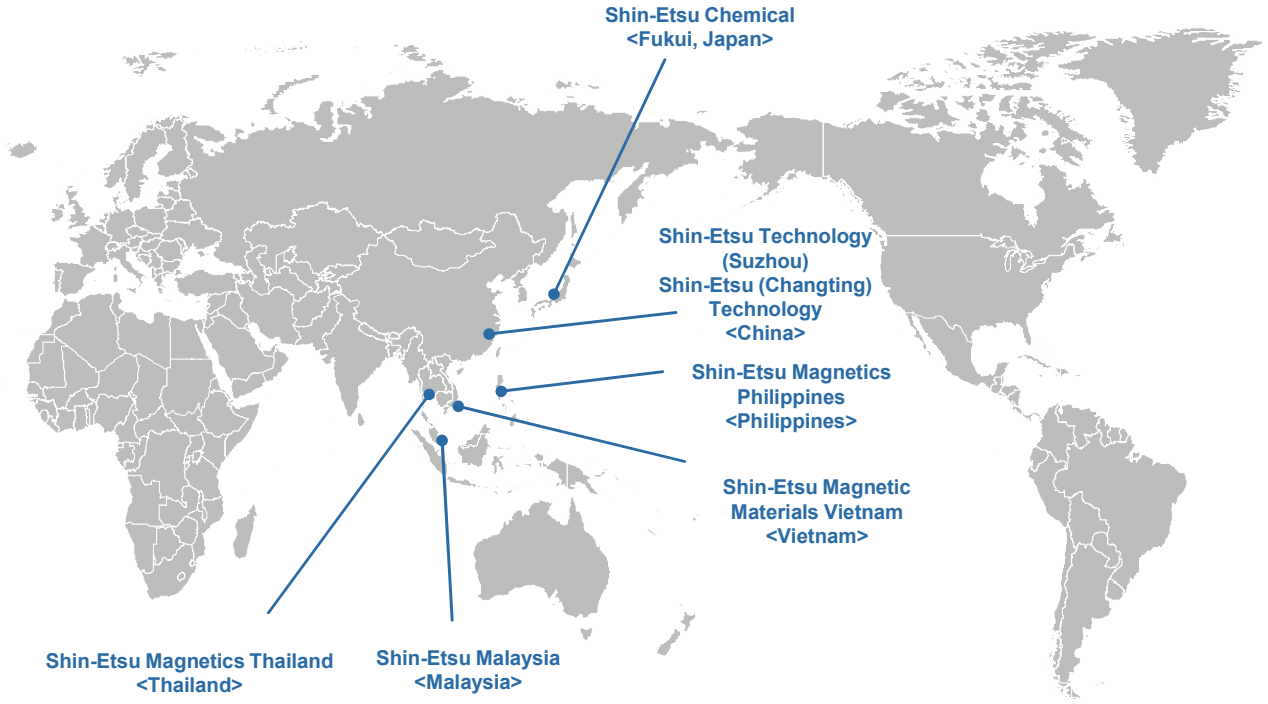
(Source) AR5 SYR, Table SPM.6

We estimated the revenue for 2050 and evaluated the impact of climate change would have on it

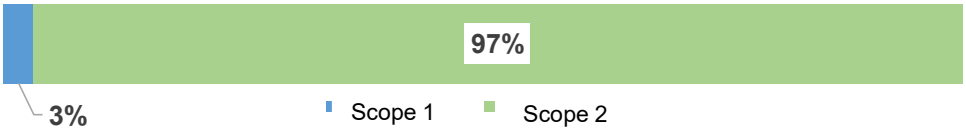
Estimate hypotheses

- Based on the increased production and growing demand for rare earth magnets, we assumed that the company would see a steady growth in sales until 2050
- Operating profits for 2050: We employed the average value over the operating profits for the past three years
- Amount of emissions for Scope 1: We assumed that they would increase in proportion to the increase in the business's sales based on the amount of emissions in FY2019
- We assumed that emission factors for electricity would decrease

Main production sites for the covered business

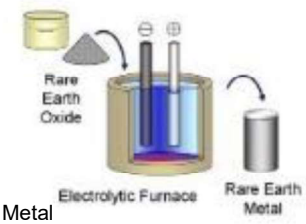


Greenhouse gas emissions for the covered business: ratio by scope

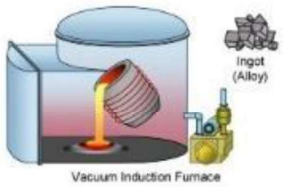


Production process for the covered business

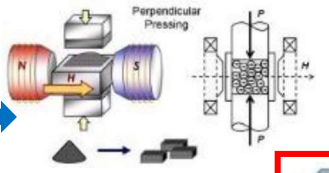
Process using large amounts of energy



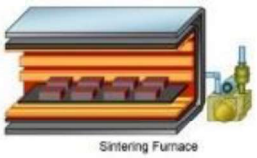
Metal
Individual rare earth oxides are separated from rare earth concentrate and change to metal by electrolytic process



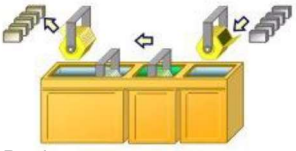
Alloy
Rare earth metals and other raw materials are charge into crucible and melt by high frequency inductive furnace.



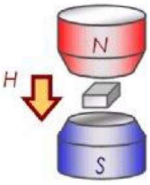
Forming
Alloys are pulverized to fine powder. Put the powder into mold and press in magnetic field.



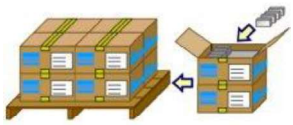
Block
Formed block put into sintering furnace and make sintered block



Products
Sintered blocks are cut and ground into the required shape and the surface is treated by plating or coating.



Magnetizing



Packaging, shipping

Business opportunities from climate change (2˚C scenario)

Application	Details	Impact
Electric vehicles, hybrid vehicles, fuel cell vehicles	The use of high-performance, compact rare earth magnets in the drive motors and other various motors of hybrid, electric, and fuel cell vehicles reduces the overall weight of the vehicles and increases their energy efficiency	High
Wind turbine generators	Rare earth magnets contribute to making offshore wind turbine generators highly efficient and reducing generator maintenance costs	High
Compressor motors for air conditioner	Energy consumption efficiency can be increased and the amount of electricity consumed can be decreased by using rare earth magnets in air conditioner compressor motors	Med.
Aircraft	The weight of aircraft can be reduced and energy efficiency improved by converting to electric or hybrid forms for small aircraft, or by converting to electric hydraulic drives (motor drive) for large aircraft	Med.
Industrial motors	The use of rare earth magnets in industrial motors can increase motor efficiency and reduce the amount of electricity consumed	Med.

Risks from climate change (2˚C scenario)

Event	Risk to Shin-Etsu	Impact on profits	Countermeasures
Increased electricity prices due to the spread of electricity from renewable energy sources	Increased costs for purchasing electricity from renewable energy sources	High	Reduction of Scope 2 emission amounts -Further promotion of production processes that use less electricity and introduction of high-efficiency equipment, etc. -Introduction of a cogeneration system that uses carbon-neutral natural gas (natural gas with emission credits)
Extreme weather conditions (typhoons, river flooding, etc.)	Flooding of production sites Supply chain disruptions	Low	Regrading of production sites Decentralization of production sites Diversification of raw material sources Securing of product inventory Purchase of property insurance
Carbon taxes introduced by various countries around the world, carbon emission quotas set	A carbon tax is imposed Costs created for purchasing emission credits in order to meet carbon emission quotas	Low	Reduction of Scope 1 emission amounts -Further promotion of more efficient production processes and introduction of high-efficiency equipment, etc. -Use of hydrogen-reduced iron materials Set absolute reduction targets for greenhouse gases and achieve them. Collect information on environmental regulations such as carbon taxes for each country, and come up with measures to deal with them.

Risks from climate change (4˚C (2.7˚C and above) scenario)

Event	Risk to Shin-Etsu	Impact on profits	Countermeasures
Increased frequency of extreme weather	Flooding of production sites Supply chain disruptions	High	Regrading of production sites Decentralization of production sites Diversification of raw material sources Securing of product inventory Purchase of property insurance
Increased frequency of flooding due to changes in precipitation patterns, etc.			
Introduction of carbon taxes in certain countries, setting of carbon emission quotas	Carbon taxes and carbon emission quotas will not be introduced in the countries that the production sites of the covered business are located in.	-	-
Electricity prices	According to the IEA's scenario analysis (the scenario for current initiatives), electricity prices will not increase. Because of this, increased electricity prices are not a risk to Shin-Etsu.	-	-

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NIPPON PAPER GROUP Outlines

日本製紙グループ
NIPPON PAPER GROUP











Business Development as a Comprehensive Biomass Company
Through Circulation of Woody Resources
Realizing a Carbon-Neutral Business Model

A Comprehensive Biomass Company "Shaping the Future with Trees"

Circulation of sustainable forest resources
Active product recycling
Circulation of woody resources used for various purposes with technological capabilitie

- Outcomes from a series of mergers and integrations
  - Proven record in research and development
  - Group companies with diverse know-how
  - Human resources with advanced skills
- Compliance and high ethical standards

With the sustainable resource "wood" as its core, the company develops various products / service business from wood resources

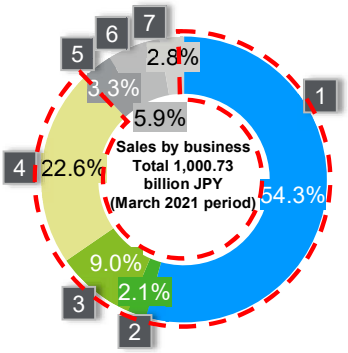
Significance assessment of risks/opportunities

Step 2 3 4 5

日本製紙グループ NIPPON PAPER GROUP

Target businesses: Japanese “paper/cardboard business”, “specialty paper business”, “household paper / lifestyle product business” and “chemicals business”

Business portfolio



	Business domain	Products handled
1	Paper, cardboard	Offers paper and cardboard
2	Specialty paper	Offers paper, specialty paper, etc. *Specialty paper: for use in food products / industrial filters
3	Household paper, health care	Offers packaging, household paper, lifestyle products, etc.
4	Chemicals	Offers CNF/CMC products
5~7	Other	Biomass fuels, housing materials such as insulation, etc.

Risks in each value chain

R&D

Afforestation and wood processing
- ✓ Carbon price
- ✓ Carbon emissions targets/policies in each country
- ✓ Changes in energy price
- ✓ Increase in average temperature
- ✓ Changes in rainfall and weather patterns
- ✓ Increasing severity of extreme weather conditions

Paper manufacturing and processing
- ✓ Carbon price
- ✓ Carbon emissions targets/policies in each country
- ✓ Changes in energy price
- ✓ Next generation technology penetration
- ✓ Changes in investor's reputation
- ✓ Increasing severity of extreme weather conditions

Transportation
- ✓ Carbon price
- ✓ Carbon emissions targets/policies in each country
- ✓ Changes in energy price
- ✓ Changes in customer reputation
- ✓ Changes in investor's reputation etc.

Sales and disposal
- ✓ Carbon price
- ✓ Energy-saving policy
- ✓ Next generation technology penetration
- ✓ Changes in customer reputation
- ✓ Increasing severity of extreme weather conditions

Investigation of high-impact risks and opportunities in the papermaking business and lifestyle products, specialty papers, and chemicals businesses

Significance assessment of risks/opportunities

Step 2 3 4 5

日本製紙グループ NIPPON PAPER GROUP

Examine risks and opportunities from raw material procurement to product use

Transition risk・Opportunities (1/2) Total 8 items

①paper/cardboard、②specialty paper、③household paper・lifestyle product、④chemicals

Risk items	Business impact			Evaluation			
Small classification	Index	Discussion (example)：Risks	Discussion (example)：Opportunities	①	②	③	④
1. Carbon price	Revenue Spending	➢ Global carbon taxes fall in line with European standards, increasing operating and logistics costs for plants	➢ By improving environmental performance, such as through the introduction of renewable energy, Nippon Paper Industries may qualify for public support and tax reductions	Large	Large	Large	Large
2. Carbon emissions targets/policies in each country	Revenue Spending	➢ If carbon emissions cannot be reduced, additional costs will be incurred, such as purchasing of emission credits ➢ Wood procurement costs increase due to forest protection policies and logging restrictions in various countries (e.g., regulations on logging/exports from natural forests, etc.)	➢ Demand for low-carbon products increases (CNFs, etc.) ➢ Business opportunities such as for the provision of biofuels may increase as a result of policies promoting decarbonization	Large	Large	Large	Large
3. Changes in energy price	Revenue Spending	➢ Conversion to renewable energy is called for, and costs for addressing this increase, such as those related to company facilities and for purchasing green energy	—	Medium	Medium	Medium	Medium
4. Increases or decreases in important products	Revenue Spending	➢ Digitalization of information / paperless practices progresses due to promotion of decarbonization ➢ Efficiency in food production decreases due to climate change; the cost of raw wood materials increases as forest areas are converted to agricultural land	➢ Increasing interest in environmental issues among consumers results in increasing demand for ethical consumption and environmentally friendly products ➢ Business opportunities related to recovered and recycled paper may increase as the circular economy gains momentum	Large	Large	Large	Large

Transition risk・Opportunities (1/2) Total 8 items

①paper/cardboard、②specialty paper、③household paper・lifestyle product、④chemicals

Risk items	Business impact			Evaluation			
Small classification	Index	Discussion (example)：Risks	Discussion (example)：Opportunities	①	②	③	④
5. Next generation technology penetration	Revenue Spending	➢ Equipment costs increase due to the introduction of environmentally friendly equipment and highly efficient low-carbon technologies and devices ➢ Intensifying competition to improve efficiency of water resources, etc., results in an increased burden of R&D investment costs	➢ Improvements in the performance of environmentally friendly equipment (e.g., solar power generation) will reduce the cost of renewable energy, which will decrease plant operating costs ➢ Commercialization of CNFs and other products will expand related business opportunities	Large	Large	Large	Large
6. Changes in customer reputation	Revenue Spending	➢ Manufacturing costs increase due to increased demand for environmentally friendly products ➢ If Nippon Paper has unsuitable forest management practices, this will be pointed out by NGOs and the media, resulting in damage to the company's reputation and decreased sales	➢ Making clear appeals of the value of forest resources in the face of rising climate change will enhance the company's reputation	Large	Medium	Large	Medium
7. Changes in investor's reputation	Capital	➢ If investors view Nippon Paper as reluctant to take environmental measures, it will be more difficult to raise capital and the cost of raising capital will increase	➢ Potential for ESG investment and other capital raising opportunities will increase if the company shifts to an environmentally friendly business model ➢ If Nippon Paper takes action leading to a reduction in environmental impact and improves its corporate image, it will be looked upon favorably by investors	Small	Small	Small	Small
8. Passing on increased costs to product prices	Revenue Spending	➢ When passing on cost increases due to each risk to product prices, there is a risk of undermining Nippon Paper's competitiveness depending on the size of the pass-on amount	➢ If there is movement to promote bearing of environmental costs over the supply chain, including consumers, Nippon Paper's business will become more sustainable	Large	Large	Large	Large

Significance assessment of risks/opportunities Step 2 3 4 5 日本製紙グループ NIPPON PAPER GROUP

Physical risk・Opportunities (1/1) Total 4 items

①paper/cardboard、②specialty paper、③household paper・lifestyle product、④chemicals

Risk items	Business impact			Evaluation			
Small classification	Index	Discussion (example)：Risks	Discussion (example)：Opportunities	①	②	③	④
1. Increase in average temperature	Revenue Spending	➢ Costs of procuring wood chips and other raw materials increase due to forest fires, increased pests and diseases, etc.	➢ In some areas, rising temperatures will accelerate tree growth and reduce the cost of procuring raw materials such as wood chips	Large	Large	Large	Large
2. Changes in rainfall and weather patterns	Revenue Spending	➢ Extreme weather conditions such as heavy rains and droughts cause instability in the supply of raw materials, which increases raw material procurement costs ➢ Changes in forest vegetation make it difficult to maintain quality / a stable supply of raw materials in existing routes	N/A	Medium	Medium	Medium	Medium
3. Rising sea level	Revenue Spending Capital	➢ There are increased costs from measures to address rising sea levels, such as elevation of production sites and dealing with flooding / waterproofing at facilities	N/A	Small	Small	Small	Small
4. Increasing severity of extreme weather conditions	Revenue Spending Asset	➢ Recognition of disaster risk is reviewed, and insurance premiums increase ➢ Operating and inventory costs increase due to plant shutdowns and increased backup inventory levels caused by climate-related natural disasters	➢ Sales of disaster response products will increase due to increasingly extreme weather conditions and increased spread of infectious diseases	Large	Large	Large	Large

Identify and define range of scenarios

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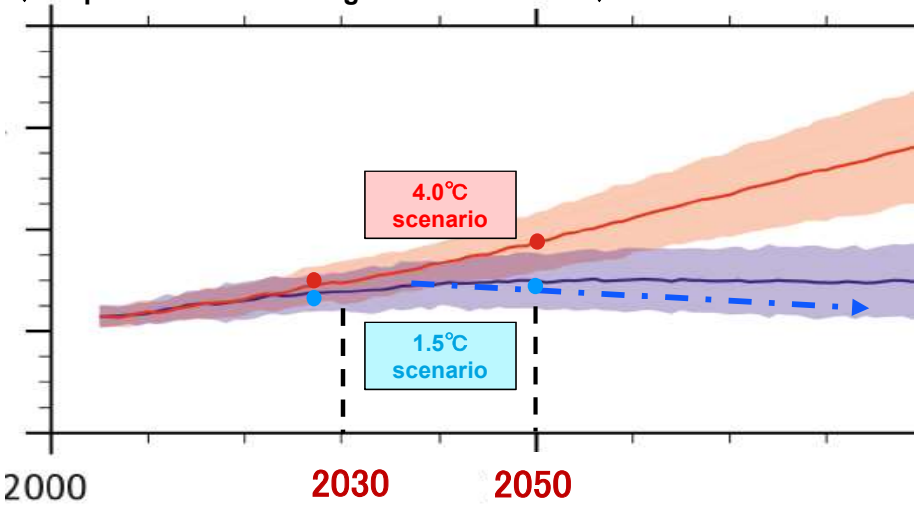
We will use two scenarios (1.5℃, 4℃) to study society in 2030, 2050

【Projected average global surface temperature change】
(compared with the average from 1986～2005)



Definition of 2.7～4℃ scenario

4℃ scenario ：
3.2～5.4℃ higher than pre-industrial Revolution levels if no additional measures against global warming are taken

Over 2℃(2.7℃～4℃) scenario ：
2.7～4.0℃ higher than pre-industrial Revolution levels if no additional measures against global warming are taken

Below 2℃ scenario ：
0.9～2.3℃ higher than pre-industrial Revolution levels if strict measures are taken

1.5℃ scenario ：
We are highly likely to achieve an increase of less than 1.5℃ compared to pre-industrial Revolution levels if a radical transition to a new system is made

Set 2030- and 2050-year time horizon for transition risk and physical risk

3-97 Sources：AR5 SYR SPM.6, IEA, "ETP2017", UNEP, "The Emission Gap Report 2015", Global Warming of 1.5℃(IPCC)

Identify and define range of scenarios

【Future Social Image in a 1.5℃ Scenario】

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Social image in 2050

Increased costs from policies such as carbon taxes increase. On the other hand, new business opportunities are created in the form of biofuels / environmentally friendly products / new materials

Legend: Relevant areas

Government
- A carbon tax is introduced
- Logging of natural forests is restricted
- Use of fossil fuels is restricted

Market

Measures toward a decarbonized society

Slight increase in natural disasters

Slight increase in natural disasters

Increase shift to paperless practices

New entry

IT companies

- Increase in the "local production for local consumption" business model from the impact of carbon tax
- The papermaking industry forms an alliance and aims to promote products that are alternatives to plastics

Update plant facilities

- Increased operating costs due to introduction of carbon tax
- It becomes necessary to purchase green energy, etc.

Increased investment in new technologies

- Increased R&D investment costs due to competition for more efficient use of water resources, textile materials, etc.

Raw materials domain

- Increased raw material procurement costs due to rising carbon taxes, etc.
- Increased activity for leveraging forest certification programs

Energy domain

- Electricity prices rise due to shift to renewable energy

Users

Biofuel CNF

- Demand for ethical consumption rises, and there is increased demand for environmentally friendly products (e.g., new materials, eco-friendly products)

3-98

Identify and define range of scenarios
【Future Social Image in a 4℃ Scenario】

Step 2 3 4 5

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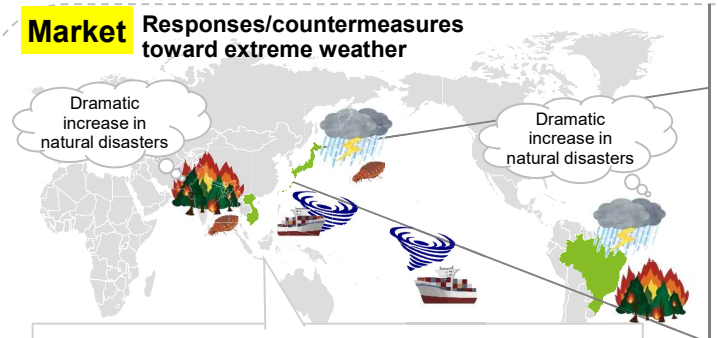
Social image in 2050
While physical risks increase,
business opportunities for disaster response products expand

Legend: Relevant areas

Government
- Disaster prevention measures / BCP measures are promoted
- Compensation plans for forest damage are expanded
- A carbon tax is not introduced

Market **Responses/countermeasures toward extreme weather**



- Shortening of supply chains and OEM outsourcing to local manufacturers are given consideration due to the impact of extreme weather events
- Preparations move forward for measures to address changes in growing areas / wood quality due to climate change by the second half of the 21st century

Review of risk for Japanese facilities

- Potential reexamination of plant facility risk and increase in insurance premiums

Requirements in the supply chain

- Companies become subject to evaluation based on the resilience of their supply chains

Raw materials domain

- Increased raw material costs due to extreme weather, forest fires, etc.
- Transportation costs increase due to extreme weather

Energy domain

- Use of renewable energy does not progress, and electricity prices continue in line with current trends

Users

- Rising demand for disaster response products and packaging with high storability due to increasingly extreme weather

Image of business impacts evaluation

Step 2 3 4 5

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We gathered scientific evidence to see what conditions in 2030 and 2050 would be like

	Change item	Parameter	Base year	2030		2050		Source
				4℃	1.5℃	4℃	1.5℃	
Transition risk	Carbon price increase	Carbon tax	Japan:286 JPY/CO_2t (2021)	Japan:289 JPY/t	Advanced countries: 14,820 JPY/t	Japan:289 JPY/t	Advanced countries: 28,500 JPY/t	IEA, "World Energy Outlook 2021"
	Electricity price increase	Electricity price	Japan: 24,692 JPY/MWh (2017)	Japan:24,713 JPY/MWh	Japan:26,221 JPY/MWh	Japan:20,828 JPY/MWh	Japan:27,052 JPY/MWh	IEA, "World Energy Outlook 2018"
	Lumber price increase	Logging tax (Vietnam lumber, Brazil lumber)	- (2021)	0	Malaysia:2,736 JPY/t	0	Malaysia:2,736 JPY/t	Utilize current Malaysian logging tax
Physical risk	Lumber price increase	Forest fire incidence (Vietnam lumber, Brazil lumber)	- (2021)	+2% (Vietnam lumber) +15% (Brazil lumber)	0%	+7% (Vietnam lumber) +19% (Brazil lumber)	0%	Forest and Grass Fire Risk Assessment for Central Asia under Future Climate Scenarios (Estimated using changes in area burned by forest fires and the rate of increase in the frequency of forest fires based on price elasticity of supply)
	Natural disaster damage (heavy rain)	Number of heavy rainfall events	Japan:0.26 days/year (2020)	0.28 days/year	0.26 days/year	0.31 days/year	0.26 days/year	Defined as the number of occurrences of 50 mm/hour precipitation, estimated from the data of "Climate Change in Japan 2020" by the Japan Meteorological Agency
	Natural disaster damage (flood)	Probability of flooding	- (2021)	0.27 days/year	0.26 days/year	0.28 days/year	0.26 days/year	Ministry of Land, Infrastructure, Transport and Tourism, "Impacts of Climate Change"
	Insurance premiums increase	Increase rate of natural disasters		+1.2%	0%	+2.9%	0%	Utilize weighted average of the rate of increase in the occurrence of various types of disasters and the ratio of the amount of damage caused by disasters
Opportunity	Ethical consumption expansion	Sustainability market expansion rate	Base year 2017	+28.8%	+32.0%	+92.2%	+105.9%	Utilize sustainable market growth rates from Nielsen "Product Insider"
	Use of new materials expansion	EV rate		0%	+256.3%	0%	+142.5%	Estimated from EV utilization trends in IEA, "Global EV Outlook 2021" and IEA "Net Zero by 2050"
	Disaster-response products expansion	Increase rate of natural disasters		+6.0%	0%	+16.4%	0%	Based on reports from the Ministry of Education, Culture, Sports, Science and Technology and the Japan Meteorological Agency

Image of business impacts evaluation

Step 2 3 4 5

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Examine business impacts of items identified by significance assessment of risks/opportunities

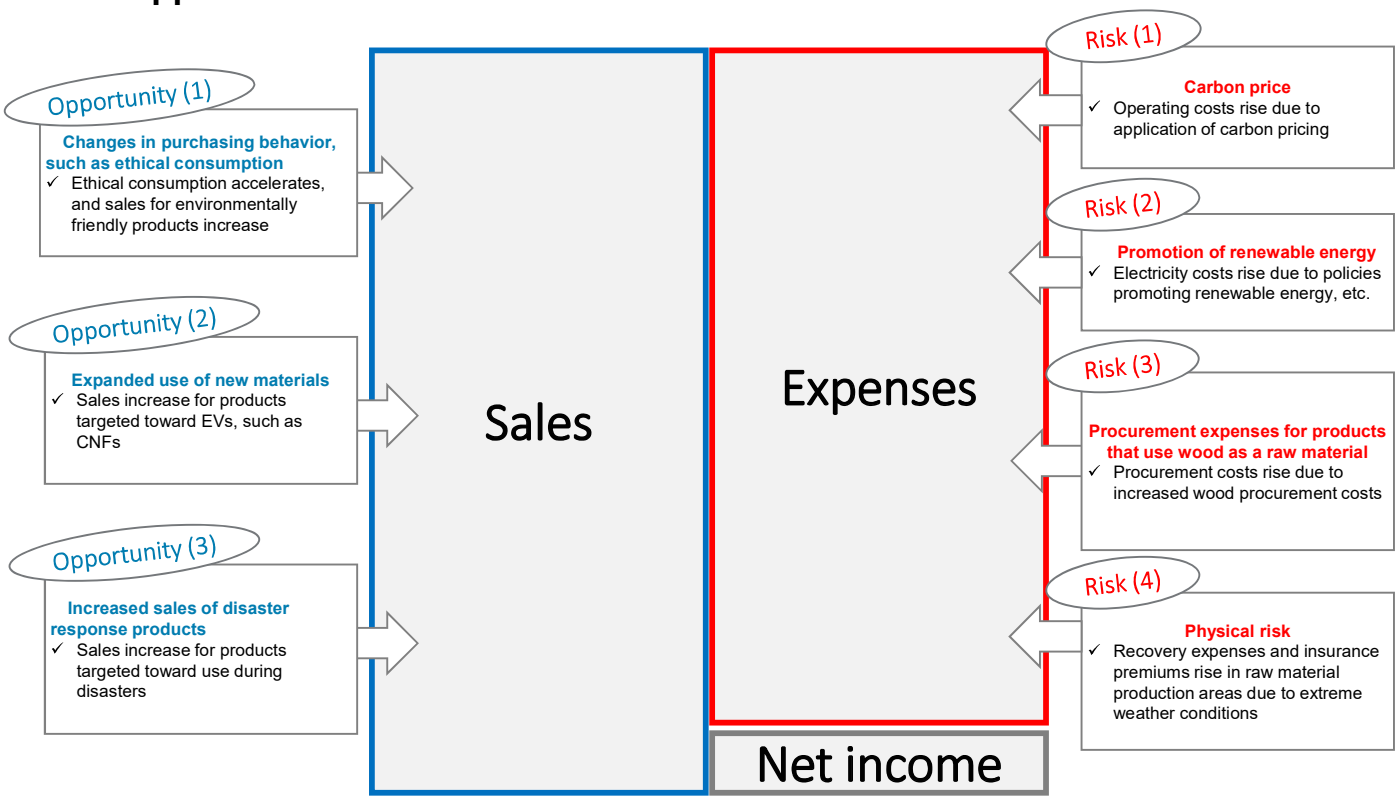

Image of business impacts evaluation

Step 2 3 4 5

日本製紙グループ NIPPON PAPER GROUP

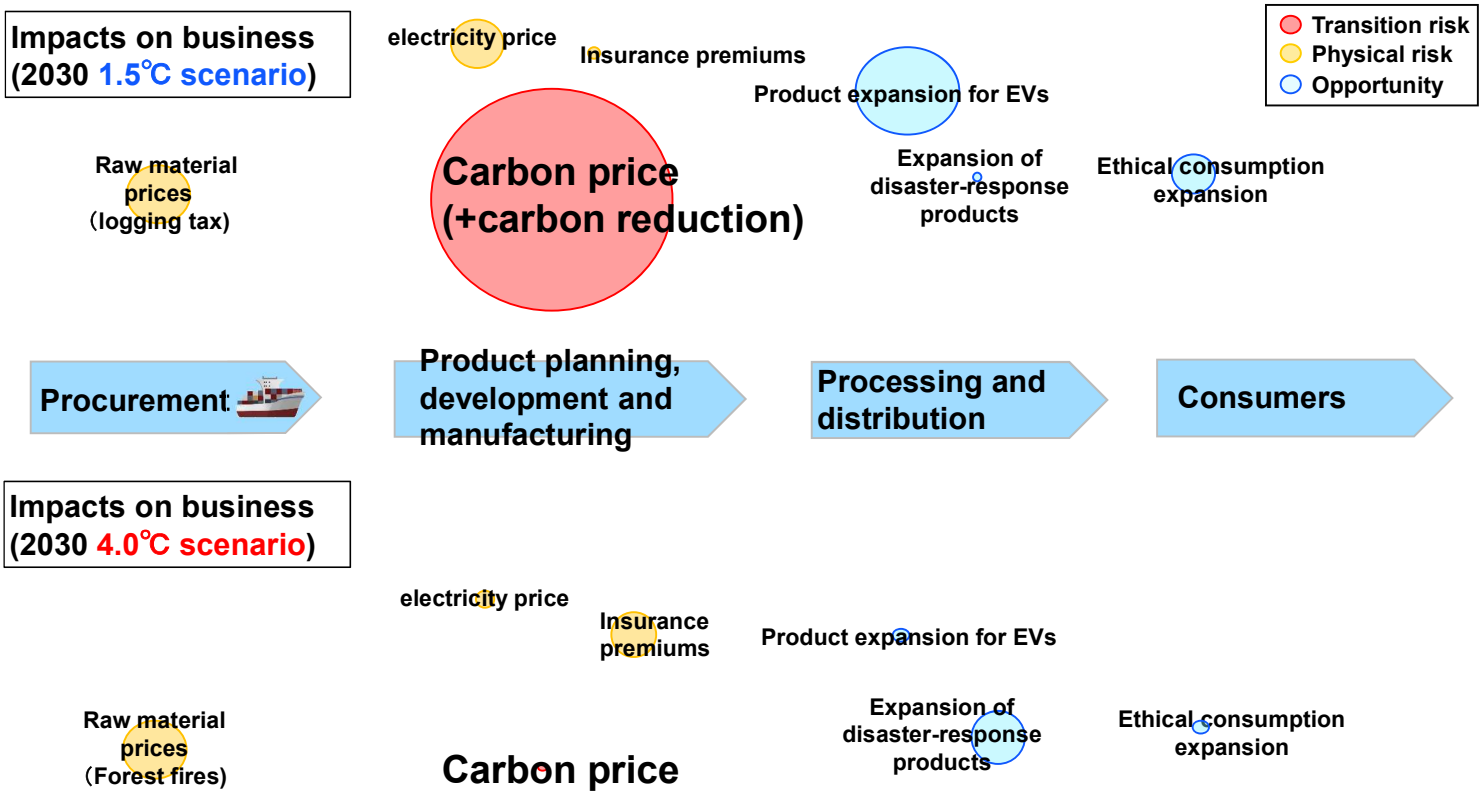

Image of business impacts evaluation

Step 2 3 4 5

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Impacts on business (2050 1.5℃ scenario)

- Transition risk
- Physical risk
- Opportunity

electricity price

Insurance premiums

Product expansion for EVs

Raw material prices (logging tax)

Carbon price (CN achieved)

Expansion of disaster-response products

Ethical consumption expansion

Procurement → **Product planning, development and manufacturing** → **Processing and distribution** → **Consumers**

Impacts on business (2050 4.0℃ scenario)

electricity price

Insurance premiums

Product expansion for EVs

Raw material prices (Forest fires)

Carbon price

Expansion of disaster-response products

Ethical consumption expansion

Countermeasures : measures to risks

Step 2 3 4 5

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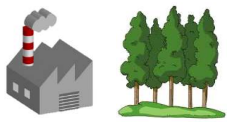
We will focus on addressing rising carbon prices, as measures here were found in our investigation of risk responses to have a significant impact

Measures for rising carbon prices	**(1) Change fuels to reduce the amount of fossil fuels used** (Reduce GHG emissions (Scope 1 + 2) by 45% compared to FY2013 levels by 2030) Non-fossil energy use ratio of 60% or more (Aim to achieve carbon neutrality by 2050) **(2) Maximize the value of forests** (Improve the CO2 fixation rate in overseas afforestation by 30% compared to FY2013 levels) **(3) Promote a modal shift (Nippon Paper Industries Co., Ltd. paper and cardboard business)** Reduce CO2 emissions during product transportation by 23% compared to FY2020 levels



Summary of each analysis step

Analysis steps	Analysis details	Analysis results
Step 2 Significance assessment of risks/ opportunities	■ Identify risks / opportunities ■ Risk significance assessment	■ Opportunities: Rising sales of environmentally friendly products due to accelerating ethical consumption, increased sales of new material products such as CNFs, increased sales of disaster response products, and maximization of forest value ■ Transition risks: Carbon tax, rising electricity costs due to promotion of renewable energy sources and soaring procurement costs for raw materials (mainly wood, etc.) caused by decarbonization ■ Physical risks: Increased costs such as additional investment for damage at production areas and facility recovery as well as increased insurance premiums due to increasingly extreme weather conditions
Step 3 Identify and define range of scenarios	■ Organization of quantitative information necessary for worldview formulation ■ Formulation of future worldviews	■ 2030, 2050: Analysis of 1.5/4ºC scenarios ➢ 1.5ºC: A world in which a global consensus is formed and policies and regulations are strengthened with the aim of decarbonization, which include drastic changes in business models and the introduction of border carbon taxes ➢ 4ºC: A world in which physical risks increase, and it is necessary to build strong plant facilities and supply chains
Step 4 Evaluate business impacts	■ Analysis of the future financial impact from climate change	■ In the 1.5ºC scenario (as of 2050), the greatest risk is rising carbon prices ■ In the 4ºC scenario (as of 2050), the greatest risk is rising wood prices caused by forest fires
Step 5 Countermeasure definition	■ Consider the direction of measures to address climate change risks/opportunities	■ Reduce the risk from carbon pricing ➢ Change fuels to reduce the amount of fossil fuels used ➢ Promote a modal shift, etc. (focused on the domestic paper/cardboard business) ■ Expand opportunities by maximizing the value of forests ➢ Improve the CO2 fixation rate in overseas afforestation

Challenges and planning for the future

For the next period and beyond, we will proceed with (1) through (4)

1 Ensure governance is in place

2 Assess materiality of climate-related risks

- Market and Technology Shifts
- Reputation
- Policy and Legal
- Physical Risks

3 Identify and define range of scenarios

Scenarios inclusive of a range of transition and physical risks relevant to the organization

4 Evaluate business impacts

Impacts on:
- Input costs
- Operating costs
- Revenues
- Supply chain
- Business interruption
- Timing

5 Identify potential responses

Responses might include:
- Changes to business model
- Changes to portfolio mix
- Investments in capabilities and technologies

(1) Examine specific measures for risks / opportunities at each head office
(2) Brushing-up of assessment (review of growth/market forecasts)
(3) Expand scope to include overseas group companies

6 Documentation and disclose

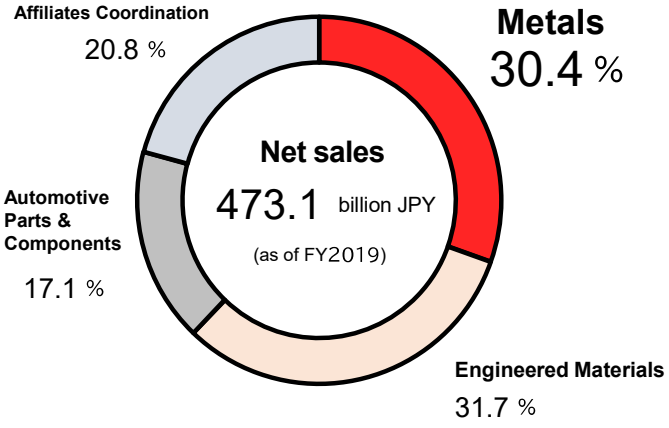
(4) Information disclosure (Integrated Report, ESG Data Book)

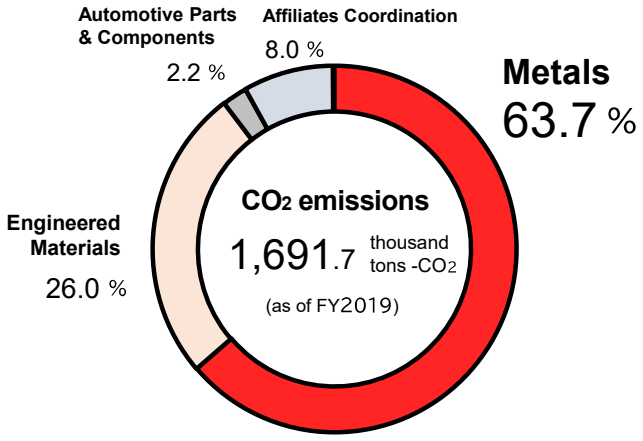
Materials

- ✓ Practice Case① : GUNZE LIMITED
- ✓ Practice Case② : Shin-Etsu Chemical Co., Ltd.
- ✓ Practice Case③ : Nippon Paper Industries Co., Ltd.
- ✓ **Practice Case④ : Mitsui Mining & Smelting Co., Ltd.**
- ✓ Practice Case⑤ : UACJ Corporation

[Business covered in this analysis]

We cover the company's metal business,
which accounts for approximately 30% of all sales



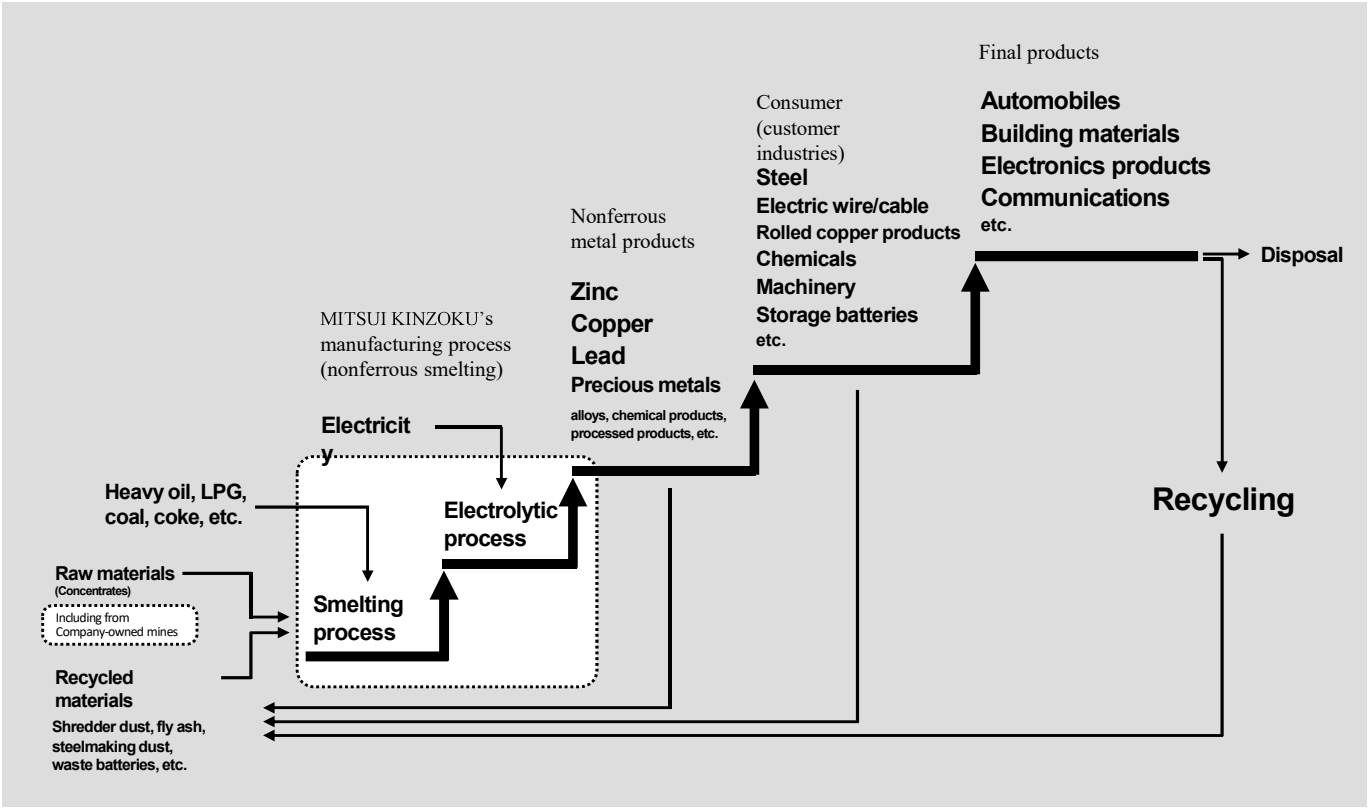


Metal business: Business structure and products

Metal Sector	Lead & Zinc Division	Zinc / Zinc-based alloys / Lead / Tin / Antimony trioxide / Bismuth
	Copper & Precious Metals Division	Copper / Gold / Silver / Sulfuric acid
	Mineral Resources Division	Zinc concentrate / Copper concentrate / Geothermal steam

[Business covered in this analysis]

Metal business supply chain and material flow



[Business covered in this analysis]

Metal business: Core business locations

Miike

Miike Smelting Co., Ltd.
Shinkaimachi, Omuta-shi, Fukuoka

Hikoshima

Hikoshima Smelting Co., Ltd.
Hikoshima-nishiyamacho, Shimonoseki-shi, Yamaguchi

Takehara

Takehara Refinery
Shiomachi, Takehara-shi, Hiroshima

Hibi

Hibi Smelter
Hibi, Tamano-shi, Okayama

Kamioka

Kamioka Mining and Smelting Co., Ltd.
Shikama, Kamiokacho, Hida-shi, Gifu

Hachinohe

Hachinohe Smelting Co., Ltd.
Hamanayachi, Kawaragi, Hachinohe-shi, Aomori

[Assessment of risk significance]

Future climate changes will bring significant risks and opportunities to the metal business

＊ Only items with a "high" impact rating have been listed

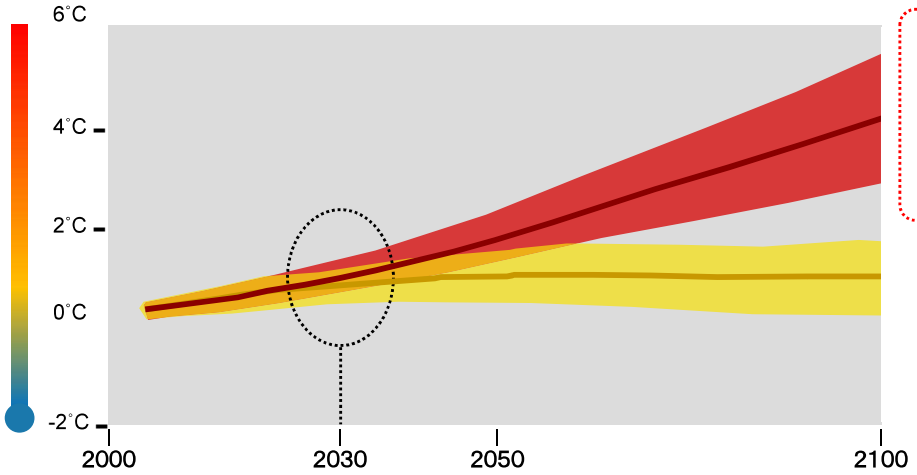
Item <Main category>	<Subcategory>	Predicted impact on business <Risks>	Predicted impact on business <Opportunities>
Transition risks	**Increase in carbon pricing**	● The introduction of carbon taxes or increases in the coal tax rate could increase costs for raw material procurement, product manufacturing, and logistics ● The nonferrous metal industry is at risk of incurring a larger cost burden than other industries as it consumes a large amount of energy for mining, ore processing, and melting	● We can establish low-coke smelting technology through methods such as developing beneficiation techniques to improve metal grades
	Changes in energy costs	● Electricity prices and energy prices from crude oil and similar are predicted to increase due to changes in the supply-demand balance ● It will be necessary to make investments toward increasing energy efficiency in the manufacturing process for nonferrous metals which have particularly high energy consumption	● The company can gain an advantage in terms of total energy output level by increasing the ratio of recycled materials and eliminating the process from mining to concentration (beneficiation) ● We can reduce the price of energy by strengthening the demand response of the electrolytic process as a means to level out the large fluctuations in renewable energy
	Changes in product prices/ demand	● Tighter regulations on mining for metals with increased demand due to trends toward electrification and renewable energy may lead to increases in response costs ● Higher market prices due to increased costs for mining raw materials will accelerate the substitution of other products in place of MITSUI KINZOKU's, resulting in lower sales	● Demand for zinc, platinum, copper, nickel, lithium, and cobalt may increase due to progress in electrification, etc. ● Demand will increase for the following materials in the following areas: zinc/platinum for automobiles, copper for energy-related facilities and equipment, lithium/cobalt/nickel for battery materials ● Demand for copper used in renewable energy-related facilities and equipment will grow with the spread of renewable energy over society as a whole
	Changes in reputation with customers	● Increased interest from client companies in environmental measures such as RE100 will lead to a preference for companies who have made advances in such measures. Because of this, additional response costs will be incurred due to the need to make manufacturing processes low-carbon, and PL/BS will be impacted as a result	● Proactive efforts to address ESG issues can be expected to lead to enhanced competitiveness and a stronger advantage for the company ● We can strengthen competitiveness from increased collection and use of environmentally friendly raw materials and switching to a product lineup with high added value from an environmental perspective
Physical risks	**Extreme weather conditions**	● Extreme weather could have a significant impact on production sites and supply chains, leading to shutdowns, suspension of logistics functions, and increased response costs ● Extreme weather may affect slag storage sites and lead to violations of laws and regulations due to spillage of hazardous substances ● Insurance premiums for weather insurance will increase	● Other sites may be substituted into BCP plans for other plants even if a certain site has been damaged by leveraging the strengths of having multiple sites (zinc/lead) ● We can use permits for industrial waste treatment to contribute toward local communities and the company's revenue through active initiatives toward disposing waste from natural disasters ● Processing costs may be reduced if demand is secured for slag as a construction material for seawalls and breakwaters
	Increase in average temperatures	● Increased heat stress and an increase in infectious diseases may lead to lower productivity for workers, as well as accidents ● Higher temperatures may cause forest fires that damage infrastructure, etc.	● We could differentiate itself from domestic and overseas competitors by using IOT and Digital Transformation initiatives to improve working environments, enhance productivity, and maintain stable operations

[Scenario group definition]

For climate change, which has a high degree of uncertainty, we will use two scenarios to study society in 2030

[Projected average global surface temperature change]

(compared with the average from 1986-2005)



(Source) Simplified form of AR5 SYR Table SPM.6

Definition of 4˚C (2.7˚C+) scenarios

4˚C scenario:
3.2-5.4 ˚C higher than pre-Industrial Revolution levels if no additional measures against global warming are taken.

Over 2˚C (2.7˚C-4˚C) scenario:
2.7-4.0˚C higher than pre-Industrial Revolution levels if no additional measures against global warming are taken.

2˚C scenario:
0.9-2.3˚C higher than pre-Industrial Revolution levels if strict measures are taken

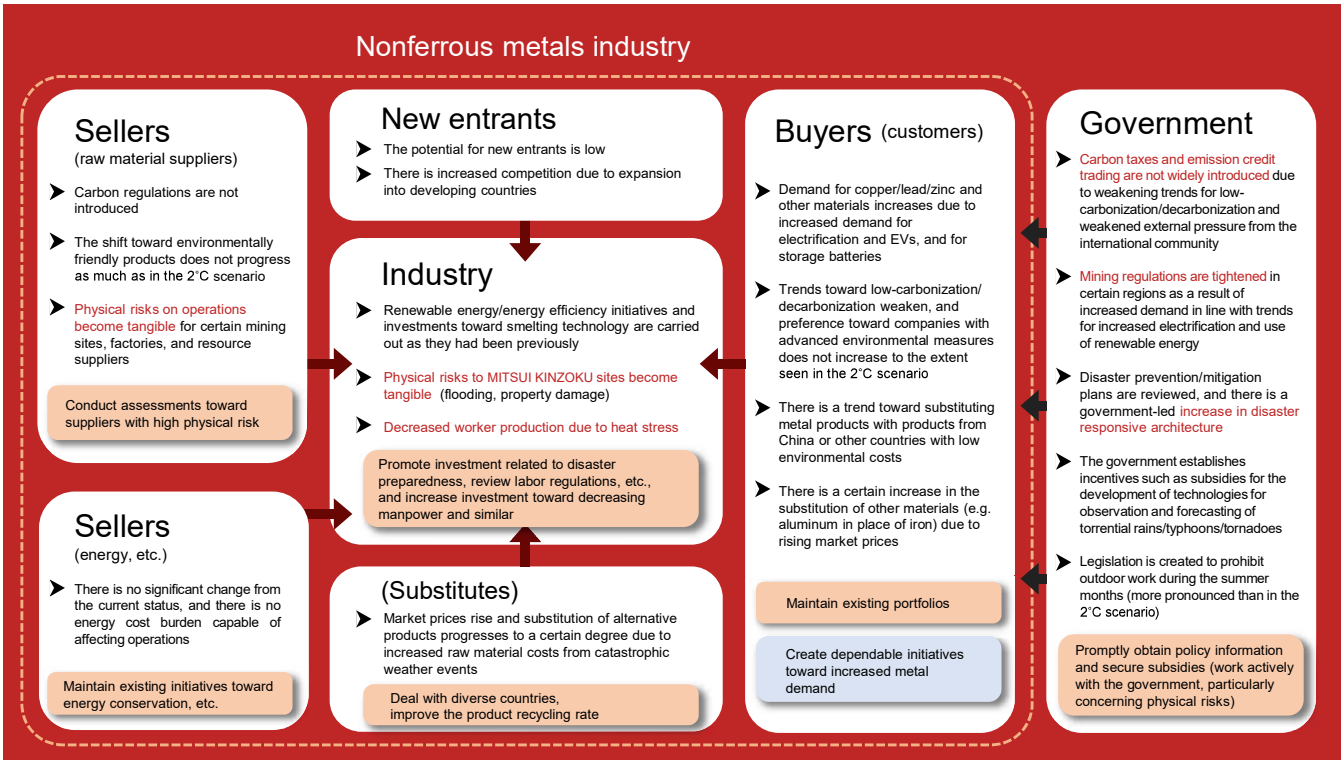
The TCFD recommendations for scenario analysis suggest that multiple temperature range scenarios be selected, including those below 2˚C

[Scenario group definition]

The 4°C worldview in 2030 (temperatures of 2.7°C and higher)

Physical risk increases as low-carbon/decarbonization trends weaken

: Actions for responding to risks
: Actions for seizing opportunities

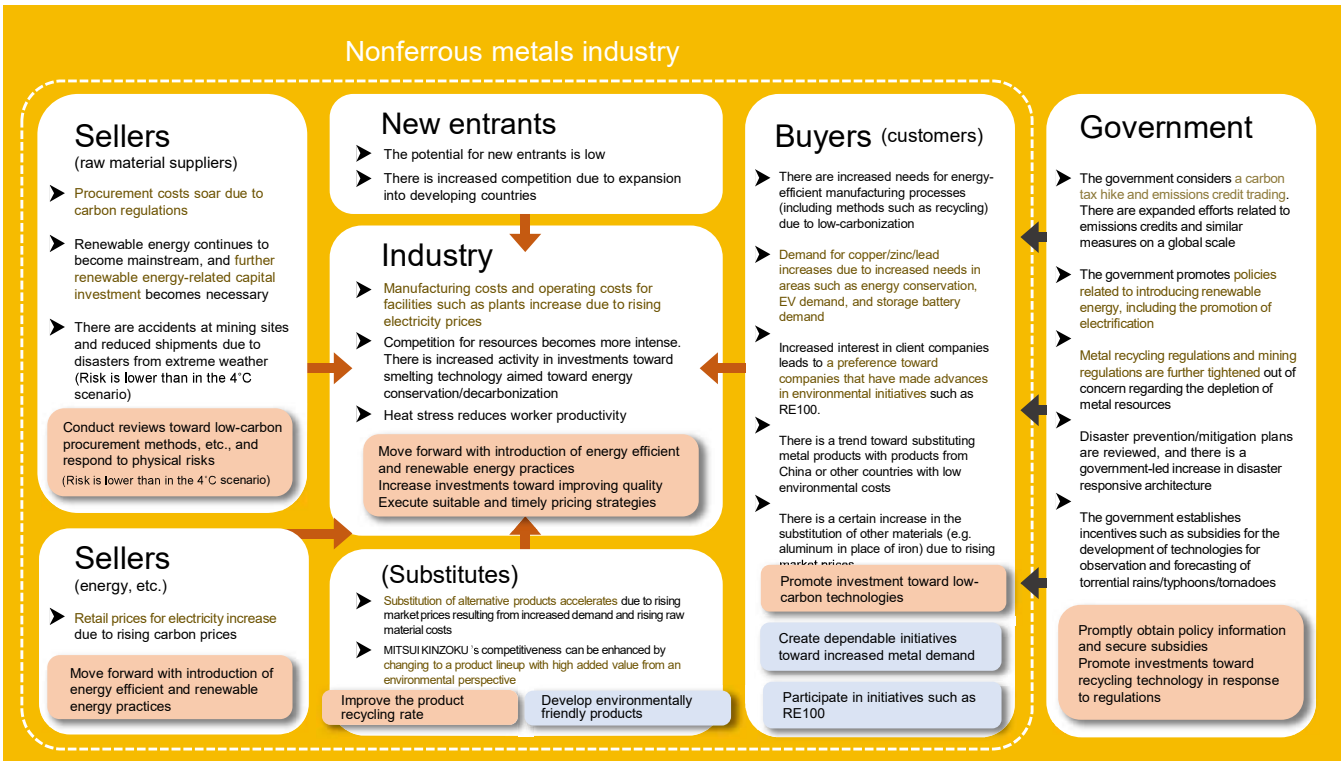


[Scenario group definition]

The 2°C worldview in 2030

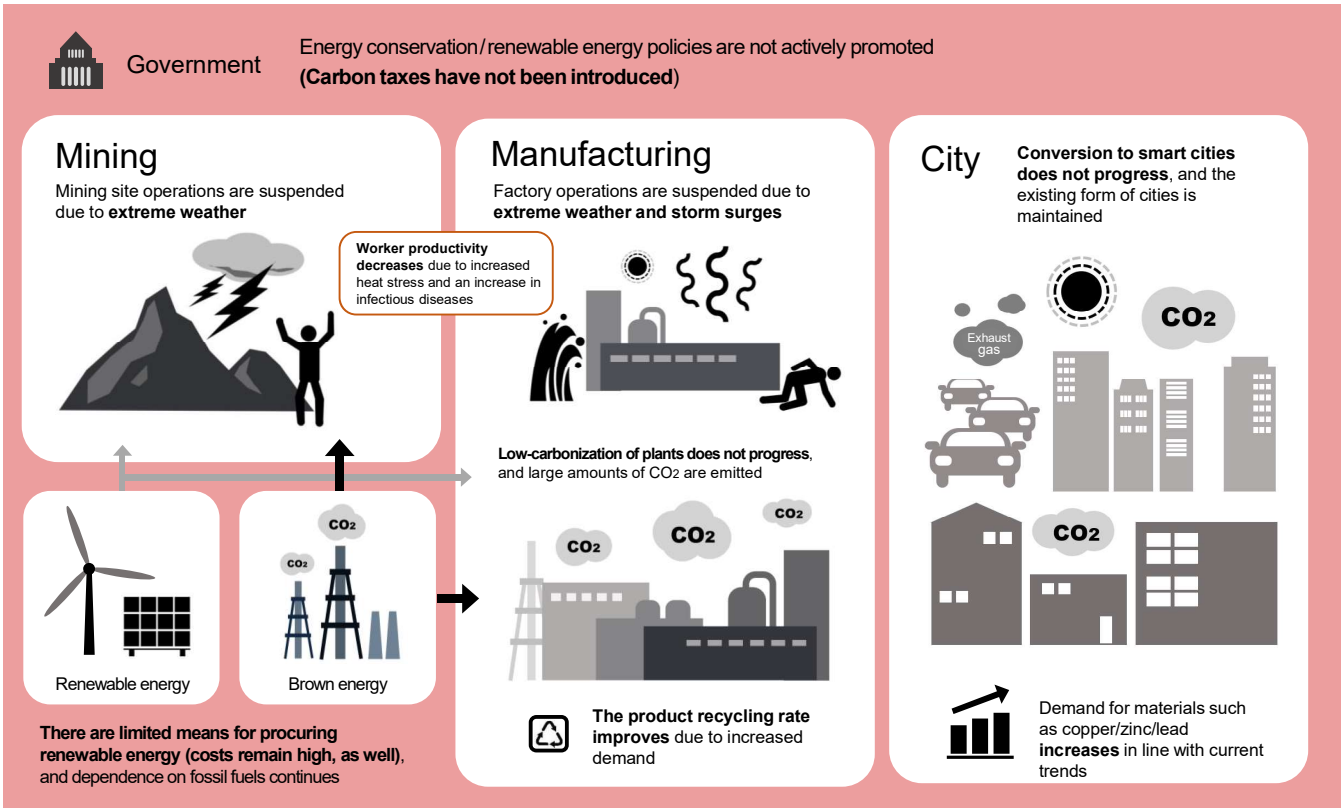
Expansion of carbon regulations and other policies result in the need for introduction of renewable energy and investment in low-carbon technologies

: Actions for responding to risks
: Actions for seizing opportunities



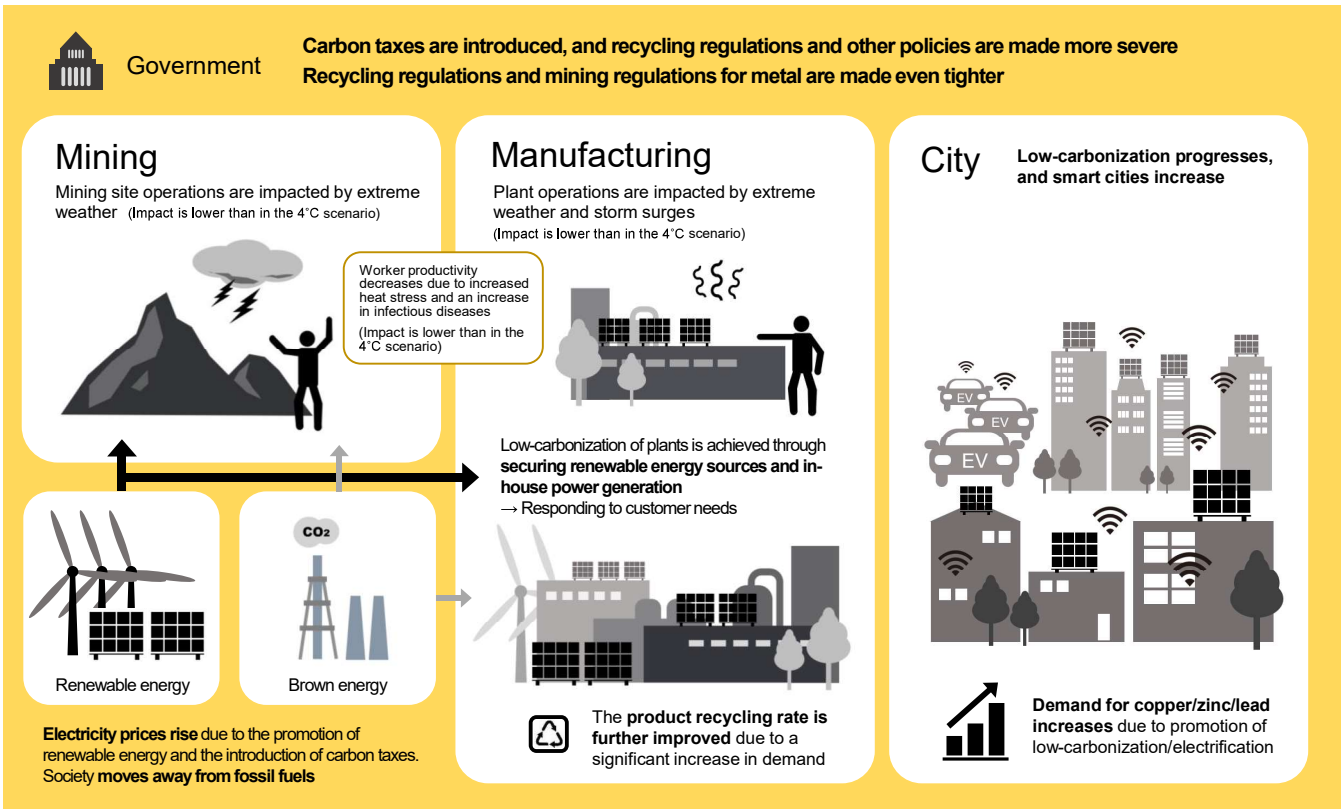
[Visual representation of a 4˚C scenario future society]

Physical risk increases as low-carbonization/decarbonization does not progress



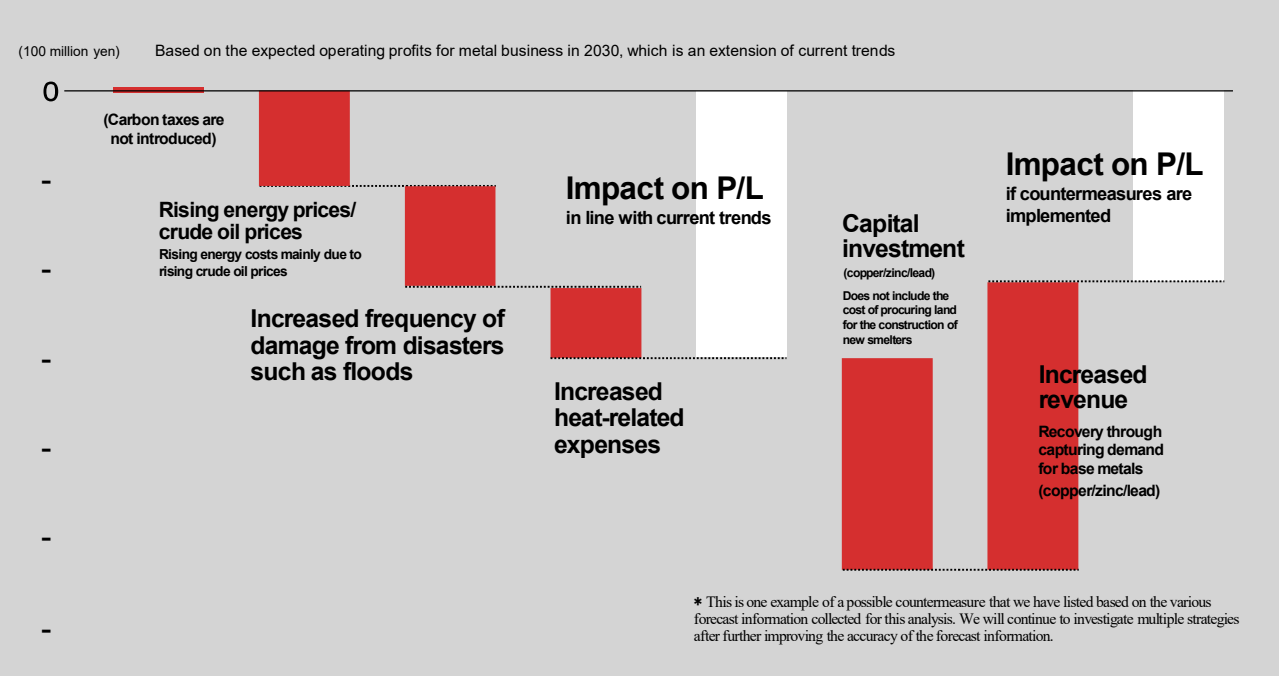
[Visual representation of a 2˚C scenario future society]

Demand for nonferrous metals increases due to the global promotion of low-carbonization initiatives



[Assessment of impact on business: 4˚C scenario]

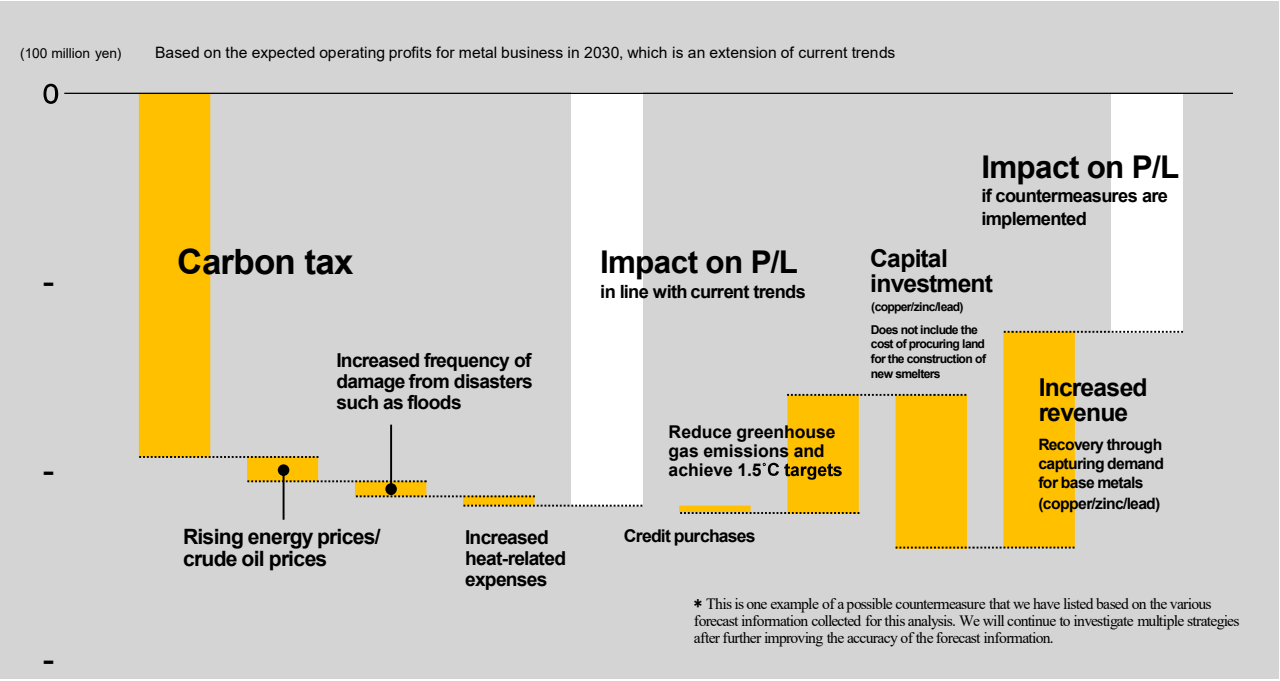
In the 4˚C scenario, while the impact of physical risks increases, demand for base metals also increases



In the 4˚C scenario, it will be necessary to focus particular attention on investigating countermeasures for physical risks in addition to responding to the expected increase in demand for base metals

[Assessment of impact on business: 2˚C scenario]

In the 2˚C scenario, carbon tax becomes a significant factor for reduced revenue, and strategies toward minimization are essential



In the 2˚C scenario, approximately half of the impact of carbon tax can be made up for by weighting energy conservation and similar efforts to curb CO_2 emissions and capturing growing demand

[Definition of countermeasures]

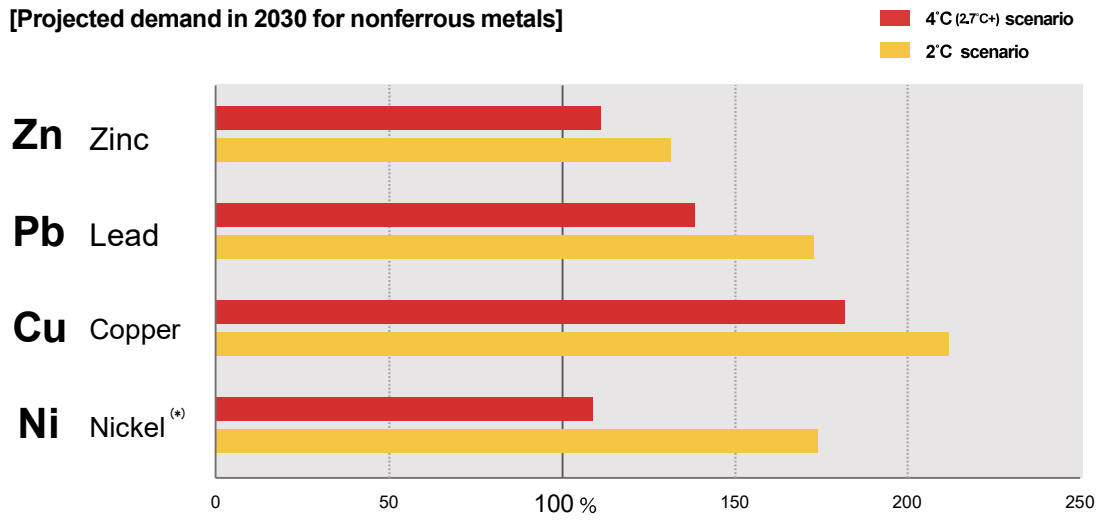
We investigate the direction for countermeasures toward responding to risks and seizing opportunities

Impact estimation items	4˚C scenario	2˚C scenario		Countermeasures corresponding to risks and opportunities
Increases in carbon pricing	Carbon tax is not introduced in the 4˚C scenario	▼▼▼	Risk	Implementation of ambitious target settings (e.g. SBT targets)
			Risk	Introduction of internal carbon pricing
			Risk	Development of low-coke, carbon-free smelting technology and creation of industry rules
			Opportunity	Development of carbon-absorbing technology such as blue carbon
Changes in energy cost	Loss ▼▼	▼	Risk	Establishment of target figures for renewable energy introduction rates
			Risk	Establishment of long-term targets for the reduction of energy used
			Opportunity	Improvement of the rate of recycled materials (energy conservation)
			Opportunity	Strengthening of demand response measures
			Opportunity	Introduction of renewable energy generation equipment to the roofs of plant buildings and unused company land
			Opportunity	Development toward off-grid buildings with hydrogen storage alloys
Changes in demand for copper, lead and zinc	▲ Profit	▲▲	Opportunity	Investment toward developing products using copper and other metals
			Opportunity	Recycling of metal scrap collected from customers
			Opportunity	Improvement of the rate of recycled materials (collection of lithium and other valuable metals)
			Op. / Risk	Reevaluation of portfolios in consideration of multiple scenarios
Extreme weather conditions	▼▼	▼	Risk	Company-wide systemization of spare parts management aimed toward swift recovery after incurring damages
			Risk	Construction work toward disaster preparedness at closed mines
			Risk	Development of low-environmental burden/low-cost processing technologies at closed mines
			Risk	BCP sophistication, including verification of the cost-effectiveness of disaster prevention measures
			Opportunity	Strengthened processing of waste from natural disasters
			Opportunity	Formulation of product sales strategies tailored to national land resilience needs
Increased average temperatures	▼	▼	Risk	Implementation of FA operations at high-temperature work sites in the smelters
			Risk	(Development of a system for remote control of mining machinery)

[Future initiatives]

For metal business, we performed regular monitoring in order to increase the certainty of the scenarios

[Projected demand in 2030 for nonferrous metals]

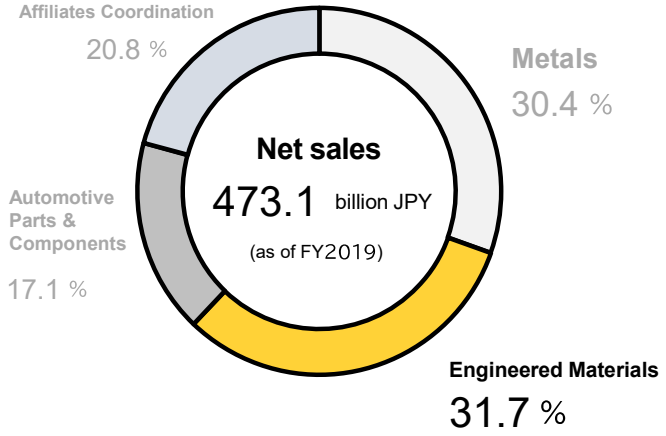


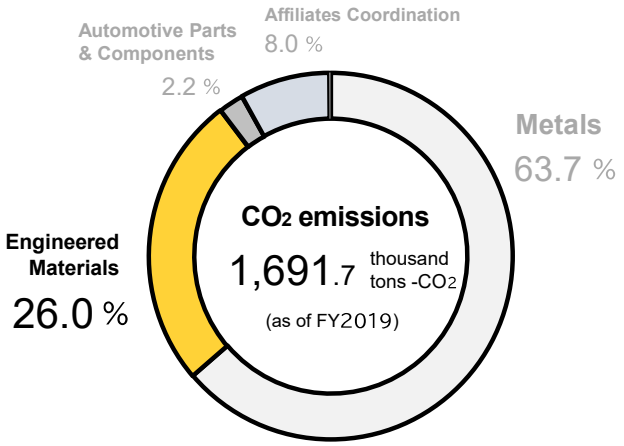
(Source, reference) Sebastiaan Deetman, World Bank et al.
For copper, we used the average demand from 2010 to 2015; for other metals, the projected figures are based on using the demand for 2013 as 100%

(*) Nickel is not currently a main product in the company's metal business, but we covered it here as a reference for metals used as raw materials by other divisions, together with cobalt and platinum.

[Future initiatives]

We will move on to analyze other business divisions after ending scenario analysis for metal business with the support of this project





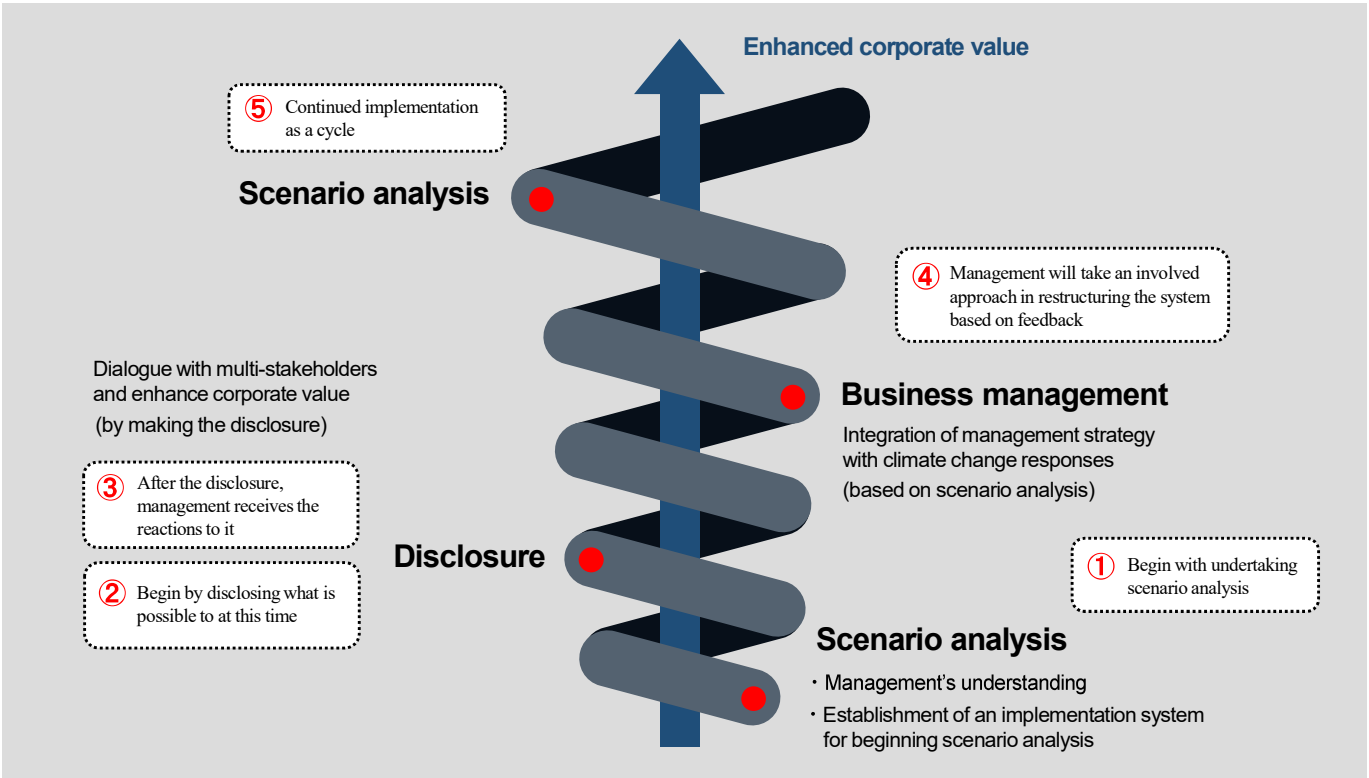
Engineered Materials: Business structure and products

Engineered Materials Sector	Engineered Powders Division	Engineered powders / Rare metals / Battery materials
	Catalysts Division	Catalysts used in exhaust gas purification (for automobiles, for motorcycles, general purpose)
	Copper Foil Division	Electro-deposited copper foil for printed wiring boards / Copper foil with carrier film
	PVD Materials Division	Sputtering targets
	Ceramics Division	Refractories / Fine ceramics / Molten aluminum filtration devices

[Future initiatives]

The goal is to integrate climate change with management and enhance corporate value

With the scenario analysis as a starter, we will go on to implement a continuous cycle of disclosure and system restructuring (integration with management strategy)



Materials

- ✓ Practice Case① : GUNZE LIMITED
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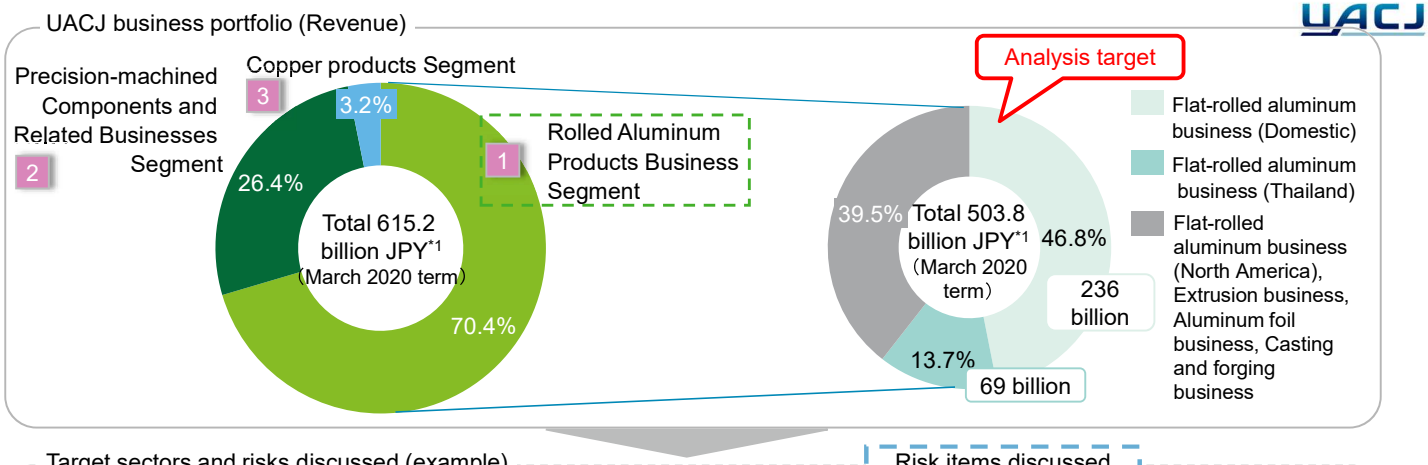
- ✓ Practice Case③ : Nippon Paper Industries Co., Ltd.
- ✓ Practice Case④ : Mitsui Mining & Smelting Co., Ltd.
- ✓ **Practice Case⑤ : UACJ Corporation**

UACJ Company Profile

Principal Business	Manufacture and sales of rolling products, casting products, forged products and precision-machined products of nonferrous metals, including aluminum and alloys thereof.
Capital/Net sales (Year ending March 2020)	52,277 million JPY / 615.2 billion JPY
Employees (As of March 31, 2020)	Consolidated：9,927 Unconsolidated：2,953
Production capability	1.23 million tons/year（Japan's largest and the world's fourth largest）
History	Start of aluminum business 1898 (first aluminum rolling in Japan) Registered establishment in 1964, Founded in 2013 as a result of the business integration of Furukawa-Sky and Sumitomo Light Metal

【Scenario analysis targets】

Business: We targeted the "flat rolled products" business within the "rolled aluminum products" business segment. The significance of the business in the portfolio and the representativeness of the business were considered
Locations: Japanese and Thai production sites



Target sectors and risks discussed (example)

	Sector (1)	Sector (2)	Products example
1	Rolled Aluminum Products Business Segment	**Flat-rolled products business**	Beverage products (Body materials, Closure materials) Automobiles (Aluminum brazing sheets, Heat exchanger materials) 
		Extrusion business	Automobiles (Sub-frames, Heat exchanger materials, Piping materials), IT products
		Aluminum foil business	Pharmaceutical products, Food packaging, Batteries
		Casting and forging business	Automobiles (Heat exchanger materials)
2	Precision-machined Components and Related Businesses Segment	Automotive Parts Business	Automobiles (Bumpers, Sunroof guides)
		Precision-machined components business	Building materials, Industrial equipment

Risk items discussed

Transition risks
- Policy
  - ✓ Carbon price, other regulations (Recycling regulations, water regulations etc.)
- Market
  - ✓ Changes in energy price、Increased price of raw materials
- Reputation
  - ✓ Changes in customer behavior, changes in investor's reputation

Physical risks
- Chronic
  - ✓ Increase in average temperature
- Acute
  - ✓ Increasing severity of extreme weather

Sources: UACJ's presentation materials of financial results for FY2020 (May 2021), UACJ's integrated report (March 2021)

2 【Risk significance assessment: risks and opportunities】
Investigated risks/opportunities ranging from procuring raw materials to disposal/recycle

(1) Transition risks, opportunities (1/2)

Risk items		Business impact		Evaluation
Small classification	**Index**	**Risks**	**Opportunities**	
Carbon price (carbon tax / carbon border adjustment mechanism)	Revenue Expenditures	➢ Procurement costs for imported raw materials / materials increase ➢ Electricity costs increase	➢ Sales and revenue increase due to reduced competitiveness of imported competitor products from countries/regions with insufficient GHG emissions controls	High
Carbon emissions targets / policies in each country (Emissions trading / Mandatory Carbon Footprint Reporting etc.)	Revenue Expenditures	➢ Raw material procurement costs / manufacturing costs increase due to expenses for purchasing carbon credits ➢ Expenses increase for updates / introduction of equipment such as aluminum scrap melting furnaces and energy-saving equipment, and enabling changeover to other fuels ➢ Production management costs increase due to mandatory carbon footprint recording and reporting	➢ Carbon tax and other costs can be reduced by reducing procurement of energy-intensive raw materials (virgin aluminum) ➢ Demand associated with switching from other materials increases due to tighter regulations ➢ There are opportunities to increase revenue by taking advantage of aluminum's light weight, high thermal efficiency, and high recyclability	Medium
Recycling regulations／policies in each country	Revenue Expenditures	➢ Prices increase due to increased demand for scrap metal ➢ Investment costs to introduce new equipment and innovative technologies to strengthen recycling technology and alloy development capabilities increase ➢ Market advantage over competitors / other materials declines due to delays in addressing recycling regulations ➢ Demand for aluminum castings decreases due to an expanding electric vehicle market; the current recycling framework does not function adequately	➢ Revenue increases through sales promotion focused on superior recyclability ➢ Business base expands and revenue increases through "closed-loop recycling" targeting automobile manufacturing processes, etc.	High

(1) Transition risks, opportunities (2/2)

Risk items		Business impact		
Small classification	Index	Risks	Opportunities	Evaluation
Changes in energy mix	Revenue Expenditures	➢ Energy costs (electricity, fuel, etc.) increase ➢ Investment in SCOPE1 decarbonization increases	➢ Energy conversion in aluminum smelting countries progresses, resulting in reduced GHG emissions from aluminum smelting processes and improved competitiveness against other materials	High
Developing next-generation technologies	Expenditures	➢ Sorting technology for recycled raw materials does not advance, resulting in lower yields and production capacity ➢ Revenue decreases due to weaker competitiveness brought on by delays in developing technologies related to GHG emissions reduction	➢ Costs associated with the use of raw materials are mitigated and reduced by the spread of closed-loop recycling ➢ Manufacturing costs are mitigated and reduced by increased use of raw materials and improved manufacturing yields resulting from the consolidation of alloys ➢ By developing materials suitable for recycling, UACJ can increase revenue from increased demand for environmentally branded products (SMART®) ➢ UACJ can raise the level of demand by developing smelting methods with low GHG emissions	High
Changes in customer behavior	Revenue Expenditures	➢ There is increasing environmental awareness among customers and users, and failure to comply with environmental labeling, etc., will result in declining sales from customers pulling away ➢ If decarbonization measures are not accelerated through the entire value chain, the environmental branding of UACJ and its business will be damaged and sales will decline ➢ Customers and users will pull away from products with low recycled content or that cannot use low carbon aluminum, resulting in a decrease in revenue from lower sales	➢ The recyclability of aluminum is reevaluated, and revenue increases as orders from cutting-edge environmental companies increase ➢ Environmental responsiveness becomes a value for UACJ and its products, improving reputation with customers and creating new business opportunities ➢ UACJ can increase its revenue by expanding recognition of its high recycling rate / low carbon aluminum for beverage cans ➢ UACJ can increase its revenue by acquiring ASI certification, etc., in response to customers' requests for environmental friendliness	Medium

2 【Risk significance assessment：risks and opportunities】
Investigated risks/opportunities ranging from procuring raw materials to disposal/recycle

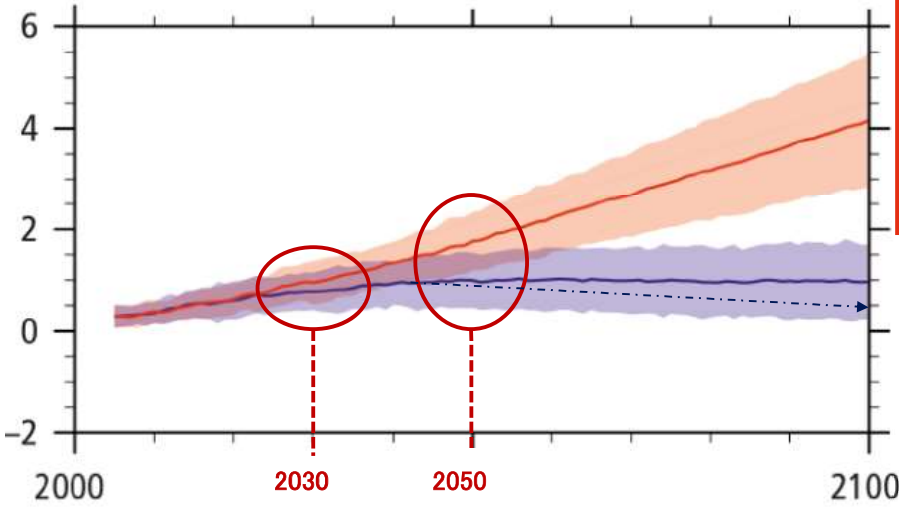
(2) Physical risks, opportunities

Risk items		Business impact		
Small classification	Index	Risks	Opportunities	Evaluation
Increase in average temperature	Revenue	➢ Revenue decreases due to lower production capacity resulting from instability in raw material procurement from impact on mining and transportation ➢ The working environment at manufacturing sites worsens due to higher temperatures, and there is a risk of decreased revenue due to lower productivity and difficulties in hiring personnel ➢ Air conditioning equipment expenses and running costs for addressing the heat increase	➢ Demand for beer and soft drinks increases, and sales grow for packaging materials, providing opportunities for increased revenue ➢ Demand for air conditioning equipment increases, and sales for fin materials grow, creating opportunities for increased revenue	Medium
Increasing severity of extreme weather conditions (cyclones, floods)	Revenue Expenditures	➢ There are operation/shipments shutdowns, suspension of operations at suppliers, loss of confidence and decreased sales due to temporary halts in production caused by extreme weather conditions (flooding and heavy rain) ➢ Expenses for equipment-related countermeasures and damage repair increase due to storm surge and flooding caused by typhoons at manufacturing sites with high risk of flooding ➢ Troubles making delivery deadlines increase due to increased disruptions in the distribution network caused by extreme weather	➢ As a result of increased demand associated with "building national resilience“ as a countermeasure against natural disasters, there is an increase in demand for disaster-prevention products and structural materials / related products that contribute to strengthening infrastructure ➢ Demand for infrastructure development increases, resulting in increased demand for sluice gates and other disaster-prevention products ➢ Demand increases for products (aluminum laminated sheets, etc.) used in evacuation centers, etc.	High

3 【Selected scenario】
We will use two scenarios (1.5℃, 4℃(2.6℃～4℃))to consider society in 2050

UACJ

【Projected average global surface temperature change】
(compared with the average from 1986～2005)



- ✓ **Almost the same temperature changes would occur in the 2℃ and 4℃ scenarios by 2030**
- ✓ **It is important to draw an appropriate transition path focusing on decarbonization by 2050 for each timeframe selected in the scenario analysis**

Definition of 4℃(2.6℃～) scenario

4℃ scenario ：
3.2～5.4℃ higher than pre-industrial Revolution levels if no additional measures against global warming are taken

Over 2℃(2.6℃～4℃) scenario ：
2.7～4.0℃ higher than pre-industrial Revolution levels if no additional measures against global warming are taken

2℃ scenario ：
0.9～2.3℃ higher than pre-industrial Revolution levels if strict measures are taken

1.5℃ scenario ：
We are highly likely to achieve an increase of less than 1.5℃ compared to pre-industrial Revolution levels if a radical transition to a new system is made

The TCFD recommendations for scenario analysis suggest that multiple temperature range scenarios be selected, including those below 2℃

Source：AR5 SYR SPM.6, IEA "ETP2017", UNEP "The Emission Gap Report 2015", IEA "WEO2021", Global Warming of 1.5℃(IPCC)

3 【List of used parameters：Transition risk】
Definition of each of the worldviews based on scientific evidence, etc., from IEA and other sources

Legend： Estimated
※exchange rate： $1=114JPY(based on 12 November 2021)

UACJ

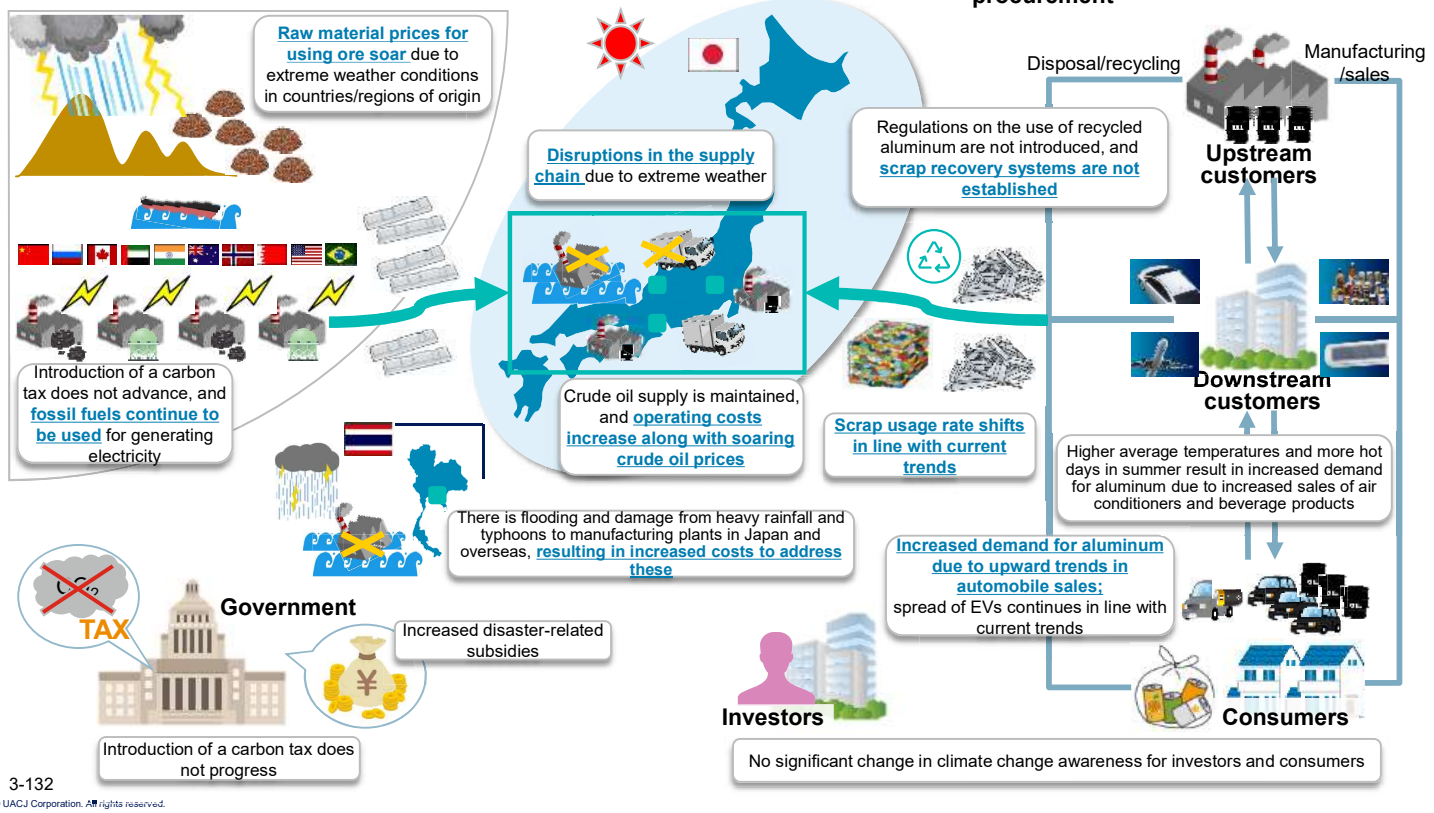
		Baseline (year, values)	2030		2050		Sources
			4℃(over 2℃)	1.5℃	4℃(over 2℃)	1.5℃	
Transition risk	①Carbon tax (JPY/t)	Japan：289 JPY (2021) Thailand：not introduced	Trends in the market	Japan：14,820 JPY (Advanced countries) Thailand:1,710 JPY (Developing countries)	Trends in the market	Japan:28,500 JPY (Advanced countries) Thailand:6,270 JPY (Developed countries) + Border Carbon Adjustment	• Present：Ministry of Environment "Introduction of a tax to combat global warming"、"Recent Developments in Carbon Tax and Border Adjustment Measures"、ICAP(EU-ETS Average in 2020) • 1.5℃：IEA WEO2021
	②Carbon emissions targets/policies in each country (%)	Japan：2013 Thailand：2005	Japan：46% Thailand：20%	Japan：46% Thailand：20%	Japan：100% Thailand：100% (2065-2070)	Japan：100% Thailand：100% (2065-2070)	• Ministry of Foreign Affairs of Japan "Climate Change: Japan's Emission Reduction Targets" • Ministry of Foreign Affairs of Japan "Domestic and International Developments Concerning Carbon Neutrality in 2050" • Agency for Natural Resources and Energy "Basic Energy Plan" • UNFCCC "Thailand's Updated Nationally Determined Contribution"(October 2020)
	③Recycled aluminum utilization rate (%)	World：33% (2020)	World：44% (1.75℃)	World：52%	World：53% (1.75℃)	World：71%	• IAI "1.5 DEGREES SCENARIO A MODEL TO DRIVEEMISSIONS REDUCTION" • National Institute for Environmental Studies, "Estimating the Impacts of Carbon Constraints on Global Metal Production and Use" (2021)
	④Electricity price (JPY/MWh)	Japan：24,692 JPY China：9,805 JPY (2017)	Japan：20,829 JPY China：12,103 JPY	Japan：26,023 JPY China：12,525 JPY	Japan：23,423 JPY China：14,680 JPY	Japan：27,502 JPY China：15,906 JPY	• IEA WEO2018
	⑤Oil price ($/barrel)	World：$42 (2020)	World：$77	World：$36	World：$88	World：$24	• IEA WEO2021
	⑥Projected Demand for Aluminum	World：93 Mt (2018)	–	–	World：244 Mt	World：335 Mt	• CM group, IAI "AN ASSESSMENT OF GLOBAL MEGATRENDS AND REGIONAL AND MARKET SECTOR GROWTH OUTLOOK FOR ALUMINIUM DEMAND"(2020年)
	(Reference) Aluminum Price	World：1,794 $/mt (2019)	World：2,454 $/mt	–	World：3,096 $/mt	–	• World Bank "Commodities Markets Outlook"

3 【List of used parameters：Transition risk, Physical risk】
Definition of each of the worldviews based on scientific evidence, etc., from IEA and other sources

		Baseline (year, values)	2030		2050		Sources
			4℃（over 2℃）	1.5℃	4℃（over 2℃）	1.5℃	
Transition risk	⑦EV Inventory	—（Million Vehicles）	193（million vehicles）	304.2（million vehicles）	945（million vehicles）	1615.6（million vehicles）	• IEA WEO2021
Transition risk	⑧Ethical Consumption Awareness	Purchase intention based on ethical consumption	19% in the home appliances sector, 17% in the automotive sector, etc. (No scenario bifurcation)				• Dentsu "Ethical Consumption Awareness Survey 2020" • Deloitte "Millennial Generation Z Annual Survey 2021"
Physical risk	⑨Rate of temperature increase and increase in midsummer days	12.12 (2020)	12.45	Trends in the market	13.32	Trends in the market	• World Bank,「Climate Knowledge Portal」 • IEA,「World Energy Outlook 2018」
Physical risk	⑩Relationship between temperature rise and air conditioner sales	—	+1.1℃（2020-2039）	+1.0℃（2℃）（2040-2059）	+2.0℃（2020-2039）	+1.3℃（2℃）（2040-2059）	• World Bank "Climate Change Knowledge Portal"（Temperature rise） • Ministry of Environment etc. "Climate Change Observation, Prediction and Impact Assessment Integrated Report 2018 - Climate Change in Japan and its Impacts"
Physical risk	⑪Relationship between rising temperatures and demand for beverage products	—	Mineral water：+1.1% Carbonated water：+2.9% Soft drinks：+1.2% Juice：+3.1%	—	Mineral water：+1.1% Carbonated water：+2.9% Soft drinks：+1.2% Juice：+3.1%	—	• National Observatory of Athens「The Impact of Climate Change on the Pattern of Demand for Bottled Water and Non-Alcoholic Beverages」（2014年）
Physical risk	⑫Increase in aluminum demand by sector	2018	—	Annual growth rate Transportation：3.9% Packaging：3.6% Electrical equipment：2.9%	Transportation：168% Packaging：171% Electrical equipment：146%	Annual growth rate Transportation：3.9% Packaging：3.6% Electrical equipment：2.9%	• CM Group, IAI「AN ASSESSMENT OF GLOBAL MEGATRENDS AND REGIONAL AND MARKET SECTOR GROWTH OUTLOOK FOR ALUMINIUM DEMAND」（2020）
Physical risk	⑬Rainfall, flow rate, and flood frequency	—（2020）	4 times	Trends in the market	2 times	Trends in the market	• Ministry of Land, Infrastructure, Transport and Tourism "Impacts of Climate Change" • Technical Study Group on Flood Control Planning in light of Climate Change, "Study on Flood Control Planning in Light of Climate Change"

3 【Future social image in a 4℃（2.6~4℃）scenario】
No increase in the use of recycled materials, and demand for aluminum will continue as-is; measures to address extreme weather will be important

4℃ 1.5℃



3 【Future social image in a 1.5℃ scenario】 Shift to renewable energy and recycled materials. Establishment of scrap recovery systems and R&D for low carbon products will be important

4℃ | 1.5℃

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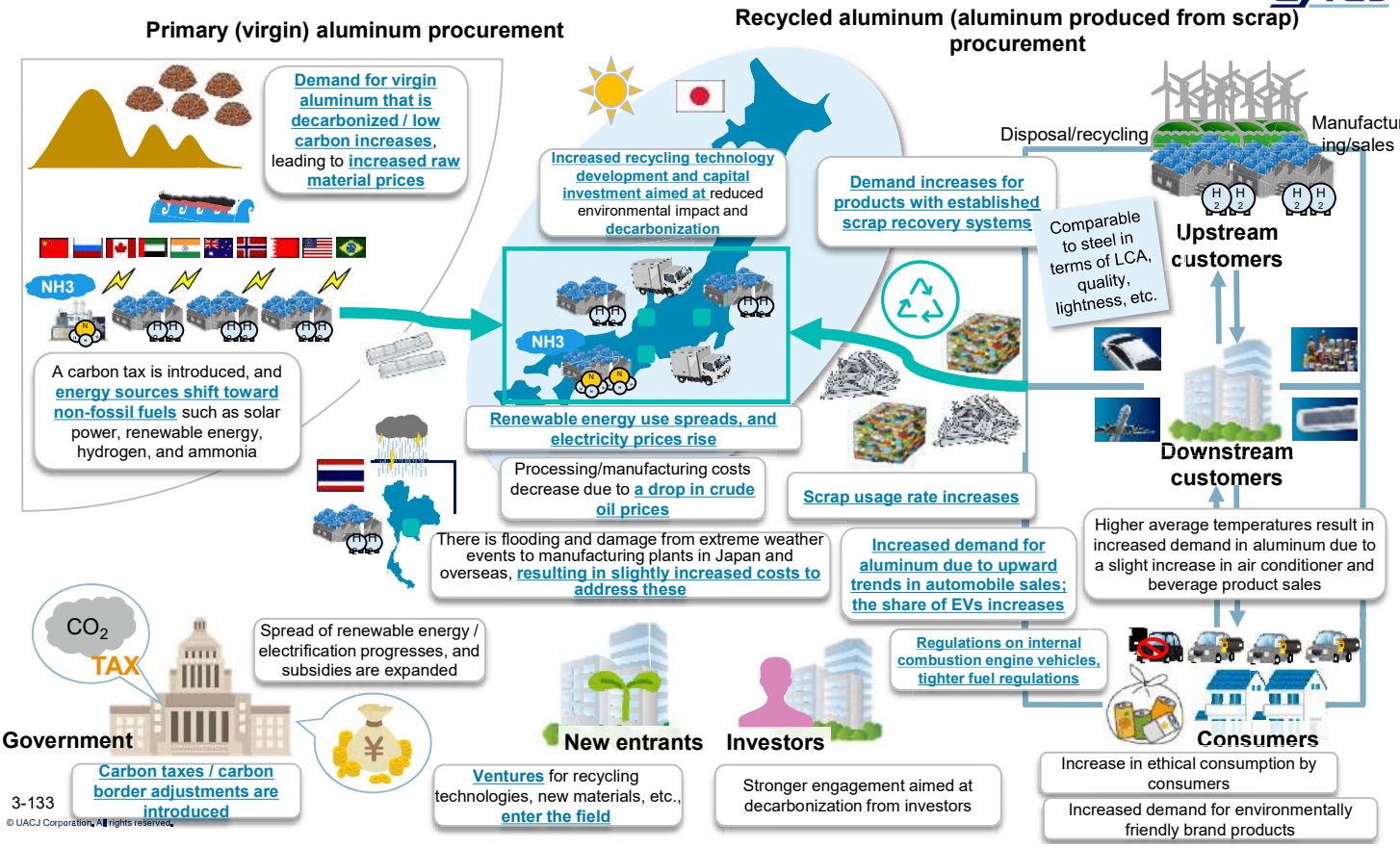
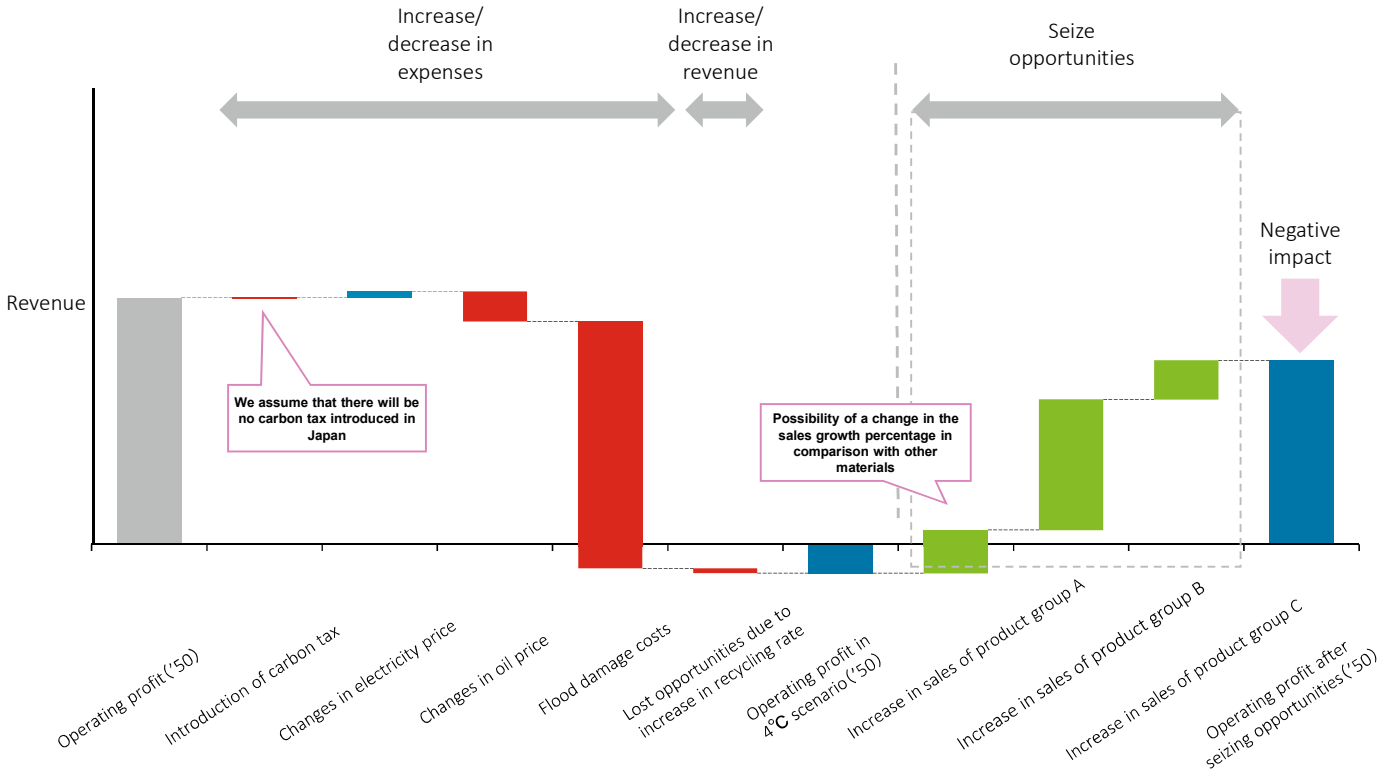


4 【Business impact evaluation：4℃（2.6～4℃）scenario（2050）】 Increased expenses are incurred. Even if further countermeasures are implemented and new opportunities are seized, there is still expected to be a negative impact

4℃, 2050

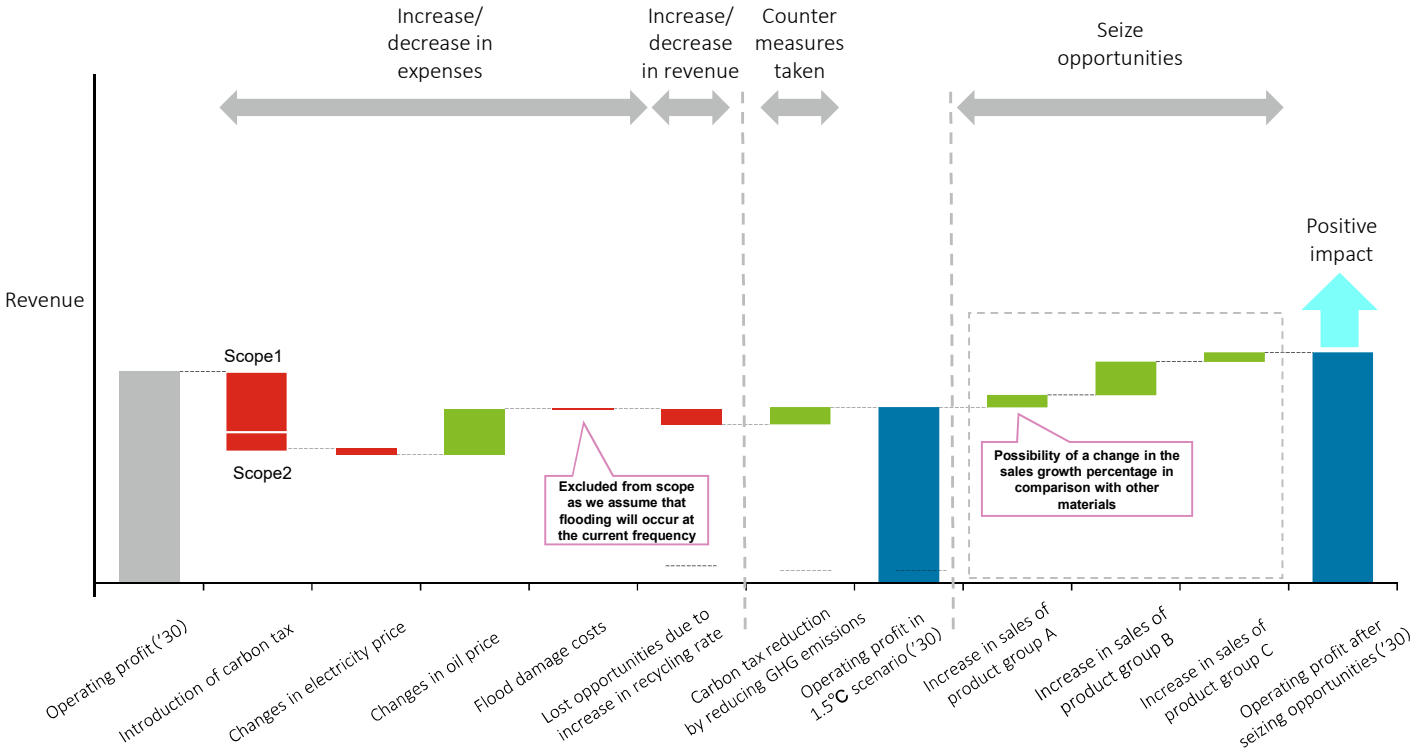


In the 4ºC scenario (2050), physical risks become manifest, and measures against disasters for manufacturing sites, etc., are called for

4 【Business impact evaluation：1.5℃ scenario（2030）】

1.5℃, 2030

Increased expenses are incurred. Positive impact is expected through combining the implementation of further countermeasures and seizing of new opportunities

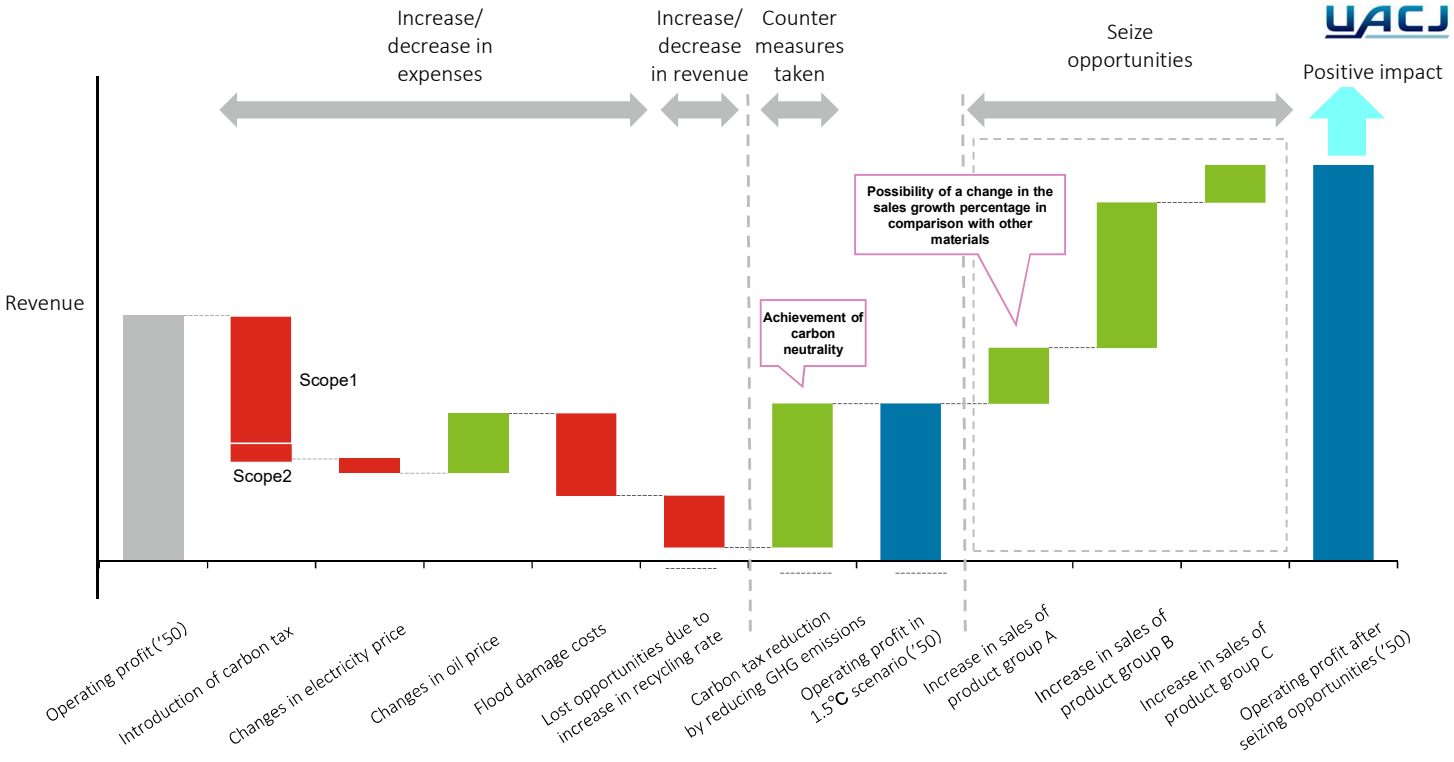


In the 1.5ºC scenario (2030), progress toward decarbonization is called for as countermeasure for the introduction of a carbon tax

4 【Business impact evaluation：1.5℃ scenario（2030）】

1.5℃, 2050

Expenses increase, but a positive impact is expected through combining the implementation of further countermeasures and seizing of new opportunities



In the 1.5ºC scenario (2050), seizing of sales opportunities from responding to shifts and further progress toward decarbonization are called for

5 【Countermeasures for organizational risks】 We need to ensure future group-wide rollout of scenario analysis, maturity level improvement, and monitoring/execution structure

Risk measures | Opportunity measures | Countermeasures for organizational risks

UACJ

Future actions	Action details
Group-wide rollout of scenario analysis	✓ In this scenario analysis, we focused on the flat rolled products business and the Japanese and Thai production sites. We will roll out the methods used this time to conduct scenario analysis for the entire group. ✓ With this project team as the core, we will establish task forces, working groups, etc., to roll out the analysis to the entire group, and to each level of operations.
Monitoring/execution structure	✓ For this time, we established two scenario patterns. Climate change has a high level of uncertainty, and we will keep regular watch on what kind of future outlook we can expect, perform impact evaluation, and review our strategies. ✓ For this time, we considered measures for climate change risks from the perspective of a project and formed a team accordingly, but we will incorporate this as a formal organizational role in the future so that it does not become a temporary effort.
Maturity level improvement	✓ As the measures implemented this time were only for scenario analysis "Level 1", we will gradually increase the maturity level in the future to aim for levels 2 and 3.

5 【Future countermeasures to individual risks】 We will strengthen competitiveness by implementing measures to reduce GHG emissions, developing materials with low environmental impact, and acquiring environmentally friendly certifications

Risk measures | Opportunity measures

UACJ

Items	Category	Risk countermeasures example	Category	Initiatives for seizing opportunities example
Carbon price, Carbon emissions targets/policies in each country	Adapted	✓ Setting of long-term GHG emissions reduction targets ✓ Setting of long-term energy use reduction targets ✓ Introduction of internal carbon pricing	Adapted	✓ Implementation of long-term GHG emissions reduction targets ✓ Leveraging of CO2 absorption through forests, etc., and credit programs ✓ Establishment of an evaluation method to measure contribution to making reductions ✓ Shifting to energy-saving technologies with an aim toward decarbonization through public-private partnerships and international cooperation
Recycling regulations/policies in each country	Adapted	✓ Promotion of higher recycling rate for products ✓ Establishment of a scrap recovery system with upstream/downstream customers	Adapted・Established	✓ Collaboration for and establishment of a scrap recovery system with retailers and local governments
Changes in energy mix, Energy-saving responses	Adapted	✓ Improved energy conservation through changing fuels / switching power companies ✓ Promotion of the introduction of renewable energy sources	Adapted・Established	✓ Promotion of use of on-site power generation such as solar power, selling of electricity ✓ Leveraging of decarbonization technologies such as CCS/CCUS
Changes in important products/prices	Adapted	✓ (Price setting for products in line with rising raw material prices)	Adapted	✓ (Strengthening of product competitiveness by curbing product price increases through measures such as improving recycling recovery efficiency)
Changes in customer behavior Increase in average temperature	Adapted	✓ Development of decarbonized aluminum products / services (certification)	Established・Retained	✓ Promotion of use of aluminum for products ✓ Establishment of UACJ's own branding by moving toward with acquiring environmentally friendly certifications ✓ Collaboration with competing materials companies
Increasing severity of extreme weather conditions (cyclones, floods)	Adapted・Retained	✓ Implementation of disaster prevention equipment ✓ Sophistication of risk models by leveraging data	Established	✓ Promotion of the use of aluminum for products: Expansion of disaster prevention technologies/products ✓ Formation of public-private consortiums, etc., aimed at disaster prevention

Agriculture, Food, and Forest Products

✓Practice Case① : Maruha Nichiro Corporation

Maruha Nichiro Group Business Outline

Company Information (As of March 31, 2021)

Company name	Maruha Nichiro Corporation
Establishment	March 1943
Head Office Location	2-20, 3-chome, Toyosu, Koto-ku, Tokyo, Japan
Capital Stock	20 billion JPY
Number of Employees	Non-consolidated：1,661 Consolidated：13,117
Group companies	149（Domestic: 74, Overseas: 75） ・Consolidated Subsidiaries: 77 ・Non-consolidated Subsidiaries: 18 （Equity-method affiliates: 2） ・Affiliated companies: 54 （Equity-method affiliates: 23）

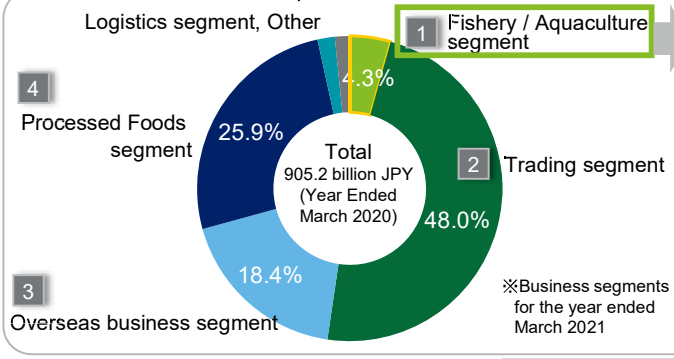
Main Business

Fisheries, Aquaculture, Marine Products Trading/Processing/Wholesaling, Manufacture/Processing/Sales of consumer frozen foods, retort pouch foods, canned foods, fish-paste products, fine chemical products and beverages, import of raw materials for meat and feed, Manufacture/Processing/Sales of meat

Business covered

We focused on the fishery and aquaculture segment (particularly Japanese aquaculture business), one of the key segments in the business portfolio, and performed impact estimation and definition of countermeasures

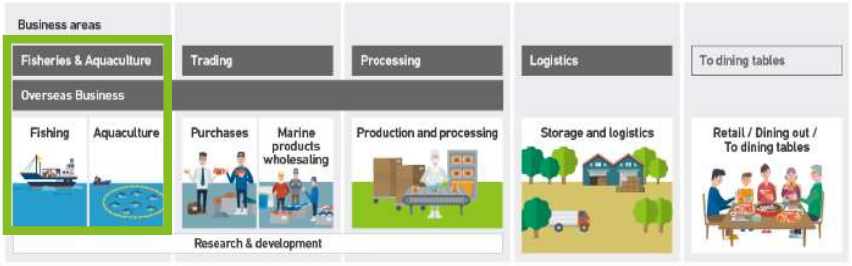
Maruha Nichiro's business portfolio



Company locations and types of fish		
Japan	Yuza (Yamagata)	Cherry salmon
	Kumano (Mie), Kushimoto (Wakayama), Kashiwajima (Kochi), Yuya (Yamaguchi), Goto (Nagasaki), Saiki (Oita), Amami Oshima	Bluefin tuna
	Karatsu (Saga), Saiki (Oita), Shimaura (Miyazaki), Minamisatsuma/Sakurajima (Kagoshima)	Yellowtail
	Karatsu (Saga), Minamisatsuma/ Sakurajima (Kagoshima), Amami Oshima	Greater amberjack
Overseas	Farm-raised salmon, sockeye salmon, walleye pollack, hoki/blue hake, southern blue whiting, Beryciformes, skipjack, horse mackerel, Patagonian toothfish, silver warehou, squid, humboldt squid, shrimp, octopus, snow crab, king crab, deep water red crab, etc.	

Target sectors and risks to consider (example)

Although the fishery and aquaculture segment accounts for only about 5% of Maruha Nichiro's sales, given its importance in its upstream part of the value chain, the analysis will focus on the domestic farm fishing business



Significance assessment → Identify scenario groups → Business impact evaluation → Countermeasure definition | 4℃ | 2℃

Significance assessment of risks/opportunities

Type	Assessment items		Discussions on business impacts (Qualitative information)		Significance
	Large classification	Small classification	Discussion: risks	Discussion: opportunities	
Transition risk	Policy/ Regulation	Carbon price	Introduction of a carbon tax (increased operating costs)	Gain on sale from cap and trade (increased revenue)	Medium※1
		Carbon emissions targets/policies in each country	Strengthened emission regulations (increased operating costs)	N/A	Medium
		Energy-saving policy	Strengthened energy conservation policies (increased operating costs)	Expanded energy conservation subsidy programs (decreased investment costs)	Small
		Fossil fuel subsidies	N/A	Expanded energy conservation subsidy programs (decreased operating costs)	Small
		Regulation on packaging	Strengthened regulations (increased operating costs)	Improved resource efficiency of containers and packaging (decreased operating costs)	Medium
	Industry/ Market	Changes in energy demand	Rising energy prices (increased operating costs)	N/A	Medium
		Changes in important products/prices	Changes in growth environments due to climate change (decreased sales)	Changes in growth environments due to climate change (increased revenue)	Large
	Technology	Diffusion of renewable energy and energy saving technologies	N/A	Development of energy conservation technologies and expanded procurement of renewable energies (decreased operating costs)	Medium
		Next generation technology progress	Strengthened regulations toward alternative CFCs (increased operating costs) Technological progress of other companies (decreased sales)	Decreased environmental impact due to improved technologies (increased sales)	Medium
	Reputation	Changes in customer behavior	Damage to the reputation of products and the company (decreased sales)	Changes in preferences to favor certified products and low carbon products (increased sales)	Medium
		Changes in investor's reputation	Lower reputation with investors (increased financing costs)	Higher reputation with investors (decreased financing costs)	Medium
Physical risk	Chronic	Increase in average temperature	Further measures for transportation and storage (increased operating costs)	Changes in consumer behavior due to rising temperatures (increased sales)	Medium
		Changes in rainfall, weather patterns and ocean environment	Increased costs due to changes in ocean environments (increased operating costs)	Improved growth environment conditions due to changes in marine environments (increased revenue)	Large
		Rising sea level	Wave proofing measures due to elevated sea levels (increased operating costs)	N/A	Medium
		Water stress (drought)	Damage to operations in regions with high water stress (increased operating costs)	N/A	Medium
	Acute	Increasing severity of extreme weather conditions (Typhoons and hurricanes at a larger scale etc.)	Damage to operations due to extreme weather events (increased operating costs)	N/A	Large

*1 While we rated this as "Medium", we will also evaluate the financial impact from carbon pricing

Identify and define range of scenarios

Key items (Items with high significance)		Parameters researched	Risk・Opportunity		Related data			Source
			Risks	Opportunities	Quantifiable or not	Scenario	Year	
Transition risk	Carbon price	(1) **Carbon tax**	●	●	○	4/2/1.5℃	2050	IEA etc.
	Changes in important products/prices	(2) **Migratory tuna catch volume**	●※1	●※2	○	4℃	2050	Nature
		(3) **Bait fish resource quantity*3**	●		○	4℃	2050～	MAFF
		(4) **Fish size**	●		○	4/2℃	2050	Daniel Pauly etc.
Physical risk	Changes in rainfall, weather patterns and ocean environment	(5) **Rising sea temperatures**	●	●	×	4/2℃	2050	IPCC etc.
		(6) **Changes in dissolved oxygen in seawater**	●		×	4/2℃	2050	IPCC
		(7) **Ocean acidification**	●		×	4/2℃	2050	IPCC
	Increasing severity of extreme weather conditions (Typhoons and hurricanes at a larger scale etc.)	(8) **Rate of increase in flooding frequency and the amount of rainfall**	●		○	4/2℃	2040	METI
		(9) **Occurrence of typhoons/cyclones**	●		Implementation of past results available	4/2℃	2050～	JMA (Japan Meteorological Agency) etc.

*1. We assumed this as a parameter that describes the decline in juvenile fish stocks
*2. Since the fish farming business is the target of the evaluation, the decline in migratory tuna catches is viewed as an opportunity for the fish farming business
*3. Resource quantity: Total amount of fish that come to the area

Identify and define range of scenarios (Identify 4℃ worldview by 5forces)

Measures to address physical risks are called for: operating costs increase due to physical risks becoming manifest, and production decreases due to the deterioration of fish growth environments

4℃ worldview @2050s (Example)

: Actions for addressing risks
: Actions for seizing opportunities

Aquaculture industry

Sellers (Raw material suppliers)

- Carbon emission regulations are not introduced
- Physical risks become manifest for aquaculture facilities and certain distribution functions
- Competition intensifies for fishery resources such as juvenile fish, and procurement costs increase
- Raw feed prices for farmed fish soar, and operating costs increase

-Introduction of equipment/facilities to prepare for physical risks
-Review of procurement methods
-Review of feed types

New entrants

- We assume no special measures will be necessary (No new entrants)

Industry

- Production at aquaculture sites decreases due to changes in the marine environment (seawater acidification, anoxia, etc.)
- Physical risks due to extreme weather toward aquaculture sites become manifest, and disaster prevention costs increase
- Catch volumes in nearshore waters decrease, catch costs increase, and reliance on aquacultures increases
- Production increases in some regions and fish species due to changes in climate patterns
- New fish diseases emerge due to high water temperatures, resulting in fish die-offs and reduced inventory

-Development of aquaculture technology and aquaculture environment improvement technology
-Implementation of disaster prevention measures at sites

Expanded distribution of fish species for which production will increase due to changes in weather patterns

Substitute products

- Cultured meat grown from cultured fish cells
- Plant-based meat using materials derived from plants

R&D on cultured meat, etc.

Buyers (Customers)

- Prices soar for certain marine products, and demand for low-priced marine products increases
- Demand for low carbon / decarbonization are low, and no special measures are called for by stakeholders

Declining cost of key products

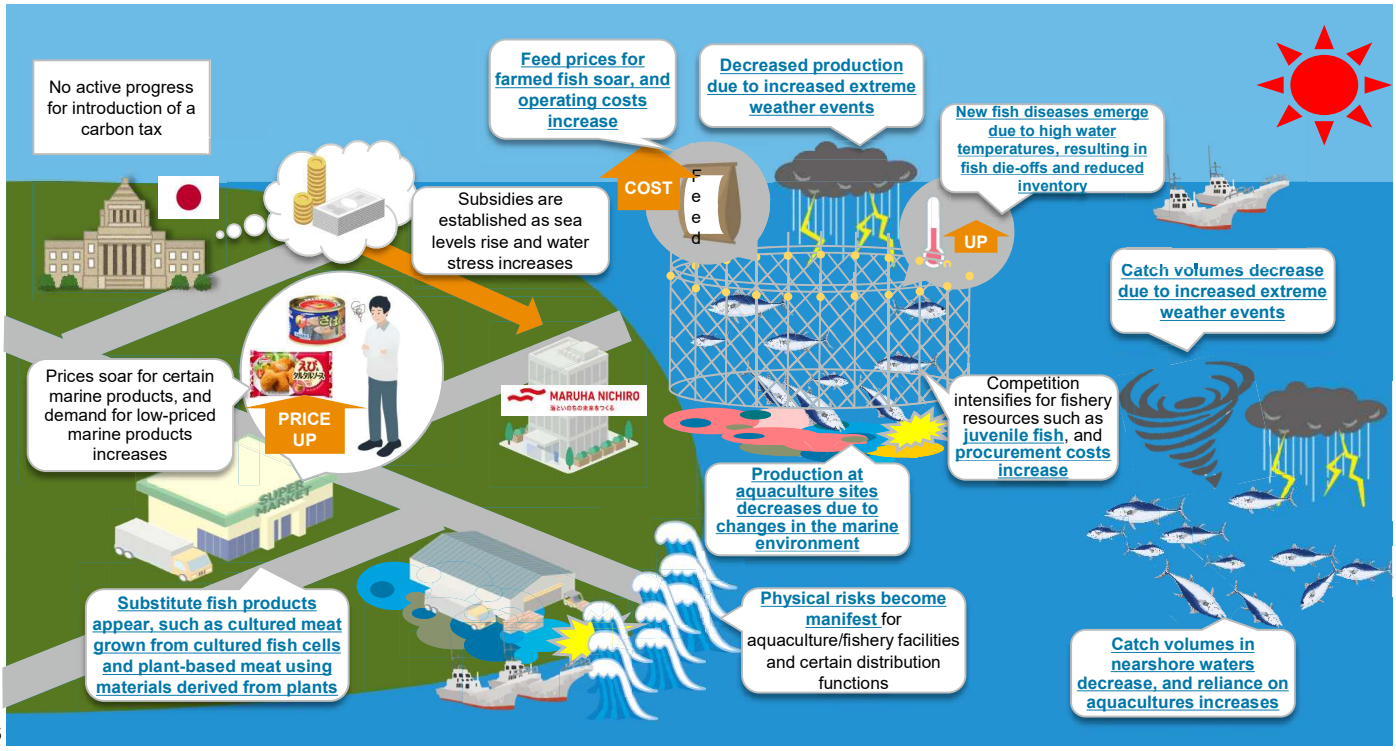
Government

- Low carbon / decarbonization trends weaken, and regulations, etc., do not move forward
- Regulations related to carbon taxes are not introduced
- Disaster prevention subsidies (for breakwaters, etc.) are established as sea levels rise and water stress increases

Prompt obtainment of policy information and securing of subsidies (mainly through active collaboration with the government toward physical risks)

Identify and define range of scenarios (Identify 4℃ worldview by 5forces)

Measures to address physical risks are called for: operating costs increase due to physical risks becoming manifest, and production decreases due to the deterioration of fish growth environments



Identify and define range of scenarios (Identify 2℃ worldview by 5forces)

As decarbonization trends grow, low-carbonization of the aquaculture business to accompany regulations and development of high value-added products / substitute products is called for

2℃ worldview @2050s (Example)

: Actions for addressing risks
: Actions for seizing opportunities

Aquaculture industry

Sellers (Raw material suppliers)

- Increased procurement costs due to carbon emission regulations
- While competition for fishery resources such as juvenile fish does not intensify to the extend of the 4ºC scenario, procurement costs increase
- Raw feed prices for farmed fish rise, and operating costs increase
- Increased share of renewable energies in aquaculture sites
- Increased introduction of low carbon aquaculture equipment/technologies

Securing of sources with advanced decarbonization measures, low carbon raw materials, etc.

Securing of self-consumption power sources, investment in renewable energies

New entrants

- We assume no special measures will be necessary (No new entrants)

Industries

- While there is no significant change in migratory tuna catches, fishery costs increase due to rising ship fuel costs
- Production increases in some regions and fish species due to changes in climate patterns

Low carbonization of production sites

Expanded distribution of fish species for which production will increase due to changes in weather patterns

Substitute products

- Cultured meat grown from cultured fish cells
- Plant-based meat using materials derived from plants

R&D on cultured meat, etc.

Buyers (Customers)

- Consumers select products with a high price advantage for which carbon prices have not been passed on
- Demand for low carbon products increase as consumers become more low-carbon conscious, leading to increased demand for products produced using low-carbon aquaculture technology
- There is increased marketing of products as ethical, including low carbon products

Reduced costs / low carbonization of products

Development of high value-added products through low carbonization

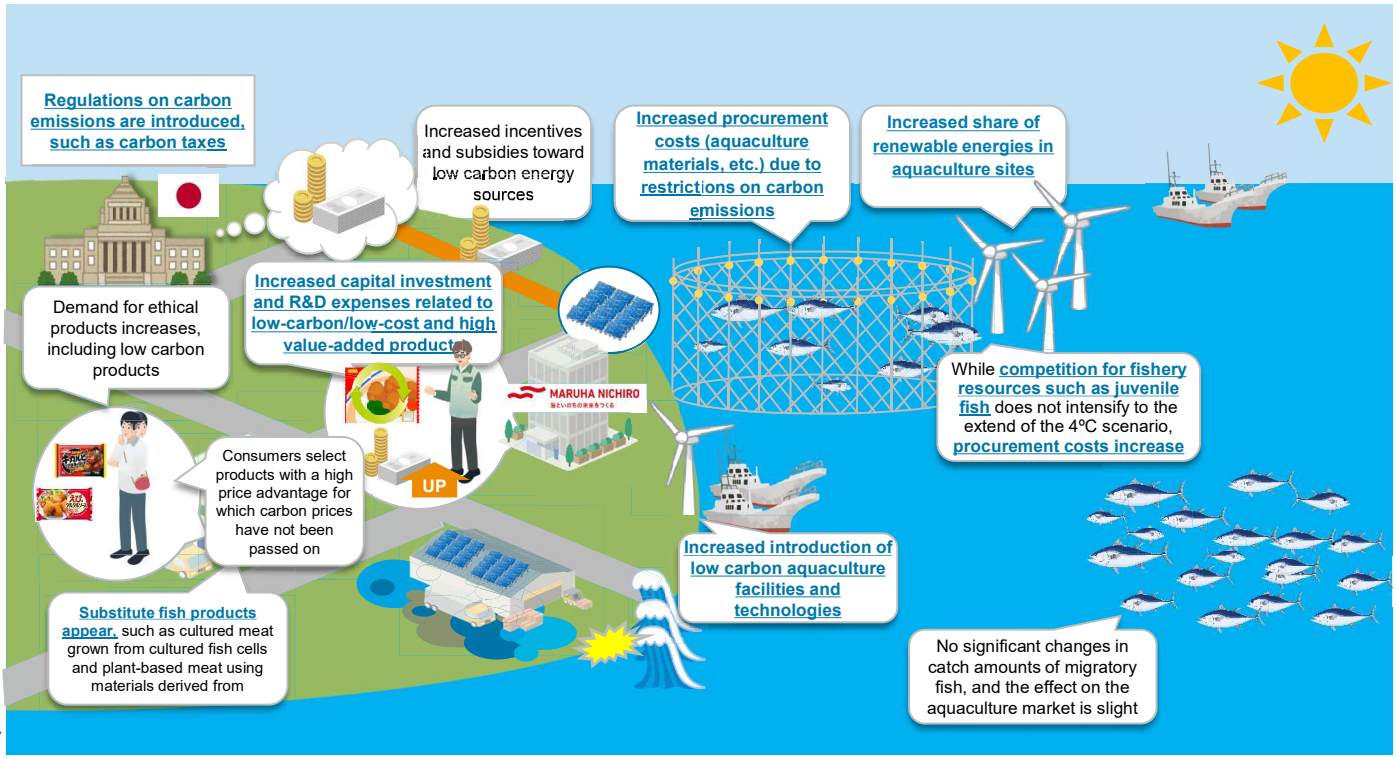
Government

- Some countries impose restrictions on emissions from production sites, etc., and emissions trading becomes active
- A carbon tax is introduced. Sites, etc. with high CO_2 emissions are subject to regulations
- Subsidies (for breakwaters, etc.) are established to some degree accompanying a certain increase in sea levels and water stress

Prompt obtainment of policy information and securing of subsidies

Identify and define range of scenarios (Identify 2℃ worldview by 5forces)

As decarbonization trends grow, low-carbonization of the aquaculture business to accompany regulations and development of high value-added products / substitute products is called for



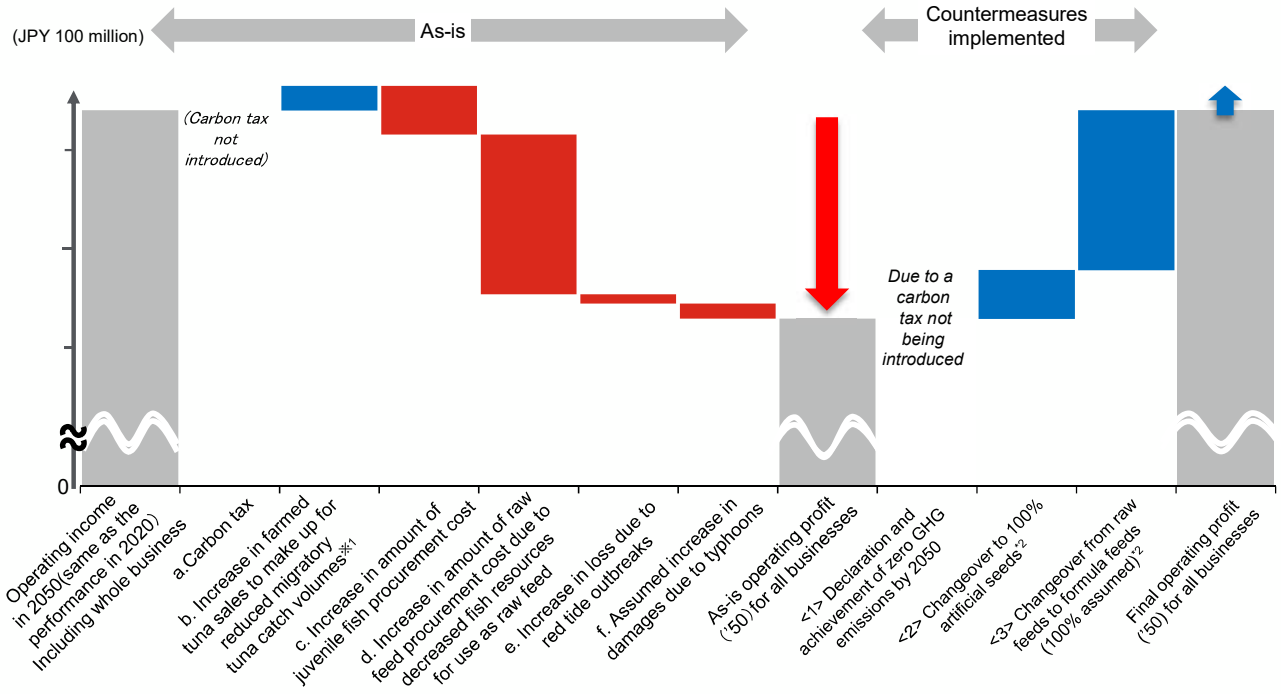
Outline of each risk item's calculation

Unit：100 million JPY

Key items (Items with high significance)		Items	Outline of calculation logic	Estimated impact on operating income	
				4℃	2℃ (1.5℃ only carbon tax)
Transition risk	Carbon price	a. Financial impact of a carbon tax	2050 GHG emissions x carbon tax	–	▲××
	Changes in important products/prices due to changes in ocean environment	b. Increase in farmed tuna sales to make up for reduced migratory tuna catch volumes	Sales of farmed tuna fluctuate in tandem with changes in migratory tuna catches Maruha Nichiro's farmed tuna sales x Percentage change in the average catch rate of Pacific migratory tuna x Operating profit margin	+××	+××
		c. Increase in amount of raw feed procurement cost due to decreased fish resources for use as raw feed	We assume that the unit cost of feed procurement is inversely proportional to the amount of feed resources 2020 raw feed procurement cost ÷ Percentage of fluctuation in the amount of fish resources for use as raw feed x (1 + business growth rate)	▲××	▲××
		d. Increase in amount of juvenile fish procurement cost	Juvenile fish resources fluctuate at the same rate as the average catch rate of Pacific migratory tuna Juvenile fish procurement cost (present) x Percentage change in the average catch rate of Pacific migratory tuna	▲××	▲××
Physical risk	Changes in rainfall, weather patterns and ocean environment	e. Increase in loss due to red tide outbreaks	Red tide frequency increases at the same rate as the amount of rainfall History of damage from red tide x percentage increase in the amount of rainfall – insurance claim amount	▲××	▲××
	Increasing severity of extreme weather conditions (Typhoons and hurricanes at a larger scale etc.)	f. Assumed increase in damages due to typhoons	We substituted the percentage increase in the amount of rainfall for the rate of typhoon occurrence History of past damage from typhoons x percentage increase in the amount of rainfall x deductible rate	▲××	▲××

Significance assessment | Identify scenario groups | **Business impact evaluation** | Countermeasure definition | **4℃** | 2℃

Business impact evaluation : 4℃ scenario



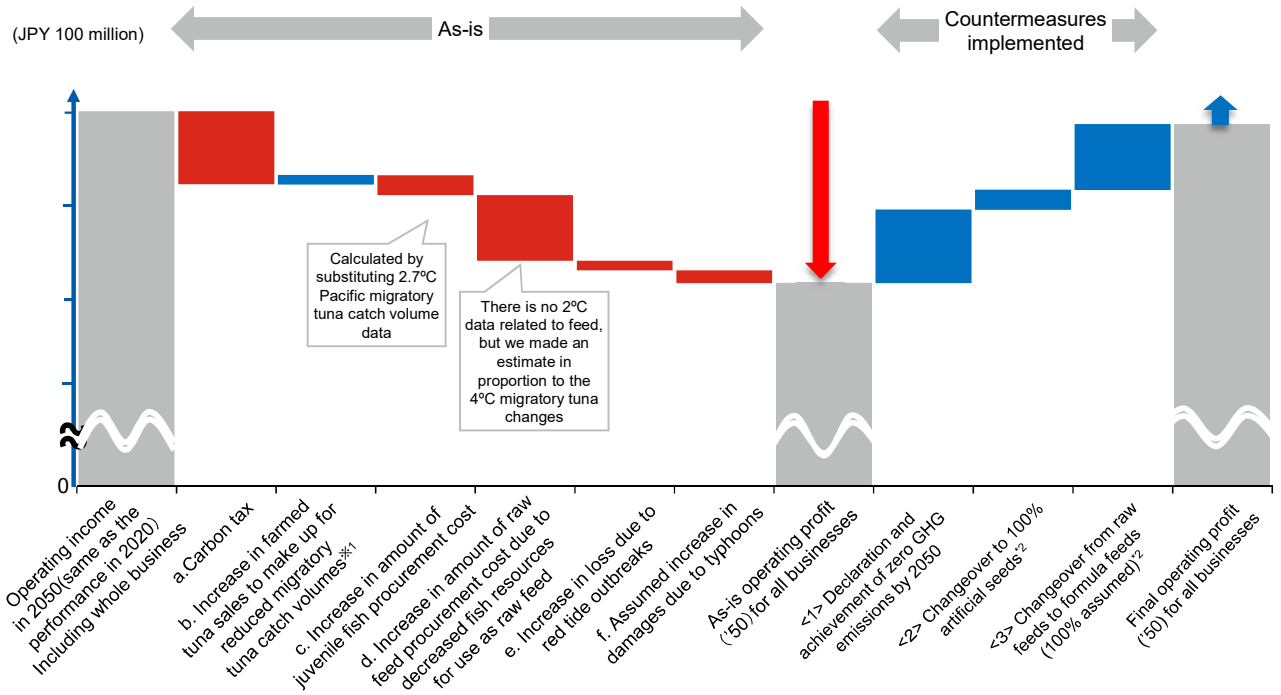
※1Changes in profit due to fluctuations in sales are calculated by multiplying the amount of fluctuations in sales by the operating profit margin

※2R&D and other development expenses and new plant construction expenses, etc., are not included in the estimate this time due to the fact that there are many areas that are unclear

In the 4ºC Scenario, the risk of decreasing resources due to changes in the natural environment will become manifest, and consideration of measures such as changing over to artificial seeds and using/developing substitute feeds will be called for

Significance assessment | Identify scenario groups | **Business impact evaluation** | Countermeasure definition | 4℃ | **2℃**

Business impact evaluation : 2℃ scenario



※1Changes in profit due to fluctuations in sales are calculated by multiplying the amount of fluctuations in sales by the operating profit margin

※2R&D and other development expenses and new plant construction expenses, etc., are not included in the estimate this time due to the fact that there are many areas that are unclear

In the 1.5ºC – 2ºC scenarios, the carbon task burden will become manifest as a risk, and shifting to low carbonization will be called for; it will also be necessary to address to some extent the risk of a certain level of decreases in resources due to changes in the natural environment

Countermeasure definition

	Key items (items with high significance)	Major initiatives in progress/to be implemented	Examples of other companies etc.
Transition risk	Carbon price	✓ Setting of medium-term targets to reduce CO_2 emissions per unit of sales by at least 4% from the FY2017 level by FY2021 ✓ Investment in energy conserving equipment (changeover to non-CFC equipment, reduction of energy consumption, etc.) ✓ Obtainment of carbon neutral certification from Austral Fisheries Pty Ltd, entry into the Climate Active NETWORK and offset emissions through afforestation activities	Measure<1> ✓ **Setting of medium to long-term GHG reduction targets and obtainment of SBT certification** ✓ Performing of life cycle assessment in aquaculture operations
Transition risk	Changes in important products/prices	✓ Domestic residual meal and meal made from fish not yet used as food are currently being used as feed ingredients. Target fish species are yellowtail, amberjack, and bluefin tuna ✓ Promotion of sustainable fishery / acquirement of aquaculture certification ✓ Promotion of handling of MSC/ASC certified marine products Measure<2> ✓ **Increased production of artificial seeds (egg-to-harvest bluefin tuna, hatched yellowtail, hatched amberjack) = supplementation/replacement of natural seedlings** Measure<3> ✓ Strengthening of R&D system for propagation and culture technology ✓ **Development of formula feeds that stabilize feed costs and quality, and that enable the design and addition of nutrients optimal for growth**	✓ Development of feeds based on physical properties of feed and feeding behavior ✓ An aquaculture management system centrally managed in the cloud ✓ Introduction of Sustainable Portfolio Management ✓ Commercialization of cultured fish meat and substitute fish meat (collaboration between large companies and ventures)
Physical risk	Changes in rainfall, weather patterns and ocean environment	✓ Activities as a member of SeaBOS Task Force I (addressing IUU fishing, child labor and forced labor) and VI (addressing climate change); participation in various domestic and international symposiums, government committees and other domestic and international dialogues ✓ Thorough resource management, promotion of eradicating IUU (illegal, unreported and unregulated) fishing ✓ Reducing the risk of marine pollution by optimizing feeding amounts through the introduction of AI-tracking fish counting devices	✓ Introduction of aquaponics ✓ Strengthening of capital participation and procurement capabilities in the fish farming business
Physical risk	Increasing severity of extreme weather conditions (Typhoons and hurricanes at a larger scale etc.)	✓ Dispersion of production and storage sites ✓ Formulation of a Business Continuity Plan (BCP) ✓ Participation in mutual aid and insurance programs ✓ R&D for fish and aquaculture methods that are resistant to diseases caused by typhoons, ride tide, etc. ✓ Introduction of submersible cages	✓ Design of aquaculture farms deep enough to allow cages to be submerged to a certain depth below the water surface ✓ Establishment of a comprehensive BCP system

Other Sector

✓ **Practice Case①：YASKAWA Electric Corporation (Electronic Equipment)**

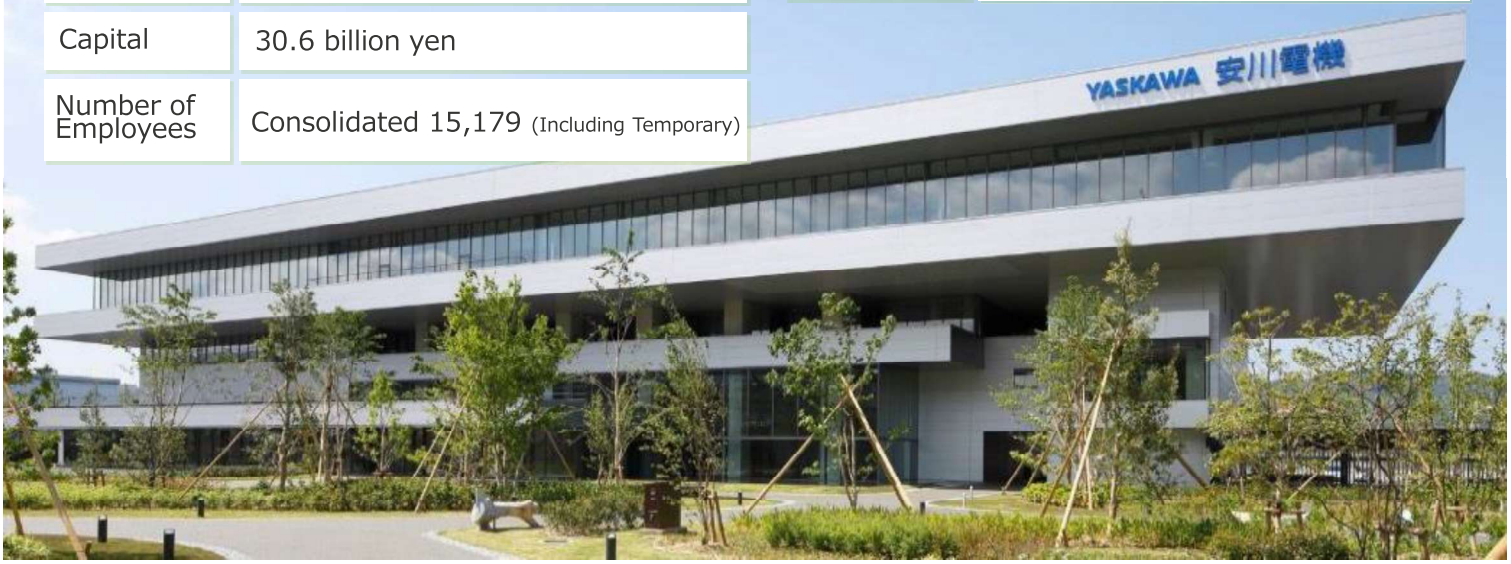
✓ **Practice Case②：SCSK Corporation (Information Technology)**

✓ **Practice Case③：ASKUL Corporation(Retailing)**

YASKAWA Electric: Profile (as of February 29, 2020)

*Consolidated fiscal year from March 1, 2019 to February 29, 2020

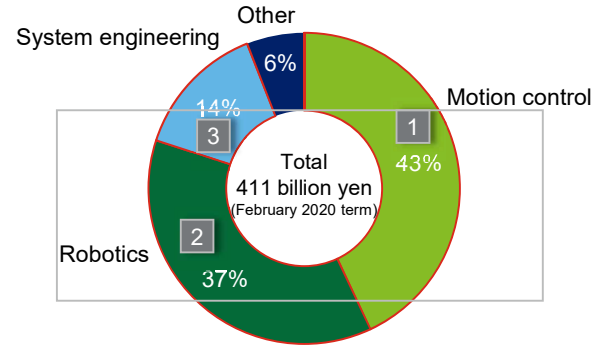
Corporate Name	YASKAWA Electric Corporation	Consolidated Revenue	411.0 billion yen
Founded	July 16, 1915	Main Business	・Motion Control (AC servos, controllers and AC drives) ・Robotics ・System Engineering
Head Office Location	2-1 KurosakiShiroishi, Yahatanishi-ku, Kitakyushu Fukuoka JAPAN		
Capital	30.6 billion yen		
Number of Employees	Consolidated 15,179 (Including Temporary)		



[Covered business]

We targeted the “Motion control”, “Robotics”, and “System engineering” businesses, and narrowed our focus to significant products in these areas to conduct our analysis

Business portfolio



Business area	Products
1 Motion control	AC servo motors, AC spindle motors for machine tools, linear motors, various motor control equipment, machine controllers, vision systems, general-purpose inverters, power regenerative converters, matrix converters
2 Robotics	Arc welding robots, spot welding robots, painting robots, handling robots, sealing/cutting robots, deburring/polishing robots, clean/vacuum handling robots used with semiconductor/LCD manufacturing equipment, robot peripheral equipment, robot-applied FA systems, robots for biomedical applications
3 System engineering	Electrical systems for steel plants, electrical systems for water supply and sewage, electrical systems for various industries, high-voltage inverters, high-voltage matrix converters, industrial motors/generators, wind power converters/motors, small hydroelectric power generators, electric power distribution equipment, wind power generation systems, solar power generation systems, systems for ships and watercraft, energy-related systems

Risks and significant products in each value chain

: Significant products ■ : Main risks

R&D	Procuring raw materials	Processing/manufacturing	Shipping/ product sales	Product use/disposal
…	• Factory automation devices (industrial robots, AC servos) • Industrial inverters • Products related to renewable energy generation equipment	• Factory automation devices (industrial robots, AC servos) • Industrial inverters • Products related to renewable energy generation equipment	…	• Factory automation equipment (industrial robots, AC servos) • Industrial inverters • Products related to renewable energy generation equipment
	■ Changes in prices for significant commodities/products ■ Carbon pricing ■ Changes in reputation with investors ■ Changes in rainfall/weather patterns ■ Extreme weather conditions, etc.	■ Changes in prices for significant commodities/products ■ Various countries’ carbon emission targets/policies ■ Spread of low-carbon technologies ■ Changes in rainfall/weather patterns ■ Extreme weather conditions, etc.		■ Changes in prices for significant commodities/products ■ Recycling regulations ■ Extreme weather conditions, etc.

We evaluated high-impact risks and determined significant products for each value chain

 Source: YASKAWA Electric website, summary of financial statements (May 2020 term)

Step 2 3 4 5 Scenario 4°C 2°C YASKAWA

[Risk significance assessment (1/2)]

We investigated risks/opportunities ranging from procuring raw materials to product use

Risks/opportunities related to transition risks

Item		Business impact		
Subcategory	Parameter	Study: risks	Study: opportunities	Rating
A Carbon pricing	Expenditures, assets	➢ The P/L is impacted by an **increased cost of production at factories** due to taxes imposed on fuel procurement costs with **the introduction of carbon taxes by the governments of various countries**	➢ N/A	High
B Various countries' carbon emission targets/policies	Revenue, expenditures	➢ **With the introduction of emissions trading and stricter regulations on energy conservation**, conversion to renewable energy will be required, and the corresponding costs for **YASKAWA facilities/green power purchasing will increase**	➢ P/L is impacted by a **decrease in costs such as green power purchasing** due to an **increased ratio of renewable energy in commercial electricity**	High
C Various countries' restrictions on exports	Revenue, expenditures	➢ P/L is impacted when **the global shift to electrification, EVs, and hybrids** leads to a **shortage of rare earths (neodymium and dysprosium) and copper for magnets**, **affecting production when prices for these materials soar and they become difficult to obtain** due to restrictions on exports by producing countries	➢ N/A	Low
D Recycling regulations	Revenue, expenditures	➢ P/L is impacted when expenditures increase due to **increased costs from the adoption of alternative materials** caused by **regulations on plastic**	➢ N/A	Low
E Changes in prices for significant commodities/products	Revenue, expenditures	➢ There is a risk that **energy prices will rise** due to changes in the supply-demand balance as a result of the **introduction of carbon taxes and a decreased supply of fossil fuels due to global warming**. As a result, P/L may be impacted by increased procurement costs ➢ P/L is impacted **when the global shift to EVs and hybrid automobiles leads to a shortage of rare earths (neodymium and dysprosium) and copper for magnets, affecting production when prices for neodymium magnets/copper soar and these materials become difficult to obtain** ➢ P/L is impacted **when the oil and gas market shrinks**, and the **U.S. inverter business aimed at the same market shrinks**, as well (significance: low)	➢ **Demand for factory automation equipment and industrial inverters increases** due to the growing need for energy-saving measures. As a result, **there are expanding opportunities for solution businesses for improving productivity / energy efficiency of corporate plants/facilities**, impacting P/L ➢ **Demand for solar, wind, hydro, geothermal, and biomass power generation facilities increases due to FIT policy incentives, etc**. As a result, business opportunities for related control equipment expand, impacting P/L ➢ As **the shift to EV automobiles** continues, **demand for EV motors and drive units increase, and business opportunities for EV-related electrical products expand**, impacting P/L (significance: low) ➢ **Business opportunities for electrical ship products expand** due to increased **demand for environmentally friendly marine transportation** and **increased demand for EV and hybrid ships**, and P/L is impacted (significance: low)	High
F Spread of low-carbon technologies	Expenditures	➢ **Competition intensifies for the energy-saving performance of products** due to the growing need for energy-saving measures. As a result, there is **an increased burden of investment costs toward R&D, etc.**, and P/L and B/S are impacted	➢ N/A	Med.
G Changes in investor/customer behavior	Expenditures, assets	➢ Increased investor interest leads to **preference for companies that have made progress with environmental initiatives such as RE100**, which in turn leads to **additional initiative costs** from the need to implement low-carbon manufacturing processes. As a result, P/L and B/S are impacted ➢ **Increased customer environmental awareness** leads to demands for environmental considerations in information disclosure and procurement, and a **delayed response to these demands will result in lost business opportunities** and impact P/L	➢ Making use of green bonds has the potential to **reduce risk through diversified investment**, impacting B/S ➢ **Expanding YASKAWA's environmental contribution business** will raise the company's reputation among investors and **increase its corporate value through increased stock prices**	Low

Step 2 3 4 5 Scenario 4°C 2°C YASKAWA

[Risk significance assessment (2/2)]

We investigated risks/opportunities ranging from procuring raw materials to product use

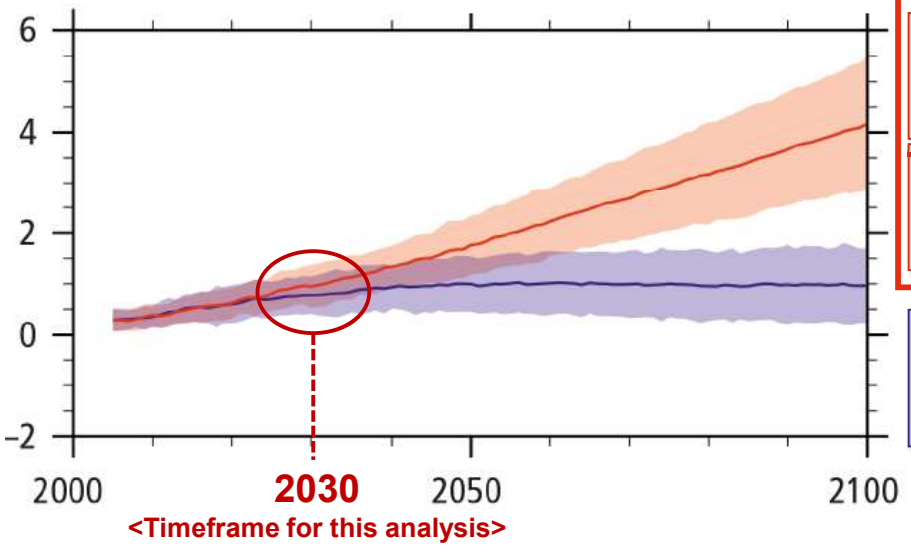
Risks/opportunities related to physical risks

Item		Business impact		
Subcategory	Parameter	Study (example): risks	Study (example): opportunities	Rating
H Changes in rainfall/weather patterns	Revenue, expenditures, assets	➢ **An increase in lightning strikes** creates a risk of power outages and an increased possibility of shutdowns for plant equipment. As a result, there **are increased costs for additional investments toward facility restoration and insurance premiums**, impacting P/L and B/S	➢ The need for a stable food supply increases demand for food product plants, impacting P/L	Low
I Increased average temperatures	Revenue, expenditures, assets	➢ There are increased energy costs due to increased use of energy for air condition at the company's plants, impacting P/L	➢ Inverter sales increase due to rising demand for inverter air conditioning equipment, impacting P/L	Med.
J Increase in infectious diseases	Revenue	➢ N/A	➢ Increased pandemics result in increased demand for reducing manpower at production sites, and automation and robotization business expands, impacting P/L	Low
K Elevated sea levels	Expenditures, assets	➢ An **elevated sea level** makes it necessary to **relocate production sites where the risk of flooding exceeds acceptable levels**, impacting P/L and B/S	➢ N/A	Low
L Water management (droughts)	Expenditures, assets	➢ **During droughts and similar events, there is a risk of plant shutdowns, and measures toward water recycling and reuse are required**, impacting P/L and B/S	➢ N/A	Low
M Extreme weather conditions	Revenue, expenditures, assets	➢ There is a risk of **shutdowns / reduced production / additional investments toward facility restoration** due to damage to employees/plants from **typhoons/tornados/flooding**. Furthermore, there are **increased costs for insurance premiums**, etc., toward assets in high-risk areas, impacting P/L and B/S	➢ N/A	High

[Step 3: Scenario group definition]

For climate change, which has a high degree of uncertainty, we studied two scenarios for a 2030 society

[Projected average global surface temperature change]
(compared with the average from 1986-2005)



Definition of 4°C (2.7°C+) scenarios

4°C scenario:
3.2-5.4°C higher than pre-Industrial Revolution levels if no additional measures against global warming are taken

Over 2°C (2.7-4°C) scenario:
2.7-4.0°C higher than pre-Industrial Revolution levels if no additional measures against global warming are taken

2°C scenario:
0.9-2.3°C higher than pre-Industrial Revolution levels if strict measures are taken

(Source) AR5 SYR, Table SPM.6

The TCFD recommendations for scenario analysis suggest that multiple temperature range scenarios be selected, including those below 2°C

[Step 3: Scenario group definition]

Definition of various worldviews based on scientific evidence from IEA and other sources

*Exchange rate: 1 USD = 106 JPY (based on the October 1, 2020 rate)

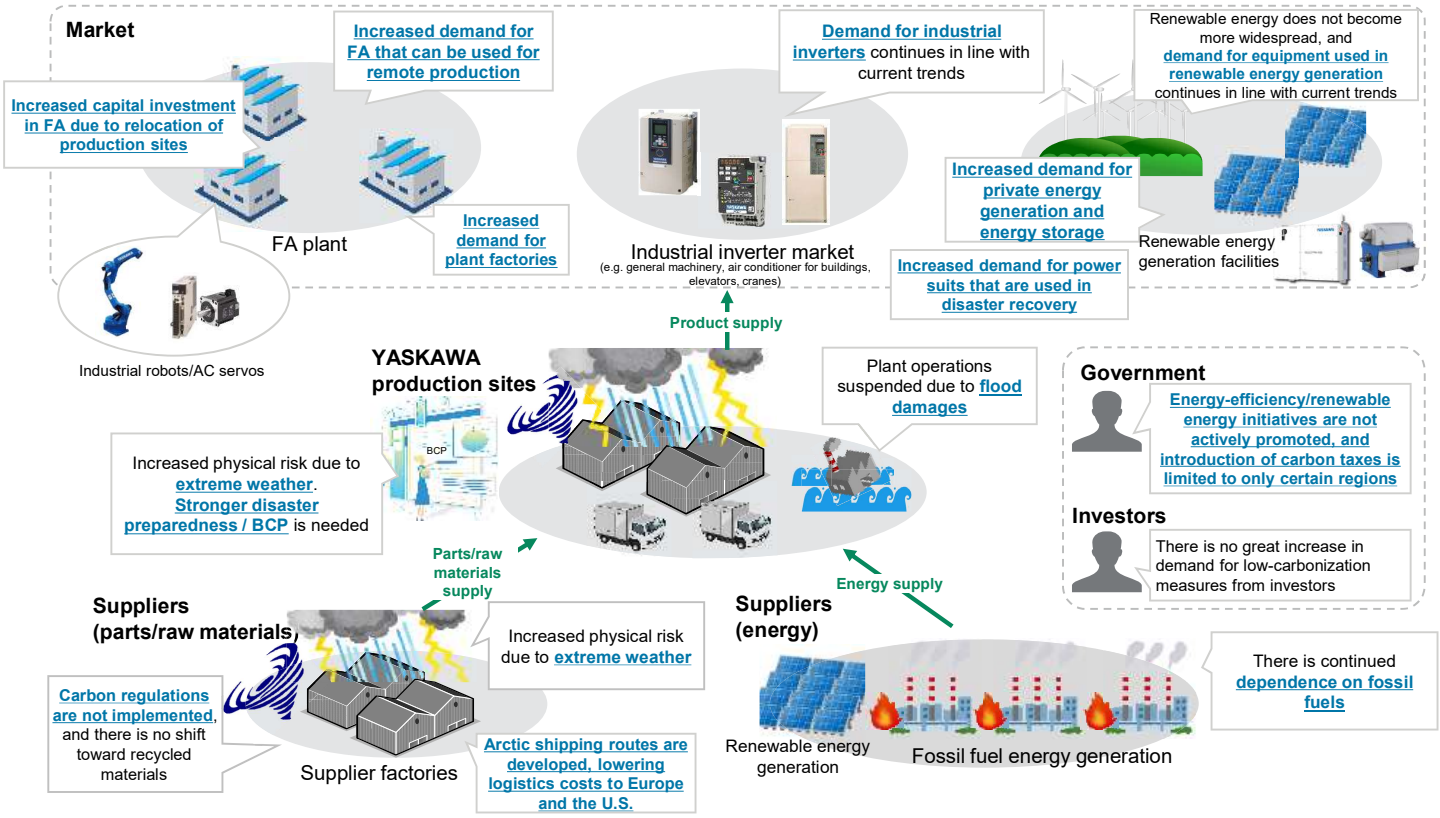
		Currently	2030		Source
			4°C (2.7°C+)	2°C	
Transition risks (increased expenses)	Carbon tax	–	–	10,600 JPY/t-CO_2	• IEA WEO2019, 2020 • We hypothesize that levels in the 4°C (2.7°C+) scenario will be the same as current levels
	Carbon pricing	23,328 JPY/MWh	22,572 JPY/MWh	24,948 JPY/MWh	• IEA WEO2019
	Emission factors for electric utilities	0.488kg-CO_2/kWh	0.37kg-CO_2/kWh	0.37kg-CO_2/kWh	• The Ministry of the Environment's "CO2 emission factors for each electric utility" was used
	Volume of demand for neodymium/dysprosium	Neodymium: 84.9 thousand tons Dysprosium: 5.7 thousand tons	Neodymium: 153.6 thousand tons Dysprosium: 10.2 thousand tons	Neodymium: 179.5 thousand tons Dysprosium: 12.0 thousand tons	• Sebastiaan Deetman et al., "Scenarios for demand growth of metals in electricity generation technologies, cars and electronic appliances"
Transition risks (increased sales)	AC servo market size	621.8 billion JPY	1189 billion JPY	1343 billion JPY	• Aggregated from: Fuji Keizai, "General survey of the state of the 2020 featured mechatronics parts market", IEA, WEO2019
	Industrial robot market size	1187.7 billion JPY	2293.7 billion JPY	2589.7 billion JPY	• Aggregated from: International Federation of Robotics, World Robotics 2019 Industrial Robots, IEA, WEO2019
	Inverter market size	1344 billion JPY	5769 billion JPY	6451.1 billion JPY	• Aggregated from: ResearchStation LCC, "The global inverter market" forecast, IEA, WEO2019
	Rate of improvement in specific energy consumption (industrial sector)	—	—	1.3%	• IEA, WEO2019
	Energy mix	Wind power: 2,955TWh Solar power: 2,265TWh	Wind power: 3,361TWh Solar power: 2,764TWh	Wind power: 4,770TWh Solar power: 4,315TWh	• IEA, WEO2020
Physical risks	Level of flood risk for each site	—	(Frequency estimated from aqueduct data)	(Frequency estimated from aqueduct data)	• The estimate is based on current sites, as the number of sites in 2030 is unknown • The estimate is made by applying the assumed level of flood depth to the "length of time business is interrupted for each level of flooding"
	Percentage increase in the probability of flooding	—	50%	150%	• Review Meeting of Technologies Related to Flood Control Planning Based on Climate Change: "A proposal for flood planning based on climate change"
	Length of time business is interrupted for each level of flooding	—	We estimate the average length of time that business is interrupted for each level of flooding	We estimate the average length of time that business is interrupted for each level of flooding	• Explanatory materials on the simulation of estimated damage from flooding by the Cabinet Office

Step 2 3 4 5 Scenario 4˚C 2˚C

YASKAWA

[Visual representation of future society in the 4˚C (2.7˚C+) scenario]

The 4˚C (2.7˚C+) world: Low-carbonization measures do not advance, and physical risks increase

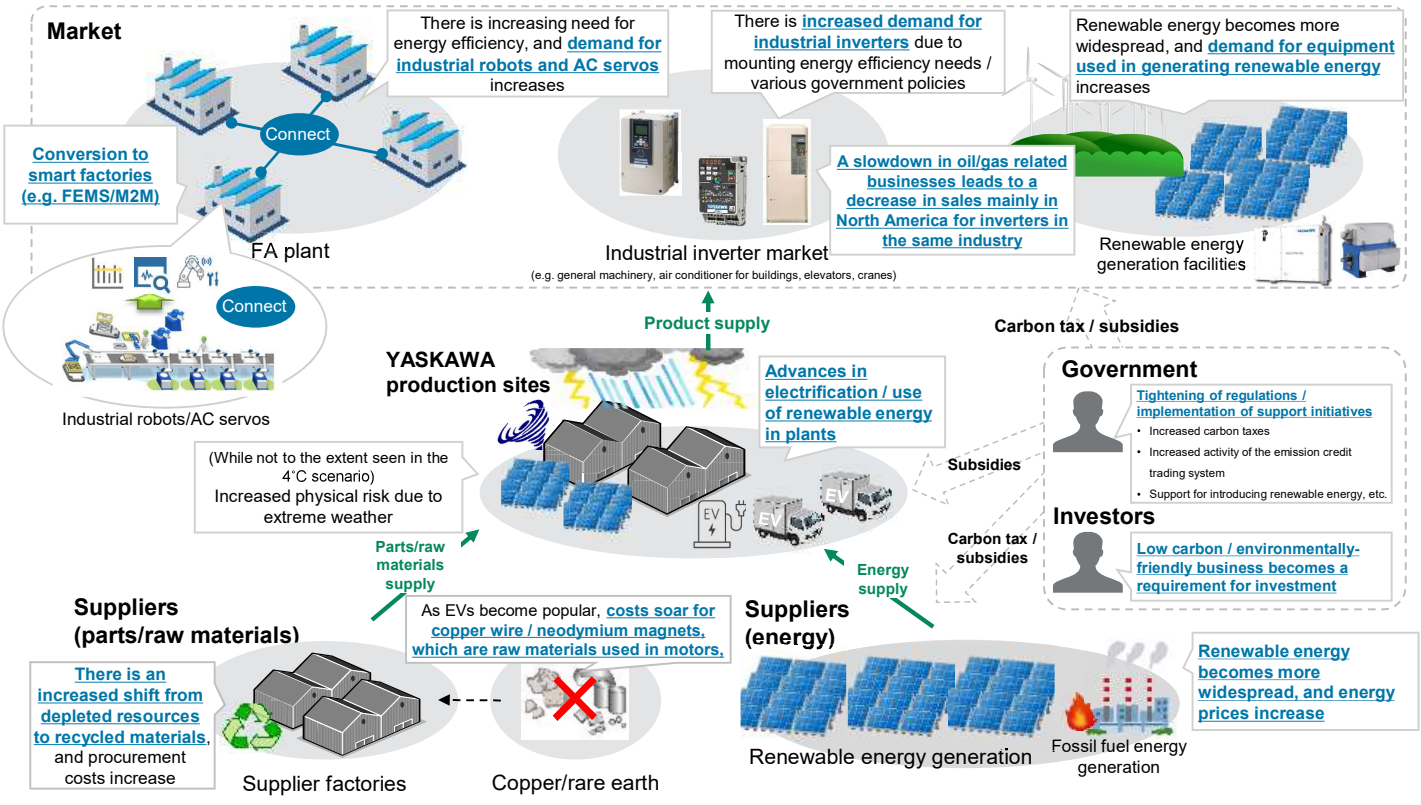


Step 2 3 4 5 Scenario 4˚C 2˚C

YASKAWA

[Visual representation of future society in the 2˚C scenario]

The 2˚C world: Low-carbonization initiatives advance, and there is increased demand for FA equipment / industrial inverters / devices used in generating renewable energy



[Scenario group definition]

Step 2 **3** 4 5 Scenario **4°C** 2°C

YASKAWA

Low-carbonization trends weaken, and physical risks increase

The 4°C (2.7°C+) worldview in the 2030s (examples)

: Actions for responding to risks

: Actions for seizing opportunities

Industrial equipment industry

Sellers (parts/raw materials)

- Carbon regulations are not introduced, and there is no change in procurement costs for raw materials
- We hypothesize that there will be no shift toward recycled materials
- Physical risks become tangible for certain plants / resource suppliers

Review procurement strategies (consider diversifying procurement sources)

Sellers (energy)

- There is no significant progress toward the introduction of renewable energy, and electricity prices remain at the current level

Optimize investment related to renewable energy

New entrants

- There is no particular impact from climate change

Industry

- Initiatives toward renewable energy / energy efficiency are implemented as usual (no significant change)
- There is an increased risk of production line downtime and logistics disruptions due to catastrophic weather events
- Increased expenses for BCP countermeasures
- New arctic shipping routes open, lowering logistics costs to Europe and the U.S.

Implement initiatives toward renewable energy/ energy efficiency as usual, and evaluate portfolios, etc., for sites with high physical risks

(Substitutes)

- There is no particular impact from climate change

Buyers (customers)

- There is increased capital investment in FA due to relocation of production sites prompted by natural disasters, rising sea levels, etc.
- Increased demand for private energy generation and energy storage boosts demand for generators and power converters
- The need to secure a stable food supply boosts demand for plant factories
- Increased infectious diseases lead to advances in automation accompanying the reduction of manpower in many diverse areas (example: increased demand for robots used to produce ready-made meals (lunchboxes, etc.))
- Demand is created for power suits used during disaster recovery
- Demand is created for FA that can be used for remote production due to extreme weather (we hypothesized that there would be conditions that made work attendance difficult)

Take actions to address the increasing demand for products related to disaster preparedness as the need for this increases

Government

- Carbon taxes are introduced in certain regions, but there is no increase in activity for emission credit trading, etc.
- There is no significant growth in demand for renewable energy due to renewable energy policies remaining at the current level
- The world continues to depend on gray energy/fuel due to difficulty in achieving targets for CO_2 emissions reduction
- Initiatives for promoting EVs, etc., do not advance, and the number of vehicles being produced/sold does not increase
- Subsidies (for breakwaters, etc.) are created as sea levels rise and water stress increases

Promptly obtain information on government policies, and secure subsidies

Investors

- N/A

[Scenario group definition]

Step 2 **3** 4 5 Scenario 4°C **2°C**

YASKAWA

As the world moves toward energy efficiency / low-carbonization, there is increased demand for FA equipment / industrial inverters / renewable energy generation facilities

The 2°C worldview in the 2030s (examples)

: Actions for responding to risks

: Actions for seizing opportunities

Industrial equipment industry

Sellers (parts/raw materials)

- Increased procurement costs due to carbon regulations
- Increased shift to recycled materials
- With the spread of EVs, there is increased demand for rare earths and copper that are raw materials used in motors, affecting production when prices for these materials soar and they become difficult to obtain

Review procurement strategies (consider diversifying procurement sources and strengthening partnerships with suppliers of recycled materials)

Sellers (energy)

- Renewable energy holds an increased share in the energy mix, and electricity prices increase

Continue/increase investment related to renewable energy

New entrants

- Increased activity for entry into new business from energy-saving and low-carbon products/business models

Strengthen partnerships (alliances, M&A)

Industry

- Advances in electrification / use of renewable energy in plants
- Increased procurement costs due to increased prices of raw materials / intensified competition for resources
- Increased R&D activity toward conversion to smart factories, such as FEMS/M2M

Low-carbonization of plants

Promoting R&D toward conversion to smart factories (e.g. FEMS/M2M)

(Substitutes)

- There is no particular impact from climate change

Buyers (customers)

- Increased demand for FA equipment and industrial inverters due to increased energy efficiency needs
- Increased demand for equipment used in generating renewable energy
- Increased demand for motor drive systems for EVs and FCVs
- Customers' needs for low-carbon / recycled materials increase, and they demand the use of these materials in manufacturing processes
- A slowdown in oil/gas related areas leads to a decrease in sales mainly in North America for inverter products in the same industry

Low-carbonization of manufacturing processes

Develop/sell products that meet the preferences of customers with strong needs for energy efficiency

Government

- Carbon taxes are introduced, stimulating the low-carbon market
- Policies toward spreading energy efficiency / renewable energy and encouraging low-carbonization are implemented with the aim of achieving CO_2 emissions reduction targets. Subsidies are also enhanced
- Fossil fuel subsidies end
- Policies aimed at popularizing EVs and FCVs are moved forward
- A charging network is established to promote popularization of EVs
- Certain subsidies (for breakwaters, etc.) are created as sea levels rise and water stress increases

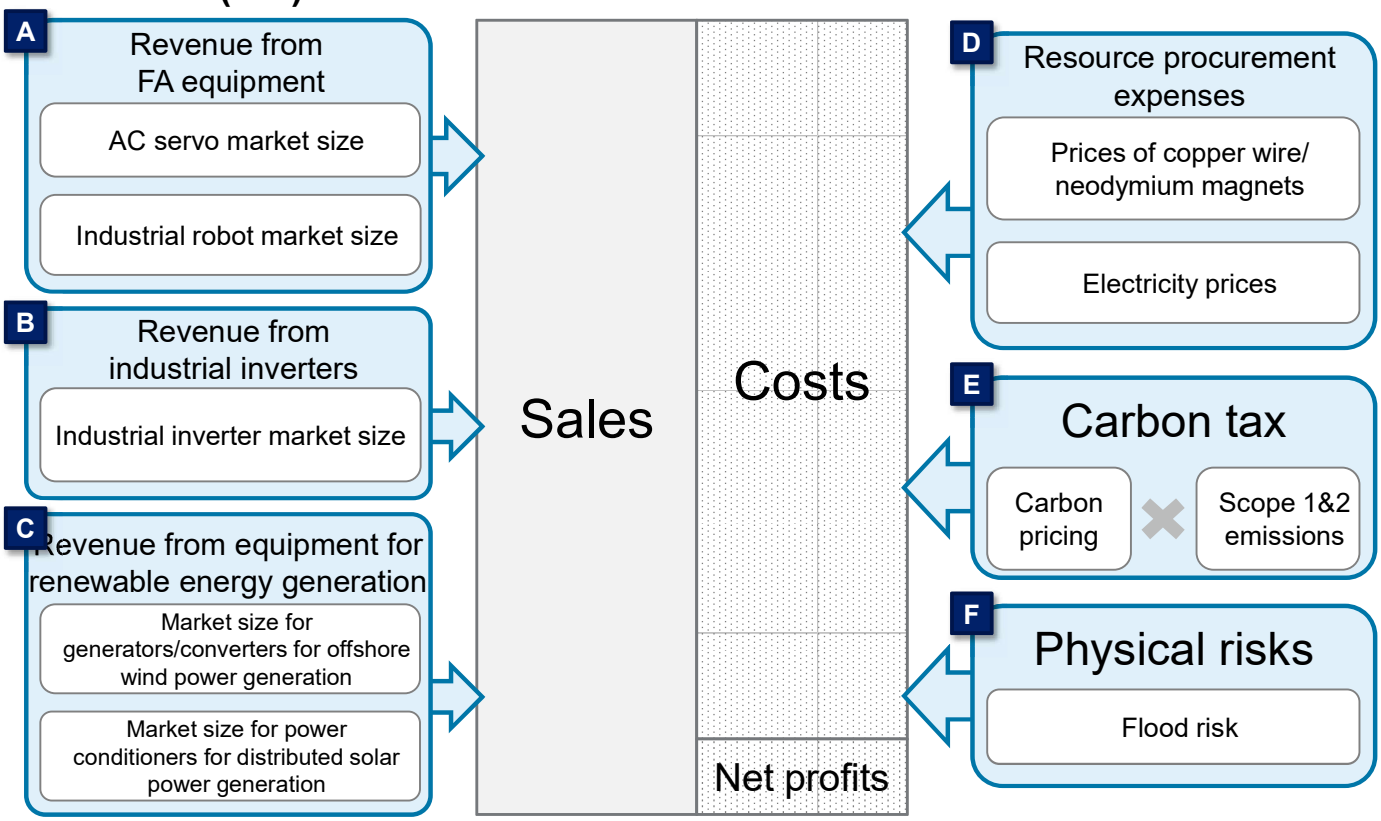
Promptly obtain information on government policies, and secure subsidies

Investors

- Low carbon / environmentally-friendly business becomes a requirement for investment

[Visual representation for assessing impact on business]

We evaluated the impact of each key driving force on the profit/loss statement (P/L)



[Results of the climate change scenario analysis]

Impact of climate change on YASKAWA's business	• When we based our hypotheses in the year 2030, we determined that the impact from climate change on YASKAWA's business (operating profits) was not particularly significant in either the 2°C scenario or the 4°C scenario. • The following identified risks and opportunities will need to be evaluated depending on the situation in the future. ➢ Opportunities: FA equipment, renewable energy-related equipment, expansion of business corresponding to extreme weather conditions ➢ Risks: Carbon tax hike, increase in procurement costs for copper/neodymium magnets, severe weather

[Future TCFD initiatives (suggested)]

TCFD disclosure	•Conduct an initial disclosure by preparing information on deficiencies and setting long-term CO_2 reduction targets based on the results of this analysis.
Post-disclosure initiatives	• After disclosing the results of this analysis, confirm the results of feedback from various stakeholders, including investors, and work to review (improve) the disclosure contents.

Other Sector

✓ Practice Case① : YASKAWA Electric Corporation (Electronic Equipment)

✓ **Practice Case② : SCSK Corporation (Information Technology)**

✓ Practice Case③ : ASKUL Corporation(Retailing)

Company Profile

SCSK

Company name	SCSK Corporation
Head Office	Toyosu Front, 3-2-20, Toyosu, Koto-ku, Tokyo 135-8110, Japan
Established	October 25, 1969
Net sales	396.8 billion yen (FY2020 Consolidated)
Employees	14,550 (FY2020 Consolidated)
Stock listing	First section of the Tokyo Stock Exchange
Business lines	Consulting, System development, Verification Services, IT Infrastructure development, IT Management, IT Software and Hardware Sales, BPO

DIVERSITY MANAGEMENT 2.0 PRIME

NADESHIKO BRAND 2020

2020 健康経営銘柄 Health and Productivity

2020 健康経営優良法人 Health and productivity ホワイト500

Group Companies

Domestic: SCSK KYUSHU CORPORATION, SCSK HOKKAIDO CORPORATION, SCSK Minori Solutions Corporation, SCSK ServiceWare Corporation, VeriServe Corporation, SCSK PRESCENDO CORPORATION, Allied Engineering Corporation, SCSK Nearshore Systems Corporation, VA Linux Systems Japan KK, SCSK SYSTEM MANAGEMENT CORPORATION, SDC Corporation, Skeed Co, Ltd., TOKYO GREEN SYSTEMS CORPORATION, Gran Manibus Co., Ltd.

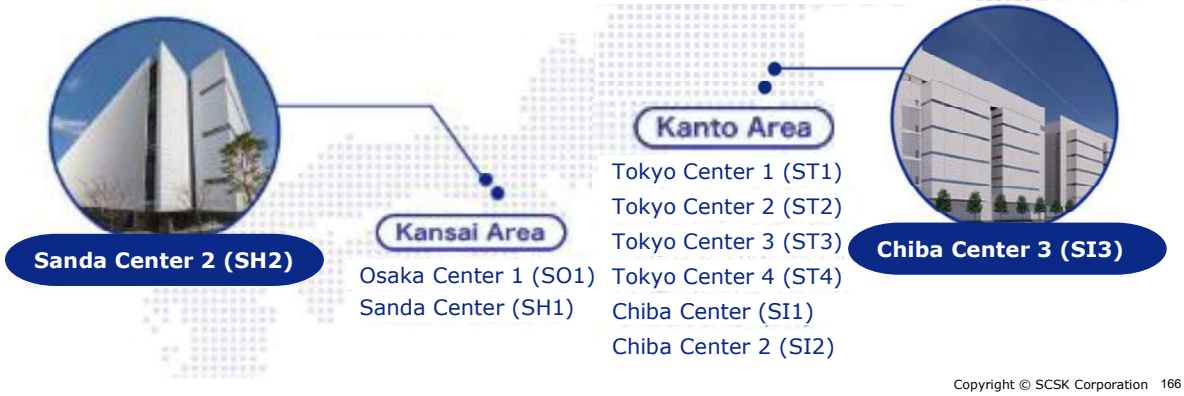
Overseas: SCSK USA Inc., SCSK Europe Ltd. (London) , SCSK Shanghai Limited, SCSK Asia Pacific Pte. Ltd. (Singapore), PT SCSK Global Indonesia, SCSK Myanmar Ltd.

SCSK data center locations

- Domestic Operation Bases(As of January 2022)
  Urban 5 Data Centers(Kanto 4 Kansai 1)
  Suburban 4 Data Centers(Kanto 2 Kansai 2)

- Suburban data center “netX DC Chiba Center 3 (SI3)” to be completed in Inzai City, Chiba Prefecture in spring 2022
  (third location in Inzai City)
  ※With the completion of netX DC Chiba Center 3 (SI3), SCSK’s total data center floor space will be approximately 95,000㎡, making it one of the largest data centers in Japan.

7 locations **10** Centers nationwide Total floor space: approximately **95,000㎡**

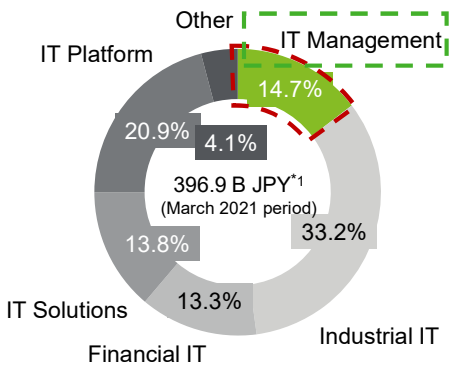


Scenario analysis: Target business

- We made the **“data center business”,** which is part of the IT management business, the **target of the scenario analysis**
- The data center business accounts for approximately 80%(*1) of SCSK group’s GHG emissions, and is considered to be **significantly affected by climate change (e.g., by carbon taxes and environmental regulations)**

*1 Percentage of emissions from the data center business of the total GHG emission amounts targeted in Scope 1 + 2

Business portfolio



Business domain	Products handled	Direction for consideration
IT Management	Provides services such as DC facility services and around-the-clock/year-round operation services	**Increasing green DC sales** **Increasing resilient DC sales**

Steps to implement scenario analysis

SCSK

1 **Ensure governance is in place** — Integrate scenario analysis into strategic planning and/or enterprise risk management processes. Assign oversight to relevant board committees/subcommittees. Identify which internal (and external) stakeholders to involve and how.

Coverage of our trial

2	3	4	5
Assess materiality of climate-related risks	**Identify and define range of scenarios**	**Evaluate business impacts**	**Definition of countermeasures**
Climate change Organize and evaluate risks and opportunities	Define multiple social scenarios (transition risk, physical risk)	Evaluate the impact of key impact items on selected business	Direction of future measures (draft) is discussed
<Main implementation items> Evaluation from the perspective of • Market and Technology Shifts • Policy and Legal • Reputation • Physical Risks	<Main implementation items> Evaluation from the perspective of • Scenario Selection • Obtain parameter information • Organize the world view of each scenario	<Main implementation items> Evaluate the impact of • Input costs • Operating costs • Revenues	<Main implementation items> Evaluation from the perspective of • Changes to business model • Creation of new services • Investments in capabilities and technologies

6 **Documentation and disclosure**

Risk significance level evaluation (1)

STEP 2 3 4 5

SCSK

For each evaluation item, we identified risks and opportunities from the perspective of their impact on DC(*1)-related business and listed in blue the risks/opportunities that impact SCSK's DC-related business

Evaluation Item	Impact	
	Risks	Opportunities
Carbon Price	➢ DC operation costs increase due to introduction of a carbon tax ➢ Carbon taxes vary by country, so this could lead to cost fluctuations if the business is being operated globally	➢ There is increased demand for cloud services due to increased demand for IT services which contribute to reducing GHG emissions
Carbon emission targets/policies of each country	➢ Costs increase for measures such as renewable energy/energy-efficient facilities and purchasing green electricity	➢ Measures against climate change are called for, and there is increased demand for DCs that use renewable energy or are energy-efficient
Energy-saving measures	➢ Costs increase for responses in SCSK's facilities to address tightening energy efficiency regulations	➢ SCSK can build a competitive advantage by acting preemptively to introduce standards and rules for decarbonization leveraging new technologies
Changes in important products	➢ The price of semiconductors rises due to increased demand from the spread of EVs, etc. ➢ If the unit cost of electricity is raised to curb electricity demand, electricity costs will increase	➢ Demand for processing/storing large amounts of data increases due to increased communication volume from the spread of SmartX(*2) ➢ Demand emerges for peripheral services for utilizing big data stored in DCs
Introduction of next-generation technology	➢ Costs increase due to the introduction of new decarbonization technologies	➢ There is potential for obtaining and retaining customers by acting ahead of other companies to address ICT energy efficiency standards

*1 DC is the abbreviation for "data center"
*2 "SmartX" is the collective term for next generation technologies, such as smart cities, smart cars, smart homes, and smart machines, which integrate the IoT and AI.

Risk significance level evaluation (2)

STEP 2 3 4 5

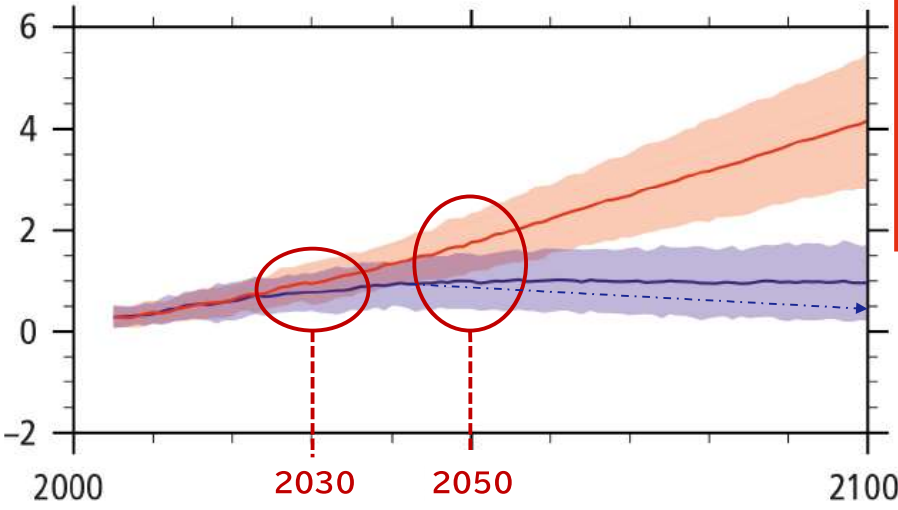
Evaluation Items	Impact	
	Risks	Opportunities
Changes in customer awareness	➢ Sales decline as customers become more environmentally aware and avoid using DCs with poor environmental performance	➢ Demand for decarbonized DCs increases in response to increased awareness of decarbonization and environmental friendliness ➢ Business opportunities are created for new services that take customer needs for decarbonization and environmental friendliness into account
Changes in investor's reputation・awareness	➢ ESG investment ratings may drop and stock prices may fall if SCSK's information disclosure measures are inadequate	➢ Corporate value improves by utilizing/issuing green bonds ➢ Reputation with investors improves through business that contributes to the environment
Increase in average temperature	➢ Air conditioning costs and electricity consumption for air conditioning increase	➢ Demand increases for ICT services that contribute to more efficient energy consumption
Changes in rainfall and weather patterns	➢ Costs increase for addressing changes in building performance requirements	➢ Extreme weather increases demand for DCs that are safe from disasters ➢ Increased demand for DCs due to usage of big data analysis, etc., for climate analysis
Rising water level	➢ There is new costs for flood control measures and relocation costs incurred by DCs located close to rivers	-
Increasing severity of extreme weather conditions	➢ DC operation/recovery costs increase because of natural disasters ➢ Risk of DC facility shutdowns increases due to power supply disruptions caused by natural disasters, etc.	➢ Demand increases for highly DCs with high resilience ➢ Demand increases for shift to DC use from on-premise data management from the perspective of damage prevention and business continuity

Scenario group definition(Selected scenarios)

STEP 2 3 4 5

Define society in 2030 and 2050 using 1.5°C and 4°C scenarios

【Projected average global surface temperature change】
(Compared with the average from 1986~2005)



Definition of 2.7~4℃ scenarios

4℃ scenario :
3.2~5.4℃ higher than pre-industrial Revolution levels if no additional measures against global warming are taken

Over 2℃(2.7℃~4℃) scenario :
2.7~4.0℃ higher than pre-industrial Revolution levels if no additional measures against global warming are taken

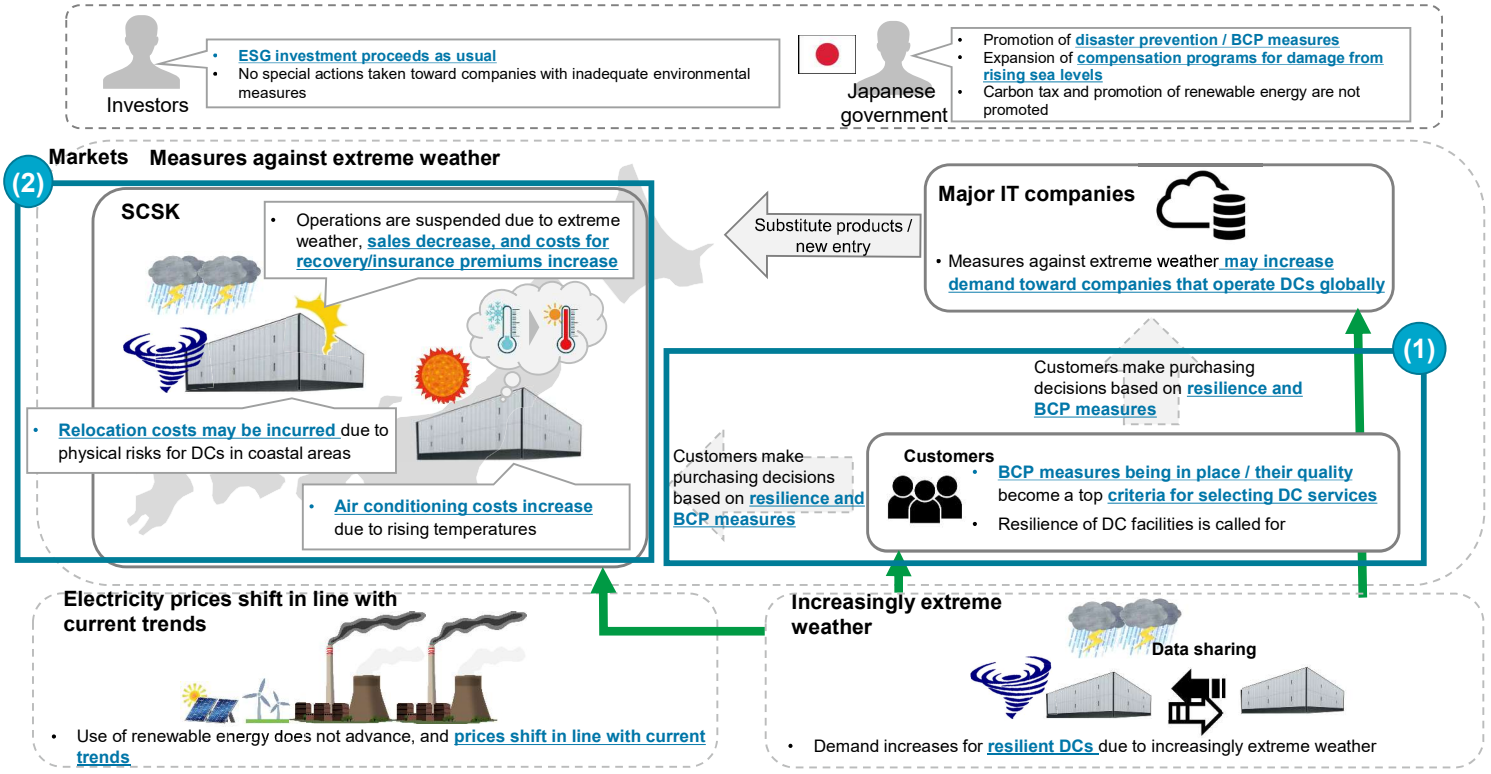
1.5℃ scenario :
We are highly likely to achieve an increase of less than 1.5℃ compared to pre-industrial Revolution levels if a radical transition to a new system is made

4°C World

Definition of scenario groups

STEP 2 3 4 5

4°C world: Business opportunities for resilient DCs increase due to increasingly severe natural disasters ("(1)" in the diagram below); meanwhile, physical risks from extreme weather and costs for addressing them increase due to SCSK's possession of DCs ("(2)")

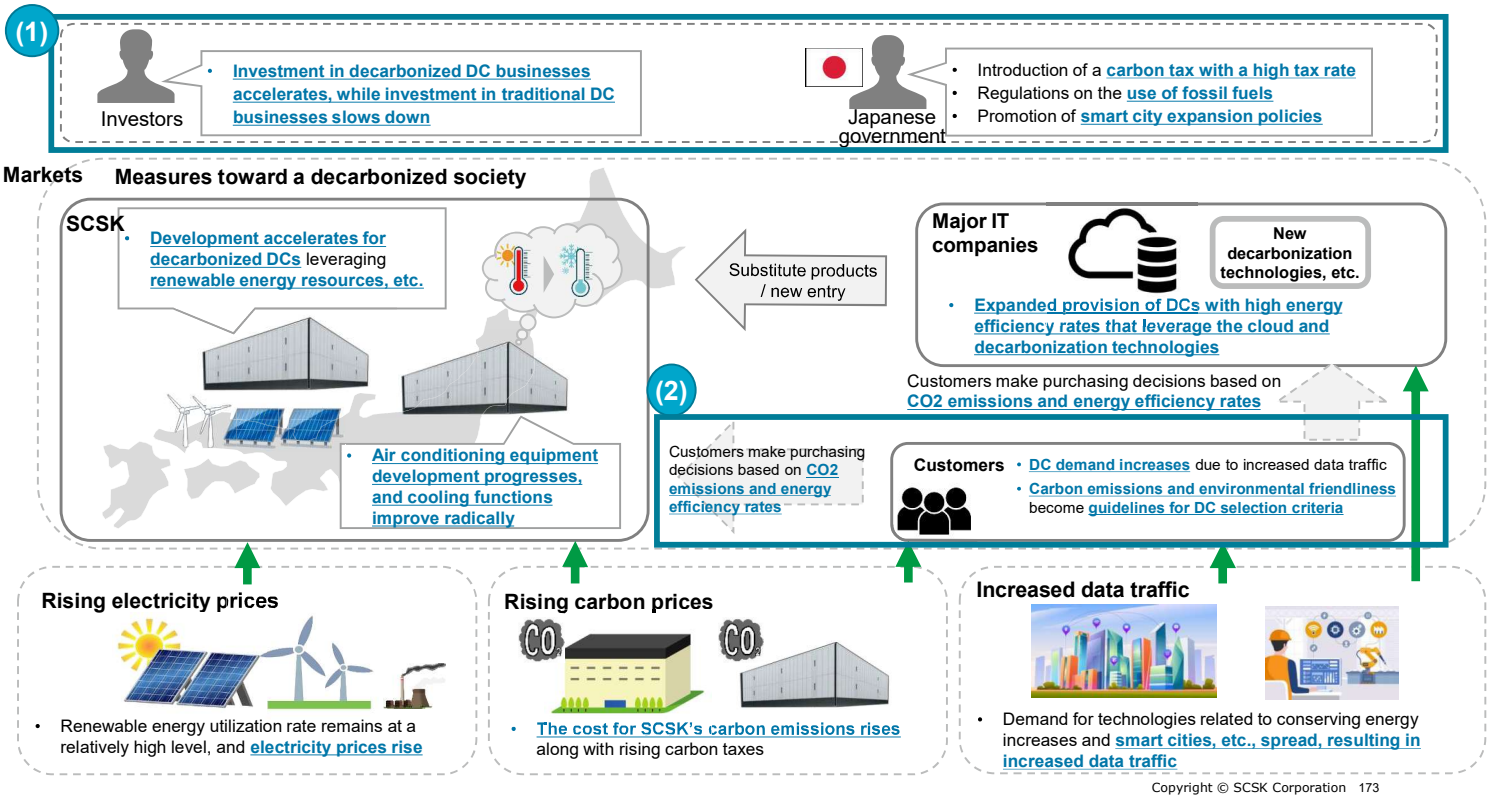


1.5°C World

Definition of scenario groups

STEP 2 3 4 5

1.5°C world: There is transformative promotion of climate change policies and other measures based on global consensus ("(1)" in the diagram below); meanwhile, environmental performance becomes a top criteria for customers in selecting services, as well ("(2)")



Business impact evaluation
(Impact items and relevant scenario)

4°C scenario Resilient business model	Worldview / Customer trends	1.5°C scenario Sustainable business model
■ Companies are required to have **resilient business models** due to increasingly extreme weather ■ **Disaster resilience, BCP measures, etc.,** become **criteria for selecting data centers**		■ Companies are required to develop **sustainable business models** that take the environment into consideration ■ **Environmental performance, such as low CO2 emissions and energy efficiency,** become **criteria for selecting data centers**

Impact overview	Impact item	Impact overview
Demand increases for resilient DCs and BCP measures due to increasingly extreme weather	Resilient DCs	Impact is slight
Impact is slight	Decarbonized DCs/related services	Consumer environmental awareness (decarbonization / energy conservation trends) and demand for new services rises
There are no government-promoted initiatives, etc.; the transition continues in line with current trends	Communication volume / data processing volume	Data traffic and data processing volume increase due to the government's "smart city development initiatives", etc., aimed at improving energy supply and infrastructure efficiency
Prices shift in line with current trends (use of renewable energy does not advance)	Electricity prices	Electricity prices rise due to promotion of renewable energy use
Air conditioning load increases due to rising temperatures, resulting in increased energy consumption	Energy consumption	Impact is slight
The cost for addressing physical risks increases due to an increase in natural disasters	Costs for addressing physical risks	Impact is slight
Impact is slight	Carbon cost	Carbon cost for carbon emissions rises due to higher carbon taxes

Business impact evaluation
(Impact level evaluation for each scenario)

4°C scenario — **Resilient business model**

Summary: We foresee increased air condition costs due to rising average temperatures, costs incurred to address natural disasters, and increased demand for resilient DCs due to increasingly severe natural disasters

impact evaluation

Category	Impact item	Level of impact on revenue (*1) As of 2030	As of 2050
Sales	Increased demand for resilient DCs(*2)	++	+++
	Increased DC demand due to larger data traffic and data processing volume	+	+
Expenses	Fluctuations in electricity prices(*3)	–	++
	Rising electricity consumption (air conditioning costs)	–	– –
	Rising costs for addressing physical risks	–	– –

1.5°C scenario — **Sustainable business model**

Summary: In regard to the increased costs from higher carbon taxes: we can reduce carbon tax costs by taking initiatives to reduce GHG emissions. We also foresee increased demand for decarbonized DCs

impact evaluation

Category	Impact item	Level of impact on revenue (*1) As of 2030	As of 2050
Sales	Increased demand for decarbonized DCs and new services that take changes in the social environment into account(*2)	++	+++
	Increased demand for DCs due to larger data traffic / data processing volume	+	+
Expenses	Fluctuation in electricity prices	–	– –
	Higher carbon taxes(*4)	(– –)	(– – –)

*1 The impact of the major business impact items in each scenario on earnings is indicated by "+/-". Evaluated on a relative basis by three levels
*2 New construction and operation costs for resilient DCs are not included in the estimate this time. The cost impact could be significant depending on the assumed scenario
*3 Based on reports from the IEA, etc., electricity prices in the 4°C scenario are assumed to increase in 2030, but decrease in 2050
*4 We assume that we can mitigate the impact of increased costs due to higher carbon taxes by reducing GHG emissions

Definition of countermeasures

STEP 2 3 4 5 SCSK

We can increase the resilience of business activities by identifying risks and opportunities in each scenario, and continuously considering initiatives to avoid/mitigate risks and initiatives to increase the probability of realizing opportunities

Scenario	Direction of initiatives	Perspective of countermeasures	Example countermeasures
4ºC scenario **Resilient business model**	New service creation	Establishment of resilient DCs	■ Building of new DCs designed to withstand severe disasters ■ Selection of DC sites taking into account the impact of natural disasters ■ Mutual backup between DCs
Common to both scenarios	Conversion to efficient energy use	Curbing of electricity costs	■ Procurement of electricity generated at low cost using midnight power services and new technologies
		Curbing of electricity use	■ Control of air conditioning using the IoT or AI, etc., or new technologies
	New service creation	Efficient use of DC waste heat	■ Urban development that utilizes DC waste heat / deployment to other business areas
1.5ºC scenario **Sustainable business model**	Conversion to renewable energy	Adoption of renewable energy	■ Virtual PPAs from purchasing renewable energy certification ■ Direct purchase of electricity from renewable energy sources (PPAs) ■ Establishment/acquisition of renewable energy power plants
	New service creation	New establishment of decarbonized DC services	■ Create new services that take changes in legal systems and the social environment into account

Other Sector

✓ Practice Case① : YASKAWA Electric Corporation (Electronic Equipment)

✓ Practice Case② : SCSK Corporation (Information Technology)

✓ **Practice Case③ : ASKUL Corporation(Retailing)**

Step 2 3 4 5 Scenario 4°C 2°C

[Step 2: Risk significance assessment]

We evaluate risk/opportunities ranging from storage/transport (copier paper is sourced from raw materials) to product usage

Business risks/opportunities related to transition risks

Risk		Business impact		Rating
Subcategory	Parameter	Study: risks	Study: opportunities	
Carbon pricing	Revenue Expenditures	➢ **The application of carbon pricing** will increase costs such as operating costs for logistics facilities/offices and costs of fuel used in deliveries	➢ Operating costs and fuel costs will decrease due to **investments made toward increased environmental performance**. The company may also be eligible for public support or tax relief	High
Various countries' carbon emission targets/government policies	Revenue Expenditures	➢ **Tighter greenhouse gas reduction obligations** will increase costs for improving the environmental performance of logistics facilities, delivery vehicles, and so on ➢ **ASKUL will need to purchase emissions credits** if carbon emissions cannot be reduced ➢ **The cost for procuring timber will increase** due to government policies/logging taxes related to forests being used as solutions for absorbing carbon, resulting in increased acquisition cost for copier paper (ASKUL's key products) and other items	➢ **If significant reductions in carbon emissions are achieved**, the company may be able to sell emission credits if a system such as emissions trading is introduced	Med.
Shifts in energy prices	Revenue Expenditures	➢ **Rising fossil fuel and electricity prices** will increase costs such as operating costs for logistics facilities and costs of fuel used in deliveries	—	High
Increases/ decreases for main products	Revenue Expenditures	➢ **Progress toward a paperless society is made due to the influence of decarbonization**, resulting in declining sales from reduced demand for copier paper, stationery, and other related office supplies ➢ **ASKUL is forced to use materials sourced from renewable resources and bio-based plastics**, resulting in increased costs due to the use of alternative materials	➢ There will be **increased demand for environmentally friendly products** such as ethical consumption goods/services, including low-carbon/decarbonized products and packaging ➢ There will be increasing momentum towards a circular economy across all of society, which could lead to **increased business opportunities through various collection services**	High
Spread of low carbon technologies	Revenue Expenditures	➢ Costs increase due to the **introduction of environmentally friendly vehicles and high-efficiency low carbon technologies/equipment**	➢ Lower fuel costs and other delivery-related costs due to **improved fuel efficiency of environmentally friendly vehicles** ➢ Lower energy costs through **introducing more efficient logistics and energy-saving equipment**	High
Changes in reputation with customers	Revenue Expenditures	➢ There is an increased risk to ASKUL's reputation if it fails to respond appropriately to the **growing public awareness of climate change**	➢ There will be more opportunities to improve the company's reputation if it responds appropriately to **growing public awareness of climate change**	High
Changes in reputation with investors	Capital	➢ **If investors perceive ASKUL as being reluctant to take environmental action**, it will be more difficult to procure funds, and financing costs will increase	➢ It will be easier to procure funds from ESG investors, etc., and financing costs will decrease if the company **gains a reputation with investors of being proactive in its environmental measures** as a result of **shifting its business to low carbon/environmentally friendly practices** and communicating this shift effectively	Low

Step 2 3 4 5 Scenario 4°C 2°C

[Step 2: Risk significance assessment]

We evaluate risk/opportunities ranging from storage/transport (copier paper is sourced from raw materials) to product usage

Business risks/opportunities related to physical risks

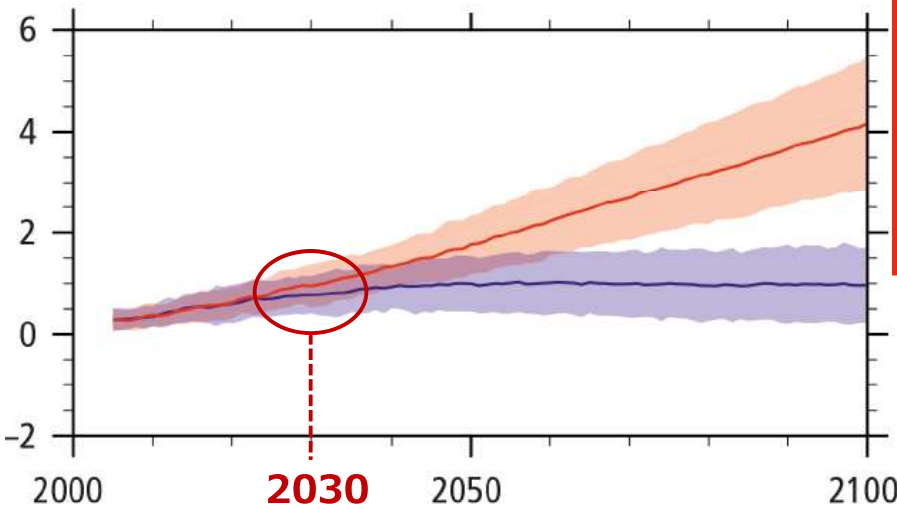
Risk		Business impact		Rating
Subcategory	Parameter	Study: risks	Study: opportunities	
Increased average temperatures	Revenue Expenditures Capital	➢ Increased costs for energy needed for **air conditioning/refrigeration in logistics facilities and delivery vehicles** ➢ **The cost for procuring timber will increase due to forest fires and tree diseases and pests**, resulting in increased acquisition cost for ASKUL's copier paper (key products) and other items which use timber as a raw material	—	High
Changes in precipitation/ weather patterns	Revenue Expenditures	➢ There will be **more delivery delays and accidents due to increased rainfall/strong winds**, resulting in increased costs from paying delivery fees/personnel costs/compensation/insurance ➢ The **cost for procuring timber will increase due to changes in flora and timber sourcing areas**, resulting in increased acquisition cost for ASKUL's copier paper (key products) and other items	➢ By **increasing the resilience of its business by diversifying its portfolio in respect to supplier countries/tree species and strengthening its supply chains**, the company will be able to avoid a decline in sales for timber-based products such as copier paper	High
Elevated sea levels	Revenue Expenditures Capital	➢ Relocation costs will arise from the need to **reconsider the location of sites over the medium- to long-term due to increased risk of flooding from storm surges/tidal waves**	➢ **Supply chains can be maintained by addressing the impact of increasing sea levels** on deliveries and logistics centers	Low
Extreme weather conditions	Revenue Expenditures Capital	➢ There will be **more delivery delays and accidents due to increased rainfall/strong winds**, resulting in increased costs from paying delivery fees/personnel costs/compensation/insurance ➢ There will be **a decrease in asset values for logistics centers/offices at high risk of flooding**, and **insurance premiums for these will increase** ➢ **The cost for procuring timber will increase due to plants ceasing operations and a decrease in forest resources**, resulting in increased acquisition cost for ASKUL's main products (copier paper and similar products) ➢ **Capital investments made for resilience** due to extreme weather conditions	➢ By **increasing the resilience of its business through diversifying its portfolio in respect to supplier countries/tree species and strengthening its supply chains**, the company will be able to avoid a decline in sales for timber-based products such as copier paper ➢ **Supply chains can be maintained by addressing the impact of extreme weather conditions** on deliveries and logistics centers	High

Step 2 3 4 5 Scenario 4°C 2°C

[Step 3: Scenario group definition]

We investigate society in 2030 using two scenarios for climate change with a high degree of uncertainty

[Projected average global surface temperature change] (compared with the average from 1986-2005)



<Timeframe for this analysis>

As stated in the following pages, the physical risks from climate change itself are limited due to this being only 10 years in the future

(Source) AR5 SYR: Table SPM.6

Definition of 4°C (2.7°C+) scenarios

4°C scenario:
3.2-5.4°C higher than pre-Industrial Revolution levels if no additional measures against global warming are taken

Over 2°C (2.7°C-4°C) scenario:
2.7-4.0°C higher than pre-Industrial Revolution levels if no additional measures against global warming are taken

2°C scenario:
0.9-2.3°C higher than pre-Industrial Revolution levels if strict measures are taken

The TCFD recommendations for scenario analysis suggest that multiple temperature range scenarios be selected, including those below 2°C

Step 2 3 4 5 Scenario 4°C 2°C

[Step 3: Scenario group definition]

Definition of each worldview based on scientific evidence from IEA, etc.

*Exchange rate: 1 USD = 106 JPY (based on the late September 2020 rate)

Key items	Assumed parameters	Currently	2030		Source
			4°C	2°C	
Carbon pricing	Carbon tax	(Not implemented)	—	100 USD/tCO2	• IEA WEO2020
Shifts in energy prices	Oil price	63 USD/barrel	76 USD/barrel	52 USD/barrel	• IEA WEO2020
	Electricity price	216 USD/MWh	209 USD/MWh	231 USD/MWh	• IEA WEO2018
Increase/ decrease in staple commodities	Recycled plastic usage rate	—	—	14%	• We hypothesize that this will reach a level similar to European plastic strategies
	Sales for certified sustainable products	125.4 billion USD	183.4 billion USD	198.1 billion USD	• Nielsen: "Product Insider"
Spread of low carbon technologies	EV penetration rate	0.3%	5%	39%	• Global Calculator
Increased average temperatures	Increased temperatures	—	Increase of 1.1 °C	Increase of 1.0 °C	• World Bank: "Climate Change Knowledge Portal"
Extreme weather conditions	Flood frequency (Japan)	—	4x	2x	• "A proposal for flood planning based on climate change"
	Flood damage costs (Indonesia)	404.6 million USD/year	875.3 million USD/year	404.6 million USD/year	• WRI: "The Aqueduct Global Flood analyzer"
Key materials **Various countries' carbon emission targets/government policies**	Forest area reduction targets (Indonesia)	450ha/year	325ha/year	Stricter than in the 4°C scenario. Peatland restrictions on artificial forests introduced	• "First Nationally Determined Contribution REPUBLIC of INDONESIA"
Key materials **Extreme weather conditions**	Flood damage costs (Indonesia)	404.6 million USD/year	875.3 million USD/year	404.6 million USD/year	• WRI: "The Aqueduct Global Flood analyzer"

Step 2 3 4 5 Scenario 4°C 2°C

[Step 3: Scenario group definition (visual representation of a future society)]

The 4°C (2.7°C+) world: Government policies do not move forward, and physical risk increases

Indonesian government

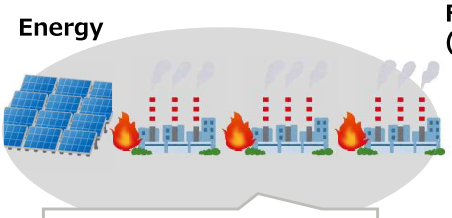
Promotion of measures for disaster prevention/mitigation in preparation for extreme weather conditions such as floods

Japanese government

No major changes can be seen in regulations or government policies, but reviews of disaster prevention/mitigation plans move forward due to increased physical risk

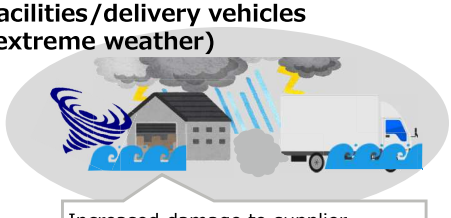
Procurement	Storage/transport	Product use/collection

Energy



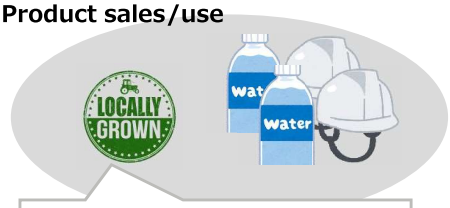
Gasoline prices soar as energy-saving initiatives fail to spread

Facilities/delivery vehicles (extreme weather)



Increased damage to supplier plants/ASKUL facilities/deliveries due to flooding, etc.

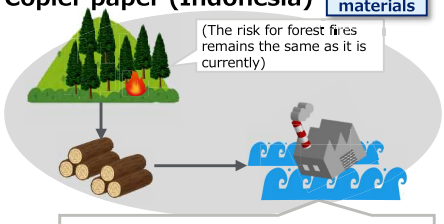
Product sales/use



(While not as much as in the 2°C scenario) Ethical consumption increases, and demand for sustainable products increases along with it

Demand for heat-protection products increases due to factors such as an increased number of extremely hot days. Increased awareness toward disaster prevention/mitigation increases demand for products related to disaster prevention/mitigation measures

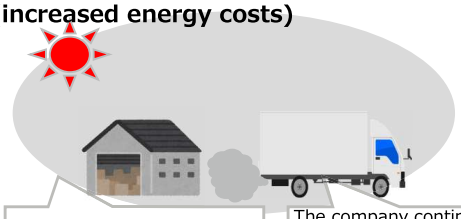
Copier paper (Indonesia) Key materials



(The risk for forest fires remains the same as it is currently)

Paper plant operations cease due to flooding, resulting in a halt in copier paper shipping

Facilities/delivery vehicles (increased energy costs)



Increased costs for AC/refrigeration needed for logistics facilities/deliveries

The company continues to use mainly ICE vehicles in its deliveries, and delivery costs increase due to the soaring price of gasoline

Step 2 3 4 5 Scenario 4°C 2°C

[Step 3: Scenario group definition (visual representation of a future society)]

The 2°C world: Low-carbon initiatives move forward, and there is increased demand for sustainable and energy-efficient products

Indonesian government

Regulations tighten and the logging tax is raised in order to protect national forests

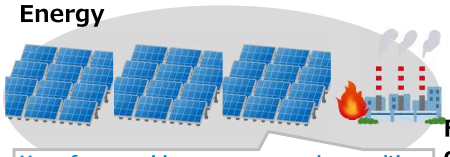
Japanese government

Support initiatives are implemented
- Sustainable product certification
- Promotion of energy-saving investments
- Support for introducing ZEVs/energy-efficient equipment

Regulations are tightened
- Increased carbon taxes
- Activation of systems such as emissions credit trading
- Recycled plastic regulations, etc.

Procurement	Storage/transport	Product use/collection

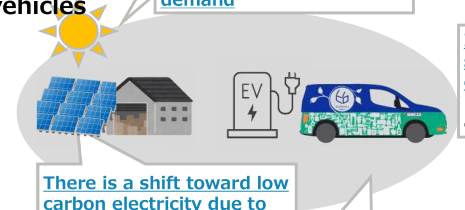
Energy



Use of renewable energy expands, resulting in increased energy costs

Facilities/delivery vehicles

(While not as much as in the 4°C scenario) an increase in extremely hot days result in increased energy demand



There is a shift toward low carbon electricity due to increased carbon tax, etc.

Accelerated implementation of low-carbon delivery methods, such as the introduction of ZEVs

Product sales/use

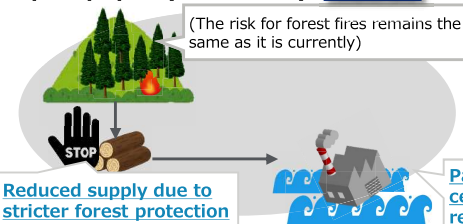
Increased demand for sustainability-certified and energy-efficient products due in part to support from the government

Slight increase in demand for products related to heat protection/disaster prevention/disaster mitigation

Plastic products

Product prices increase due to regulations on recycled plastic

Copier paper (Indonesia) Key materials



(The risk for forest fires remains the same as it is currently)

Reduced supply due to stricter forest protection regulations

Paper plant operations cease due to flooding, resulting in a freeze in copier paper stock

Product collection

Increased momentum toward a circular economy

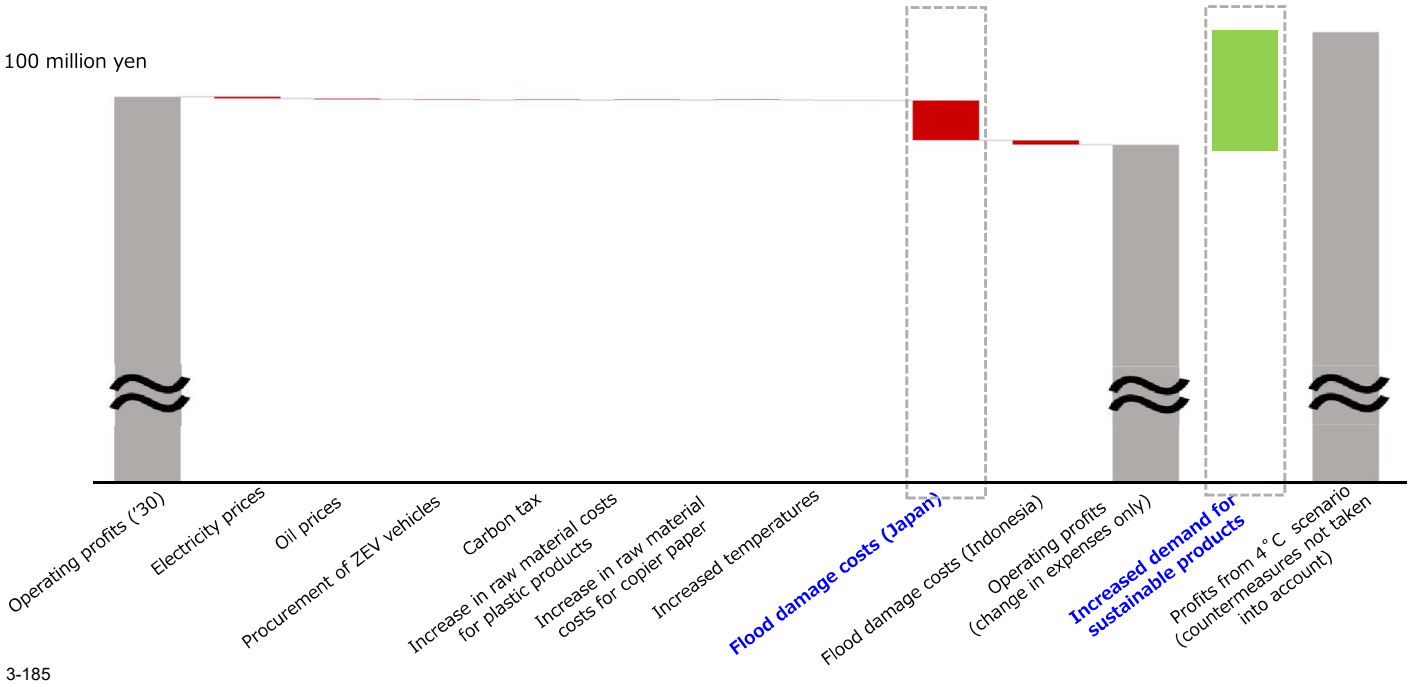
Step 2 3 4 5 Scenario 4°C 2°C

[Step 4: Business impact evaluation]
In the 4°C (2.7°C+) scenario, it will be important to take measures against flood damage and seize opportunities for increased product demand

Increase/decrease in expenses

Increase/decrease in revenue

100 million yen



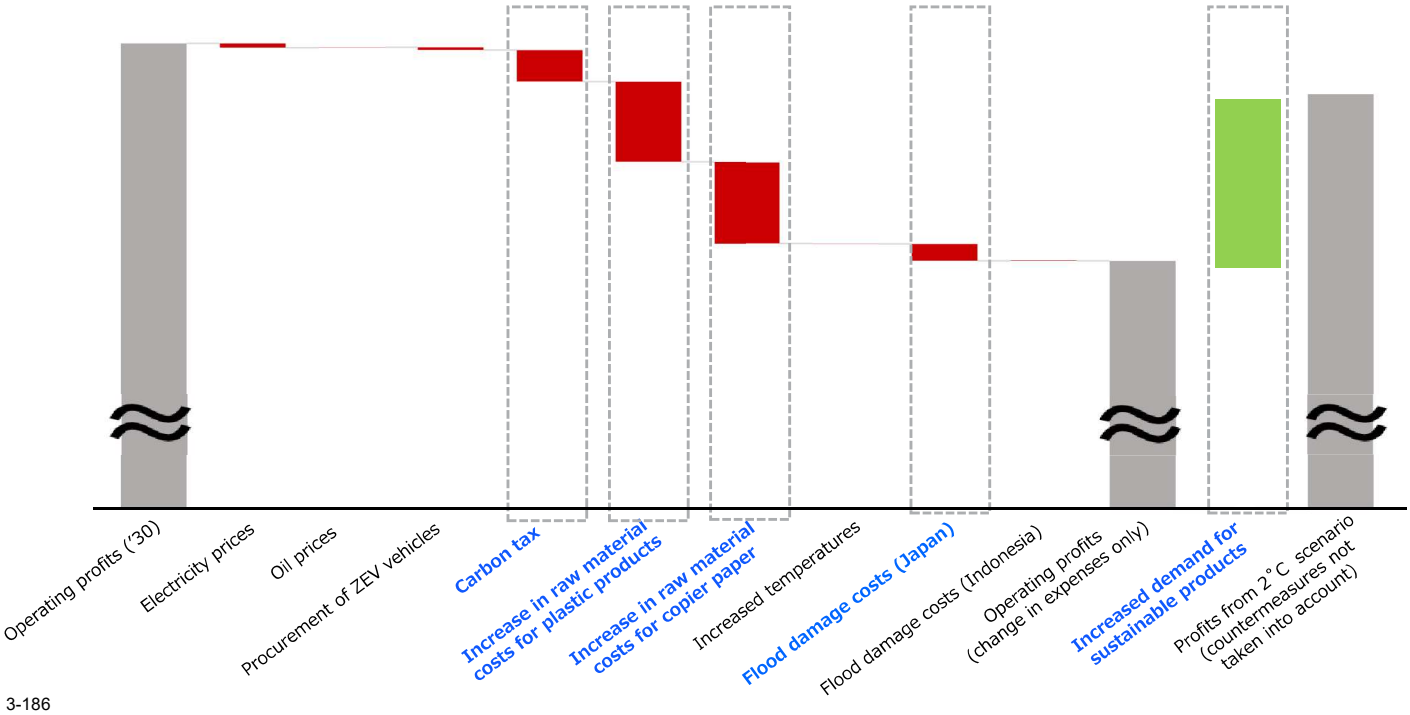
Step 2 3 4 5 Scenario 4°C 2°C

[Step 4: Business impact evaluation]
In the 2°C scenario, it will be important to seize opportunities for increased product demand in addition to taking measures against carbon taxes/increases in raw material costs

Increase/decrease in expenses

Increase/decrease in revenue

100 million yen



[Step 5: Definition of countermeasures]

Step 2 3 4 **5** Scenario **4°C** **2°C**

Although existing response policies such as those in the medium-term management plan already include some countermeasures, we will continue developing countermeasures that are even more robust while referring to initiatives taken by leading companies

Item	Perspectives for approaching risk countermeasures	Category	Response policy	Risk countermeasures
Carbon pricing	✓ Reduce **CO2 emissions from logistics facilities, vehicles, etc.**	Adapted	RE100 EV100	✓
	✓ Reduce utility costs for cooling, etc. by **introducing automation to increase unmanned operations in logistics facilities**	Adapted	Medium-term management plan	✓
	✓ Reduce fuel consumption throughout the entire supply chain by achieving **efficient transportation and delivery of products**	Adapted	Medium-term management plan	✓
Product raw material costs	✓ Investigate sustainable **sources/procurement methods for copier paper**	Established	Medium-term management plan	✓
	✓ Avoid the **impact of increased costs from pushes toward using recycled plastics**	Adapted	Medium-term management plan	✓
Extreme weather conditions (flooding)	✓ Establish **redundancy against flooding risk**	Adapted	Risk management plan	✓
	✓ Establish measures to **reduce the duration of shutdowns** in the event of a disaster	Adapted	Risk management plan	✓
	✓ Establish countermeasures against **increased disaster risks for suppliers**	Retained	Risk management plan	✓

[Step 5: Definition of countermeasures]

Step 2 3 4 **5** Scenario **4°C** **2°C**

Although existing response policies such as those in the medium-term management plan already include some countermeasures, we will work proactively to take advantage of business opportunities with solutions for individual risks

Item	Perspectives for approaching risk countermeasures	Category	Response policy	Measures for taking advantage of opportunities
Sustainable products/ circular economy	✓ Formulate **strategies** for what kinds of products to **make into sustainable products**, and in what ways	Adapted	Medium-term management plan	✓
	✓ Achieve **a circular economy utilizing ASKUL's supply chain**	Established	Medium-term management plan	✓
Increased average temperatures Extreme weather conditions (flooding)	✓ **Respond to increased demand for products** corresponding with increasing temperatures and increasing disaster awareness	Adapted	Medium-term management plan	✓

[Disclosure process]
We expect to make a disclosure of ASKUL's scenario analysis using the following three processes below :
1. Identify the substantial risks for each scenario
2. Clearly state that the efforts concerning countermeasures have been initiated in conjunction with medium- to long-term strategies
3. Provide specific examples of how opportunities (particularly those for high-impact key products) are proactively utilized to create value

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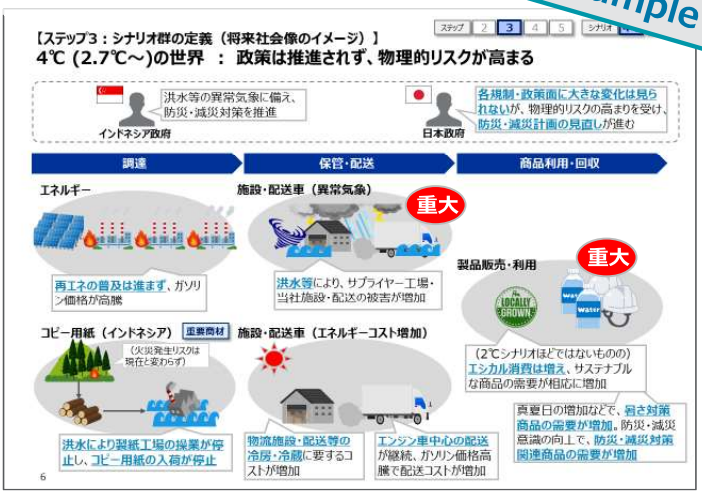

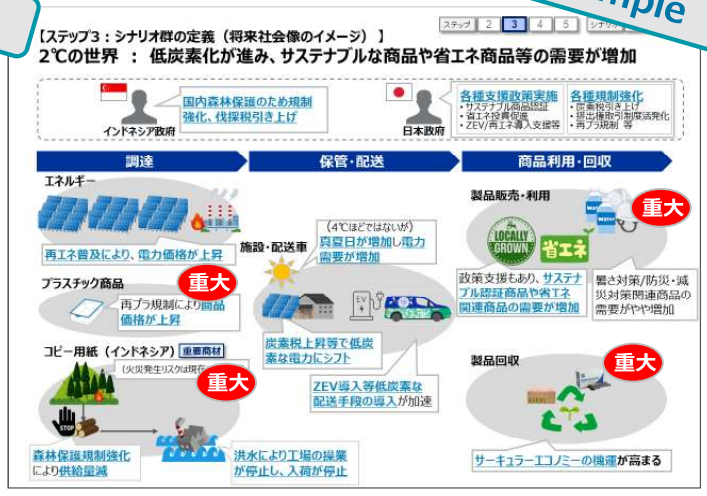

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Sample


【ステップ5：対応策の定義】
先進企業等の取組を参考にしながら、リスク回避を一層強固に行うための対応策を導出

項目	リスクへの対応の着眼点	区分	対応方針	リスク対応策
炭素価格	✓物流施設、車両などからのCO2排出量を削減	適応	RE100 EV100	
	✓物流施設の自動化により無人化を進め、冷房等に要する光熱費を削減	適応	中期経営計画	
	✓商品の効率的な輸配送を実現し、サプライチェーン全体での消費燃料を削減	適応	中期経営計画	
商品原材料費	✓サステナブルなコピー用紙の調達先・調達方法を検討	形成	中期経営計画	
	✓再生プラスチック化推進による原価増の影響を回避	適応	中期経営計画	
異常気象の激甚化（洪水）	✓洪水リスクに対する冗長性を構築	適応	リスクマネジメント計画	
	✓罹災時の操業停止期間を減少させる為の対応策を構築	適応	リスクマネジメント計画	
	✓サプライヤーの罹災リスク増加への対応策を構築	留保	リスクマネジメント計画	

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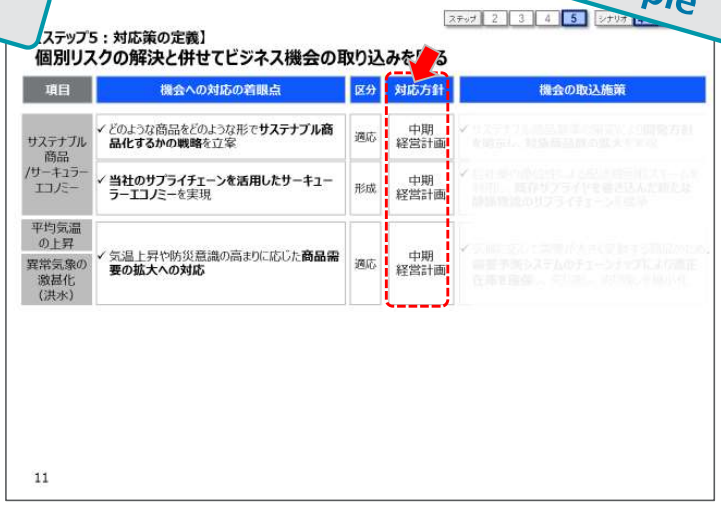
Sample


【ステップ5：対応策の定義】
個別リスクの解決と併せてビジネス機会の取り込みを図る

項目	機会への対応の着眼点	区分	対応方針	機会の取込施策
サステナブル商品/サーキュラーエコノミー	✓どのような商品をどのような形でサステナブル商品化するかの戦略を立案	適応	中期経営計画	
	✓当社のサプライチェーンを活用したサーキュラーエコノミーを実現	形成	中期経営計画	
平均気温の上昇 異常気象の激甚化（洪水）	✓気温上昇や防災意識の高まりに応じた商品需要の拡大への対応	適応	中期経営計画	

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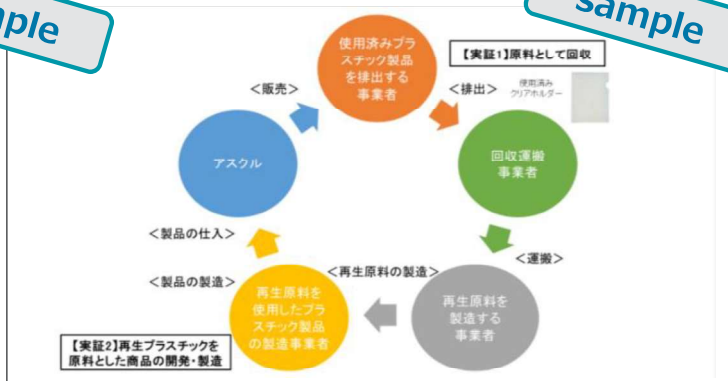
Sample

Sample



[FY2020 demonstration project for establishing a recycling system for plastics and other resources to support a decarbonized society]
(Establishing a new "resource recycling value chain" that extends from collecting clear file folders to creating new products)