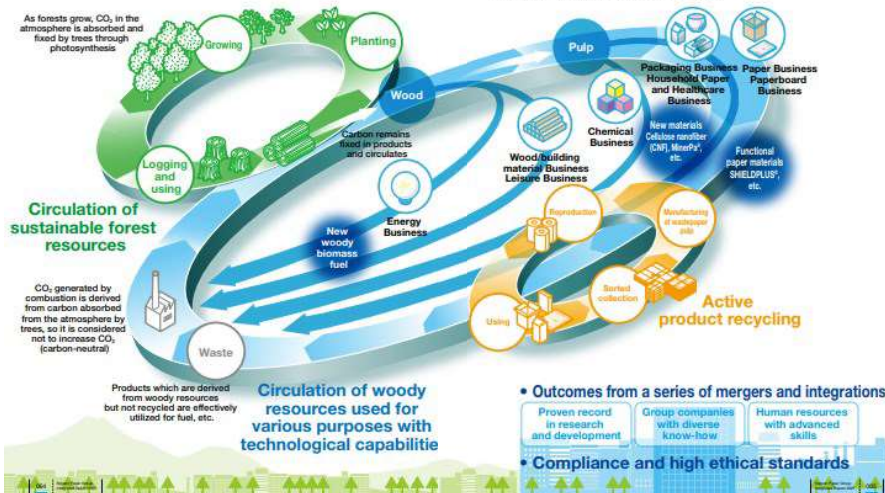




Business Development as a Comprehensive Biomass Company

Through Circulation of Woody Resources

Realizing a Carbon-Neutral Business Model



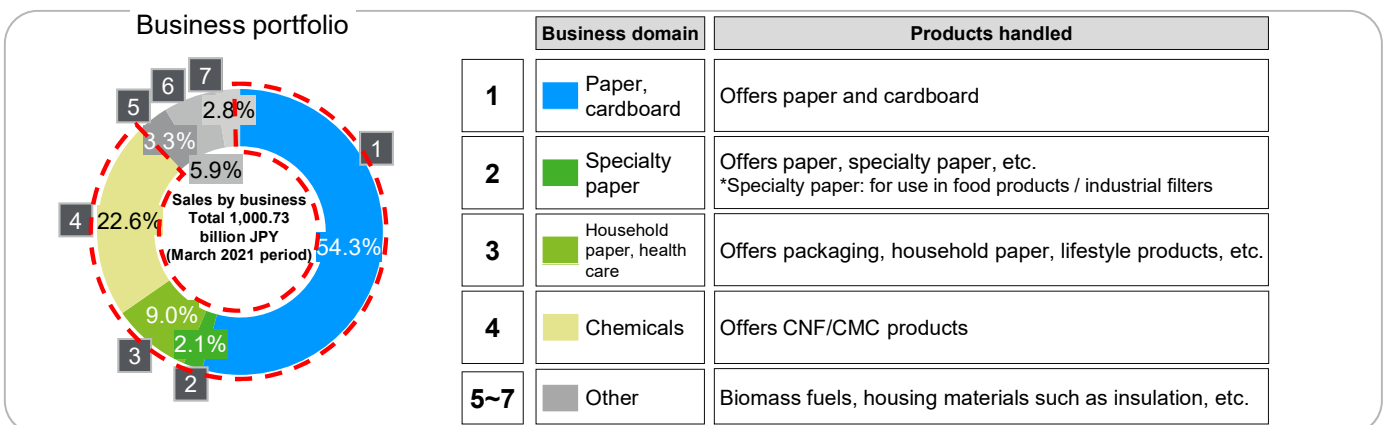
With the sustainable resource “wood” as its core, the company develops various products / service business from wood resources

3-92

Significance assessment of risks/opportunities

Step 2 3 4 5

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



Risks in each value chain

R&D

Afforestation and wood processing

Paper manufacturing and processing

Transportation

Sales and disposal

- ✓ 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

- ✓ 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

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

- ✓ 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

3-93

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	<ul style="list-style-type: none"> Global carbon taxes <u>fall in line with European standards</u>, increasing operating and logistics costs for plants 	<ul style="list-style-type: none"> By improving environmental performance, such as <u>through the introduction of renewable energy</u>, Nippon Paper Industries may qualify for public support and tax reductions 	Lar ge	Lar ge	Lar ge	Lar ge
2. Carbon emissions targets/policies in each country	Revenue Spending	<ul style="list-style-type: none"> If carbon emissions cannot be reduced, additional costs will be incurred, <u>such as purchasing of emission credits</u> Wood procurement costs increase due to <u>forest protection policies and logging restrictions in various countries</u> (e.g., regulations on logging/exports from natural forests, etc.) 	<ul style="list-style-type: none"> Demand for low-carbon products increases (CNFs, etc.) Business opportunities such as for the provision of <u>biofuels</u> may increase as a result of policies promoting decarbonization 	Lar ge	Lar ge	Lar ge	Lar ge
3. Changes in energy price	Revenue Spending	<ul style="list-style-type: none"> Conversion to renewable energy is called for, and costs for addressing this increase, <u>such as those related to company facilities and for purchasing green energy</u> 	—	Me diu m	Me diu m	Me diu m	Me diu m
4. Increases or decreases in important products	Revenue Spending	<ul style="list-style-type: none"> Digitalization of information / paperless practices progresses due to promotion of decarbonization Efficiency in food production decreases due to climate change; the <u>cost of raw wood materials</u> increases as forest areas are converted to <u>agricultural land</u> 	<ul style="list-style-type: none"> Increasing interest in environmental issues among consumers results in <u>increasing demand for ethical consumption and environmentally friendly products</u> Business opportunities related to <u>recovered and recycled paper</u> may increase as the circular economy gains momentum 	Lar ge	Lar ge	Lar ge	Lar ge

3-94

3

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	<ul style="list-style-type: none"> 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 <u>increased burden of R&D investment costs</u> 	<ul style="list-style-type: none"> Improvements in the performance of environmentally friendly equipment (e.g., solar power generation) will <u>reduce the cost of renewable energy</u>, which will decrease plant operating costs Commercialization of CNFs and other products will <u>expand related business opportunities</u> 	Lar ge	Lar ge	Lar ge	Lar ge
6. Changes in customer reputation	Revenue Spending	<ul style="list-style-type: none"> Manufacturing costs increase due to <u>increased demand for environmentally friendly products</u> If Nippon Paper has unsuitable forest management practices, <u>this will be pointed out by NGOs and the media</u>, resulting in damage to the company's reputation and decreased sales 	<ul style="list-style-type: none"> Making clear appeals of the value of forest <u>resources</u> in the face of rising climate change <u>will enhance the company's reputation</u> 	Lar ge	Me diu m	Lar ge	Me diu m
7. Changes in investor's reputation	Capital	<ul style="list-style-type: none"> If investors view Nippon Paper as reluctant to take <u>environmental measures</u>, it will be more difficult to <u>raise capital</u> and the cost of raising capital will increase 	<ul style="list-style-type: none"> Potential for ESG investment and other <u>capital raising opportunities</u> will increase if the company shifts to an <u>environmentally friendly business model</u> 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 	Sm all	Sm all	Sm all	Sm all
8. Passing on increased costs to product prices	Revenue Spending	<ul style="list-style-type: none"> When passing on cost increases due to each risk to product prices, <u>there is a risk of undermining Nippon Paper's competitiveness depending on the size of the pass-on amount</u> 	<ul style="list-style-type: none"> If there is movement to promote bearing of environmental costs over the supply chain, including consumers, Nippon Paper's business will become more sustainable 	Lar ge	Lar ge	Lar ge	Lar ge

3-95

4

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

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

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

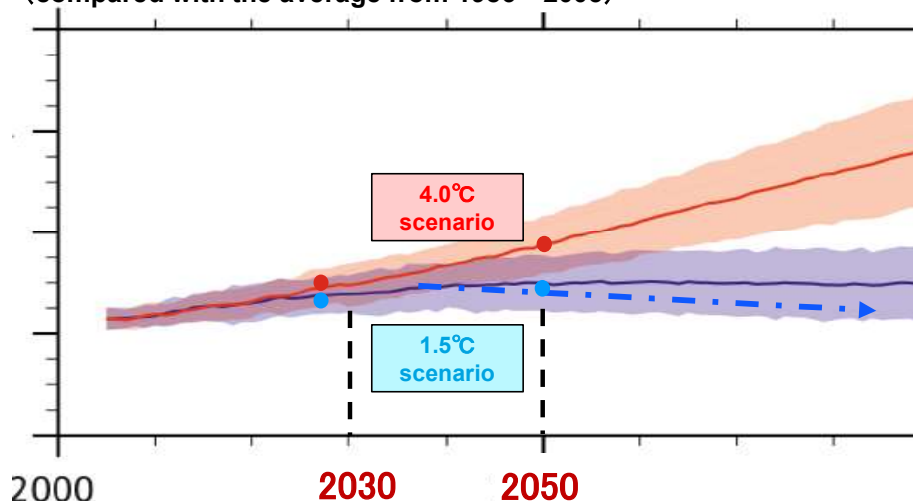
3-96

5

Identify and define range of scenarios

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

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



Definition of 2.7~4°C scenario

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

Below 2°C scenario :

0.9~2.3°C higher than pre-industrial Revolution levels if strict measures are taken

1.5°C scenario :

We are highly likely to achieve an increase of less than 1.5°C 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

Identify and define range of scenarios

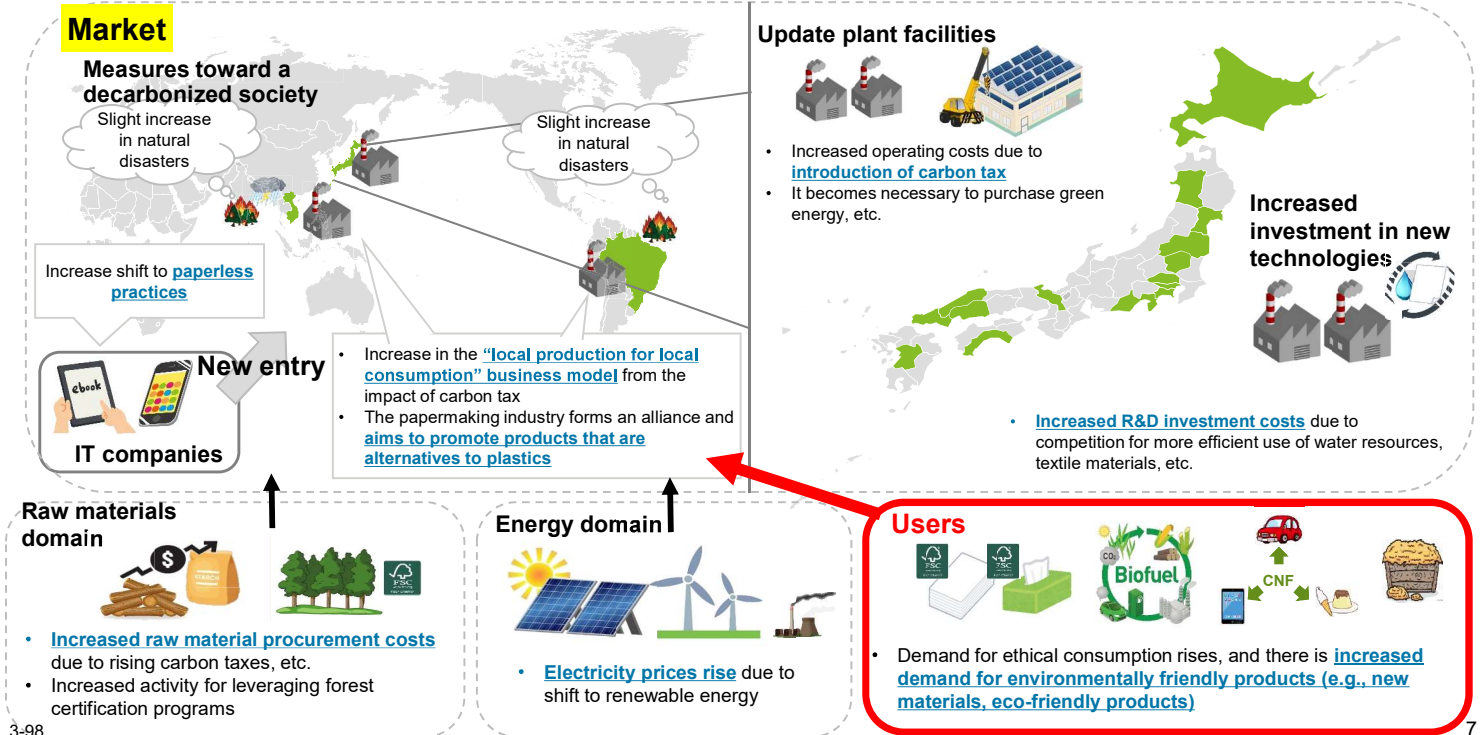
【Future Social Image in a 1.5°C Scenario】

Step 2 3 4 5

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



Identify and define range of scenarios

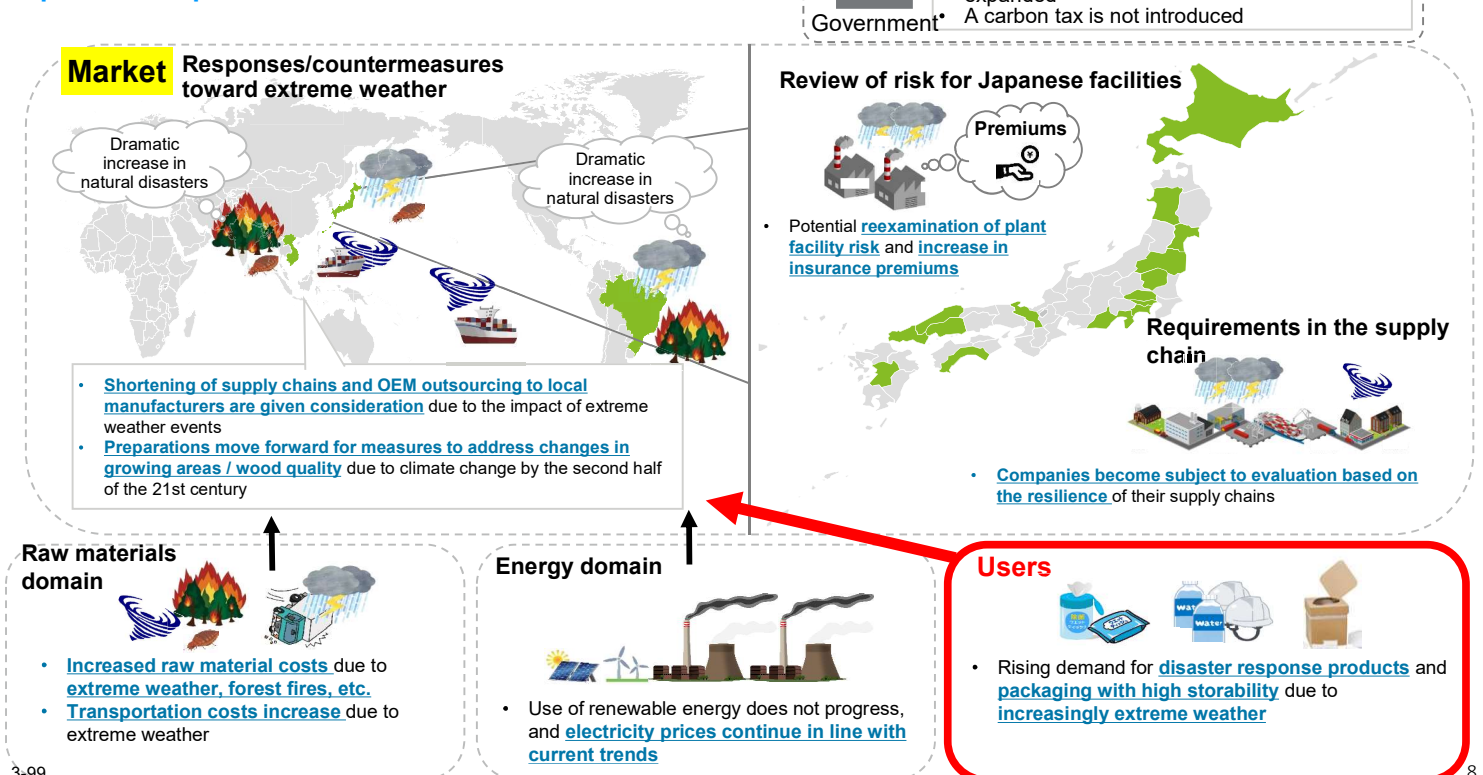
【Future Social Image in a 4°C Scenario】

Step 2 3 4 5

Social image in 2050

While physical risks increase, business opportunities for disaster response products expand

Legend: Relevant areas



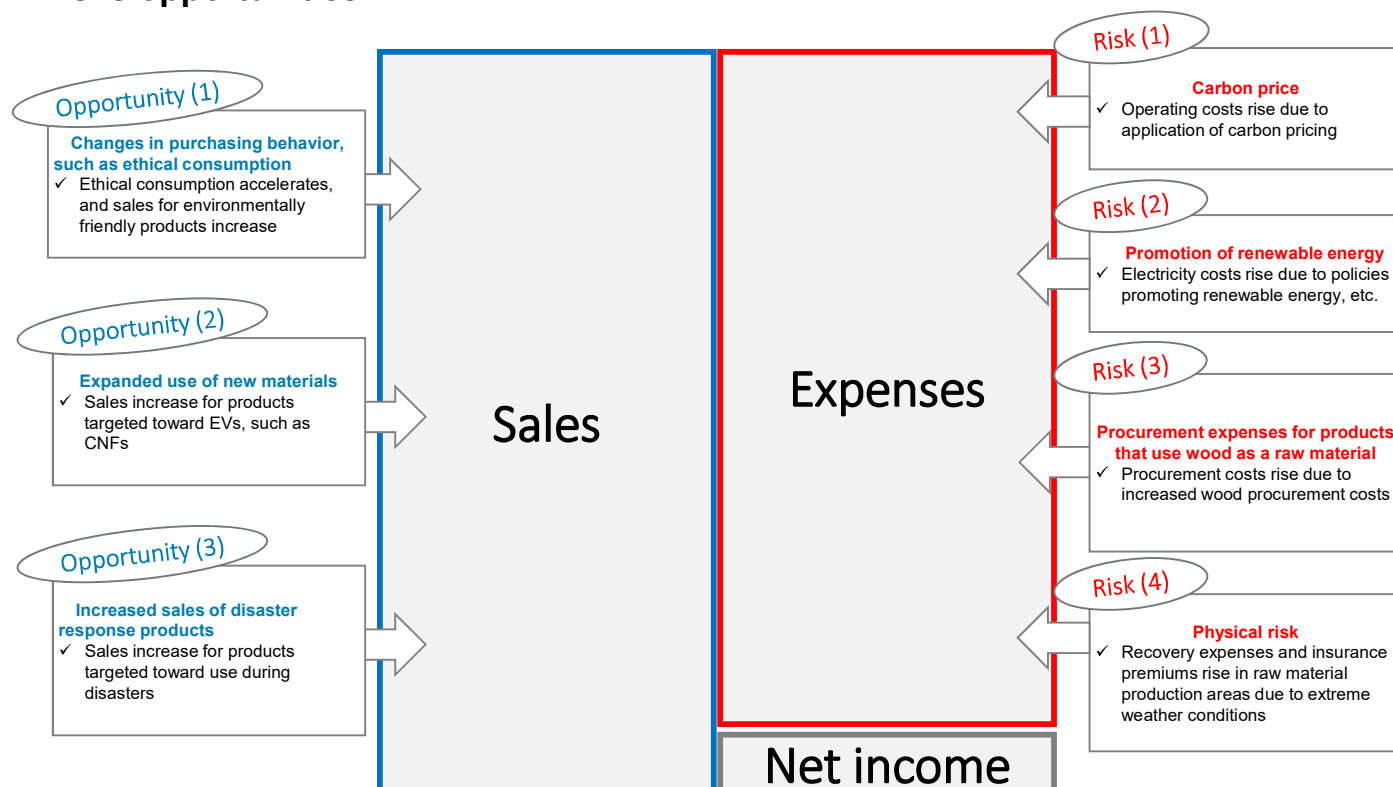
We gathered scientific evidence to see what conditions in 2030 and 2050 would be like

	Change item	Parameter	Base year	2030		2050		Source
				4°C	1.5°C	4°C	1.5°C	
Transitional risk	Carbon price increase	Carbon tax	Japan:286 JPY/CO ₂ t (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

3-100

9

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



3-101

10

Image of business impacts evaluation

Step

2

3

4

5

Impacts on business (2030 1.5°C scenario)

Raw material
prices
(logging tax)

electricity price

Insurance premiums

**Carbon price
(+carbon reduction)**

Product expansion for EVs

Expansion of
disaster-response
products

Ethical consumption
expansion

● Transition risk
● Physical risk
○ Opportunity

Procurement

Product planning,
development and
manufacturing

Processing and
distribution

Consumers

Impacts on business (2030 4.0°C scenario)

Raw material
prices
(Forest fires)

electricity price

Insurance
premiums

Carbon price

Product expansion for EVs

Expansion of
disaster-response
products

Ethical consumption
expansion

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Image of business impacts evaluation

Step

2

3

4

5

Impacts on business (2050 1.5°C scenario)

Raw material
prices
(logging tax)

electricity price

Insurance premiums

**Carbon price
(CN achieved)**

Product expansion for EVs

Expansion of
disaster-response
products

Ethical consumption
expansion

● Transition risk
● Physical risk
○ Opportunity

Procurement

Product planning,
development and
manufacturing

Processing and
distribution

Consumers

Impacts on business (2050 4.0°C scenario)

Raw material
prices
(Forest fires)

electricity price

Insurance
premiums

Carbon price

Product expansion for EVs

Expansion of
disaster-response
products

Ethical consumption
expansion

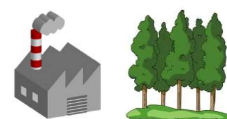
3-103

12

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



3-104

13

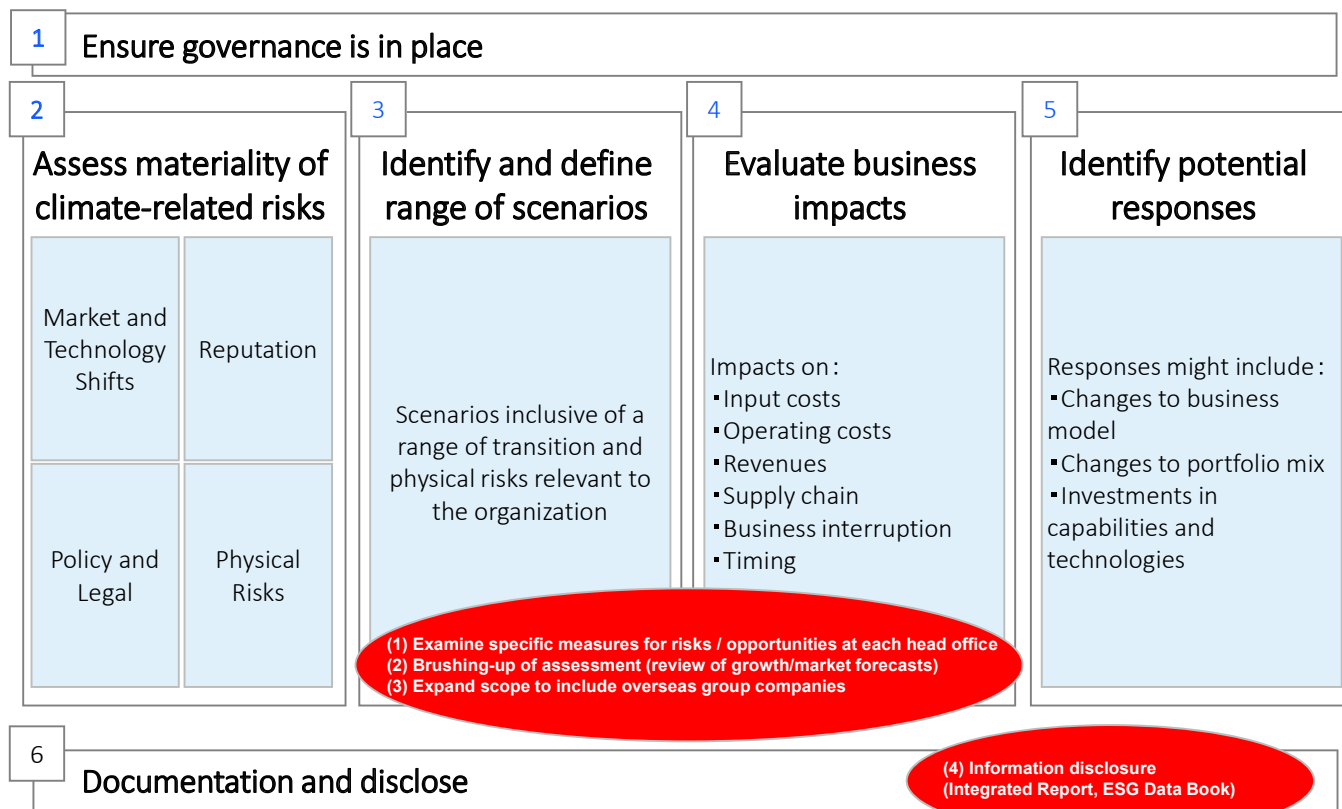
Summary of each analysis step

Analysis steps	Analysis details	Analysis results
Step 2 Significance assessment of risks/opportunities	<ul style="list-style-type: none"> Identify risks / opportunities Risk significance assessment 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Organization of quantitative information necessary for worldview formulation Formulation of future worldviews 	<ul style="list-style-type: none"> 2030, 2050: Analysis of 1.5/4°C scenarios <ul style="list-style-type: none"> 1.5°C: 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 4°C: A world in which physical risks increase, and it is necessary to build strong plant facilities and supply chains
Step 4 Evaluate business impacts	<ul style="list-style-type: none"> Analysis of the future financial impact from climate change 	<ul style="list-style-type: none"> In the 1.5°C scenario (as of 2050), the greatest risk is rising carbon prices In the 4°C scenario (as of 2050), the greatest risk is rising wood prices caused by forest fires
Step 5 Countermeasure definition	<ul style="list-style-type: none"> Consider the direction of measures to address climate change risks/opportunities 	<ul style="list-style-type: none"> Reduce the risk from carbon pricing <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> Improve the CO₂ fixation rate in overseas afforestation

3-105

14

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

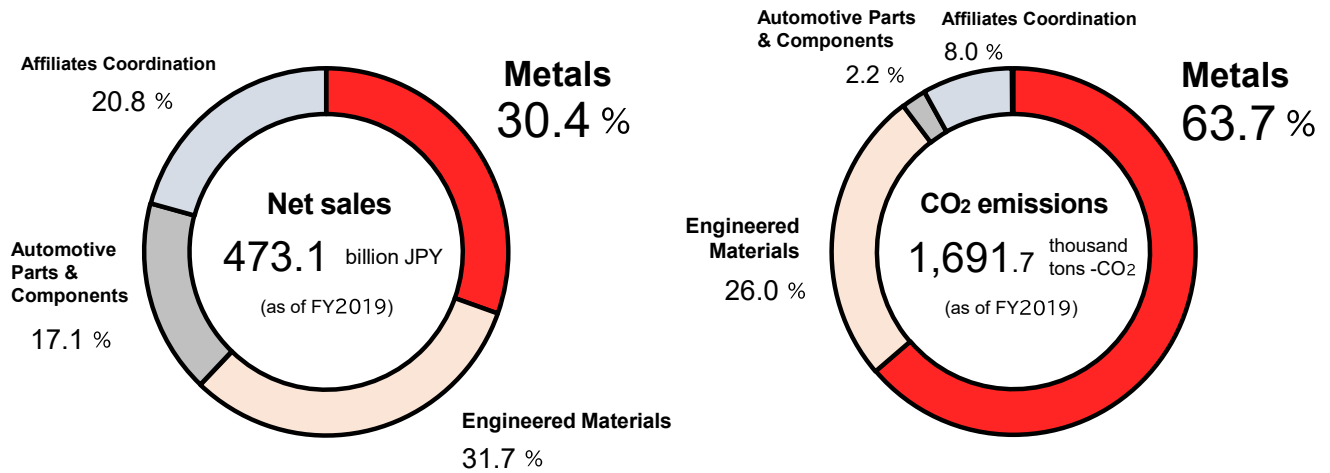


Materials

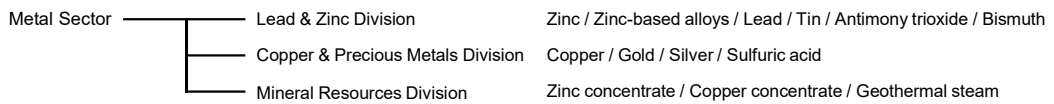
- ✓ Practice Case① : GUNZE LIMITED
- ✓ Practice Case② : Shin-Etsu Chemical Co., Ltd.
- ✓ Practice Case③ : Nippon Paper Industries Co., Ltd.
- ✓ Practice Case④ : Mitsui Mining & Smelting Co., Ltd.
- ✓ Practice Case⑤ : UACJ Corporation

[Business covered in this analysis]

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



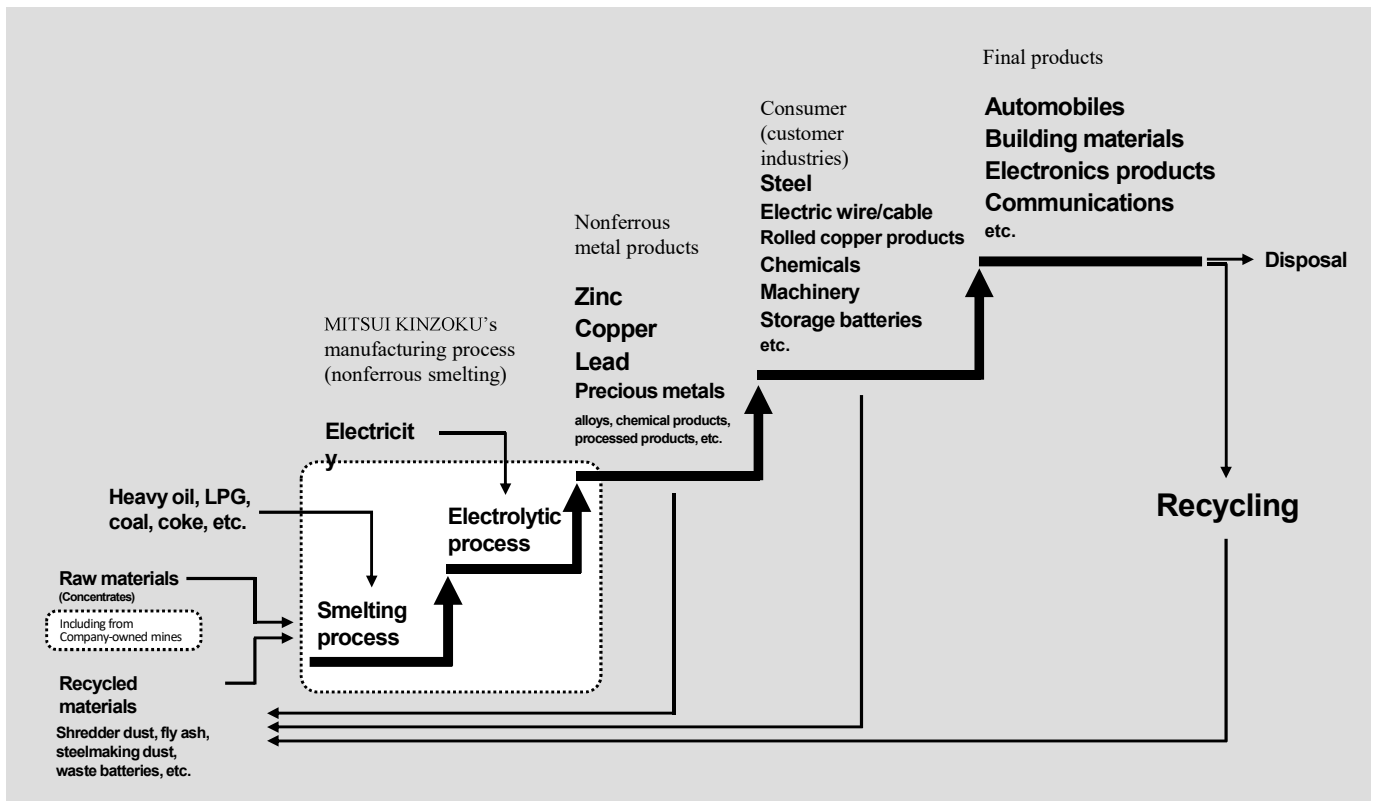
Metal business: Business structure and products



3-108

[Business covered in this analysis]

Metal business supply chain and material flow



3-109

[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.
Hamayachi, Kagaragi, Hachinohe-shi, Aomori

3-110

[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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> We can establish low-coke smelting technology through methods such as developing beneficiation techniques to improve metal grades
	Changes in energy costs	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 PLBS will be impacted as a result 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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

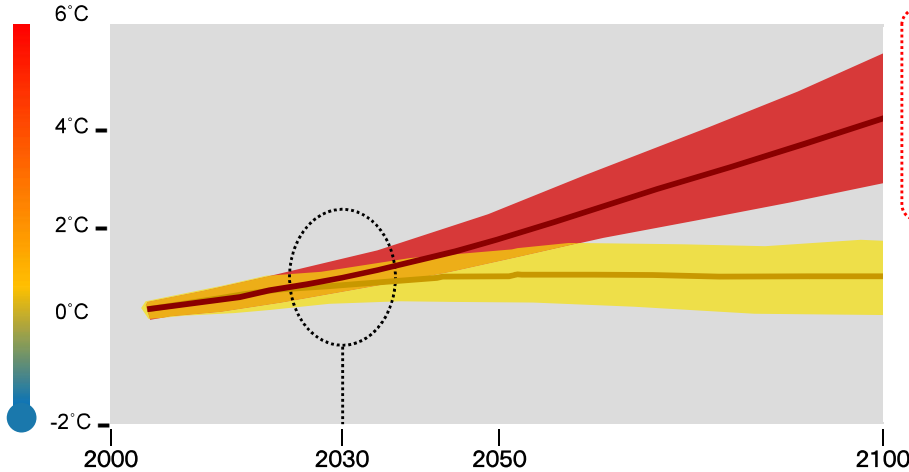
3-111

[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)



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

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

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

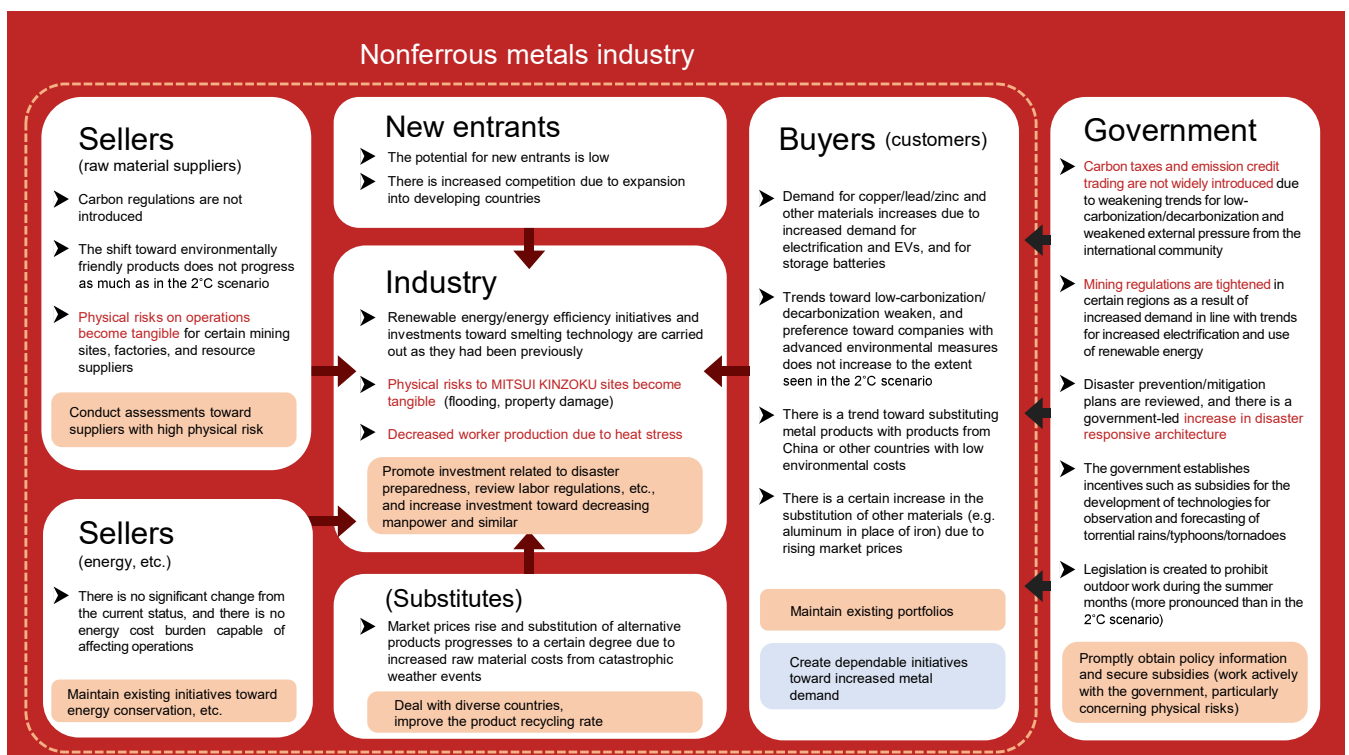
3-112

[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



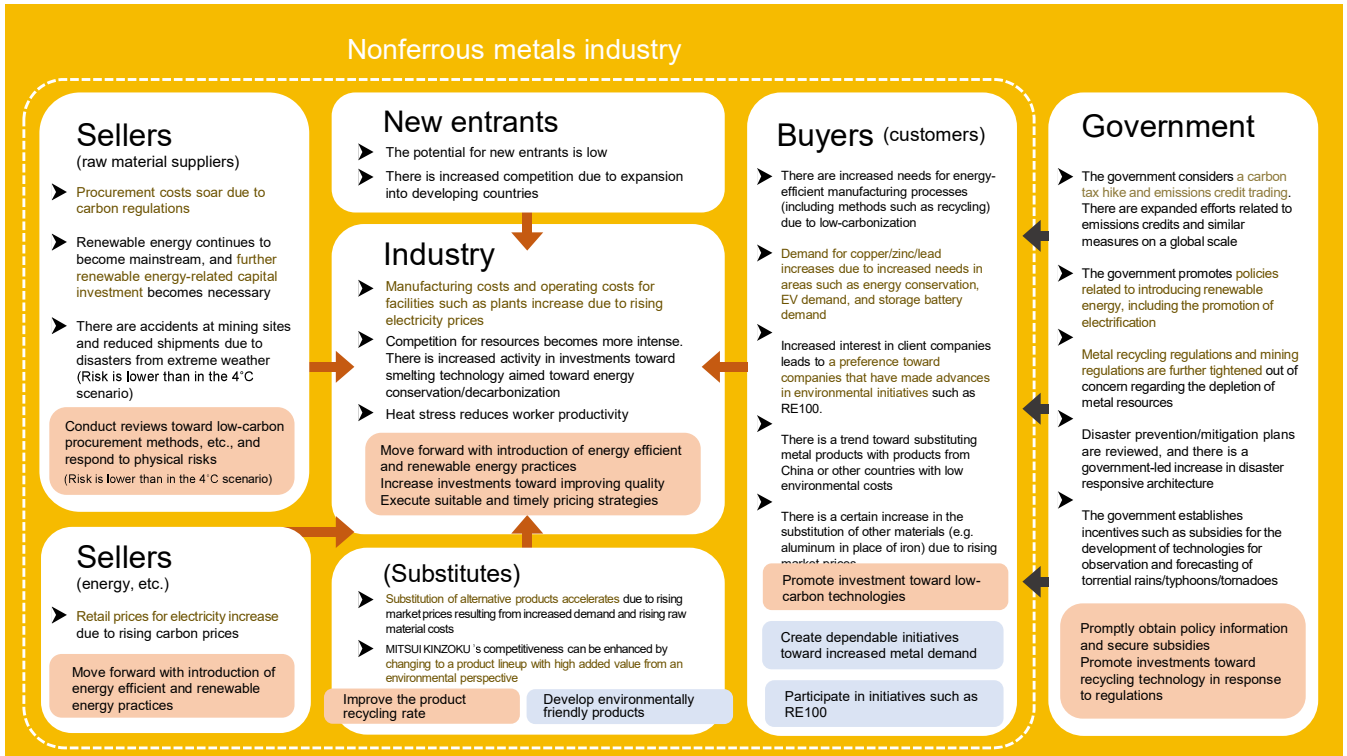
3-113

[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

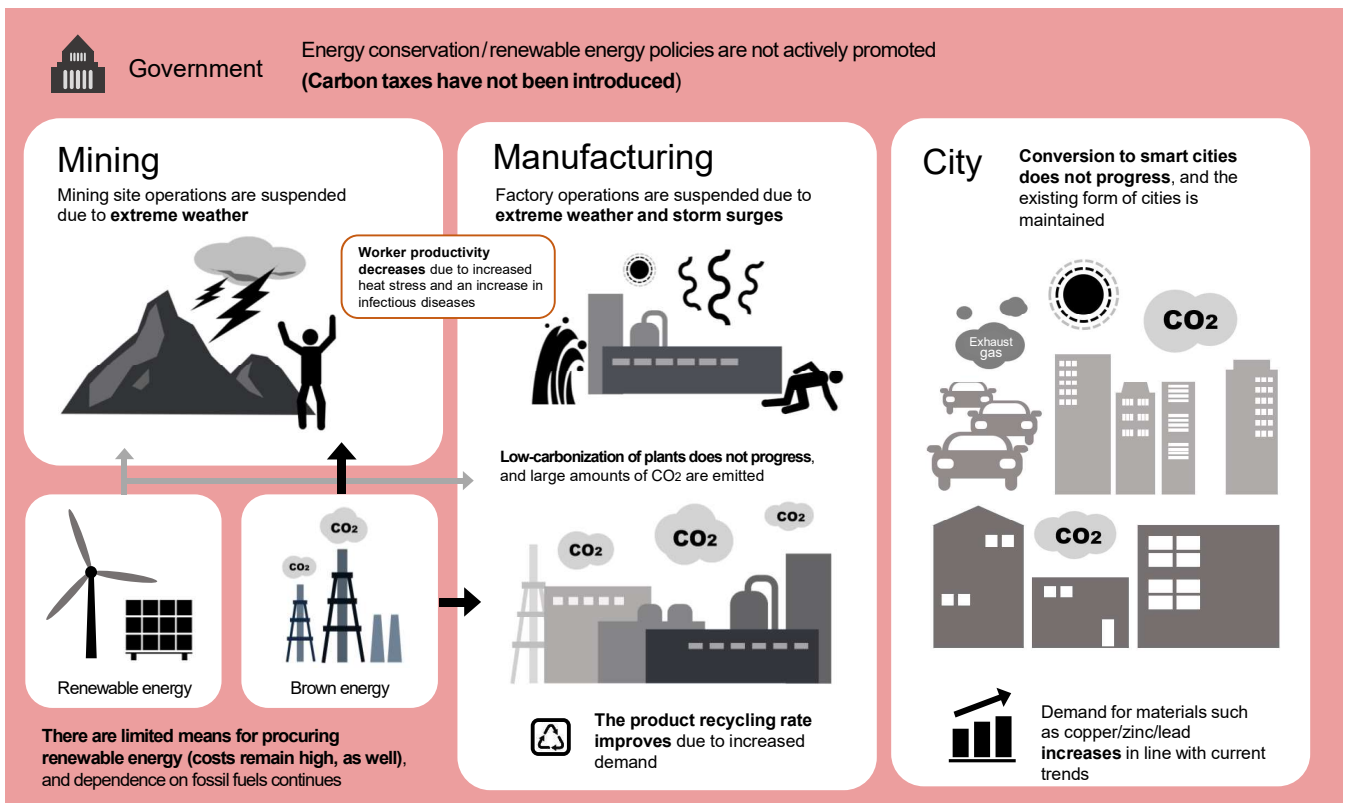
Actions for responding to risks
Actions for seizing opportunities



3-114

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

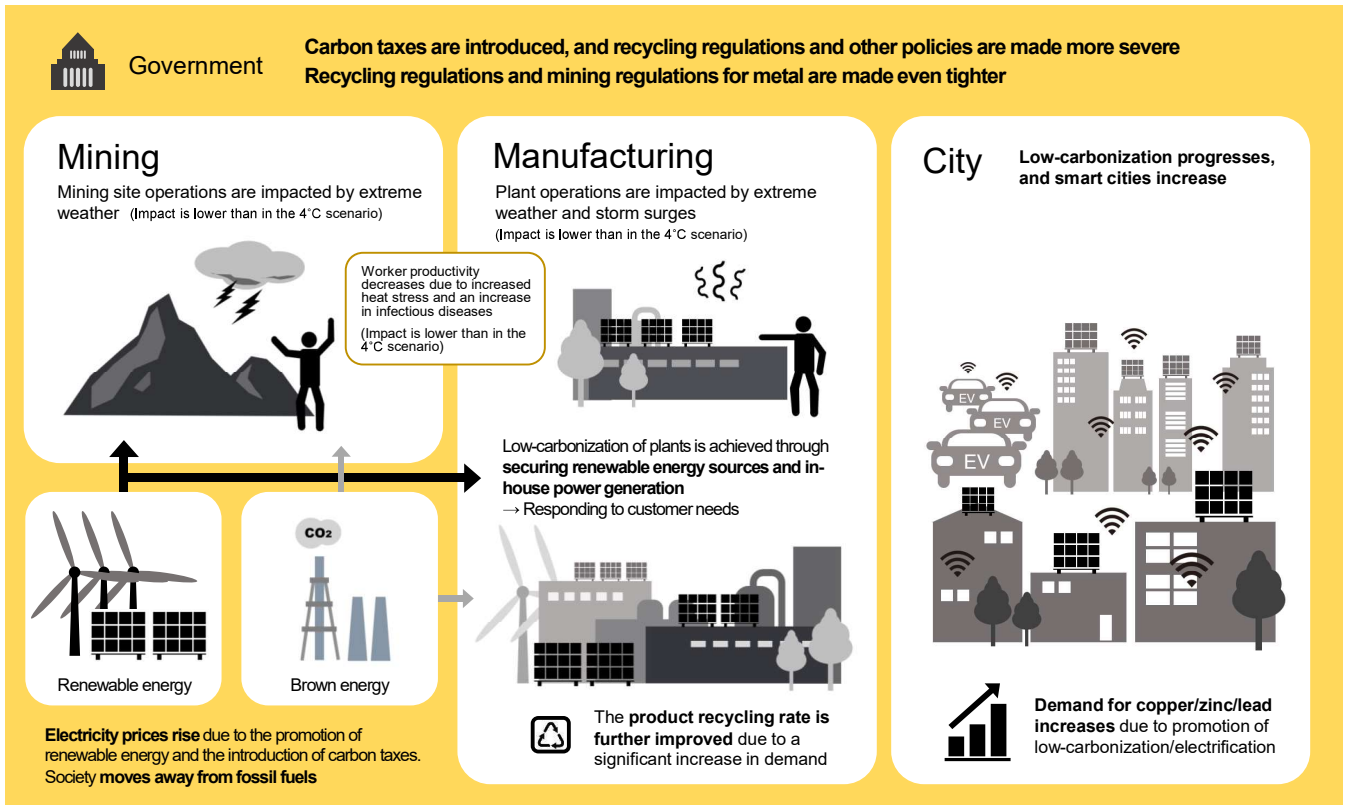
Physical risk increases as low-carbonization/decarbonization does not progress



3-115

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

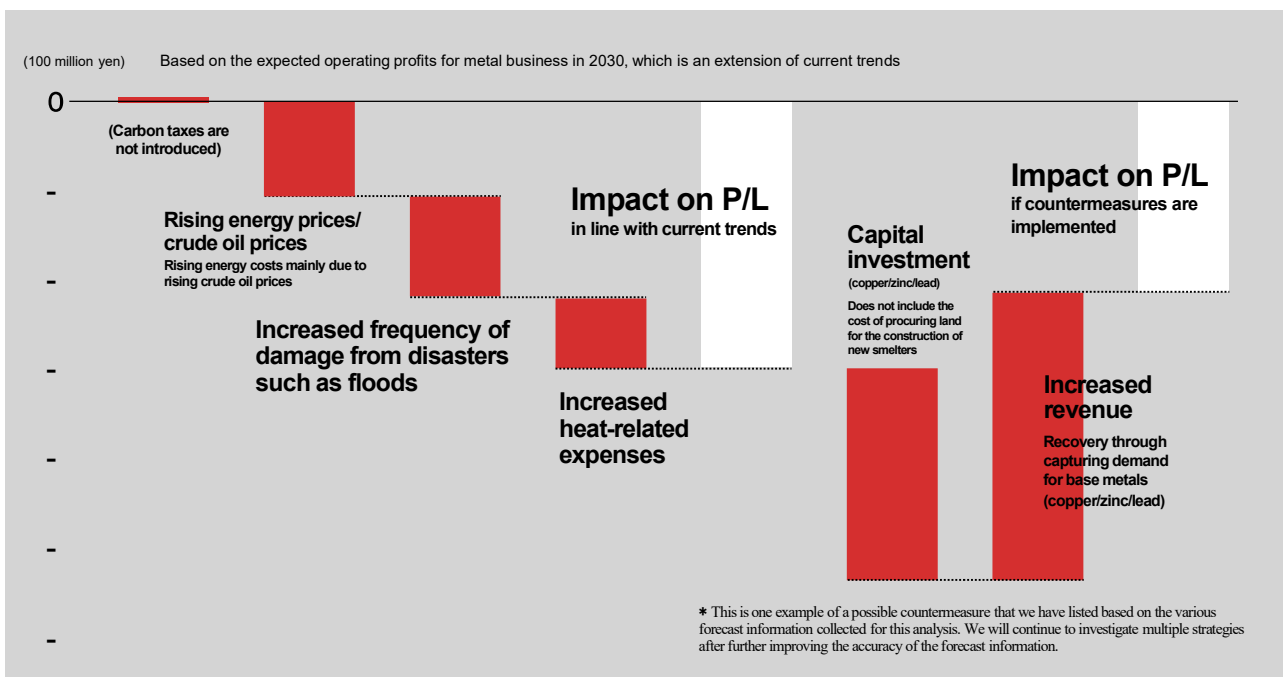
Demand for nonferrous metals increases due to the global promotion of low-carbonization initiatives



3-116

[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

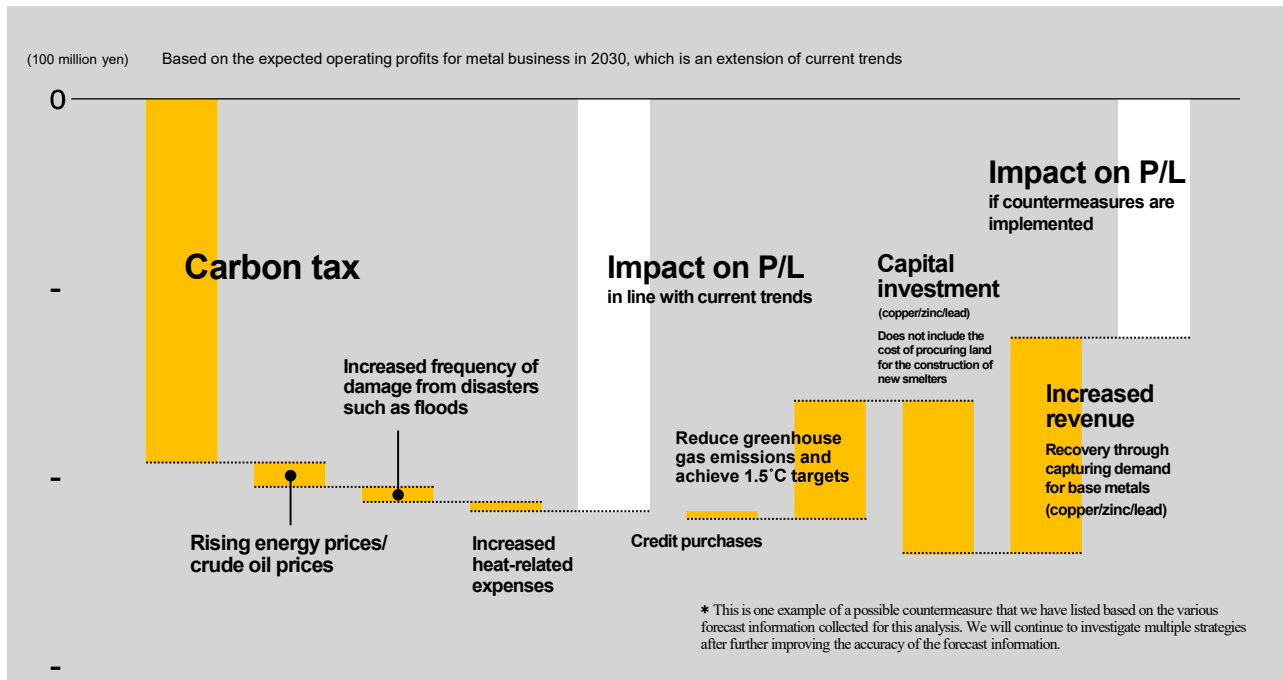


In the 4°C scenario, it will be necessary to focus particular attention on investigating countermeasures for physical risks in addition to responding to the expected increase in demand for base metals

3-117

[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 CO2 emissions and capturing growing demand

3-118

[Definition of countermeasures]

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

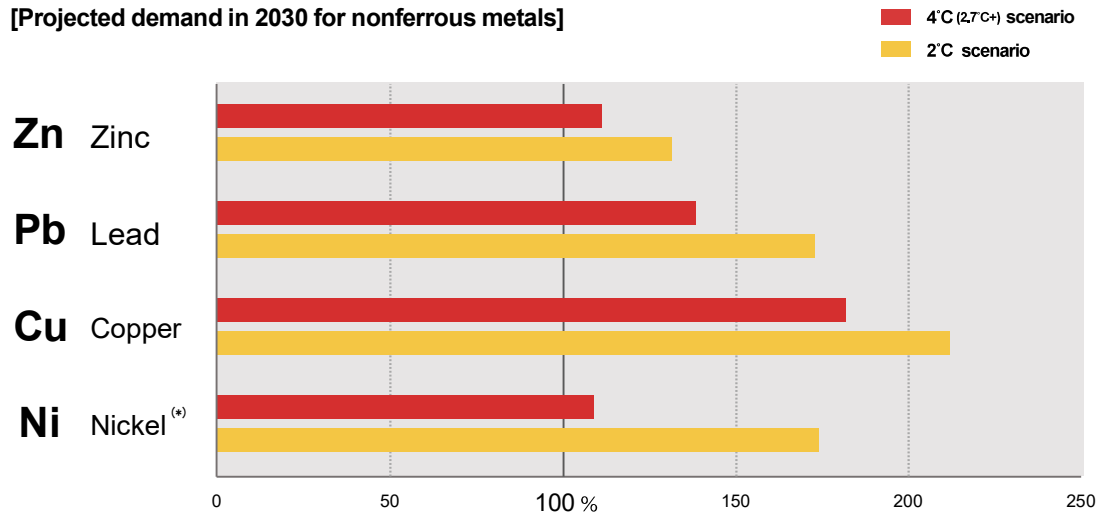
Impact estimation items	4°C scenario	2°C scenario	Countermeasures corresponding to risks and opportunities
Increases in carbon pricing	Carbon tax is not introduced in the 4°C scenario	▼ ▼ ▼	<div>Risk</div> Implementation of ambitious target settings (e.g. SBT targets)
			<div>Risk</div> Introduction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

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[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.

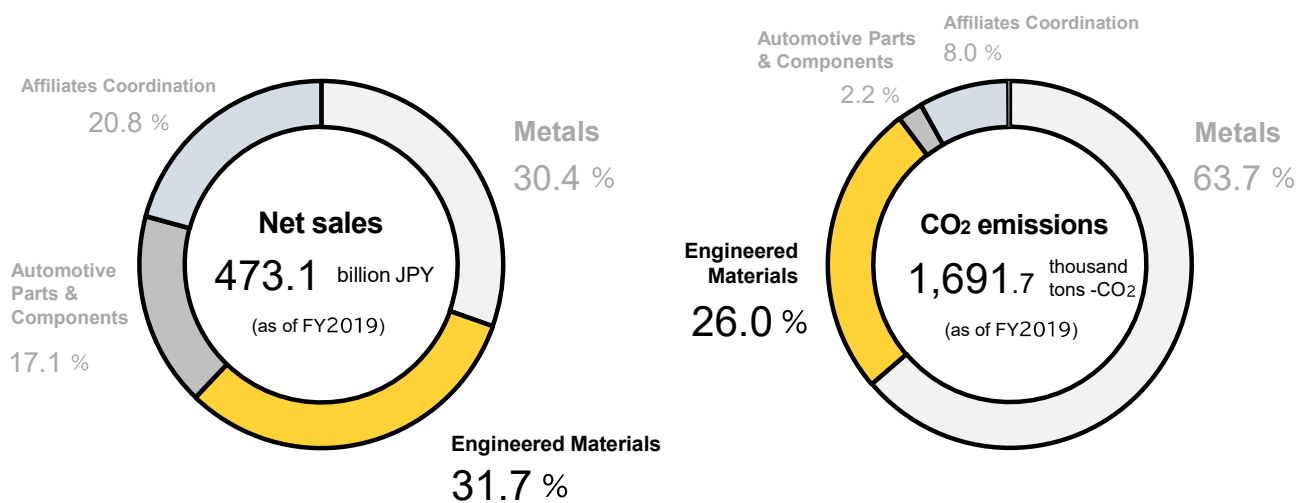
For copper, we used the average demand from 2010 to 2015; for other metals, the projected figures are based on using the demand for 2013 as 100%

(*) 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.

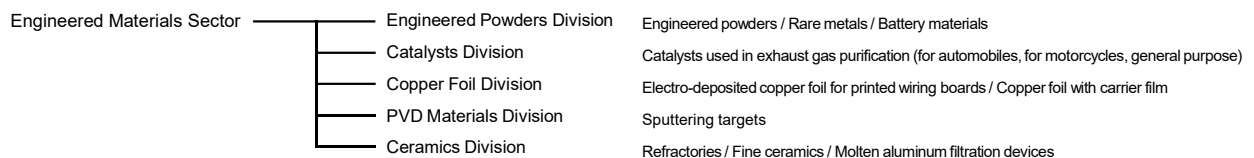
3-120

[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

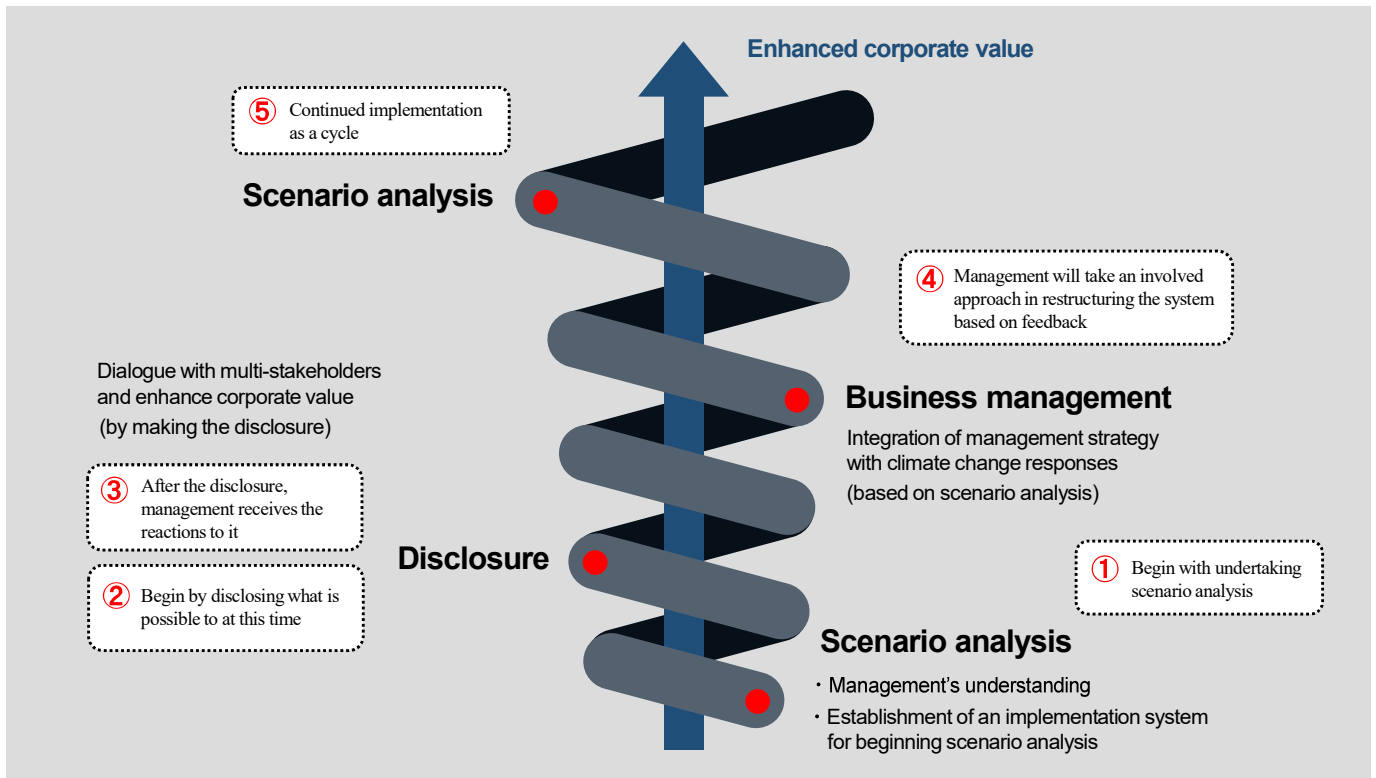


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[Future initiatives]

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)



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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

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

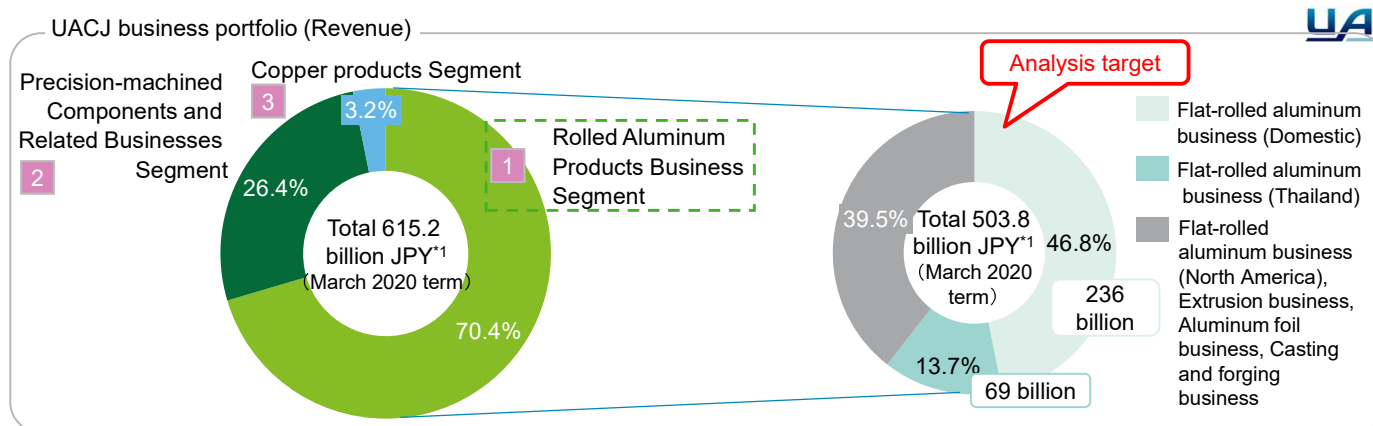
3-124

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【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	<u>Flat-rolled products business</u>	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

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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	<ul style="list-style-type: none"> ➢ Procurement costs for imported raw materials / materials increase ➢ Electricity costs increase 	<ul style="list-style-type: none"> ➢ 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	<ul style="list-style-type: none"> ➢ 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 	<ul style="list-style-type: none"> ➢ 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	<ul style="list-style-type: none"> ➢ 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 	<ul style="list-style-type: none"> ➢ 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

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



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

Risk items		Business impact		Evaluation
Small classification	Index	Risks	Opportunities	
Changes in energy mix	Revenue Expenditures	<ul style="list-style-type: none"> ➢ Energy costs (electricity, fuel, etc.) increase ➢ Investment in SCOPE1 decarbonization increases 	<ul style="list-style-type: none"> ➢ 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	<ul style="list-style-type: none"> ➢ 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 	<ul style="list-style-type: none"> ➢ 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	<ul style="list-style-type: none"> ➢ 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 	<ul style="list-style-type: none"> ➢ 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

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2 [Risk significance assessment: risks and opportunities]

Investigated risks/opportunities ranging from procuring raw materials to disposal/recycle

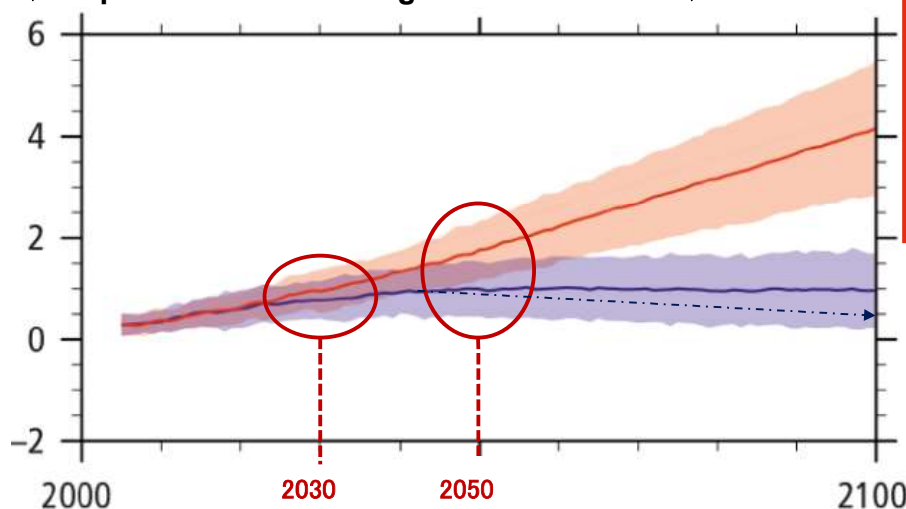
(2) Physical risks, opportunities

Risk items		Business impact		Evaluation
Small classification	Index	Risks	Opportunities	
Increase in average temperature	Revenue	<ul style="list-style-type: none"> ➢ 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 	<ul style="list-style-type: none"> ➢ 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	<ul style="list-style-type: none"> ➢ 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 	<ul style="list-style-type: none"> ➢ 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°C, 4°C (2.6°C~4°C)) to consider society in 2050

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



- ✓ Almost the same temperature changes would occur in the 2°C and 4°C 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°C (2.6°C~) scenario

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 (2.6°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

1.5°C scenario :

We are **highly likely** to achieve an increase of less than 1.5°C 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°C

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)

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		Baseline (year, values)	2030		2050		Sources
			4°C (over 2°C)	1.5°C	4°C (over 2°C)	1.5°C	
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	<ul style="list-style-type: none"> 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°C: 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)	<ul style="list-style-type: none"> 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°C)	World: 52%	World: 53% (1.75°C)	World: 71%	<ul style="list-style-type: none"> IAI "1.5 DEGREES SCENARIO A MODEL TO DRIVE EMISSIONS 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	<ul style="list-style-type: none"> IEA WEO2018
	⑤Oil price (\$/barrel)	World: \$42 (2020)	World: \$77	World: \$36	World: \$88	World: \$24	<ul style="list-style-type: none"> IEA WEO2021
	⑥Projected Demand for Aluminum	World: 93 Mt (2018)	—	—	World: 244 Mt	World: 335 Mt	<ul style="list-style-type: none"> 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	—	<ul style="list-style-type: none"> World Bank "Commodities Markets Outlook"

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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

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		Baseline (year, values)	2030		2050		Sources
			4°C (over 2°C)	1.5°C	4°C (over 2°C)	1.5°C	
Transition risk	⑦EV Inventory	— (Million Vehicles)	193 (million vehicles)	304.2 (million vehicles)	945 (million vehicles)	1615.6 (million vehicles)	<ul style="list-style-type: none"> IEA WEO2021
	⑧Ethical Consumption Awareness	Purchase intention based on ethical consumption	19% in the home appliances sector, 17% in the automotive sector, etc. (No scenario bifurcation)				<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> World Bank, "Climate Knowledge Portal" IEA, "World Energy Outlook 2018"
	⑩Relationship between temperature rise and air conditioner sales	—	+1.1°C (2020-2039)	+1.0°C (2°C) (2040-2059)	+2.0°C (2020-2039)	+1.3°C (2°C) (2040-2059)	<ul style="list-style-type: none"> 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"
	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%	—	<ul style="list-style-type: none"> National Observatory of Athens "The Impact of Climate Change on the Pattern of Demand for Bottled Water and Non-Alcoholic Beverages" (2014年)
	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)
	⑬Rainfall, flow rate, and flood frequency	— (2020)	4 times	Trends in the market	2 times	Trends in the market	<ul style="list-style-type: none"> 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"

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3

[Future social image in a 4°C (2.6~4°C) 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

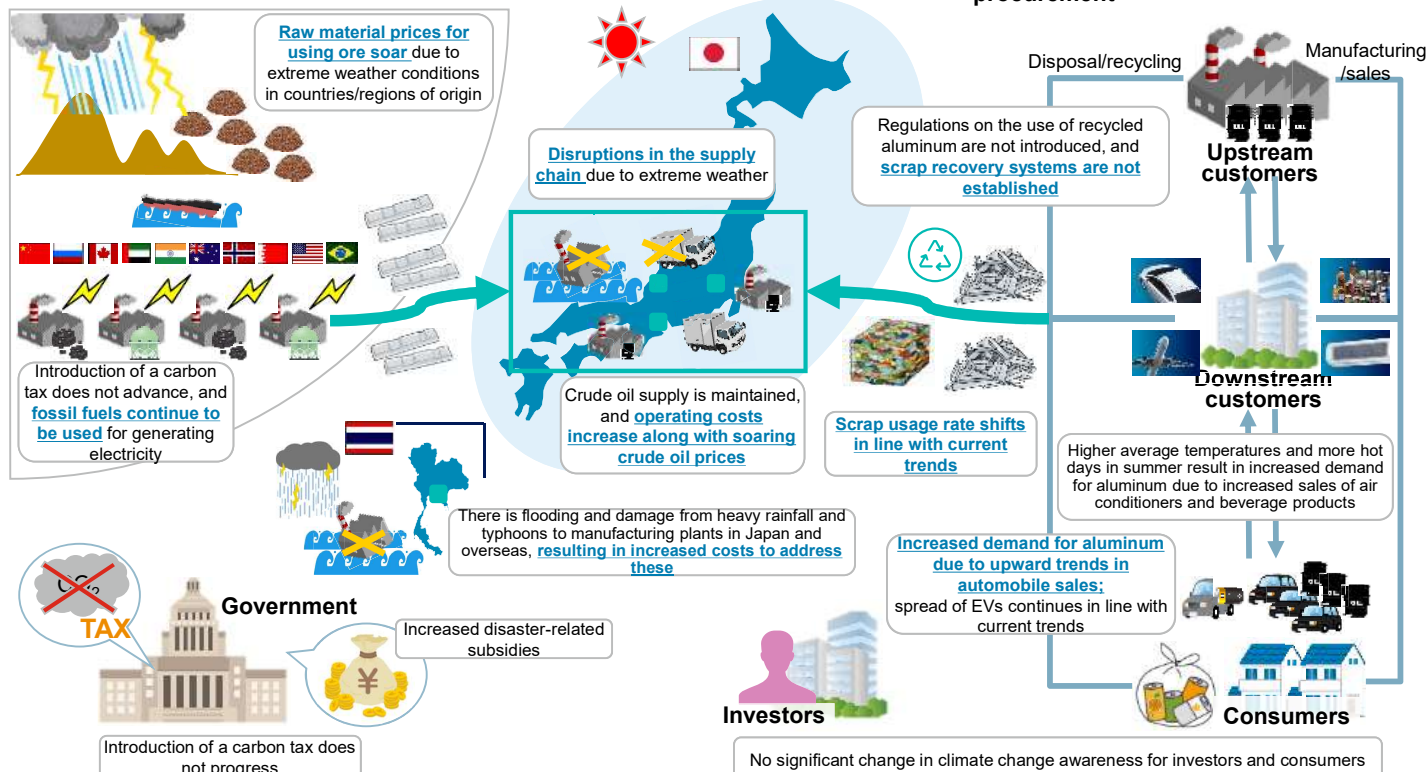
4°C

1.5°C

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Primary (virgin) aluminum procurement

Recycled aluminum (aluminum produced from scrap) procurement



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3

[Future social image in a 1.5°C scenario]

Shift to renewable energy and recycled materials. Establishment of scrap recovery systems and R&D for low carbon products will be important

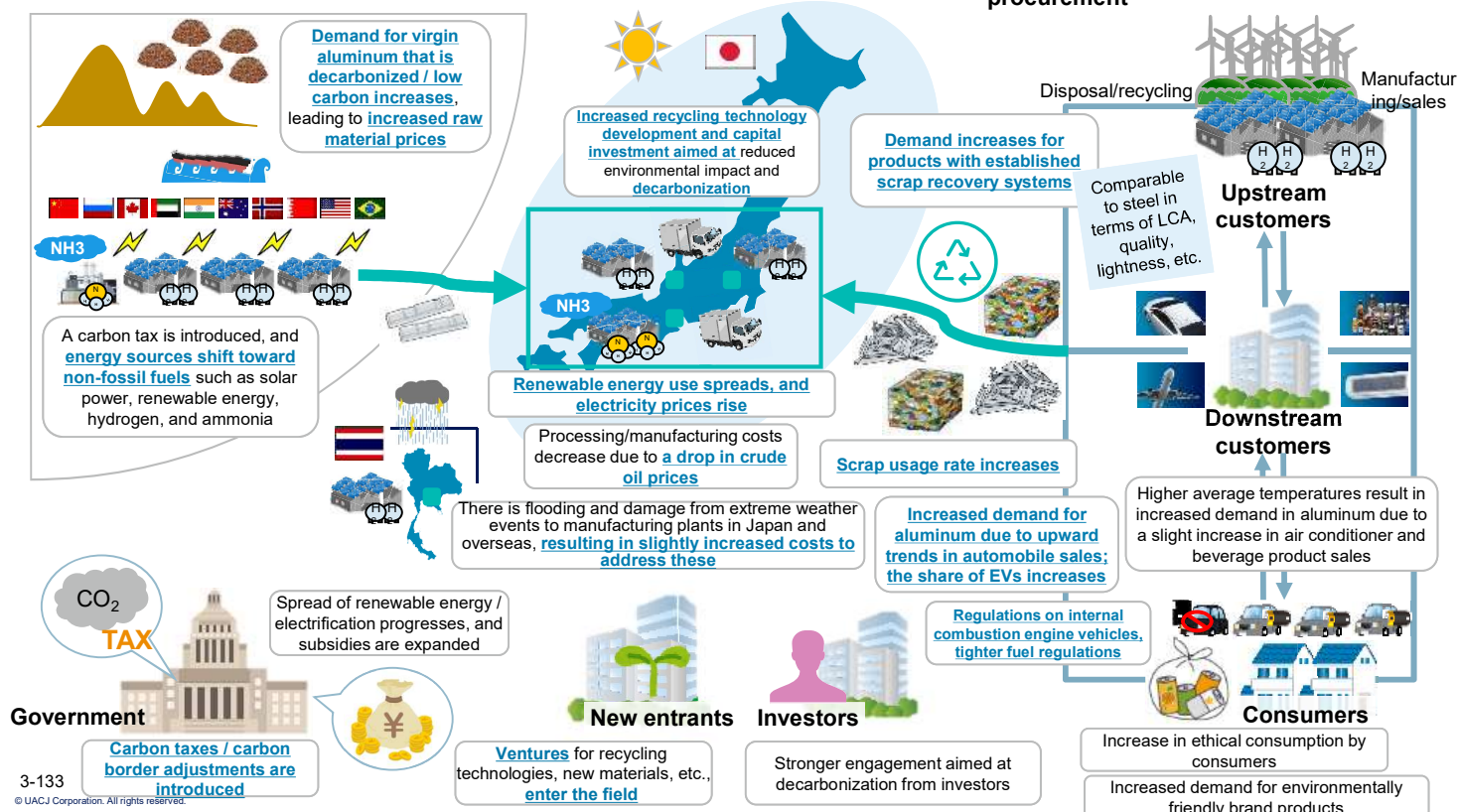
4°C

1.5°C

UACJ

Primary (virgin) aluminum procurement

Recycled aluminum (aluminum produced from scrap) procurement



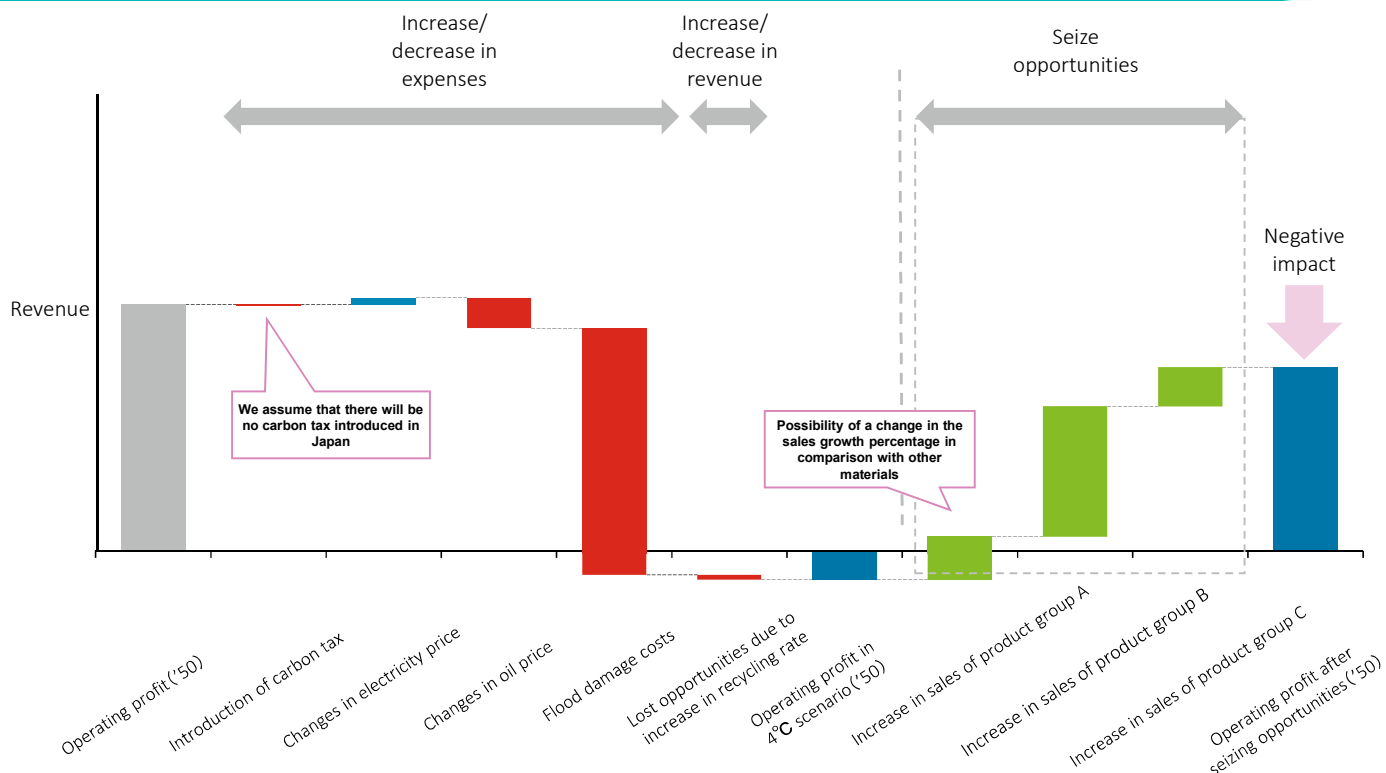
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4 【Business impact evaluation: 4°C (2.6~4°C) scenario (2050)】

4°C, 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



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

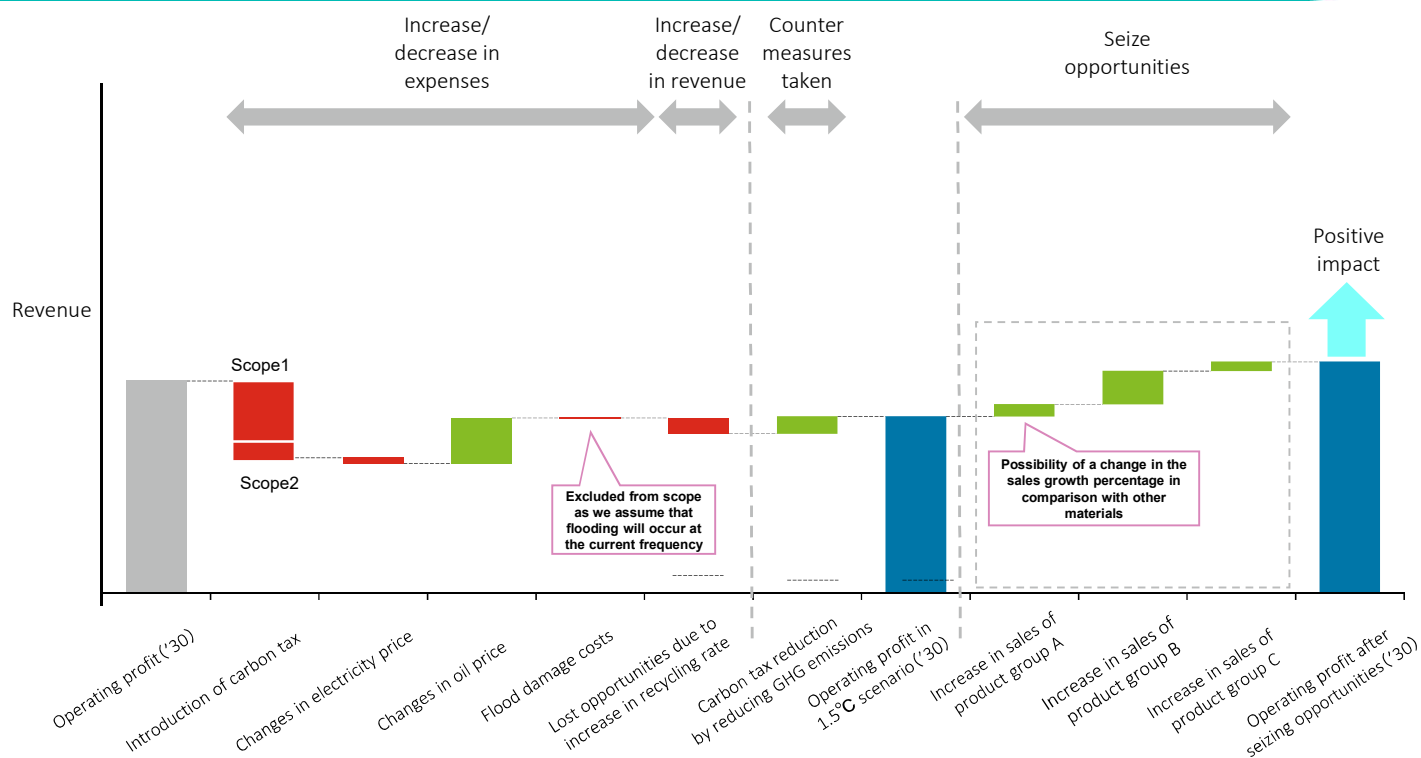
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4 【Business impact evaluation: 1.5°C scenario (2030)】

1.5°C, 2030

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

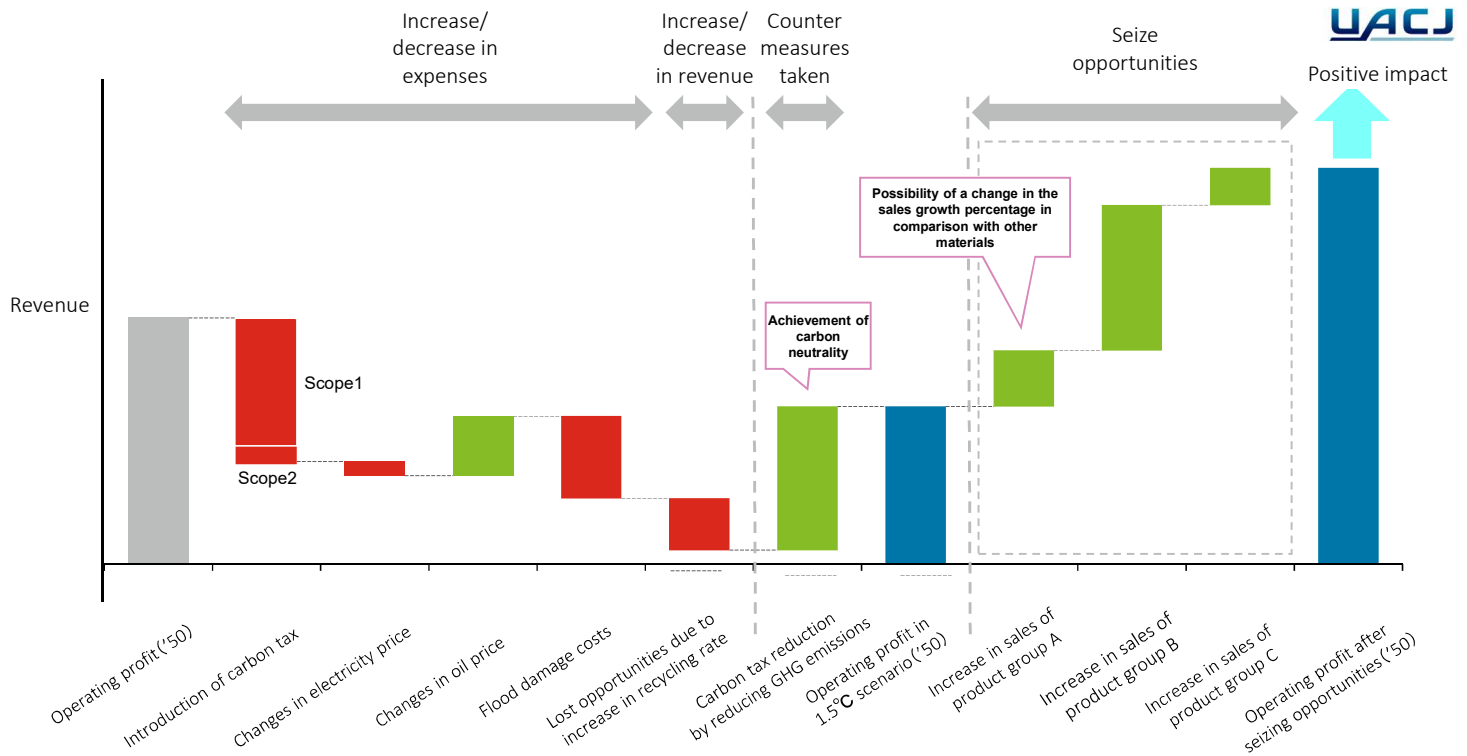


In the 1.5°C scenario (2030), progress toward decarbonization is called for as countermeasure for the introduction of a carbon tax

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



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

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We need to ensure future group-wide rollout of scenario analysis, maturity level improvement, and monitoring/execution structure



Future actions	Action details
Group-wide rollout of scenario analysis	<ul style="list-style-type: none"> ✓ In this scenario analysis, we focused on the flat rolled products business and the Japanese and Thai production sites. <u>We will roll out the methods used this time to conduct scenario analysis for the entire group.</u> ✓ With this project team as the core, <u>we will establish task forces, working groups, etc., to roll out the analysis to the entire group, and to each level of operations.</u>
Monitoring/execution structure	<ul style="list-style-type: none"> ✓ For this time, we established two scenario patterns. Climate change has a high level of uncertainty, and we will <u>keep regular watch</u> on what kind of future outlook we can expect, <u>perform impact evaluation, and review our strategies.</u> ✓ For this time, we considered measures for climate change risks from the perspective of a project and formed a team accordingly, but we will <u>incorporate this as a formal organizational role in the future</u> so that it does not become a temporary effort.
Maturity level improvement	<ul style="list-style-type: none"> ✓ As the measures implemented this time were only for scenario analysis “Level 1”, we will <u>gradually increase the maturity level</u> in the future to aim for levels 2 and 3.

Items	Category	Risk countermeasures example	Category	Initiatives for seizing opportunities example
Carbon price, Carbon emissions targets/policies in each country	Adapted	<ul style="list-style-type: none"> ✓ Setting of long-term GHG emissions reduction targets ✓ Setting of long-term energy use reduction targets ✓ Introduction of internal carbon pricing 	Adapted	<ul style="list-style-type: none"> ✓ 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	<ul style="list-style-type: none"> ✓ Promotion of higher recycling rate for products ✓ Establishment of a scrap recovery system with upstream/downstream customers 	Adapted ▪ Established	<ul style="list-style-type: none"> ✓ Collaboration for and establishment of a scrap recovery system with retailers and local governments
Changes in energy mix, Energy-saving responses	Adapted	<ul style="list-style-type: none"> ✓ Improved energy conservation through changing fuels / switching power companies ✓ Promotion of the introduction of renewable energy sources 	Adapted ▪ Established	<ul style="list-style-type: none"> ✓ 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	<ul style="list-style-type: none"> ✓ (Price setting for products in line with rising raw material prices) 	Adapted	<ul style="list-style-type: none"> ✓ (Strengthening of product competitiveness by curbing product price increases through measures such as improving recycling recovery efficiency)
Changes in customer behavior	Adapted	<ul style="list-style-type: none"> ✓ Development of decarbonized aluminum products / services (certification) 	Established ▪ Retained	<ul style="list-style-type: none"> ✓ Promotion of use of aluminum for products ✓ Establishment of UACJ's own branding by moving toward with acquiring environmentally friendly certifications
Increase in average temperature				<ul style="list-style-type: none"> ✓ Collaboration with competing materials companies
Increasing severity of extreme weather conditions (cyclones, floods)	Adapted ▪ Retained	<ul style="list-style-type: none"> ✓ Implementation of disaster prevention equipment ✓ Sophistication of risk models by leveraging data 	Established	<ul style="list-style-type: none"> ✓ 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	Group companies	149 (Domestic: 74, Overseas: 75)
Establishment	March 1943		• Consolidated Subsidiaries: 77
Head Office Location	2-20, 3-chome, Toyosu, Koto-ku, Tokyo, Japan		• Non-consolidated Subsidiaries: 18 (Equity-method affiliates: 2)
Capital Stock	20 billion JPY		• Affiliated companies: 54 (Equity-method affiliates: 23)
Number of Employees	Non-consolidated: 1,661 Consolidated: 13,117		

Main Business

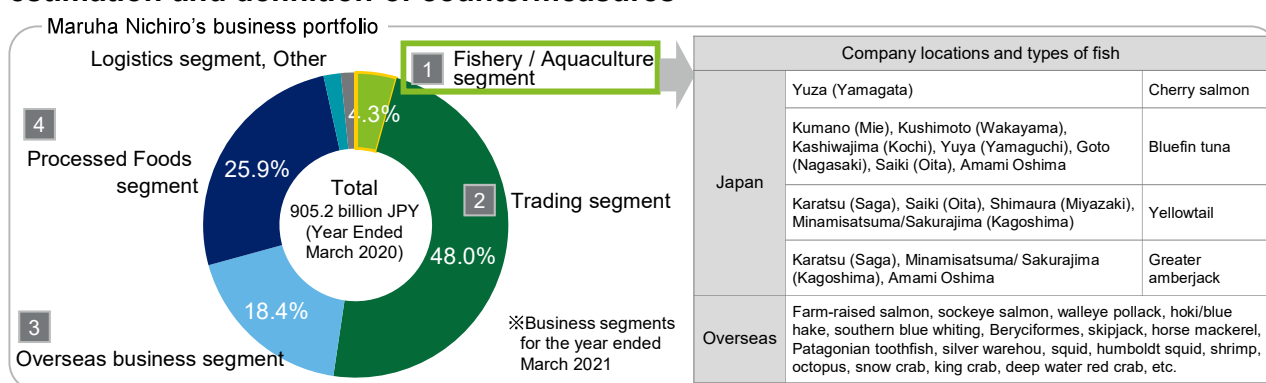
Fisheries, Aquaculture, Marine Products Trading/Processing/Wholesaling, Manufacture/Processing/Sales of consumer frozen foods, retort pouch foods, canned foods, fish-paste products, fine chemical products and beverages, import of raw materials for meat and feed, Manufacture/Processing/Sales of meat



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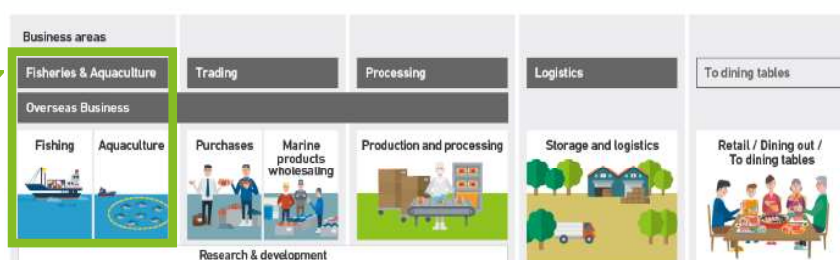
Business covered

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



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



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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

3-142 ^{*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°C	2050	IEA etc.
	Changes in important products/prices	(2) Migratory tuna catch volume	● ^{*1}	● ^{*2}	○	4°C	2050	Nature
		(3) Bait fish resource quantity ^{*3}	●		○	4°C	2050~	MAFF
		(4) Fish size	●		○	4/2°C	2050	Daniel Pauly etc.
Physical risk	Changes in rainfall, weather patterns and ocean environment	(5) Rising sea temperatures	●	●	×	4/2°C	2050	IPCC etc.
		(6) Changes in dissolved oxygen in seawater	●		×	4/2°C	2050	IPCC
		(7) Ocean acidification	●		×	4/2°C	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°C	2040	METI
		(9) Occurrence of typhoons/cyclones	●		Implementation if past results available	4/2°C	2050~	JMA (Japan Meteorological Agency) etc.

^{*1} We assumed this as a parameter that describes the decline in juvenile fish stocks

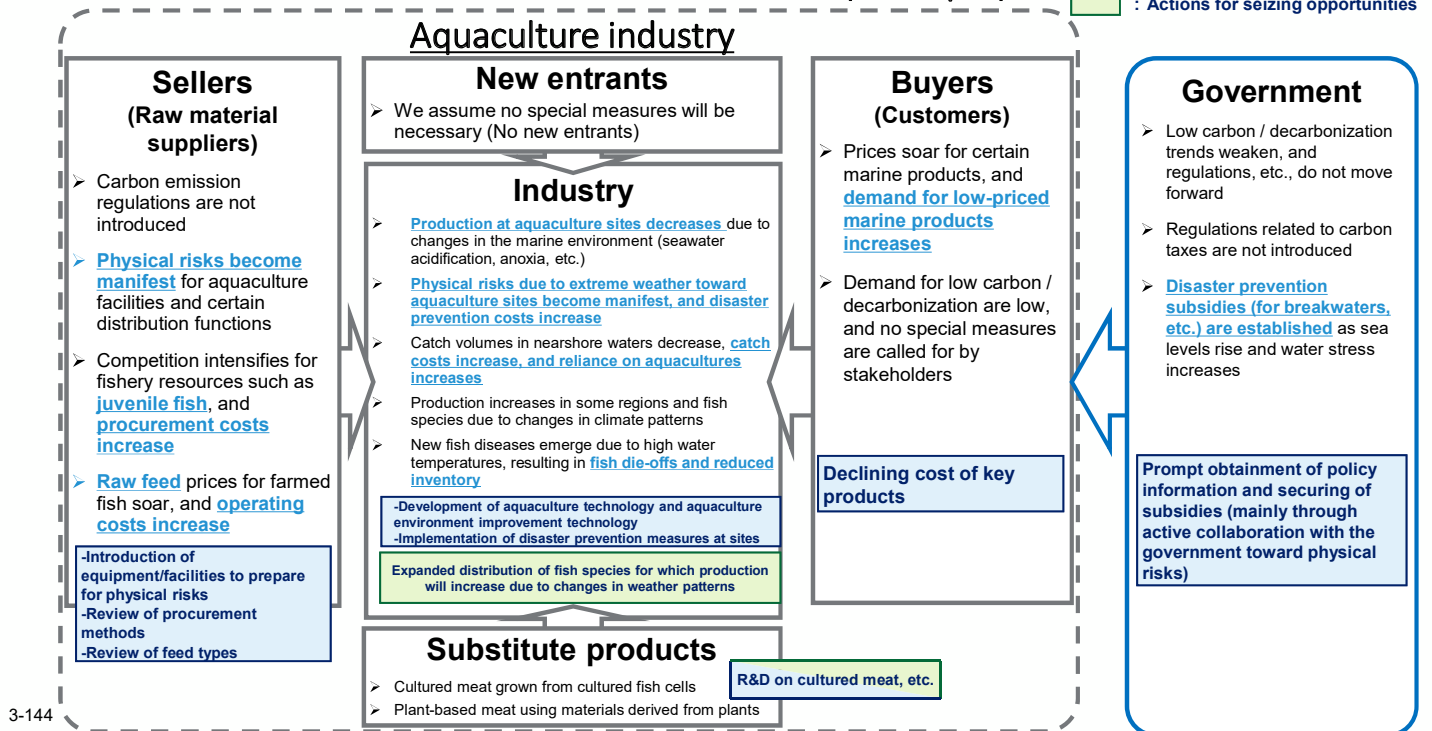
^{*2} Since the fish farming business is the target of the evaluation, the decline in migratory tuna catches is viewed as an opportunity for the fish farming business

^{*3} Resource quantity: Total amount of fish that come to the area

Identify and define range of scenarios (Identify 4°C 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

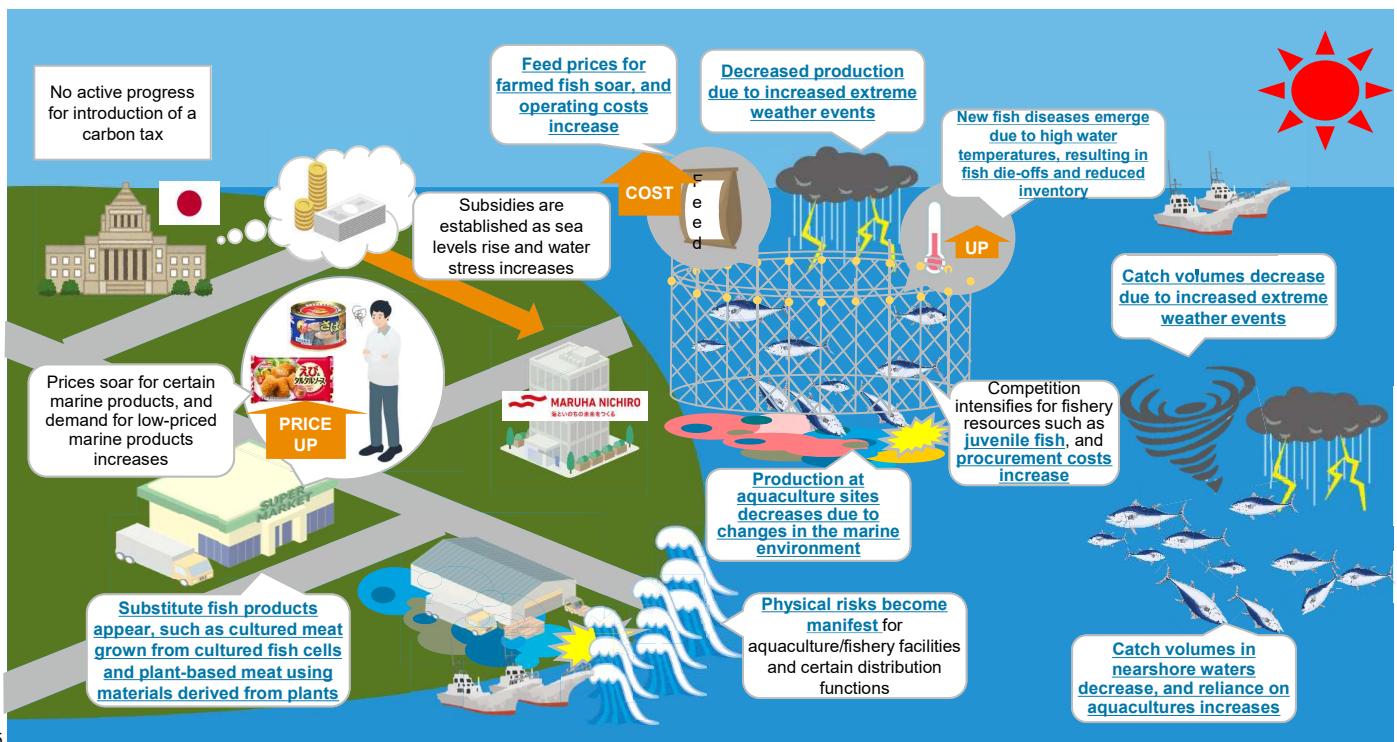
4°C worldview @2050s (Example)



3-144

Identify and define range of scenarios (Identify 4°C 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

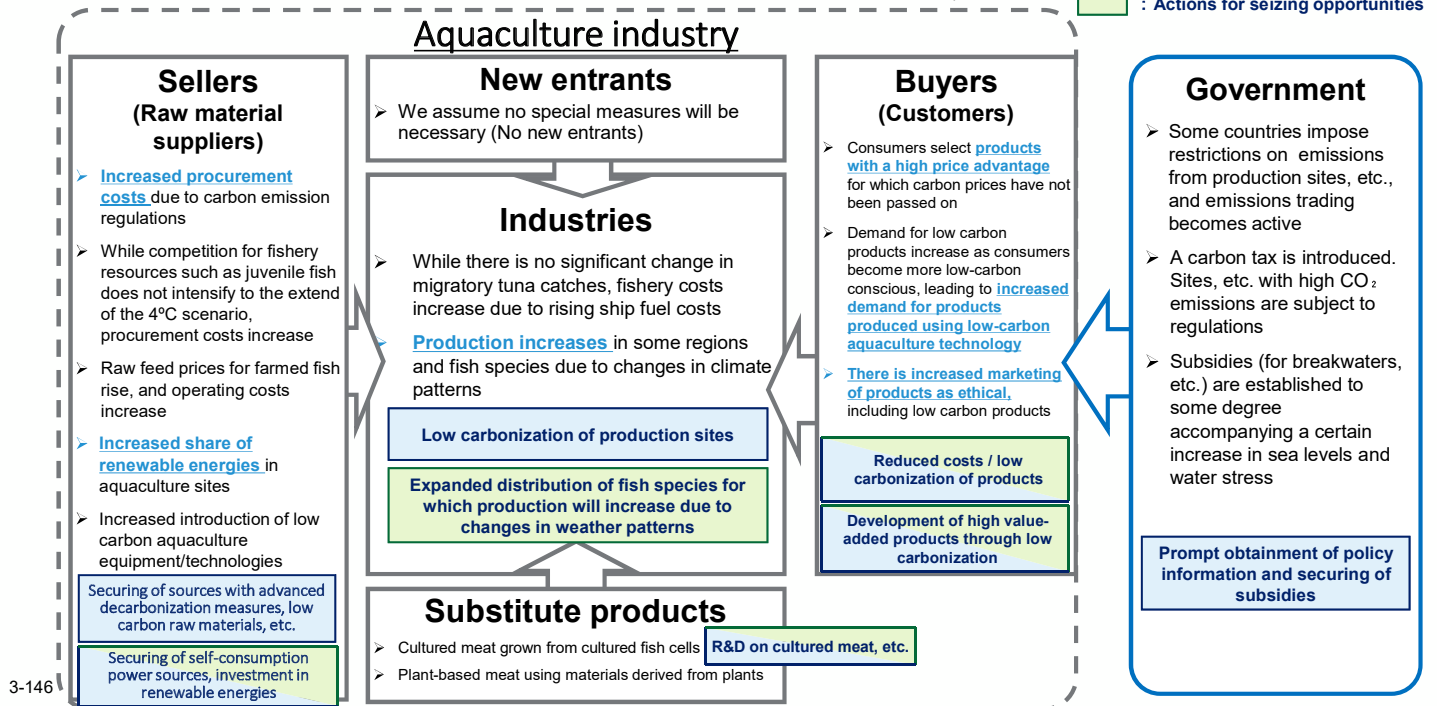


3-145

Identify and define range of scenarios (Identify 2°C 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

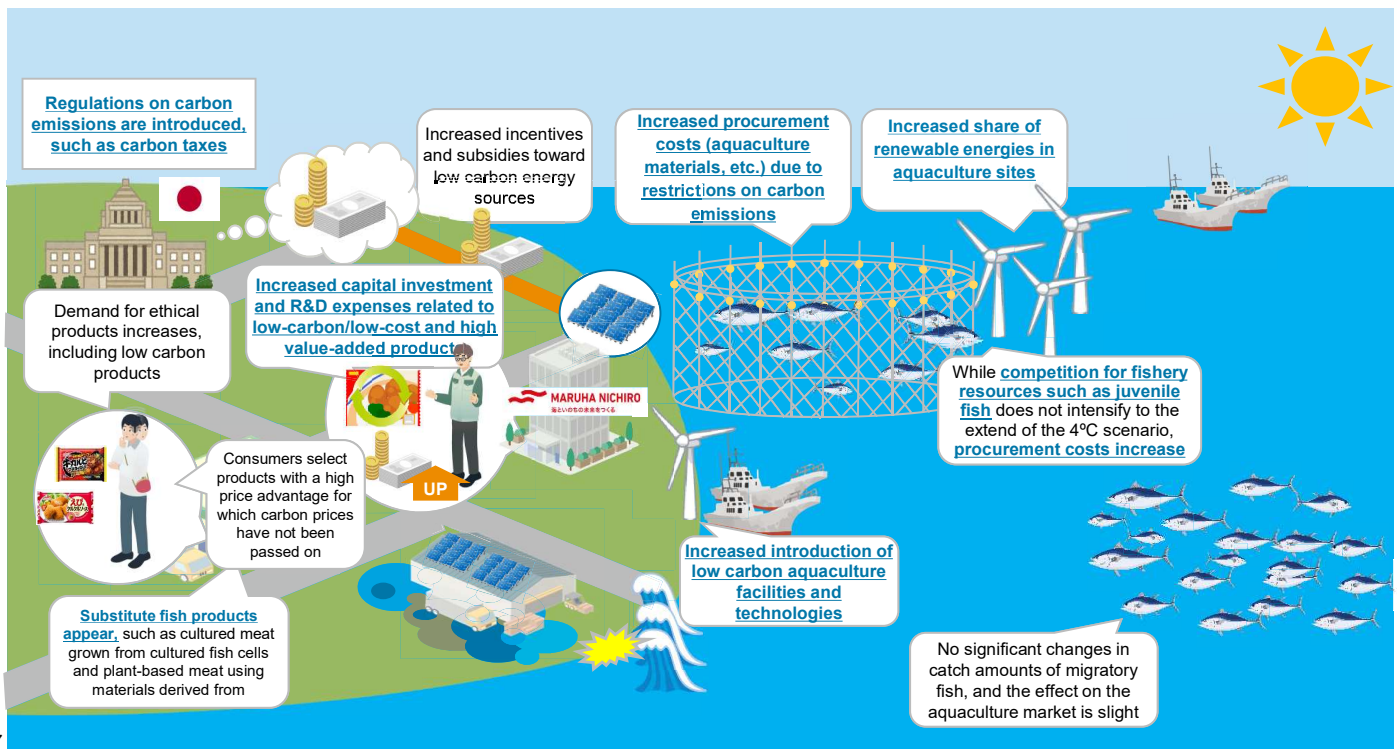
2°C worldview @2050s (Example)



3-146

Identify and define range of scenarios (Identify 2°C 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



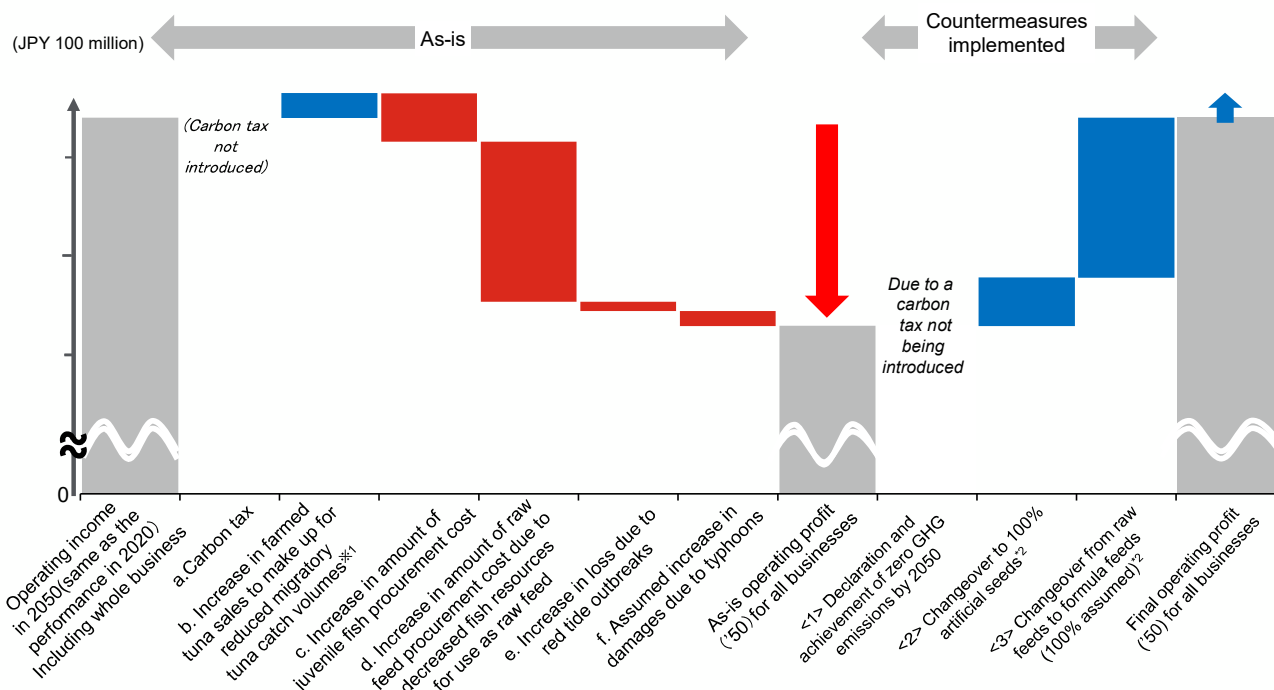
Outline of each risk item's calculation

Unit: 100 million JPY

	Key items (Items with high significance)	Items	Outline of calculation logic	Estimated impact on operating income	
				4°C	2°C (1.5°C only carbon tax)
Transition risk	Carbon price	a. Financial impact of a carbon tax	2050 GHG emissions x carbon tax	—	▲ x x
	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	+ x x	+ x x
		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)	▲ x x	▲ x x
		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	▲ x x	▲ x x
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	▲ x x	▲ x x
	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	▲ x x	▲ x x

3-148

Business impact evaluation : 4°C scenario



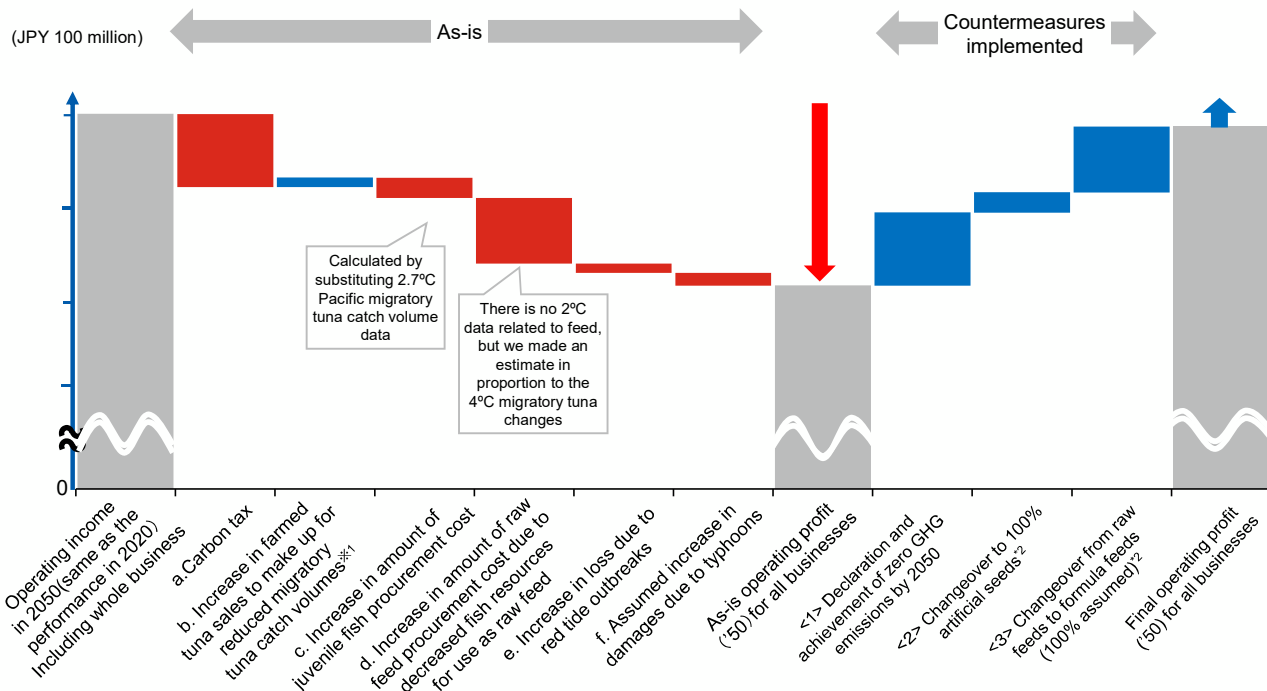
^{*1}Changes in profit due to fluctuations in sales are calculated by multiplying the amount of fluctuations in sales by the operating profit margin

^{*2}R&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 4°C 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

3-149

Business impact evaluation : 2°C scenario



^{*1}Changes in profit due to fluctuations in sales are calculated by multiplying the amount of fluctuations in sales by the operating profit margin

^{*2}R&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 1.5°C – 2°C 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

3-150

Countermeasure definition

Key items (items with high significance)		Major initiatives in progress/to be implemented	Examples of other companies etc.
Transition risk	Carbon price	<ul style="list-style-type: none"> Setting of medium-term targets to reduce CO₂ 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 	<p>Measure<1></p> <ul style="list-style-type: none"> Setting of medium to long-term GHG reduction targets and obtainment of SBT certification Performing of life cycle assessment in aquaculture operations
	Changes in important products/prices	<ul style="list-style-type: none"> 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 Increased production of artificial seeds (egg-to-harvest bluefin tuna, hatched yellowtail, hatched amberjack) = supplementation/replacement of natural seedlings 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Introduction of aquaponics Strengthening of capital participation and procurement capabilities in the fish farming business
	Increasing severity of extreme weather conditions (Typhoons and hurricanes at a larger scale etc.)	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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

3-151

Other Sector


- ✓ Practice Case① : YASKAWA Electric Corporation
(Electronic Equipment)
- ✓ Practice Case② : SCSK Corporation
(Information Technology)
- ✓ Practice Case③ : ASKUL Corporation(Retailing)

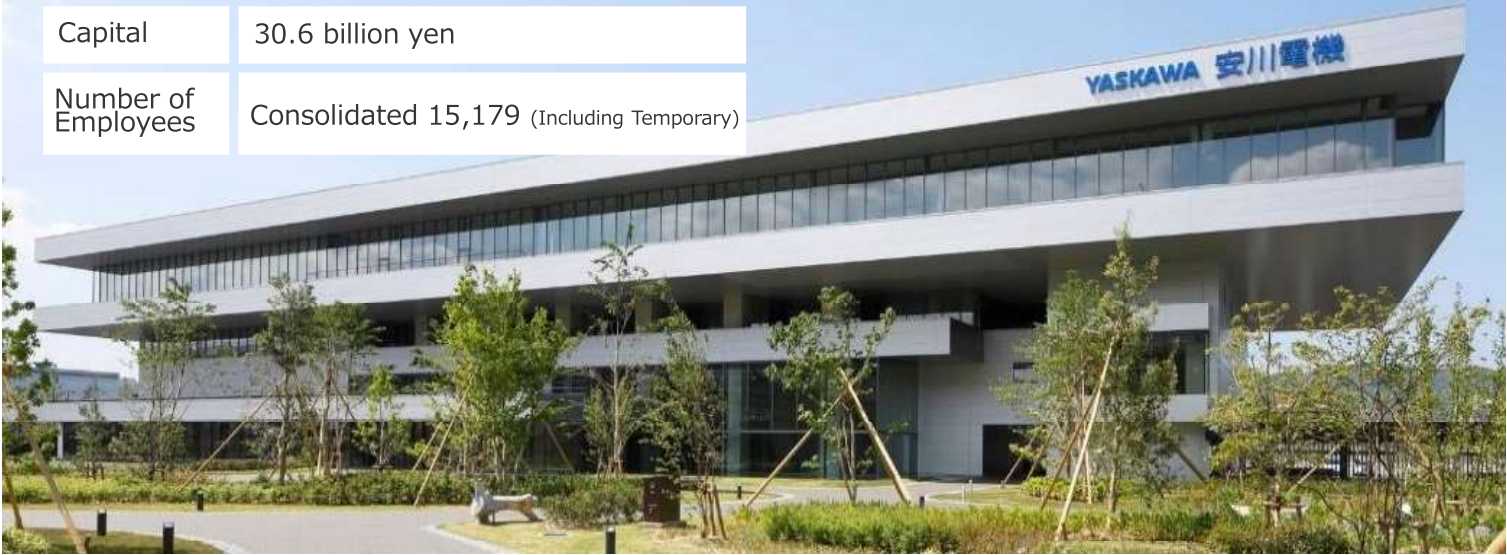
3-152

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

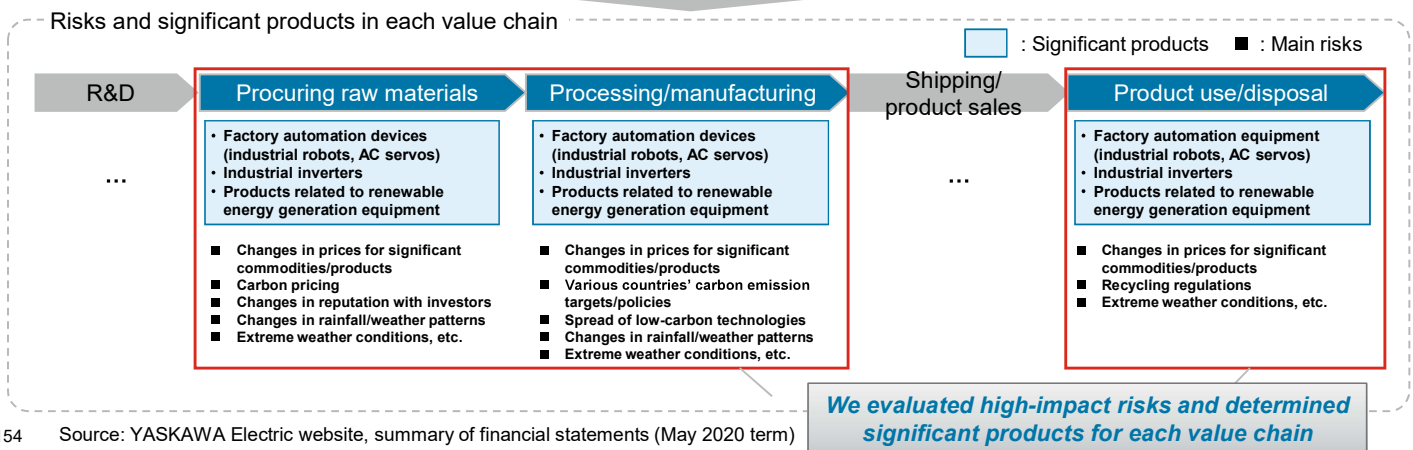
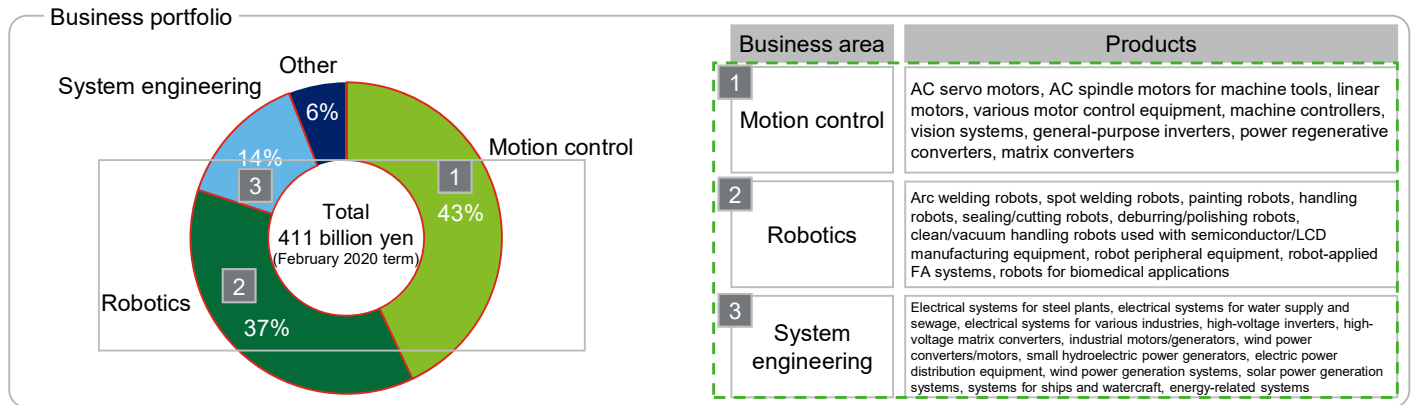


*Consolidated fiscal year from March 1, 2019 to February 29, 2020

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)		



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



3-154 Source: YASKAWA Electric website, summary of financial statements (May 2020 term)

[Risk significance assessment (1/2)]

Step 2 3 4 5 Scenario 4°C 2°C

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

Risks/opportunities related to transition risks

Item	Business impact	
Subcategory	Parameter	Rating
A Carbon pricing	Expenditures, assets	High
B Various countries' carbon emission targets/policies	Revenue, expenditures	High
C Various countries' restrictions on exports	Revenue, expenditures	Low
D Recycling regulations	Revenue, expenditures	Low
E Changes in prices for significant commodities/products	Revenue, expenditures	High
F Spread of low-carbon technologies	Expenditures	Med.
G Changes in investor/customer behavior	Expenditures, assets	Low

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

Risks/opportunities related to physical risks

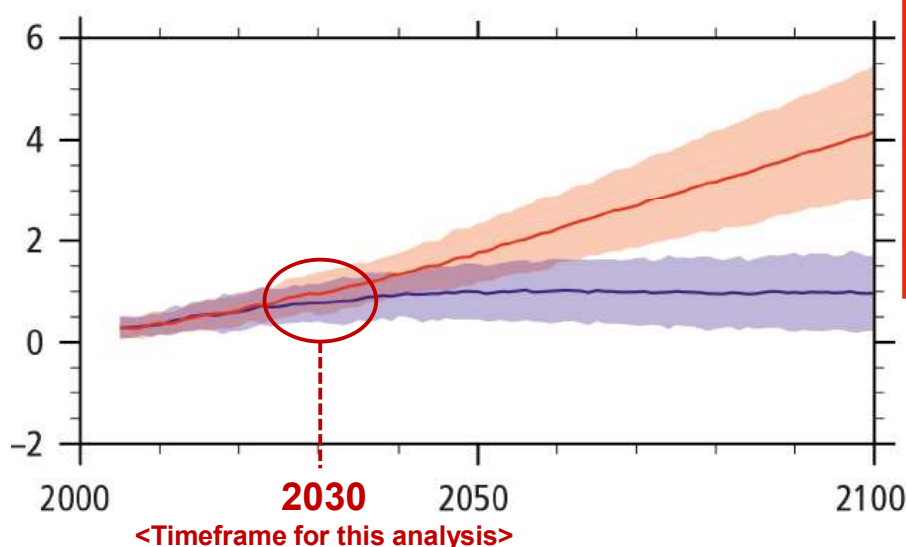
Item	Subcategory	Parameter	Business impact		Rating
			Study (example): risks	Study (example): opportunities	
H	Changes in rainfall/weather patterns	Revenue, expenditures, assets	➤ An increase in lightning strikes creates a risk of power outages and an increased possibility of shutdowns for plant equipment. 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

3-156

[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

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

(Source) AR5 SYR, Table SPM.6

3-157

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

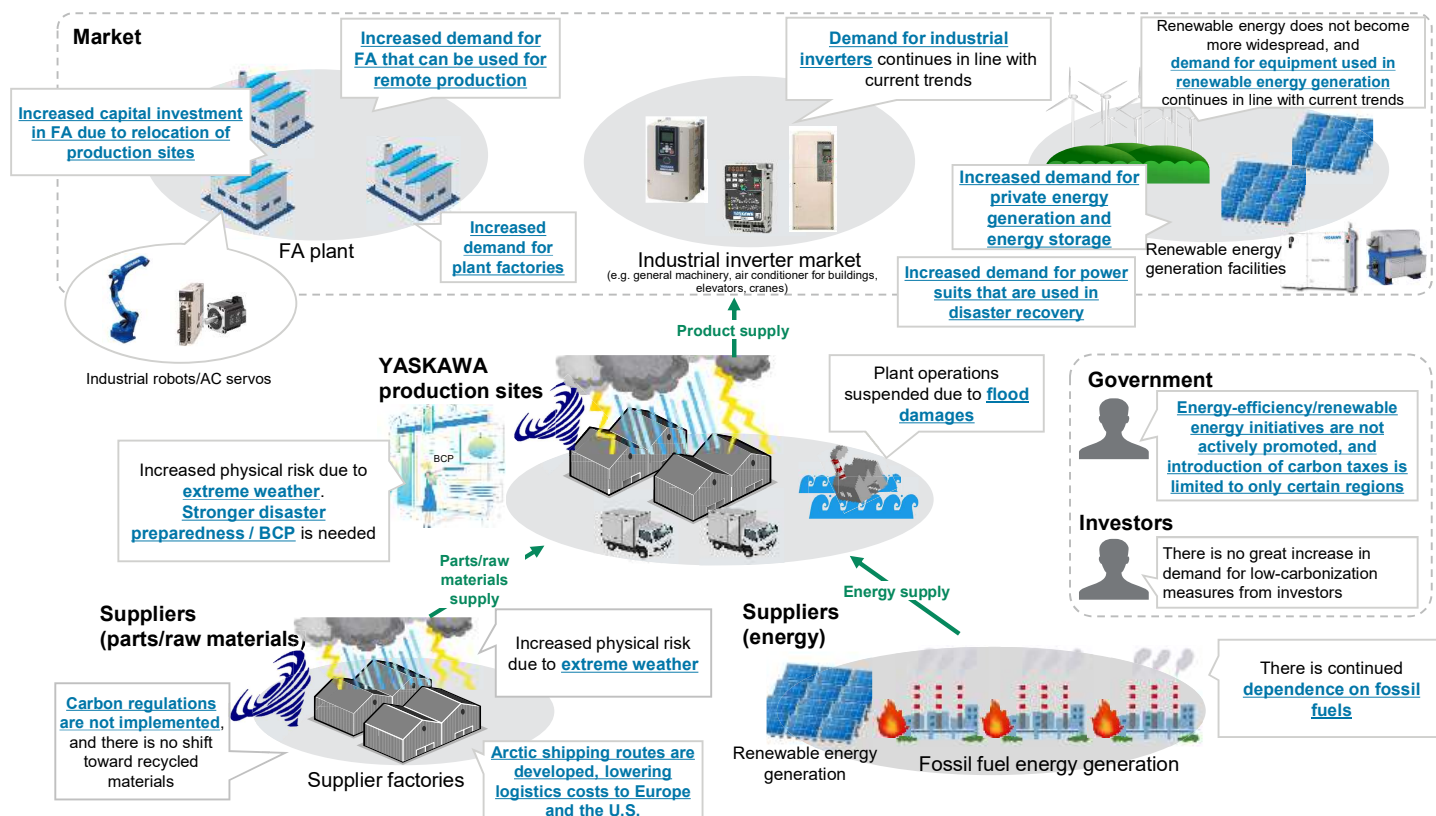
*Exchange rate: 1 USD = 106 JPY (based on the October 1, 2020 rate)

		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 "CO ₂ 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

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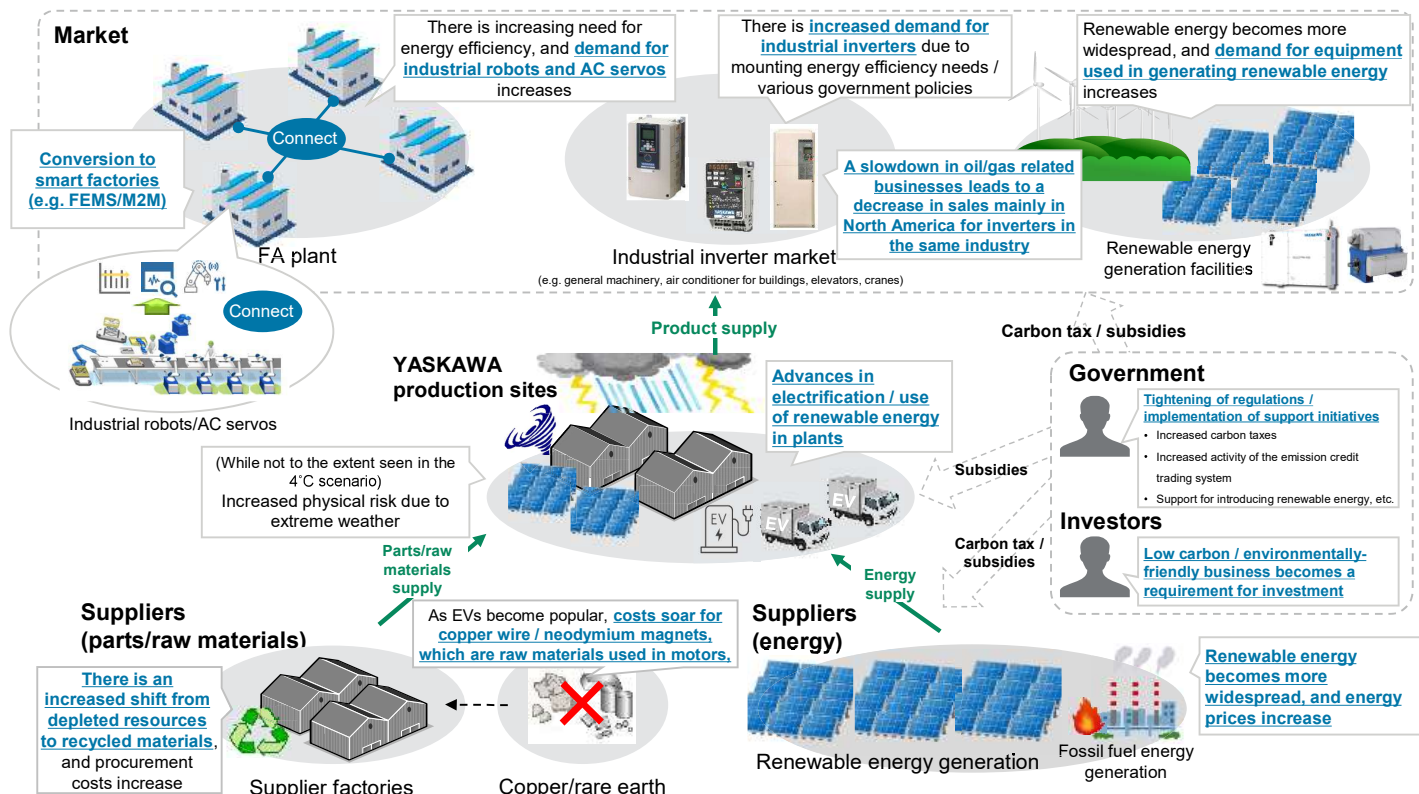
[Visual representation of future society in the 4°C (2.7°C+) scenario]

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



[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



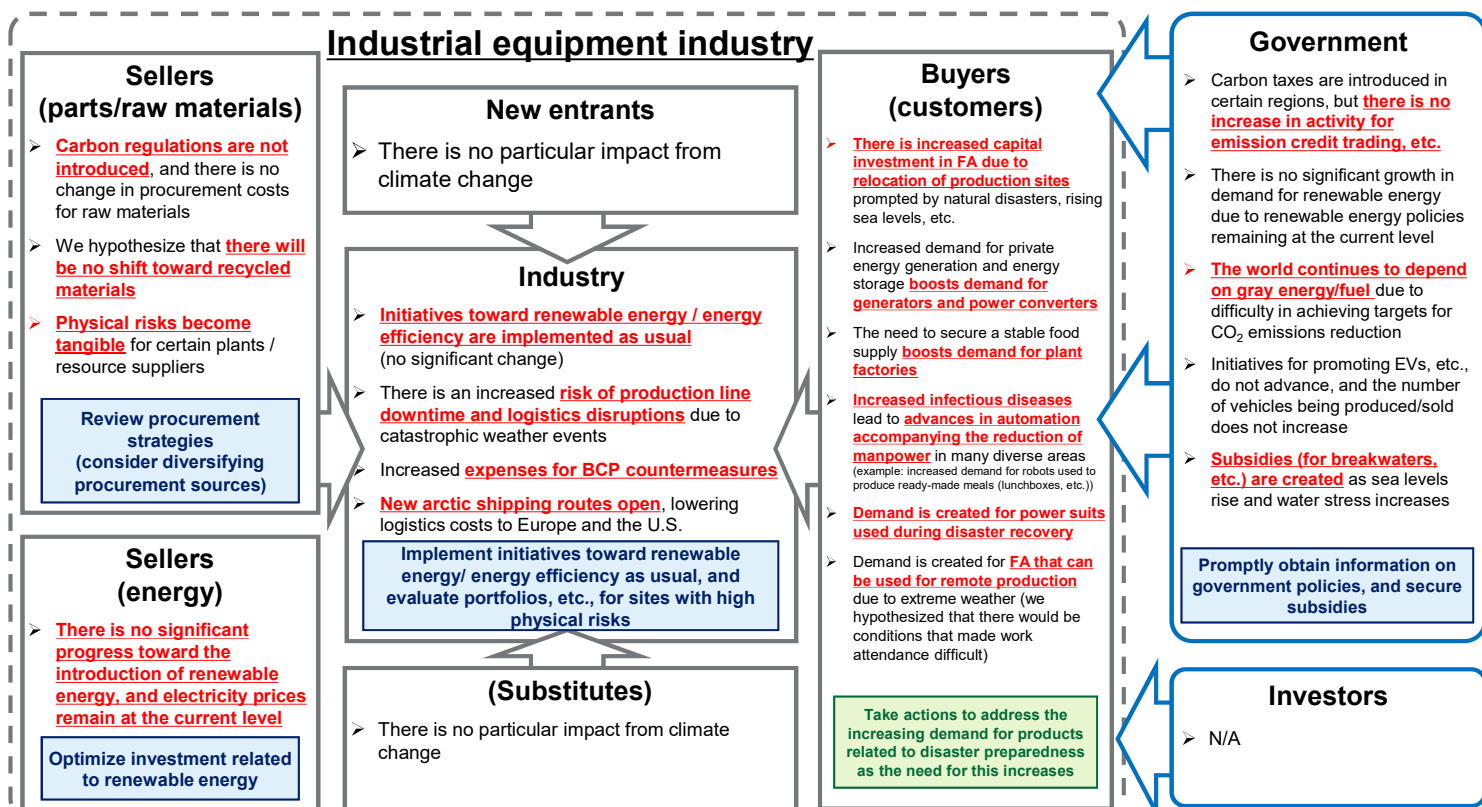
3-160

[Scenario group definition]

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

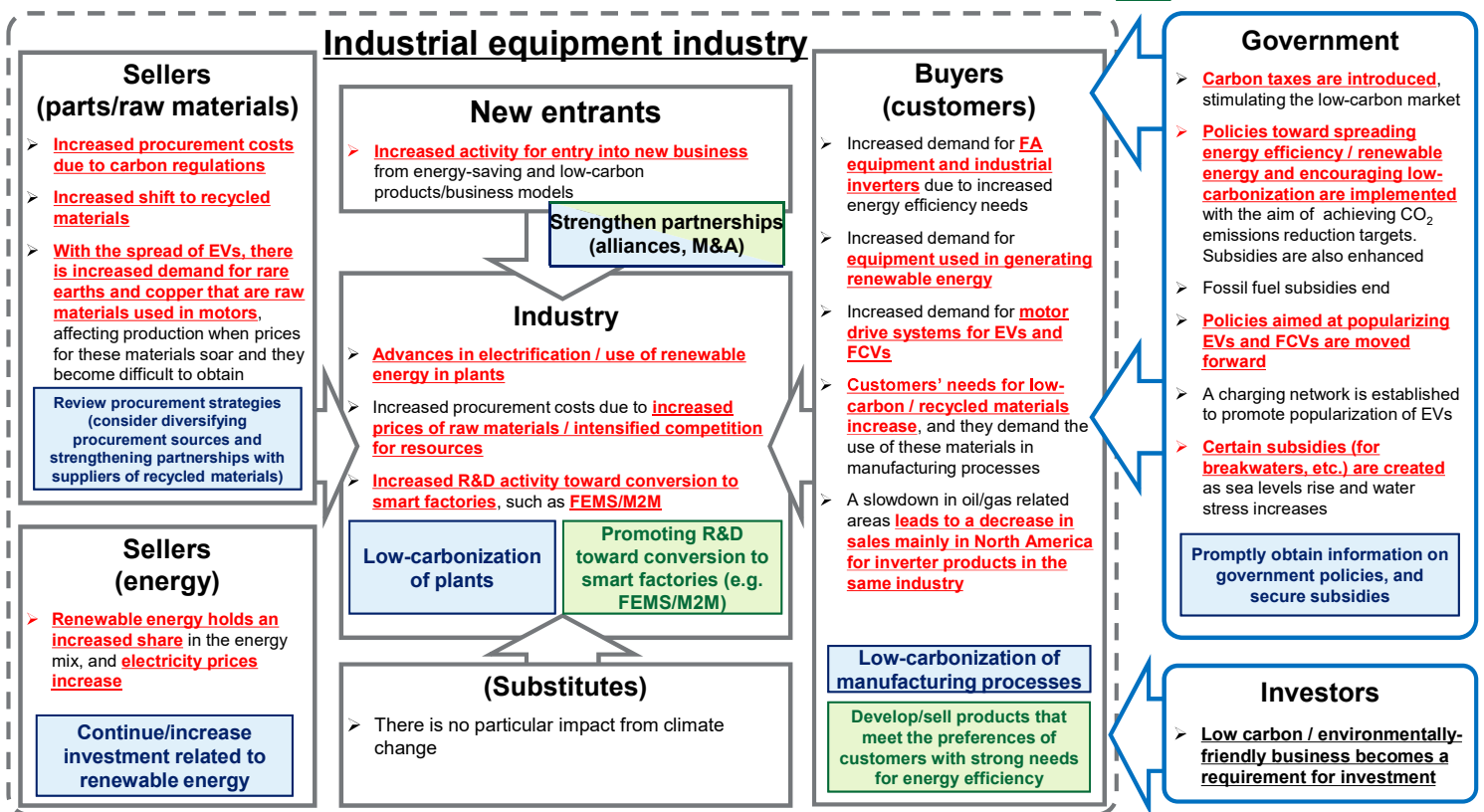


3-161

[Scenario group definition]

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

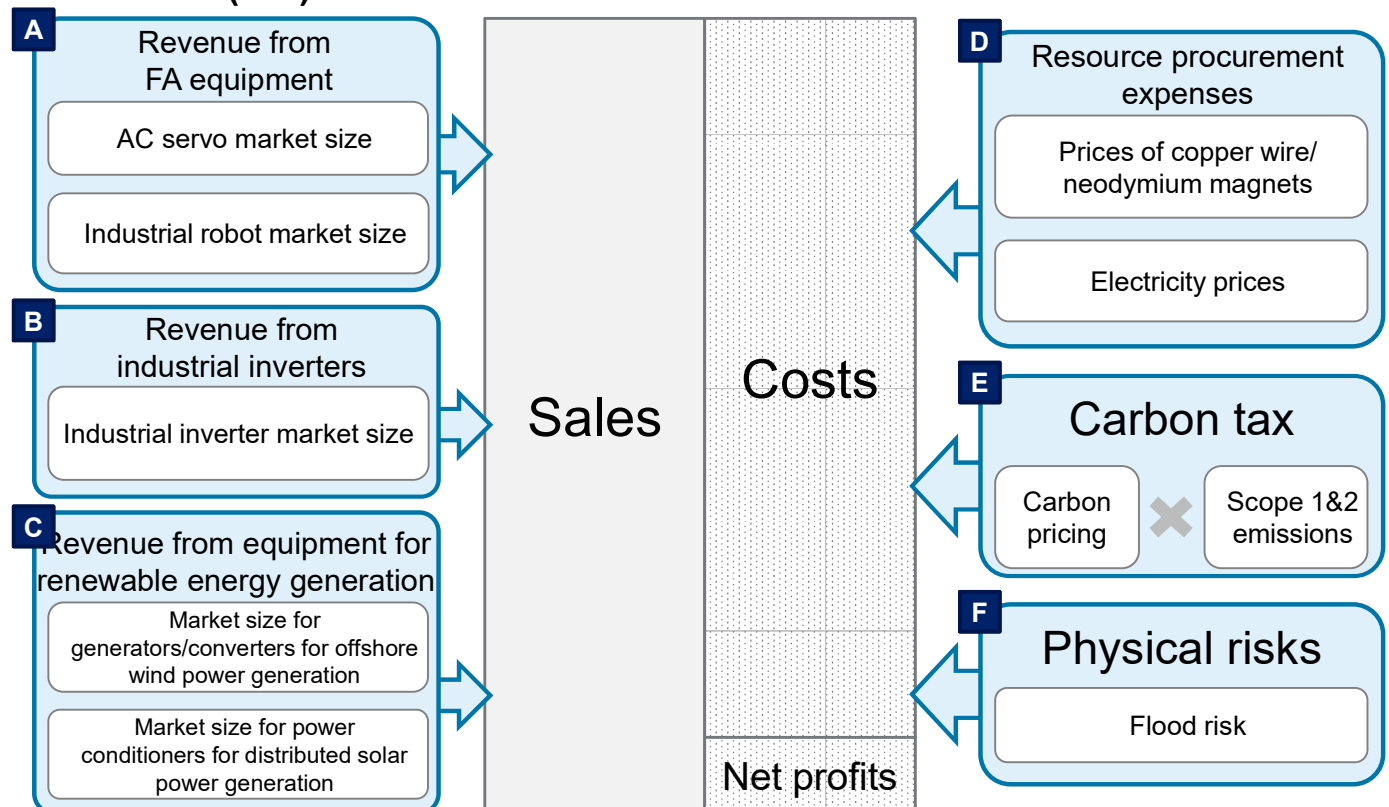
The 2°C worldview in the 2030s (examples)



3-162

[Visual representation for assessing impact on business]

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



3-163

[Results of the climate change scenario analysis]

Impact of climate change on YASKAWA's business	<ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> 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
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[Future TCFD initiatives (suggested)]

TCFD disclosure	<ul style="list-style-type: none"> Conduct an initial disclosure by preparing information on deficiencies and setting long-term CO₂ reduction targets based on the results of this analysis.
Post-disclosure initiatives	<ul style="list-style-type: none"> 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 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



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.

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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㎡**



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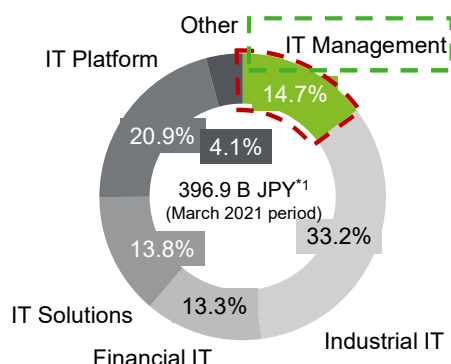
3-167

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%^(*) 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	<u>Increasing green DC sales</u> <u>Increasing resilient DC sales</u>

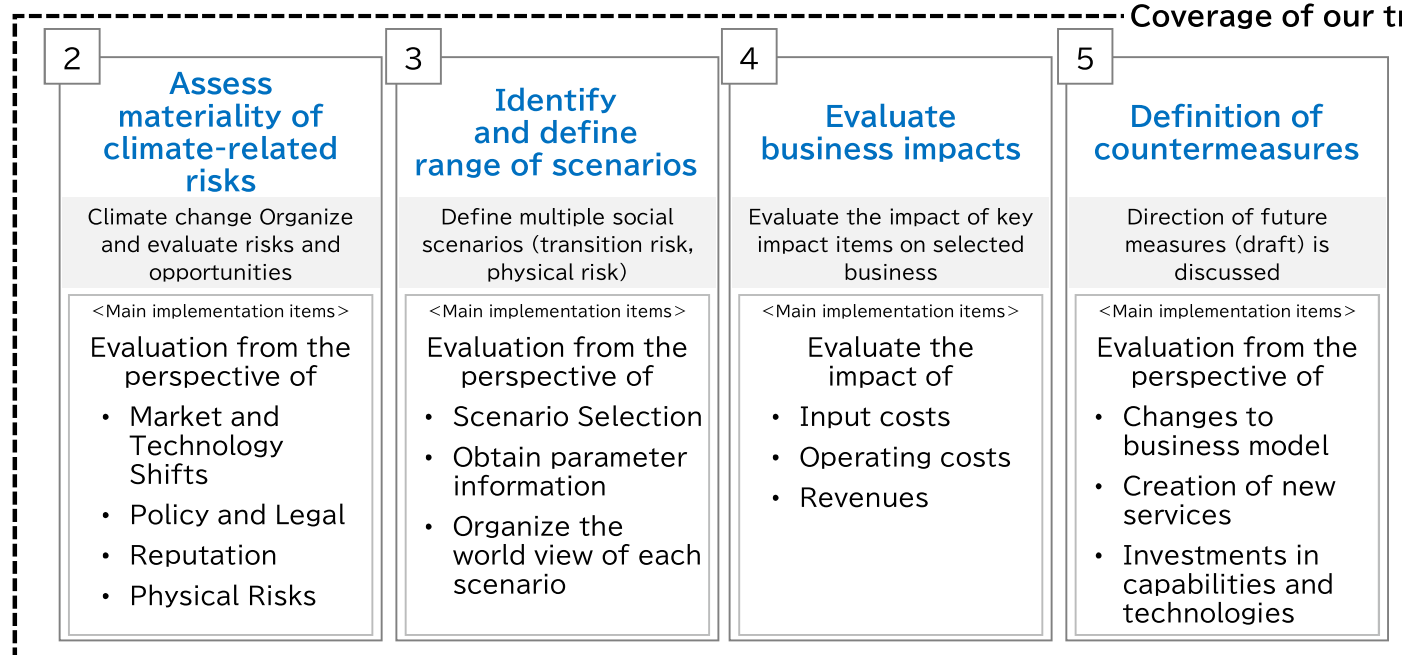
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Steps to implement scenario analysis

- 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



- 6 **Documentation and disclosure**

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Risk significance level evaluation (1)

STEP

2

3

4

5



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

Evaluation Item	Impact	
	Risks	Opportunities
Carbon Price	<ul style="list-style-type: none"> ➢ 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 	<ul style="list-style-type: none"> ➢ 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	<ul style="list-style-type: none"> ➢ Costs increase for measures such as renewable energy/energy-efficient facilities and purchasing green electricity 	<ul style="list-style-type: none"> ➢ 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	<ul style="list-style-type: none"> ➢ Costs increase for responses in SCSK's facilities to address tightening energy efficiency regulations 	<ul style="list-style-type: none"> ➢ SCSK can build a competitive advantage by acting preemptively to introduce standards and rules for decarbonization leveraging new technologies
Changes in important products	<ul style="list-style-type: none"> ➢ 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 	<ul style="list-style-type: none"> ➢ Demand for processing/storing large amounts of data increases due to increased communication volume from the spread of SmartX^(*) ➢ Demand emerges for peripheral services for utilizing big data stored in DCs
Introduction of next-generation technology	<ul style="list-style-type: none"> ➢ Costs increase due to the introduction of new decarbonization technologies 	<ul style="list-style-type: none"> ➢ 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"

3-170 *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.

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Risk significance level evaluation (2)

STEP

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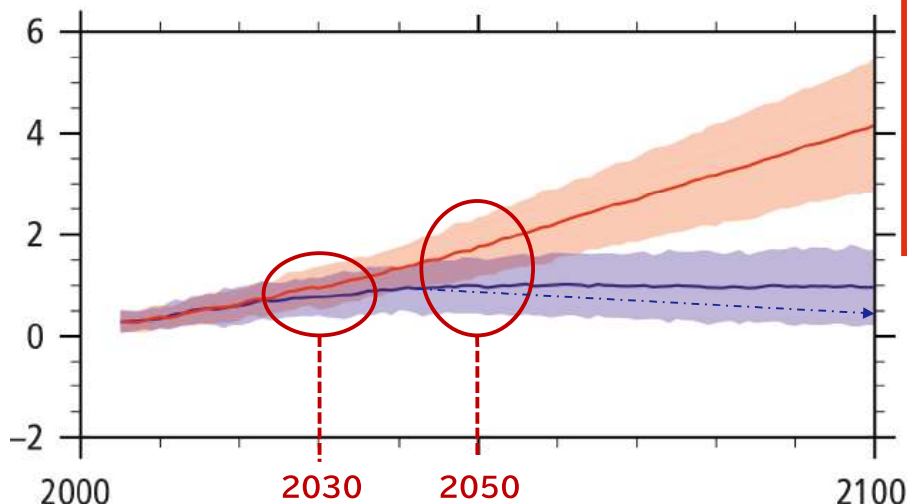


Evaluation Items	Impact	
	Risks	Opportunities
Changes in customer awareness	<ul style="list-style-type: none"> ➢ Sales decline as customers become more environmentally aware and avoid using DCs with poor environmental performance 	<ul style="list-style-type: none"> ➢ Demand for decarbonized DCs increases 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	<ul style="list-style-type: none"> ➢ ESG investment ratings may drop and stock prices may fall if SCSK's information disclosure measures are inadequate 	<ul style="list-style-type: none"> ➢ Corporate value improves by utilizing/issuing green bonds ➢ Reputation with investors improves through business that contributes to the environment
Increase in average temperature	<ul style="list-style-type: none"> ➢ Air conditioning costs and electricity consumption for air conditioning increase 	<ul style="list-style-type: none"> ➢ Demand increases for ICT services that contribute to more efficient energy consumption
Changes in rainfall and weather patterns	<ul style="list-style-type: none"> ➢ Costs increase for addressing changes in building performance requirements 	<ul style="list-style-type: none"> ➢ 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	<ul style="list-style-type: none"> ➢ There is new costs for flood control measures and relocation costs incurred by DCs located close to rivers 	-
Increasing severity of extreme weather conditions	<ul style="list-style-type: none"> ➢ 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. 	<ul style="list-style-type: none"> ➢ 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

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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°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

1.5°C scenario :

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

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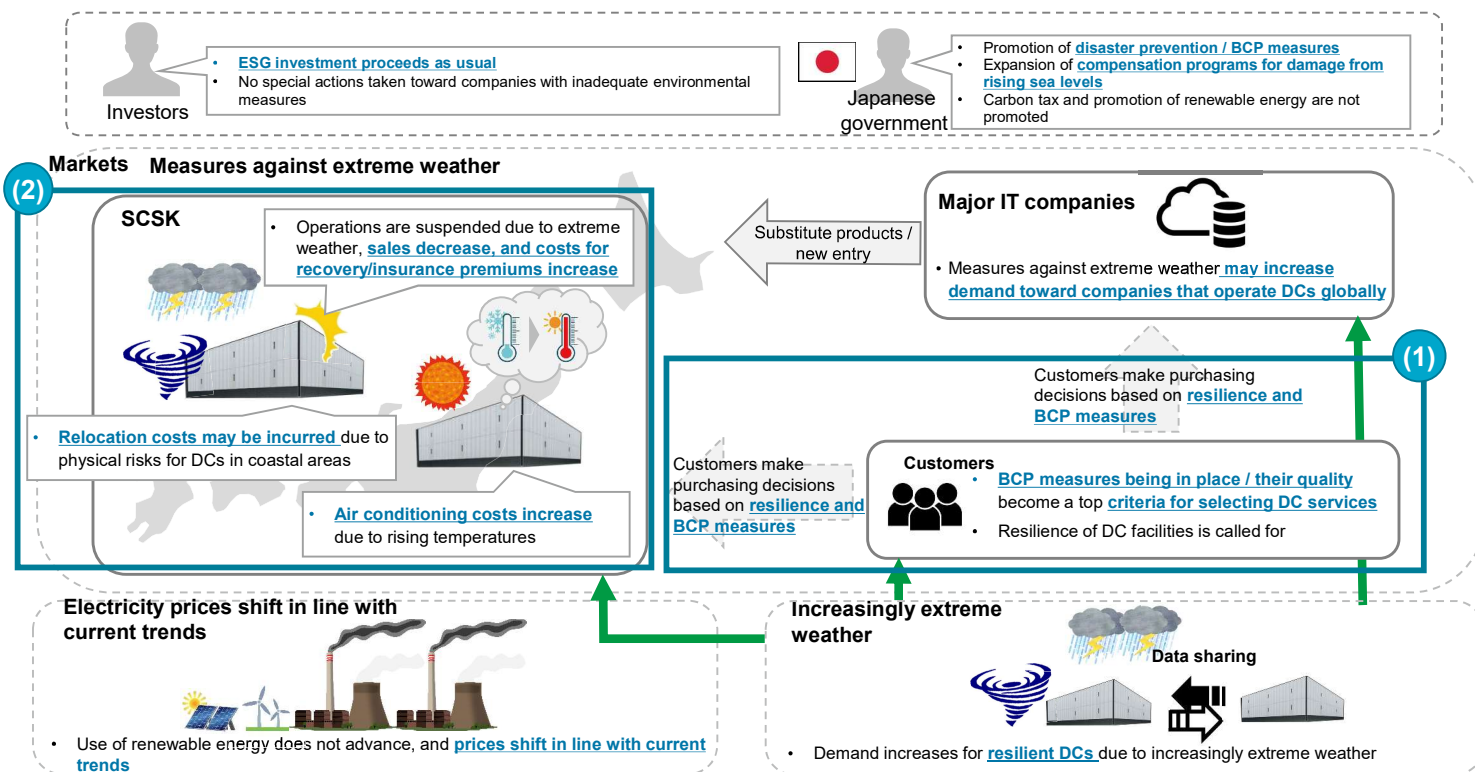
4°C World

Definition of scenario groups

4

SCSK

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”)



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Definition of scenario groups

STEP

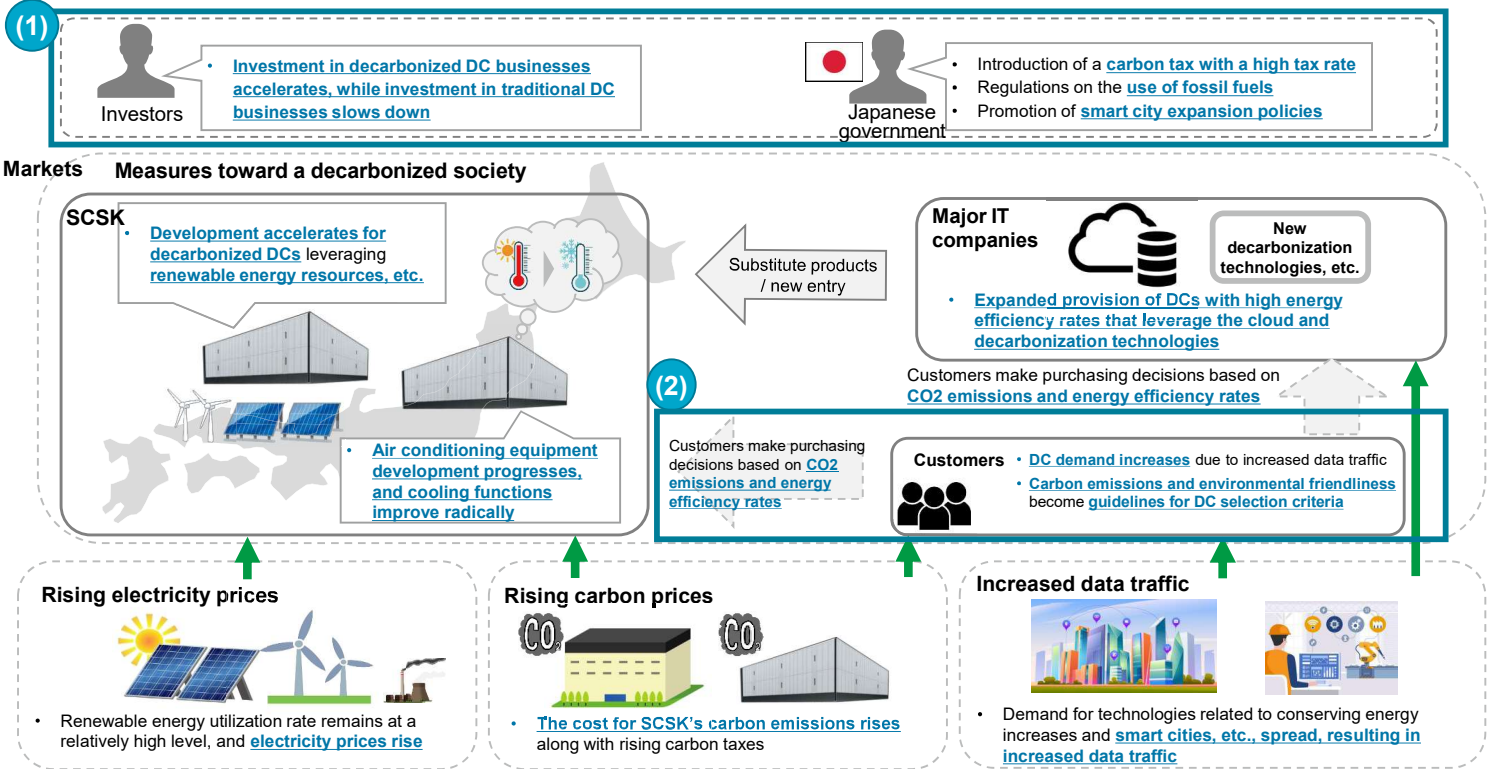
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1.5°C world: There is transformative promotion of climate change policies and other measures based on global consensus (“(1)” in the diagram below); meanwhile, environmental performance becomes a top criteria for customers in selecting services, as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



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Business impact evaluation
(Impact items and relevant scenario)

STEP

2

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5

4°C scenario Resilient 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

Worldview / Customer trends**1.5°C scenario Sustainable business model**

- 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

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Business impact evaluation

(Impact level evaluation for each scenario)

STEP 2 3 4 5



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 ^(*)	
				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 ^(*)	
				As of 2030	As of 2050
		Sales	Increased demand for decarbonized DCs and new services that take changes in the social environment into account ^(*)	++	+++
			Increased demand for DCs due to larger data traffic / data processing volume	+	+
		Expenses	Fluctuation in electricity prices	—	--
			Higher carbon taxes ^(*)	(--)	(---)

*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

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Definition of countermeasures

STEP 2 3 4 5



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
4°C scenario Resilient business model	New service creation	Establishment of resilient DCs	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Procurement of electricity generated at low cost using midnight power services and new technologies
		Curbing of electricity use	<ul style="list-style-type: none"> Control of air conditioning using the IoT or AI, etc., or new technologies
	New service creation	Efficient use of DC waste heat	<ul style="list-style-type: none"> Urban development that utilizes DC waste heat / deployment to other business areas
1.5°C scenario Sustainable business model	Conversion to renewable energy	Adoption of renewable energy	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Create new services that take changes in legal systems and the social environment into account

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Other Sector

✓ Practice Case① : YASKAWA Electric Corporation
(Electronic Equipment)

✓ Practice Case② : SCSK Corporation
(Information Technology)

✓ Practice Case③ : ASKUL Corporation(Retailing)

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[Step 2: Risk significance assessment]

Step 2 3 4 5 Scenario 4°C 2°C

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	<ul style="list-style-type: none"> ➤ The application of carbon pricing will increase costs such as operating costs for logistics facilities/offices and costs of fuel used in deliveries 	<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ 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 	<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ 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 	<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ Costs increase due to the introduction of environmentally friendly vehicles and high-efficiency low carbon technologies/equipment 	<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ There is an increased risk to ASKUL's reputation if it fails to respond appropriately to the growing public awareness of climate change 	<ul style="list-style-type: none"> ➤ 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	<ul style="list-style-type: none"> ➤ If investors perceive ASKUL as being reluctant to take environmental action, it will be more difficult to procure funds, and financing costs will increase 	<ul style="list-style-type: none"> ➤ 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

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[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

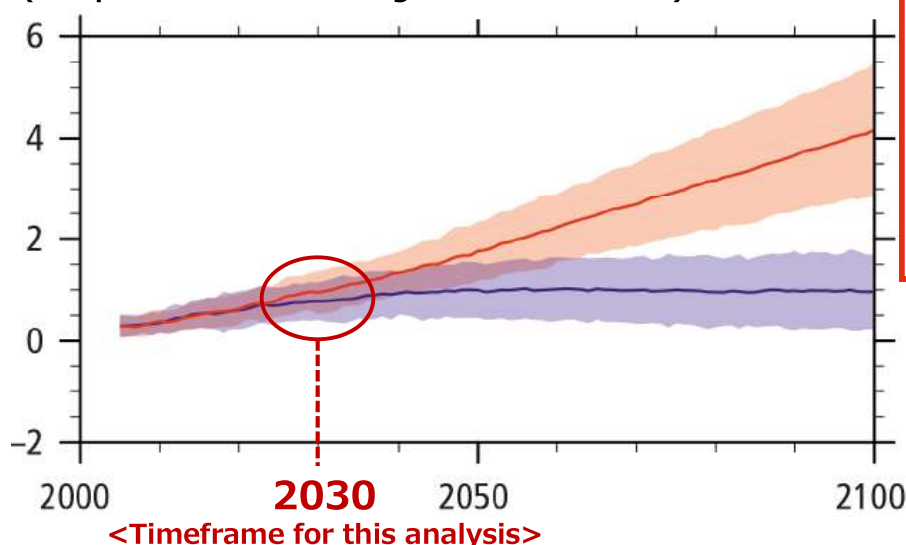
Risk	Business impact			Rating
Subcategory	Parameter	Study: risks	Study: opportunities	
Increased average temperatures	Revenue Expenditures Capital	<ul style="list-style-type: none"> Increased costs for energy needed for air conditioning/refrigeration in logistics facilities and delivery vehicles The 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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

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[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)



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

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

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

(Source) AR5 SYR: Table SPM.6

[Step 3: Scenario group definition]

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

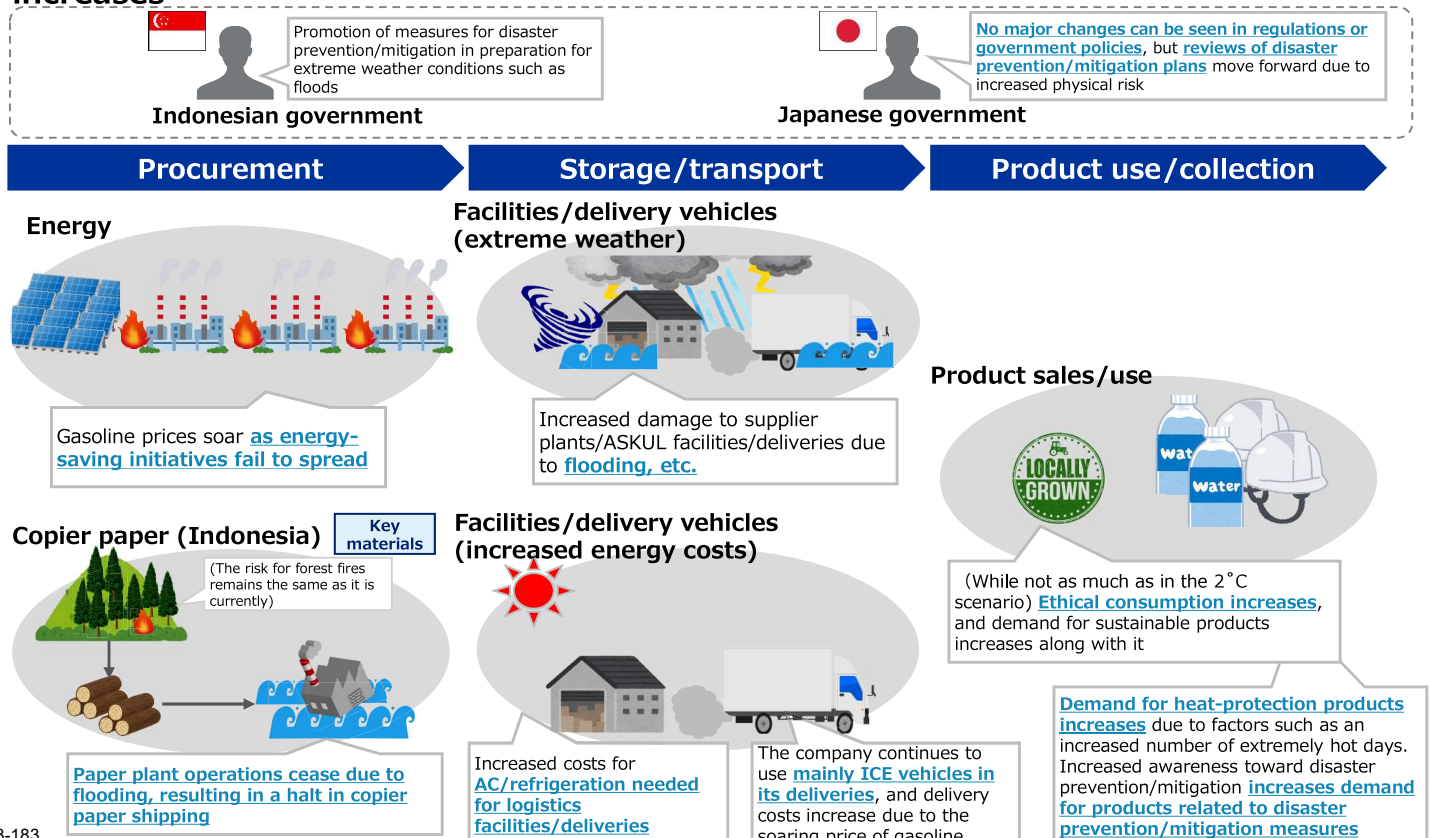
*Exchange rate: 1 USD = 106 JPY (based on the late September 2020 rate)

Key items	Assumed parameters	Currently	2030		Source
			4 °C	2 °C	
Carbon pricing	Carbon tax	(Not implemented)	—	100 USD/tCO ₂	• 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"
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"
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"

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

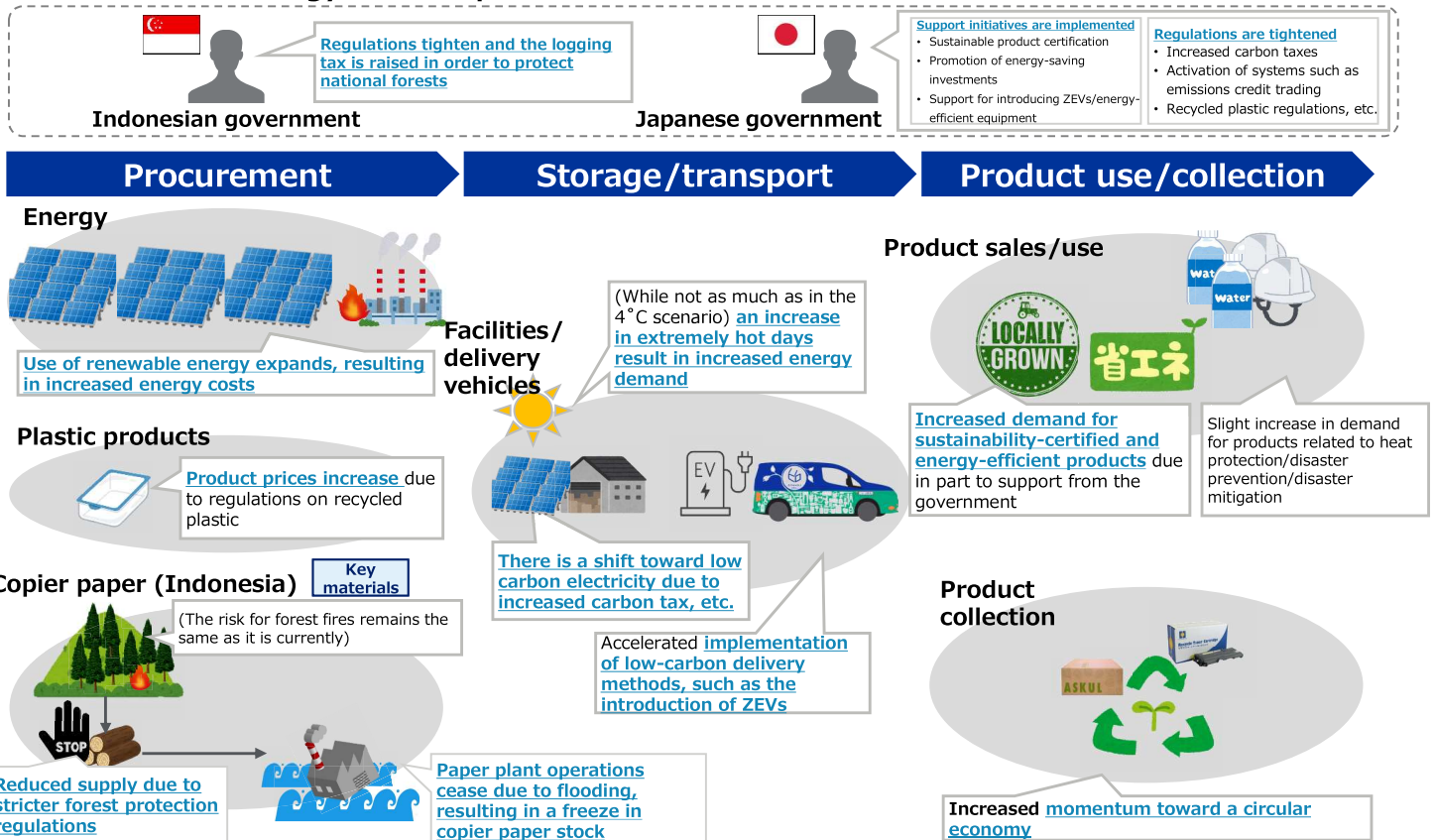
The 4 °C (2.7 °C+) world: Government policies do not move forward, and physical risk increases



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

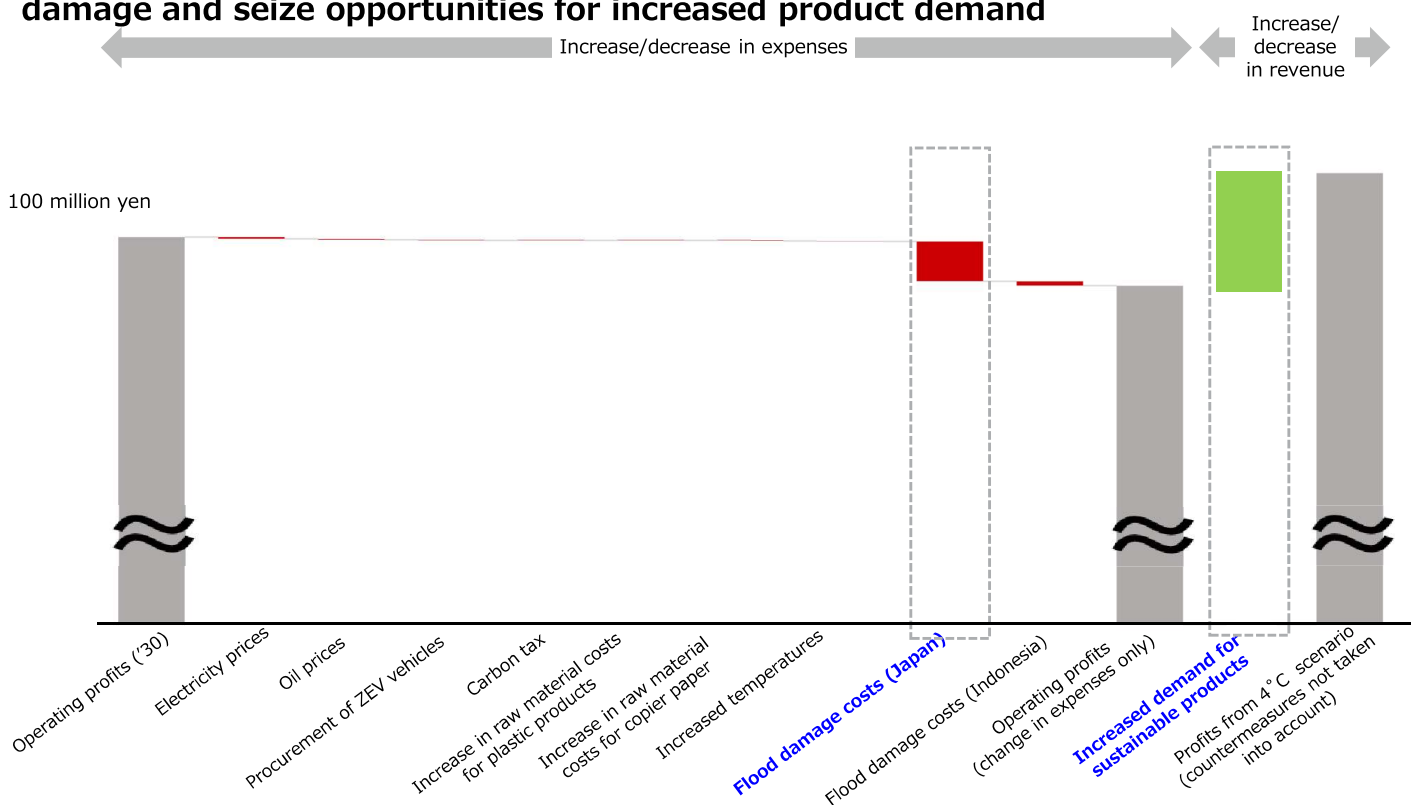
The 2°C world: Low-carbon initiatives move forward, and there is increased demand for sustainable and energy-efficient products



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[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

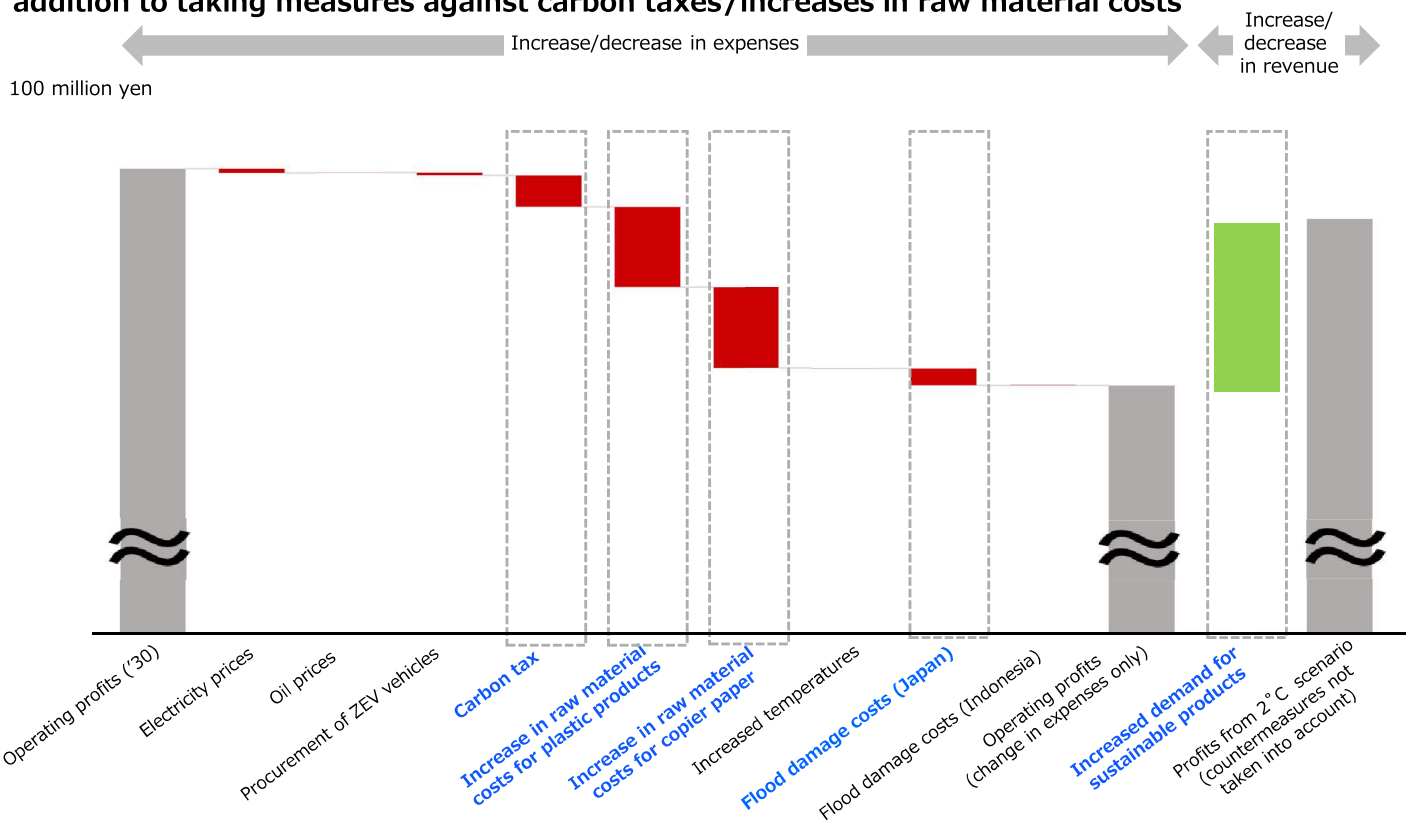


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[Step 4: Business impact evaluation]

Step 2 3 **4** 5 Scenario 4°C **2°C**

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



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[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	✓

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[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	✓ Respond to increased demand for products corresponding with increasing temperatures and increasing disaster awareness	Adapted	Medium-term management plan	✓
Extreme weather conditions (flooding)				

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[Disclosure process]

We expect to make a disclosure of ASKUL's scenario analysis using the following three processes below :

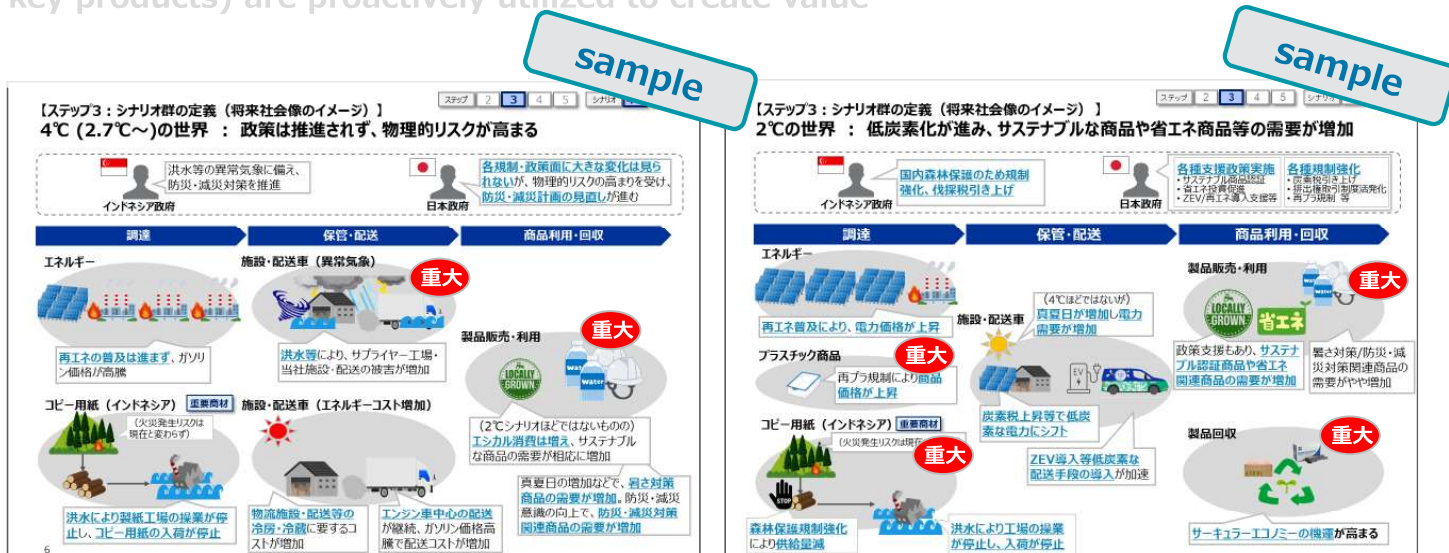
1. Identify the substantial risks for each scenario
2. Clearly state that the efforts concerning countermeasures have been initiated in conjunction with medium- to long-term strategies
3. Provide specific examples of how opportunities (particularly those for high-impact key products) are proactively utilized to create value

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[Disclosure process]

We expect to make a disclosure of ASKUL's scenario analysis using the following three processes:

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

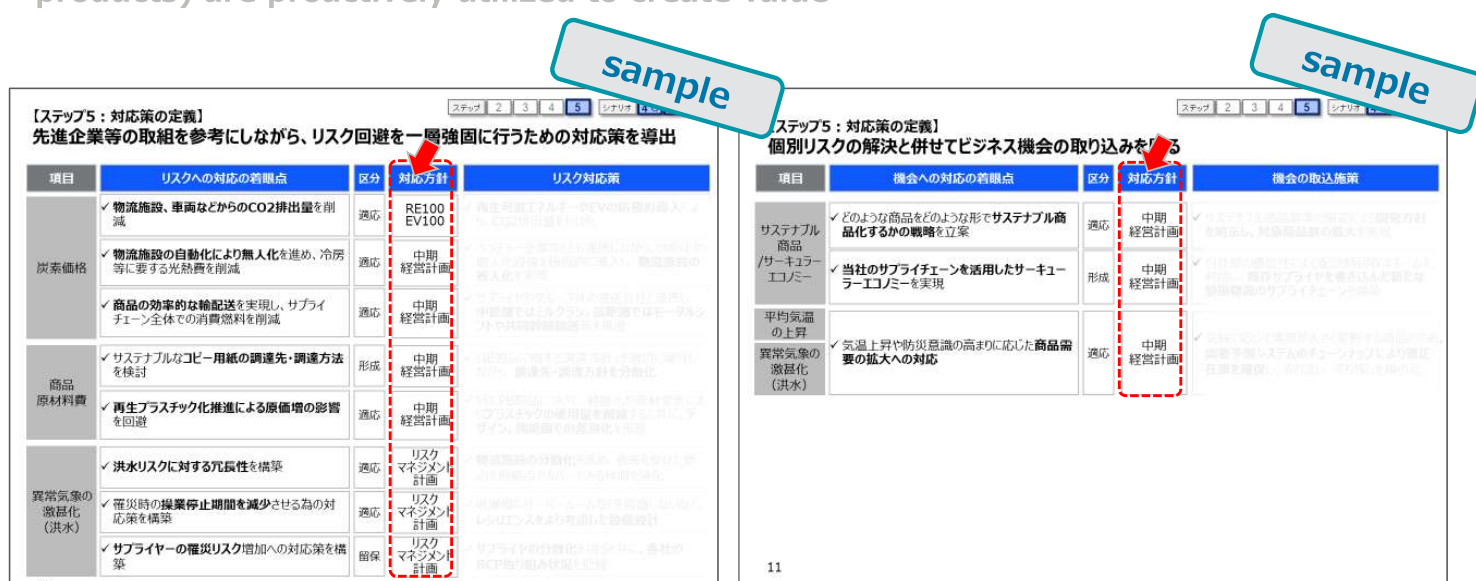


3-190

[Disclosure process]

We expect to make a disclosure of ASKUL's scenario analysis using the following three processes:

1. Identify the substantial risks for each scenario
2. Clearly state that 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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[Disclosure process]

We expect to make a disclosure of ASKUL's scenario analysis using the following three processes:

1. Identify the substantial risks for each scenario
2. Clearly state that 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

